Oracle® Fusion Middleware

Administrator's Guide for Oracle Adaptive Access Manager

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Oracle Fusion Middleware Administrator's Guide for Oracle Adaptive Access Manager, 11*g* Release 2 (11.1.2.0)

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Preface

The *Oracle Fusion Middleware Administrator's Guide for Oracle Adaptive Access Manager* provides in-depth information on administering and using Oracle Adaptive Access Manager's set of tools for fraud monitoring and detection.

Audience

This document is intended for the following users:

Users	Description
Investigators and Support Personnel	Investigators (Fraud Investigators and Fraud Investigation Managers) and support personnel (CSR and CSR Managers) use Oracle Adaptive Access Manager's case management tools to handle security and customer cases day-to-day. They have detailed knowledge about user activity and security issues. Security Administrators work with Investigators and support personnel to identify if policies need to be adjusted or new policies need to be created.
Security Administrators	Security Administrators (Rule Administrators) gather intelligence from various sources to identify needs and develop requirements to address them. Some sources for intelligence include Investigators, industry reports, antifraud networks, compliance mandates, and company polices. Security Administrators plan, configure and deploy policies based on the requirements from analysts.
System Administrator	System Administrators configure environment-level properties and transactions.

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Related Documents

For more information, see the following documents in the Oracle Fusion Middleware 11*g* Release 2 (11.1.2) documentation set:

- *Oracle Fusion Middleware Java API Reference for Oracle Adaptive Access Manager*
- *Oracle Fusion Middleware Installation Planning Guide for Oracle Identity and Acess Management*
- *Oracle Fusion Middleware Installation Guide for Oracle Identity and Access Management*
- *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*
- *Oracle Fusion Middleware Administrator's Guide for Oracle Access Management*
- *Oracle Fusion Middleware Administrator's Guide*
- *Oracle Fusion Middleware Performance and Tuning Guide*
- *Oracle Fusion Middleware Integration Guide for Oracle Identity Management Suite*
- *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*
- *Oracle Fusion Middleware High Availability Guide*
- *Oracle Fusion Middleware Upgrade and Migration Guide for Oracle Identity and Access Management*
- *Oracle Fusion Middleware Application Security Guide*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

What's New in Oracle Adaptive Access Manager 11.1.2?

This chapter introduces the new and changed administrative features of Oracle Adaptive Access Manager 11.1.2. It contains these topics:

New Features for Oracle Adaptive Access Manager 11.1.2.0

Oracle Adaptive Access Manager 11.1.2.0 includes many important features and enhancements that were not available with Oracle Adaptive Access Manager 10*g*. The following is a list of the new features and enhancements:

Areas	Features and Enhancements
Enhanced mobile security	Enhanced mobile security includes: ■ Better mobile browser UX ■ Mobile tuned security policies ■ REST services and SDK for mobile application developers ■ Hardened mobile device fingerprinting ■ Lost and stolen mobile device security
Transactional autolearning	New transactional autolearning includes: ■ Customizable patterning ■ Transaction rule conditions

Areas	Features and Enhancements
Investigation tools	New investigation tools have been added to make investigations quicker and easier: ■ Improved case management ■ Utility panel quick search ■ Utility panel notes pane ■ Search transactions ■ Additional search filters for transaction and entity data, alert messages, geographic location, and IP addresses range ■ Transaction details ■ Compare transactions ■ Streamlined white/black listing ■ Multitenant access controls for customer service representative interface to allow protection of multiple application tenants with a single instance of OAAM ■ "Add to Group" feature in search sessions and details pages that enables entities to be added to groups easily
Entity enhancements	Enhanced entities includes: ■ Linked entities ■ Entity CRUD operations ■ Targeted purging
Access monitoring toolkit	The Access monitoring toolkit includes: ■ JMSQ interface ■ Database view generation

Feature Comparison Chart - Oracle Adaptive Access Manager 11.1.2.0 vs. Oracle Adaptive Access Manager 11.1.1.3.0

Features	10.1.4.5	11.1.1.3.0	11.1.2
Real-time and offline rules engine	X	X	X
Virtual authentication devices	X	X	X
Knowledge-based authentication	X	X	X
Adaptive device identification*	X	X	X
Base security policies (ongoing updates)	X	X	X
Real-time dashboard (improved)	X	X	X
Customer service module	X	X	X
Real-time access to activity data	X	X	X

Features	10.1.4.5	11.1.1.3.0	11.1.2
Actions, alerts, and risk scoring	X	X	X
Rule conditions	X	X	X
Optimized log data management	X	X	X
Enhanced caching of rules data object	X	X	X
Expanded integration APIs	X	X	X
Investigation agent workflow	X		
Rules authoring user interface	X	X	X
Transaction definition and mapping user interface	X	X	X
Data entity definition and mapping user interface	X	X	X
Behavior pattern configuration interface	X	X	X
Configurable actions	X	X	X
Server-generated one-time password	X (Native only)	X (All deployment types)	X (All deployment types)
Customizable reporting BI Publisher (bundled)	X	X	X
Tree-based navigation and policy browse		X	X
Tabular multitasking user interface		X	X
Customizable search screens		X	X
Common audit framework		X	X
Better mobile browser UX			X
Mobile tuned security policies			X
REST services and SDK for mobile application developers			X
Lost and stolen mobile device security			X
Customizable patterning			X
Transaction rule conditions			X
Improved case management			X
Utility panel quick search			X
Utility panel notes pane			X
Search transactions			X
Transaction details			X
Compare transactions			X
Streamlined white/black listing			X
Linked entities			X
Entity CRUD operations			X
Targeted purging			X
JMSQ interface			X
Database view generation			X
Integrated Oracle Identity Manager password management flows		X	X
Oracle Installer and Repository Creation Utility		X	X

Features	10.1.4.5	11.1.1.3.0	11.1.2
Oracle Patch		X	X
Oracle Adaptive Access Manager Offline User Interface	X	X	X
Document Models	X		
Globalization	X	X	X

Integrations	10.1.4.5	11.1.1.3.0	11g (11.1.2)
Oracle Access Management Access Manager integration	X	X	X
Oracle Identity Manager integration		X	X
Juniper SSL VPN integration			X

Concepts and Terminology Changes for Oracle Adaptive Access Manager 11*g*

Customers migrating from Oracle Adaptive Access Manager 10*g* to 11*g* will notice a few key conceptual and terminology changes. These changes are intended to align terminology used across the Identity Management suite products and simplify administration. Full definitions of these and many other terms can be found in the glossary.

General Term Changes

10*g* Term	11*g* Term
runtime	checkpoint A checkpoint is a specified point in a session when Adaptive Access Manager collects and evaluates security data using the rules engine.
model	policy Policies contain security rules and configurations used to evaluate the level of risk at each checkpoint.
manual override	trigger combination Trigger combinations are additional results and policy evaluation that are generated if a specific sequence of rules trigger.
Application ID	Organization ID From the administration perspective, each application or primary user group is translated into an "Organization ID." The term, "Application ID" has been renamed as "Organization ID," which represents the primary user group of a particular user. For the OAAM Server side, the term "Application ID" remains the same as before. When communicating with proxies, OAAM Server passes the Applications ID, which uniquely identifies an application.

Concept Changes

Concepts changes are listed in the following table.

10*g* Concept	11*g*R1 Concept
OAAM Adaptive Risk Manager	The rules engine is now part of OAAM Server. The Administration Console is now a separate application named OAAM Admin.

10*g* Concept	11*g*R1 Concept
OAAM Adaptive Strong Authenticator	The end-user flows including the virtual authentication devices, Knowledge-Based Authentication and One-Time Password authentication are now contained in OAAM Server.
rule template	The concept has been removed from product
policy type	The concept has been removed from the product

Web Applications

Oracle Adaptive Access Manager's deployed applications in 11*g* are:

- OAAM Server - Adaptive Risk Manager, Adaptive Strong Authenticator, Web services, LDAP integration and user Web application used in all deployment types except native integration
- OAAM Admin - Administration Web application for all environment, Adaptive Strong Authenticator and Adaptive Risk Manager features

Architecture and Deployment Changes

Architecture and deployment changes are listed as follows:

- Administration User Interface is now a separate Web application called *OAAM Admin*.
- Adaptive Strong Authenticator is now deployed as part of the *OAAM Server* Web application.
- OAAM Web applications are now packaged as `.ear` files. Exploding them is neither recommended nor supported.

Part I

Getting Started with Oracle Adaptive Access Manager

This part of the book provides an introduction to the Oracle Adaptive Access Manager 11*g*.

Part I contains the following chapters:

1

Introduction to Oracle Adaptive Access Manager

Oracle Adaptive Access Manager (OAAM) is a key component of Oracle Access Management Suite Plus, delivering risk-aware, context-driven access management across the industry's most complete set of access management services.

This chapter provides a high-level overview of Oracle Adaptive Access Manager 11g with links to more information. This chapter contains the following sections:

1.1 Introduction to Oracle Adaptive Access Manager

Oracle Adaptive Access Manager provides an innovative, comprehensive feature set to help organizations prevent fraud and misuse. Strengthening standard authentication mechanisms, innovative risk-based challenge methods, intuitive policy administration and integration across the Identity and Access Management Suite and with third party products makes Oracle Adaptive Access Manager uniquely flexible and effective. Oracle Adaptive Access Manager provides real-time and batch risk analytics to combat fraud and misuse across multiple channels of access. Real-time evaluation of multiple data types helps stop fraud as it occurs. Oracle Adaptive Access Manager makes exposing sensitive data, transactions and business processes to consumers, remote employees or partners via your intranet and extranet safer.

Oracle Adaptive Access Manager provides an extensive set of capabilities including device fingerprinting, real-time behavioral profiling and risk analytics that can be harnessed across both Web and mobile channels. It also provides risk-based authentication methods including Knowledge Based Authentication (KBA) challenge infrastructure with Answer Logic and OTP Anywhere server-generated one-time passwords, delivered out of band via SMS, email or IM channels. Oracle Adaptive Access Manager also provides out-of-the-box integration with Oracle Identity Management, the industry leading identity management and Web Single Sign-On products, which are integrated with leading enterprise applications.

Functionality can be divided into two major areas as summarized in Table 1–1.

Table 1–1 Oracle Adaptive Access Manager Functionality

Functionality	Description
Real-time or offline risk analysis	Oracle Adaptive Access Manager provides functionality to calculate the risk of an access request, an event or a transaction, and determine proper outcomes to prevent fraud and misuse. A portion of the risk evaluation is devoted to verifying a user's identity and determining if the activity is suspicious. Functionality that support risk analysis are: ■ Rules Engine ■ Entities ■ Transactions ■ Patterns ■ Alerts ■ Actions ■ Configurable actions
End-user facing functionality to prevent fraud	Oracle Adaptive Access Manager protects end users from phishing, pharming, and malware. The virtual authentication devices secure credential data at the entry point; this ensures maximum protection because the credential never resides on a user's computer or anywhere on the Internet where it can be vulnerable to theft. As well, Oracle Adaptive Access Manager provides interdiction methods including risk-based authentication, blocking and configurable actions to interdict in other systems. Functionality that supports end-user facing security are: ■ Virtual authentication devices ■ Knowledge-Based Authentication (KBA) ■ OTP Anywhere ■ Security policies

With Oracle Adaptive Access Manager, corporations can protect themselves and their online users against potent fraudulent attacks, such as Phishing, Malware, Transaction and Insider Fraud, in a cost-effective manner. Table 1–2 summarizes fraud attack threats and Oracle Adaptive Access Manager defense mechanisms.

Table 1–2 Oracle Adaptive Access Manager Defense Mechanisms

Threat	Oracle Adaptive Access Manager Offense
Phishing	Oracle Adaptive Access Manager offenses for phishing are: ■ A phishing site cannot easily replicate the user experience of the OAAM virtual devices (TextPad, QuestionPad, KeyPad, and PinPad). As such, if users notice any difference in the user experience, and they would most likely not enter their password or PIN code. ■ The personal image and phrase a user registers and sees every time they log in to a valid website serves as a shared secret between user and server. If the shared secret is not presented or presented incorrectly, users can be clued in. ■ The "freshness" time-stamp displayed in the OAAM virtual devices shows an end user that it was created for this session. This makes re-presenting old virtual devices on a phishing site suspect to an end user. ■ If a phishing exercise is successful in stealing a user's login credentials, real-time risk analytics, behavioral profiling, and risk-based challenge make using stolen credentials very difficult since the fraudster will almost certainly not have exactly the same behavior as the valid user and therefore would be challenged or blocked by Oracle Adaptive Access Manager.
Malware	Oracle Adaptive Access Manager offenses for malware are: ■ The virtual authentication devices combat key-loggers and many other forms of malware that attempt to steal a user's authentication credentials. ■ The KeyPad and PinPad send a random string of numbers over the wire that only Oracle Adaptive Access Manager can decode. As a result no sensitive data is captured or sent to the server, so it is not easily compromised by automated means. ■ The same technology can be used to protect any sensitive data point. For example, a user's Social Security Number could be safely communicated to a server by entering it using the virtual devices.
Transaction fraud	Oracle Adaptive Access Manager offenses for transaction fraud are: ■ Oracle Adaptive Access Manager performs both real-time and batch-based risk analysis on session, transaction, event and contextual data. ■ Possible outcomes of these evaluations include alerts, blocking, risk-based challenge or custom integration actions to affect other systems. ■ Virtual devices can be implemented to prevent automated navigation of transaction interfaces and malware programmed to hijack user sessions post login. For example, if a PinPad is used to enter the destination account number of a transaction, malware cannot easily navigate this process and the random data entered and sent is not the actual account number so it cannot be altered for fraud.
Insider fraud	Oracle Adaptive Access Manager offenses for insider fraud are: ■ Oracle Adaptive Access Manager profiles user behavior and assesses the risk associated with an access request in real-time. If an employee/partner/contractor exhibits anomalous behavior, alerts can be generated for security and compliance analysts to review. ■ Risk-based KBA or OTP challenge can thwart fraudulent impersonation.

1.2 Oracle Adaptive Access Manager Features

Oracle Adaptive Access Manager can provide the high levels of security with context-sensitive online authentication and authorization. Thus, situations are evaluated and proactively acted upon based on various types of data.

This section outlines key components/features used for authentication and fraud monitoring and detection.

1.2.1 Autolearning

Oracle Adaptive Access Manager employs a unique mixture of real-time and predictive auto-learning technology to profile behavior and detect anomalies. Because of this, Oracle Adaptive Access Manager can recognize high risk activity and proactively take actions to prevent fraud and misuse. Also, as Oracle Adaptive Access Manager is evaluating and learning behaviors in real-time it constantly learns what is typical for each individual user and for users as a whole. In addition to the autolearning, the continuous feedback from experienced fraud and compliance investigators "teach" the OAAM engine what constitutes fraud and misuse. In this way, Oracle Adaptive Access Manager fully harnesses both the human talent in your organization and multiple forms of machine learning to prevent fraud and misuse.

A simple example would be the behavioral profiling and evaluation of access times for a nurse. Nurses often work in a couple of hospitals; they may work different shifts on a rotating schedule, but they will most likely work one shift more than the others in any given month. In such a scenario, Oracle Adaptive Access Manager keeps track of when a nurse is at work accessing the medical records system. If during the same month a nurse has been working mostly night shifts to fill in, then, seeing an access request from her between 10:00 am and 12:00 pm would be an anomaly. This of course does not mean fraud or misuse is occurring, but the risk is elevated, so Oracle Adaptive Access Manager could challenge the nurse for additional identity verification. As the nurse accesses various applications and information during the day shift, Oracle Adaptive Access Manager learns in real-time that this is typical and is therefore low risk.

One of the main goals of automated anti-fraud solutions is to eliminate unnecessary manual processes and remove much of the inconsistency and costs that can occur when humans are directly involved in access evaluations. Oracle Adaptive Access Manager automates not only risk evaluations but also keeps track of changing behaviors so humans do not have to. Based on this dynamic risk evaluation, proactive action can be taken to prevent fraud with various forms of interdiction including blocking and challenge mechanisms. In this way, Oracle Adaptive Access Manager prevents fraud with little or no need for human interaction. However, in instances when human investigators are needed to follow up directly with end users or make final decisions based on additional contextual information, Oracle Adaptive Access Manager seamlessly captures their insights to improve the accuracy of future risk evaluations.

1.2.2 Configurable Risk Engine

The OAAM risk engine utilizes a flexible architecture based on highly configurable components. Oracle Adaptive Access Manager employs three methods of risk evaluation that work in harmony to evaluate risk in real-time. The combination of configurable rules, real-time behavioral profiling and predictive analysis make Oracle Adaptive Access Manager unique in the industry. Administrators can easily create, edit and delete security policies and related objects directly in the business user friendly administration console. Business users can understand and administer OAAM policies and view dashboards and reports in the graphical user interface with little or no dependence on IT resources. Security rules are created by combining any number of configurable rule conditions. Both access and transaction based rules are created from the library of conditions available with Oracle Adaptive Access Manager.

Oracle Adaptive Access Manager also profiles behavior and evaluates risk using a fully transparent and auditable rules based process. This allows high performance, flexibility and complete visibility into how and why specific actions were or were not taken during a session. If Oracle Adaptive Access Manager blocks access for an end

user there is a complete audit trail that shows exactly what data was evaluated and the specific evaluations that occurred.

1.2.3 Virtual Authentication Devices

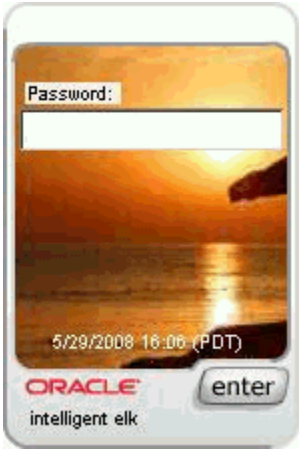
Oracle Adaptive Access Manager provides a number of rich features that strengthen existing Web application login flows. Regardless of the type of authentication in place, Oracle Adaptive Access Manager can improve the level of security. Insider fraud, session hijacking, stolen credentials, and other threats cannot be eliminated by strong, credential based authentication alone. Adding a risk-based challenge layer behind existing authentication can increase the level of security with minimal impact to the user experience.

Oracle Adaptive Access Manager's suite of virtual authentication devices combats phishing personalized images and phrases known only to the server and the end user. Through the use of KeyPad and PinPad, security of the user credentials during entry can be assured by not capturing or transmitting the actual credential of the end user. This protects the credential from theft by malware and other similar threats. The virtual authentication devices are server driven; all features are provided without any client-side software or logic that can be compromised by key-loggers and other common malware. Additionally, Oracle Adaptive Access Manager performs device fingerprinting and behavioral profiling on every access to determine the likelihood that the authentication is being attempted by the valid user.

Descriptions of the various text pads in the virtual authentication suite follow.

TextPad

TextPad is a personalized device for entering a password or PIN using a regular keyboard. This method of data entry helps to defend against phishing primarily. TextPad is often deployed as the default for all users in a large deployment. Then, each user individually can upgrade to another device if he wants. The personal image and phrase a user registers and sees every time he logs in to the valid site serves as a shared secret between the user and server. If this shared secret is not presented or presented incorrectly, the users will notice.



PinPad

PinPad is a lightweight authentication device for entering a numeric PIN.

QuestionPad

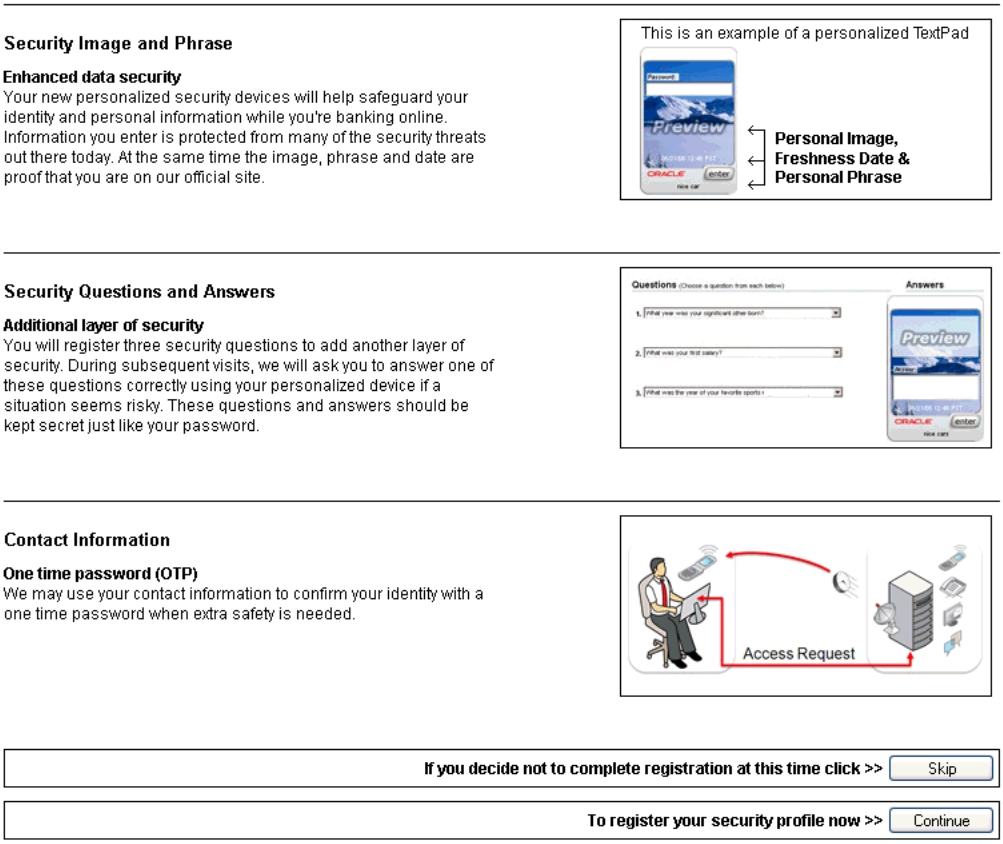
QuestionPad is a personalized device for entering answers to challenge questions using a regular keyboard. The QuestionPad is capable of incorporating the challenge question into the Question image. Like other Adaptive Strong Authentication devices, QuestionPad also helps in solving the phishing problem.

KeyPad

KeyPad is a personalized graphics keyboard, which can be used to enter alphanumeric and special character that can be enter using a traditional keyboard. KeyPad is ideal for entering passwords and other sensitive data. For example, credit card numbers can be entered.

In Figure 1–1, the user is given the option to register his profile now or to skip registration for a later date.

Figure 1–1 Access Security



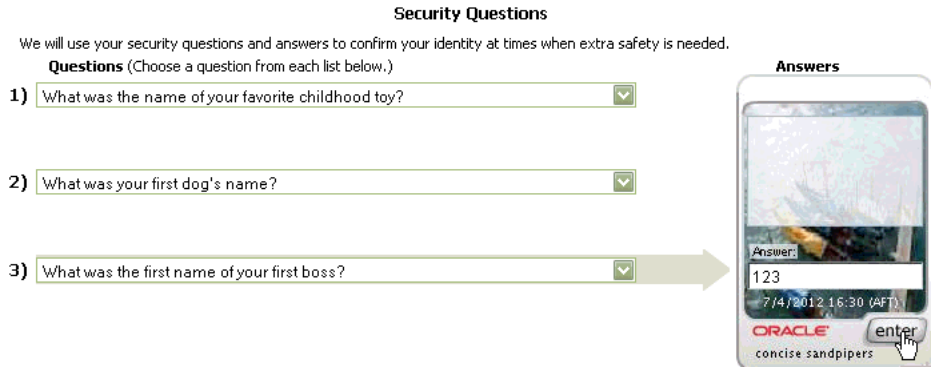
1.2.4 Device Fingerprinting

Oracle Adaptive Access Manager provides both proprietary, clientless technologies and an extensible client integration framework for device fingerprinting. Device usage is tracked and profiled to detect elevated levels of risk. OAAM customers can secure

both standard browser-based access and mobile browser-based access without additional client software or choose to integrate a custom developed client such as a JAVA applet. For securing access to mobile applications, customers and partners can easily integrate OAAM device fingerprinting capabilities via the Mobile and Social SDK and REST interface. Oracle Adaptive Access Manager generates a unique single-use cookie value mapped to a unique device ID for each user session. The device cookie value is refreshed on each subsequent fingerprinting process with another unique value. The fingerprinting process can be run multiple times during a user's session to allow detection of mid-session changes that could indicate session hijacking. Oracle Adaptive Access Manager monitors a comprehensive list of device attributes. The single-use cookie and multiple attribute evaluations performed by server-side logic and client extensions make OAAM device fingerprinting flexible, easy to deploy and secure.

1.2.5 Knowledge-Based Authentication

Oracle Adaptive Access Manager provides out-of-the-box secondary authentication in the form of knowledge-based authentication (KBA) questions. The KBA infrastructure handles registration, answers, and the challenge of questions. Since KBA is a secondary authentication method, it is presented after successful primary authentication.



KBA is used to authenticate an individual based on knowledge of personal information, substantiated by a real-time interactive question and answer process. Oracle Adaptive Access Manager's Rules Engine and organizational policies are responsible for determining if it is appropriate to use challenge questions to authenticate the customer.

1.2.6 Answer Logic

Answer Logic increases the usability of Knowledge Based Authentication (KBA) questions by accepting answers that are fundamentally correct but may contain a small typo, abbreviation or misspelling. For example, if abbreviation is enabled in Answer Logic a user is challenged with the question "What street did you live on in high school?" They may answer "1st St." which is fundamentally correct even though when they registered the answer six months ago they entered "First Street". By allowing a configurable variation in the form of correct answers, Answer Logic dramatically increases the usability of registered challenge questions making the balance between security and usability firmly in the control of the enterprise.

1.2.7 OTP Anywhere

OTP Anywhere is a risk-based challenge mechanism consisting of a server generated one time use password delivered to an end user via a configured out of band channel. Supported OTP delivery channels include short message service (SMS), email, and instant messaging. OTP Anywhere can be used to compliment Knowledge Based Authentication (KBA) challenge or instead of KBA. Oracle Adaptive Access Manager provides an innovative challenge processor framework. This framework can be used to implement custom risk-based challenge solutions combining third party authentication products or services with OAAM real-time risk evaluations. Both KBA and OTP Anywhere actually utilize this same challenge processor framework internally. OTP Anywhere via SMS uses a person's cell phone as a form of second factor, the identity assurance level is elevated without the need for provisioning hardware or software to end users.

1.2.8 Mobile Access Security

Oracle Adaptive Access Manager provides mobile security features both directly and via the Mobile and Social Access Services component of Oracle Access Management using the ASDK and RESTful web services. Users accessing OAAM protected web applications through a mobile browser will navigate the user interface and flows optimized for the mobile form factor without performing any development. Security policies available with Oracle Adaptive Access Manager can dynamically adjust when user access originates from a mobile device.

This improves the range of analysis and accuracy of the risk evaluation, which reduces false positives. For example, IP geolocation velocity rules behave differently if the access request is via a cell connection than it does when using a Wi-Fi connection.

When customers utilize the Mobile and Social (MS) Access Services component of the Oracle Access Management Suite, Oracle Adaptive Access Manager provides enhanced device fingerprinting, device registration, mobile specific risk analysis, risk-based challenge mechanisms as well as lost and stolen device management. Mobile Access Services allow enterprises to extend their existing access security solution to cover both the web and mobile access channels.

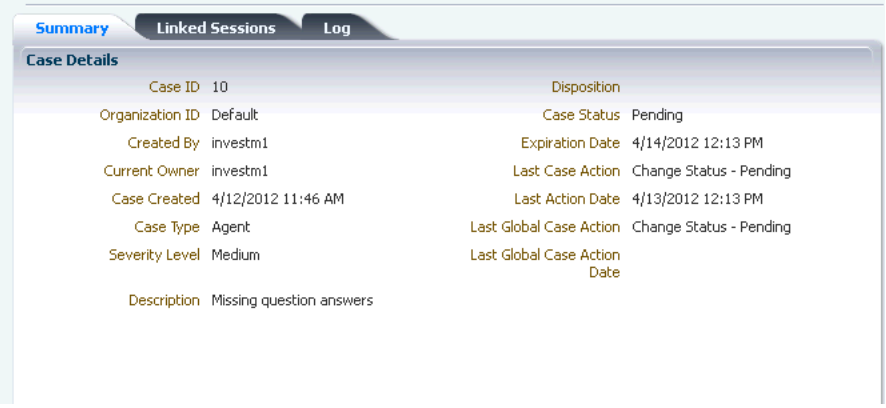
1.2.9 Universal Risk Snapshot

Change control is important in an enterprise deployment, especially concerning mission critical security components. The Universal Risk Snapshot feature allows an administrator in a single operation to save a full copy of all OAAM policies, dependent components, and configurations for backup, disaster recovery and migration. Snapshots can be saved to the database for fast recovery or to a file for migration between environments and external backup. Restoring a snapshot is an automated process that includes visibility into exactly what the delta is and what actions will be taken to resolve conflicts.

1.2.10 Fraud Investigation Tools

Oracle Adaptive Access Manager provides a streamlined and powerful forensic interface for security analysts and compliance officers. Users can easily evaluate alerts and identify related access requests and transactions to uncover fraud and misuse.

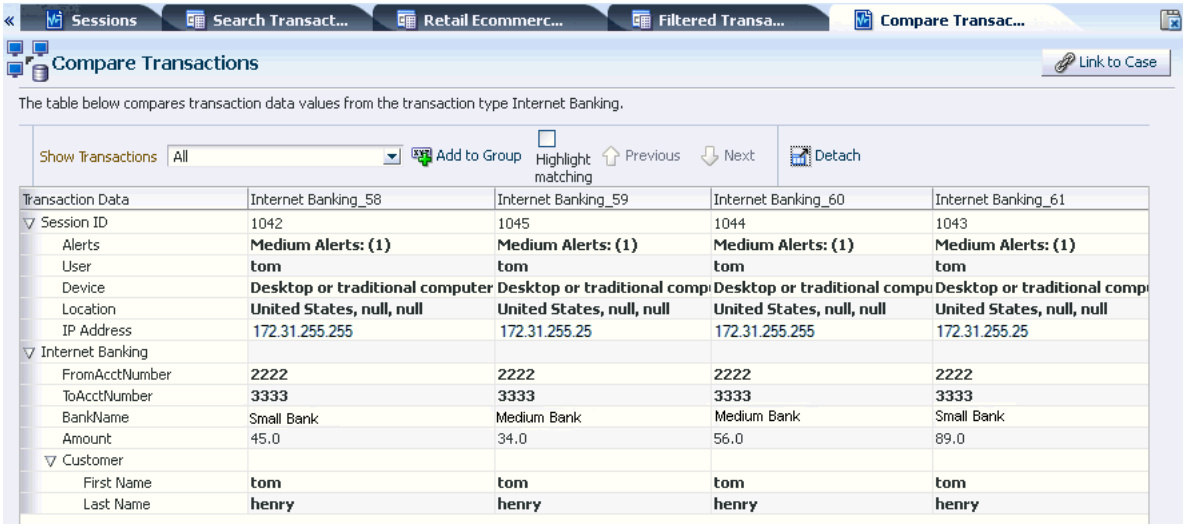
Agent Cases



Oracle Adaptive Access Manager provides case management functionality tailored to forensic investigation. Agents are provided a repository for findings and investigation workflow management. Security analysts and compliance officers' record notes and link suspect sessions to a case as they perform an investigation so all findings are captured for use in legal proceedings and to influence future real-time risk analysis.

Search and Compare Transactions

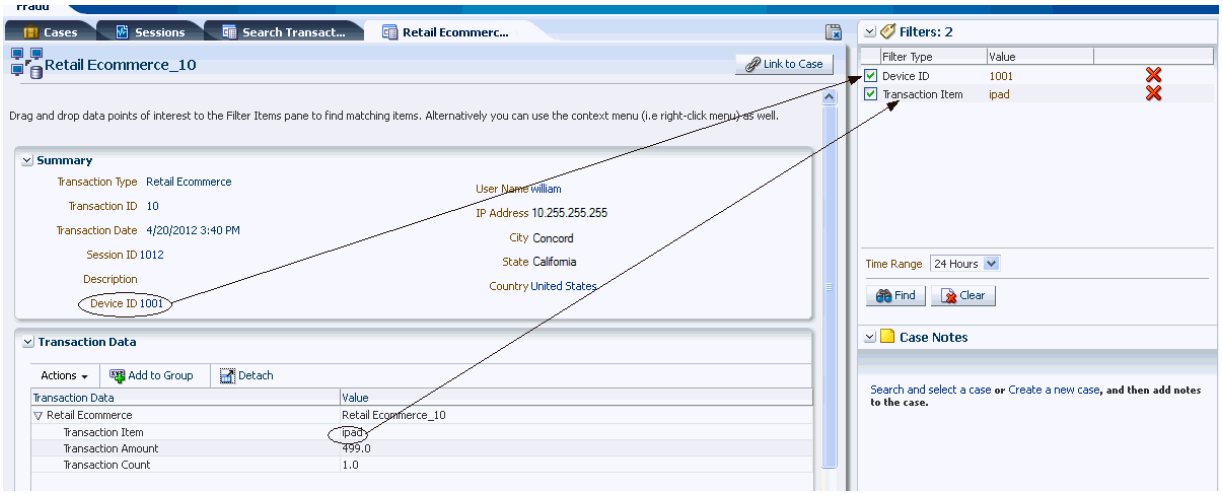
Oracle Adaptive Access Manager provides an intuitive interface for security analysts and compliance officers to search and compare transactions that have been subjected to risk analysis. The full data and context of each transaction is available even for encrypted data fields. This allows security and compliance professionals deep visibility into user activity while still protecting the data from administrators or other types of enterprise users. The ability to compare multiple transactions side by side is extremely useful for expanding investigations from known high risk transactions to transactions that may not have initially appeared high risk on their own.



Utility Panel

The investigation utility panel provides a persistent interface for common operations security analysts and compliance officers perform multiple times in the process of an investigation. Both quick search and case notes are always available regardless of what other functionality is being used. This ensures that findings from any process can be

combined to search for suspect sessions and transactions. Also, the utility panel ensures that any thoughts or findings can be captured in case notes.



1.2.11 Policy Management

Policies and rules can be used by organizations to monitor and manage fraud or to evaluate business elements. The policy and rules are designed to handle patterns or practices, or specific activities that you may run across in the day-to-day operation of your business. Using Oracle Adaptive Access Manager, you can define when the collection of rules is to be executed, the criteria used to detect various scenarios, the group to evaluate, and the appropriate actions to take when the activity is detected.

1.2.12 Dashboard

The Oracle Adaptive Access Manager Dashboard is a unified display of integrated information from multiple components in a user interface that organizes and presents data in a way that is easy to read. The Oracle Adaptive Access Manager dashboard present monitor data versions of key metrics. Administrators can easily see up-to-the-minute data on application activity from a security perspective. The reports that are presented help users visualize and track general trends.

1.2.13 Reports

Reporting is available through Oracle Adaptive Access Manager. A limited license of Oracle Business Intelligence Publisher is included for customizable reporting capabilities.

Oracle Identity Management BI Publisher Reports uses Oracle BI Publisher to query and report on information in Oracle Identity Management product databases. With minimal setup, Oracle Identity Management BI Publisher Reports provides a common method to create, manage, and deliver Oracle Identity Management reports.

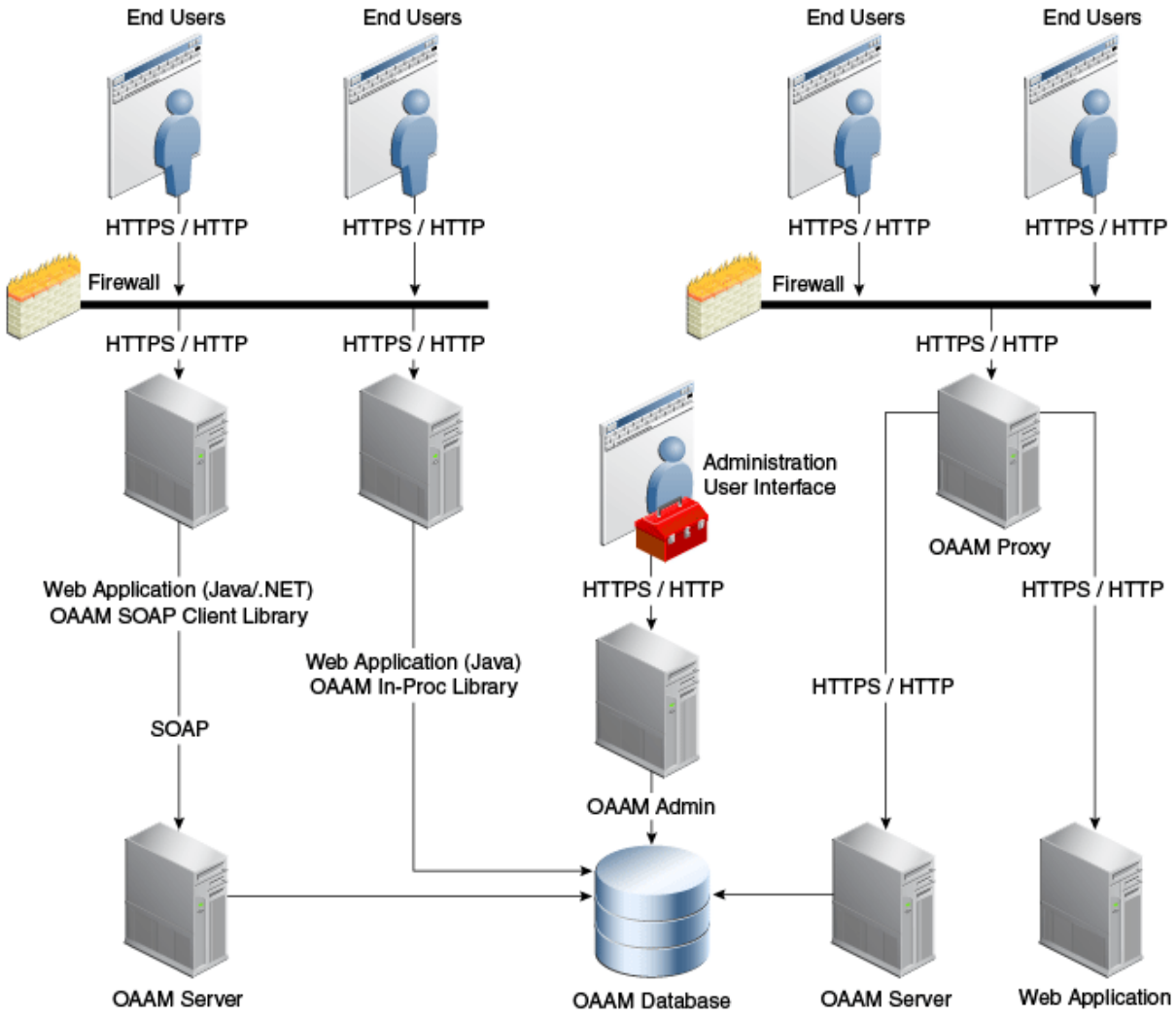
The report templates included in Oracle Identity Management BI Publisher Reports are standard Oracle BI Publisher templates—though you can customize each template to change its look and feel. If schema definitions for an Oracle Identity Management product are available, you can use that information to modify and generate your own custom reports.

1.3 Oracle Adaptive Access Manager Component Architecture

Oracle Adaptive Access Manager is built on a J2EE-based, multi-tier deployment architecture that separates the platform's presentation, business logic, and data tiers. Because of this separation of tiers, Oracle Adaptive Access Manager can rapidly scale with the performance needs of the customer. The architecture can leverage the most flexible and supported cross-platform J2EE services available: a combination of Java, XML and object technologies. This architecture makes Oracle Adaptive Access Manager a scalable, fault-tolerant solution.

Figure 1–2 shows the single instance architecture for Oracle Adaptive Access Manager.

Figure 1–2 Single instance Architecture for Oracle Adaptive Access Manager



The runtime components including the rules engine and end user interface flows are contained in one managed server while the administration console functionality is separated out into its own managed server. The administration console contains the customer service and security analyst case management functionality which must always be available to employees in potentially large call centers with high call volumes.

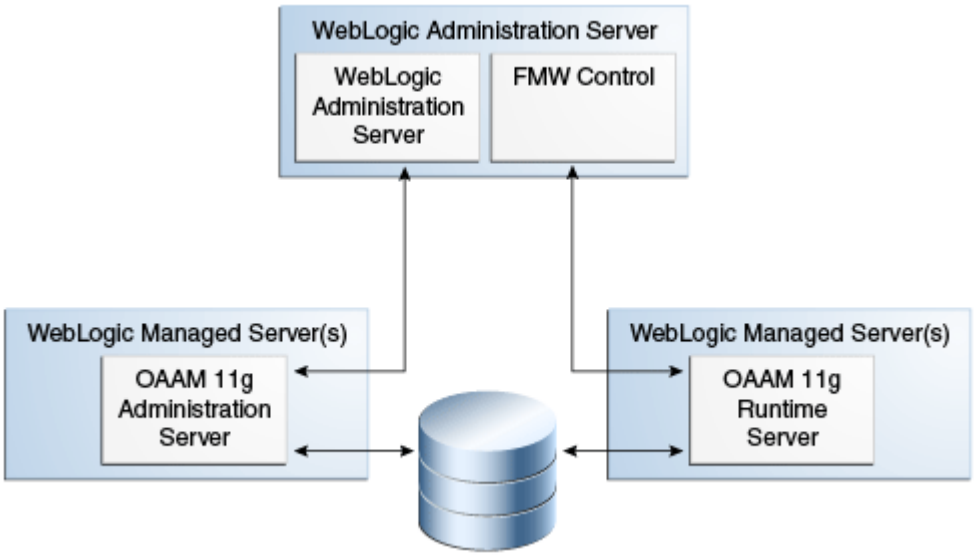
Depending on the deployment method used the topology changes slightly. Native application integration deployments embed the runtime components so the administration console is the only additional managed server added to the deployment. Oracle Adaptive Access Manager is also completely stateless and fully supports clustered deployments to meet high performance requirements. As well, all high availability features of the Oracle database are supported for use with Oracle Adaptive Access Manager.

Oracle Adaptive Access Manager consists of the following two components:

- OAAM_ADMIN: This component is used for administration and configuration of OAAM_SERVER application. This component is developed using the Oracle JAVA ADF Framework the Identity Management shell and deployed as Web applications in a J2EE container. It is packaged as an EAR file.
- OAAM_SERVER: This component contains the OAAM Admin and OAAM Server sub-components within a single web application. The OAAM_SERVER component is packaged as an EAR file and is composed of servlets and JSPs in addition to Java classes. The subcomponents of OAAM_SERVER are described below by layer:
  - Presentation Layer: typically a Web application serving JSPs, servlets, and so on. The presentation layer provides the strong authenticator functionality; it uses the interfaces provided by the business layer (SOAP or Java native) to access its services.
  - Business Logic Layer: this layer contains the core application logic that implements the risk analyzing engine. This layer provides Java and SOAP interfaces for the presentation layer. When the Java interface is used, the business logic layer and presentation layer can be part of a single web application. With the SOAP interface, these layers are deployed as different applications.
  - Data Access Layer: contains data access components to connect to the supported relational databases. Oracle Adaptive Access Manager uses Oracle's TopLink, which provides a powerful and flexible framework for storing Java objects in a relational database.

Table 1–3 illustrates the distribution of Oracle Adaptive Access Manager components.

Figure 1–3 Oracle Adaptive Access Manager Component Distribution



Note: If batch processing is used, there is another Managed Server in addition to the ones shown in the illustration, which is the OAAM Offline server.

1.4 Deployment Options

Oracle Adaptive Access Manager supports a number of deployment options to meet the specific needs of practically any deployment. The decision of which deployment type to employ is usually determined based on the use cases required and the applications being protected.

Table 1–3 describes the types of OAAM deployments.

Table 1–3 Oracle Adaptive Access Manager Deployment Options

Deployment	Description
Single Sign-On Integration	Oracle Adaptive Access Manager has an out of the box integration with Oracle Access Management Access Manager to provide advanced login security including the virtual devices, device fingerprinting, real-time risk analysis and risk-based challenge. New to 11*g* there are two versions of the Oracle Adaptive Access Manager and Access Manager integration, basic and advanced. The "basic" integration embeds Oracle Adaptive Access Manager into the Access Manager runtime server. It includes many of the login security use cases available from Oracle Adaptive Access Manager and reduces the footprint. To gain advanced features and extensibility customers can deploy using the "advanced" integration. Features such as OTP anywhere, challenge processor framework, shared library framework and secure self-service password management flows require the advanced integration option. Oracle Adaptive Access Manager can also be integrated with third party single sign-on products via systems integrators if required.
Universal Installation Option Reverse Proxy	Oracle Adaptive Access Manager can be deployed using an Apache module to intercept login requests and provide advanced login security. The flows available are the same as for the advanced single sign-on integration option. The main benefit of the Oracle Universal Installation Option (UIO) deployment is that it requires little or no integration with protected applications and SSO is not required.
Native Application Integration	Oracle Adaptive Access Manager can be natively integrated with an application to provide extreme high performance and highly customizable security. A native integration embeds OAAM in-process inside the protected applications. The application invokes the Oracle Adaptive Access Manager APIs directly to access risk and challenge flows.
Web Services Application Integration	Customers who have advanced requirements similar to native integration but who prefer to use SOAP web services instead of Java API integration directly can choose this option.
Java Message Service Queue Integration	Customers with access monitoring requirements involving multiple applications and data sources now have the ability to take a proactive security and compliance posture. Using the provided Java Message Service Queue (JMSQ) customers can implement near real-time risk analysis to actively identify suspected fraud or misuse.

1.5 System Requirements and Certification

Refer to the system requirements and certification documentation for information about hardware and software requirements, platforms, databases, and other information. Both of these documents are available on Oracle Technology Network (OTN).

You can access OTN at

http://www.oracle.com/technetwork

The system requirements document covers information such as hardware and software requirements, minimum disk space and memory requirements, and required system libraries, packages, or patches:

The certification document covers supported installation types, platforms, operating systems, databases, JDKs, directory servers, and third-party products:

2

Setting Up the OAAM Environment

When you install Oracle Adaptive Access Manager, you install the binary files, such as executable files, jar files, and libraries. Then, you use configuration tools to configure the software.

This chapter presents details on setting up the Oracle Adaptive Access Manager environment for first time users. For information on how to upgrade an existing Oracle Adaptive Access Manager 10*g* (10.1.4.5) to Oracle Adaptive Access Manager 11*g* Release 2 (11.1.2), see *Oracle Fusion Middleware Upgrade and Migration Guide for Oracle Identity and Access Management*.

2.1 Prerequisites

All tasks in this book presume that you have Oracle Adaptive Access Manager 11*g* installed with initial configuration completed as described in the *Oracle Fusion Middleware Installation Guide for Oracle Identity and Access Management*.

2.2 Setting Up the Base Environment

After completing the installation process, including post-installation steps, you must set up the Oracle Adaptive Access Manager base environment before you can use the graphical user interfaces or command-line tools to manage authentication mechanisms, risk based challenge methods, policy administration, and integration. Setting up the base environment involves the following tasks:

Table 2–1 Tasks to Set Up OAAM Base Environment

No.	Task	Description
1	Set up the CLI environment	The Oracle Adaptive Access Manager Command-Line Interface (CLI) scripts enable users to perform various tasks instead of using the Oracle Adaptive Access Manager Administration Console. You will need to set up the CLI environment before setting up encryption and database credentials. For information on setting up the CLI environment, see Section 2.3, "Setting Up the CLI Environment."
2	Set up encryption and database credentials	For information, see Section 2.4, "Setting Up Encryption and Database Credentials for Oracle Adaptive Access Manager."
3	Create OAAM users	For information, see Section 2.5, "Creating OAAM Users."
4	Import OAAM base snapshot	For information, see Section 2.6, "Importing the OAAM Snapshot."

Table 2–1 (Cont.) Tasks to Set Up OAAM Base Environment

No.	Task	Description
5	Import IP location data	For information, see Section 2.7, "Importing IP Location Data."
6	Enable OTP	For information, see Section 2.8, "Enabling OTP."
7	Set the time zone for time stamps in the OAAM Administration Console	For information, see Section 2.9, "Setting the Time Zone Used for All Time Stamps in the OAAM Administration Console."

2.3 Setting Up the CLI Environment

The Oracle Adaptive Access Manager Command-Line Interface (CLI) scripts enable users to perform various tasks instead of using the Oracle Adaptive Access Manager Administration Console.

Setting up the CLI environment involves the following tasks:

1. Set up the CLI work folder
2. Set up the Credential Store Framework (CSF) configuration
3. Set up the Oracle Adaptive Access Manager database credentials

2.3.1 Set up the CLI Work Folder

In this section, you will copy the CLI folder *$IDM_ORACLE_HOME*`/oaam/cli` to a working directory, for example, `oaam_cli`.

> **Note:** This task is required since it is not recommended to edit or change any files that are inside the `IDM_ORACLE_HOME` folder (the folder where you installed the Oracle Identity Management software).

1. Create a working directory.

```
mkdir work

cd work

mkdir oaam_cli
```

2. Copy the `oaam_cli` folder to the working directory by executing the following command:

In Unix:

Execute the following command:

```
cp -r <IDM_ORACLE_HOME>/oaam/cli ~/work/oaam_cli
```

In Windows

Execute the following command:

```
xcopy/s   <IDM_ORACLE_HOME>\oaam\cli   c:\work\oaam_cli
```

Select `D=directory` when it prompts so that entire folder can be copied.

2.3.2 Set Up the Credential Store Framework (CSF) Configuration

A credential store is a repository that can hold user name and password combinations, symmetric keys, tickets, or public key certificates. Oracle Platform Security Services includes the Credential Store Framework (CSF), a set of APIs that applications can use to create, read, update, and manage credentials securely. OAAM uses the CSF APIs to access credentials. Credentials are stored in the CSF of the Oracle WebLogic Server domain and managed using Oracle Fusion Middleware Enterprise Manager Control or Oracle WebLogic Scripting Tool (WLST).

Select one of the following mechanisms to access the OAAM encryption keys stored in the CSF:

- CSF without Mbeans
- CSF with MBeans

2.3.2.1 Configure OAAM Database Details with CSF without MBeans

Important notes about this approach are listed as follows:

- This method requires that you run the Oracle Adaptive Access Manager command-line utility scripts on the same computer as the WebLogic Server.
- This method does not require you to specify the WebLogic Administrator and password.
- This method is not recommended if Oracle Adaptive Access Manager is deployed in a clustered environment

To use this mechanism, go to the work folder where you copied the `cli` folder and open the file, `conf/bharosa_properties/oaam_cli.properties` in a text editor and then set the following properties:

Property Name	Notes about Property Value
oaam.csf.useMBeans	false
oaam.jps.config.filepath	Set the absolute file path of `jps-config-jse.xml`. Usually, it resides in *$DOMAIN_HOME*`/config/fmwconfig` folder
oaam.db.url	Specify valid JDBC URL of the Oracle Adaptive Access Manager database. Make sure there are no typos.
oaam.db.additional.properties.file	Leave this as blank if there are no additional Oracle Toplink properties. Otherwise specify the name of the properties file that has additional Oracle Toplink properties. Make sure the file is in the same folder as `oaam_cli.properties`
oaam.db.driver	`oracle.jdbc.driver.OracleDriver` (Change this value only if the Oracle Adaptive Access Manager schema is in non-oracle database)
oaam.db.min.read-connections	1 (Do not change this value unless required)
oaam.db.max.read-connections	25 (Do not change this value unless required)
oaam.db.min.write-connections	1 (Do not change this value unless required)
oaam.db.max.write-connections	25 (Do not change this value unless required)

2.3.2.2 Configure OAAM Database Details with CSF with MBeans

Important notes about this approach:

- This method is recommended if Oracle Adaptive Access Manager is deployed in a clustered environment.

- This method permits you to remotely connect to the Oracle Adaptive Access Manager WebLogic Server.
- This method requires you to specify the Oracle Adaptive Access Manager WebLogic Administrator user and password.

To configure the Oracle Adaptive Access Manager Database details with CSF with MBeans, go to the work folder where you copied the `cli` folder and open the file `conf/bharosa_properties/oaam_cli.properties` in a text editor and then set the following properties:

Property Name	Notes about Property Value
oaam.csf.useMBeans	true (Keep it as true)
oaam.adminserver.hostname	<Host name where WebLogic Administration Server runs>
oaam.adminserver.port	<Port number of WebLogic Administration Server. Usually it is 7001>
oaam.adminserver.username	<User name of the WebLogic Administrator user. Usually it is WebLogic>
oaam.adminserver.password	<Password of the WebLogic Administrator user>
oaam.db.url	Specify valid JDBC URL of the Oracle Adaptive Access Manager database. Make sure there are no typos.
oaam.db.additional.properties.file	Leave this as blank if there are no additional Oracle Toplink properties. Otherwise specify the name of the properties file that has additional Oracle Toplink properties. Make sure the file is in the same folder as `oaam_cli.properties`
oaam.db.driver	oracle.jdbc.driver.OracleDriver (Change this value only if the Oracle Adaptive Access Manager schema is in non-oracle database)
oaam.db.min.read-connections	1 (Do not change this value unless required)
oaam.db.max.read-connections	25 (Do not change this value unless required)
oaam.db.min.write-connections	1 (Do not change this value unless required)
oaam.db.max.write-connections	25 (Do not change this value unless required)

2.3.3 Setting Up Oracle Adaptive Access Manager Database Credentials

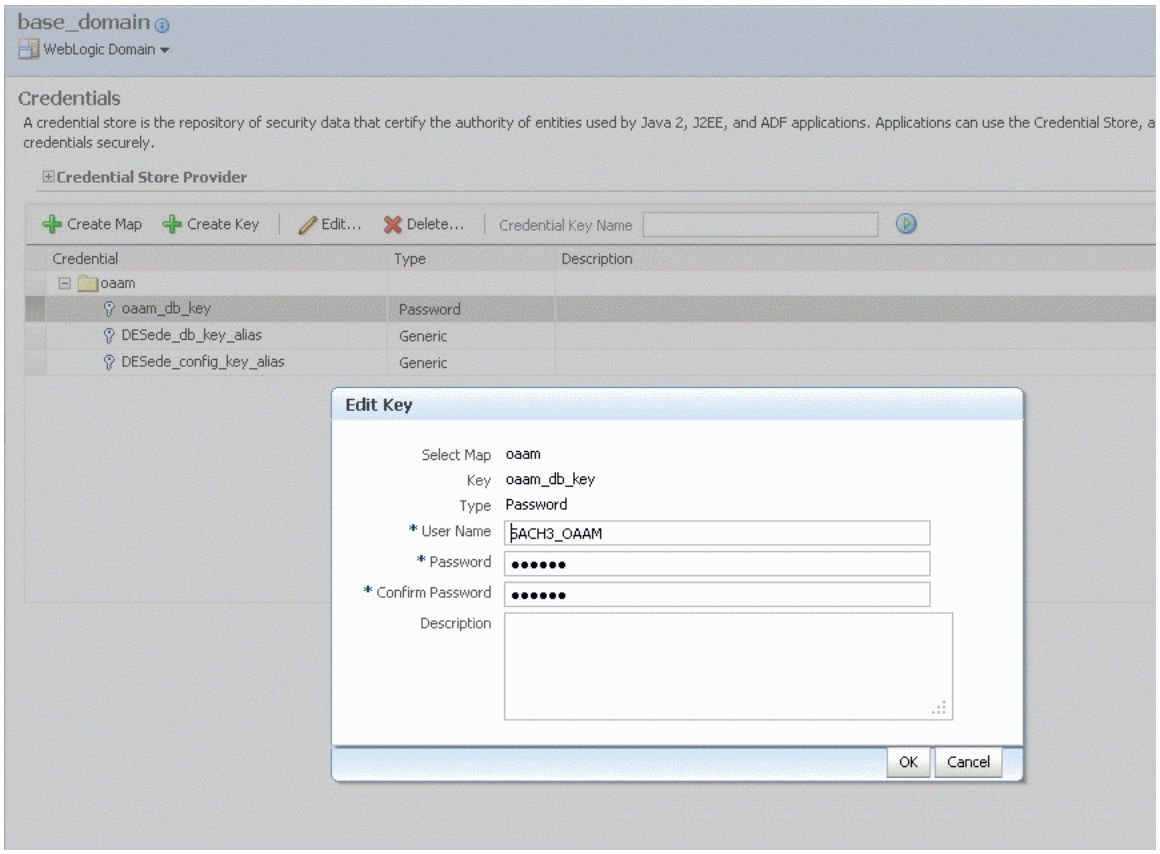
Configuring database credentials in the Credential Store Framework involves the following steps:

- Use the Oracle Enterprise Manager Fusion Middleware Control to add database credentials (user name and password) in the Credential Store Framework in the domain where Oracle Adaptive Access Manager is installed. These credentials are used by the Oracle Adaptive Access Manager command-line utilities.
- Configure the properties files that are used by the Oracle Adaptive Access Manager CLI utilities with details of the WebLogic administration server and Oracle Adaptive Access Manager database.

For information on the credential store, see *Oracle Fusion Middleware Application Security Guide*. Figure 2–1 shows the database credential setup.

For instructions on setting up database credentials in the CSF, see Section 2.4.6, "Setting Up Oracle Adaptive Access Manager Database Credentials in the Credential Store Framework."

Figure 2–1 Setting Up Database Credentials in the Credential Store



2.3.4 Using Persistence Instead of Setting Database Credentials in the Credential Store Framework

If you want to use `persistence.xml` instead of setting the Oracle Adaptive Access Manager database credentials in CSF, go through the following steps. However this approach is not recommended and supported.

1. Go to the work folder where you copied the `cli` folder. Open the file `conf/bharosa_properties/oaam_cli.properties` in a text editor and set the property value of `oaam.db.toplink.useCredentialsFromCSF` to `false`.
2. Update the Oracle Adaptive Access Manager database connection details in the `META-INF/persistence.xml` file by editing the relevant `eclipselink.jdbc` properties, as in the following examples:

```
<property name="eclipselink.jdbc.driver"
value="oracle.jdbc.driver.OracleDriver"/>
<property name="eclipselink.jdbc.url"
value="jdbc:oracle:thin:@<dbhost.mydomain.com>:1521/<SERVICE_NAME>"/>
<property name="eclipselink.jdbc.user" value="<OAAM DB USER>"/>
<property name="eclipselink.jdbc.password" value="< DB Password >"/>
```

2.4 Setting Up Encryption and Database Credentials for Oracle Adaptive Access Manager

Out-of-the-box, encryption keys are automatically generated if they do not exist when oaam_server and oaam_admin are started for the first time.

Oracle Adaptive Access Manager uses secret keys to encrypt data stored in the credential store framework. Encryption protects data within Oracle Adaptive Access Manager from unauthorized access. The process uses methods and a key or keys to encode plain text into a non-readable form. A key is required to decrypt the encrypted information and make it readable again. Authorized persons who own the key can decrypt information that is encrypted with the same key.

About Secret Keys

Oracle Adaptive Access Manager requires that secret keys be set up to encrypt data stored in the credential store framework. These secret keys can be added to the WebLogic Server Credential Store Framework using Oracle Enterprise Manager Fusion Middleware Control.

There are three keys that need to be created for OAAM to work.

- oaam_db_key
- DESede_db_key_alias
- DESede_config_key_alias

The `oaam_db_key` is used to access the database and must be added manually. For information on `oaam_db_key`, see Section 2.3.3, "Setting Up Oracle Adaptive Access Manager Database Credentials."

The `DESede` keys are used to encrypt data. As noted in the introduction to this section, if they do not exist, the OAAM servers will create them when it is first started. You can accept these `DESede` keys or create your own.

If you choose to use your own `DESede` keys you have two choices for creating and encoding them:

- Provide your own secret key (a string of characters), encode it using `encodeKey.sh`, and then store that value, or
- Use `generateEncodedKey.sh` to generate a key and encodes it in one step

Note that if you allow the server to generate the value or use `generateEncodedKey.sh`, you do not know the "secret phrase." You know only the encoded value. This value should be backed up. If you use your own secret key, you can regenerate the encoded value.

Setting Up Encryption

Setting up encryption involves the following steps:

- Ensure the secret keys (symmetric keys) for both the configuration value and database are available. If you do not have a secret key, generate an encoded symmetric key using the `genEncodedKey` command.
- Encode the key using the `base64encode` option of the `encodeKey` command. This step is not required if the `genEncodedKey` command was used to generate the key.
- Use the Oracle Enterprise Manager Fusion Middleware Control to add the encoded secret key to an alias in the Credential Store Framework in the domain where Oracle Adaptive Access Manager is installed.

A credential store is a repository to store user name/password or generic credentials (a certificate). The value of using a credential store is that the application does not store passwords in clear text and does not have to invent its own solutions for protecting passwords, allowing administrators and developers alike to work with a consistent credential repository.

2.4.1 Prerequisites for Setting Up Encryption and Database Credentials

Prerequisites for setting up encryption and database credentials for Oracle Adaptive Access Manager are as follows:

1. If you do not have access to the Oracle Adaptive Access Manager installation folder, make sure Oracle Adaptive Access Manager 11*g* is configured with Oracle Enterprise Manager Fusion Middleware Control while creating the domain.
2. If you have access to the Oracle Adaptive Access Manager installation folder then make sure you have access to running the command-line scripts in the *MW_HOME**IDM_ORACLE_HOME*\oaam\cli folder.
3. Make sure the JDK is installed and check that the `java` command is in the path by executing the `java` command.

Note: If you are upgrading from Oracle Adaptive Access Manager 10.1.4.5 to Oracle Adaptive Access Manager 11*g*, you can skip Section 2.4.2, "Setting up the Encoded Secret Key for Encrypting Configuration Values,", Section 2.4.3, "Setting Up Encoded Secret Key for Encrypting Database Values,"and Section 2.4.4, "Generating an Encoded Secret Key," since the Upgrade Assistant automatically migrates the secret keys from Oracle Adaptive Access Manager 10.1.4.5 to the Credential Store Framework in Oracle Adaptive Access Manager 11*g*.

2.4.2 Setting up the Encoded Secret Key for Encrypting Configuration Values

To set up the encoded secret key for encrypting configuration values, proceed as follows:

1. Go to the Oracle Adaptive Access Manager command-line folder *MW_HOME**IDM_ORACLE_HOME*\oaam\cli.
2. Create a file `config_secret_key.file` and add the secret key to the file by entering:

   tobase64=<secret-key>

Note: ■If you do not have any secret key and need instructions to generate an encoded secret key, see Section 2.4.4, "Generating an Encoded Secret Key."

- This is your key to the encryption algorithm.
- Note that 3DES accepts any key, but it must be a minimum of 24 characters.

---

3. Encode the key using the Base64 algorithm by executing the following command.
   a. In Unix

```
encodeKey.sh config_secret_key.file
```

b. In Windows

```
encodeKey.cmd config_secret_key.file
```

If the encoding command was successful, you see output similar to the following:

```
base64encode is done!
Base64 Encoded value =<encoded_value>
```

If the `KeyStore` command was not successful, you might see the following error:

```
Exception in thread "main" java.lang.NoClassDefFoundError: while resolving
class: com.bharosa.vcrypt.common.util.KeyStoreUtil at
java.lang.VMClassLoader.resolveClass(java.lang.Class)
(/usr/lib/libgcj.so.5.0.0) at java.lang.Class.initializeClass()
(/usr/lib/libgcj.so.5.0.0) at java.lang.Class.forName(java.lang.String,
boolean, java.lang.ClassLoader) (/usr/lib/libgcj.so.5.0.0) at
java.lang.Class.forName(java.lang.String) (/usr/lib/libgcj.so.5.0.0)
```

4. Note down the encoded value of the key printed on the screen. Make sure there are no spaces. You need this to add to the Credential Store Framework.

2.4.3 Setting Up Encoded Secret Key for Encrypting Database Values

To set up the secret key for encrypting database values, proceed as follows:

1. Go to the Oracle Adaptive Access Manager command-line folder *MW_HOME**IDM_ORACLE_HOME*\`oaam\cli`.
2. Create a `file db_secret_key.file` and add the secret key to the file by entering:

   tobase64=<secret-key>

   Note: ■If you do not have any secret key and need instructions for generating an encoded secret key, see Section 2.4.4, "Generating an Encoded Secret Key."

   - This is your key to the encryption algorithm.
   - Note that 3DES accepts any key, but it must be a minimum of 24 characters.

3. Encode the key using Base64 algorithm by executing the following command.

   a. In Unix

   ```
   encodeKey.sh db_secret_key.file
   ```

   b. In Windows

   ```
   encodeKey.cmd db_secret_key.file
   ```

   If the encoding command was successful, you see output similar to the following:

   ```
   base64encode is done!
   Base64 Encoded value = <encoded_value>
   ```

   If the `KeyStore` command was not successful, you might see the following error:

   ```
   Exception in thread "main" java.lang.NoClassDefFoundError: while resolving
   ```

```
class: com.bharosa.vcrypt.common.util.KeyStoreUtil at
java.lang.VMClassLoader.resolveClass(java.lang.Class)
(/usr/lib/libgcj.so.5.0.0) at java.lang.Class.initializeClass()
(/usr/lib/libgcj.so.5.0.0) at java.lang.Class.forName(java.lang.String,
boolean, java.lang.ClassLoader) (/usr/lib/libgcj.so.5.0.0) at
java.lang.Class.forName(java.lang.String) (/usr/lib/libgcj.so.5.0.0)
```

4. Note down the encoded value of the key printed on the screen. Make sure there are no spaces. You need this to add to the Credential Store Framework.

2.4.4 Generating an Encoded Secret Key

To generate an encoded secret key, proceed as follows:

1. Execute the following command:
   a. In Unix

      ```
      genEncodedKey.sh sample.db_3des_input.properties
      ```

   b. In Windows

      ```
      genEncodedKey.cmd sample.db_3des_input.properties
      ```

2. If the command is successful you see output similar to the following:

   ```
   Generated key = <encoded_key>
   ```

   Note: Encoding the generated key is not necessary since it is already encoded.

2.4.5 Adding the Encoded Symmetric Key to the Credential Store Framework

OAAM Servers automatically generate the secret key if you start them after domain creation. You can choose to use those auto-generated secret keys if you do not want to use different secret keys.

To add a symmetric key to the Credential Store Framework, proceed as follows:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control at http://*weblogic_admin_server*:*port*/em using the Web browser and use the WebLogic Administrator credentials to log in.
2. Expand the **WebLogic Domain** icon in the Navigation tree in the left panel.
3. Select **OAAM domain** and right-click and select the menu option **Security**, and then the option **Credentials** in the submenu.
4. Check to see whether there is a map with the name **oaam**. If not, click the **Create Map** option and enter the Map Name as `oaam`. Click **OK** to save the map.
5. Click **oaam** to select the map and then click **Create Key**.
6. In the popup dialog make sure **Select Map** is **oaam**.
7. Enter the following values:
   - **Key Name**: `DESede_db_key_alias` if the key is database-related or `DESede_config_key_alias` if it is configuration/application related. Make sure there are no typos or spaces.
   - **Type**: `Generic`.

- **Credential Value**: encoded value of the symmetric key

8. Enter a description in the **Description** field.
9. Click **OK** to save the secret key to the Credential Store Framework.
10. Make sure you back up the alias and the secret key.

    The backup is required if you must re-create the domain and point the domain to the existing Oracle Adaptive Access Manager database.

> **Note:** If you lose the secret key, all the existing data in the Oracle Adaptive Access Manager database becomes unusable since many important administrative operations involve encrypted data.

2.4.6 Setting Up Oracle Adaptive Access Manager Database Credentials in the Credential Store Framework

To set up the Oracle Adaptive Access Manager database credentials in the Credential Store Framework, proceed as follows:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control at http://*weblogic_admin_server*:*port*/em using the Web browser and use the WebLogic Administrator credentials to log in.
2. Expand the **WebLogic Domain** icon in the Navigation tree in the left panel.
3. Select the **OAAM domain** and right-click and select the menu option **Security** and then the option **Credentials** in the submenu.
4. Check to see whether there is a map with the name **oaam**. If not click the **Create Map** option and enter the **Map Name** as `oaam`. Click **OK** to save the map.
5. Click **oaam** to select the map and then click **Create Key**.
6. In the popup dialog make sure **Select Map** is **oaam**.
7. Enter the following values:
   - **Key**: `oaam_db_key`. Make sure there are no typos and spaces.
   - **Type**: `Password`
   - **UserName**: database user name of OAAM
   - **Password**: database password of OAAM
8. Enter the description.
9. Click **OK** to save the secret key to the Credential Store Framework.

2.4.7 Backing Up Database Credentials and Encoded Secret Keys for Encrypting the Database and Configuration Values

You must back up the encoded secret keys used. You may need these keys, if you have to re-create the Oracle Adaptive Access Manager 11g domain. Make sure you note the encoded secret key and the alias name.

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Expand the WebLogic Domain on the left panel, and select **OAAM** domain.
3. From the OAAM Domain, select **Security**, and then **Credentials**.

4. Expand **oaam** and select the symmetric key related entries associated with the Type **Generic**.
5. Click **Edit**.
6. Go to the **Credentials** section then copy the symmetric key related entries and note the key name.
7. Repeat these steps to back up database and configuration keys.

> **Note:** If you delete and re-create the Oracle Adaptive Access Manager 11g domain, make sure you use the backed-up secret keys when setting the encryption keys so that the existing data in the Oracle Adaptive Access Manager database can be decrypted properly.

2.5 Creating OAAM Users

The Oracle Adaptive Access Manager users can access functionality based on the roles they are assigned. These administrator roles have specific permissions assigned to them based on their responsibilities.

You can create new users and assign the relevant Oracle Adaptive Access Manager roles in your WebLogic administration domain by using the Oracle WebLogic Administration Console. Best practices is to refrain from assigning multiple roles to a single user. If a user has multiple roles assigned to him, the user will have all of the permissions from the different groups.

If you want to take care of user and group creation in the external LDAP store, see the *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*.

To create an OAAM user, proceed as follows:

1. Log in to the Oracle WebLogic Administration Console for your WebLogic administration domain.
2. In the left panel, select **Security Realms**.
3. On the Summary of Security Realms page select the name of the realm (for example, `myrealm`).
4. On the Settings for Realm Name page select **Users and Groups** > **Users**.
5. Click **New** and provide the required information to create a user, such as `user1`, in the security realm.
6. Click the newly created user, `user1`.
7. Click the **Groups** tab.
8. Assign any of the groups with the `OAAM` prefix to the user, user1.
9. Click **Save**.

2.6 Importing the OAAM Snapshot

A full snapshot of policies, dependent components and configurations is shipped with Oracle Adaptive Access Manager. The `oaam_base_snapshot.zip` file is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory.

1. Log in to the Oracle Adaptive Access Manager Administration Console (OAAM Admin) using the following URL:

`http://host:port/oaam_admin`

2. Load the snapshot file into the system by following these instructions:
   a. Open **System Snapshot** under **Environment** in the Navigation tree.
   b. Click the **Load from File** button.

      A Load and Restore Snapshot dialog appears.
   c. Deselect **Back up current system now** and click **Continue**.

      A dialog appears with the message that you have not chosen to back up the current system, and do you want to continue?
   d. When the dialog appears with the message that you have not chosen to back up the current system, and do you want to continue, click **Continue**.

      The Load and Restore Snapshot page appears for you to choose a snapshot to load.
   e. Browse for `oaam_base_snapshot.zip` and click the **Load** button to load the snapshot into the system database.
   f. Click **OK** and then **Restore**.

The snapshot contains the following items that must be imported into OAAM:

- Challenge questions for English (United States)

  During registration, which could be enrollment, opening a new account, or another events such as a reset, the user selects different questions from a list of questions and enters answers to them. These questions, called challenge questions, are used to authenticate users.

  Questions for the languages you want to support must be in the system before users can be asked to register. These questions may also be required to log in to OAAM Server.
- Entity definitions

  The actors that are tracked during authentication are called authentication entities and include user, city, device, and so on. These base entities are required to enable conditions that are used for patterns.
- Out-of-the-box patterns

  Patterns are used by Oracle Adaptive Access Manager to either define one bucket or dynamically create buckets. Oracle Adaptive Access Manager collects data and populates these buckets with members based on pattern parameters, and rules perform risk evaluations on dynamically changing membership and distributions of the buckets.
- Out-of-the-box configurable actions

  Configurable actions are actions that are triggered based on the result action or risk scoring or both after a checkpoint execution. The configurable actions are built using action templates.

Note: If you are upgrading from Oracle Adaptive Access Manager 10.1.4.5 to Oracle Adaptive Access Manager 11*g*, you see that the names and descriptions of the out-of-the-box action templates are slightly different, since the action templates in Oracle Adaptive Access Manager 11*g* are globalized and hence the difference.

- Out-of-the-box policies

  Policies are designed to help evaluate and handle business activities or potentially risky activities that are encountered in day-to-day operation.

- Any groups

  Collections of items used in rules, user groups, and action and alert groups are shipped with OAAM.

If you need to customize any properties, you should import the snapshot into your new test system, make the changes, export the snapshot, and import it into your new system. Alternatively you can import the snapshot on the new system and make the property changes directly, thereby eliminating the test system completely.

> **Note:** For customers who are upgrading from 11.1.1.3.0 to 11.1.2: Do not import the snapshot. This procedure is only for first time initial setup. Importing a snapshot overwrites the existing environment and replaces it with a new one. For upgrades, import separate zip files for the entities, definitions, or policies.

For upgrading policies, components, and configurations, perform a backup, and then import the separate file. The following are available:

- Base policies are shipped in the `oaam_policies.zip` file, which is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory
- Configurable action templates are shipped in the `OOTB_Configurable_Actions.zip` file, which is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory.
- Base-authentication required entities are shipped in the `Auth_EntityDefinition.zip` file, which is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory.
- Default patterns are shipped in the `OOB_Patterns.zip` file, which is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory

2.7 Importing IP Location Data

IP location data is used by risk policies to determine the risk of fraud associated with a given IP address (location).

To be able to determine location of the login or transaction, this data must be uploaded to an OAAM database. For information on loading the data into the OAAM database, see Section 26.3, "Importing IP Location Data."

2.8 Enabling OTP

For information on enabling OTP, see Section 8, "Setting Up OTP Anywhere."

2.9 Setting the Time Zone Used for All Time Stamps in the OAAM Administration Console

A time zone identifies an area that always shares the same local time.

Time zones are used throughout Oracle Adaptive Access Manager for a variety of purposes. A time stamp can indicate when an alert was generated, the process start

and end dates of a job, search pages, and so on. Users often are most comfortable working in their local time zones. As the administrator, you can configure the preferred time zones for the OAAM Administration Console.

The property is a system wide time zone setting and not a per-user one. All users must be in the single time zone.

Note that time zone and the browser locale formatting are independent of each other. For example, if you set your browser to `en-gb`, but set your `oaam.adf.time zone` to `America/Los_Angeles`, the time stamps are formatted as per British locale formatting but the time zone is still Pacific Time.

Use the Property Editor to set `oaam.adf.timezone` to the desired time zone.

For example,

`oaam.adf.timezone = Atlantic/Reykjavik`

For instructions on using the Properties Editor, see Chapter 25, "Using the Properties Editor."

Time zone as listed in Section C.1.17, "Time Zone Properties."

2.10 Using Different Encryption Algorithms and Adding New Encryption Extensions

Out of the box supported encryption algorithms

- AES
- DES
- DESede (Triple DES)

  DESede is the default

To switch to different encryption

Set the property `bharosa.cipher.encryption.algorithm.system.default` to one of the following:

- DES
- AES

To use a new encryption algorithm follow these steps:

1. Write a java a class that implements the interface `com.bharosa.common.util.Password`.
2. Implement the methods `encrypt()` and `decrypt()`.
3. Add an element to the `bharosa.cipher.encryption.algorithm.enum` enum with the following attributes to `oaam_custom.properties` file:
   - name: Name of the algorithm
   - description: Description of the algorithm
   - classname: Fully qualified Class name of the java class developed in Step 1
   - keyRetrieval.className: Set this to `com.bharosa.common.util.cipher.CSFKeyRetrieval`
   - prefix.system: Prefix that will be used while encrypting (Optional)

- alias: Alias of the encryption algorithm

4. Set the property `bharosa.cipher.encryption.algorithm.system.default` to the newly added element name.
5. Compile and build the jar and related property files
6. Package them as OAAM extensions war
7. Deploy the OAAM extensions war and target it to both oaam_admin and oaam_server

   For details on using the OAAM extensions shared library, see *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

3

Getting Started with Common Administration and Navigation

This chapter describes the initial steps needed to log in and navigate around the OAAM Administration Console. This chapter includes the following topics:

3.1 Starting and Stopping Components in Your Deployment

The following procedure describes starting the database, OAAM Administration Console and online and offline servers:

1. Start the database.
   a. Set the ORACLE_HOME environment variable to the Oracle home for the database.
   b. Set the ORACLE_SID environment variable to the SID for the database.
   c. Start the Net Listener:

      ```
      ORACLE_HOME/bin/lsnrctl start
      ```

   d. Start the database instance:

      ```
      ORACLE_HOME/bin/sqlplus /nolog

      SQL> connect SYS as SYSDBA

      SQL> startup
      ```

2. Start the WebLogic Administration Server.

   ```
   DOMAIN_HOME/bin/startWeblogic.sh
   ```

3. Start the managed server hosting OAAM Admin Server.

   ```
   DOMAIN_HOME/bin/startManagedWeblogic.sh <oaam_admin_server1>
   ```

4. Start the online and offline servers.

   ```
   DOMAIN_HOME/bin/startManagedWeblogic.sh <server_name>
   ```

The following procedure describes stopping the OAAM Administration Console and online and offline servers. You will be stopping the components in the opposite sequence.

1. Stop the OAAM managed, offline, and OAAM Admin servers.

   ```
   DOMAIN_HOME/bin/stopManagedWeblogic.sh oaam_admin_server1

   DOMAIN_HOME/bin/stopManagedWeblogic.sh oaam_server_server1

   DOMAIN_HOME/bin/stopManagedWeblogic.sh oaam_offline_server1
   ```

2. Stop the WebLogic Administration Server.

   ```
   DOMAIN_HOME/bin/stopWeblogic.sh
   ```

3. Stop the database.

   a. Stop the database instance:

      ```
      ORACLE_HOME/bin/sqlplus /nolog

      SQL> connect SYS as SYSDBA

      SQL> shutdown

      SQL> quit
      ```

   b. Stop the Net Listener:

      ```
      ORACLE_HOME/bin/lsnrctl stop
      ```

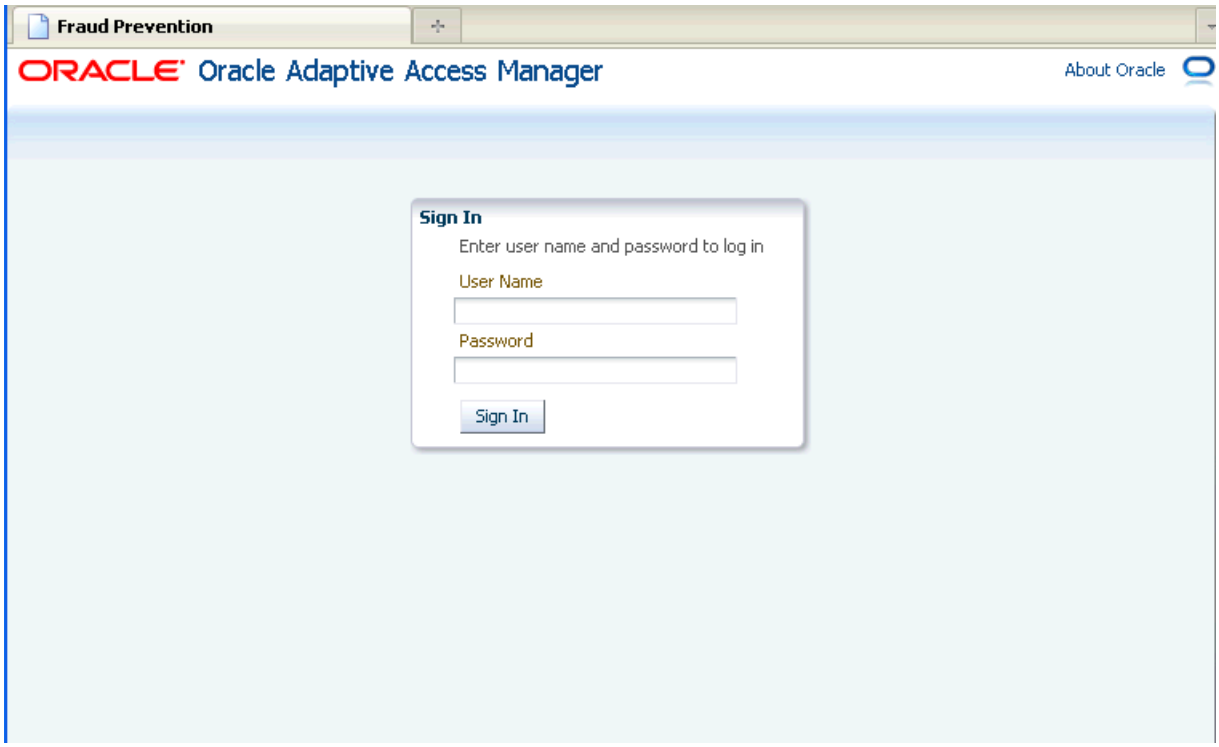
3.2 Signing In to Oracle Adaptive Access Manager 11*g*

This section describes how to sign in to OAAM Admin.

The features available when you sign in are based according to roles and business requirements.

An **Oracle Adaptive Access Manager Sign In** page is shown in Figure 3–1.

Figure 3–1 Oracle Adaptive Access Manager Sign In



To sign in to OAAM Admin, follow these steps:

1. In a browser window, enter the URL to the **Oracle Adaptive Access Manager 11g Sign In** page.

   `http://host:port/oaam_admin/`

   where

   - *host* refers to the Oracle Adaptive Access Manager managed Admin Server
   - *port* refers to the OAAM Admin managed server port
   - `/oaam_admin/` refers to the OAAM Admin Sign In page

2. On the **Sign In** page, enter your credentials.
3. Click the **Sign In** button.

   If you have logged in successfully, the **Fraud Prevention** tab appears on the left with an expanded navigation tree.

To sign out, select the **Sign Out** link in the upper-right corner of OAAM Admin.

3.3 OAAM Administration Console and Controls

Upon a successful sign in, Oracle Adaptive Access Manager displays the OAAM Administration Console.

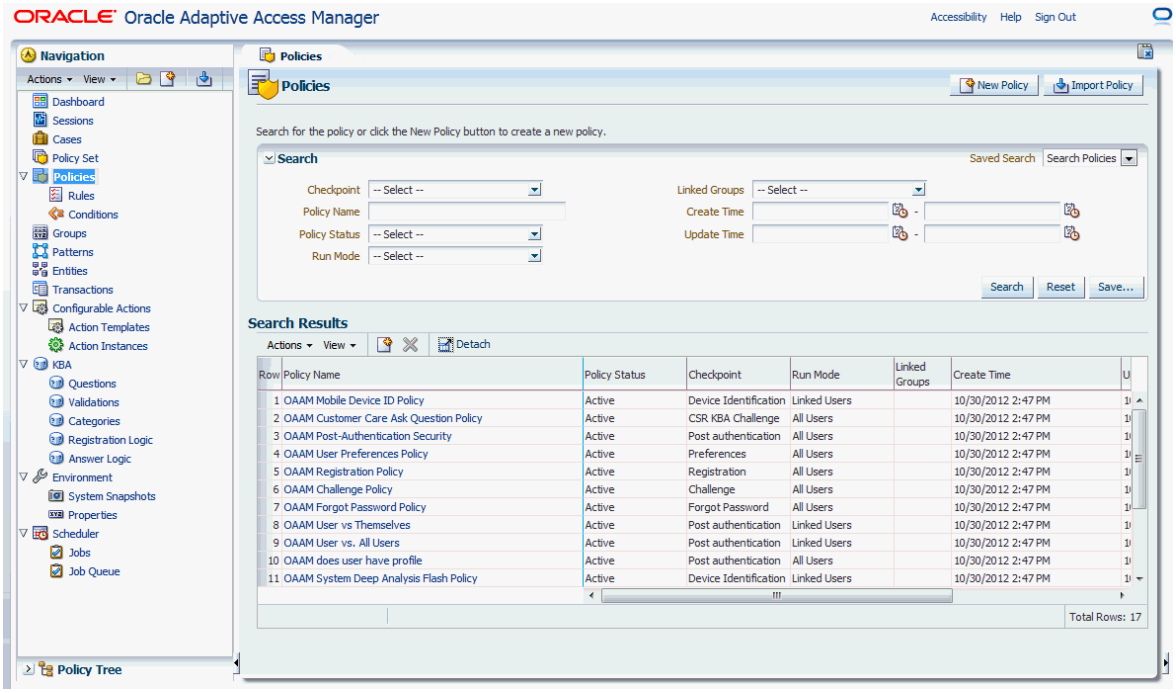
The OAAM Administration Console is divided into the following areas: navigation panel on the left and the main, active page on the right.

The navigation panel helps users access all environment, Adaptive Strong Authenticator, and Adaptive Risk Manager features of Oracle Adaptive Access Manager. Named nodes in the panel identifies these items.

Initially, no active page is opened on the right side of OAAM Admin. You must open a node first.

Figure 3–2 shows OAAM Admin with an active page opened.

Figure 3–2 OAAM Administration Console



When you open a node, a new tab opens with the corresponding details or search page. A named tab identifies each open page. The active page generally enables you to create, view, and modify items.

You can have up to ten pages open at one time, which enables multitasking.

> **Note:** If you try to open more than ten tabs, an error appears with the message that only ten tabs are allowed to be kept open. You can manually close one or more tabs and then try to open the new tab.

When multiple pages are open, only the active page and named tabs of other open pages are visible. You can click a named tab to return to the corresponding page.

The following sections provide more information about OAAM Admin:

- Navigation Panel
- Navigation Tree
- Policy Tree
- Management Pages
- Online Help

3.4 Navigation Panel

OAAM Admin provides navigators for easy access to different features of Oracle Adaptive Access Manager.

The Navigation panel in OAAM Admin contains the following trees:

- Navigation Tree
- Policy Tree

3.5 Navigation Tree

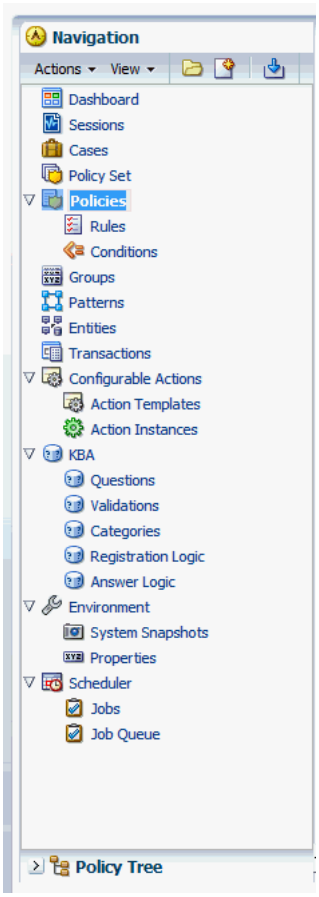
The Navigation tree, illustrated in Figure 3–3, is a collapsible and expandable tree that provides quick and visible access to features of Oracle Adaptive Access Manager.

3.5.1 Navigation Tree Structure

The Navigation tree includes named nodes that identify the individual features and groups of items within the Oracle Adaptive Access Manager product on which you can take action.

Figure 3–3 shows the Navigation tree.

Figure 3–3 Navigation tree



Depending on your access level, the Navigation tree can display the following nodes:

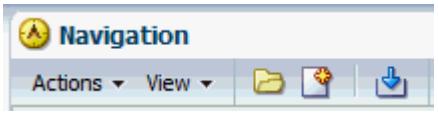
Table 3–1 OAAM Features

Features	Function
Dashboard	Access feature, which provides a high-level view of real customer data.
Cases	Access tools for creating and supporting Customer Service Representative (CSR). Cases not available in offline.
Policies	Access feature for designing policies to evaluate and handle business activities or potentially risky activities
Groups	Access feature to create groups for simplifying workload.
Sessions	Access feature to view the forensic record of a session
Patterns	Access feature to create patterns used for profiling behavior
Entities	Access feature to create data structure, which comprises of a set of attributes, that can be re-used across different transactions.
Transactions	Access feature to create transaction definitions so that client-specific transactions and parameters can be captured for monitoring
KBA	Access framework to manage tasks that impact challenge questions, validations and levels of logic algorithms used for answers, question categories, and levels of logic algorithms used for registration.
Scheduler	Access feature to manage jobs.
Environment	Access feature to manage Oracle Adaptive Access Manager environment.
Configurable Actions	Access feature to create custom actions

3.5.2 Navigation Tree Menu and Toolbar

A menu and toolbar appears above the Navigation tree, as shown Figure 3–3. Menus provide commands that you can use to take action on the selected item in the Navigation tree. Many menu commands are also provided as command buttons in the toolbar for quick access.

Figure 3–4 Menu and Toolbar



Create New

Create New opens the corresponding create page of the selected node. **Create New** is available only for certain nodes where applicable. See Table 3–2, " Create New of Selected Nodes" for a list of pages that can be opened by clicking **Create New**.

Table 3–2 Create New of Selected Nodes

Node	Subnode	Create Page or Dialog
Dashboard		N/A
Sessions		Not available
Cases		Create Case
Policy Sets		Not available
Policies		New Policy
	Rules	Not available
	Conditions	Not available
Groups		Create Group
Patterns		New Pattern
Entities		New Entity
Transactions		New Transaction
Configurable Actions		
	Action Templates	New Action Template
	Action Instances	New Action Instance
KBA		Not available
	Questions	New Questions
	Validations	Not Available
	Categories	New Category
	Registration Logic	Not available
	Answer Logic	Not available
Scheduler		Not available
	Jobs	Jobs search
	Job Queue	Job Queue
Environment		Not available
	Snapshots	Not available
	Properties	New Property

Open

Open opens the corresponding page for the node you have selected.

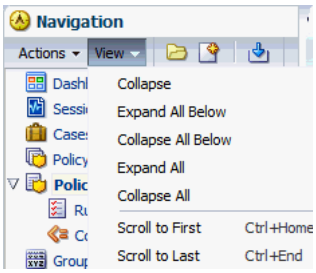
Import

Import opens the Import dialog for the node you have selected.

View Menu

Figure 3–5, "View Menu" illustrates the **View** menu and commands. Menu items that cannot be used on the selection in the Navigation tree appear in grey.

Figure 3–5 View Menu



The **View** menu command descriptions are provided in Figure 3–3.

Table 3–3 View Menu Commands

Command	Description
Collapse	Immediately closes the node.
Expand All Below	Immediately reveals all items below the selection.
Collapse All Below	Immediately closes the node and all items below the selection.
Expand All	Immediately reveals all the nodes and subnodes along with their leaf nodes in the Navigation tree.
Collapse All	Immediately closes all the nodes and subnodes along with their leaf nodes in the Navigation tree.
Scroll to First	Scrolls to the first node
Scroll to Last	Scrolls to the last node

Actions Menu

Figure 3–6 illustrates the **Actions** menu, which provides appropriate commands for the selection in the Navigation tree. For instance, if you have **Policies** selected in the Navigation tree, one of the commands, **New Policy...**, on the **Actions** menu enables you to open the **New Policy** page for creating a new policy.

Figure 3–6 Action Menu

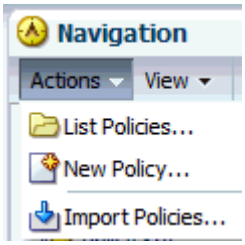


Table 3–4 Actions Commands

Command	Description
List Policies	Opens the item, search, or details page.
New Policy	Activates a new page that you can fill in to define a new item.
Import Policies	Displays the Import dialog, which enables you to locate and import the item.

3.6 Policy Tree

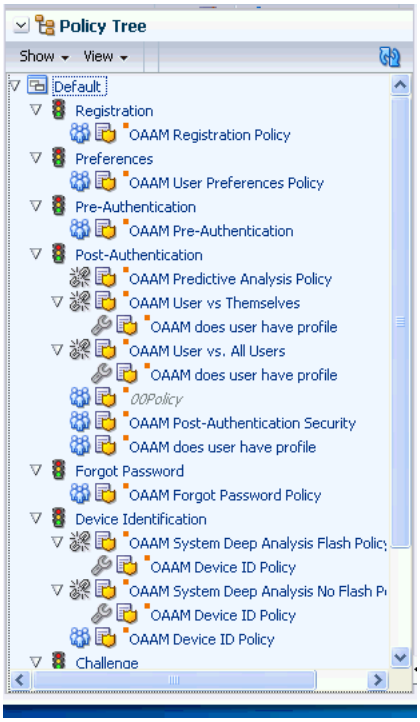
The Policy tree gives a visual representation of the policy hierarchy and the relationship between different policies, user groups, and the checkpoints.

Double-clicking an item in the Policy tree opens a dynamic tab for that item. This enables administrators to view and edit the configurations in context.

You can expand the Policy tree to view the details about the user groups and policies under each checkpoint.

For example the **Forgot Password** policy is under the **Forgot Policy Checkpoint** and **All Users** is assigned to the policy.

Figure 3–7 Policy Tree



Policy is the last level in the Policy tree. You cannot drill down further except to see nested policies.

Table 3–5 provides a legend for the icons which appear on the Policy tree.

Table 3–5 Policy Tree Legend

Icon	Definition	Description
	Checkpoint	The checkpoint is a decision and enforcement point when policies are call to run their rules.
	Policy	The policies available in the system. Disabled policies are grayed out. Policies linked to multiple user groups are bold and highlighted. To open the **Policy Details** page of a policy, double-click the **Policy** node. The **Policy Details** page can also be opened by clicking **Open Selected** from the context menu. To view nested policies, expand the policy node.
	All Users	Policy is linked to **All Users**.
	User Groups	Policy is linked to **Users**
	No user group	No users are associated with the policy.
	Trigger combination	Trigger combinations exist in the policy.
	More...	Summary information is available about the policy.

From the Policy tree, you can click the **More** icon for summary information on the policy.

3.7 Management Pages

The individual features and groups of items are organized on the Navigation tree. To open a component, double-click its node in the Navigation tree. The details of that node or a search page opens in a new tab on the right side of the console. A named tab identifies each open page, like the tabs on manila folders.

Only the active page is visible, with as many named tabs of other open pages that can fit on one line. You can click a named tab to return to the corresponding page.

The nodes and their corresponding pages are listed in Table 3–6.

Table 3–6 Open Pages

Node	Subnode	Pages
Dashboard		Dashboard
Sessions		Sessions
Cases		Cases search page
Policy Sets		Policy Sets page
Policies		Policies search page
	Rules	Rules search page
	Conditions	Conditions search page
Groups		Groups search page
Patterns		Pattern search page
Entities		Entity Definition Search page
Transactions		Transactions search page
Configurable Actions		Not available
	Action Templates	Action Templates search page
	Action Instances	Action Instance search page
KBA		Not available
		Note: KBA is not available in offline mode.
	Questions	Questions search page
	Validations	Validations search page

Table 3–6 (Cont.) Open Pages

Node	Subnode	Pages
	Categories	Categories search page
	Registration Logic	Registration Logic page
	Answer Logic	Answer Logic page
Environment		Not available
	System Snapshot	Snapshots search page
	Properties	Properties search page
Scheduler		
	Jobs	New Job
	Job Queue	

3.7.1 Search Pages

The search page is the starting place for managing the environment, adaptive strong authentication, and adaptive risk management features, and groups of like items.

You can open a search page by:

- Double-clicking a node in the Navigation tree
- Right-clicking a node in the Navigation tree and selecting the **List** command from the context menu that appears
- Selecting the node in the Navigation tree and then choosing the **List** command from the **Actions** menu

When a search page first appears, you see a search filter and a **Search Results** table. The **Search Results** table is initially empty. You must click the **Search** button to see a list of items.

To search for items:

1. Select the criteria to search from the dropdown lists. The lists of available criteria varies according to the feature.
2. Enter strings to match in the text boxes.
3. Select or specify filters to narrow the search scope.
4. Click the **Search** button to trigger the search and to display the results in the Search Results table.

The search returns all items that match the specified criteria; leave the fields empty to obtain the list of all items of the type.

3.7.1.1 Elements in the Search Form

This section describes the elements in the search forms.

Search

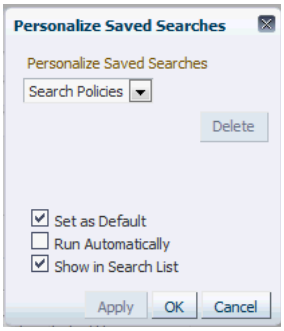
You can search for items using the attribute search criteria fields.

Reset

The **Reset** button enables you to reset the search criteria.

Saved Searches

You can create saved searches that persist for the duration of your session. You would enter the search criteria, then click the **Save** button to open the **Personalize Saved Search** dialog. The **Personalize Saved Search** dialog is used to specify how you want to save the search criteria you entered. You can name the search, for example, **myspecialsearch**, so that it displays in the **Saved Search** list.

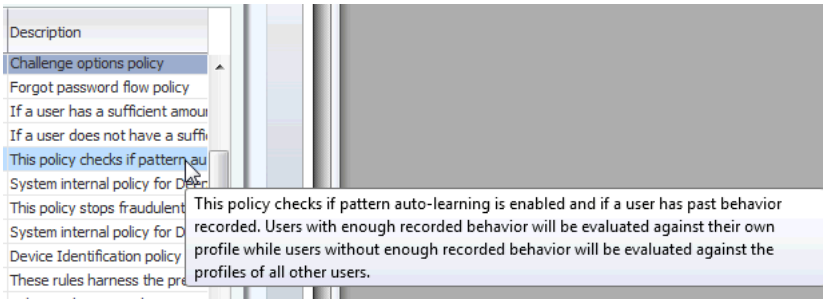


3.7.1.2 Search Results Table

The Search Results table shows at most the first 200 matches found by the search.

You can sort the results by using the **Sort Ascending** and **Sort Descending** buttons next to the column name.

If the description of an item is too long to be fully shown, positioning the cursor over the visible text displays the entire description.



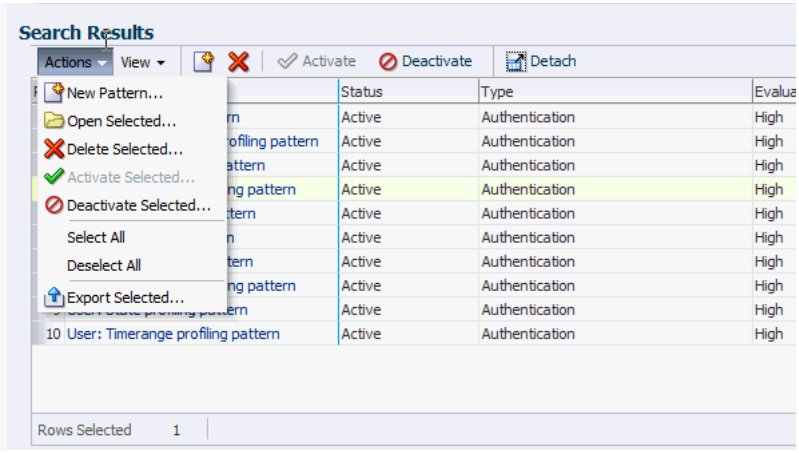
Once an item is selected in the **Search Results** table, an action can be performed on it by clicking one of the icons on the toolbar or by selecting a command from the **Actions** menu.

If you want to see more details, click the available link for the item.

3.7.1.3 Search Results Menu and Toolbar

A menu and toolbar appears above the **Search Results** table. Figure 3–8 shows the **Search Results Menu and Toolbar** from the **Patterns Search** page.

Figure 3–8 Results Menu and Toolbar



The **Actions** menu and command buttons provide appropriate commands for the selection in the Navigation tree and **Search Results** table.

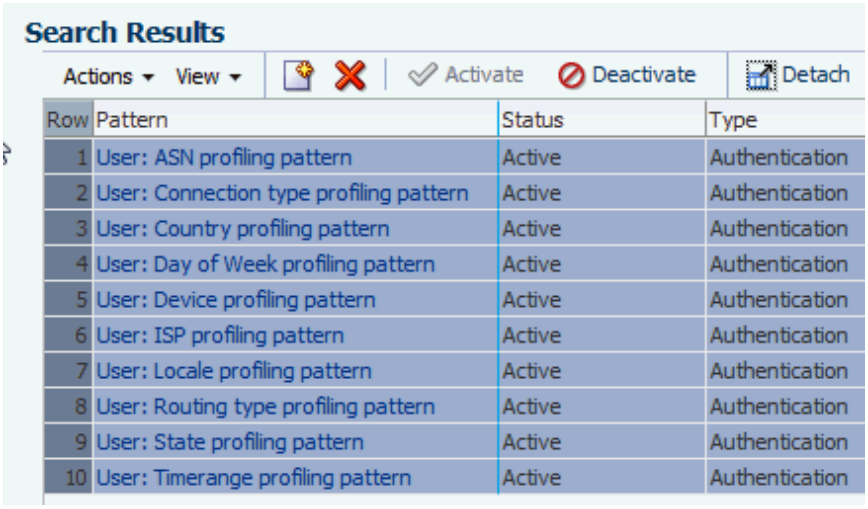
Figure 3–8 shows command buttons that may be available, depending on the selection.

Table 3–7 Results Menu and Toolbar

Button	Definition	Description
	Create	Opens a new page, which you can fill in to add a new item of the selected type. The new page opens as the active page on the right side of the Navigation tree.
	Delete	Removes the selected item.
	Create Like	Creates a new item that is similar— or "like"—the existing one.
	Activate	Activates the selected item.
	Deactivate	Deactivates the selected item.
	Detach	Detaches the Results table.

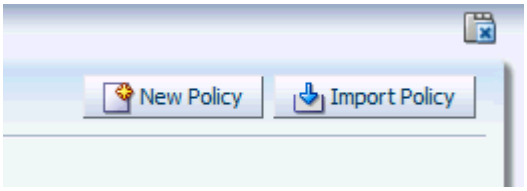
3.7.1.4 Select All

You can select all the results to perform actions on by clicking the header of the Row column in the upper-left corner of the **Search Results** table.



3.7.1.5 Create and Import

Generally, buttons to create new items or import items are in the upper-right corner of the console.



3.7.1.6 Close Multiple Tabs

The small close tabs button in the upper-right corner of the console enables you to close the tabs you are viewing.

If you have multiple tabs open, a Close Multiple Tabs dialog appears. To close multiple tabs, highlight the names of the tabs, and press **OK**.

3.7.2 Detail Pages

You can view details of a specific item by opening its details page.

A **Case Details** page is shown in Figure 3–9.

Figure 3–9 Case Details

3.8 Dashboard

The dashboard presents a real-time view of activity via aggregates and trending.

The dashboard is divided into three sections:

- The performance panel (Section 1) presents real-time data. It shows the performance of the traffic that is entering the system. A trending graph is shown of the different types of data based on performance.
- The summary panel (Section 2) presents aggregate data based on time range and different data types.
- The dashboard panel (Section 3) presents historical data. The detailed dashboards are used for trending data over time ranges.

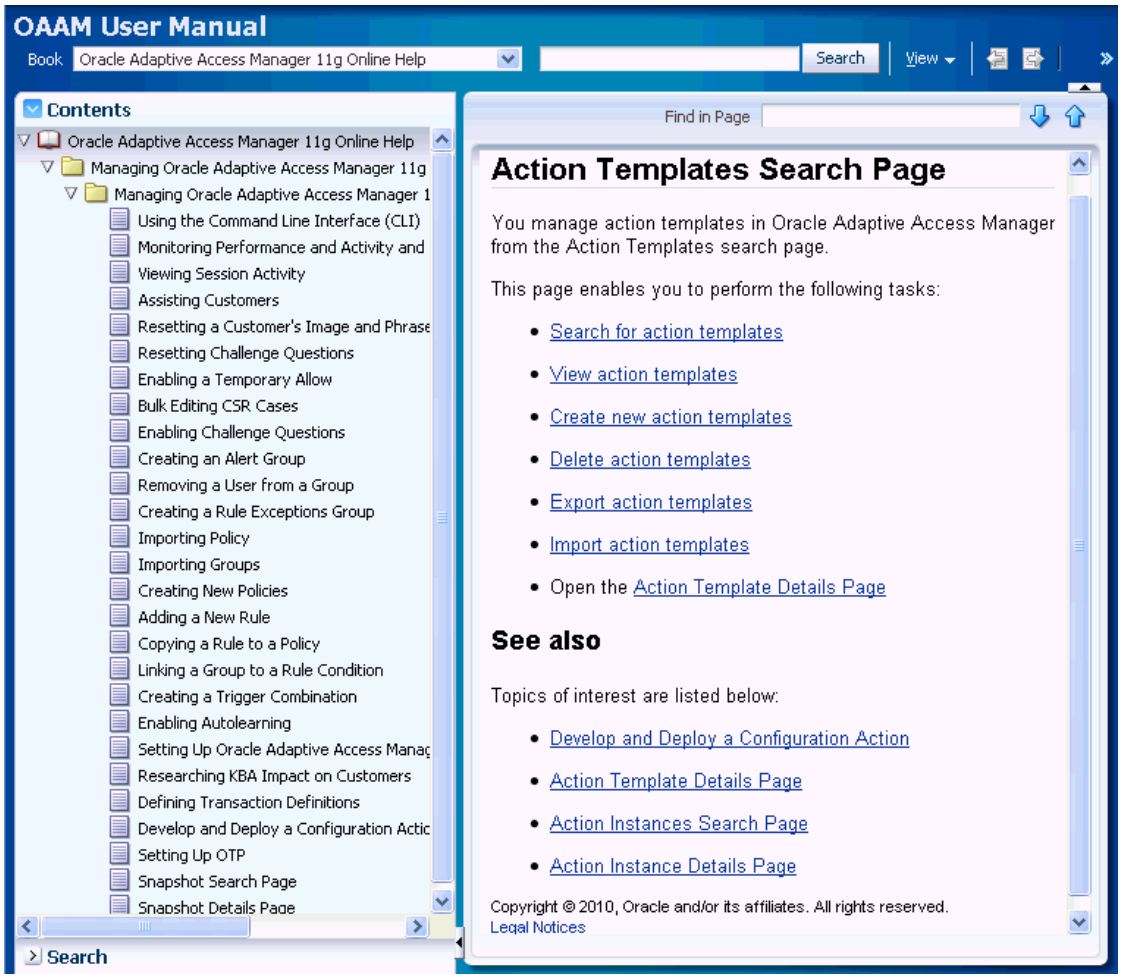
3.9 Online Help

To access online help documentation, on the upper right corner of any window, click **Help** to bring up the help window. A help topic for the relevant top-level search or details page is displayed. These help topics contain links to information in an online version of the *Oracle Fusion Middleware Administrator's Guide for Adaptive Access Manager*.

Selecting **Managing Oracle Adaptive Access Manager 11g Online Help** displays several topics in the online documentation.

Topics that are displayed by selecting **Help** appear in only English and Japanese languages. Online Help is not translated into the nine Admin languages.

Refer to the following illustration for an example of an online help window.



3.10 Search, Create, and Import

Oracle Adaptive Access Manager provides more than one way to search, create, and import.

Search

Depending on the selection, you can open a **Search** page by:

- Double-clicking the node in the Navigation tree.
- Right-clicking the node in the Navigation tree and selecting **List <item>** from the context menu.
- Selecting the node in the Navigation tree and then choosing **List <item>** from the **Actions** menu.
- Clicking the **List <item>** button in the Navigation tree toolbar.

Create

Depending on the selection, you can open a **Create** page by:

- Clicking the **New <item>** button in the upper right of the console.
- Right-clicking the node in the Navigation tree and selecting **New <item>** from the context menu.

- Selecting the node in the Navigation tree and then choosing **New <item>** from the **Actions** menu.
- Clicking the **Create new <items>** button in the Navigation tree toolbar.
- Selecting the **Create New <item>** button from the **Search Results** toolbar.
- Selecting **New <item>** from the **Actions** menu in **Search Results**.

Import

Depending on the selection, you can open a **Import** page by:

- Clicking the **Import <item>** button in the upper right of the console.
- Right-clicking the node in the Navigation tree and selecting **Import <item>** from the context menu.
- Selecting the node in the Navigation tree and then choosing **Import <item>** from the **Actions** menu.
- Clicking the **Import <items>** button in the Navigation tree toolbar.

3.11 Export to Excel

You can generate a report of the results from the Search pages for policies, questions, validations, snapshots, properties, entities, transactions, conditions, groups, patterns, and so on.

To export results to an Excel report:

1. Ensure the oaam.export.max.rows.allowed property is configured so that you are able to export all the rows needed. This property limits the maximum row selection.
2. In a search page, select rows the rows of interest from the search results.
3. Click the **Export To Excel** button.

   When the export confirmation dialog is shown, you can view the selected list. The export table with the selected rows shows the ID number and display name columns, so that you can easily identity and verify the selected rows before the export.
4. Click **Export** to export the rows to Excel.

3.12 Access Level to OAAM Admin

OAAM Admin provides functions for security investigators and customer service representatives (CSRs), security administrators, and system administrators. The functions and navigation that are available depend on the roles. For information, see Appendix G, "OAAM Access Roles."

OAAM Users will be needed in order to be able to use Oracle Adaptive Access Manager. You can create new users and assign the relevant Oracle Adaptive Access Manager roles in your WebLogic administration domain by using the Oracle WebLogic Administration Console. Best practices is to refrain from assigning multiple roles to a single user. If a user has multiple roles assigned to him, the user will have all of the permissions from the different groups. For information, see Section 2.5, "Creating OAAM Users."

Part II

Customer Service and Forensics

This part of the book presents information about the customer service and forensics tools of Oracle Adaptive Access Manager.

It contains the following chapters:

4

Managing and Supporting CSR Cases

Oracle Adaptive Access Manager provides a set of tools for creating and supporting Customer Service Representatives (CSR) cases. This chapter provides information to CSR and CSR Managers for managing cases and contains the following sections:

4.1 Introduction and Concepts

This section provides an introduction to CSRs and CSR Managers and a high-level view of how they might use the Oracle Adaptive Access Manager set of tools for creating and supporting cases.

4.1.1 Case

A **case** is a record of all the actions performed by the CSR to assist the customer as well as various account activities of the customer. Each case is allocated a **case number**, a unique case identification number.

Users of the enterprise using Oracle Adaptive Access Manager can call up the enterprise asking for assistance with user-facing features of Oracle Adaptive Access

Manager such as images, phrases or challenge questions, or any issues with their account. The CSR uses the Case Management feature to create a case which records all the actions performed by the CSR to assist the user as well as various account activities of the user.

4.1.1.1 CSR Cases

CSR cases are used in customer service situations associated within the standard course of doing business online and over the phone when providing assistance to customers. A CSR case is created for a specific user.

4.1.1.2 Escalated Cases

CSR escalates a case when he cannot resolve a case and needs further investigation by an investigator or when he determines there is suspicious activity associated with the specific user and he wants further investigation by an investigator. Once escalated the case is treated as an Agent case, which is no longer visible to the CSR. However, any agent can work on the escalated case.

4.1.2 Customer Service Representative (CSR)

Customer service representatives are employed by many different types of companies to serve as a point of contact for customers who call. They are responsible for ensuring that their company's customers receive an adequate level of service and help for low risk issues originating from customer calls. In handling customers' complaints, they must attempt to resolve the problem according to guidelines established by the company. These procedures may involve opening a case, entering notes as they are speaking to customers, asking questions to determine the validity of a complaint, making changes or updates to a customer's profile information, and, if required, passing the case on to a CSR Manager who has the appropriate privileges to respond. In a Multitenant deployment, CSRs only have access to cases limited to an Organization.

4.1.3 CSR Manager

The **CSR Manager** is in charge of overall management of CSR-type cases. A CSR Manager has all the access and responsibilities of a CSR and access to more operations, such as:

- bulk edit cases
- temp allow users
- extend expiration

The CSR does not have the permissions to perform these actions. A CSR Manager routinely searches through the CSR cases to check on status and clean up if needed.

4.1.4 Locked Status

If the user fails a challenge, he is locked out of the account. The status of the account is **Locked**. The Locked status is only used if the **Knowledge Based Authentication (KBA)** or **One Time Password (OTP)** facility is in use.

- Knowledge Based Authentication (KBA): For online challenges, a customer is locked out of the session after the Online Counter reaches the maximum number of failures. For phone challenges, a customer is locked out when the maximum number of failures is reached and no challenge questions are left.

- One Time Password: OTP sends a single-use password to the user through a configured delivery method, and if the user exceeds the number of retries when attempting to put in his OTP code, his account becomes locked.

After the lock out, a CSR must reset the status to **Unlocked** before the account can be used to enter the system.

4.1.5 Temporary Allow

A temporary allow grants temporary account access to a customer who is being blocked from logging in or performing a transaction. A customer is blocked when a security rule is triggered. For example, a customer may be traveling on business and attempting to log in from a blacklisted country and the system has blocked him or her.

4.1.6 Case Status

Case Status is the current state of a case. Status values used for the case are **New**, **Pending**, **Escalated**, or **Closed**. When a case is created, the status is set to **New** by default. CSRs cannot Authentication a closed case. CSR Managers and Investigators can Authentication a closed case. Escalated cases cannot be created.

4.1.7 Severity Level

The **Severity Level** is a marker to communicate to case personnel how serious the case is. The severity level is set by whomever creates the case. The available severity levels are **High**, **Medium**, and **Low**.

4.1.8 Expiration Date

Note: Depending on the type of the case, the terminology used and behavior may be different.

The **expiration date** is the date when a case expires. By default, the length of time before a case expires is 24 hours, but is configurable.

- **CSR cases**: For CSR cases, the status of the case changes from the current status to **Expired**. The case could have any status when it expires. The CSR can open the case but cannot perform any actions on it. The CSR Manager can extend an expired case.
- **Escalated cases**: For escalated cases, the status of the case changes from the current status to **Expired**. When the case is expired, an expired flag is set for the case to let managers know that the case requires their attention. For example, if escalated cases are set to 24 hours and if the case is open and has not been accessed in more than 24 hours, the flag is set to **Expired**. When the Fraud Investigator accesses the expired case, it is reactivated and the expiration date is extended for another 24 hours (or however long it has been configured for). The expired behavior is configurable using the Properties Editor. CSRs cannot change the expiration date of escalated cases.

4.1.9 Customer Resets

Oracle Adaptive Access Manager uses images and phrases on virtual authentication devices as part of the personalization to help prevent fraud. The Customer Resets feature enables you to reset the customer's image and phrase and unregister his

device. The Customer Reset feature is not be available for a closed, an escalated or an expired case.

4.2 CSR and CSR Manager Role Permissions

Customer Service personnel can access various functionality in Oracle Adaptive Access Manager based on the role to they are assigned. The out-of-box roles are CSR and CSR Manager. A CSR has limited access to the OAAM Administration Console. Their primary function is to resolve low risk customer issues originating from customer calls.

A CSR Manager has all the access and responsibilities of a CSR and access to more sensitive operations. The CSR Manager is in charge of the overall management of CSR type cases.

Table 4–1 CSR and CSR Manager Role Permissions

Action	CSR Permissions	CSR Manager Permissions
Search Cases	Search for CSR cases Search for open and closed cases.	Search for CSR cases Search for open and closed cases.
New Case	Create only CSR cases	Create only CSR cases
View Case Details	View closed case details View Transactions in Sessions tab (CSRs do not have access to Session details from Queries)	View closed case details View Transactions in Sessions tab
Edit Case	Add notes to closed cases (view only for everything else) Perform all customer and KBA resets on a CSR case Perform KBA phone challenge on a CSR case Change status and severity on a CSR case	Authentication closed cases Add notes to CSR cases Change status and severity on a CSR case Bulk edit CSR cases Temp allow users Extend expiration Perform all customer and KBA resets Perform KBA phone challenge

4.3 Getting Started

Before using the case tools, read through Section 4.1, "Introduction and Concepts"—the section is useful in helping you to understand the concepts presented in this chapter. To perform the operations listed earlier, log in as a CSR or CSR Manager. When you log in, the **Cases Search** page is opened.

The **Cases Search** page is the starting place for managing CSR cases. From the **Cases Search** page, you can:

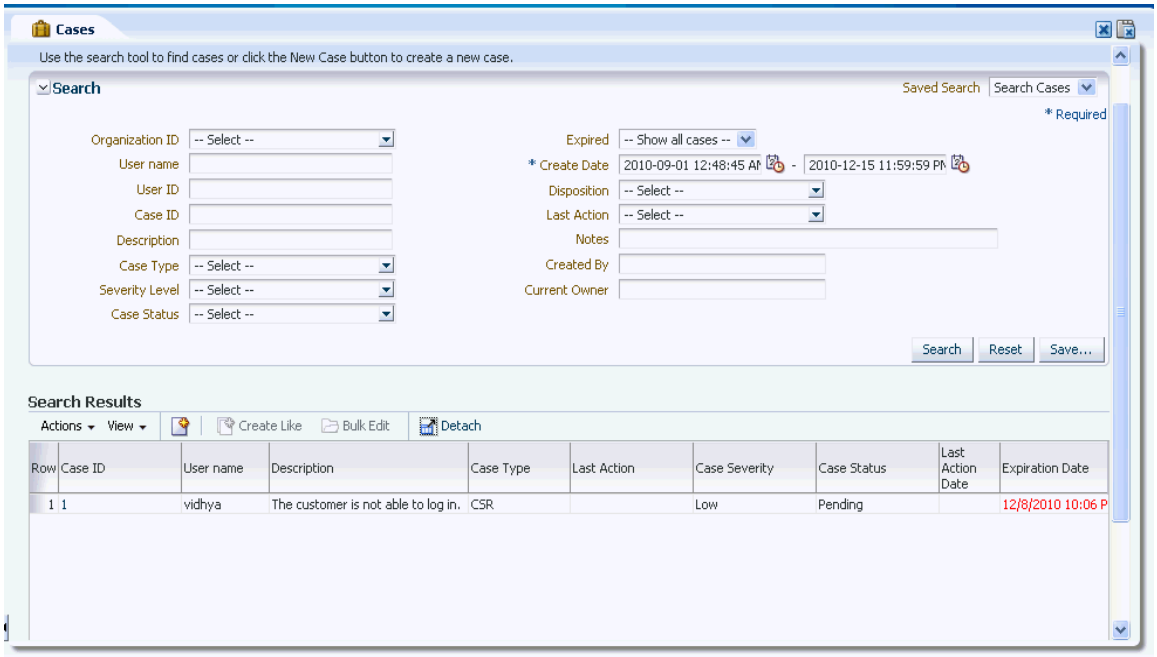
- create new cases
- create like cases
- bulk edit cases
- perform searches

If you are a CSR, you can open only one case at a time.

4.4 Cases Search Page

The **Cases Search** page contains the search tools to help you find cases that you are interested in. An example **Cases Search** page is shown in Figure 4–1.

Figure 4–1 CSR Cases Search Page



The filters are shown in Table 4–2.

Table 4–2 Search Filters

Filter	Description
Organization ID	To locate cases for an organization, select the Organization ID. In a Multitenant deployment, CSRs only have access to cases limited to an Organization. Organization names to which the user has access are presented.
User Name	To locate cases for a specific user, enter his user name or part of a user name in the User Name field.
User ID	To locate a case by the user identifier.
Case ID	To locate a specific case, enter the Case ID.
Description Keyword	To locate a case by a keyword that is in the description, enter the word you want.
Case Type	To filter cases by case type, select CSR.
Severity Level	To filter cases by severity level, select Low, High, or Medium.
Case Status	To filter cases by case status, select New, Pending, Closed, Escalated.
Expired	To filer the list by expired, select the option you want. The options available are: ▪ Hide Expired ▪ Show Only Expired
Created Date	To locates cases created within a given create date range, enter the start and end dates you want for the range.

Table 4–2 (Cont.) Search Filters

Filter	Description
Disposition	To filter cases by dispositions, you can select: ■ Confirmed Fraud ■ Duplicate ■ False Negative ■ False Positive ■ Issue Pending ■ Issue Resolved ■ Not Fraud The disposition describes the way in which the issue was resolved in a case. Cases only have dispositions when they are closed. If a case has any status besides closed, the disposition is left blank.
Last Action	Search based on the last action that was taken in case.
Notes	Search for cases that contain specific keywords in their log. For example, if you search for all cases that contain the word "chargeback," a case with a note that contains "The device used seems to be related to a number of chargebacks" would return in the list of cases.
Created by	Search by user name of the agent who created the case.
Current Owner	Search by user name of the agent who is working on this case currently (who performed the last action)

4.4.1 Searching for Cases

When a customer telephones with a question or problem, you can search all customers and cases quickly through any combination of factors. For example, you can search for a customer's open case by entering his User ID and **New**, **Pending**, and **Escalated** for his case status. For example, you can search for CSR cases created between a month ago and yesterday.

To search cases:

1. From the **Cases Search** page, specify criteria in the search filter.
2. Click **Search**.

There is a link on the case number. To view the case details, click the link. You can get the case detail for cases that belonged to any user belonging to the group you have access to. If the user does not belong to the group you have access to, you do not see that case in search results.

4.4.2 Viewing a List of Cases

Depending on the criteria entered for the search, the **Search Results** table can display a list of cases. In a multitenant environment, if the user does not belong to an organization you have access to, you do not have access to his case. If you had been assigned to one organization previously and created cases for users in that organization and serviced them, when you are reassigned to another organization, you only see cases for the new organization when you log in again, regardless of whether you serviced them or not.

4.4.3 Viewing a List Cases You are Currently Working On

From the **Cases Search** page, enter your user name in the Current Owner field to locate cases that you are currently working on and click **Search**. The Search Results table displays the list of cases you are currently working on.

4.4.4 Searching for Open and Closed Cases

1. From the **Cases Search** page, search by **Case Status**:
   - **New**, **Pending**, and **Escalated** to locate open cases
   - **Closed** to locate closed cases

   For information, see Section 4.4.1, "Searching for Cases."
2. Click the case number of the case you want.

   The **Case Details** page is displayed (Figure 4–2).

   When the CSR or CSR Manager opens the case
   - The current owner becomes the CSR or CSR Manager.
   - The Created By field remains the same.
   - The status of the case is "Pending."
3. Next, the CSR or CSR Manager can perform the necessary actions such as granting a temporary allow, performing challenge question resets, and other actions.

4.4.5 Searching Case by Description Keyword

Searching by description keywords would display all cases with any matching words in that was entered as a description during case creation.

1. From the **Cases Search** page, enter the description keyword to locate cases that contains the **Description Keyword** and click **Search**.
2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).

4.4.6 Viewing a List of Cases

Searching by description keywords would display all cases with any matching words that was entered as a description during case creation.

4.5 Case Details Page

By clicking the case number in the **Cases Search** page, you can review the details of a specific case perform various actions on cases. The **Case Details** page provides such general details about the case as the customer's user name, status, severity level, and description. For information, see Section 4.5, "Case Details Page."

Figure 4–2 Case Details

4.5.1 Case Actions

Case Details also provides access to the actions that can be taken, a log of case activity, and a list of customer sessions. From the **Case Details** page, the following options are available:

- Add Notes
- Ask Question
- Customer Resets
- Temporary Allow (CSR Manager Only)
- Change Severity
- Change Status
- Extend Expiration Date (CSR Manager Only)
- Escalate Case (CSR Manager Only)

You can only act on those case that you can access in the details page. You can open the case only when you have access to the user's group.

4.5.2 Viewing Case Details

The following information is displayed in **Case Details**.

- **Case Status** - The current state of a case. Status values used for the case are **New**, **Pending**, **Escalated**, or **Closed**.
- **Severity Level** - The available severity levels are **High**, **Medium**, and **Low**. For information about severity levels, see Section 4.1.7, "Severity Level."

- **Description** - The details for the case. A description is required.
- **Case Created** - The date and time the case was created.
- **Last Case Action** - The last action executed in the CSR case.
- **Date of Last Case Action** - The date when last action occurred.
- **Last Global Case Action** - The last action that occurred for this user in all CSR cases. Escalated cases are not taken into account.
- **Date of Last Global Case Action** - The last action performed against the user online.
- **Expiration Date (for CSR cases)** - The date when a case expires. For information about expiration dates, see Section 4.1.8, "Expiration Date."
- **Disposition** - The description of how the issue was resolved when the case was closed. Cases only have dispositions when they are closed. If a case has any status besides closed, the disposition is left blank.

4.5.3 Viewing User Details

The following information is displayed in **User Details**.

- **User Name** - Identifier a user uses to log in
- **Organization ID** - The unique identifier for the organization the user belongs in

  The combination of **User Name** and **Organization ID** is the unique identifier for a user accessing an application. In a multitenant deployment, CSRs only have access to cases limited to an Organization.
- **Completed Registration** - If the user has completed registration, this field shows **Yes**; otherwise it shows **No**. To be registered a user may need to complete all of the following tasks: Personalization (image and phrase), registering challenge questions/answers and email/cellphone.
- **Personalization Active** - When the user has an image, a phrase and questions active, this field would display **Yes**. If any one of these are reset, this field would display **No**.
- **Questions Active** - If user has completed registration, but questions have been reset, and the user has not gone back and registered new ones, this field would display **No**. This field shows **Yes** if the user has completed registration and questions exists by which he or she can be challenged.
- **OTP Active** - If supported OTP delivery channels are registered, the field shows **Yes**.
- **Last Online Action** - The last action that the user executed. For example, **Block** is displayed if the user is blocked.
- **Date of Last Online Action** - The date when the last online action was executed.
- **Temporary Allow** - If temporary allow is active, this field shows **Yes**; otherwise the field shows **No**.

4.6 Viewing Case Activity

OAAM Admin maintains a unique log of every customer service action taken while working on a case. The log is available in the **Logs** tab of the **Case Details** page. Each log entry includes the Log ID, ARM ID of the CSR, log date, action, subaction, and

notes. You can use this log while you are on the phone with a customer to view the case history.

4.6.1 Viewing the Case History

To view the case history:

1. From the **Cases Search** page, specify criteria in the search filter.

   For information, see Section 4.4.1, "Searching for Cases."

2. Click the case number of the case you want.

   View the activity log for that case.

4.6.2 Searching the Log of a Case

To search the log of a case:

1. Display the log for the case you want to search, as described in Section 4.6.1, "Viewing the Case History."
2. Enter the search criteria and click **Search**.

Table 4–3 Log Search Filters

Filter	Description
Notes Keyword	Keyword in notes describing why an action was taken in a case. For example, suspected fraud.
ARM ID	The type of agent that performed the action. For example, csrm1
Log Date	The date of the case action.
Action	The action taken for the case. For example, escalation.

4.6.3 Viewing Escalated Case Logs and Notes

To view the log and notes of an escalated case:

1. In the **Cases Search** page, search by the case status and by other filters to locate the case.

   For example, search for **Agent** cases for Alex's user name. For information, see Section 4.4.1, "Searching for Cases."

2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).

3. Click the **Log** tab.

   The activity log for that case appears.

4. Enter the search criteria and click **Search**.

4.7 Viewing Customer's Sessions

OAAM Admin maintains a history of a customer's sessions. Each session entry includes the Session ID, authentication status, session date, Device ID, location, transactions, and alerts. Sessions information is available in the **Sessions** tab of the **Case Details** page. You can use the **Sessions** tab while you are on the phone with a customer to view the sessions history (a list of that customer's previous sessions).

4.7.1 Viewing a Customer's Session History

To view a customer's session history:

1. From the **Cases Search** page, specify criteria in the Search Filter.

   For information, see Section 4.4.1, "Searching for Cases."

2. Click the case number of the case you want.

   The **Case Details** page appears.

3. Click the **Sessions** tab.

4.7.2 Searching for a Customer's Sessions

To search for a customer's sessions:

1. Display the list of sessions for the case, as described in Section 4.7.1, "Viewing a Customer's Session History."
2. Enter search criteria and click **Search**.

Table 4–4 Sessions Search Filters

Filter	Description
Session ID	The identifier for the session. For example, 11702.
Device ID	The identifier for the device. For example, 1803.
Alert Message	Text message configured in the alert.
Authentication Status	Status of the session (each login/transaction attempt creates a new session).
Alert Level	Severity of the alert whether high, medium, low.
Transactions	Types of transactions that took place during the session.
Country	The country the user logged in from.
State	The state the user logged in from.
City	The city the user logged in from.
Session Date	The time the user logged in to perform the transaction. For example, 2013-11-01 02:26:41 PM.

You can search sessions belonging to the users that belong to the organizations that you have access to.

4.7.3 Searching for a Customer's Sessions by Device ID or Date Range

To search for a customer's sessions by Device ID or date range:

1. Display the list of sessions for the case, as described in Section 4.7.1, "Viewing a Customer's Session History."
2. To search the sessions by **Device ID**, enter the ID of the device.
3. To search the sessions by date range, click the calendar icons and select the start date and the end date.
4. Click **Search**.

4.7.4 Filtering the Session History by Authentication Status or Alert Level

To filter the list of customer's sessions by authentication status or alert level

1. Display the list of sessions for the case, as described in Section 4.7.1, "Viewing a Customer's Session History."
2. To filter the sessions by authentication status, select the authentication status you want.
3. To filter the sessions by alert level, select the alert level you want.
4. Click **Search**.

4.7.5 Viewing Transactions in the Sessions History

To view the customer's transactions.

1. Display the list of sessions for the case, as described in Section 4.7.1, "Viewing a Customer's Session History."
2. Filter the log by transactions.
3. Click **Search**.

4.8 Creating a CSR Case

A CSR case is a record of related customer care events and actions for a single customer. Multiple cases also provide a way of segregating unrelated issues and actions for a customer. CSR cases are used by the CSR while assisting a customer. Procedures are described in this section for creating new and like cases.

4.8.1 Creating a Case

The CSR is only able to create cases for users of the organizations he has permissions for. A new CSR case is created by a CSR Manager or CSR when a customer care situation occurs either online or through a phone call. The CSR or CSR Manager searches for cases by the Organizations ID and user name.

In a Multitenant deployment, CSRs only have access to cases limited to an Organization. He is not be able to see the case if the user belongs to an organization he does not have permission for.

Depending on the case, the CSR or CSR Manager decides if a new case must be created or if it can be handled with an existing case for that user.

To create a new case:

1. In the **Cases Search** page, click **New Case**.

   The **Create Case** screen appears.

   You could also open the **Create Case** screen by right-clicking **Cases** in the Navigation tree and selecting **New Case** from the context menu that appears.

Figure 4–3 Create Case

2. Select the **Organization ID**.

   A list of **Organization ID**s for which you have access to is provided. From the list you can select one **Organization ID**.

   You can select an **Organization ID** and enter a **user name** or enter the **User ID**.

3. Enter the **user name**.

   User name is the identifier a user uses to log in. The combination of **user name** and **Organization ID** is the unique identifier for a user accessing an application. The unique **Organization ID** and **user name** combination must be available in the system. The user name is case-sensitive. If the user name is invalid or does not use the correct uppercase and lowercase, an error message appears when you press **Create**.

4. Enter the **User ID**.

   User ID is unique identifier generated by the system for the user.

5. Select a severity level from the **Severity Level** list

   The available severity levels are **High**, **Medium**, and **Low**.

6. Enter a description of the case in the **Description** field, or multiple descriptions from the **Canned Description** list, or both.

   You can enter any description, for example, if a customer calls and says that he or she cannot "do banking," you could create a case for the customer with the description "can't do banking."

   The **Description** field can contain alphanumeric and special characters. You can select multiple descriptions, one at a time, from the **Canned Description** list for the same case. Each description selected from the list is appended to the previous.

7. Click **Create** or **Cancel**.

   If an invalid parameters were entered, an error message is displayed and the new case is not created. If you click **Cancel**, the **Cases Search** page appears. If you click **Create**, a new case is created, and you are directed to the **Case Details** page of the newly created case.

   When the **Case Details** page is displayed:

   - The **Case Status** shows **Pending**.
   - The **Created By** field shows the user name of the CSR who created the case.
   - The **Current Owner** field shows his user name because he is the current owner of the case.

4.8.2 Creating a Case Like Another Case

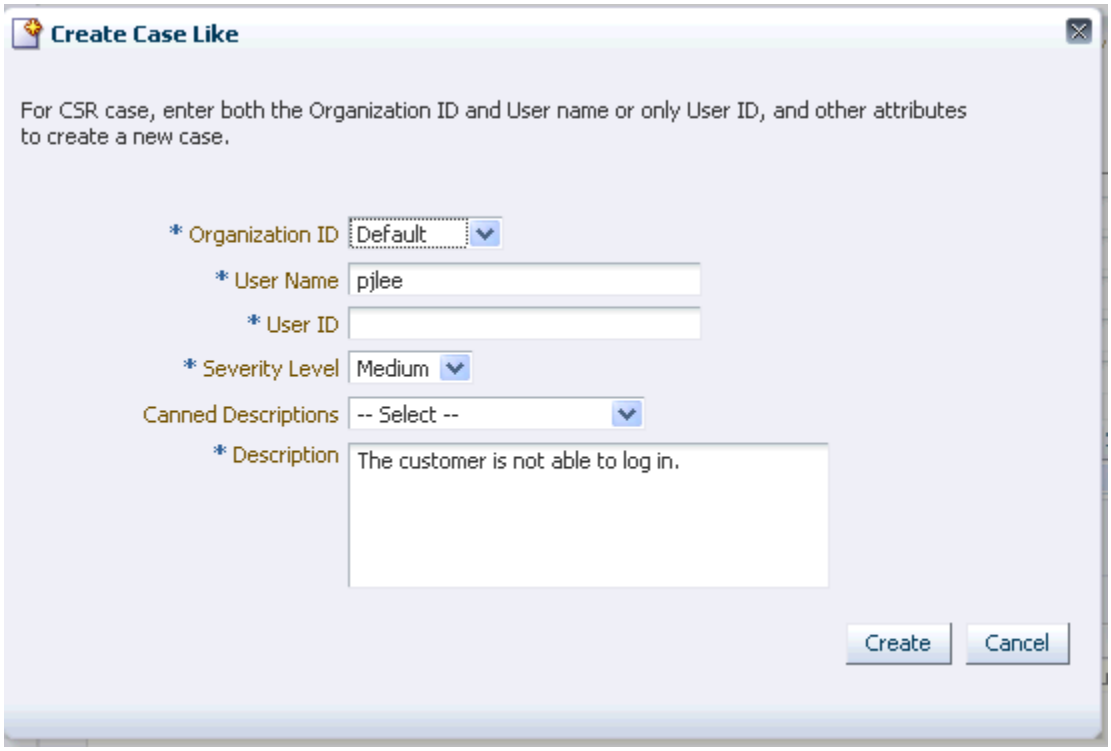
To create a new case that is similar— or "like"—an existing case:

1. From the **Cases Search** page, select a case by clicking in the checkbox next to case in the **Search Results** table.
2. Click the **Create Like** button.

   The **Create Case Like** screen appears with pre-populated data from the original case. If you had chosen a closed case, the **Create Case Like** screen shows pre-populated data from the case except the **Case Status** is **New**.

   If you had chosen an escalated case, the **Create Like** screen shows pre-populated data from the case except the **Case Status** is **New** and the **Case Type** is **CSR**.

Figure 4–4 Create Like



3. Enter a description in the **Description** field, or select a description from the **Canned Description** list, or both.

   Description is a required field. You can select multiple descriptions, one at a time, from the **Canned Description** list for the same case. Each description selected from the list is appended to the previous description. If you are entering a description, the **Description** field can contain alphanumeric and special characters.

4. Edit any of the other fields if you want.

5. Click **Create** or **Cancel**.

   If you click **Cancel**, the **Cases Search** page appears. If you click **Create**, a new case is created with data from the original case and your changes, and you are directed to the **Case Details** page of the newly created case.

4.9 Performing Customer Resets

Authenticator uses images and phrases on its virtual authentication devices as part of the personalization to help prevent fraud. **Customer Resets** enable you to reset the customer's image and phrase and unregister his device. **Customer Resets** are not be available for a closed, escalated or expired case.

4.9.1 Resetting Image

If you reset a customer's image, OAAM Admin randomly assigns a new image to the customer. After resetting the image, you can inform the customer that the authenticator will display a new image at the next log in to the website. The same phrase will continue to be used. If a customer is not registered and does not have an image to reset, an error message appears if you try to reset his image.

To reset a customer's image:

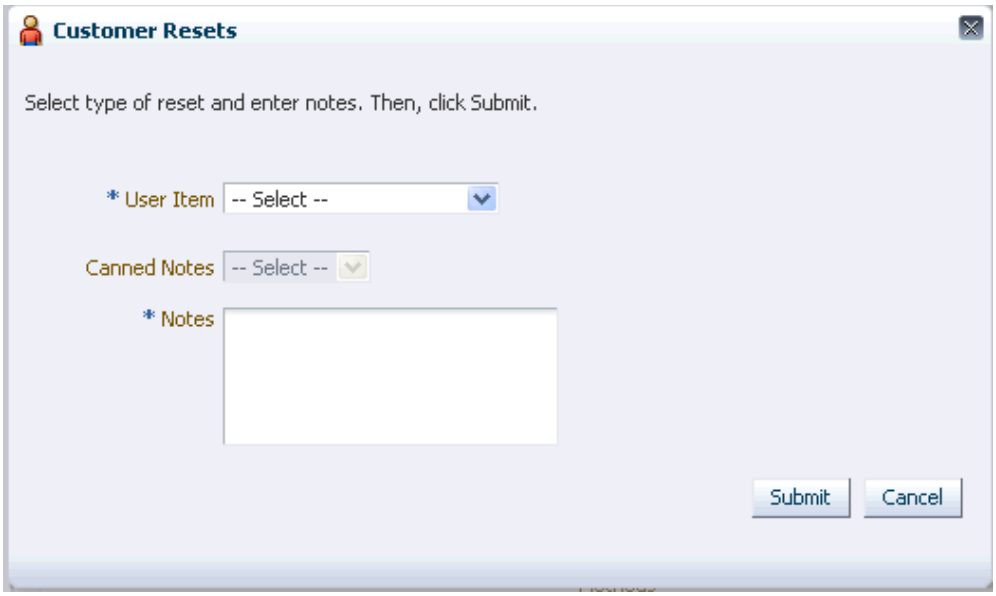
1. From the **Cases Search** page, search for an existing case for resetting the image for the customer, and if it does exist, click the case number in the results table.

2. If the case does not exist, create one for resetting the customer's image.

3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.

Figure 4–5 Customer Resets



4. In the **User Item** list, select **Image**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

4.9.2 Resetting Phrase

When the customer's phrase is reset, a new one is randomly assigned to the customer. After resetting the phrase, you can inform the customer that the authenticator will display a new phrase the next time he or she logs in to the website. The same image will continue to be used.

To reset a customer's phrase:

1. From the **Cases Search** page, search for an existing case for resetting the phrase for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for resetting the customer's phrase.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Phrase**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

   An error message appears if the customer is not registered and does not have a phrase to reset.

4.9.3 Resetting Image and Phrase

If you reset a customer's image and phrase, OAAM Admin generates a new image and phrase and assigns them to the customer. Afterward, you can inform the customer that

the authenticator will display a new personal image and phrase at the next log in to the website.

To reset a customer's image and phrase:

1. From the **Cases Search** page, search for an existing case for resetting the image and phrase for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for resetting the customer's image and phrase.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Image and Phrase**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

   An error message appears if the customer is not registered and does not have a phrase and an image to reset.

4.9.4 Unregistering Devices

When you unregister devices, OAAM Admin unregisters all of a customer's devices. The customer can register another device if he wants.

To unregister a customer's devices:

1. From the **Cases Search** page, search for an existing case for unregistering the device for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for unregistering the customer's device.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Unregister Devices**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

4.9.5 Resetting OTP Profile

When a customer's OTP profile is reset, the system deletes the contact information that is used to send the OTP. Out of the box, the user is asked to register contact information on next login, if the OTP profile is reset. OAAM deployments may choose to use both KBA and OTP. If that is the case, if the OTP profile is reset, but questions are still active, the customer is asked to reregister OTP information at the next login.

To reset a customer's OTP profile:

1. From the **Cases Search** page, search for an existing case for resetting the OTP profile for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for resetting the customer's OTP profile.
3. On the menu bar of the Case Details page, click **Customer Resets**.

The **Customer Resets** screen is displayed.

4. In the **User Item** list, select **Reset OTP profile**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

OTP Delivery Method Reset Example

Jacob calls the CSR and requests that his OTP delivery method be reset and change from phone to SMS and provides a phone number for SMS.

Carl the CSR performs these steps:

1. Carl searches for Jacob's logins and verifies with him about last login time and place.
2. Carl creates a case for Jacob and resets his OTP delivery method.
3. He asks Jacob to login again and verify the new OTP delivery method.
4. After he is done and confirms the new OTP working fine, Carl goes ahead and closes the case.

4.9.6 Resetting Virtual Authentication Device

A customer may sometimes ask to have the virtual authentication device reset.

To reset a customer's virtual authentication device:

1. From the **Cases Search** page, search for an existing case for resetting the virtual authentication device for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for resetting the customer's virtual authentication device.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Reset Authentication Pad**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

4.9.7 Unlocking OTP

The CSR unlocks the customer who calls because he or she has been OTP-locked. Unlocking the customer resets the customer's OTP failure counter to 0.

To unlock OTP for the customer:

1. From the **Cases Search** page, search for an existing case for unlocking the OTP for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for unlocking the customer's OTP.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Unlock OTP**.

5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

4.9.8 Resetting All Registration Data, Challenge Counters, and OTP Contact and Delivery Information

The **Customer (All)** option resets all user registration information including security phrase, image, challenge questions, challenge (question and OTP) counters, and OTP profile.

To reset all registration data, challenge counters, and OTP profile information:

1. From the **Cases Search** page, search for an existing case for resetting all registration data, challenge counters, and OTP contact and delivery information for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for the customer.
3. On the menu bar of the Case Details page, click **Customer Resets**.

   The **Customer Resets** screen is displayed.
4. In the **User Item** list, select **Customer (All)**.
5. In the **Canned Notes** list, select the note you want to add and edit the note in the **Notes** field. You can also enter notes into the **Notes** field directly.
6. Click **Submit**.

4.10 Performing Challenge Question Resets

Authenticator uses questions as additional credentials to help prevent fraud. You can perform question-related actions for the customer when necessary. The Challenge Questions feature enables you to reset the following items for a customer:

- Reset Questions
- Next Question
- Reset Question Set
- Unlock Question
- Ask Question

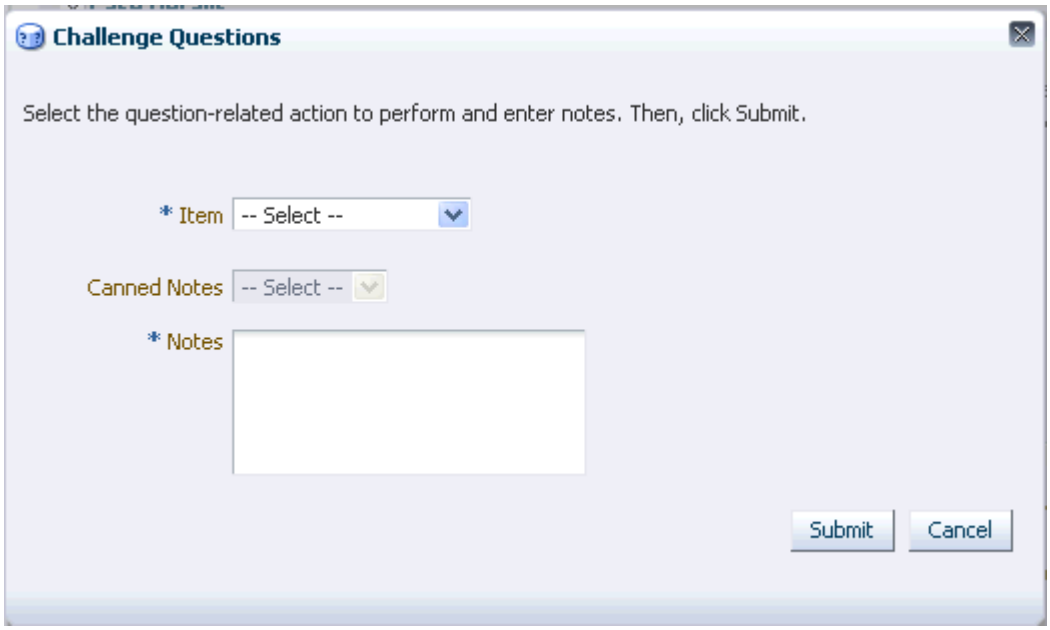
4.10.1 Performing Challenge Questions Related Actions

Open the **Challenge Questions** screen by following these instructions:

1. From the **Cases Search** page, search for an existing case for performing the reset for the customer, and if it does exist, click the case number in the results table.
2. If the case does not exist, create one for the customer.
3. On the menu bar of the Case Details page, select **More Actions**, and then click **Challenge Questions**.

   The **Challenge Questions** screen appears.

Figure 4–6 Challenge Questions



4.10.2 Resetting Challenge Questions

Resetting challenge questions deletes the existing questions and answers and generates a new question set for the customer to register from. The customer is informed that registration of challenge questions (select new questions and answers from his or her question set) is required at the next log in to the website.

To reset a customer's challenge questions:

1. Open the **Challenge Questions** screen, as described in Section 4.10.1, "Performing Challenge Questions Related Actions."
2. In the **Item** list, select **Reset Questions**.
3. In the **Canned Notes** list, select the note you want to add and edit it in the **Notes** field if necessary. You can also enter notes into the **Notes** field directly.

   For example, you could select the **Forgot Question/Answers**.
4. Click **Submit**.

   After completing the task, you can enter a note about the actions that were taken (Section 4.12.1, "Adding Notes to Cases") and change the status of the case if necessary (Section 4.12.3, "Changing Status of a Case").

Question Reset Example

Martha calls the CSR and requests that her questions be reset since she has forgotten answers to her challenge questions.

Carl the CSR performs these steps:

1. Carl searches for Martha's logins and verifies with her about last login time and place.
2. Carl creates a case for Martha and resets her questions.
3. He asks Martha to login again and register the questions.

4. After she is done and confirms the new questions are registered, Carl goes ahead and closes the case.

4.10.3 Resetting Challenge Questions and the Question Set

Resetting the challenge question set resets the challenge questions and the question set that the customer can register questions from. The customer is informed that registration of challenge questions is required at the next log in to the website.

To reset a customer's challenge questions and the set of questions to pick from:

1. Open the **Challenge Questions** screen, as described in Section 4.10.1, "Performing Challenge Questions Related Actions."
2. In the **Item** list, select **Reset Question Set**.
3. In the **Canned Notes** list, select the note you want to add and edit it in the **Notes** field if necessary. You can also enter notes into the **Notes** field directly.
4. Click **Submit**.

   After completing the task, you can enter a note about the actions that were taken (Section 4.12.1, "Adding Notes to Cases") and change the status of the case if necessary (Section 4.12.3, "Changing Status of a Case").

4.10.4 Incrementing a Customer to His Next Question

If you reset the customer's next question, OAAM Admin advances the customer to the next challenge question in his list of registered questions. So if he is currently being asked question A, he is now asked question B or C. The customer is informed that he will be asked a different challenge question the next time he logs in to the website.

To increment a customer to his next question:

1. Open the **Challenge Questions** screen, as described in Section 4.10.1, "Performing Challenge Questions Related Actions."
2. In the **Item** list, select **Next Question**.
3. In the **Canned Notes** list, select the note you want to add and edit it in the **Notes** field if necessary. You can also enter notes into the **Notes** field directly.
4. Click **Submit**.

   After completing the task, you can enter a note about the actions that were taken (Section 4.12.1, "Adding Notes to Cases") and change the status of the case if necessary (Section 4.12.3, "Changing Status of a Case").

4.10.5 Unlocking a Question (KBA)

When you unlock a question, he or she is forced to register new questions and answers the next time he successfully logs in.

To unlock the question:

1. Open the **Challenge Questions** screen, as described in Section 4.10.1, "Performing Challenge Questions Related Actions."
2. In the **Item** list, select **Unlock Question**.
3. In the **Canned Notes** list, select the note you want to add and edit it in the **Notes** field if necessary. You can also enter notes into the **Notes** field directly.
4. Click **Submit**.

After unlocking the question you can close the case if desired (Section 4.12.3, "Changing Status of a Case").

4.10.6 Performing KBA Phone Challenge

Users can be authenticated over the phone using their registered challenge questions. This option is not available for unregistered users or in deployments not using KBA.

To use a customer's challenge questions for phone authentication:

1. Open the **Challenge Questions** screen, as described in Section 4.10.1, "Performing Challenge Questions Related Actions."
2. In the **Item** list, select **Ask Question**.
3. In the **Notes** list, select **User Challenged**.

   If you select **User Challenged**, the **Notes** field contains the phrase, **Request for customer question**, which you can edit to describe why you are taking the action.
4. Click **Submit**.
5. In the confirmation dialog, click **OK**.

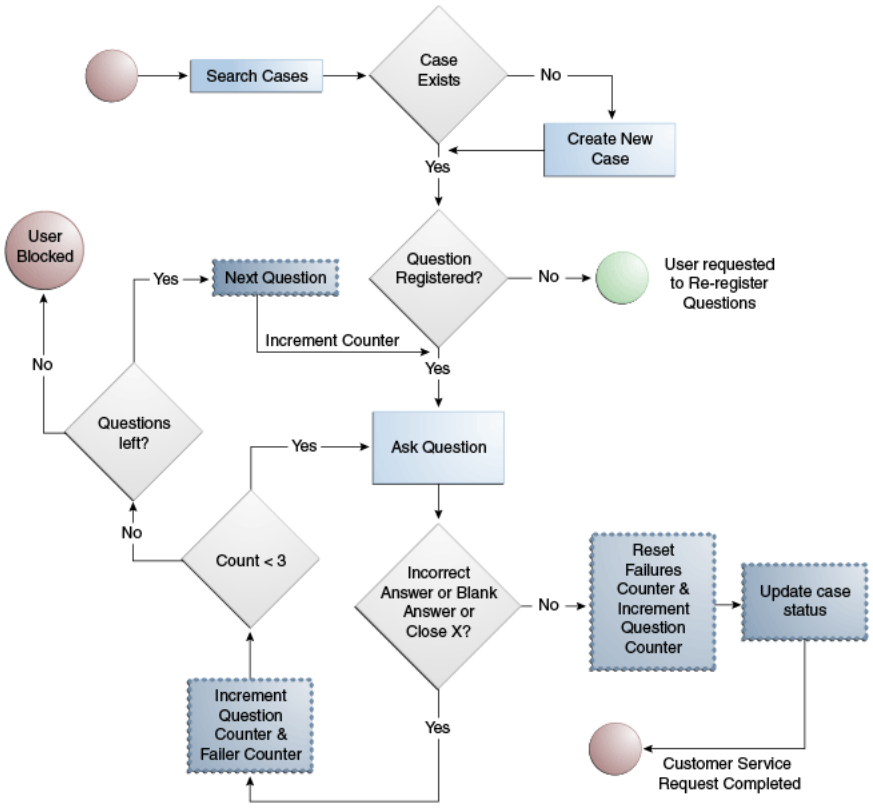
   The **Ask Question** screen appears displaying a challenge question to ask the customer and a field to enter customer's response.
6. Ask the customer the question.
7. Enter the customer's answer in the **Answer** field.
8. Click **Submit**.

   Failure counters are used to lock out fraudsters so that they are unable to obtain the answers/questions.

   The maximum number of questions the user is allotted is 3 by default. The maximum number of attempts per question is 3 by default for phone challenges. In phone challenges the CSR enters the user's answers for him. If you enter an incorrect answer for the user, left the field blank, or closed the screen for the user, the failure counter is incremented. The same challenge question remains on the screen until the maximum number of attempts per question is reached. Then, another question is displayed.

   Since the customer is given three attempts per question, a maximum of nine attempts is allowed for the phone challenge. If a question is answered correctly, the failure counter is reset and the system automatically takes appropriate actions depending on the status such as unlocking the customer. If the customer does not provide correct answers and exceeds the maximum number of failures, he is locked out.

Figure 4–7 Ask Question Flow



Ask Questions Example

1. Log in as a CSR and create a case for the customer and ask KBA questions through using the Ask Question case action.

   Enter the user's answers until he answers correctly or is locked out.

2. If the user answers the question correctly, inform the user he must register new questions online next time he logs in.

3. Verify reset questions works for user after asking challenge questions.

   You need to actually verify this by doing logins before and after the reset action to verify that the user is asked to register.

4.11 Enabling a Temporary Allow

To enable a temporary allow:

1. From the **Cases Search** page, search for an existing case for granting a temporary allow for the customer, and if it does exist, click the case number in the results table.

2. If the case does not exist, create one for the customer.

3. Click **Temporary Allow** on the menu bar.

4. In the **Allow** list, select the desired temporary allow.

   - **Single Login**

- **Two Hours**
- **Select End Date**

  If you select **Select End Date**, click the calendar icon and click the end date you want.

- **Cancel**

  If you want to terminate an active allow for a customer, select **Cancel** to remove it

5. In the **Notes** list, select the type of note you want.
6. Edit the note to add information about the action you are taking.

   For example, you can add notes about the actions taken and that the customer is on his trip for three months and should receive an exception for that time.
7. Click **Submit**.

Temporary Allow Example

Rita is blocked user and cannot log in to bank account and is on vacation in Mexico. She needs to login in next 2 hours to transfer some money to her account since her mortgage payment is coming up. She calls Carl (CSR) and requests to let her login for next 2 hours only.

Carl performs these steps:

1. Carl searches for Rita's logins and asks her when she logged in last time and from where.
2. He crosschecks that information with session data that he sees.
3. Carl creates a case for Rita.
4. He opens that case and creates a temporary allow for Rita for 2 hours.

4.12 Performing Case Actions

You can perform the following case actions:

- Adding Notes to Cases
- Changing Severity Level of a Case
- Changing Status of a Case
- Extending Expiration
- Escalating a CSR Case to an Agent Case
- Bulk-Editing CSR Cases

4.12.1 Adding Notes to Cases

Each time you take an action in a case you should enter a note describing why you are taking the action. The notes are saved to the case log.

To add notes to cases:

1. From the **Cases Search** page, search for the case from the **Cases Search** page.

   For information, see Section 4.4.1, "Searching for Cases."
2. Click the case number of the case you want.

The **Case Details** page appears (Figure 4–2).

3. Click **Add Notes** on the menu bar.

   The **Add Notes** screen appears.

Figure 4–8 Add Notes

4. Enter a note.
5. Click **Submit**.

   If you click **Cancel**, the **Add Notes** screen is dismissed.

   If you click **Submit**, the notes are saved to the case log.

4.12.2 Changing Severity Level of a Case

When a case is created it is assigned a severity level to indicate its importance and allow administrators to filter cases. The severity level is shown on the **Case Details** page.

1. Search for the case from the **Cases Search** page.

   For information, see Section 4.4.1, "Searching for Cases."

2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).

3. On the menu bar, click **More Actions**, and then click **Change Severity**.

   The **Change Severity** screen appears.

4. In the **Severity List**, click the severity level you want.

   The available severity levels are **High**, **Medium**, and **Low**. If a customer suspects fraud, then the severity level assigned would be **High**. If the customer wants a different image, then the severity level assigned would be **Low**. You can escalate or de-escalate the severity level of a case when necessary.

5. In the **Notes** list, select the type of note you want.

6. Edit the note to add information about the action you are taking.
7. Click **Submit**.

4.12.3 Changing Status of a Case

Status refers to the current state of a case. The status of a case can be new, pending, or closed. OAAM Admin automatically assigns the status of **New** to each case when it is created. You must change the status to **Pending** after the case is escalated.

1. Search for the case from the **Cases Search** page.

   For information, see Section 4.4.1, "Searching for Cases."
2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).
3. In the menu bar, click **More Actions**, and then click **Change Status**.

   The **Change Status** screen appears.
4. In the **Status** list, click the status you want.

   You can select **New**, **Pending**, or **Closed**.

Table 4–5 Case Status

Status	Definition
New	The status of a case when it is created.
Pending	The status of a case that is not yet resolved.
Closed	The status of a case when the issue is resolved.
Escalated	The status of a case that has been escalated.

5. If status is changed to **New** or **Pending**, extend the expiration date.
6. If status is changed to **Closed**, enter the disposition.
7. Enter a note describing the issue.

   You can select from existing notes or enter a new note.
8. Click **Submit**.

   A confirmation dialog is displayed.
9. Click **OK**.

4.12.3.1 Changing Case Status to Pending

Pending is the status of a case that is not yet resolved. To change the case status to pending.

1. Search for a new case from the **Cases Search** page.

   For **Case Status**, select **New**.

   For information, see Section 4.4.1, "Searching for Cases."
2. In the Search Results table, click the case number of the case you want.

   The **Case Details** page is displayed (Figure 4–2).
3. In the menu bar, click **More Actions**, and then click **Change Status**.

The **Change Status** screen appears.

4. For **Status**, select **Pending**.
5. Enter a note describing the issue.

   Select a description from the **Notes** list or enter a new note.
6. Click **Submit**.

   A confirmation dialog is displayed.
7. Click **OK**.

4.12.3.2 Closing a Case

Closed is the status of a case when the issue is resolved. To close a case:

1. Search for a new or pending case from the **Cases Search** page.

   For case status, select **New** or **Pending**.

   For information, see Section 4.4.1, "Searching for Cases."
2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).
3. Click **More Actions** on the menu bar, and select **Change Status**.

   The **Change Status** screen appears.
4. For **Status**, select **Closed**.
5. Select a disposition from the **Disposition** list.
6. Enter a note describing the issue.

   Select a description from the **Notes** list or enter a new note.
7. Click **Submit**.

   A confirmation dialog is displayed.
8. Click **OK**.

4.12.3.3 Authenticating Closed Cases

To authenticate a closed case:

1. Search for a closed case from the **Cases Search** page.

   Search cases by case status **Closed**.

   For information, see Section 4.4.1, "Searching for Cases."
2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).
3. Click **More Actions** on the menu bar, and select **Change Status**.

   The **Change Status** screen appears.
4. In the **Status** list, select **New** or **Pending**.
5. Extend the expiration date.
6. Enter a note describing the issue.

   You can select from existing notes or enter a new note.

7. Click **Submit**.

4.12.4 Extending Expiration

To extend expiration:

1. Search for the case from the **Cases Search** page.

   For information, see Section 4.4.1, "Searching for Cases."

2. Click the case number of the case you want.

   The **Case Details** page appears (Figure 4–2).

3. Click **More Actions** on the menu bar, and select **Extend Expiration Date**.

4. In the **Extension** list, select the length of time you want the expiration to be extended to.

5. In the **Notes** list, click the note you want you want to add.

6. Click **Submit**.

4.12.5 Escalating a CSR Case to an Agent Case

CSRs can escalate a case. For example, if a customer service representative receives a call from a user who claims they were a victim of fraud, the CSR can escalate the case to the fraud investigation group. The following are the series of steps required to escalate a CSR type case to an Agent type case:

To escalate a case so that Investigators can review it:

1. Either create a new CSR type case or search for and open an existing one.

   For information on creating a case, see Section 4.8, "Creating a CSR Case."

2. If you are opening an existing one, click the case number of the case you want the Investigator to review.

   The **Case Details** page appears (Figure 4–2).

3. On the toolbar, click **More Actions** and then select **Escalation**.

   The **Escalation** screen is displayed.

4. In the **Type** list, select **Escalate to Agent Case**.

5. Provide notes for the case.

   Notes are required.

   You can provide notes by selecting notes from the **Canned Notes** list or entering notes in the **Notes** box, or both.

   - From the **Canned Notes** list, select a note to describe the reason for the escalation.
   - In the **Notes** box, enter notes if further details are needed.

     Best practice is to enter any information you learned during the interaction with the end user that an investigator might find useful.

6. Click **Submit**.

   The case is escalated to an Agent case and as a CSR, you no longer have permissions to see the case.

4.12.6 Bulk-Editing CSR Cases

The **Cases Search** page enables you to change the severity, and status, and extend the expiration date for multiple cases at once. For example, you can close all cases more than a year old.

When the status of the case is set to **New** or **Pending**, you are able to extend the expiration. The option of changing the disposition is not available. When the status of the case is set to **Closed**, you can change the **Disposition**. The option of changing the expiration is not available.

To change the case settings for multiple cases at once:

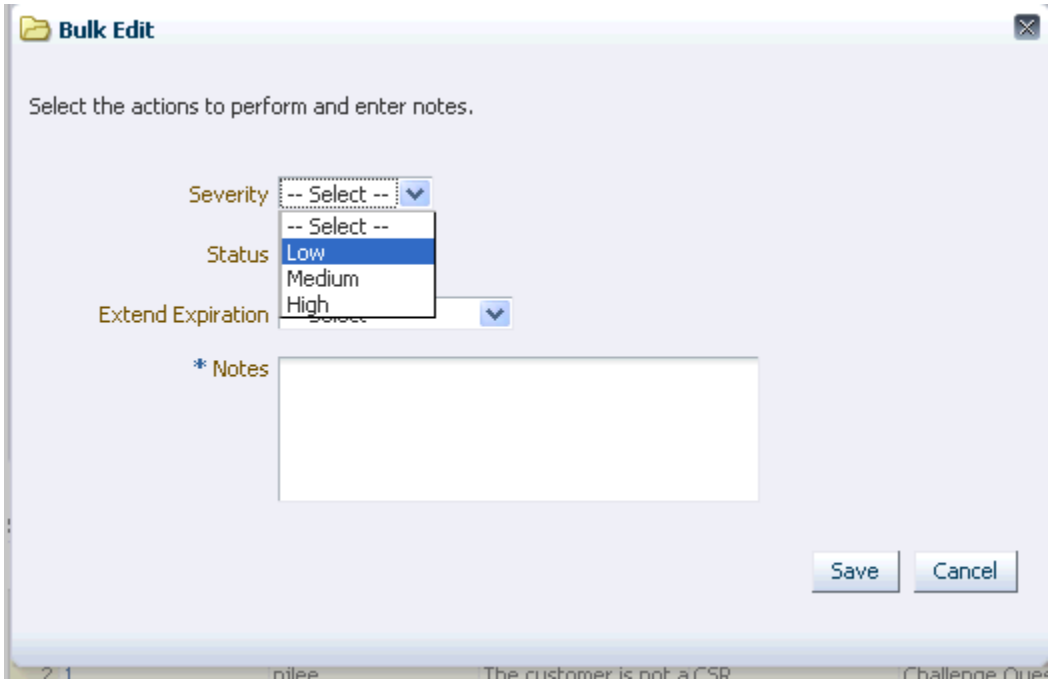
1. Open the **Cases Search** page.
2. Select the cases you want.

   For example, you can search cases by type, expiration, and date.

   For information, see Section 4.4.1, "Searching for Cases."
3. Click **Bulk Edit Selected**.

   The **Bulk Edit** screen is displayed.

Figure 4–9 Bulk Edit



4. Change the case settings you want and add notes.
5. Click **OK** to perform the bulk edit.

   A confirmation dialog appears with a message that the bulk editing operation was performed successfully.
6. Click **OK** to dismiss the dialog.

Bulk Editing Example

Jackie needs to cleanup case back log.

1. She goes ahead and searches for all the expired cases and closes them all.
2. She also goes to all overdue cases and updates the status to pending again.

4.13 Reporting

For information on how CSRs use the reporting functionality of Oracle Adaptive Access Manager, see Chapter 24, "Reporting and Auditing."

4.14 Multitenancy

In multitenant deployment the CSR's access is limited to only those organizations to which they are supposed to be servicing. CSRs can work with the cases that are associated to the users of only those organizations that they service. Agents do not see and work on cases for the users of other groups for which they do not have access.

4.14.1 Enabling Multitenancy

To turn on the access control in OAAM Admin for multitenant deployments, you must set the bharosa.multitenant.boolean property to true. By default, the value is set to false.

4.14.2 Changing Permissions

The Security Administrators of the OAAM application can set up access control for the CSRs. CSRs cannot change their own access permissions. Only system administrators are able to change access permissions.

4.14.3 Access to Cases

CSRs can access cases for the users of groups that they have access permissions to. They cannot access cases for the users of groups that they do not have access to Agent cases cannot be accessed by CSRs.

If multitenancy is disabled, the CSR Manager, Investigator and Investigation Manager have access to details screens (links do not appear). If multitenancy is enabled, the CSR Manager, Investigator and Investigation Manager do not have access to details screens (links do not appear). The CSR never has access to details screens.

From the Session Details page the Investigator cannot get to the Detail screens if multitenancy is on (links are disabled). Multitenant access control only applies for CSRs and Investigators. Security Administrators and System Administrators have full access to cases.

4.14.4 Searching Sessions

CSRs and Investigators can only view sessions from organizations they have access to. If Investigators have access to multiple organizations, they should be able to apply the search filters to view sessions from specific organizations. If you have access to an organization, you can search their sessions by Organization ID, Session ID, Alert Level, User Name, Device ID, IP Address, Authentication Status, and Login Time.

4.14.5 Examples of Multitenancy in OAAM

The following examples illustrate the user seeing restricted amounts of data on the customer care screens based on permissions.

Table 4–6 CSR Access

Organization	Application Users	Admin Users
Default		
	■ bbcuser1 ■ bbcuser2 ■ bbcuser3	■ bbccsr1 ■ bbccsr2 ■ bbccsr3
AAB		
	■ aabuser1 ■ aabuser2 ■ aabuser3	■ aabcsr1 ■ aabcsr2
Both organizations		
		■ supercsr1 ■ supercsr2
No organization		csrm1

In the examples, there are two organizations: default and AAB.

4.14.5.1 CSR Creates a Case

CSR named "bbccsr1" has permission for group "Default."

1. The CSR "bbccsr1" logs in to the system.
2. He selects the Organization ID, "Default."

   He can choose "Default" because he has access only to "Default."
3. He enters "bbcuser1" in the User Name field and other attributes.

   A case for "bbcuser1" is created.

   The Case Details page appears.

   - The Case Status is "Pending."
   - The Created By field shows "bbccsr1."
   - The Current Owner field shows "bbccsr1."
4. He searches for the case in the Log tab, and sees the "Create Case" action with ARM ID "bbccsr1."
5. A session corresponding to the case exists.
6. The CSR, "bbccsr1" adds notes to the case. (CSRs can add notes to a case.)
7. He goes back to the Logs tabs, and the action for the case is now "Add Notes."

4.14.5.2 CSR is unable to Create Case Successfully for Organization and Login Combination

CSR named "aabcsr1" has permission for group "AAB."

1. The CSR logs in to the system.
2. The only Organization ID he can choose from is "AAB" because he has access only to "AAB."
3. He tries to create a case for "bbcuser1."

- He selects the Organization ID, "AAB"
- He enters "bbcuser1" as the user name.

  bbcuser1 is a member of "Default."

4. An error is displayed:

   "Invalid application AAB and login bbcuser1 combination.

4.14.5.3 CSR is able to Create Case Successfully for Organization and Login Combination

CSR named "aabcsr1" has permission for group "AAB."

1. The CSR logs in to the system.
2. The only Organization ID he can choose from is "AAB" because he has access only to "AAB."
3. He tries to create a case for "bbcuser1."
   - He selects the Organization ID, "AAB"
   - He enters "aabuser1" as the user name.

     aabuser1 is a member of "AAB."
4. The case is created successfully.

4.14.5.4 CSR Has Access to More Than One Organization ID Is Unable to Create Case

CSR named "supercsr1" has permission for groups "AAB" and Default.

1. The CSR logs in to the system.
2. Both Organization IDs "AAB" and "Default" are available from the dropdown.
3. He tries to create a case for "aabuser1."
   - He selects the Organization ID, "Default"
   - He enters "aabuser1" as the user name.

     aabuser1 is a member of "AAB."
4. An error appears with information that he cannot choose Default as the Organization ID and create a case for a AAB user.

4.14.5.5 CSR Has Access to More Than One Organization ID is able to Create Case Successfully

CSR named "supercsr1" has permission for groups "AAB" and Default.

1. The CSR logs in to the system.
2. Both Organization IDs "AAB" and "Default" are available from the dropdown.
3. He tries to create a case for "aabuser1."
   - He selects the Organization ID, "AAB"
   - He enters "aabuser1" as the user name.

     aabuser1 is a member of "AAB."
4. The case is created successfully.

4.14.5.6 CSR Who Cannot Access Any Organization Tries to Create Case

CSR named "csrm1" cannot access any organization.

1. The CSR logs in to the system.
2. He tries to create a new case, but he cannot select any Organization ID because he does not have access to any organization. He cannot create a new case with the necessary attribute.
3. When he tries a search, there are no results.

4.14.5.7 CSR Acts On Case

CSR named "aabcsr1" has permission for group "AAB."

1. The CSR logs in to the system.
2. He performs a search.
   a. The Organization ID dropdown presents all the Organization IDs which he has access to.
   b. CSR selects the desired Organization IDs.
   c. CSR provides the data required for his search.
3. The results are AAB users only.

   The CSR gets back the result which has only those cases whose users belong to group that he has access to.

4.14.5.8 CSR Views Case Details

CSR named "aabcsr1" has permission for group "AAB."

1. The CSR finishes scenario "CSR Acts On Case".
2. From the search screen, CSR clicks one of the Case IDs.
   a. CSR is able to see the details of the case.
   b. In the bottom half of the tab he sees action logs for the case.

4.14.5.9 CSR Searches Sessions

CSR named "aabcsr1" has permission for group "AAB."

1. The CSR finishes scenario "CSR Views Case Details".
2. From the case details page, CSR clicks Search Sessions.

   CSR is able to see only the Organization IDs that he has access to in the search query.
3. CSR selects the Organization IDs he is interested in, fills in the other data for the filters, and performs the search.

   Only the results of the sessions of the users of the groups that he has access to is shown.

4.14.5.10 Agent Creates a Case

For information, refer to Chapter 5, "Investigation Using OAAM."

4.14.5.11 CSR Searches Cases

For information, refer to Section 4.4.1, "Searching for Cases."

4.15 Use Cases

The following sections provide scenarios of how Oracle Adaptive Access Manager's investigation tools are used.

4.15.1 Use Case: Customer Session Search and Case Creation

Carl is Dollar Bank CSR.

Tim calls Carl because he unable to login because he is blocked.

1. Carl searches for blocked sessions by user to determine if any belong to Tim and creates a case when he finds none for Tim.
   a. Carl must search sessions for users with blocked logins.
   b. Carl must search first the session for "Tim" and see his logins history for last one month.
   c. He then must search for cases that might be there for Tim.

      Carl finds no cases for Tim.
2. Carl creates a case by choosing out-of-the-box texts for blocked login.

   Some days pass and Tim calls again to inquire about the case.
3. Carl locates the case and sees that it has expired.
4. Carl escalates the case. After escalation he no longer sees the case in the search.

Jackie is CSR Manager.

1. She logs in and searches for escalated cases.
2. She finds Tim's case and views it.
3. She looks at the action logs of the case and figures who created and acted on it.
4. She adds notes to the case saying she is working on it.

4.15.2 Use Case: Reset Challenge Questions

You are Jerry, a customer service representative at Acme Corp. You answer phones at the call center and assist users with issues they may be experiencing. You received a call from Henry, a user who has forgotten the answers to his challenge questions. You must verify his personal information before you can reset his answers.

Directions: Part A: Authenticate Henry in another system by verifying personal information such as home address and last four digits of his Social Security Number. His User ID is xxxx.

Directions: Part B: Then, open a new CSR case for Henry and reset his challenge questions.

Directions: Part C: Now, close the case with a resolved disposition and notes.

1. Log in to OAAM Admin as a Customer Service Representative.

   The **Cases Search** page is displayed.
2. In another system enter Henry's User ID and verify his home address and last four digits of his Social Security Number.
3. Search open cases by user.

Search for Henry's open cases by entering xxxx into the **User ID** field and selecting **New**, **Pending**, and **Escalated** for his case status.

New, pending, and escalated cases do not exist for Henry; therefore, you must create a new case.

4. Create a new case.
   a. In the **Cases Search** page, click the **New Case** button.

      The **Create Case** screen is displayed.

   b. Enter the Henry's user name, xxxx, in the **User ID** field and select the **Organization ID** (group Henry belongs to).

   c. For severity level, select **Low** from the **Severity Level** list

      The available severity levels are **High**, **Medium**, and **Low**.

   d. Select **Forgot question answers** from the **Description** list.

   e. Click **Create**.

      If invalid parameters were entered, an error message is displayed and the new case is not created.

      If you click **Create**, the new case is created.

      A confirmation message appears.

   f. Click **OK** to dismiss the confirmation message.

5. Reset Henry's questions.
   a. To reset Henry's questions, in the **Case Details** page, select **More Actions** and then select **Challenge Questions**.

      Authenticator uses questions as additional credentials to help prevent fraud. From the **Challenge Questions** screen, you can perform questions-related actions for the customer when necessary.

   b. In the **Item** list, select **Reset Questions** as the question-related action to perform.

   c. In the **Notes** list, select **Forgot Question/Answers**.

   d. Click **Submit** to reset Henry's questions.

      When you reset a customer's challenge questions, OAAM Admin deletes the existing questions and answers and generates a new question set for customers to register from.

      A confirmation message appears.

   e. Click **OK** to dismiss the dialog.

6. Add notes on the case.

   Each time you take an action in a case you should enter a note describing why you are taking the action. The notes are saved to the case log.

   a. Click **Add Notes** on the menu bar to add notes on the case.

   b. Enter a note that Henry's challenge questions were reset.

   c. Click **Submit**.

      If you click **Submit**, the notes are saved to the case log.

      A confirmation message appears.

d. Click **OK**.

7. Inform Henry that he will go through challenge questions registration (select new questions and answers from his question set) the next time he logs in.
8. Close the case with a disposition.
   a. To close the case, in the **Case Details** page, click **More Actions** and select **Change Status**.

      Case status refers to the current state of a case.

   b. In the **Status** list, click **Closed**.

      Closed is the status of a case when the issue is resolved.

   c. For the disposition select **Issue Resolved**.
   d. Select **Issue Resolved** from the **Notes** list as the note describing the issue.

      You can select from existing notes or enter a new note.

   e. Click **Submit**.

      A confirmation message appears.

   f. Click **OK** to dismiss the dialog.

4.15.3 Use Case: Reset Image and Phrase

You answer a call from Nancy, a user who does not like the virtual device personalization she registered. She would like you to change it for her. You explain that Nancy can do this herself on the **User Preferences** page of the Authenticator, but she insists that you reset her image and phrase.

Directions: Part A: Open a new CSR case for Nancy and reset her image and phrase. You tell her that her virtual authentication device will show a new image and phrase the next time she logs in.

Directions: Part B: Then, close the case with a resolved disposition and enter some pertinent notes.

1. Log in to OAAM Admin as a Customer Service Representative.

   The **Cases Search** page is displayed.

2. Search open cases by user.

   Perform a search by case number or by Nancy's **User ID** and a **Case Status** of **Open**, **Pending**, or **Escalated** to see if a case already exists.

   Since an open case to reset her personalization does not exist, you create a new case.

3. Open a new case.
   a. Click **New Case** to create a new case.
   b. Enter the required details.
   c. Click **Create**.

      If invalid parameters were entered, an error message is displayed and the new case is not created.

      If you click **Create**, a new case is created and a confirmation dialog is displayed with the Case ID number.

d. Click **OK** in the **Create Case** confirmation dialog.

   The **Case Details** page for the newly created case is displayed.

4. Reset the user's image and phrase.

   a. In the menu bar of the **Case Details** page, select **Customer Resets**. The **Customer Resets** screen appears.

   b. In the **User Item** list, select **Image and Phrase**.

   c. In the **Notes** list, select the type of note you want to add.

   d. In the **Description** field, modify the description to suit your needs.

   e. Click **Submit**. A confirmation dialog is displayed with the message that the customer has been assigned a new image and phrase.

   f. In the confirmation dialog, click **OK**.

      When you reset a customer's image and phrase, OAAM Admin generates a new image and phrase and assigns them to the customer.

5. Tell Nancy that her virtual authentication device will show a new image and phrase the next time she logs in.

6. Close the case with a disposition.

   a. In the menu bar, click **More Actions**, and then click **Change Status**.

      The **Change Status** screen appears.

   b. In the **Status** list, click **Closed**.

   c. For the disposition, select **Issue Resolved**.

   d. Enter a note describing the issue.

      You can select from existing notes or enter a new note.

   e. Click **Submit**. A confirmation dialog is displayed with the message that the case status was successfully saved.

   f. Click **OK** to dismiss the dialog.

4.15.4 Use Case: Bulk Edit CSR Cases

You are Mike, a customer service manager at Acme Corp. The company policy for CSR cases is that cases should be closed as soon as the user issue is resolved. After a month you close out any CSR cases that have been left open by mistake. Directions: Today is the end of the month, so you are going to bulk-close any cases older than 24 hours and newer than a month ago.

To bulk edit CSR cases:

1. Log in to OAAM Admin as a Customer Service Representative Manager.

   The **Cases Search** page is displayed.

2. Search the pending CSR cases created between a month ago and yesterday.

   a. In the **Case Status** field, select **Pending**.

   b. For **Created Date**, enter the date and time for the last day of the previous month.

   c. For **End Date**, enter the date and time 24 hours ago.

   d. Click **Search**.

3. Select all cases and close them with a disposition and notes.
   a. Select all cases listed in the **Search Results** table.
   b. Click the **Bulk Edit** icon on the **Search Results** toolbar.

      The **Bulk Edit** screen appears.
   c. In the **Status** list, click **Closed**.
   d. For the disposition, select **Issue Resolved**.
   e. Enter a note that says that the case was left open by mistake.
   f. Click **OK**. A confirmation dialog is displayed with the message that the bulk editing operation was performed successfully.
   g. Click **OK** to dismiss the dialog.

4.15.5 Use Case: CSR Manager Bulk Case Edit

Carl is Dollar Bank CSR manager. He comes into work each morning and searches through the CSR cases to check on status and clean up if needed. First he runs a search for CSR cases that are expired. There are four cases with the **Expired** status, so Carl looks at the creation dates for each. All are more than two days old. One of them has a **High** severity and the last action was a **Temp Allow**. The other three were **Low** severity cases with **Phone Challenge** as the last action. He selects these three and closes them with a disposition of **expired and resolved**. Carl opens the high severity case to look at the log. He sees that the temporary allow is active for another week so he leaves the case in the expired status as a marker.

1. Log in to OAAM Admin.

   The **Cases Search** page is displayed.
2. In the **Expired** field, select **Show Only Expired**.
3. In the **Case Type** field, select **CSR**.
4. Click **Search**

   There are four cases with the **Expired** status.
5. View **Created Date** column for the four cases in the **Search Results** table.
   - All are more than two days old. (View **Created Date**)
   - One of them has a **High** severity and the last action was a **temp allow**. (View **Case Severity** and **Last Action Type** columns.
6. Select the three cases and click **Bulk Edit**.
7. In the **Status** field, select **Closed**.
8. In **Deposition** field, select **Issue Resolved**.
9. In **Notes**, enter `expired and resolved`.
10. Click the **Case ID** for the **High** severity case.
11. In the **Case Details** page, view the log for log code and notes.

4.15.6 Use Case: CSR - Ask Questions

User "customer" is a registered user. He has not been challenged for the past 30 days and when he had to answer a challenge question, he completely forgot the answer to this question. He is sure he remembers the answers to his other questions. User

answers the question incorrectly all 3 times. Before he could try it out, he is blocked. He calls customer support, and the CSR creates a case and asks challenge questions. She enters the user's answers until he answers correctly or is locked out. He answers the question correctly. He is unlocked and is able to login successfully. The CSR informs the user he must register new questions online next time he logs in. The CSR closes the case.

4.16 Best Practices and Recommendations

This section provides best practices and recommendations:

- A Fraud Investigator looks into suspicious situations either escalated from customer service or directly from OAAM Admin alerts.
- A Fraud Investigation Manager determines which cases must be given attention by his team.
- If a customer suspects fraud, then the severity level assigned is **High**. For example, if the customer wants a different image, then the severity level assigned is **Low**. Severity levels of a case can be escalated or de-escalated when necessary. Anyone can change the severity of cases.
- Sometimes, when you are in telephone contact with a customer, there may be reasons why you may want to escalate the case to a fraud investigator. For example, if you were to enable a temporary allow, or if a customer were to call to report funds missing from their account, you might need to escalate the case for the investigator to look at.

5

Investigation Using OAAM

Oracle Adaptive Access Manager provides a streamlined and powerful forensic interface for security analysts and compliance officers. Users can easily evaluate alerts and identify related access requests and transactions to uncover fraud and misuse.

This chapter includes the following sections:

5.1 Fraud Investigation

Oracle Adaptive Access Manager largely automates the task of preventing fraud/misuse. Prevention is accomplished by analyzing risk and taking preventative actions to either block access in extremely high risk situations or challenge users via mechanisms including KBA and OTP when the risk is medium. In all OAAM deployments there will be some measure of human review required for situations that are either edge cases, false negatives, or when real-time interdiction is not feasible or desired. In these scenarios, human investigators are required to review individual incidents, perform forensic investigation to uncover related incidents, and take action to influence future risk evaluations to reduce false positive and negatives.

Examples of scenarios requiring human investigators are as follows:

- Jeff is a fraud analyst on the BigMart team. He reviews suspect transactions to identify fraud. The deployment primarily utilizes a manual case creation and investigation flow. Fraud analysts start each investigation by searching for transactions with high severity alerts. When fraud is identified, fraud analysts record findings, black list entities of various sorts, and close out cases with a disposition.
- Jeff is a fraud analyst on the BigMart team. The deployment primarily utilizes automated case creation and investigation flow. Analysts start each investigation by searching for new cases. They drill in on the sessions for which the case was generated. When fraud is identified analysts record findings, black list entities of various sorts and close out cases with a disposition.
- John Smith calls the BigBank customer service claiming to have lost money out of his account. John claims that there was a wire transfer for $129 out of his account

last week that he did not initiate. Sarah is a Customer Service Representative (CSR) at BigMart. She opens case 321 for John via his username jsmith and enters notes based on the information he provided. The case displays John's username in the title so any CSR viewing the case can always see what user this case is for. Sarah escalates the case and tells jsmith he will be contacted within 24 hours by an investigator. Mike works on the BigBank Security team. He is responsible for investigating customer service related security issues. He searches for cases with an escalated status and filters by date. Mike opens the newly escalated case from Sarah, the CSR. Mike can view customer and user specific data and the notes from the CSR as a starting point. He searches for wire transfer transactions John Smith has performed for values between $100 and $200. Mike compares the transactions returned to determine if this looks like fraud.

- Jeff is a security analyst at Acme Corp. Acme has online purchase and user profile change transactions defined in the deployment. Jeff is searching for transactions that involved addresses in the 95060 zipcode. He selects all transaction types and adds a filter for address.zipcode. When he runs the query the zipcode column appears in the results. When the zipcode column is added the rest of the columns resize horizontally to optimize the screen real estate available.
- Jeff is a security analyst at Acme Corp. Acme has online purchase and user profile change transactions defined in the deployment. Jeff is searching for ecommerce transactions that involved dollar totals greater than $500. He selects the ecommerce transaction type and adds a filter for total dollar amount. The add fields menu contains all the specific entities, entity data and linked entity data. When he runs the query the dollar total column appears in the results. When the new column is added the rest of the columns resize horizontally to optimize the screen real estate available.

5.1.1 What is Fraud Investigation?

The purpose of a fraud investigation is to evaluate situations where the security policies have detected a high risk scenario that require human intelligence and/or non-electronic interaction to determine whether fraud has occurred and if there were other related incidents. Fraud investigators examine suspicious session and transaction data across events to locate related incidents. The OAAM Investigation Interface is designed to simplify and streamline the investigation process.

5.1.2 Fraud Investigation Roles

Before an investigator can access and start using Oracle Adaptive Access Manager for investigation, he will need to have the appropriate role with specific permissions. User roles determine the tasks that the user can perform within the application. Roles relate to the type of work the user performs. Permissions are also defined in the application to specify the functions each role can perform. Different menus and options may be available depending on the user's role and permissions.

Fraud Investigator and **Fraud Investigation Manager** are out-of-the-box roles provided by Oracle Adaptive Access Manager. Fraud investigators or fraud investigation managers are responsible for the investigation of fraud scenarios and suspicious patterns. Table 5–1 summarizes the out-of-the-box permissions associated with fraud investigators.

A Fraud Investigator investigates a specific fraud scenario or suspicious pattern through an Agent case that is escalated from a CSR case because investigation is needed for some reason, auto-generated, or manually created. A Fraud Investigation Manager also investigates cases, but he has access to actions that the Fraud

Investigator does not have. Table 5–1 shows the permissions of a Fraud Investigator and a Fraud Investigation Manager side by side.

Table 5–1 Fraud Investigation Role Permissions

Action	Investigator Permissions	Investigation Manager Permissions
Actions	All functions of Investigator role	All functions of Investigator role and some special privileges
Search Cases	■ Search for CSR, Escalated and Agent cases ■ Search for open and closed cases	■ Search for CSR, Escalated and Agent cases ■ Search for open and closed cases.
Create New Case[1]	Only Agent cases	Only Agent cases
View Case Details	■ View Escalated cases ■ View closed case details	■ View Escalated cases ■ View closed case details
Edit Case	■ Add notes to CSR and Escalated cases ■ Change status and severity of Agent cases ■ Cannot bulk edit cases ■ Escalate cases	■ Add notes to CSR and Escalated cases ■ Reopen closed cases ■ Change status and severity of Agent cases ■ Bulk edit cases ■ Escalate cases
Search session	Search sessions	Search sessions
Link sessions	Link sessions	Link sessions
Unlink sessions	Unlink sessions	Unlink sessions
View linked sessions	View linked sessions	View linked sessions
Add to group	Add to group	Add to group
Link to case	Link to case	Link to case
View all entity and transaction data in the clear	Fraud Investigators and Investigation Managers can view all entity and transaction data in the clear. Other roles will see masked text for any encrypted entity or transaction data fields.	Fraud Investigators and Investigation Managers can view all entity and transaction data in the clear. Other roles will see masked text for any encrypted entity or transaction data fields.

[1] By default only Investigators and Investigation Managers have access to create Agent cases. The property for investigator access is oaam.permission.creatagentcase=oaam.perm.create.case.type.agent. CSRs can be given access to Agent cases if permission is granted to them. For information on granting this permission, refer to Section C.2.8, "Configuring Agent Case Access."

5.1.3 What is an Agent Case?

OAAM provides case management functionality tailored to forensic investigation. An OAAM Agent case is a repository for findings and investigation information used to manage and conduct investigations on fraudulent sessions and transactions. The following are some specific functions of an Agent type case. Agent cases are used to perform the following:

- An investigator utilizes a case to capture findings gathered in the process of investigation
- Cases are used to manage the life cycle of an investigation.
- White/black listing of devices, location and other entities.
- Influence future risk evaluations based on findings

- Export finding to a spreadsheet

5.1.4 How are Agent Cases Created?

The decision to create a fraud case stems from its sources. Examples of sources are as follows:

- Investigators monitor or analyze the sessions from a given day continuously. If they find a high "fraud" alert that warrants immediate attention, they file an Agent case. A Fraud Investigator picks up the case and begins investigating further. The Fraud Investigator can create an agent case for alerts, multiple block sessions from a user, multiple blocked sessions from a device, high risk scores, and other situations.
- A configurable action creates an Agent case automatically as a supplementary action that is triggered based on a result action and/or a risk score after a checkpoint execution.
- A CSR escalates a case because investigation is needed for some reason.

5.1.4.1 Manually Created Case

Only an investigator can manually create an Agent case directly. No user information is shown or required for creation of an Agent case. The only required inputs to create an Agent case are Organization ID, name, and description. Manually created Agent cases have a **Pending** status when the case is created.

5.1.4.2 Auto-Generated Case

An auto-generated case is created when a security administrator configures an action to create an Agent case when specific rules trigger. In other words, the new Agent case is dynamically created as a result of a particular event. This Agent case contains the session data for which it was created. An investigator starts his investigation by performing a search for all cases with **New** status.

5.1.4.3 Escalated Cases

These special escalated cases are created by CSRs. The CSR submits a CSR case for investigators to look into when there is suspicious activity associated with the case. The case retains the user details used to create the CSR case. Once escalated, the case is treated as an Agent case. It will no longer be visible to the CSR. They have the **Escalated** status and when accessed for the first time, the status automatically changes to **Pending**. An investigator can start his investigation by searching for cases with the **Escalated** status and filters the results on the severity column so the highest severity cases are shown at the top. Best practice is to open the escalated case and view the logs for notes entered by the CSR and CSR Manager. For example, the notes can show that the CSR escalated the CSR case to an Agent case because he suspected fraud activity. The log shows that the case was created, then escalated, then accessed, and then the status changed.

Example of searching by **Escalated** status: A CSR Manager escalates a CSR case. Matt is a fraud investigator specializing in customer specific security issues. He searches for all cases with the **Escalated** case status.

When the escalated case is expired, an expired flag is set for the case to let investigators know that the case requires their attention. For example, if escalated cases are set to 24 hours and if the case is open and has not been accessed in more than 24 hours, the flag is set to **Expired**.

When the Fraud Investigator accesses the expired case, it is reactivated and the expiration date is extended for another 24 hours (or however long it has been configured for). For details on configuring expiry of cases, refer to Section C.2.7, "Configuring Expiry Behavior for Agent Cases."

5.1.5 Case Ownership

Initially Current Owner is Investigator Who Creates Agent Cases

Initially the current owner of the case is the investigator who created the case.

1. The Investigator logs in to the system.
2. He creates a case.

   The Case Details page appears.

   - The **Case Status** is **Pending**.
   - The **Created By** field shows the investigator
   - The **Current Owner** field shows the investigator.
   - User details are not shown because this case is not created for a user.

The Current Owner is the Investigator Who is Working on the Case Currently

The Current Owner is the investigator who is working on the case currently.

As soon as the investigator opens the case, the following details are shown in the Case Details page:

1. The **Current Owner** changes from the previous owner to the investigator opening the case.
2. The **Created By** field still shows the investigator who created the case or that it is automatically generated.
3. The status of the case is **Pending**.

CSR Escalates a Case to an Agent Case Does Not Have Access to the Case

As soon as the CSR escalates the case, he will not be able to see the case in the Search results table:

1. A CSR logs in to the system.
2. He creates a new case
3. He escalates the case to an Agent case and adds notes.
4. Now the CSR does not have permissions to see the details of the case.
5. When an investigator opens the case
   a. The **Current Owner** changes from the CSR to the investigator.
   b. The **Created by** field still shows the CSR.
   c. The status of the case is **Pending**.

Ownership in Concurrent Access of Case

OAAM allows two agents to concurrently access a case. When two investigators try to open a case, the investigator who has the case opened is the current owner.

1. Investigator1 logs in and searches for a case with status **New**.

2. He can see the case in the results. For example, Case ID 132.
3. Another user Investigator2 logs in and searches for a case with status **New**.
4. He can also see the case, Case ID 132, in the results.
5. Investigator2 opens the case and the status changes to **Pending**.
6. Investigator2 is the current owner of the case.
7. Investigator1 still sees the case as **New** in the results.
8. He tries to open this new case but a message appears saying that Investigator2 is the current owner of the case and he can choose to continue or cancel.
9. If he chooses to cancel, nothing will happen and Investigator2 remains the current owner.
10. If he chooses to continue, he will become the current owner and the status of the case is Pending.

Two Investigators Add Notes to a Case

OAAM allows concurrent write access to cases, and if the two agents add notes to the case, OAAM saves both agents' notes. Notes are displayed and attributed to the correct agent.

5.1.6 How Fraud Investigators Use Agent Cases for Investigation?

Oracle Adaptive Access Manager Agent cases are used to manage investigations into fraudulent activity. An Agent case is created to capture the runtime data identified as suspect, provide a repository for investigation notes and feedback findings into the engine which improves future risk analysis. Once an Agent case is created, the main purpose of an investigator is to help identify if a fraud occurred. To achieve this goal, investigators use detail pages and compare pages to identify the relationship, pattern, or historical patterns. Search and detail pages provide fraud investigators the ability to:

- Drill into individual sessions to see the exact chain of events that led to an alert
- View and search for complex relationships between different data types
- White/black list entities "on the fly" without leaving the investigation flow

  This feeds back into risk evaluation. For example, a high risk device group.
- Link session data to a case to further narrow the investigation

A fraud investigator can quickly view the data involved in an incident and quickly locate related situations by easily harnessing the complex data relationships captured by OAAM. Then, he identifies the case as fraud or not fraud and closes the case with a disposition.

5.1.7 Closing a Case

When an investigation is complete a case is closed with a disposition. A disposition both summarizes how the case was resolved and how the findings may influence future risk evaluation.

5.1.8 Agent Case Feedback

Agent case "feedback" closed findings into the risk engine to improve accuracy of future evaluations automatically. If a deployment is utilizing predictive risk analysis

then the out of the box clustering model will take into account sessions contained in cases with confirmed fraud and confirmed not fraud dispositions.

For example, an investigator creates an Agent case and links several fraudulent sessions to it. Later, the investigator closes the case with a disposition of confirmed fraud. A predictive model is rebuilt every "n" hours to take into account data from sessions linked to cases with a confirmed fraud disposition. Investigators can determine the frequency of rebuilding the models. Each session in the system is compared to see how close it is to the fraudulent ones. The closer the match the higher the risk. An example evaluation would be, was the probability more than 50% that this login session is fraudulent based on all sessions linked to confirmed fraud cases?

5.2 Investigation Workflow

OAAM provides three workflows, which make it easier for an investigator to examine fraudulent transactions. The investigation workflow includes interfaces to search and compare runtime data, isolate related incidents, capture findings, and affect future risk analysis. Each customer deployment generally utilizes a combination of the following three common workflows depending on business need:

- Alert-centric
- Auto-generated
- Escalated

The steps for starting an investigation are different depending on the type of deployment. The following table lists the steps for each type of investigation workflow and how to get started.

Table 5–2 Investigation Workflows

Investigation Flow	Description	Steps
Alert-centric	The deployment primarily utilizes the manual case creation. A new Agent case is created when a suspicious activity or fraud scenario is detected and needs investigation.	The process is as follows: 1. View High Alerts in Sessions and Transactions 2. Search for Suspect Transactions to Review 3. View Transaction and Entity Data 4. Identify Related Sessions and Transaction 5. View Transactions from the Filtered Transaction Page 6. Compare Transactions 7. Link Sessions to an Agent Case 8. Add the Data Element Utilized in the Fraudulent Transactions to a Group 9. Close a Case with a Disposition
Auto-generated	The deployment primarily utilizes the automated case creation. A security administrator configures an action to create an Agent case when specific rules trigger. When a rule triggers or rules trigger, in addition to the actions and alerts, a case is generated automatically. The auto-generated case requires a review of the transaction.	The process is as follows: 1. Search for Auto-Generated Agent Cases with Current Status "New" and Open Case 2. View Linked Sessions 3. View Relevant Transaction's Details Such Transactional and Summary Data 4. Identify Related Sessions and Transaction 5. View Transaction or Session Oriented Results 6. Compare Multiple Instances of the Same Transactions 7. Select Transaction to Link Sessions to a Case 8. Add Case Notes 9. Add to Group 10. Close a Case with a Disposition
Escalated	The deployment uses the customer service escalated case and investigation flow. A CSR escalates a CSR case for an investigator to look at because the CSR suspected fraud activity. The case becomes an Agent case. Because the case originated from a customer service case, it contains specific user information in the details.	1. Open a Newly Escalated Case 2. View Case Logs 3. Search for Sessions and Transactions 4. View Transaction and Entity Data 5. Compare Transactions 6. Select Transaction to Link Sessions to a Case 7. Add Case Notes 8. Close a Case with a Disposition

Alert-Centric Investigation Flow

A Fraud Investigators starts each investigation by searching for sessions or transactions with high severity alerts and reviewing suspect transactions to identify fraud. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. He creates a case to link data to narrow the investigation. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

Henry is a security analyst at the online ecommerce division of Big Mart. Henry opens the Search Transaction page from the OAAM Investigation Interface. In the Search Transaction page, he selects Transaction Type as **Retail Ecommerce** and Alert Level as

High and queries for online order transactions with high severity alerts in the last hour.

Seven transactions are returned in the search results. The Search Results table lists the transactions, the transaction type, transaction status, and alerts. The Search Results table also contains a **Transaction Date** column that can be sorted in ascending or descending order. Henry click the down icon in the Transaction Date column header to filter results by ascending time stamp. In the Transaction Search page, Henry selects the first transactions to view its details. In the Search Results table, he clicks the orange square next to the high alert in the Alert column to display the total count of high alerts and alert messages in a popup. In the popup, he sees there is a single high alert with the message "Device with multiple low frequency credit cards."

Seeing this Henry clicks the **Transaction ID** in the Search Results table to open the Transaction Details page. He can view the transaction in detail such as the run time values of the transaction and entity data along with the session information in the Transaction Details page. The transaction looks suspect so he wants to find other transactions with the same credit card and device in the last 7 days. The Filters panel of the Utility panel provides a quick way to perform targeted searches for sessions and transactions simultaneously. He drags and drops the credit card number and device ID from the details pages into the Filter panel area and selects **7 days** in the Time Range field to filter the transactions and sessions that have occurred within the past 7 days. He clicks the **Find** button in the Utility Panel to filter the transactions to identify sessions and transactions that are connected based on the credit card and device ID.

No sessions or transactions are returned in the Matching Items Found section of the Utility Panel. He wants to exclude Device ID temporarily from the search and deselects the checkbox that precedes the Device ID label and clicks **Find** to run a query again. No sessions or transactions are returned in the Matching Items Found section. He excludes the credit card number from the search by deselecting its checkbox and selects the checkbox that proceeds the Device ID in the Filter panel and clicks **Find** to run a query again. 20 transactions and 4 sessions are returned. He was able to quickly find related sessions and transactions using the Utility Panel.

Henry clicks the Number of Transactions link in the Matching Items Found section of the Utility Panel to see the transactions filtered by Device ID. In the Filtered Transactions page, he views a listing of the transactions. Henry wants to see the transactions together in detail. Out of the available transactions, he applies the **Show Transactions** filter in the Filtered Transactions page and selects the first six to compare and clicks the **Compare** button on the search results toolbar to open the Compare Transactions tab. Ten transactions maximum can be compared by default. He compares and contrasts the transaction and entity data side by side. He clicks the **Detach** button to detach the results so there is more real estate. To highlight matching details, he select the **Highlight Matching** checkbox and clicks the **Previous** or **Next** arrow to highlight the matching data elements, stepping though the matches top to bottom. Highlighting allows Henry to visually compare and enables him find the data elements that are matching. From the data shown, Henry can see each transaction utilized a different card and each one purchased a single high value item.

Henry uses the **Show Transactions** filter again and selects the next six to compare. He wants to detect abnormal patterns in online buying behavior indicative of fraud. The same pattern exists. Henry determines the device should be watch listed.

From the Transaction Comparison screen Henry selects the device ID in the session data listing and uses the Add to Group feature to add it to a high risk group. **Add to Group** allows an investigator to add entities, transaction data, and session elements to a respective administration group to help with investigating an issue further,

rebuilding predictive models, and evaluating rules. If such a group does not exist, he can create it.

Henry then selects all the transactions and adds them to a new case. The sessions in which the selected transactions occurred will be linked to the case. Linking sessions and transactions to cases enables investigators to formulate hypotheses on potential fraud activities of potential interest. The investigator can link any number of sessions as might be connected to an investigation. He enters notes on his findings then closes the case with a disposition of "confirmed fraud." A closed case is one which needs no further investigation since the issue has been resolved. Closed cases contain dispositions that describe the way in which the issue was resolved in the case.

Auto-Generated Case Investigation Flow

The investigator starts each investigation by searching for new Agent cases dynamically created as a result of a particular event. He performs a search for all cases with new status. The fraud investigator selects the first case. A session is already linked to the case so he drills in on the session for which the case was generated. He looks at the case and other data in the linked session. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

A security administrator configures an action to create Agent cases when specific rules trigger. (For information, see Chapter 16, "Managing Configurable Actions.") These auto-generated cases require a review of the transaction. The details pages contain the information needed by the investigator in order to accomplish this task. An example workflow is shown below for an auto-generated case.

John is a fraud investigator for the bank. John searches for new Agent cases dynamically created as a result of blocked access requests.

John opens one of the auto-generated cases in the listing to start working on it. Automatically the case status changes from **New** to **Pending** and the current case owner becomes John. Other investigators can now see that this case is actively being worked on (since the case has an owner, John, and the status is not new, but pending). When case <case_number> was automatically created the session which was blocked was linked to the case so all the session data is captured and ready for review. This includes a full set of the alerts triggered in the session. John sees a session in which five different alerts were triggered. John can easily read the alert messages to understand what was going on in this situation. He sees that the highest alert was generated because the access attempt was from an IP known to be an anonymizing proxy. The bank security policy restricts banking while utilizing an anonymizing proxy as they are often used by criminals to hide their true geographic location.

John clicks the IP address to drill in on the location to investigate further. He sees that the most severe alert is one that concerns an IP address (an anonymizing proxy). This opens the IP address details page in an adjacent user interface tab. John selects the users tab to see what user accounts have been utilized from this high risk IP address. He sees that there are four different bank users potentially affected by the activity originating from this location.

John clicks the sessions tab of the IP details page to list sessions from this IP address.

He selects them all and links them to case <case_number> that he is working on. This way he collects the data he has found along with notes as to why he did this. In this case all the sessions had been blocked but if there were sessions that had not been blocked then linking those sessions to the case for further follow up is extremely useful

since without the data cross referencing ability of the details pages such a situation may have gone undetected.

Now all data from these linked sessions is captured in case <number>. John sees that the same device <device_number> was used in all these blocked access attempts.

John clicks device <device_number> to open the device details page. In the device details an investigator can also see data relationships and sessions for this device but can as well view the fingerprinting details of the device itself. For example, the browser locale used.

John opens the alerts tab to view the types of alerts and frequency of each generated from activity by involving this device. For example he can see the aggregate count for the anonymizer alert is four.

John follows up with phone calls to the four affected customer account holders to further confirm that they were not the ones attempting these blocked attempts. Feeling he has investigated this incident to the fullest and confirmed fraud John is ready to close the case and move on to the next incident. Before closing the case John exports the linked sessions to Excel.

John feels confident that this device has only been used for fraudulent access attempts so he determines it should be blacklisted. Directly from the details page John adds the device to the Restricted Devices group. This ensures it cannot be used to access online banking even if the other session data seems valid and no other rules trigger. This is very important as fraudsters often hit multiple times testing the security of an application to see how they can get around it. Device fingerprinting can be the one data point that stays the same across fraudulent attempts.

John closes the case as confirmed fraud with notes summarizing his findings. His manager or auditors can view a full log of case activity including actions taken, notes and individuals involved.

Since the case was marked as confirmed fraud the combinations of specific data found in the fraudulent access requests are automatically consumed by the risk evaluation engine to "teach" it what fraud looks like. This helps improve accuracy of future risk evaluations. Likewise, if John has found that the alerts he saw were not the result of fraud he would have closed the case and marked it as not fraud. This would also adjust future risk evaluations to reduce false positives.

Escalated Agent Cases Investigation Flow

An investigator starts the investigation by searching for all the cases with the Escalated status. He filters the results on the severity column so the highest severity cases are shown at the top. He opens the escalated case and views the logs for notes entered by the CSR and CSR Manager. He searches for sessions based on the user in the case. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

Matt is an investigator specializing in customer specific security issues. He searches for all cases with the **Escalated** case status.

Best practice is for investigators not to open cases that other investigators are working on. The first time an investigator accesses a case, the status changes to **Pending** automatically. This allows investigators to know if another investigator is already working on the case. Matt opens the escalated case. The status automatically changes from **Escalated** to **Pending** and the current owner becomes Matt. Best practice is to open the escalated case and view the logs for notes entered by the CSR and CSR

Manager. He sees they escalated the CSR case to an Agent case because they suspected fraud activity. Because the case originated from a customer service case, it contains specific user information in the details. Matt looks at the case details and notes that jsmith is the user. He writes down the user ID because he needs it to search for sessions.

Matt navigates to the Linked Sessions tab and opens Linked Sessions to search for sessions by the user ID, jsmith. jsmith has sessions so Matt looks for the most recent session by filtering on the date and the timestamp. Matt wants the most recent one because it caused the escalation.

He reviews the alerts messages to understand what occurred. The highest alert was generated because the access attempt was from an IP known to be an anonymizing proxy. Matt clicks the IP address to drill in on location logins to investigate. He looks at other locations from the past to determine if a fraud potentially occurred. Since he has more questions, he calls the actual user, jsmith, and talks to him and takes notes. When Matt is satisfied his conclusion, he closes the case with a disposition.

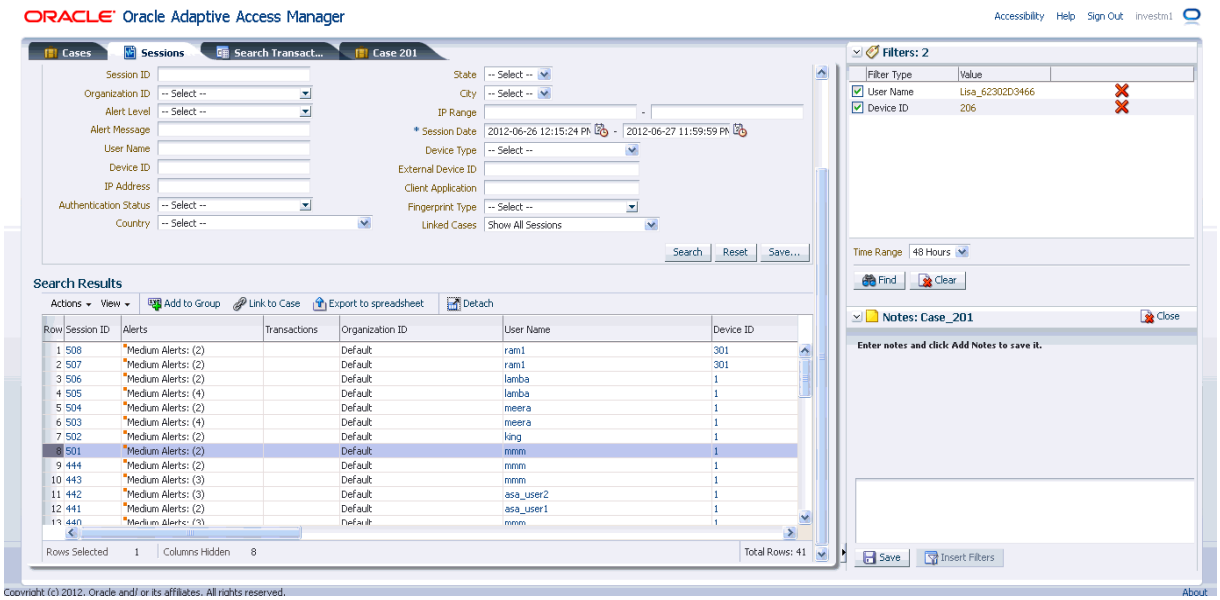
5.3 OAAM Investigation Search and Analysis Features

The OAAM investigation interface allows investigators to create and manage Agent cases via five key pages and panels:

- Agent Case search
- Sessions search
- Transactions search
- Utility Panel
- Case Notes

This section describes the key components an investigator uses to navigate through the investigation workflows, and highlights the tools required to conduct investigations and work with Agent cases.

Figure 5–1 Investigation Interface



The Investigation interface provides fraud investigators the ability to:

- View runtime data of sessions and transactions
- Compare transactions
- Perform a drill-down of key objects, people, and entities
- Manage Agent cases
- Quickly add or remove datapoints to use in searches or compare

The tabs cannot be closed and only one Agent case can be worked on at a time in the console. Specific searches enable fraud investigators to make discoveries and uncover hidden truths from a collection of data and information to find suspicious transactions. Risk analysis can be performed on data elements added to groups.

5.3.1 Agent Case Search

From the **Agent Cases Search** an investigator can search for cases that he is interested in that meet his criteria. The **Search Results** table displays the list of cases he has access to with links to more details. From the page, he can perform the following tasks:

- Quickly access a case based on his search criteria
- Create a new case
- View a list of cases

> **Note:** Agent cases from previous releases are still visible if the environment is upgraded.

For example, the investigator can search for new Agent cases dynamically created as a result of a particular event.

5.3.2 Search for Sessions and Transactions

From the Sessions and Transaction search pages, the Investigators can search for OAAM runtime data in a transaction-centric manner. He can search by default filters such as date range, alert type and level and he can add and configure additional filters that are required. Configured filters can be saved for reuse later.

For example, the investigator begins the investigation by searching for Retail Ecommerce transactions in the last 24 hours at a certain alert level.

Search Transactions provide these features:

- Add to Group
- Compare
- Link to Case
- Export to EXCEL

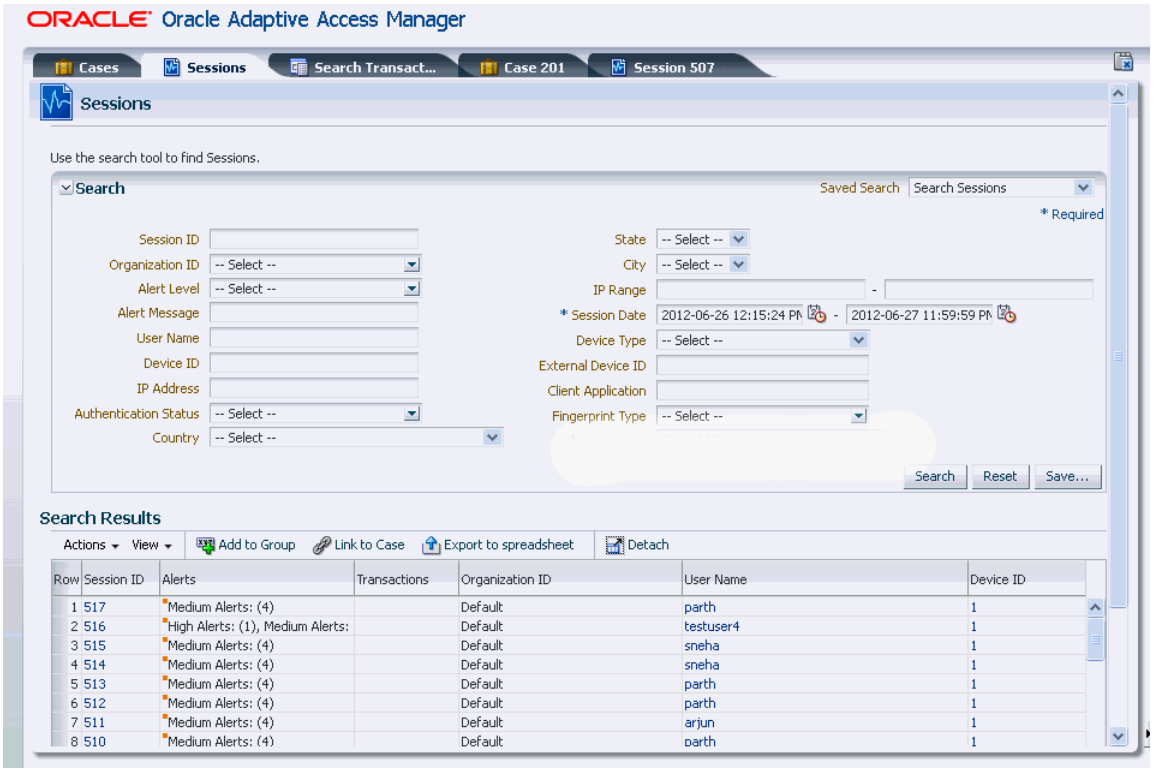
5.3.2.1 Sessions Search

From the Sessions Search page, the investigator can search for potentially suspicious sessions based on various filter criteria. The investigator can then determine the sessions that need investigation based on authentication and entity information included in a session, such as:

- User information
- Device used by user to login
- Location from where the user logged from
- Fingerprint details of the device
- Alerts triggered and generated
- Transactions

Table 5–2 shows the Sessions Search page with criteria to search and filter by.

Figure 5–2 Sessions Search Page



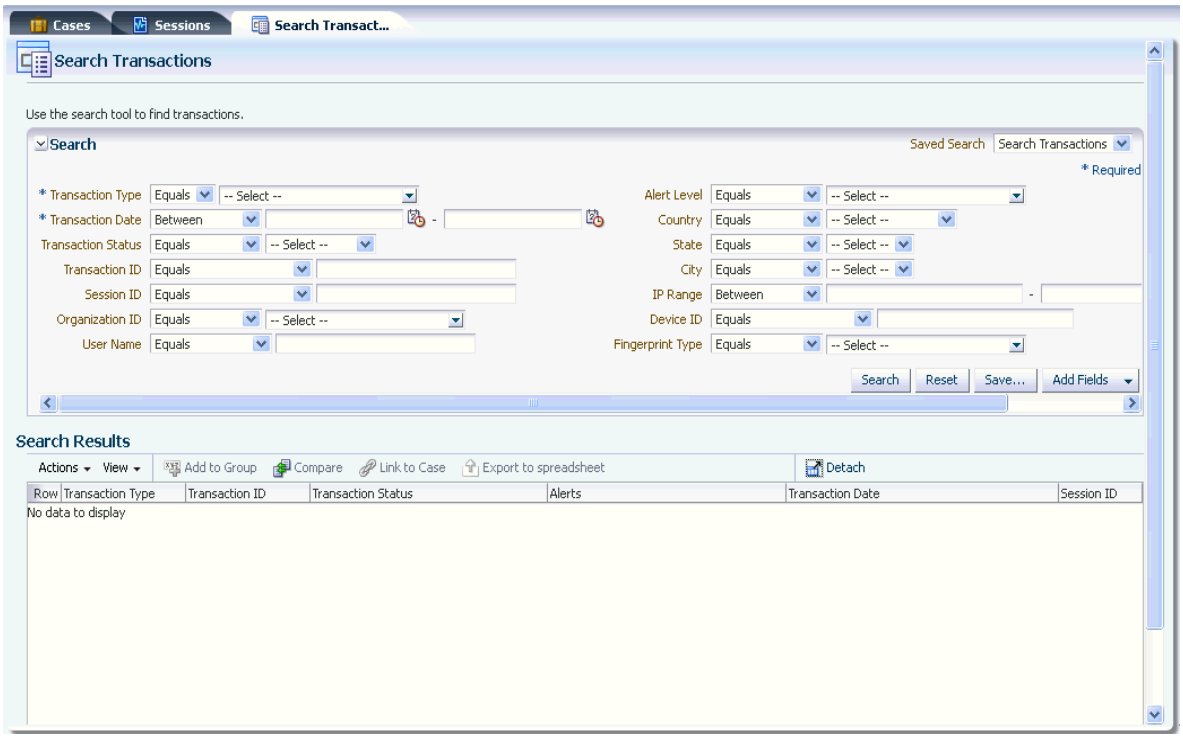
5.3.2.2 Transaction Search

From the Transactions search page, the investigator can search and filter transactions for important details that can be examined to determine fraud in an investigation. The data and context of each transaction is available even for encrypted data fields. Using the transaction search, the investigator can locate relevant transactional data and the runtime data created based on the transaction definitions and view the relationship between entities. This deep visibility into user activity allows him to analyze for possible occurrences of fraud.

Note: The Search Transactions is only available for investigators or investigation manger roles.

Figure 5–3 shows the Search Transactions page.

Figure 5–3 Search Transactions



5.3.3 Utility Panel

The investigation utility panel provides a persistent interface for common operations security analysts and compliance officers perform multiple times in the process of an investigation. It is specialized for performing searches and is readily accessible from every page in the OAAM workflows. It is used for quickly finding sessions and transactions that are related to one another based on common data.

The Utility Panel consists of the following:

- Filter Items panel

  The Filters panel is used to quickly search for related sessions and transactions.

- Case Notes panel

  An investigator can capture their findings at any time in the case notes using the utility panel.

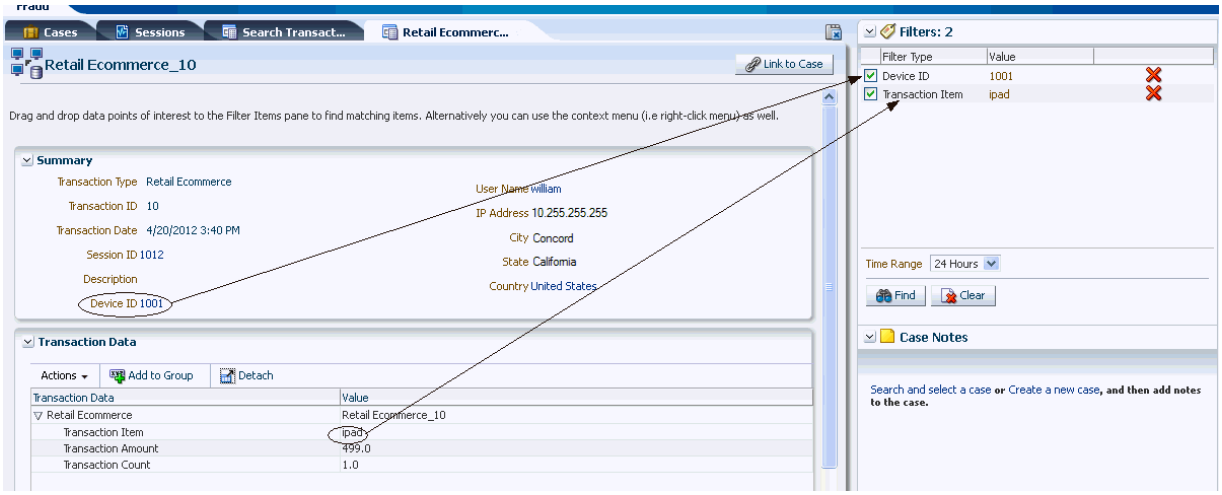
If no case is open an investigator can easily search and open an existing case or create a new one via the panel.

Using the Utility Panel enables the investigator to:

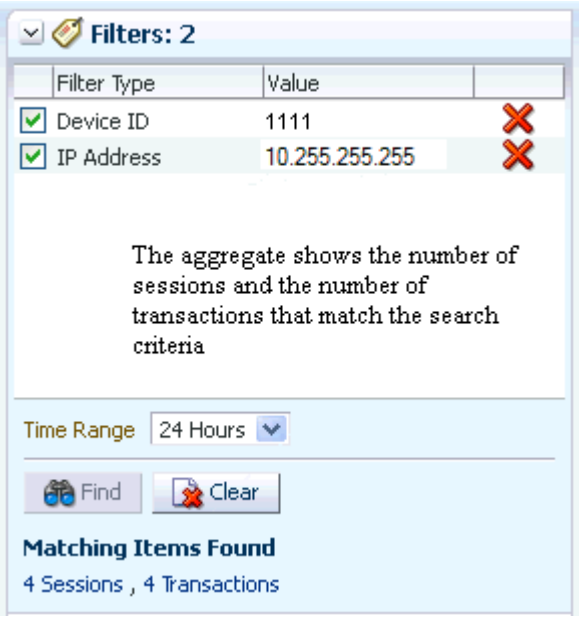
- Quickly locate sessions and transactions with data in common
- Iterate on a query to expand and contract returns
- Both view aggregate numbers of sessions and transactions found and drill in to expand investigation

The Filters panel provides a quick way to perform targeted searches for sessions and transactions simultaneously. Investigators drag and drop individual data points from different pages, such as the case linked sessions tab, search sessions, search transaction and compare transactions. Alternatively, the right-click context menu may be used to

add data points. Data points that may be used as filters include username, device ID, IP, city, state country, transaction data and practically any other runtime data.



Filters may be easily added, disabled or removed. Query results are aggregate number sessions and transactions that match the active filters in the given time range. Clicking the aggregate numbers will display lists of the sessions or transactions.



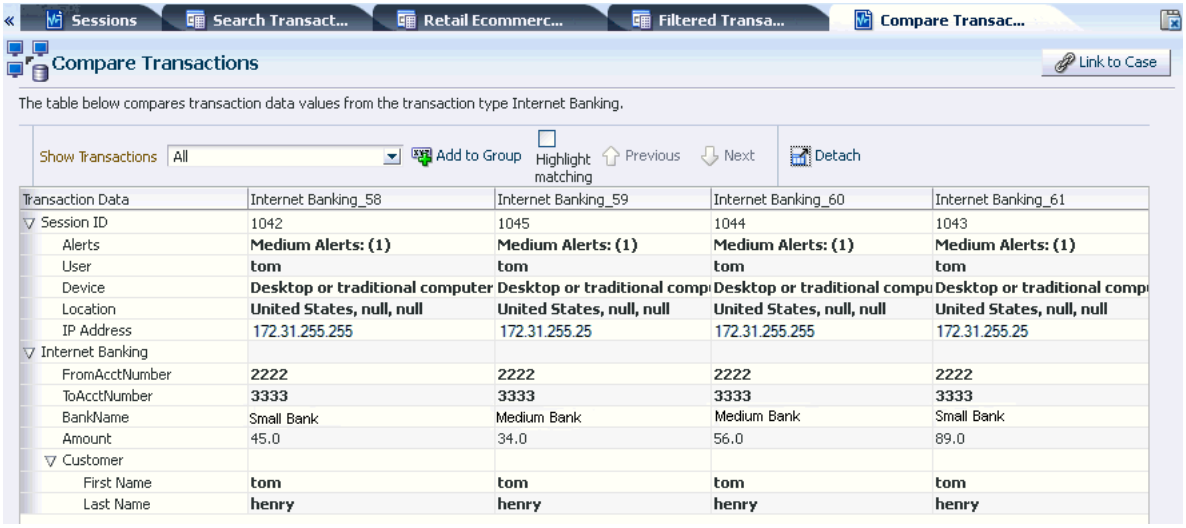
The Case Notes area lists all the notes for the current case in a descending order based on time. By adding notes to a case, an investigator can document and share results of findings, hidden relationships or unusual behavior. He can add notes directly in the Case Notes panel by adding the notes and clicking Add Note as he continues with the investigation at anytime. As part of documenting his findings, the investigator can save the filter criteria so other investigators can see the related data points for the case. There is no limits to the number notes the investigator can add. If the investigator wants to add more notes, the panel has the feature for scrolling. Tracking the discovery process over time enables an investigator to share results with other fraud investigators and show others how he arrived at his conclusions.

Note: OAAM allows two users to concurrently access a case. If the two users both add notes to the case, then OAAM saves both users' notes; however the second user's notes show as added by the first user.

5.3.4 Compare Transactions

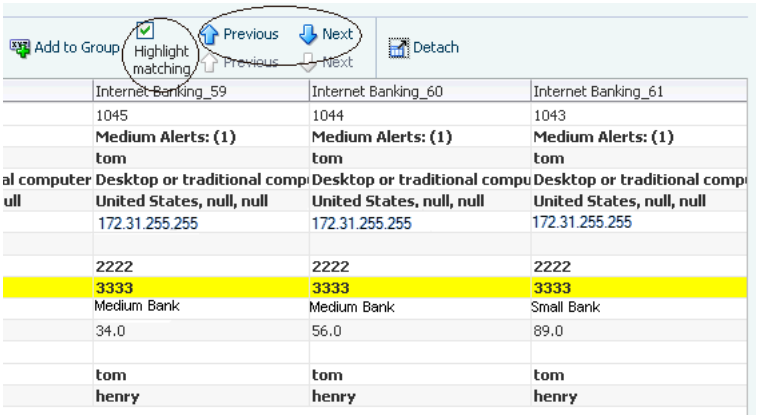
You can compare parameters of entities and transaction details so that connections can be discerned. Selecting multiple transaction search results of the same transaction definition type and clicking the Compare button on the search results toolbar opens the Compare Transactions tab. Ten transactions maximum can be compared by default.

You can compare and contrast the transaction and entity data side by side.



Transaction Data	Internet Banking_58	Internet Banking_59	Internet Banking_60	Internet Banking_61
Session ID	1042	1045	1044	1043
Alerts	**Medium Alerts: (1)**	**Medium Alerts: (1)**	**Medium Alerts: (1)**	**Medium Alerts: (1)**
User	**tom**	**tom**	**tom**	**tom**
Device	**Desktop or traditional computer**	**Desktop or traditional comp**	**Desktop or traditional compu**	**Desktop or traditional comp**
Location	**United States, null, null**	**United States, null, null**	**United States, null, null**	**United States, null, null**
IP Address	172.31.255.255	172.31.255.25	172.31.255.255	172.31.255.25
Internet Banking				
FromAcctNumber	**2222**	**2222**	**2222**	**2222**
ToAcctNumber	**3333**	**3333**	**3333**	**3333**
BankName	Small Bank	Medium Bank	Medium Bank	Small Bank
Amount	45.0	34.0	56.0	89.0
Customer				
First Name	**tom**	**tom**	**tom**	**tom**
Last Name	**henry**	**henry**	**henry**	**henry**

You can highlight and focus on matching details.



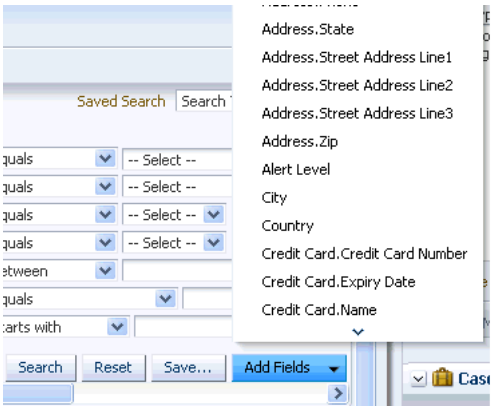
	Internet Banking_59	Internet Banking_60	Internet Banking_61
	1045	1044	1043
	Medium Alerts: (1)	**Medium Alerts: (1)**	**Medium Alerts: (1)**
	tom	**tom**	**tom**
al computer	**Desktop or traditional comp**	**Desktop or traditional compu**	**Desktop or traditional comp**
ull	**United States, null, null**	**United States, null, null**	**United States, null, null**
	172.31.255.255	172.31.255.255	172.31.255.255
	2222	**2222**	**2222**
	3333	**3333**	**3333**
	Medium Bank	Medium Bank	Small Bank
	34.0	56.0	89.0
	tom	**tom**	**tom**
	henry	**henry**	**henry**

You can drag and drop additional data elements involved in suspect transactions, one by one to see if there is other activity which needs evaluation.

5.3.5 Add and Remove Fields

Investigators can search for OAAM runtime data in a transaction-centric manner using the Sessions and Transactions search pages. Common query filters such as date range,

alert type and level are shown by default and you can add and configure additional filters that are required. Configured filters can be saved for reuse.



5.3.6 Add to Group

Add to Group allows an investigator to add entities, transaction data, and session elements to a respective administration group to help with investigating an issue further, rebuilding predictive models, and evaluating rules. For example, the investigator finds that a data element, the credit card, is suspect, and he wants to blacklist that credit card. The investigator can add the credit card used in the purchases to a high risk credit card group. If such a group does not exist, he can create it.

The Add to Group feature is available for all data types listed in:

- Linked Sessions
- Session Search
- Session Details
- Search Transactions

  Data types associated with the sessions for the selected transactions can be added to a group
- Transaction Details

  Data types associated with the sessions for the selected transactions can be added to a group
- Compare Transactions

  Data types associated with the sessions for the selected transactions can be added to a group. Add to group in the Transaction Compare page is only applicable for the visible transactions. (For example, if the investigator selected four transactions for comparison from the search page, but filtered the view to display only two transactions, Add to Group adds only the elements from the two displayed transactions)

5.3.6.1 Use Case: Add Data to Group

Jeff is a fraud investigator looking into a case generated by OAAM. On further research, he finds out that the credit card used was a stolen credit card. The credit card could have been used in different transactions like shopping cart, retail ecommerce, and so on. The investigator wants to list all the different transactions that used this credit card in the last one week to estimate the damage. The card number is one of the

entity fields. The investigator selects all or multiple transaction types and search on the entity fields.

Filter	Choice
Transaction type	Select All the Transactions
Entity	Credit Card
Credit Card Number	xxxx xxxx xxxx 1234

Upon searching for transaction data, Jeff gets all the transactions where this Credit Card has been used. He can now select a transaction and click the button **Add to Group**. A dialog is displayed where Jeff can select transaction data like **To Account Number** to be added to a group. He selects the radio button associated with this field in the dialog and clicks Next.

The next page is where Jeff can add this data to a group. He can either create a new group or use existing group of the group that stores this type of data.

5.3.7 Link Sessions to an Agent Case

If the investigator feels that there is a connection between the sessions and activities involved, he can search for those sessions and link them to an existing case or a new case. He would add linking notes and descriptions.

Linking sessions to cases enables investigators to formulate hypotheses on potential fraud activities of potential interest. The investigator can link any number of sessions as might be connected to an investigation. For example, an investigator could identify three sessions which were found to contain similar fraud. The sessions could be selected from Sessions search and linked to an existing case. The session in which the selected transaction occurred will be linked to the case. If an Agent case is open in the console, the case ID is automatically selected as the case to link to. If an investigator wants to change the value or there is no case open the investigator can search existing cases and create a new case to link to.

He can also unlink one or more sessions already linked to this case if the sessions are no longer relevant to the case.

The investigator can link sessions and transactions to a case from the following pages:

- Sessions Search
- Sessions Details
- Search Transactions
- Transaction Details
- Transactions Compare

To link sessions with transactions to a case from sessions and transactions pages and add notes about linking the sessions, proceed as follows.

1. Select transactions or sessions that are suspicious and click the **Link to Case** button in the search results toolbar.

   A dialog appears listing the sessions have been selected to link to the case. Instructions are given to enter a note for linking the session.

2. Enter notes by selecting the best description for the situation from the **Canned Notes** dropdown list and enter any additional comments in the notes box.

3. Click **Link Sessions** to link sessions to the case.

   A dialog appears with a confirmation that the selected sessions are linked to the case successfully.

4. Click **OK** in the **Link to Case** confirmation dialog to confirm.

   The Case Details page is opened.

5.3.8 Select Transaction to Link Sessions to a Case

Link sessions of the transaction to the Agent case.

1. Select the transactions and click the Link to Case button in the search results toolbar.

   A dialog appears with the instructions to open a case to link sessions. Either search and select an existing case or create a new case, and then link the sessions.

   If the investigator has no case open, then he has the option to either search for a case or create a new case. The Search and select option opens the cases search page. Create new case opens the create task flow with the popup

2. Click the Open existing case button to open an existing case.
3. In the Link to Case dialog, enter criteria and click Search.
4. Click Next.

   Another Link to Case dialog appears listing sessions that have been selected to link to the case. Instructions are given to enter a note for this action.

5. Select the list item that best describes the situation. Enter any additional comments.
6. Click Link Sessions.
7. Click OK in the Link to Case confirmation dialog to confirm.

Usage example: Gary is a Fraud Investigator for Dollar Bank. Gary searches for a new case to work on. He does a search for all cases with new status and filters the view by cases with least time to overdue at the top. Gary selects the first case, looks at the alerts and other data in the linked session. He then searches to find other sessions from North Korea. One other session is returned when he searches for the last six months. Gary links this second session to the case so relationships based on data from both of the sessions can be used to investigate. Gary notices that the two linked sessions were from the same device. Gary continues the investigation by looking into other sessions from this device in the past year. He finds there is another session from this device that says it was from China. He links that session as well. Each of the three sessions used a different IP address. Next Gary individually looks for sessions from each IP. Two of the IPs was only used in those sessions. The third IP from China had 178 sessions in the last three months. He wants to see the users potentially affected by this situation so he opens the IP details screen and views the users tab. A listing of all the users with details for each is shown. Gary looks into the identity management product to investigate each user to see if any have contact information in China. None of them do, all are Americans living in the continental US. Gary exports the list of user to XLS and contacts the customers who accounts were being used to ask a few questions. He finds that none of them had been in North Korea or China so he enters the conversations in the case notes. He asks them to change their passwords and resets their challenge questions. He also adds them to a victim watch list group and the device to a high risk watch list. Gary then closes the case with a confirmed fraud disposition.

5.3.9 View High Alerts in Sessions and Transactions

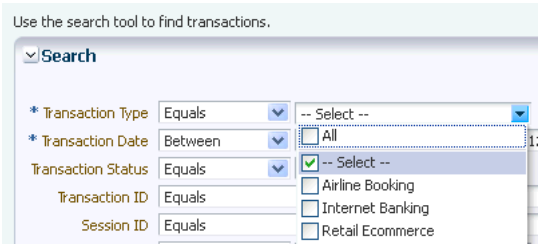
When performing an investigation in the alert-centric investigation workflow, begin by searching for transactions with high severity alerts. View the full set of the alerts generated in the session and read the alert messages to understand what occurred in this situation. View why the alert was generated and drill in on data points to start the investigation.

> **Note:** Operators for the search filter are provided in the operator drop-down list. The operator for the search filter allows the investigator to refine the results of the search.
>
> For example, Transaction Type **Equals** or **Does not Equal** *transaction_type_value*.

To search for transactions with high severity alerts, proceed as follows:

1. In the Agent Cases page, click the Search Transaction tab to open the Transaction search page.
2. Select a transaction type from the Transaction Type field and an operator for the search filter from the operator drop-down list.

   To search for transactions, select the transaction type to filter certain transactions by specific types. In the Transaction Name field, select the transaction type. For example, "Internet Banking," "Retail Ecommerce," and so on.



3. Enter start and end dates in the Transaction Date fields to search for transactions. The dates are mandatory. The date is set to the last 24 hours by default.

   An error message is displayed if special characters are entered. Also, the **To Date** cannot be greater than the **From Date**.

   Table 5–3 describes the date and time field operators.

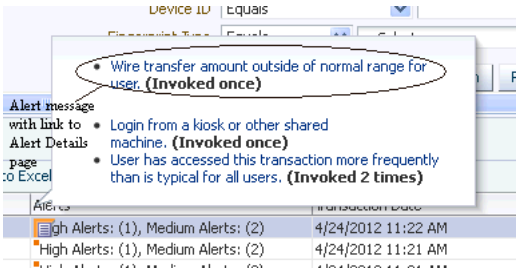
Table 5–3 Date and Time Field Operators

Operator	Description
Does not Equal	Specifies that only transactions that do not occur on the specified date are matched.
Before	Specifies that only transactions before the specified date are matched.
After	Specifies that only transactions after the specified date are matched.
On or after	Specifies that only transactions on or after the specified date are matched.
Between	Specifies that only transactions that occur between the specified dates are matched.

4. Select **High** as the Alert Level and click **Search**.

   In the results table of Transaction search page, transactions with High severity alerts are listed.

5. Click the Transaction Date column header to filter results by ascending order. The transaction at the top of the list is the oldest.
6. In the Results table, click the orange square next to the high alert in the Alert column to display the total count of high alerts and alert messages in a popup.
7. Click the Alert message link to open the Alert detail page.



8. Using the details pages, view information on the generation of the alert, the message, alert level, message type, and the alert's relationship to other data types such as user, device, location, sessions, browser, operating system, locales, and others.

   Table 5–4 lists the detail pages and the type of information provided by each page.

Table 5–4 Alert Details Tabs

Alert Details Tabs	Description
Summary	View general information about the alert and the alert template with the current details (level/type) View alert groups with which an alert is associated
Users	View users that have a session in which this alert was triggered. This report enables the investigator to see which users and how many times the alert was generated for each user during login process.
Devices	View devices that have been in a session in which this alert was triggered. This report enables the investigator to see which devices and how many times the alert was generated for each device during login process.
Locations	View locations that have been in a session in which this alert was triggered. This report enables the investigator to see which locations and how many times the alert was generated for each location during login process.
Sessions	View sessions in which this alert was triggered.
Fingerprint Data	View fingerprints created in the login process during which the alert was generated.

5.3.10 Search for Suspect Transactions to Review

If the investigator has further details about the suspect transactions he wants to review, such as dollar amount, an entity the transaction is related to, transaction ID number, session ID number, or other search criteria, he can narrow his search results using the Transaction search page.

To search for transactions, proceed as follows:

1. In Agent Cases page, click the **Search Transactions** tab.

   Table 5–5 lists the transaction filters to search and filter transactions.

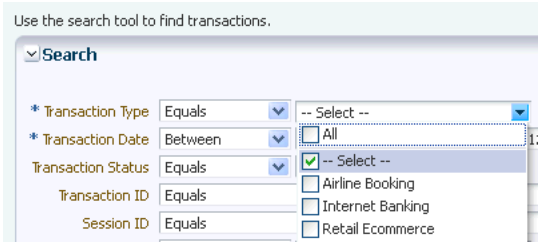
Table 5–5 Search Transactions Filters

Filter	Description
Transaction Type	The transaction type. For example, Internet Banking, Retail Ecommerce, and so on. The transaction name field is a mandatory field to which the search would be specific. If the type of transaction are selected, corresponding transaction data and entity data fields that can be selected from to add to the search are populated in OAAM Admin. You can perform a multi-select of transaction name attribute.
Transaction Date	The transaction date is the time that the transaction was submitted.
Transaction Status	The transaction status is the current state of a transaction. The values are: success, failure or pending.
Transaction ID	Transaction ID is a unique identifier created each time a customer submits a transaction.
Session ID	The session ID is the identifier of the authenticated session in which the customer logged in before performing the transaction.
Organization ID	The Organization ID is a unique identifier for the organization you belong in. Each user belongs to only one Organization ID. It identifies what tenant applications a user utilizes and scopes which OAAM policies runs for them.
User Name	The user name is the name of entered for login authentication.
Alert Level	Severity of the alert whether high, medium, low.
Country	Country ID
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
IP Range	Range of IP addresses
Device ID	Device identification
Entity Data	Entity data are attributes related to entities, which are mapped to the particular transaction type that has been selected for the search. For example, add the search field, BankName, if Internet Banking was selected as the Transaction Name. Investigators can perform searches using corresponding values of these attributes.
Transaction Data	Transactional data includes specific attributes related to the transaction type. For example **ToAccountNumber** or **FromAccountNumber** in a money transfer.

Note: Search by encrypted fields is not supported. Entity fields and transaction fields, which are encrypted, cannot be used as the search transaction filters and are not available as dropdowns.

2. Select a transaction type from the Transaction Type field and an operator for the search filter from the operator drop-down list.

   To search for transactions, select the transaction type to filter certain transactions by specific types. In the Transaction Name field, select the transaction type. For example, "Internet Banking," "Retail Ecommerce," and so on.

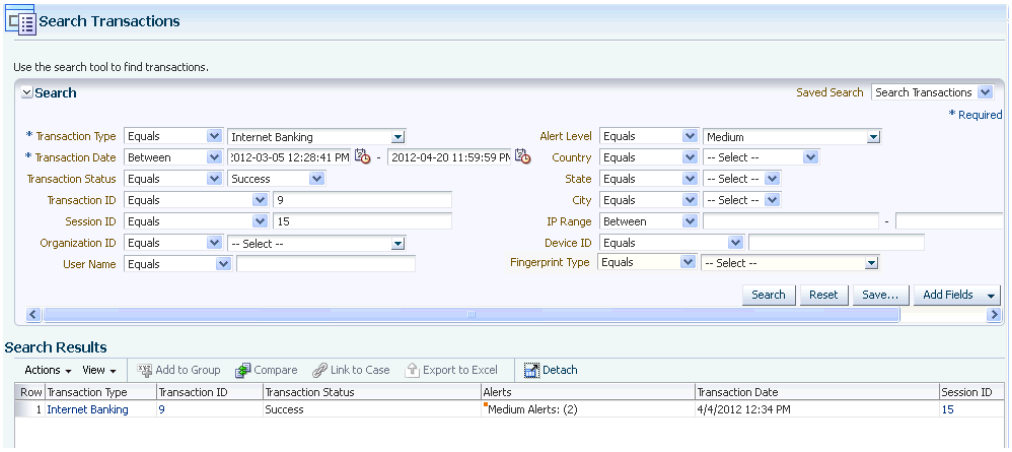


3. Enter start and end dates in the Transaction Date fields to search for transactions. The dates are mandatory. The date is set to the last 24 hours by default.

   An error message is displayed if special characters are entered. Also, the **To Date** cannot be greater than the **From Date**.

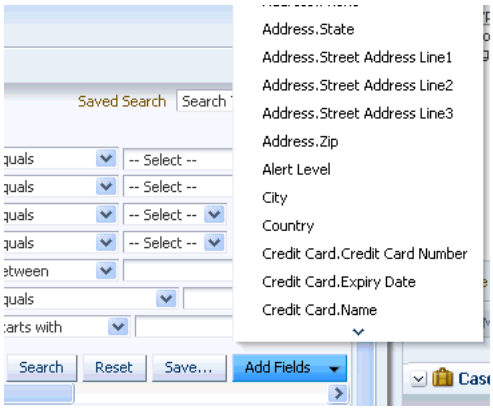
   Table 5–3 describes the date and time field operators.

4. In the search field, enter the criteria and use the search operator to refine the search results and then click Search.



   An error message is displayed if special characters are entered.

5. To add a filter, click the **Add Fields** down arrow button.



6. From the list of parameters, choose the additional filter. For example, "Address.Zip."

7. In the search field, enter the criteria.

8. In the search field, enter the criteria, use the search operator to refine the query in the text field, and click **Search**.

   The transactions that match the search criteria appear in the Search Results table. By default, the search results are sorted by Session ID. Sort by transaction name, transaction status and date.

   View a transaction in detail by clicking the transaction name link. The Transaction Details page displays the run time values of the transaction and entity data along with the session information.

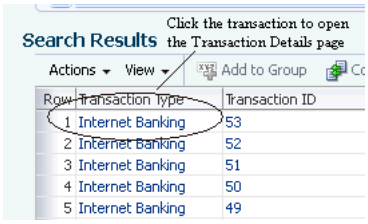
9. Export the search results into a spreadsheet by selecting the rows and clicking Export. The limit is 25 rows.

10. Add the transaction and entity data and authentication entities into groups, which can be further used in rules evaluation using the Add to Group option. For example, blacklisted accounts, suspicious merchants, and so on.

5.3.11 View Transaction and Entity Data

After locating the transaction, review the transaction and entity data in detail to find relevant entities. Through review decide whether or not a data element is relevant. The Transaction Details page displays the run time values of the transaction and entity data along with the session information.

1. In the search results table in the Search Transaction page, click the transaction link.



2. View general information about the transaction in the Summary section.

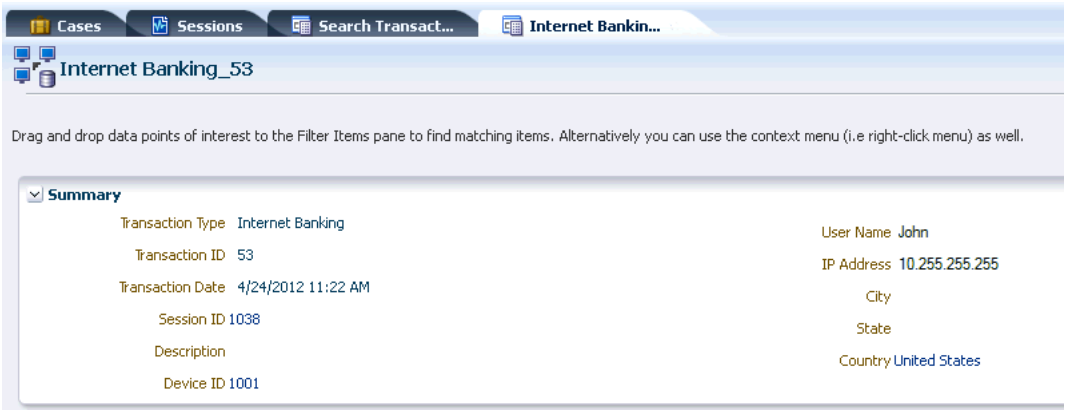


Table 5–6 provides details about the summary information that appears in the Summary panel.

Table 5–6 Summary Information in Transactions

Details	Description
Transaction Type	The transaction type. For example, Internet Banking, Retail Ecommerce, and so on. The transaction name field is a mandatory field to which the search would be specific. When the type of transaction is selected, corresponding transaction data and entity data fields that can be selected from to add to the search are populated in OAAM Admin. You can perform a multi-select of transaction name attribute.
Transaction ID	Transaction ID is a unique identifier created each time a customer submits a transaction.
Transaction Date	The day and time the transaction occurred
Session ID	Unique identifier of session in which the login or transactions occurred. The link takes the investigator to the Session Details page.
Description	Notes about the transaction.
Device ID	Uniquely identifies each device and is auto-generated by the application.
User Name	Login name given by user to login.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
Country	Country ID

3. View transactional data, entity instances, and related instances in the Transaction Data panel.

Table 5–7 provides details about the transaction data that appears in the Transaction Data panel.

Table 5–7 Transactional Data in Transaction Details

Transaction Data	Description
Transaction Type	The transaction type. For example, Internet Banking, Retail Ecommerce, and so on. The transaction name field is a mandatory field to which the search would be specific. When you select the type of transaction, corresponding transaction data and entity data fields that you can select from to add to the search are populated in OAAM Admin. You can perform a multi-select of transaction name attribute.
Entities	Entities involved in the transaction.
Values	Data entered by the user that is part of the transaction.

4. View session data to take a closer look at exactly what occurred in the session.

   Session data shown in the panel include:

   - Alerts and actions
   - Final action
   - Alerts table displays additional information like alert level, alert message, trigger date, and so on.
   - The rules and policy names are linked under trigger sources and can open the corresponding detail pages.

   View alert activity in the Sessions Data panel. The Alerts list displays the alerts that were launched during the session. In the Alerts History list, view the alert level of the launched alerts, any messages associated with the alerts, the alert type, and the time and date that the alert rules were triggered.

Table 5–8 Alert Session Data

Alert Information	Description
Alert Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert.
Alert Type	Type of the alert whether fraud, investigation, information, or other reason
Trigger Sources	Rules that generated the particular alert
Timestamp	The time the alert was generated.

5.3.12 Identify Related Sessions and Transaction

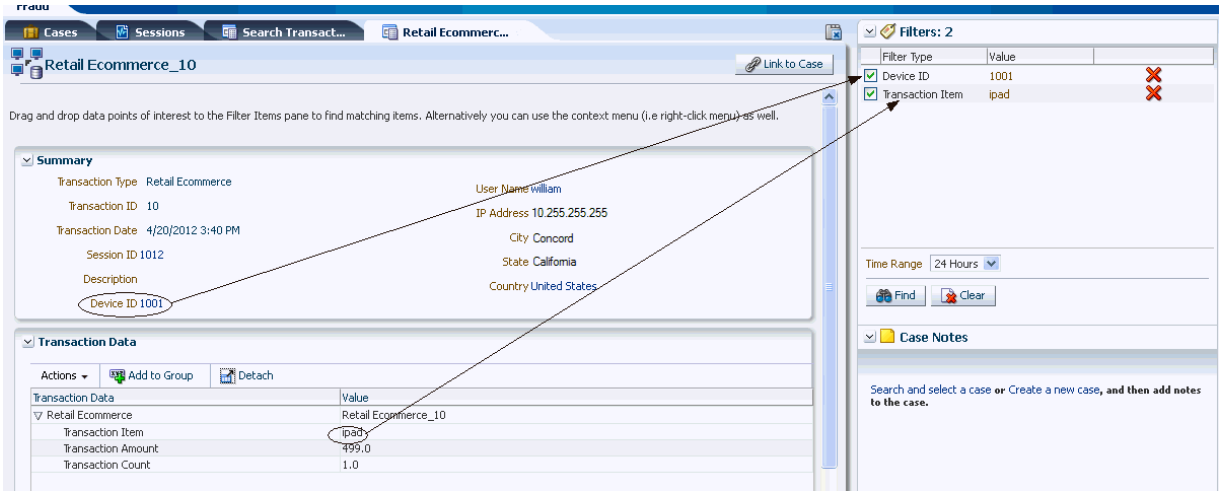
The Utility Panel enables fraud investigators to make discoveries and uncover hidden truths from a collection of data and information. A transaction may look suspect, so the investigator may want to find other transactions with the same Device ID, user name, IP address, city, state, or country shown in Transaction Details. Filter the transactions so that you can identify sessions and transactions that are connected based on the datapoints.You can perform searches using any valid data point at any time.

To filter transactions, proceed as follows:

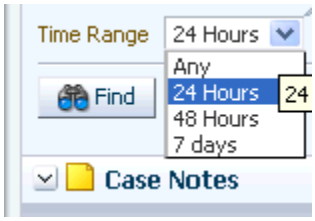
1. In the Sessions, Session Details, Linked Sessions, Search Transactions, Transaction Details, and Compare Transaction pages, drag an individual datapoint you want to use as a filter on other transactions, and then drop the datapoint onto the Filtered Items panel of the Utility Panel. Alternatively, use the context menu to select any data element for matching.

   The selected datapoint is displayed in the Filtered Items panel.

2. Continue dragging and dropping datapoints into the Filtered Items panel to refine your search.



3. If you want to delete the datapoint from the search, click the red x icon to the right of the datapoint.
4. If you want to exclude a datapoint temporarily from the search, deselect the checkbox that precedes the datapoint label.
5. In the Time Range, you can select:
   - **Any**: Do not restrict the time range
   - **24 hours**: Filter the transactions and sessions that have occurred within the past 24 hours
   - **48 hours**: Filter the transactions and sessions that have occurred within the past 48 hours
   - **7 days**: Filter the transactions and sessions that have occurred within the past 7 days



   The default time range used for the search is the last 24 hours.
6. Click Find to search for matches.

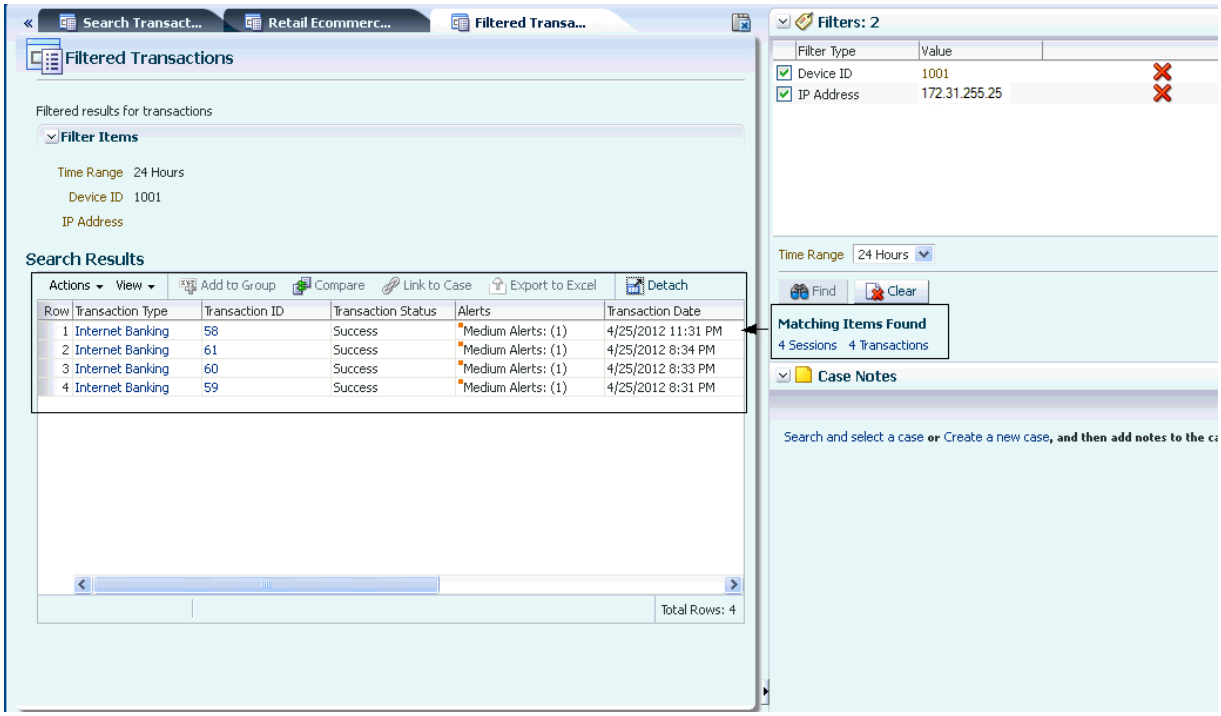
   OAAM searches for matching sessions and transactions based on the current datapoints in the Filtered Items panel. The result count for sessions and transactions are shown at the bottom of the Filtered Items panel.

   This aggregate shows the number of sessions and the number of transactions that match the search criteria. For example, the sessions and transactions use the same credit card and device.

Note: The datapoints listed in the Utility Panel are not persisted across sessions. It is cleared when a case is closed.

7. Refine the search to include other datapoint by dragging the datapoint to the Utility panel.
8. Click Find.

   The aggregate now shows the number of sessions and the number of transactions that use the data elements. For example, the sessions and transactions use the same credit card and device.
9. Click the count, to open the corresponding filter page. The filter page shows the matching transactions or sessions in the search results table.



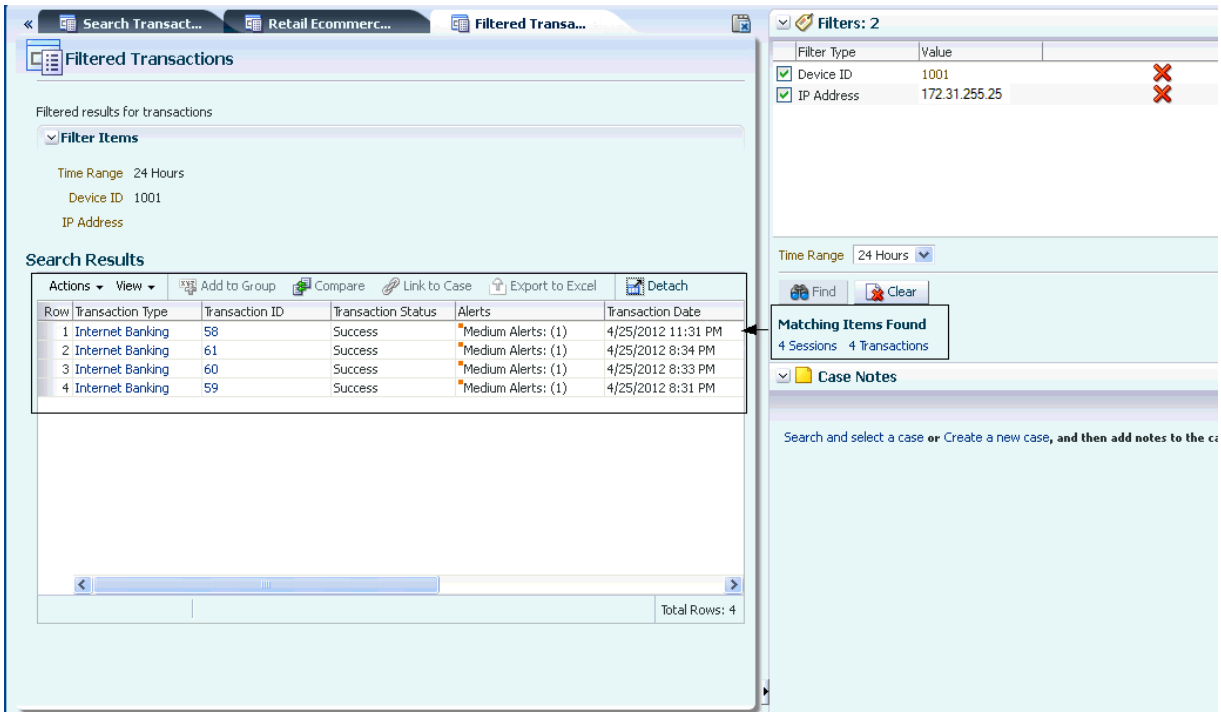
5.3.13 View Transactions from the Filtered Transaction Page

If the investigator wants to see the specific transactions, he navigates to the Filtered Transactions page.

To open filtered transactions page, proceed as follows:

1. Click the Number of Transactions link in the Utility Panel to see the transactions filtered by the datapoints you have specified earlier.

   Since the page that opens is only a Filtered Transactions page rather than the Transaction Search page, you can have multiple ones opened.



2. From the filter page, view the alerts.

Table 5–9 Transaction Details

Transaction Information	Description
Transaction Type	The type of transaction that was performed. Links to Transaction Details page.
Transaction ID	Transaction ID is a unique identifier created each time a customer submits a transaction. Links to Transaction Details page
Transaction Status	Status of the transaction.
Alerts	The alerts that were triggered.
Transaction Date	The day and time the transaction occurred
Session ID	Unique identifier of session in which the login or transactions occurred. The link takes the investigator to the Session Details page.

3. Select Transactions to compare.

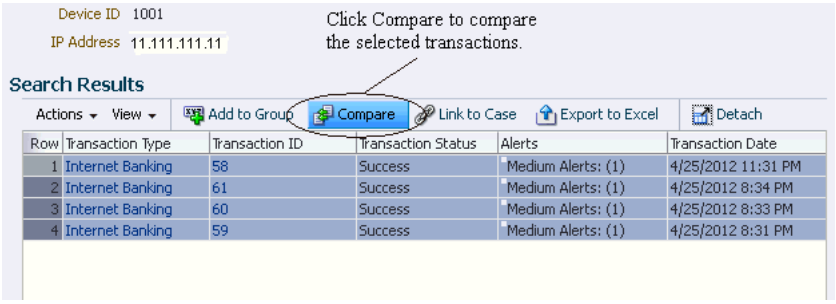
5.3.14 Compare Transactions

Compare parameters of transactions and customer details so that connections can be discerned. Selecting multiple transaction search results of the same transaction definition type and clicking the Compare button on the search results toolbar opens the Compare Transactions tab. Ten transactions maximum can be compared by default.

You can filter and view only the common data elements between the selected transactions. By default, all the data elements for the selected transactions will be displayed in the comparison page including the non-common data elements.

To select two or more transactions of the same type and perform a comparison on the values, proceed as follows:

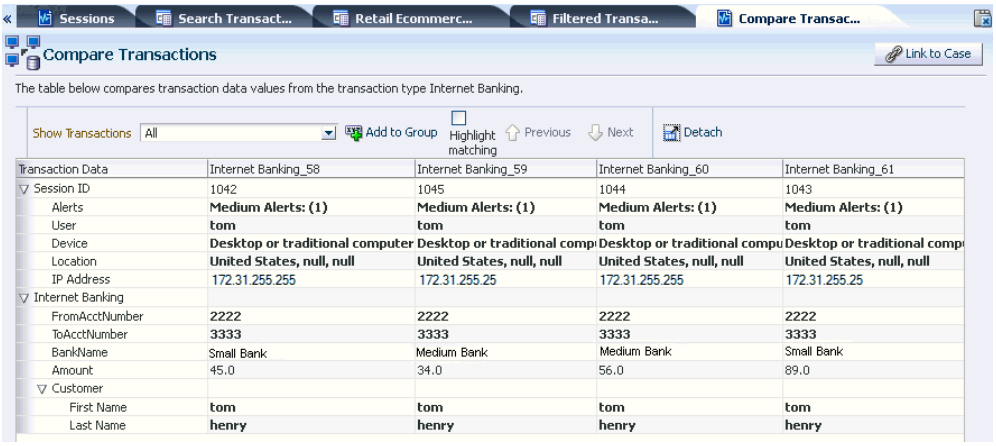
1. In the Utility panel, click the number for matching transactions in the Related Items Found section to see filtered data elements.
2. In the Search Results table of the Filtered Transaction page, select two or more transaction search rows of the same transaction type, and click **Compare**.



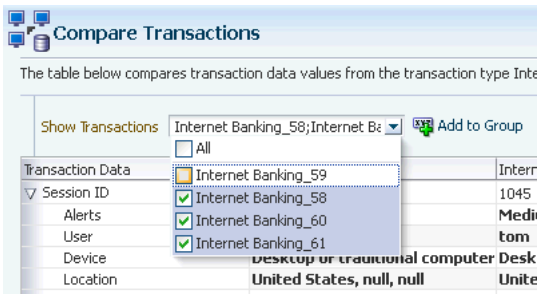
The Compare option is disabled until at least two transactions are selected from the search results.

Comparison is only available for the same type of transactions. Ten transactions maximum can be compared by default. Out of the ten transactions that are available by default, the investigator can choose to view a few transactions by applying a filter.

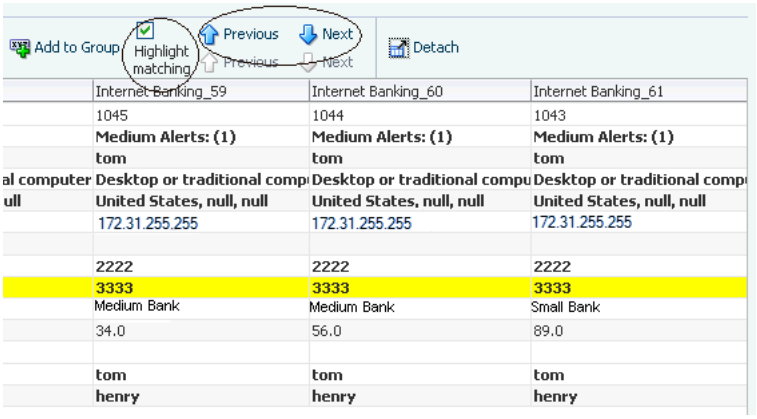
3. On the Compare Transaction tab, compare and contrast the transaction and entity data side by side.



4. Out of the available transactions, choose to view a few transactions by applying a filter.



5. To highlight matching details, select the Highlight Matching and click the Previous or Next arrow to walk through the details.



6. Drag and drop additional data elements involved in suspect transactions, one by one, to the Filtered Items panel to see if there is other activity which needs evaluation.

You can also compare transaction from the Transaction Search page.

1. Click the Transactions tab.
2. In the Transaction type field choose the Transaction Type and operator of equals.
3. In Transaction ID field, enter the number of the unique identifier created when the customer submitted the transaction.
4. Add another field.
5. In the Transaction ID field, enter the other transaction ID.
6. Click Search.
7. Select transactions from the Transaction search results and click Compare.

   The Compare Transactions page appears with a results table that compares transaction data values from the transaction type Retail Ecommerce.
8. To highlight the matching data, select the Highlight Matching box. Then click the down or up arrow key to highlight one match at a time.
9. Compare the transactions.

5.3.14.1 Use Case: Comparing Transaction Data

Jeff is a fraud investigator looking into a case generated by OAAM.

The user "John" appears to be fraudulent and has performed several wire transfers to different account numbers in the bank. The investigator wants to list all the account numbers and the amount transferred each time in the result. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Entity	Customer
Entity First name	John
Result	
Transaction Data	Amount

Filter	Entity Field
Entity	Account
Transaction field	To Account number

Jeff selects two transaction search rows of the same the type Wire Transfer and clicks the **Compare** button. Jeff is taken to the **Compare Transactions** tab which compares transaction and entity data.

5.3.15 Add the Data Element Utilized in the Fraudulent Transactions to a Group

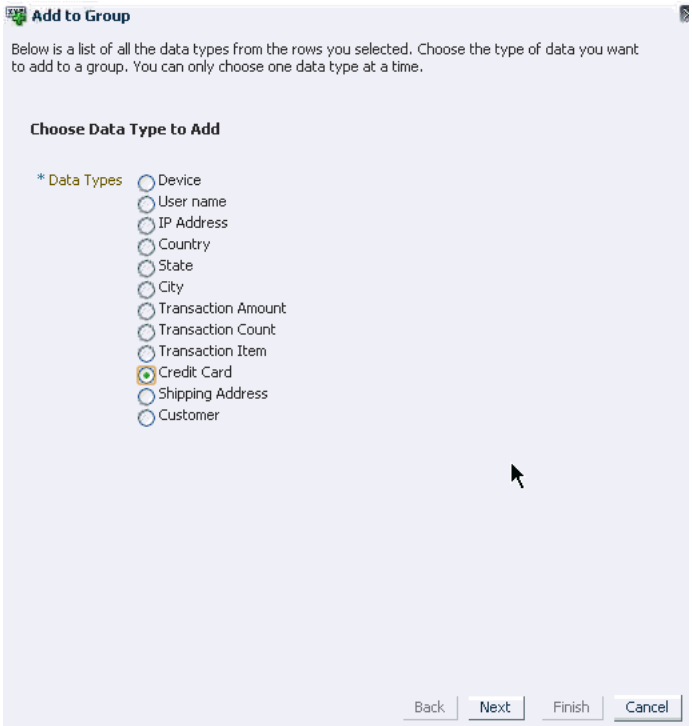
To add a data element to a group from the Transaction Compare Panel, proceed as follows:

1. Select a row to add entities, transaction data, and session elements to a specific data group and click **Add to Group**. For example, if an investigator selected **transaction1**, **transaction2**, and **transaction3** and they have account numbers **123**, **234**, and **345**. All three account numbers are added to the **suspicious account** group.

   Add to Group dialog appears with instructions, "Below is a list of all the data types from the rows you selected. Choose the type of data you want to add to a group. You can only choose one data type at a time."

2. Choose the data type and click Next to open another dialog which will allow you to select a group to add your data element to or create a group first and then add your data element.

Figure 5–4 Choose Data Type to Add to Group



5.3.15.1 Search from existing group

To select an existing group and add the entity to the selected group, proceed as follows:

1. Choose Search from existing group.

   Based on the data type selected, the corresponding available groups that the entity can belong to are shown.

   - For example, if an account number is selected, numeric group types are listed.
   - For example, if an account holder name is selected, string group types are listed.

2. Enter the group name in the Group Name field and click Search. You could also select a group from the list without performing a search.

   When you click **Search**, existing groups and descriptions are listed in the search results.

3. Select the group from the list to which to add the entity.

   The Preview shows the group name and members associated with group. If no members are associated, this message is shown: "No members associated with the group."

   Its existing members can be viewed in a preview area below the available groups table. The existing members list is relevant so that the investigator can determine whether any of the selected entities is a member of the selected group and decide whether to select or deselect it for adding.

   Entity cannot be added to the same Group multiple times.

4. Click Next.

   Data elements to be added to the group are listed in the next screen. Group selected and data elements to add are shown on this page.

5. To go back and change the data element, click the Back button. To proceed with adding these data elements, click the Finish button.

   If you clicked Finish, the Add to Group dialog appears with the message, "Successfully added device to selected groups."

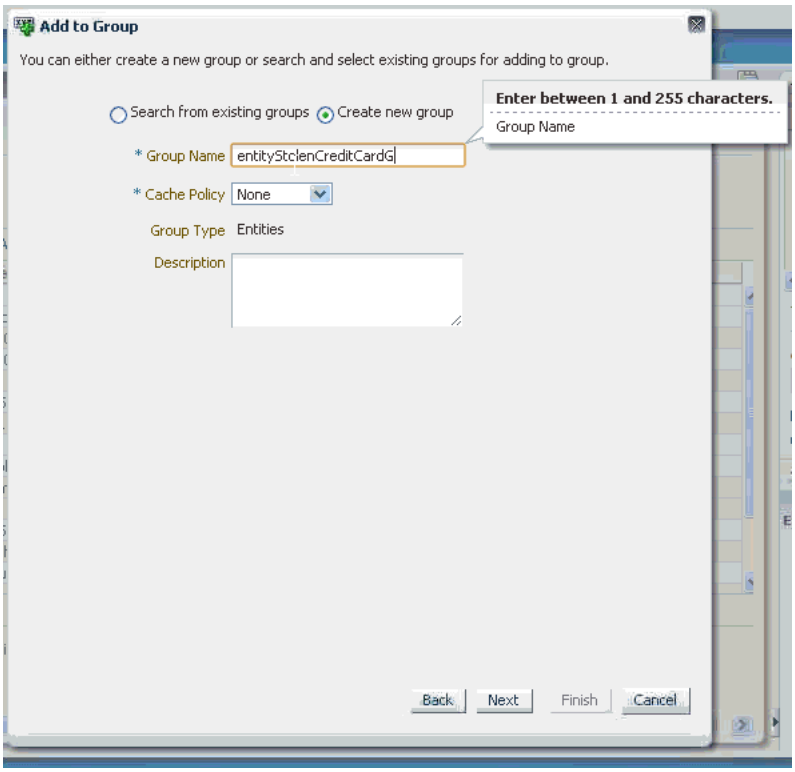
6. Click OK to dismiss the dialog.

5.3.15.2 Create New Group to Add Data Element to

Create New Group enables you to create a new group and add the entity to this newly created group.

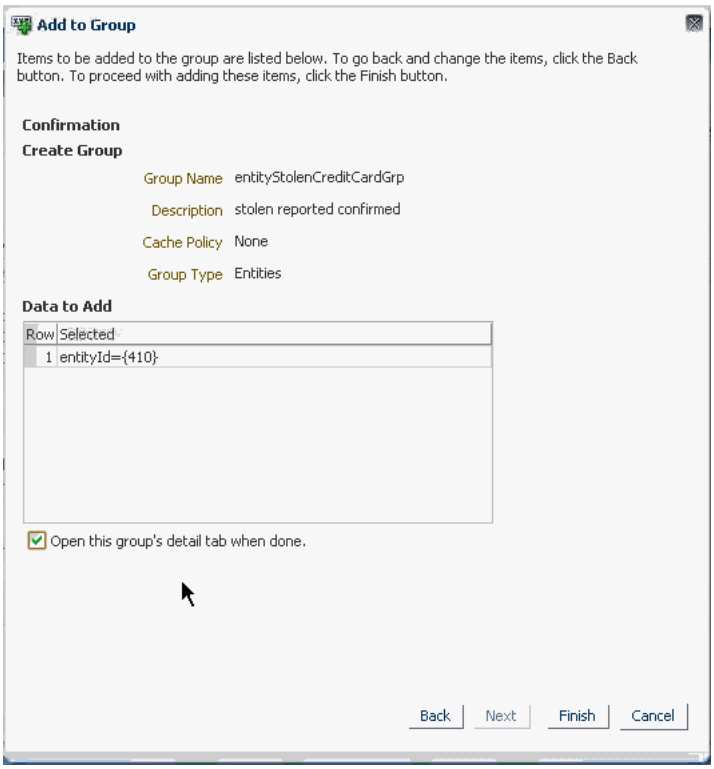
1. Select Create New Group to begin the process for creating a new group to add the entity to.

Figure 5–5 Create a New Group to Add Data Element To



2. Enter the name of the group in the Group Name field. You can enter up to 256 ASCII characters or up to 85 UTF-8 characters.
3. Select a cache policy from the Cache Policy field. Choices are None or Full Cache.
4. Enter a description in the Description box and click Next. You can enter up to 256 ASCII characters or up to 85 UTF-8 characters.
5. Data elements to be added to the group are listed in the Add to Group dialog. To go back and change the data elements, click the Back button. To proceed with adding the data elements, click the Finish button.

Figure 5–6 Adding to a New Group



When the **Open this group's detail tab when done** checkbox is selected, the group details page opens after you click **Finish**.

If the Group with the same name already exists an error occurs, otherwise the Group is created in the database and the entity added to this new group within the same transaction.

6. Click the Entities tab to ensure the entity has been added to the newly created group.

Note: The group definitions but not their members are available for import and export and in the snapshot. You must explicitly export and import the members as needed.

5.3.16 Close a Case with a Disposition

After an investigator finishes investigating a situation and comes up with a conclusion ("he put the pieces together"), he closes the case with a disposition. A closed case is one which needs no further investigation since the issue has been resolved. Closed cases contain dispositions that describe the way in which the issue was resolved in the case. Cases only have dispositions when they are closed.

1. Open the Case Details page.

   You have the choice to **Add Notes**, **Change Status**, or **Change Severity**.

2. Click **Change Status**. The Changed Status dialog appears. Select a status for this case and enter notes. Then, click **Submit**

   The choices are **Status**, **Canned Notes**, and **Notes**. The statuses to choose from are **New**, **Pending**, and **Closed**.

3. In the **Status** list, select **Closed**.

   A Disposition field appears in the dialog.

4. Select a disposition from the following choices:
   - Confirmed Fraud
   - Duplicate
   - False Negative
   - False Positive
   - Issue Pending
   - Issue Resolved
   - Not Fraud

5. Select Canned Notes which best describes the situation.

6. Enter some final notes summarizing findings. Manager or auditors can view these notes on the case activity including actions taken and individuals involved.

7. Click **Submit**.

   A confirmation dialog is displayed.

8. Click **OK** to dismiss the confirmation dialog.

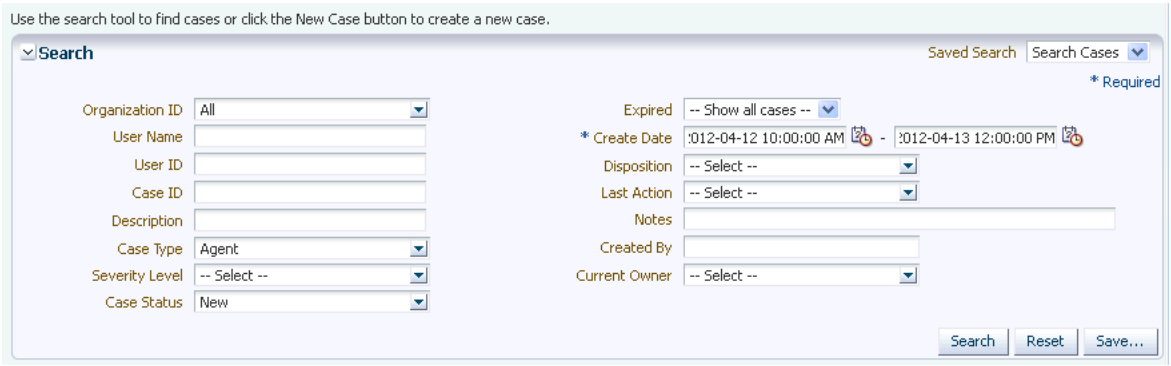
5.3.17 Search for Auto-Generated Agent Cases with Current Status "New" and Open Case

A case is the container for storing the details an investigator gathers when he is investigating. Once a case is created, the investigator searches for it to view its details.

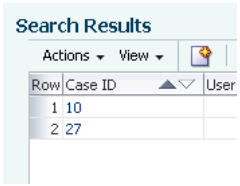
To search for auto-generated cases to work on, proceed as follows:

1. From the **Cases Search** page, filter all Agent cases by the most recent hours and select **New** in the Case Status field. Then click **Search**.

   For example, to search for auto-generated cases created in the last two hours, the investigator would make the following selections:



2. The results table contains a Case ID column that can be sorted in ascending or descending order by clicking the Case ID column header. The up/down arrow next to it indicates the current order of the data. Click the Case ID column header to filter results by ascending order. The lowest Case ID number is the oldest.



3. Click the **Case ID** to open the case.

   When an investigator accesses a case with the **New** status to start working on it, the status automatically changes to **Pending** and the **Current Owner** becomes the investigator.

   The Case Details page provides information about the current owner and the case status.

   Other investigators can now see that the case is actively being worked on since the case has an owner and the status is not **New** but **Pending**. Best practice is for investigators not to open cases that other investigators are working on.

5.3.18 View Linked Sessions

When the case was automatically created the sessions were linked to the case so all the session data is captured and ready for review. This includes a full set of the alerts triggered in the session. The investigator can read the alert messages to understand what was going on in this situation. He can look at the highest alert and see how it was generated. For example, the bank security policy might restrict banking while utilizing an anonymizing proxy as they are often used by criminals to hide their true geographic location, and an alert was triggered when an access attempt was made from an IP known to be an anonymizing proxy.

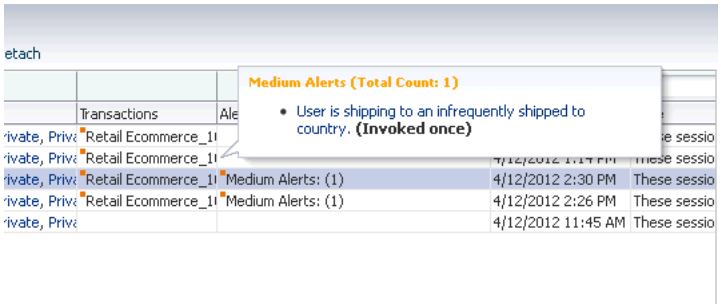
1. In the Case Details page, click the **Linked Sessions** tab to view the alerts and details of the sessions.

   The Linked Sessions tab enables him to view all of the sessions that are linked for the case he is investigating. The tab also displays information such as the date at which it was linked, alerts, transactions, and any notes provided at the time of linking. Table 5–10 summarizes the columns available in the Search results.

Table 5–10 Link Sessions Columns

Field	Description
Linked On	The date the sessions were associated with the case by an investigator.
Session ID	Unique identifier of sessions that have been associated to the Agent case by a fraud investigator.
User Name	Unique identifier of the individual who submitted the account problem.
Device ID	Unique identifier of the device that was used for the transactions.
Device Score	Level of risk that has been calculated for specific device that has been used in the session by the user.
IP Address	Unique network identifier issued by an Internet Service Provider to a user's device every time he is logged on to the Internet. IP address of the device from which the login was made
Location	Geographic location of the device from which the login was made.
Transactions	Transactions that took place in the session.
Alerts	Alerts that are triggered and generated for a user during the transaction process.
Session Date	The date and time that the session occurred
Note	Notes concerning why the session was linked.

2. A small orange square is shown in the upper left-hand corner of the alerts in the Alert column. When the cursor is placed over the square, a larger triangle with a note icon is displayed. Click the triangle to view the total count of alerts of a severity level and alert messages in a popup.



A full set of the alerts triggered in the session can be viewed and alert messages can be read to understand what occurred in this situation. View why the alert was generated and continue investigating, looking at each detail.

1. Click the alert message link in the alert popup to open the Alert Details page for more details.
2. Using the details pages, view information on the generation of the alert, the message, alert level, message type, and the alert's relationship to other data types such as user, device, location, sessions, browser, operating system, locales, and others.

   Table 5–11 lists the detail pages and the type of information provided by each page.

Table 5–11 Alert Details Tabs

Alert Details Tabs	Description
Summary	View general information about the alert and the alert template with the current details (level/type) View alert groups with which an alert is associated
Users	View users that have a session in which this alert was triggered. This report enables the investigator to see which users and how many times the alert was generated for each user during login process.
Devices	View devices that have been in a session in which this alert was triggered. This report enables the investigator to see which devices and how many times the alert was generated for each device during login process.
Locations	View locations that have been in a session in which this alert was triggered. This report enables the investigator to see which locations and how many times the alert was generated for each location during login process.
Sessions	View sessions in which this alert was triggered.
Fingerprint Data	View fingerprints created in the login process during which the alert was generated.

3. To view transaction and session details: In the Transactions column, click the orange square next to the transaction in the session to display the transactions that occurred during the session in a popup. Then click the Transaction to view more data.

   A summary section and a transaction data section are shown.

Table 5–12 Summary and Transaction Data

Details	Description
Transaction Type	Type of transaction. For example, Internet Banking, Retail Ecommerce, and so on.
Transaction ID	Transaction ID is a unique identifier created each time a customer submits a transaction.
Transaction Date	The day and time the transaction occurred
Session ID	Unique identifier of session in which the login or transactions occurred. The link takes the investigator to the Session Details page.
Description	An additional description of the transaction that occurred.
Device ID	Unique identifier of the device that was used for the transactions. The link takes the investigator to the Device Details page.
User Name	Login name given by user to login. Links to User Details page.
IP Address	Address mapped to the location of the transaction.
City	City where the transaction took place.
State	State where the transaction took place.
Country	Country where the transaction took place.
Transaction Data	Transaction type, entities, and runtime data.

4. Investigate further investigate by picking data points from the sessions to drill in on details.

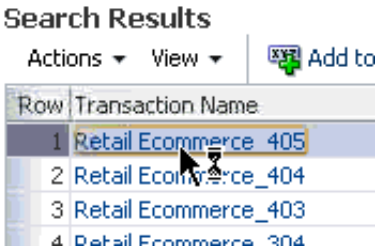
5.3.19 View Relevant Transaction's Details Such Transactional and Summary Data

In the Search Transactions page, click a transaction in the Transaction Type column in the Search results table to view the transaction in greater details through the Transaction Details page.

The following options are also available on this page:

- Add to Group
- Link to Case

Figure 5–7 Click Transaction Name to Access Transaction Details Page For More Information



5.3.19.1 View Summary Information

The top section displays the general information about the transaction along with the session ID.

Table 5–13 Summary Information in Transactions

Details	Description
Transaction Type	The type of transaction. For example, Internet Banking, Retail Ecommerce, and so on.
Transaction ID	Transaction ID is a unique identifier created each time a customer submits a transaction.
Transaction Date	The day and time the transaction occurred
Session ID	Unique identifier which identifies a user's online transaction session. Link to Session Details page.
Description	Note link
Device ID	Uniquely identifies each device and is auto-generated by the application. Links to Device Details page.
User Name	Login name given by user to login. Links to User Details page.
IP Address	Address mapped to a location usually, although some addresses are unknown or private. Links to IP Details page.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State. Links to City Details page.
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States. Links to State Details page.
Country	Country ID. Links to Country Details page.

5.3.19.2 View Transaction Data

The Transaction details are displayed in a name and value table. The following information is displayed as specified in the order below:

- Transaction Data
- Entity instances
- Related Entity Instances

Figure 5–8 View Transactional Data in Transaction Details Page

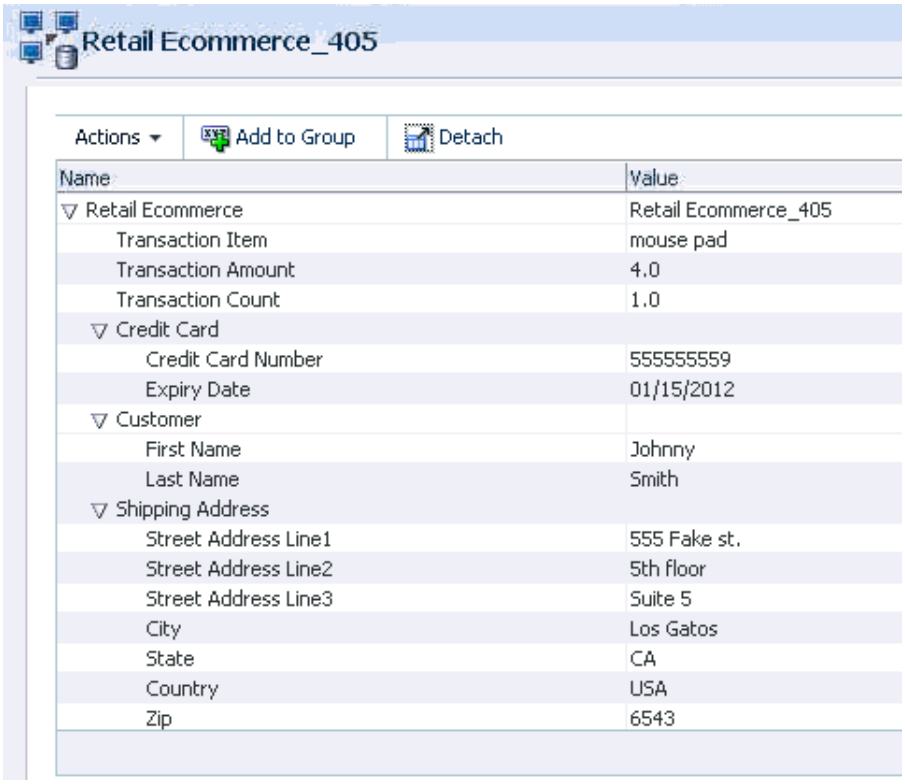


Table 5–14 Transactional Data in Transaction Details

Transaction Data	Description
Transaction Type	Type of transaction. For example, Internet Banking, Retail Ecommerce, and so on.
Entities	The entities involved in the transaction.
Values	The values entered by the user as part of the transaction.

5.3.19.3 View Session Data

In the Transaction Details page, view alerts and actions.

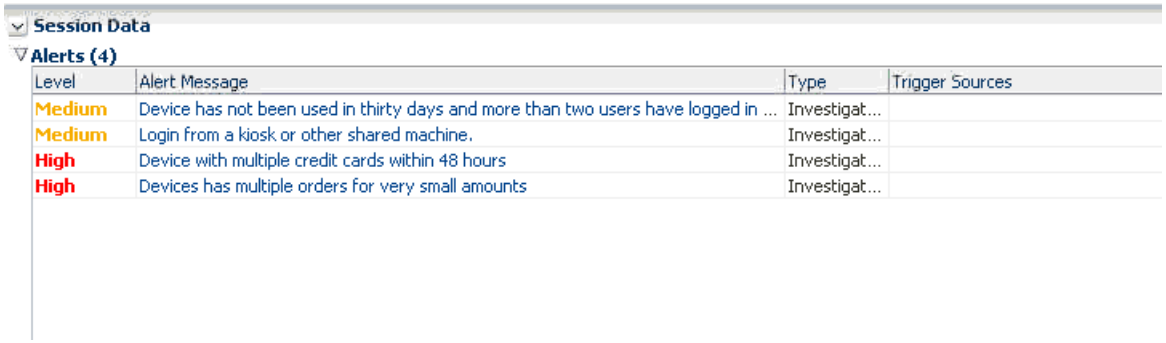
Session data shown in this section include:

- Alerts and actions
- Final action
- Alerts table displays additional information like alert level, alert message, trigger date, and so on.
- The rules and policy names are linked under trigger sources and can open the corresponding detail pages.

Table 5–15 Alert Session Data

Alert Information	Description
Alert Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert. Links to Alert Details
Alert Type	Type of the alert whether fraud, investigation, information, or other reason.
Trigger Sources	Rules that generated the particular alert
Timestamp	The time the alert was generated.

Figure 5–9 View Alerts in Transaction Details Page

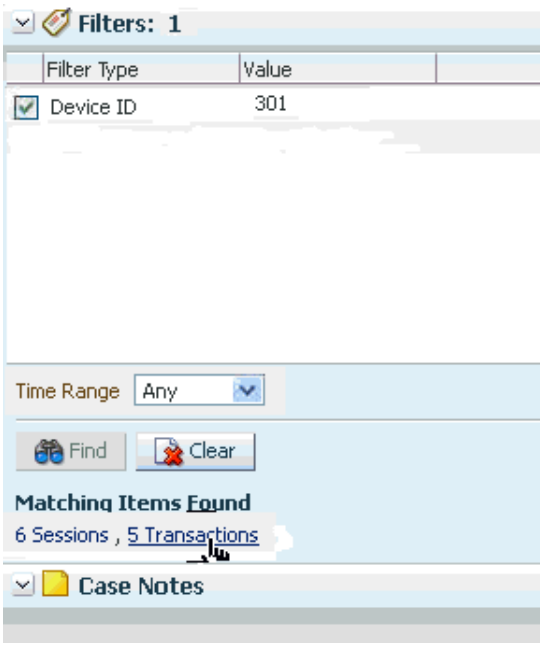


5.3.20 View Transaction or Session Oriented Results

To open filtered sessions page, proceed as follows:

1. Click the **Session Count** link to see the sessions filtered by the datapoints specified earlier.

Figure 5–10 Seeing Filter Results



2. From the filter page, view the following data elements:

Table 5–16 Search Results from the filter page

Field	Description
Session ID	Unique identifier for the session. Links to Session Details.
Alerts	Alerts that were generated from the transaction.
Transactions	Transactions that were filtered by datapoints.
Organization ID	Identifies the organization to which the user belongs.
User Name	Login name given by user to login. Links to User Details page.
Device ID	Uniquely identifies each device and is auto-generated by the application.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	Place where the transaction occurred
Session Date	Time duration when the sessions occurred.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
User ID	Unique Identifier of that user

Note: The Add to Group feature is available from this page.

5.3.21 Compare Multiple Instances of the Same Transactions

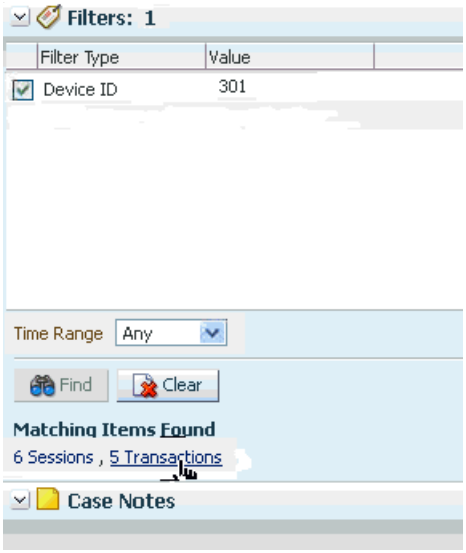
Compare transaction data to find out similarity. Selecting multiple transaction search results of the same transaction definition type and clicking the Compare button opens the Compare Transactions tab, which can be used to compare these transactions.

The investigator can filter and view only the common data elements between the selected transactions. By default, all the data elements for the selected transactions will be displayed in the comparison page including the non-common data elements.

To select two or more transactions of the same type and perform a comparison on the values, proceed as follows:

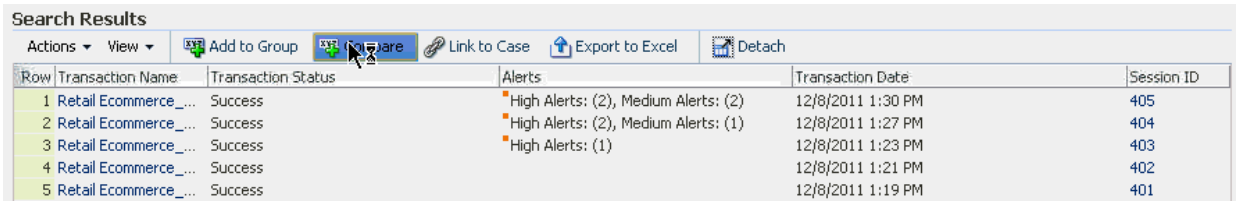
1. In the Utility panel, click the number for matching transactions in the Related Items Found section to see filtered data elements.

Figure 5–11 Click Number of Transaction Link



2. In the Search Results table of the Filtered Transaction page, select two or more transaction search rows of the same transaction type, and click **Compare**.

Figure 5–12 Compare Transactions



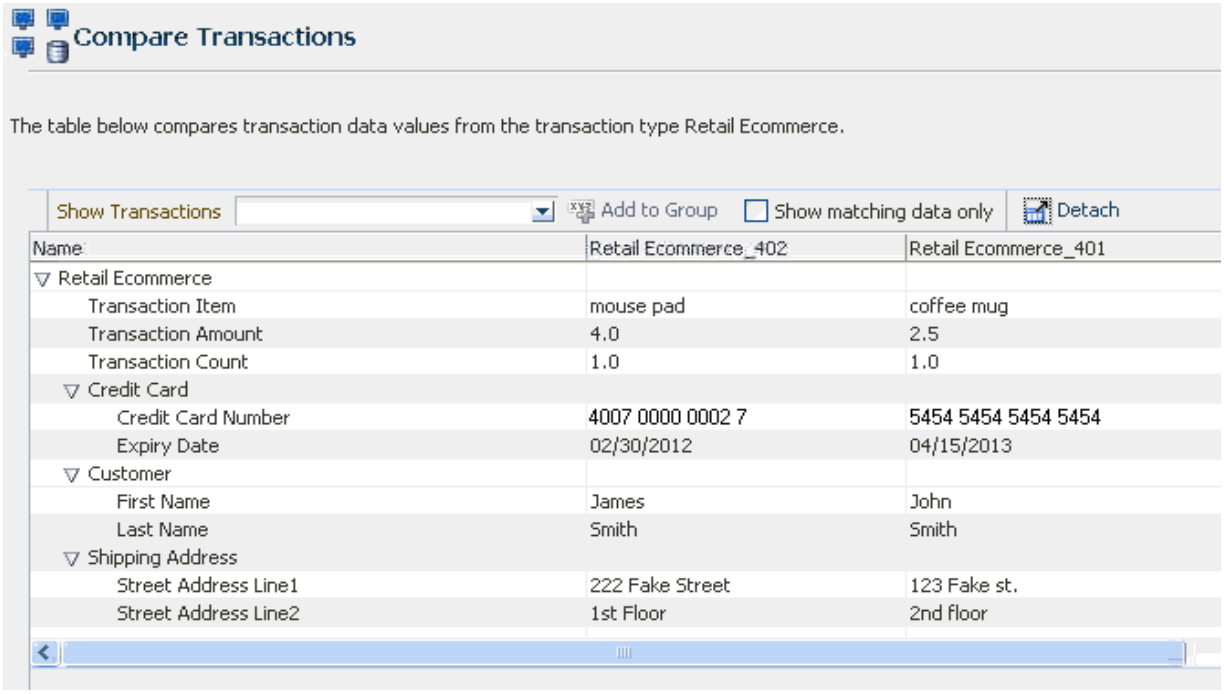
The Compare option is disabled until at least two transactions are selected from the search results.

Comparison is only available for the same type of transactions. Ten transactions maximum can be compared by default. Out of the ten transactions that are available by default, the investigator can choose to view a few transactions by applying a filter.

Clicking **Compare** opens a new tab and the transaction values are displayed for examination.

3. On the Compare Transaction tab, compare and contrast the transaction and entity data side by side.

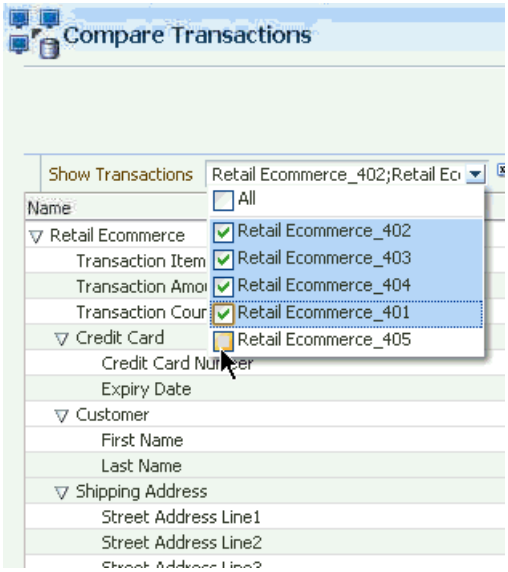
Figure 5–13 View Comparison of Transactions



Ten transactions maximum can be compared by default.

4. Out of the available transactions, choose to view a few transactions by applying a filter.

Figure 5–14 Apply filter



5. Drag and drop additional data elements involved in suspect transactions, one by one, to the Filtered Items panel to see if there is other activity which needs evaluation.

5.3.21.1 Use Case: Comparing Transaction Data

Jeff is a fraud investigator looking into a case generated by OAAM.

The user "John" appears to be fraudulent and has performed several wire transfers to different account numbers in the bank. The investigator wants to list all the account numbers and the amount transferred each time in the result. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Entity	Customer
Entity First name	John
Result	
Transaction Data	Amount
Entity	Account
Transaction field	To Account number

Jeff selects two transaction search rows of the same the type Wire Transfer and clicks the **Compare** button. Jeff is taken to the **Compare Transactions** tab which compares transaction and entity data.

5.3.22 Add Case Notes

A utility panel contains a Case Notes area and lists all the notes for the current case in a descending order based on time. By adding notes to a case, the investigator can document and share results of findings, hidden relationships or unusual behavior. The investigator can add notes directly into the Case Notes panel by entering notes and clicking Add Note as he continues with the investigation.

As part of documenting his findings, the investigator can save the filter criteria so other investigators can see the related data points for the case. To include the filter, he clicks Insert Filter Item so that he can add the filter detail as a note. There is no limits to the number notes the investigator can add. If the investigator wants to add more notes, the panel has the feature for scrolling. Tracking the discovery process over time enables an investigator to show others how he arrived at his conclusions.

To add new notes to the case directly in the Case Notes panel, proceed as follows:

1. Enter notes in the Case Notes panel.
2. Click the **Add Note** button in the Case Notes panel after adding a note to the Case. All case notes could be seen in the panel in a descending order based on time. This is very useful information for the investigators since they know the full history of the case before they start working on it.
3. Add filtered data elements and their value to the case as notes by clicking **Insert Filter Items**. This enables investigators to see the related data points for the Case.

   This action will only add the data elements that are actually used in the search and not all the data elements in the Filter Items panel. For example, a device ID `1234` might be added to the filter data elements, but may not be checked which means it is not being used in the search and hence will not be inserted.

Later, when you click the **Close Case** button in Case Notes, the Filter Utility panel is automatically refreshed including the Case Notes panel.

Note: Linking notes are not seen in the Case Notes panel. Only case notes added directly in the Case Notes panel and notes added using **Add Note** in the tool bar are seen.

Case notes are mandatory.

5.3.23 Close a Case with a Disposition

After an investigator finishes investigating a situation and comes up with a conclusion ("he put the pieces together"), he closes the case with a disposition.

1. Open the Case Details page.

   Choices are to add notes, change the status of a case, or change the severity of a case.

2. Click **Change Status**. The Changed Status dialog appears. Select a status for this case and enter notes. Then, click **Submit**

3. In the **Status** list, select **Closed**.

   A Disposition field appears in dialog.

4. Select a disposition from the following choices:

5. Select Canned Notes which best describes the situation.

6. Enter some final notes summarizing findings. Manager or auditors can view these notes on the case activity including actions taken and individuals involved.

7. Click **Submit**.

   A confirmation dialog is displayed.

8. Click **OK** to dismiss the confirmation dialog.

5.3.24 Open a Newly Escalated Case

Best practice is for investigators not to open cases that other investigators are working on. The first time an investigator accesses a case, the status changes to **Pending** automatically and the current owner becomes the investigator opening the case. Best practice is to open the escalated case and view the logs for notes entered by the CSR and CSR Manager.

Escalated cases contain the following tabs:

- Summary - Lists the details about the case
- Linked Sessions - Lists the sessions linked to the case
- Logs - Lists the case action logs

The Summary tab shows the case detail and if the case is an escalated case then it shows the details of the user associated with the case. Agent cases that are user less show a User Details section.

5.3.25 View Case Logs

Because the case originated from a customer service case, it contains specific user information in the details. Look at the case details and notes the user. Write down the user ID because you will need it to search for sessions.

The logs sections to show the logs of action performed on the case. The search filters are as follows:

Table 5–17 Log Search Filters

Filters	Description
Notes Keyword	Keyword from Canned Notes
ARM ID	CSR identifier
Action	Last action in the case. For example, yesterday jsmith called customer service claiming to have lost money out of his account. The CSR escalated the case and told jsmith he would be contacted within 24 hours. About 36 hours later, jsmith calls back to see why he has not been contacted. The CSR must view the case escalated yesterday for **jsmith**. He searches cases for **jsmith** with an **Escalate** action and ones that are not overdue in the last 48 hours.
Created Date	Date case was created.

5.3.26 View User Data

The following information is displayed in User Data for escalated cases.

Table 5–18 User Data

Data	Description
User Name	User for whom case is created
User ID	Auto generated?
Organization ID	The identifier of the application. (In a multitenant deployment, CSRs only have access to cases limited to their Application ID. CSR Managers and investigators can access cases from multiple applications)
Last Online Action	The last action that user executed. For example, the Answered challenge question field show **Challenge Question** or if user is blocked, **Block**.
Date of Last Online Action	Date when last online action was executed.
Temporary Allow Expiration Date	When a temporary allow is enabled. This field shows when it expires. If temporary allow is 7 days, the expiry date is a week from today.
Temporary Allow Active	If temporary allow is active, this field shows **Yes**, otherwise the field shows **No**.
OTP Bypass Active	Similar to temporary allow but OTP challenges are ignored instead of blocks
OTP Bypass Expiration Date	Date and time OTP Bypass is no longer be active
Completed Registration	If a user completed registration, this field shows **Yes**; otherwise it shows **No**. To be registered, a user may need to complete all of the following tasks: personalization (image and phrase), registering KBA questions/answers, and providing email/cell phone contact information.
Questions Active	If user completed registration, but questions were reset, and he did not go back to register new ones, this field displays **No**. This field shows **Yes** if the user completed registration and questions exist that can be used to challenge him.
OTP Delivery method active	User has either email or cell phone registered for the OTP challenge
Personalization Active	When an image, a phrase and questions are active for the user, this field displays, **Yes**. If anyone of these are reset, this field displays **No**.

5.3.27 View Case Details

The following information is displayed in Case Details.

Table 5–19 Case Details

Details	Description
Case ID	Unique case number to identify the case.
Organization ID	The Organization ID of the case.
Created By	This displays the name of the fraud investigator who created the case. If the case was created by a configurable action **Created by** displays **dynamic**.
Current Owner	Name of the investigator who is working on this case currently
Case Created	The date when the Agent Case was created
Case Type	Agent, CSR or Escalated (Escalated cases cannot be created)
Severity Level	The severity level is set by the user who creates the case and used as a marker to communicate to users how severe the case is. Anyone can change the severity of cases
Description	The details for the case. A description is required.
Disposition	When a case is closed the disposition describes the way in which the issue was resolved. Cases only have dispositions when they are closed. If a case has any status besides closed, the disposition is blank.
Case Status	The case status is **Pending** when the Agent case is created manually and **New** when an Agent case is created automatically (with Configurable Action) and changes to **Pending** once the case is accessed. The case status is **Escalated** for escalated cases and changes to **Pending** when the investigator accesses this case. Case status is changed when accessed by various administrators.
Expiration Date	Agent cases and escalated cases have a default expiration date of 24 hours from the date of creation. If the case has not been accessed before the expiration date, it has the status of Overdue. Each time a case is accessed, the expiration date of the Agent case or escalated case is reset to a new value; by default the date is reset to 24 hours from the date of accessing the case.
Last Case Action	The last action performed in the escalated or Agent case. There are no user details in Agent cases.
Last Action Date	The date when last action occurred.
Last Global Case Action	For an Agent case that is not created from an escalated CSR case, the last global case action field is always empty. For an Agent case associated to a user (escalated case), the last global case action is the last case action performed by the user associated with the Agent case. The case action could be performed on any case (CSR/Fraud Investigator)
Last Global Case Action Date	The last action performed against the user online.

Summary Shows Current Owner and Fraud Investigator Who Created Case

The summary data displays the current owner as well as the fraud investigator who created the case. If the case was created by a configurable action "dynamic" is shown as the originator of the case.

5.3.28 Search for Potentially Suspicious Sessions Based on Various Criteria

To search for sessions:

1. Click the **Sessions** tab. The **Sessions Search** page is displayed.

   The session filters are:

Table 5–20 Session Search Filters

Filters	Description
Session ID	ID for the session.
Organization ID	Identifies the organization to which the user belongs.
Alert Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert.
User Name	Login name given by user to login.
Device ID	Uniquely identifies each device and is auto-generated by the application.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Country	Country ID
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
IP Range	Range of IP addresses
Login Time	The time the customer logged in to perform the transaction. For example, 5/11/09.
Device Type	Reflects if a device was laptop/desktop or a mobile device
Client Application	Shows the native mobile application the user was accessing
External Device ID	Utilized if an MDM or other 3rd party solution provides a unique mobile device identifier

2. In the Sessions search page, narrow down the number of sessions that are returned by specifying criteria in the search filters.

   For example, search through sessions in the last **12 hours** with **High** alerts and a **Blocked** or **Locked** authentication status (sessions filtered by **Time**, **Alert Level** and **Action**).

5.3.29 View a List of Sessions Matching Specified Criteria

After clicking the Search button, the search results show a list of sessions that match the criteria.

Table 5–21 Sessions Search Results

Fields	Definition
Session ID	ID for the session.
Alerts	Severity of the alert and number of alerts. Click the More button (orange square) to see details on the number of alerts for the severity level and the alert triggered.
Transactions	Types of transactions that took place during the session. Click the More button (orange square) to access links to open the transaction details page of the specific transaction. This page contains general summary for the transaction and transaction data with entity and transactional data with values.
Organization ID	Identifies the organization to which the user belongs.

Table 5–21 (Cont.) Sessions Search Results

Fields	Definition
User Name	Login name given by user to login.
Device ID	Uniquely identifies each device and is auto-generated by the application.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	Country ID, State ID, and City ID
Authentication Status	Status of the session (each login/transaction attempt creates a new session).
Log in Time	The time the customer logged in to perform the transaction. For example, 5/11/09.
Pre-Authentication Score	Score for Pre-Authentication checkpoint.
Post-Authentication Action	Action for Post-Authentication checkpoint.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
User ID	Unique Identifier of that device
Internal Session ID	System generated ID for the session

5.3.30 View Forensic Record and General Details of a Session

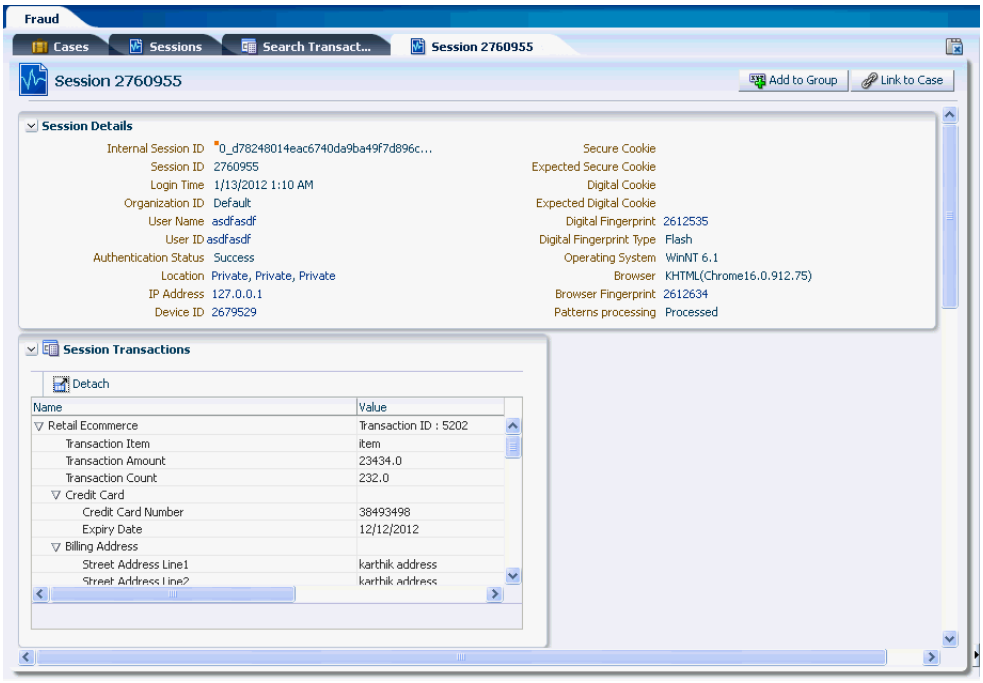
A **Session Details** page displays an overview of the events that transpired during a particular session for fraud analysis. It contains:

- General session data points such as user, device, location, and other details
- Additional information about the custom fingerprinting type along with available out of the box fingerprint information.
- A forensic record of the session, including transactions and checkpoints that were evaluated. Each checkpoint displays the policies in that checkpoint, alerts that were triggered during the session for that checkpoint, and the final action for that checkpoint.

5.3.30.1 Runtime Information

The **Session Details** page contains several panels. Panels are not displayed if information is not available. Except for the **Session Details** and **Session Transactions** panels, all other panels are displayed in the order of execution. Looking at the Session Details page, the flow of events is seen, the sequence when the events happened within the session.)

Figure 5–15 Sessions Details



5.3.30.1.1 Session Details The **Session Details** panel shows all the related information regarding the login transaction. It shows the authentication status, IP address from which the user logged in, user name, User ID, cookie information, autolearning processing status, the login time, and type of digital fingerprint used to collect digital fingerprint. If custom fingerprinting is used, then it shows the custom fingerprinting type name.

Usage example: You see a session, (name or ID) with a velocity alert and a locked authentication status. In your experience this combination is pretty rare and often indicative of a fraud attempt. This may be a case of stolen authentication credentials so you want to look into it. You open the details screen for this session to take a closer look at exactly what went on in this session. You see that the login had triggered a KBA challenge and there were three failed attempts to answer the question which resulted in the lock. You also see that the user was dynamically added to a high risk users group as a result of this rule. Drill in on the policy that caused the challenge to see what rules triggered. You also want to see if this user has any CSR cases related to this lockout. Search the CSR cases and determine if Phillip called in to have his KBA questions reset.

5.3.30.1.2 Session Transactions The Session Transactions panel shows transactions in a name and value table. The following information is displayed as specified in the order below:

- Transaction Data
- Entity instances
- Related Entity Instances

Usage example: Jeff is a fraud investigator looking into an automatically generated case. In the case, he can see there were two alerts generated. To see exactly why they were triggered he opens the Session Details. From this view he can see the rule instances that were triggered, the policies that contained them, the checkpoints linked to the policies and the transactions related to the checkpoints. He can also easily see if

there were any action or score overrides. All entities and transaction data is easily accessible on the session detail page. It includes external transaction ID and transaction status from the protected application. Investigators can use this data to trace a suspect transaction back to an application transaction and see if the transaction was successful, rejected, delayed, or blocked.

5.3.30.1.3 Checkpoints

An investigator is interested in why a particular rule triggered. For example, he might look at which policy and rules triggered the alert.

Information can be gathered by looking at these details. For example, a user who successfully went through Pre-Authentication and Post-Authentication checkpoints knew the password and the questions and answers and there fore, there is a good chance that he is a valid user. On the other hand, a user who attempted to answer the questions twice and succeeded in providing a correct answer on his third attempt might be considered suspicious. This user did not know the answers right away so there is a chance that he may be a fraud trying out new answers.

5.3.30.1.4 Policies A list of policies in that checkpoint are displayed in the **Policies** panel. View the rules and action that triggered.

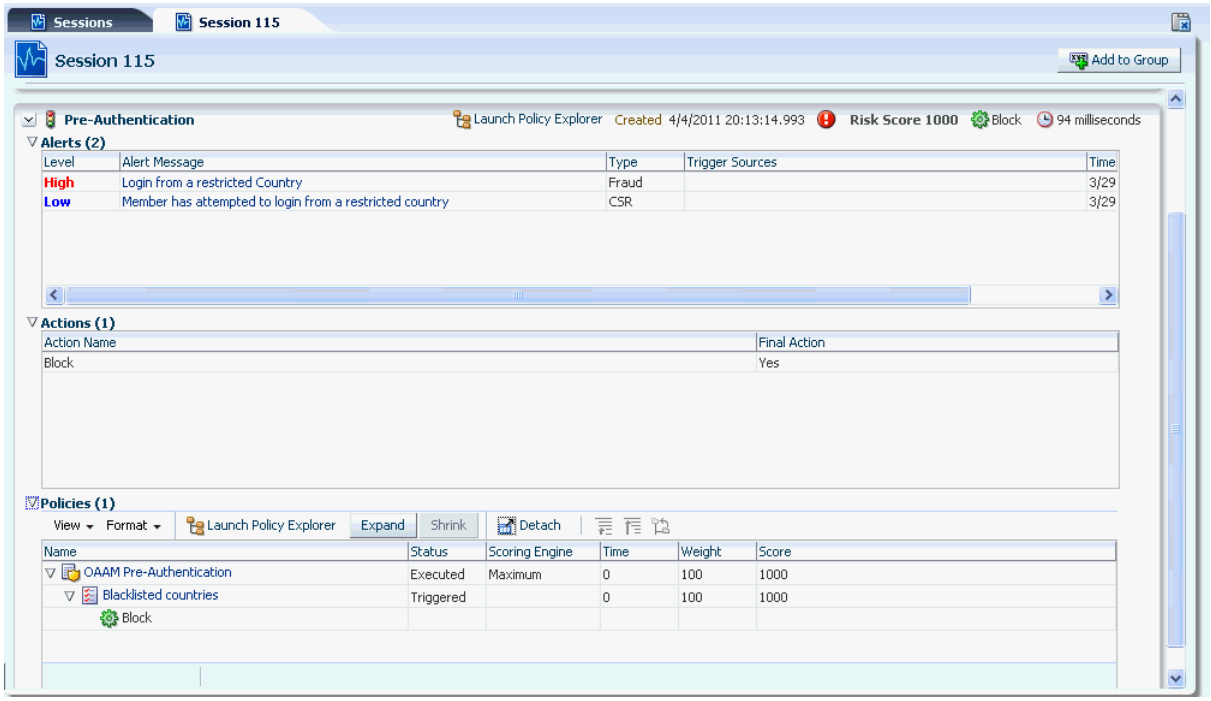
Table 5–22 Policies in a Checkpoint

Item	Description
Name	The name of the policies that are under the checkpoint, rules under the policies, the conditions under the rules, and the action triggered.
Status	Executed (for policies) and Triggered (for rules).
Scoring Engine	A scoring engine is provided at the policy level and at the checkpoint level. The policy scoring engine is applied to rule scores to determine the risk for each policy.
Time	The time of the occurrence.
Weight	Percentage value used to influence the total score.
Score	Level of risk that has been calculated for specific situations or parts of a situation, expressed as a number. There are multiple policies under one checkpoint. The scores of these policies are used to determine a score for the checkpoint.

5.3.30.2 Action, Alerts, and Scores

Figure 5–16 shows an example of alerts, actions, and scores displayed in a Session Details page.

Figure 5–16 Session Details: Alerts, Actions, and Scores



Alerts

The Alerts panel shows alerts that were generated for a checkpoint during the session and details about the alerts, as shown in the table below. Each checkpoint could trigger multiple alerts. High-level alerts are displayed in bold red.

Table 5–23 Sessions Checkpoint Actions

Item	Description
Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert.
Type	Type of the alert whether fraud, investigation, information, or other reason
Trigger Source	Rules that generated the particular alert
Timestamp	The time the alert was generated.

Actions

All actions are displayed in the **Actions** panel with a Action Name column and a separate column indicating whether or not the action is final. The final action is also displayed in the top right section of checkpoint panel.

Scores

Scores are displayed for the policy and checkpoint. The scores are useful in detecting the probability of fraud or business scenarios and in decision making.

5.3.30.3 Outcomes from Each Checkpoints

Checkpoint panels are arranged in chronological order of execution and display the checkpoints and a list of the actions and alerts that were triggered at those checkpoints. By default, checkpoint panels are collapsed. In the initial opened view,

only the transactions and the final alerts are displayed in the expanded form. All other panels are collapsed. Expand all the panels to view additional information for that checkpoint.

The first checkpoint panel could be one for Pre-Authentication. On top of the panel, the total amount of time taken for this checkpoint to execute, the final action, and the final risk score are shown.

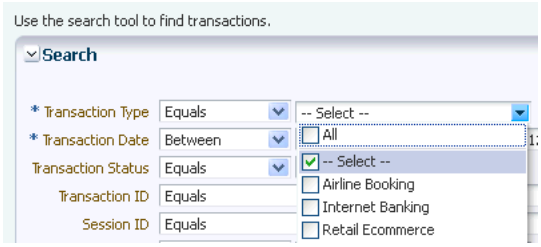
5.3.31 Searching for Transactions

The Transaction Search page allows investigators to search transactions independent of session. To search for transactions, you must select the transaction type to filter certain transactions by specific types. Based on the transaction type, corresponding entity and transaction fields available to be added are displayed. These are attributes of the transaction. Enter values for the attributes to search for and filter transactions results. The Transaction Type and Transaction Date fields are mandatory. The date is set to the last 24 hours by default.

Clicking one of the transactions opens a Transactions Detail page. The Add to Group feature is available for all data types listed.

To search for transactions, proceed as follows:

1. In Agent Cases page, click the **Transactions** tab.
2. To search for transactions, you must select the transaction type to filter certain transactions by specific types. In the Transaction Name field, select the transaction type. For example, "Internet Banking," "Retail Ecommerce," and so on.



3. Enter values in the Transaction Date fields. They are mandatory. The date is set to the **last 24 hours** by default.

   An error message is displayed if you enter special characters. Also, the **To Date** cannot be greater than the From Date.

4. In the search field, enter the criteria and use the search operator to refine your query to search and filter transaction results and then click **Search**.

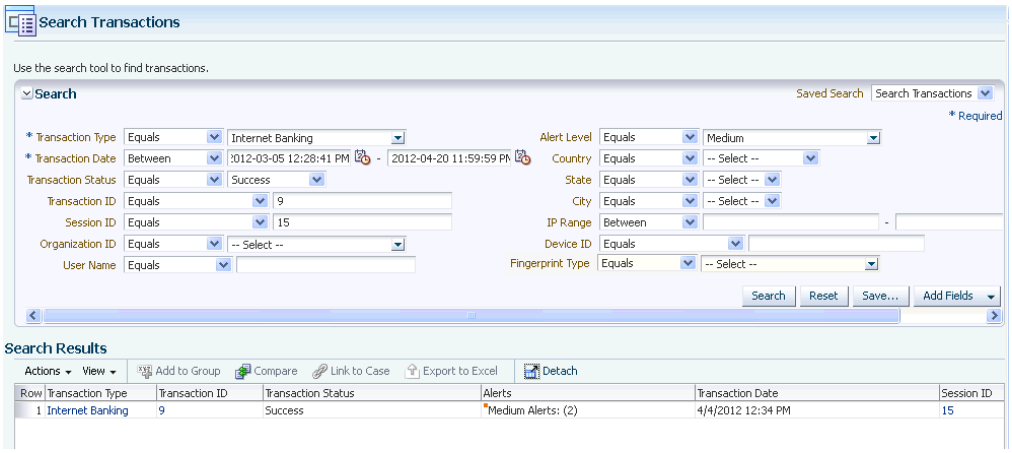


Table 5–24 lists the transaction filters to search and filter transactions.

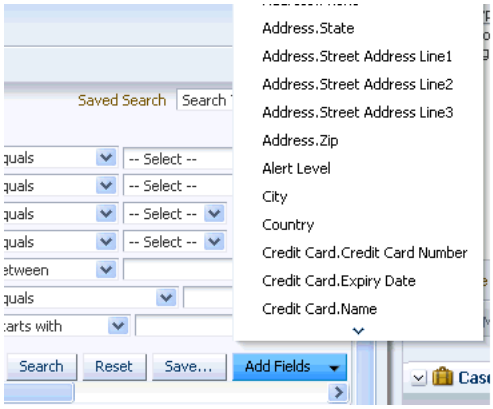
Table 5–24 Search Transactions Filters

Filter	Description
Transaction Type	The transaction type. For example, Internet Banking, Retail Ecommerce, and so on. The transaction name field is a mandatory field to which the search would be specific. If you select the type of transaction, corresponding transaction data and entity data fields that you can select from to add to the search are populated in OAAM Admin. You can perform a multi-select of transaction name attribute.
Transaction Date	The transaction date is the time that the transaction was submitted.
Transaction Status	The transaction status is the current state of a transaction. The values are: success, failure or pending.
Transaction ID	The transaction ID is the unique numerical reference assigned to each transaction that has been processed.
Session ID	The session ID is the identifier of the authenticated session in which the customer logged in before performing the transaction.
Organization ID	The Organization ID is a unique identifier for the organization you belong in. Each user belongs to only one Organization ID. It identifies what tenant applications a user utilizes and scopes which OAAM policies runs for them.
User Name	The user name is the name of you entered for login authentication.
Alert Level	Severity of the alert whether high, medium, low.
Country	Country ID
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
IP Range	Range of IP addresses
Device ID	Device identification
Entity Data	Entity data are attributes related to entities, which are mapped to the particular transaction type that has been selected for the search. For example, you can add the search field, BankName, if you selected Internet Banking as the Transaction Name. Investigators can perform searches using corresponding values of these attributes.
Transaction Data	Transactional data includes specific attributes related to the transaction type. For example **ToAccountNumber** or **FromAccountNumber** in a money transfer.

Note: Search by encrypted fields is not supported. Entity fields and transaction fields, which are encrypted, cannot be used as the search transaction filters and are not available as dropdowns.

An error message is displayed if you enter special characters.

5. To add a filter, click the **Add Fields** down arrow button.



6. From the list of parameters, choose the additional filter. For example, "Address.Zip."
7. In the search field, enter the criteria.
8. Use the search operator to refine your query in the text field. For example, "Equals." Then, click **Search**.

   The transactions that match the search criteria appear in the Search Results table. By default, the search results are sorted by Session ID. You can sort by transaction name, transaction status and date.

   You can view a transaction in detail by clicking the transaction name link. The Transaction Details page displays the run time values of the transaction and entity data along with the session information.
9. Search on the related entity data.
10. Export the search results into a spreadsheet by selecting the rows and clicking Export. The limit is 25 rows.
11. Add the transaction and entity data and authentication entities into groups, which can be further used in rules evaluation using the **Add to Group** option. For example, blacklisted accounts, suspicious merchants, and so on.

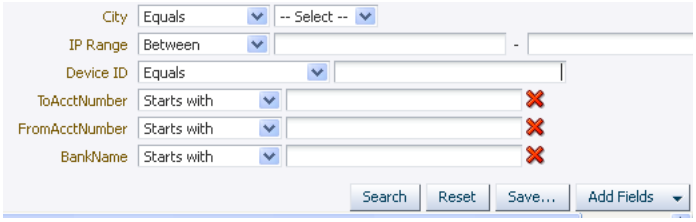
5.3.32 Searching for Transactions by Entities of a Single Transaction Type

You can use entity attributes to perform a search to list all the transactions related to that entity. To do this:

1. In Agent Cases page, click the **Transactions** tab.
2. To search for transactions, you must select the transaction type to filter certain transactions by specific types. In the Transaction Name field, select the transaction type. For example, "Internet Banking," "Retail Ecommerce," and so on.
3. Enter values in the Transaction Date fields. They are mandatory.

An error message is displayed if you enter special characters. Also, the **To Date** cannot be greater than the **From Date**.

4. Add entity data and transaction data search fields after selecting the Transaction Type. To add the filter, click the **Add Fields** down arrow button.
   - Entity data are attributes of entities that relate to the transaction type selected to be search on. For example, add the search field, BankName, if you selected Internet Banking as the Transaction Type. Investigators can perform searches using corresponding values of these attributes.
   - Transactional data includes specific attributes related to the transaction type. For example **ToAccountNumber** or **FromAccountNumber** in a money transfer.



The Add Fields list depends on the transaction type selected. For single transaction types, transaction data and entity instances for a particular transaction are displayed along with the default authentication entities, such as Transaction Date, IP Range, Device ID, and so on.

5. Export the search results into a spreadsheet by selecting the rows and clicking Export. The limit is 25 rows.
6. Add the transaction and entity data and authentication entities into groups, which can be further used in rules evaluation using the Add to Group option. For example, blacklisted accounts, suspicious merchants, and so on.

5.3.32.1 Use Case: Search by Entity Fields

Jeff is a fraud investigator is looking into a case generated by OAAM. On further research, he finds out that the Address used is a fake address. The investigator wants to list all the transactions that used this address. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Entity	Address
Address Line 1	House No. 123
Address Line 2	Fake Street
Address City	Fake City
Address State	Fake State

5.3.32.2 Use Case: Search for ATM Transactions By ATM Card

Jeff is a fraud investigator who needs to find all the ATM transactions that used a stolen ATM card in the last one week to estimate the damage. He can perform a search to list all transactions related to an entity with entity field attributes as search filters.

The ATM card number is one of the entity fields in the Card Entity. Jeff uses the ATM card number search filter along with the transaction type to list all transactions that use the ATM card.

Filter	Entity Field
Transaction name	Select All the Transactions
Entity	ATM
ATM Card Number	xxxx xxxx xxxx 1234

5.3.32.3 Use Case: List All Account Numbers and Amount Transferred Each Time

Jeff is a fraud investigator looking into a case generated by OAAM.

The user "John" appears to be fraudulent and has performed several wire transfers to different account numbers in the bank. The investigator wants to list all the account numbers and the amount transferred each time in the result. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Entity	Customer
Entity First Name	John
Result	
Transaction Data	Amount
Entity	Account
Transaction field	To Account number

5.3.33 Searching Transactions by a Combination of Entities and Transaction Data

You can use entity field attributes to perform a search to list all the transactions related to that entity. To do this:

1. Click the **Transactions** tab on the Agent Cases page.
2. On the Transactions Search page, select a single transaction type and entities. All the available entity fields are displayed as a result. You can also add fields to search on using the Add Field list.
3. Enter entity attribute values to filter results on and click **Search**. The search results contain transaction logs with matching entity data.

   When a single transaction type is selected, you can filter search results on both entity data (and related entity data) as well as transaction data.
4. Search on the related entity data.

5.3.33.1 Use Case: Search by Entity and Transaction Data

Jeff is a fraud investigator looking into a case generated by OAAM.

The user "John" appears to be fraudulent and has performed several wire transfers to this account number "1234" in the bank. The investigator wants to determine the number of transactions and the amount transferred each time. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Transaction Data	To account number - 1234
Entity	Customer
Entity First Name	John

5.3.34 Searching Transactions by Entities Across Multiple Transaction Types

You can search entities across these transaction type using entity attributes as search filters. This scenario is used when a common entity is shared across transactions.

1. Click the **Transactions** tab on the Agent Cases page.
2. On the Transactions Search page, select **All** as the transaction types in the dropdown. All the available entity fields are display as a result.

   You must select the transaction type first in order to proceed with the different modes of search. Transaction data and entity data are not populated if transaction type is not selected.
3. Add entity attribute fields and related entity attribute fields of the entities across these selected transaction types.

   The Add Fields list depends on the transaction type selected. For multiple or all transactions, only top level entities along with their relationships which are common across the transaction type selected are displayed.

   Note: Transaction data and entity instances are not displayed.

4. Enter entity attribute values to filter results on and click **Search**. The search results contain transaction logs with matching entity data.

   The transaction name is a combination of Transaction Type and Transaction ID. For example, wiretransfer_12.

   Clicking the transaction name opens the Transactions Detail page. The Transaction Details page displays the run time values of the transaction and entity data along with the session information.

   Note: The Add to Group option is disabled when more than one transaction is selected in the results.

   By default, the search results are sorted by Session ID. You can also sort by transaction name, transaction status and date. For multiple transactions in a single session, results are automatically grouped next to each other since the results are sorted on session ID.

   The Alerts display is similar to the Sessions search. Hovering the mouse enable you to view the alerts messages along with the number of occurrences.

   Note: You will not be able to search on the related entity data.

5. Search on the related entity data.

6. Save the search template along with the results layout and reuse them as needed. You can also set one of the search templates as your default search page.
7. Export the search results into a spreadsheet. The limit is 25 rows.

5.3.34.1 Use Case: Search Credit Card in Different Transactions (Shopping Cart and Retail Ecommerce)

Jeff is a fraud investigator looking into a case generated by OAAM. On further research, he discovers that the credit card used is a stolen credit card. The credit card could have been used in different transactions like shopping cart, retail ecommerce, and so on. The investigator wants to list all the different transactions that used this credit card in the last one week to estimate the damage. The card number is one of the entity fields. The investigator selects all or multiple transaction types and search on the entity fields.

Filter	Choice
Transaction type	Select All the Transactions
Entity	Credit Card
Credit Card Number	xxxx xxxx xxxx 1234

5.3.35 Opening Details Pages from Sessions Search Page

Click the **Session ID**, **User Name**, **Device ID**, **IP Address**, **Location**, and Alert to open the corresponding details pages to view additional information.

Note: If the checkpoint is not run, the Pre-Authentication or Post-Authentication checkpoint displays a score of -1.

Table 5–25 Search Session results

To open the Details page	Click this link
Session Details page	Session ID link Click the Session ID link from the sessions listing or other pages to open the corresponding Session Details page, which shows consolidated information about the session.
Transaction Details page	Click the More button and then the link of the particular transaction. A transaction details page opens, which shows general information about the transaction and transaction data with the entity and attribute values of the transaction.
Alert Details page	Alert message links from other pages (session details, other detail pages, and Agent pages) Click the alert message links from other pages (session details, other detail pages, Agent pages) to open the Alert Details page. The Alert Details page provides information on the message, level, type of the message and cross references on other data types such as user, device, location, sessions, browser, operating system, locales, and others. Additionally, information is provided about the way/ways in which the alert were generated.
User Details page	User Name or UserID links from other pages Click the User Name or UserID links from other pages to open the User Details page, which shows additional details regarding that user.

Table 5–25 (Cont.) Search Session results

To open the Details page	Click this link
Device Details page	Device ID link in the session details or other listing pages Click the Device ID link in the session details or other listing pages to open the corresponding details page. This page displays details for a device including cross references on other data types such as user, location, alerts, browser, sessions, full list of fingerprint data, and so on.
IP Address Details page	IP Address links from sessions listing or other pages. Click the IP Address links from the sessions listing or other pages to open the corresponding IP Address Details page, which shows additional details regarding that IP location.
Location Details page	Country, State or City links from the sessions listing or other pages Click the Country, State or City links from the sessions listing or other pages to open the corresponding Location Details page, which shows additional details regarding that location.
Fingerprint Details page	Digital Fingerprint ID or Browser Fingerprint ID links from the session details or listing page Click the Digital Fingerprint ID or Browser Fingerprint ID links from the session details or listing page to open the Fingerprint Details page. The Fingerprint Details page provides basic information about the Fingerprint; the data collected during Device Fingerprinting; lists of users, devices, and locations used; and a list of login sessions in which the fingerprint was generated for a particular period.

Open a details pages from another details page, up to a maximum of 10 tabs. The details page tabs also contain linked parameters, which can launch the details pages.

Note: When multitenancy is enabled, investigators do not have access to details pages from anywhere in the OAAM Administration Console.

5.3.36 Viewing a Particular Alert for a Session

Details for an alert includes message, level, type and cross reference on other data types such as user, device, location, sessions, browser, operating system, and locales. The Alert Details page enables an investigator to quickly see the relationship between not just the users who have generated this alert but also other data relationships that would be useful, such as locales that have been used while generating this alert.

To view a particular alert that had been triggered and generated for a session in greater detail, proceed as follows:

1. Click the **Sessions** tab to open the Sessions search page.
2. Search for sessions by entering the Session ID in the Session ID field and the alert message in the Alert Message field, and clicking **Search**.
3. In the Results table, click the orange square next to the alert in the Alert column to display alert message popup.
4. Click the alert message displayed in the popup to open the Alert Details page.
5. Using the details pages, view information on the generation of the alert, the message, alert level, message type, and the alert's relationship to other data types such as user, device, location, sessions, browser, operating system, locales, and others.

Table 5–26 lists the detail pages and the type of information provided by each page.

Table 5–26 Alert Details Tabs

Alert Details Tabs	Description
Summary	View general information about the alert and the alert template with the current details (level/type) View alert groups with which an alert is associated
Users	View users that have a session in which this alert was triggered. This report enables you to see which users and how many times the alert was generated for each user during login process.
Devices	View devices that have been in a session in which this alert was triggered. This report enables you to see which devices and how many times the alert was generated for each device during login process.
Locations	View locations that have been in a session in which this alert was triggered. This report enables you to see which locations and how many times the alert was generated for each location during login process.
Sessions	View sessions in which this alert was triggered.
Fingerprint Data	View fingerprints created in the login process during which the alert was generated.

5.3.37 Viewing Transaction Search Results

After clicking **Search** in the Transactions Search page, transactions that match the criteria are shown in the results table.

Figure 5–17 View Transaction Search Results

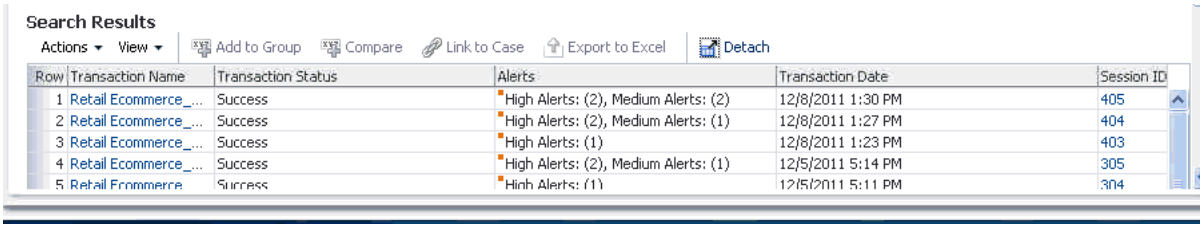


Table 5–27 summarizes the columns in the transaction search results.

Table 5–27 Search Transactions Results

Data	Definition
Transaction Type	Type of transaction. Clicking the Transaction Name link in the transaction search results opens a details tab about that transaction instance. The tab will contain transaction and entity data as well as session data. This field provides a link to Transaction Details page of a particular transaction.
Transaction ID	ID of the transaction. This field provides a link to Transaction Details page of a particular transaction.
Transaction Status	Status of the Transaction.
Alerts	Alerts for the transaction instance. Clicking the alerts links opens alerts summary pop with a link to the Alert Details page.
Transaction Date	Date when transaction occurred.
Session ID	The session ID of the user. Clicking the Session ID link opens the Session Details tab.

You can view a transaction in detail by clicking the **Transaction Type** link in Search Results. The Transaction Details page displays the run time values of the transaction and entity data along with the session information.

By default, the search results are sorted by Session ID. You can also sort by Transaction Type, Transaction Status and Transaction Date.

5.3.37.1 Use Case: View Transaction Details

Jeff is a fraud investigator looking into a case generated by OAAM. The user "John" appears to be fraudulent and has performed several wire transfers to different account numbers in the bank. The investigator wants to list all the account numbers and the amount transferred each time in the result. The investigator selects a specific transaction type to search on the entity fields.

Filter	Entity Field
Transaction name	Wire Transfer
Entity	Customer
Entity First name	John
Result	
Transaction Data	Amount
Entity	Account
Transaction field	To Account number

Jeff selects any one of the search results and clicks the transaction name link, which take Jeff to the Transaction Details page.

5.3.38 Linking Sessions to a New Case

To link sessions to a case:

1. Select the sessions and click **Link to Case** in toolbar to link the sessions to a new Agent case or an existing one.

   A dialog appears with the instructions, "Open a case to link sessions. Either search and select an existing case or create a new case, and then link the sessions." Three buttons are shown: **Create New Case**, **Open existing case**, and **Cancel**.

2. Click **Create New Case**.

   A Link to Case dialog appears with instructions to enter details. The case type is Agent and cannot be changed.

3. Enter details for the following fields:

   Organization ID

   Severity Level: Choices are Low, Medium, High

   Canned Descriptions: Choices are Cannot Login, Forget Question Answers, Possible Fraud, and OTP Override.

   Description

4. Click **Next**.

   Another Link to Case dialog appears with the message, "The following sessions have been selected to link to the case <case_number>. Enter a note for this action."

As part of the linking enter notes describing why the sessions were linked.

5. Enter Canned Notes. Choices are "These sessions contain suspected fraud" and "These sessions contain corporate misuse."
6. Click **Link Sessions**. A dialog appears with a message, "The selected sessions were linked to Case_<number> successfully."
7. Click **OK** to dismiss the dialog.

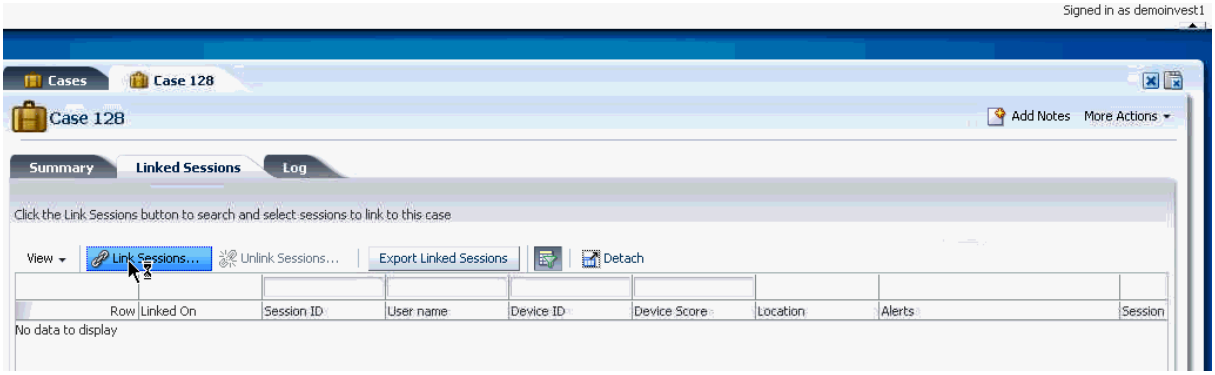
The case log records the notes as well as the user who performed the link action. These sessions stay linked to the case unless they are unlinked by an investigator or manager.

5.3.39 Linking Sessions to a Case from Case Details

To link sessions, proceed as follows:

1. On the Case Details page, click the **Linked Sessions** tab.
2. Click the **Link Sessions** button.

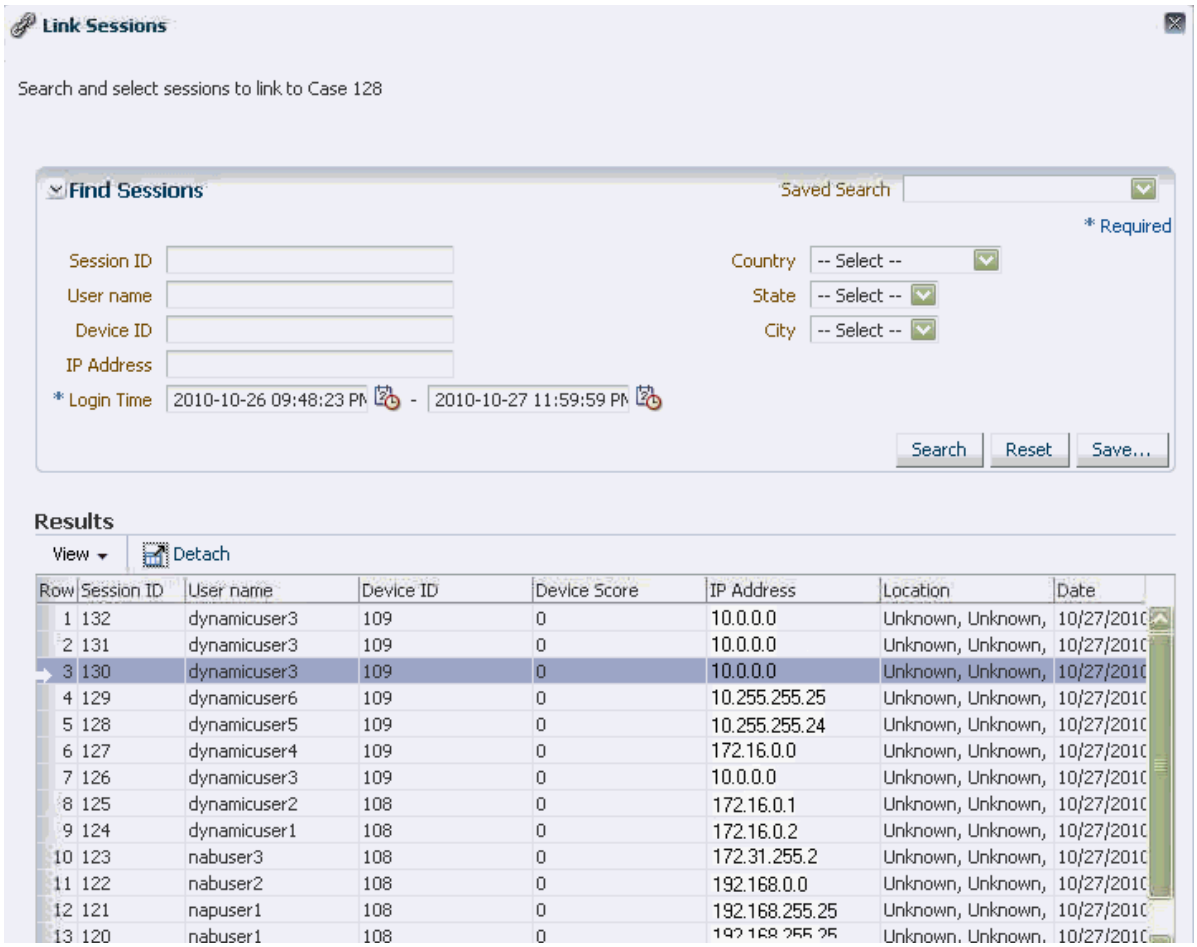
Figure 5–18 Links Button



A Linked Session dialog opens where investigators can find the sessions to add.

3. Filter sessions on Session ID, User Name, IP Address, Device ID, and Location and specifying a specific login time range.

Figure 5–19 Linked Sessions Search

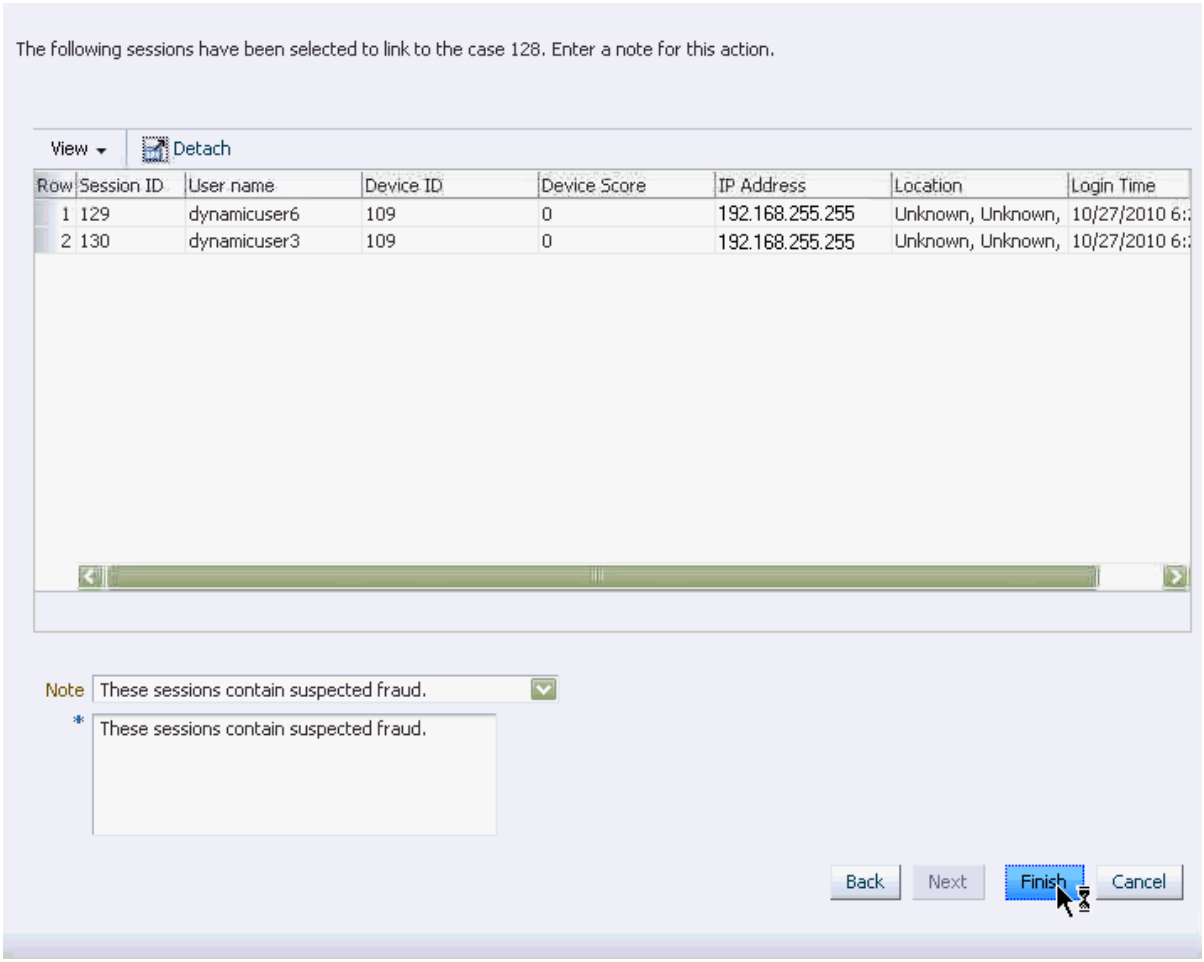


4. From the results, select the sessions to link to this case and click **Next**.

   Select one or more sessions to link at a time. These are the sessions that are part of the case that needs investigation.

   A dialog appears showing that the sessions that can be linked to the case.

Figure 5–20 Add Notes About Linking



5. In the Notes field, select a note from the Note list or enter a note between 1 and 4000 characters into the text box to describe why the sessions are being linked.
6. Click **Finish**.

   The sessions are linked to the case and appear in the Linked Sessions tab.

5.3.40 Verifying Entities in a Group

You can verify "entities in group". For example, if a you want to verify if the account number being used in a transaction belongs to a "suspicious account" group, then the transaction should be blocked. The condition you would use is Transaction: Check Transaction Count Using Filter Condition.

5.3.41 Exporting Linked Session for Further Analysis

The investigator can select one or more linked sessions and export them as MS-Excel document (XLS) for further analysis. Only MS-Excel document export is available.

The maximum number of linked session allowed to be exported is pre-configured for 1000. To change the limit, edit the following configurable property:

```
oaam.xls.case.linkedsession.export.row.upperbound=1000
```

To export linked sessions for further investigation and analysis:

1. In the Case Details page, click the **Linked Sessions** tab.

   The Linked Sessions page opens, listing all the linked sessions.
2. Select the linked sessions and click **Export Linked Sessions**.
3. Select **Save File**, browse for the location for file to be saved and click **Export**.

   The sessions are exported with the following details:

   - Row
   - Session ID
   - Linked On
   - User Name
   - Device ID
   - Device score
   - IP Address
   - Location
   - Transactions
   - Alerts
   - Session date
   - Note

5.3.42 Unlinking Linked Sessions

If they feel that the linked sessions are not relevant to the case, an investigator can unlink them from the case.

To unlink linked sessions:

1. On the Case Details page, click the **Linked Sessions** tab.
2. Click **Unlink Sessions** on the toolbar.

   The Unlink Sessions dialog opens, listing all the selected sessions to be unlinked.
3. Enter notes about why the sessions are being unlinked.
4. Select the linked sessions to unlink and press **Unlink**.

   The sessions are unlinked from the case.

5.3.43 Saving Case Details for Later Reference, Portability and Offline Investigation

Save case details including summary, log list, linked sessions to a file in XLS format for later reference, portability and offline investigation.

To save case details from the Cases search page:

1. Select the cases from the Search Results table and click **Export to XLS**.
2. When the Export Dialog is opened, select to save the file to Excel.

You can also save the case details from the Case Summary, Case Logs and Case Linked Sessions pages as well by clicking the **Export to XLS**.

Note: The default number of rows you can select for export is 100 rows. An error occurs if you try to select more than 100 rows to export.

5.3.44 Using OAAM BI Publisher Reports for Investigation and Forensics

This section provides two examples of report usage in investigation and forensics. See Chapter 24, "Reporting and Auditing" for information on setting up BI Publisher reports.

5.3.44.1 Session Activity Aggregates

BI Publisher reports can be used to show the results of checkpoints.

- Total number of each action by checkpoint
- Total number of each alert by checkpoint
- Total number of sessions with risk score ranges (0 - 600, 601 - 800, 801 - 1000) by checkpoint

Login Analysis Aggregates Report

For example, George is a security and compliance officer. He has been asked to configure a solution to run login risk evaluations offline that are deemed too expensive to run in real-time. He is using the out of the box run task to perform the whole login chain of checkpoints on every session in the selection. After the load and run are complete George generates an aggregate report showing metric for total numbers of each action, alert, risk scores in Pre-Authentication and Post-Authentication data.

For example, George is a security and compliance officer. He has been asked to configure a solution to run login risk evaluations offline to test new policies before they are rolled out to production. When testing to see the difference in results between one policy configuration and another he performs a run with policy set A then he runs this report and exports to HTML. Next he does the same with policy set B and compares the two reports to see if policy changes are behaving as expected.

5.3.44.2 Search Sessions By Case Disposition

As Investigation Managers and business analysts, you can assess the effectiveness of OAAM and your fraud team. As part of investigating, you can run a report that returns all sessions that have been linked to a case with a specified disposition. The results will show the case IDs each session is linked to.

Search sessions by case disposition Report

At the end of the week a manager runs the report to find a list of all sessions with organization ID "Sears" and that have been linked to a case with a "confirmed fraud" disposition.

5.4 Managing Cases

Case management procedures are documented below.

5.4.1 Searching for Agent Cases

A case is the container for storing the details an investigator gathers when he is investigating. Once a case is created, you search for it to view its details.

General Case Searches

Once a case is created, you search for it to view its details.

To search for cases

1. From the **Cases Search** page, filter your search using the search filters and fields.

   Table 5–28 describes the Case search filters.

Table 5–28 Search Filters

Search Criterion	Description
Organization ID	To locate cases for an organization, select the Organization ID. Fraud investigators are able to see the cases from only those organization's users to which they have access. Escalated cases associated with the Organization ID to which the fraud investigator has access are also included in the search result if it fits the query criterion.
User Name	The User Name field is blank for Agent cases.
User ID	The UserID field is blank for Agent cases.
Case ID	To locate a specific case, enter the Case ID.
Description	To locate a case by a keyword that is in the description, enter the word you want. Search by description displays all cases with any matching words in the description field.
Case Type	To filter cases by case type, select Agent. Investigators and investigation managers work on Agent cases. Agent cases are used specifically by fraud investigators and investigation managers for analyzing data and finding relationships between sessions and cases.
Severity Level	To filter cases by severity level, select Low, High, or Medium. The severity level is a marker to communicate to case personnel how severe this case is. The severity level is set by whomever creates the case.
Case Status	To filter cases by case status, select New, Pending, Closed, Escalated.
Expired	To filer the list by expired, select the option you want. The options available are: ■ Hide Expired ■ Show Only Expired
Created Date	To locates cases created within a given create date range, enter the start and end dates you want for the range.
Disposition	To filter cases by dispositions, you can select: ■ Confirmed Fraud ■ Duplicate ■ False Negative ■ False Positive ■ Issue Pending ■ Issue Resolved ■ Not Fraud The disposition describes the way in which the issue was resolved in a case. Cases only have dispositions when they are closed.
Last Action	Search based on the last action that was taken in case.

Table 5–28 (Cont.) Search Filters

Search Criterion	Description
Notes	Search for cases that contain specific keywords in their log. For example, if you search for all Agent type cases that contain the word **chargeback**, a case with a note that contains "The device used seems to be related to a number of chargebacks" would return in the list of cases.
Created by	Search by user name of the investigator who created the case.
Current Owner	Search by user name of the investigator who is working on this case currently (who performed the last action)

2. Click **Search**.

   After the case is located, click the Case ID to view the case details.

   When a specific case is located, an option is available for performing several different tasks, which are described in this chapter.

3. If you want to save the search template along with the results layout and reuse them as needed, click **Save**. You can also set one of the search templates as your default search page.

> **Note:** If multitenancy is enabled, search results display all the cases with users who belong to the organizations that the CSR has access to if they match the search criteria. User less cases are part of the result set if the case owner's Organization ID is on the investigator's access permission list and the case matches the search criteria.

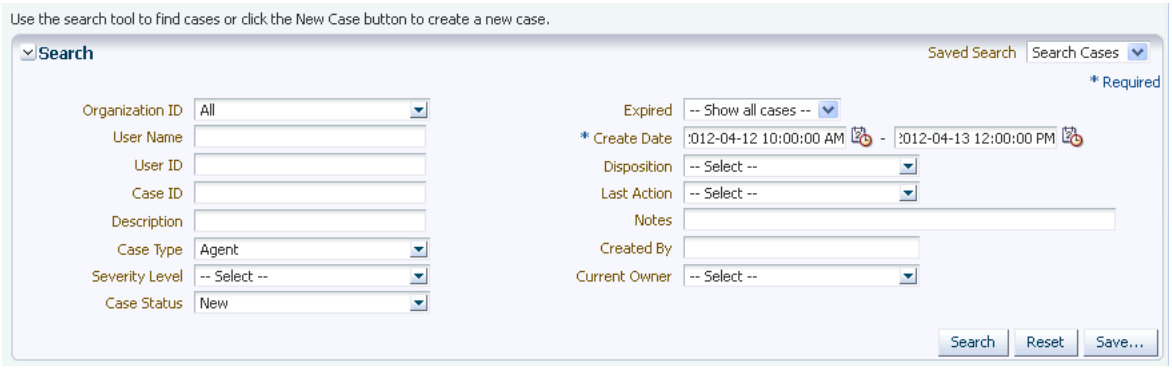
Searching for Auto-generated Cases to Work On

When you perform an investigation from an auto-generated case, you begin by searching for new auto-generated cases.

To search for auto-generated cases to work on, proceed as follows:

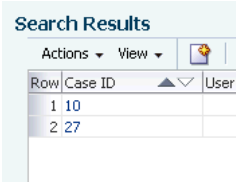
1. From the **Cases Search** page, filter all Agent cases by the most recent hours and select **New** in the Case Status field. Then click **Search**.

   For example, to search for auto-generated cases created in the last two hours, you would make the following selections:



2. The results table contains a Case ID column that can be sorted in ascending or descending order by clicking the Case ID column header. The up/down arrow

next to it indicates the current order of the data. Click the Case ID column header to filter results by ascending order. The lowest Case ID number is the oldest.



3. Click the Case ID to open the case.

   When an investigator accesses a case with the **New** status to start working on it, the status automatically changes to **Pending** and the **Current Owner** becomes the investigator.

   The Case Details page provides information about the current owner and the case status.

   Other investigators can now see that the case is actively being worked on since the case has an owner and the status is not **New** but **Pending**. Best practice is for investigators not to open cases that other investigators are working on.

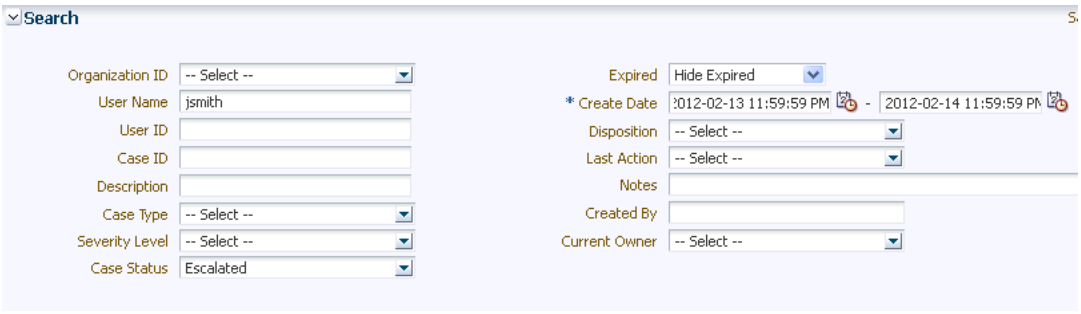
Searching for Escalated Cases

When you perform an investigation from an escalated case, begin by searching for a pending escalated cases.

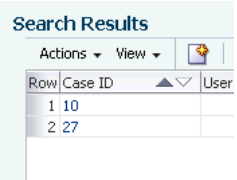
To search for cases to work on, proceed as follows:

1. From the **Cases Search** page, filter all Agent cases by time and select **Escalated** in the Case Status field. You can specify the user name in the **User Name** field. Then click **Search**.

   For example, to search for the case escalated yesterday for smith, you would make the following selections.



2. The results table contains a Case ID column that can be sorted in ascending or descending order by clicking the Case ID column header. The up/down arrow next to it indicates the current order of the data. Click the Case ID column header to filter results by ascending order. The lowest Case ID number is the oldest.



3. Click the Case ID to open the case.

   When an investigator accesses a case with the **New** status to start working on it, the status automatically changes to **Pending** and the **Current Owner** becomes the investigator.

   The Case Details page provides information about the current owner and the case status.

   Other investigators can now see that the case is actively being worked on since the case has an owner and the status is not **New** but **Pending**. Best practice is for investigators not to open cases that other investigators are working on.

Searching by Created By

You can search for all Agent type cases that were created by an investigator in the last "n" hours.

1. From the **Cases Search** page, filter all Agent cases by time.
2. Enter the name of the investigator in the Created By field. Then click **Search**.

A list of all cases manually created by the user are displayed.

Searching for Cases by the Actions Taken

Investigators can search both CSR and Agent cases based on actions that were taken in them.

Example: Yesterday jsmith called customer service claiming to have lost money out of his account. The CSR escalated the case and told jsmith he would be contacted within 24 hours. jsmith calls back 36 hours later to see why he has not been contacted. The fraud investigator needs to view the case escalated yesterday for jsmith. He searches cases for jsmith with an **Escalate** action and ones that are not expired.

1. From the **Cases Search** page, select Agent in Case Type field.
2. Enter jsmith in the User Name field.
3. Select **Escalated** as the Case type.

   A list of all cases manually created by the user are displayed.
4. Filter escalated cases by last 24 hours and click **Search**.

   The escalated case for jsmith appears in the search results table.

Searching Cases by Case Status

On the Agent case search page there is a field for Case Status for investigators to search on. Case status is the current state of a case. It tells the investigator if the investigation is new, pending, closed, or escalated when he searches for cases to work on. Table 5–29 shows the status values used for cases.

Table 5–29 Case Status

Status	Definition
New	A new case is one that has been created but not worked on yet. It is the status of a case when it is created. Cases are New when they are created through a configurable action (auto-generated)
Pending	An investigation is pending if an investigator is still working on it. The status of a case that is not yet resolved. Manually created cases are Pending when they are created.
Closed	A closed case is one which needs no further investigation since the issue has been resolved. Closed cases contain dispositions that describe the way in which the issue was resolved in the case. Cases only have dispositions when they are closed. For example, if fraud is identified, fraud investigators record findings, blacklist high risk entities related to the case, and close the case with a disposition.
Escalated	An escalated case is one that originated from a customer service case. The CSR submits a CSR case for investigators to review when there is suspicious activity associated with the specific user in the case. For example, A CSR Manager escalates a CSR case. An investigator specializing in customer specific security issues searches for all cases with the Escalated case status.

Searching Cases by Disposition

An investigator manager searches for all Agent type cases that have a confirmed fraud disposition.

1. From the **Cases Search** page, select Agent in Case Type field.
2. Select Confirmed Fraud in the Disposition field and click **Search**.

   A list of all cases confirmed as fraud by an investigator are listed in the search results table.

5.4.2 Create Agent Cases

Procedures for creating cases are presented below.

5.4.2.1 Creating an Agent Case Manually

A new Agent case is created when a suspicious activity or fraud scenario is detected and needs investigation. Only an investigator can create an Agent type case directly. No user information is shown or required for the creation of an Agent type case. The only required inputs to create an Agent case are Organization ID, severity level, and description.

An investigator is allowed to open and work on one Agent case at a time. He cannot have more than one tab with an open case. If he tries to create an Agent case while he has another case opened, a warning appears with the message that the current case workflow will be replaced with the new case workflow.

The **Create** button is disabled until all the fields are entered. Required fields are marked with a "*" (asterisks). If invalid parameters were entered, an error message is displayed and the new case is not created.

To create an Agent case:

1. In the **Cases Search** page, click **New Case**.

   The **Create Case** dialog appears with **Agent** specified as the Case Type because the system already knows from the login that an investigator is creating this case. He will not be able to change the Case Type.

2. Enter the **Organization ID** the case is created for.

   A list of **Organization ID**s for which he has access to is provided. From the list he can select one **Organization ID**. Later, he can create a case for a different Organization ID if he needs to.

   Note: You do not have to enter a user name or User ID because the Agent case is a user less one.

3. Select a severity level from the **Severity Level** list

   The available severity levels are **High**, **Medium**, and **Low**.

4. Enter a description of the case in the **Description** text box, or select descriptions from the **Description** list, or do both.

   The **Description** text box can contain alphanumeric and special characters, but it should not exceed 4000 characters. Select a description from the **Canned Description** list, one at a time for any number of times. When a canned description is selected, a description is automatically added to the Description text box. Each description selected from the list is appended to the previous.

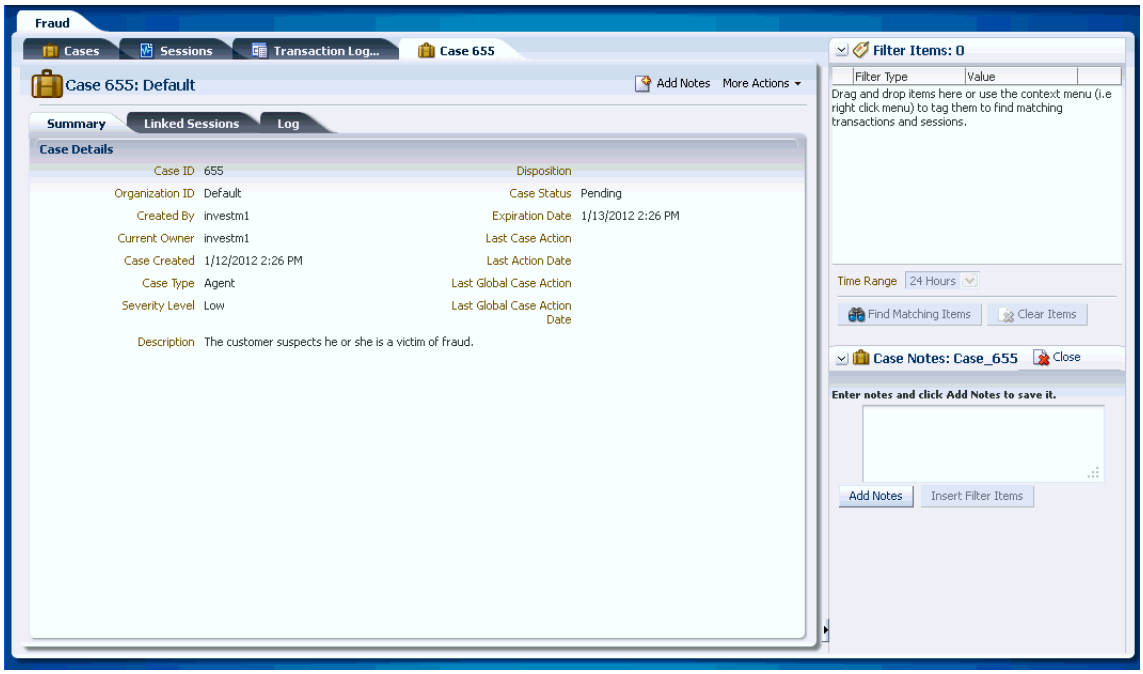
   Description is a required field. The **Create** button is disabled until a description is entered.

5. Click **Create**.

   The case is created and the **Case Details** page opens for the new case. The Case Details page shows **Pending** as the status of the case. The investigator is listed in the Created by and Current Owner fields. There are no user details shown in the Case Details because the case is a manually created Agent case. The new Agent case does not contain any linked sessions. When viewing the logs, **Create Case** is

displayed as the Action. Figure 5–21 shows a Case Details page when the case is first created manually.

Figure 5–21 Case Details Page



Manual Agent Case Creation Example

An investigator creates an Agent type case for the 1st Bank Organization ID. He is not given the option to create cases of other types (CSR case). Organization ID is a required field. The new Agent case does not contain any linked sessions. He is not required to enter any user information to create the case since Agent cases are not linked to any single user.

5.4.2.2 Creating a Case Like Another Agent Case

To create a new case that is similar— or "like"—an existing Agent case:

1. From the **Cases Search** page, select an Agent case by clicking in the checkbox next to case in the **Search Results** table.

   The **Create Like** button is disabled if multiple rows are selected in the **Search Results** table.

2. Click the **Create Like** button.

   The **Create Case Like** dialog appears with Organization ID, Severity level and description pre-populated from the original case.

3. Edit any of these fields.

   Do not leave any fields blank.

   The Create button is disabled until the required fields are filled in.

4. Click **Create**.

   Click **Cancel** to cancel changes and return to the **Cases Search** page.

   Click **Create** to create a new case.

A new Agent case is created with data from the original case and the changes, and the **Case Details** page opens for the new case. A new Agent case created like an escalated Agent case does not contain any user data. The case status is **Pending**.

5.4.2.3 Search and Select and Create a New Case Feature

The Search and Select and Create a New Case links allow an investigator to search for a case or create a new case if he does not have a case opened. The Search and select a case link opens the Cases search page. The Create new case opens the Create Case dialog so that he can create a case.

5.4.2.4 Setting Up OAAM to Create an Agent Case Automatically

To configure an action so that an Agent case is created automatically, you would have to:

- Create a custom rule action called create_agent_case.
- Add a rule with the rule condition you want to a policy for the appropriate checkpoint. Configure it such a way that it will trigger and return the action **create_agent_case** whenever the specified conditions are met. For example, whenever a suspicious activity occurs the create Agent case action is triggered.

Steps are provided as follows:

1. Create an action instance of the action template **CaseCreationAction** and associate it to the checkpoint.
   a. Log in as a security administrator.
   b. In the Navigation tree, expand **Configurable Actions**.
   c. Double-click **Action Instances**.

      The **Action Instances Search** page is displayed.
   d. From the **Action Instances Search** page, click **New Action Instance**.

      The **New Action Instance** page appears where you can enter details to create the **Create Agent Case** action.
   e. Click **Choose Action Template**.
   f. Select the CaseCreationAction. The java class name for the configurable action is

      ```
      com.bharosa.vcrypt.tracker.dynamicactions.impl.CaseCreationAction
      ```

      This CreateCaseAction configurable action is provided out of the box.
   g. In the **Name** field, enter Create Agent Case.
   h. In the **Description** field, enter a description for the Create Agent Case action.
   i. In the **Log Level** field, enter the log level.

      The log level indicates whether the execution status of instance should be recorded.

      Disable turns off logging

      Enable turns on logging

      Log if error turns on logging when errors occur

      Only if there is an error will the execution status be recorded in the logs. Otherwise, the instance triggering is not recorded in the logs.

2. Set the parameters of **Create Agent Case Action** as follows:
   a. Enter "2" (for Agent type) as value of **Case Type**.
   b. Enter "2" (for Medium) or "3" (for High) for the **Severity**.
   c. Enter a case description. For example, "Failed login."
   d. Enter the userId for "Case Creator UserId" parameter. Make sure that userId has a proper role and access permissions for creating the case. For our example, the Case Creator is Dynamic.
3. Set the trigger criteria for when to trigger the action.

   The criteria should be either a score or an action or both. These are compared against the values for the selected checkpoint.

   - If the evaluated action matches the action provided, the configurable action is triggered.
   - If the Rules Engine returns a score in the range provided, the configurable action is executed.

   For example, if you want to create a case whenever the action type is block, Oracle Adaptive Access Manager will create a case whenever there is an action, "block," in the policy. If you want to create a case whenever the score is greater than 500, Oracle Adaptive Access Manager will create a case when the score is greater than 500 in that particular session.

   When both action and score are specified, the configurable action is executed only if both of criteria match with the outcome from the Rules Engine.
4. Enter the **create_agent_case** for the action.
5. Save the action instance.

   Click **Apply**.

   If the action instance is created successfully, a confirmation appears.
6. Click **OK** to dismiss the dialog.

When the trigger criteria are fulfilled, you see an automatic creation of an Agent case by the configurable action.

The status of the case is **New**.

The new Agent case has autolinked sessions based on the action instance parameters.

If an Investigator opens the case, the Status of the case changes to "Pending." The Current Owner is the Investigator and the Created by displays the Case Creator UserId. User Details are also shown for this case.

Sessions that correspond to the action instance parameters like checkpoint, score range, execution type are autolinked to the Agent case that is created by the configurable action.

5.4.3 Closing Multiple Cases

To close multiple cases:

1. Log in as an investigator. The **Cases Search** page is displayed.
2. In the Search Results table, select the cases you want to close.
3. Click the **Bulk Edit** button.

4. Select **Closed** as the status.
5. Select the disposition and enter notes.
6. Click **Save**.
7. Click **OK** to dismiss the Confirmation dialog.

5.4.4 Changing Severity Level of a Case

When a case is created it is assigned a severity level to indicate its importance and allow administrators to filter cases. The severity level is shown on the **Case Details** page.

1. In the Case Details page, click **More Actions** and select **Change Severity**.

   The **Change Severity** dialog appears.

2. In the **Severity List**, select the severity level you want.

   The available severity levels are **High**, **Medium**, and **Low**. If a customer suspects fraud, then the severity level assigned would be **High**. If the customer wants a different image, then the severity level assigned would be **Low**. Escalate or de-escalate the severity level of a case when necessary.

3. In the **Notes** list, select the type of note you want.
4. If necessary edit the note to add information about the action you are taking.
5. Click **Submit**.

   The case severity is saved to the case log.

6. Click **OK** to dismiss the confirmation dialog.

5.4.5 Changing Status of a Case

The status of a case can be changed manually or automatically.

5.4.5.1 Changing the Status of a Case Manually

The scenarios show how to change the case status manually.

5.4.5.1.1 Changing the Status of the Case to New Manually To change the status of a case to New manually:

1. In the Case Details page, click **More Actions** and select **Change Status**.

   The **Change Status** dialog appears.

2. In the **Status** list, select **New**.
3. Enter a note describing the issue.

   Select from existing notes, or enter a new note, or both.

   Existing notes to choose from are the following:

   - Manager Review
   - Other

4. Click **Submit**.

   A confirmation dialog is displayed.

5. Click **OK**.

5.4.5.1.2 Changing the Status of the Case to Pending Manually To change the status of a case to Pending manually:

1. In the Case Details page, click **More Actions** and select **Change Status**.

   The **Change Status** dialog appears.

2. In the **Status** list, select **Pending**.

3. Enter a note describing the issue.

   Select from existing notes, or enter a new note, or both.

   Existing notes to choose from are the following:

   - Manager Review
   - Issue in Progress
   - Other

4. Click **Submit**.

   A confirmation dialog is displayed.

5. Click **OK**.

5.4.6 Bulk-Editing Agent Cases

Only an Investigation Manager can bulk edit Agent cases.

To change the case settings for multiple cases at once:

1. Log in as an Investigation Manager. The **Cases Search** page is displayed.

2. Select the cases you want.

3. Click **Bulk Edit**.

   Note: For out-of-the-box OAAM roles, the **Bulk Edit** button is disabled for the Investigator role and enabled for the Investigation Manager role.

4. Change the case settings you want and add notes.

   The **Close** action is allowed regardless of severity.

   Severity is editable regardless of status. You can also change the severity of cases irrespective of their **Closed** status.

5. Click **OK** to perform the bulk edit.

   A confirmation dialog appears with a message that the bulk editing operation was performed successfully. If you are closing a case and there are Agent cases that were already in the Closed status at the time of the bulk edit operation, a message appears, saying that the Agent cases have to be in the **New** or **Pending** status for a bulk close action to be executed.

6. Click **OK** to dismiss the dialog.

   When you refresh the search, the status is shown for those cases in the results.

Last Case Action on the Search page is not updated immediately after a bulk edit. It is updated when you launch the Search page again.

Usage Example: Zeek is a Dollar Bank fraud investigation manager. He always searches for overdue cases at the beginning of his shift. He exports the list of cases in a XLS and sends it via email to his team as a reminder. If Zeek finds that a number of overdue cases have already been resolved but were mistakenly left open he selects them all and closes them with a resolved status and notes.

5.5 Multitenant Access Control

Multitenancy access control handles access to the OAAM Administration Console for each organization so that it results in a different experience for fraud investigators and CSRs of multiple tenants. Businesses can limit a fraud investigator's access to certain Organization IDs through multitenant access control.

For example, Second Bank is an international bank with hundreds of fraud investigators across the world. Second Bank has deployed OAAM to secure both the consumer banking application and the business banking application. The bank divides its team into two organizations: fraud investigators who investigate consumer banking issues and those who investigates only business banking issues. Second Bank has strict control over all session, policy, and other data visible to each of these fraud investigator organizations if multitenant access control is enabled. When the consumer banking fraud investigators search, view, create, edit cases they only see data related to consumer banking. Likewise the business banking fraud investigators only see data for business banking.

Table 5–30 summarizes the multitenant access control experience in OAAM for investigators.

Table 5–30 Multitenant Experiences for Fraud Investigators

Task	Fraud Investigator Experience
Create CSR Case	N/A
Create Agent Case	Fraud Investigators can only create cases for the organization(s) they have access to.
Search Cases	Fraud Investigators can search for and view cases from those organizations to which they have access to.
Case Details	Fraud Investigators can see the case detail for cases that belong to any user belonging to an organization they have access to or cases that are associated with their Organization ID.
Case Actions	Fraud Investigator can perform case actions on a cases they have access to.
Sessions Search and Details Pages	Fraud Investigator will not be able to access the detail pages if multi-tenancy access control is enabled. If multitenant access control is disabled, the Fraud Investigator is able to access details pages from any sessions search if the link is available.
Search Sessions	Fraud Investigators can search sessions that belong to users in the organizations that they have access to and those organizations to which they have access.
Link Sessions	Fraud Investigators can link sessions to the cases belonging to organizations that they have access to. Also in search sessions for linking, Fraud Investigators are able to view the sessions of only those organizations to which they have access.

Multitenancy access control is only applicable for case management data access. Hence multitenancy access control is only applicable for Investigator and CSR roles.

5.6 Best Practices and Recommendations

Best practices and recommendations are provided below:

- An investigator looks into suspicious situations either escalated from customer service or directly from alerts.
- A Fraud Investigation Manager would want to see which cases need to be given attention by his team.
- A Fraud Investigation Manager must routinely search for overdue cases to make sure none of the cases are pending.
- If a customer suspects fraud, then the severity level assigned is **High**. For example, if the customer wants a different image, then the severity level assigned is **Low**. Severity levels of a case can be escalated or de-escalated as necessary. Anyone can change the severity of cases.
- Investigators should not open cases that other investigators are working on.
- An Investigator should open an escalated case and view the logs for notes entered by the CSR and CSR Manager. For example, the notes can show that the CSR escalated the CSR case to an Agent case because he suspected fraud activity.
- Investigators should filter the time-stamp column so the oldest case is on top.
- Use the Transaction: Check Transaction Count Using Filter condition to verify entities in a group. For example, if a user wants to verify if the account number being used in a transaction belongs to a "suspicious account" group, then the transaction should be blocked.

6

Viewing Additional Details for Investigation

OAAM provides the capability to gather detailed information about the session parameters and to allow you to drill down further into the details involved in the session. The session parameters are users, devices, locations, alerts, and fingerprints.

6.1 Details Pages Overview

Investigators perform fraud investigation and leverages all available data, knowledge, and expertise to determine if in fact there is fraudulent activity present.

The details pages provide additional details of session parameters such as user, device, location, alerts, and fingerprints and shows their relationships so that you can cross references on data points and drill in on related data.

The following are examples of related data:

- Administration groups to which the session parameters belong
- Sessions in which the parameter was used
- Success and failure login attempts for the parameters
- Policies and rules executed during those sessions
- Alerts generated for the session
- Fingerprint information

Example of relationships between parameters:

You can identify what devices a single user used, which particular location was the device used, which login attempts were successful, and how many users logged in from a particular location.

6.2 Details Page Structure

Each details page provides the following items:

- Summary of basic information such as ID, name, creation date, and other information

  For an example, refer to Section 6.11.1, "User Details: Summary Tab."

- Detail tabs for a view of the entity's relationship with other entities

  The relationships are shown through the tabs.

  For summaries of the tabs for each details pages, refer to:

  – Table 6–8, " User Details Tabs"

  - Table 6–22, " Location Details Tabs"
  - Table 6–34, " Device Details Tabs"
  - Table 6–48, " Fingerprint Details Tab"
  - Table 6–57, " Alert Details Tabs"
- Links to details pages for more information
- Add to Group feature

6.3 Prerequisites

Prerequisites for viewing details pages are listed in this section.

6.3.1 Multitenant Access

To have access to details pages, ensure the multitenancy flag is disabled. If the user's role is a multitenant enabled role, he may not be able to access the details pages. If multitenancy is enabled, these users cannot access any of the details pages from the sessions page or sessions search. If the multitenancy flag is disabled, these users can access details pages from the sessions page or any sessions search if the link is available. CSRs do not have access to the sessions search or details pages.

6.3.2 View Transactions in Session Details

Before you can view transactions in the **Session Details** page, you must set the property to show transactions to true.

```
bharosa.trackeradmin.show.transaction.detail=true
```

Setting the property to `false` turns off the display for transactions.

Before using the details pages, check that the following properties are enabled.

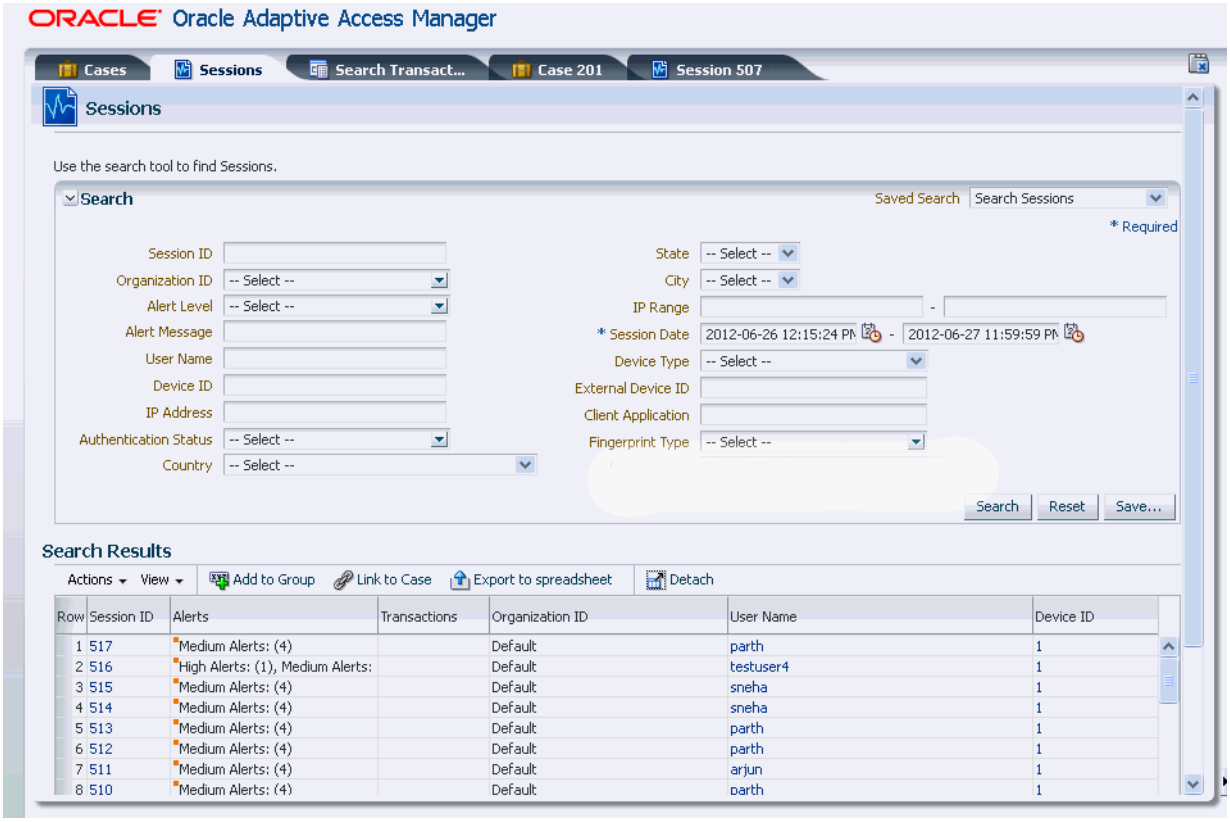
```
oaam.admin.detail.ip.enabled=false
oaam.admin.detail.user.enabled=true
oaam.admin.detail.device.enabled=false
oaam.admin.detail.fingerprint.enabled=false
oaam.admin.detail.alert.enabled=false
oaam.admin.detail.challengecount.enabled
=false
```

6.4 Searching for Sessions

To search for sessions:

1. Log in to the OAAM Administration Console as an Investigator.
2. Click **Sessions**. The **Sessions Search** page is displayed.

Figure 6–1 Sessions Search Page



3. In the Sessions search page, narrow down the number of sessions that are returned by specifying criteria in the search filters.

   For example, search through sessions in the last **12 hours** with **High** alerts and a **Blocked** or **Locked** authentication status (sessions filtered by **Time**, **Alert Level** and **Action**).

   The filters are:

Table 6–1 Session Search Filters

Filters	Description
Session ID	ID for the session.
Organization ID	Identifies the organization to which the user belongs.
Alert Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert.
User Name	Login name given by user to login.
Device ID	Uniquely identifies each device and is auto-generated by the application.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Country	Country ID

Table 6–1 (Cont.) Session Search Filters

Filters	Description
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
IP Range	Range of IP addresses
Login Time	The time the customer logged in to perform the transaction. For example, 5/11/09.

Click the **Session ID**, **User Name**, **Device ID**, **IP Address**, **Location**, and **Alert Message** to open the corresponding details pages to view additional information.

Note: If the checkpoint is not run, the Pre-Authentication or Post-Authentication displays a score of -1.

Table 6–2 Search session results

To open the Details page	Click this link
Session Details page	**Session ID** link Click the **Session ID** link from the sessions listing or other pages to open the corresponding Session Details page, which shows consolidated information about the session.
Alert Details page	**Alert message** links from other pages (session details, other detail pages, and Agent pages) Click the **alert message** links from other pages (session details, other detail pages, Agent pages) to open the Alert Details page. The Alert Details page provides information on the message, level, type of the message and cross references on other data types such as user, device, location, sessions, browser, operating system, locales, and others. Additionally, information is provided about the way/ways in which the alert were generated.
User Details page	**User Name** or **UserID** links from other pages Click the **User Name** or **UserID** links from other pages to open the User Details page, which shows additional details regarding that user.
Device Details page	**Device ID** link in the session details or other listing pages Click the **Device ID** link in the session details or other listing pages to open the corresponding details page. This page displays details for a device including cross references on other data types such as user, location, alerts, browser, sessions, full list of fingerprint data, and so on.

Table 6–2 (Cont.) Search session results

To open the Details page	Click this link
IP Address Details page	**IP Address** links from sessions listing or other pages. Click the **IP Address** links from the sessions listing or other pages to open the corresponding IP Address Details page, which shows additional details regarding that IP location.
Location Details page	**Country**, **State** or **City** links from the sessions listing or other pages Click the **Country**, **State** or **City** links from the sessions listing or other pages to open the corresponding Location Details page, which shows additional details regarding that location.
Fingerprint Details page	**Digital Fingerprint ID** or **Browser Fingerprint ID** links from the session details or listing page Click the **Digital Fingerprint ID** or **Browser Fingerprint ID** links from the session details or listing page to open the Fingerprint Details page. The Fingerprint Details page provides basic information about the Fingerprint; the data collected during Device Fingerprinting; lists of users, devices, and locations used; and a list of login sessions in which the fingerprint was generated for a particular period.

You can launch a details pages from another details page, up to a maximum of 10 tabs. The details page tabs also contain hyperlinked parameters, which can launch the details pages.

Note: When multitenancy is enabled, investigators do not have access to details pages from anywhere in the OAAM Administration Console.

6.5 Export Sessions to Excel

An export option is available on details pages and tabs for exporting sessions information to Excel. To export sessions information for further investigation:

1. In the details page or tab, search for and select the sessions to export.
2. Click the **Export to Excel** button.
3. Click **Save File** or **Open** with and click **OK**.

   The Excel sheet shows information on the Row, Session ID, Alerts, Organization ID, User name, Device ID, IP Address, Location, Authentication Status, Login Time, Pre-Authentication Score, Pre-Authentication Action, Post-Authentication Score, Post-Authentication Action, Client Type, User ID, and Internal Session ID.

6.6 Add to Group

An Add to Group feature is available in Search sessions, session details, and each details page. While searching results, insights can be saved and used later for rebuilding predictive models, further investigation and rules evaluation. Add a sessions parameter to a group or create a group and add the sessions parameter to it, or remove a sessions parameter from a group, using the **Add to Group** button from the sessions pages (sessions search results and Session Details page).

One or more data points of various types can be easily selected in search results and added to an appropriate group.

Only Security Administrators, System Administrators, and Investigators have access to the **Add to Group** command.

Table 6–3 Add and Remove from Group

Feature	Description
Add sessions parameter to sessions parameter group	Select a sessions parameter group from a list of parameter groups with which the parameter is not already associated and add the parameter to it. A User Group can be either a User ID or User Name group type. A parameter cannot be added to the same parameter group multiple times with the exception of the alert. An alert can be added to an Alert Group multiple times, since whenever an alert is added to an Alert Group, a new instance of the existing alert is created and added to the group.
Create a new sessions parameter group and add parameter to the newly created group.	Add a new parameter group and add the parameter to it. A user group can be of either User ID or User Name group type.
Remove parameter from parameter group	Select multiple parameter groups with which the parameter is already associated and remove the parameter from the selected groups. Note: Removing users from Organization ID is not recommended.

Instructions for adding sessions parameters is provided in the following sections.

6.6.1 Add to Group From Sessions

To add a sessions parameter from sessions to an existing group

1. Select sessions of interest from the search results.
2. Click the **Add to Group** button.

   The Add to Group dialog is displayed.
3. Choose the type of data to add to a group and click **Next**. Choose only one data type at a time.
   - Device
   - User name
   - IP Address
   - Country
   - State
   - City
4. Search and select existing groups for adding the device to and click **Next**.
5. Items to be added to the group are listed below. To go back and change the items, click the **Back** button. To proceed with adding these items, click the **Finish** button.

To add a sessions parameter to a group that is being creating:

1. Click **Create New group** to create a new group to add the device to.
2. On Add to Group dialog, enter:
   - Group Name
   - Cache Policy

- Description

3. Click **Next**.
4. Items to be added to the group are listed. To go back and change the items, click the **Back** button. To proceed with adding the items, click the **Finish** button.

6.6.2 Add to Group from Details Pages

To add a sessions parameter to a group:

1. Select a row containing one or more session parameters (user, Device ID, IP, and so on).
2. Click the **Add to Group** button in the upper right corner.

   The Add to Group dialog appears with the following search filters:

Table 6–4 Add to Group Dialog Filters

Filter	Description
Group Name	The name of the group. Groups for which the sessions parameter is not a member of are listed.
Group Type	The type of group. Groups for which the sessions parameter is not a member of are listed.
Description	The description of the group. Groups for which the session parameter is not a member of are listed.

3. Select the group or create a new group.

   Figure 6–2 shows the dialog for adding a sessions parameter to an existing group.

Figure 6–2 Add to Existing Group

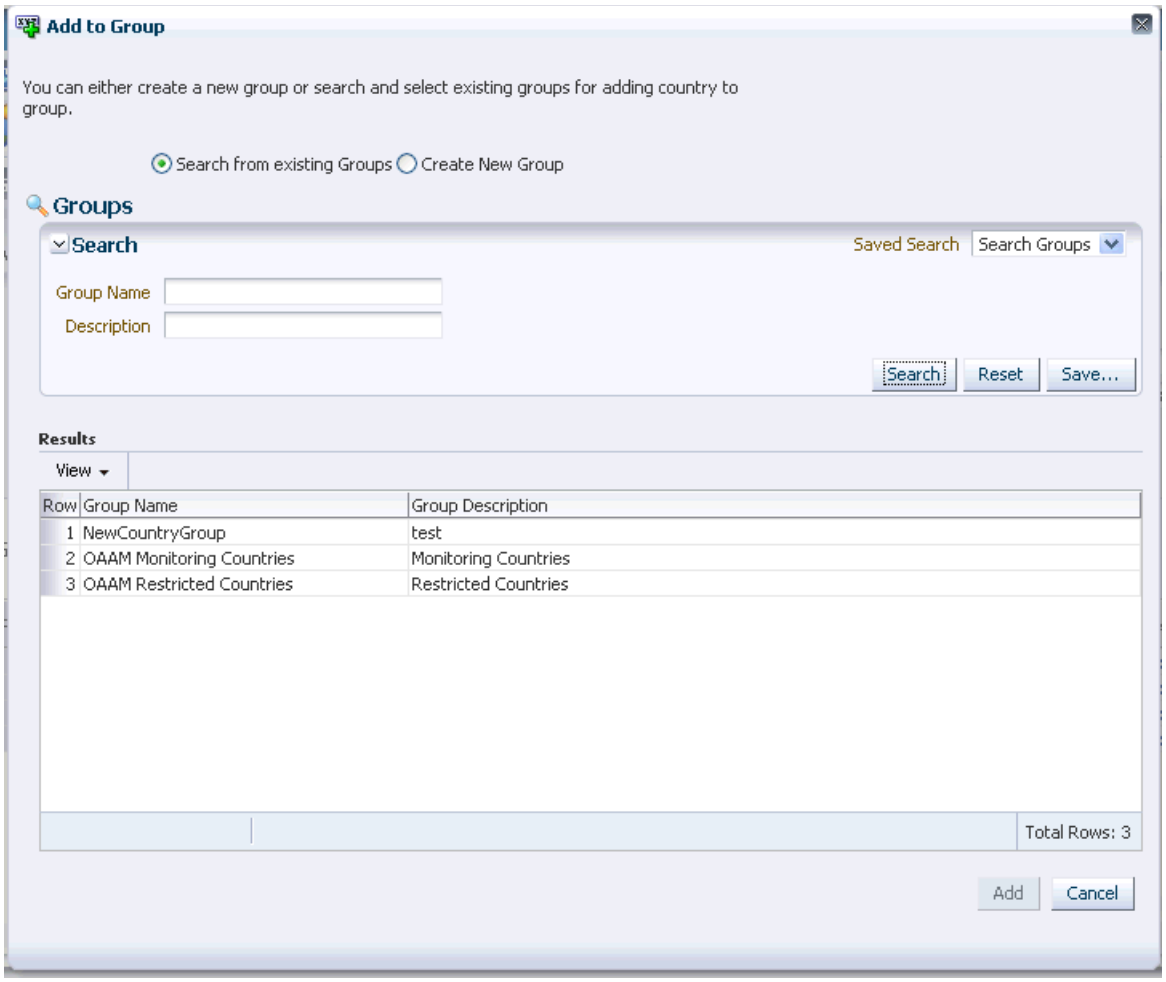
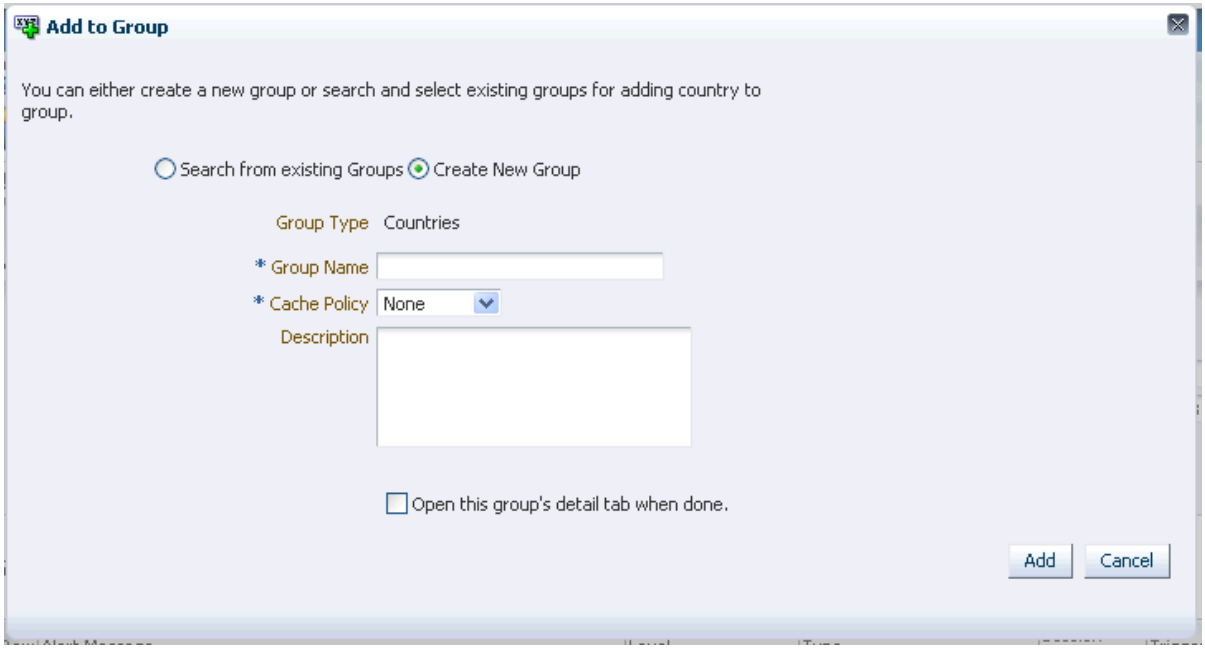


Figure 6–3 shows the dialog for creating a group to add a sessions parameter to.

Figure 6–3 Create a New Group to Add Sessions Parameter to



Enter the following information to create a group:

Table 6–5 Add to Group Fields

Field	Description
Group Name	The name of the group.
Cache Policy	Groups offer two Cache Policy options: Full Cache or None. By default, the Cache Policy should be set to "all." For information, refer to **Cache Policy**.
Group Type	The type of group.
Description	Information about the group.

When adding a group to an existing group, data from selected rows of the type the group can accept are added to the group. If any data is already in the group, an informational message is displayed. When creating a group to add the entity to, do not leave any fields blank; otherwise, an error occurs.

4. Select **Open this group's detail tab when done**.
5. Click **Add**.

   A confirmation dialog appears.
6. Click **OK** to dismiss the confirmation dialog.

6.7 Session Details Page

The **Session Details** page consolidates information needed for fraud analysis.

To go to the **Session Details** page:

1. In the **Search Results** table, click the **Session ID** of the session of interest. The **Session Details** page for that session is displayed.

General details and all of the actions performed during the session are captured in the Session Details page.

2. View the details of the session.

6.8 Looking at Events from a Higher Level with Session Details

A **Session Details** page displays an overview of the events that transpired during a particular session for fraud analysis. It contains:

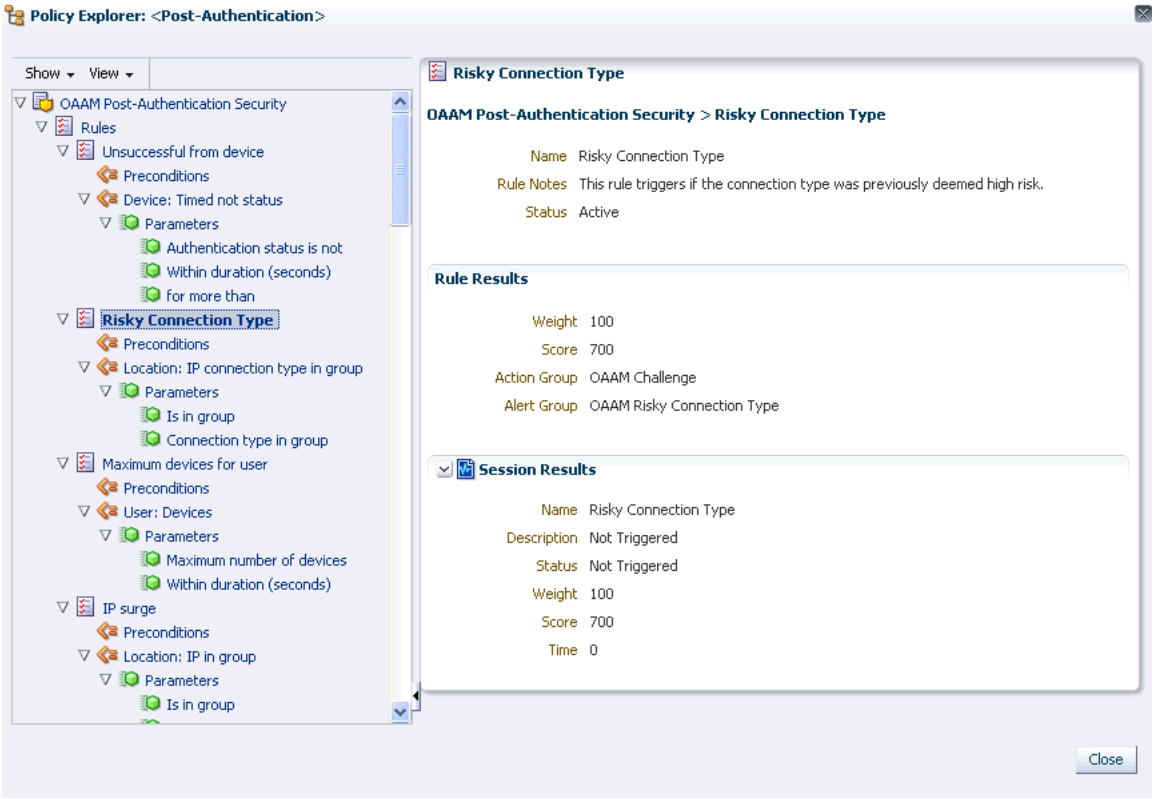
- General session data points such as user, device, location, and other details
- Additional information about the custom fingerprinting type along with available out of the box fingerprint information.
- A forensic record of the session, including transactions and checkpoints that were evaluated. Each checkpoint displays the policies in that checkpoint, alerts that were triggered during the session for that checkpoint, and the final action for that checkpoint.

The policy explorer view is also available to provide additional details about policies, rules, and conditions.

6.8.1 Policy Explorer

The Policy Explorer displays information about rules, conditions, trigger combinations, group linking, nested policies, and other items.

Figure 6–4 Policy Explorer



Rule Details

Details about the rule is shown in the Policy Explorer. The session results display the scores and results of that rule.

Pre-conditions

Pre-conditions for that rule is displayed in the details panel. The session results show the confidence factors and other values for the pre-conditions for that session.

Conditions

The values for the condition parameters are displayed. The session results show if the conditions returned true for this session evaluation.

Trigger Combinations

There is an option to view the triggered override combinations or view all overrides. Session results show the override information that was evaluated for this session including the nested policy information.

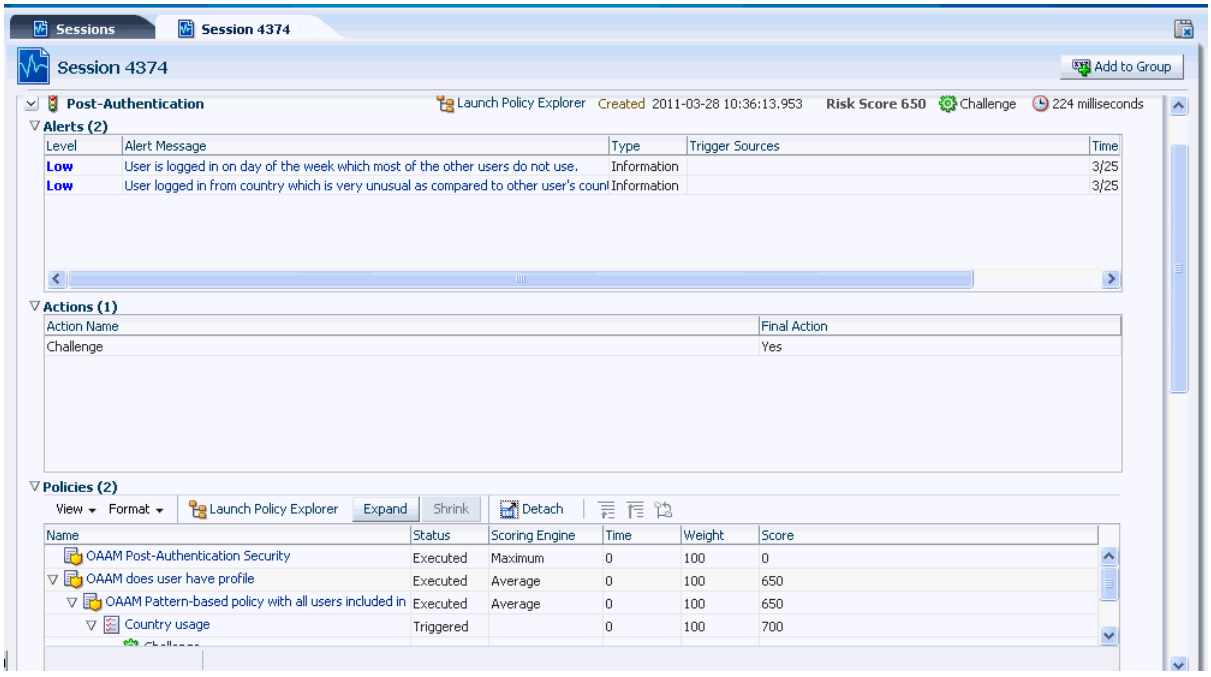
Group Linking

Group linking for the policy is displayed in the details panel.

6.8.2 Using Session Details to View Runtime Information

The **Session Details** page contains several panels. The main panels like checkpoints and transactions have multiple panels. Panels are not displayed if information is not available. Except for the **Session Details** panel, all other panels are displayed in the order of execution. (Looking at the Session Details page, you can see the flow of events, the sequence when the events happened within the session.)

Figure 6–5 Session Details with Checkpoint, Alerts, Actions, and Policies



6.8.2.1 Session Details

The **Session Details** panel shows all the related information regarding the login transaction. It shows the authentication status, IP address from which the user logged in, user name, User ID, cookie information, autolearning processing status, the login time, and type of digital fingerprint used to collect digital fingerprint. If custom fingerprinting is used, then it shows the custom fingerprinting type name.

6.8.2.2 Policies

A list of policies in that checkpoint are displayed in the **Policies** panel. You can view the rules and action that triggered.

Table 6–6 Policies in a Checkpoint

Item	Description
Name	The name of the policies that are under the checkpoint, rules under the policies, the conditions under the rules, and the action triggered.
Status	Executed (for policies) and Triggered (for rules).
Scoring Engine	A scoring engine is provided at the policy level and at the checkpoint level. The policy scoring engine is applied to rule scores to determine the risk for each policy.
Time	The time of the occurrence.
Weight	Percentage value used to influence the total score.
Score	Level of risk that has been calculated for specific situations or parts of a situation, expressed as a number. There are multiple policies under one checkpoint. The scores of these policies are used to determine a score for the checkpoint.

As an investigator, you are interested in why a particular rule triggered. For example, you might look at which policy and rules triggered the alert.

Information can be gathered by looking at these details. For example, a user who successfully went through Pre-Authentication and Post-Authentication checkpoints knew the password and the questions and answers and there fore, there is a good chance that he is a valid user. On the other hand, a user who attempted to answer the questions twice and succeeded in providing a correct answer on his third attempt might be considered suspicious. This user did not know the answers right away so there is a chance that he may be a fraud trying out new answers.

To view more details about the policy, you can launch the Policy Explorer using the icon on top of the panel or from any of the icons within the table. The policy link displays the **Policy Details** page and the rules link displays the **Rule Details** page. Only active and triggered rules are displayed. Only active policies are displayed. You have the option to view all the rules in the Policy Explorer.

In the Policy Explorer, you can view the runtime values for each one of the policies and rules that were triggered. For example, if a rule triggered that showed that the user had logged in from a country that he did not usually log in from, you would want to look at the runtime details to see which country he logged in from. The Policy Explorer shows the policies that were triggered, the condition parameters, and the actual values.

6.8.2.3 Transactions

The Transactions panel displays a list of transactions that were created. You can view the actual transaction data and the entity attribute values used in the transactions. For

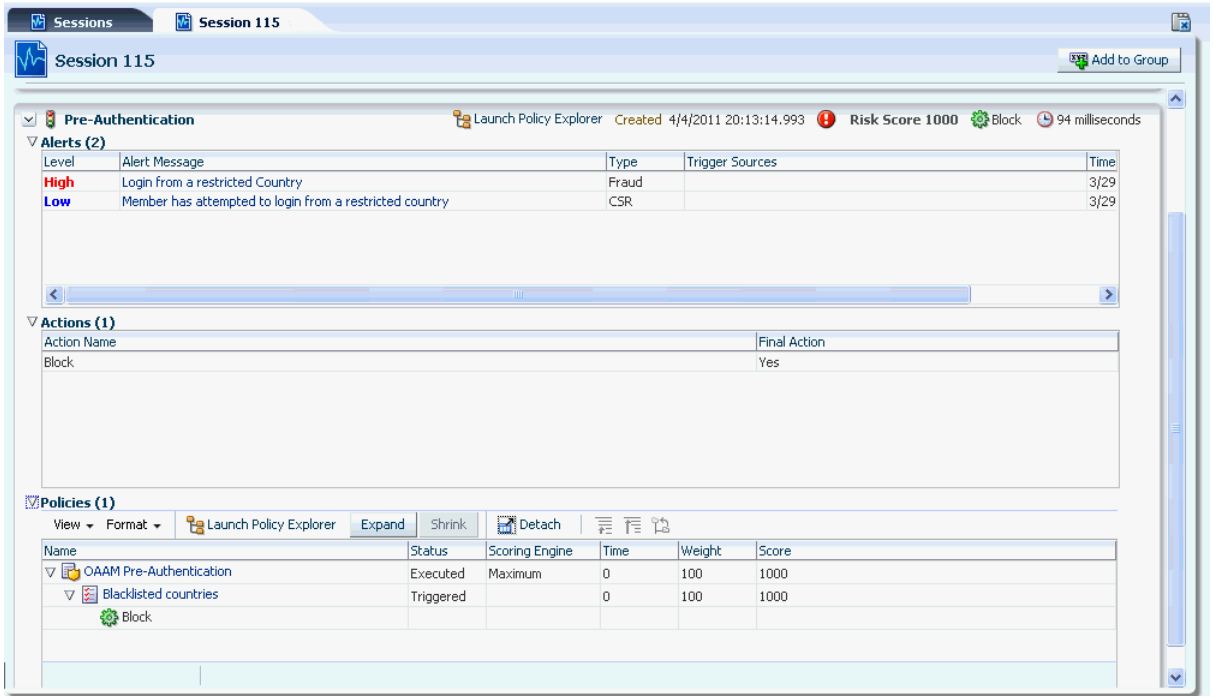
example, a fraud investigator analyzing a session can see that a user was blocked performing a transaction and that a particular rule was triggered, and he can also see the amount that was passed in and the account number that was used in the transaction.

Transactions can be created within a checkpoint or without an associating checkpoint. If a Transaction ID (the unique identifier created when the customer submitted the transaction) is not provided (as in the case of a transaction without an associating checkpoint), OAAM processes the last transaction in the session. The Transaction data for all transaction types are displayed in the Transactions panel of the session details page whether associated to a checkpoint or not. The Transaction checkpoints and policies are displayed in the order of execution along with other checkpoints, but the order of execution of the transactions and the checkpoints at which a particular transaction occurred cannot be determined.

6.8.3 Action, Alerts, and Scores

Table 6–6 shows an example of alerts, actions, and scores displayed in a Session Details page.

Figure 6–6 Session Details: Alerts, Actions, and Scores



Alerts

The Alerts panel shows alerts that were generated for a checkpoint during the session and details about the alerts, as shown in the table below. Each checkpoint could trigger multiple alerts. High-level alerts are displayed in bold red.

Table 6–7 Sessions Checkpoint Actions

Item	Description
Level	Severity of the alert whether high, medium, low.
Alert Message	Text message configured in the alert.
Type	Type of the alert whether fraud, investigation, information, or other reason
Trigger Source	Rules that generated the particular alert
Timestamp	The time the alert was generated.

Actions

All actions are displayed in the **Actions** panel with a Action Name column and a separate column indicating whether or not the action is final. The final action is also displayed in the top right section of checkpoint panel.

Scores

Scores are displayed for the policy and checkpoint. The scores are useful in detecting the probability of fraud or business scenarios and in decision making.

6.8.4 Outcomes from Each Checkpoints

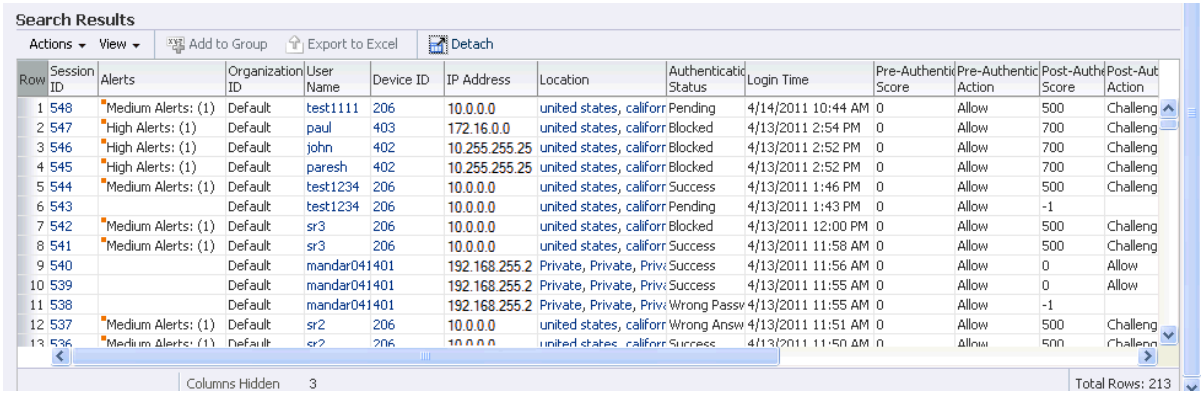
Checkpoint panels are arranged in chronological order of execution and display the checkpoints and a list of the actions and alerts that were triggered at those checkpoints. By default, checkpoint panels are collapsed. In the initial opened view, only the transactions and the final alerts are displayed in the expanded form. All other panels are collapsed. You can expand all the panels to view additional information for that checkpoint.

The first checkpoint panel could be one for Pre-Authentication. On top of the panel, the total amount of time taken for this checkpoint to execute, the final action, and the final risk score are shown.

6.9 Investigation and the Importance of Details Pages

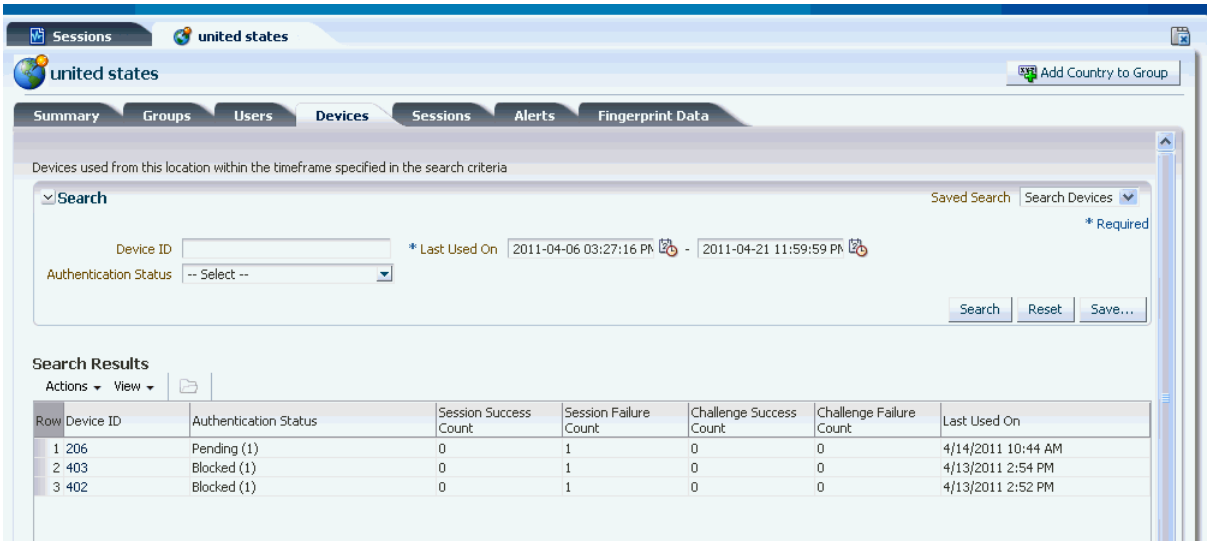
OAAM provides the capability to gather detailed information about the session parameters and to allow you to drill down further into the details involved in the session. For example, you need information to investigate logins so you perform a sessions search. From the results, you can see the country, location, and other session information, as shown in Figure 6–7.

Figure 6–7 Sessions Search



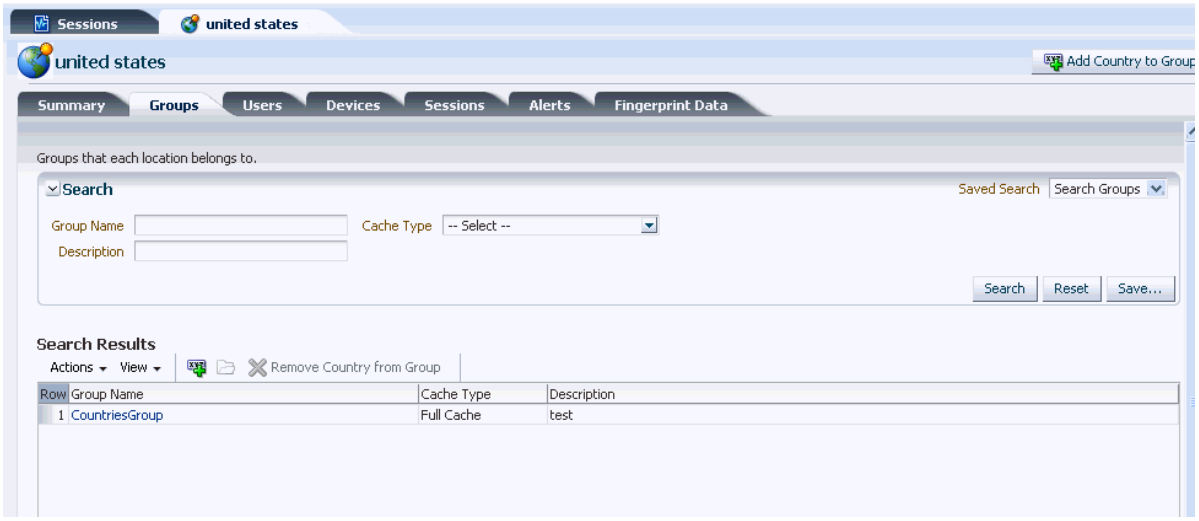
If you want to know more details about one of these, you can open a details page. These pages provide more information about the item you are interested in and allow you to filter out further and look at the related data to that particular item. In this example, if you open the location details page for the United States, you can look at the logins that only happened in the United States and all the devices used when users logged into the United States. Then, you can filter on the date created or updated if you want to look at the devices that were created during a particular time frame and used in logins from the United States. In this way, you are able to limit the data you wanted to view based on the detailed information you are looking at.

Figure 6–8 Location Details (USA): Devices



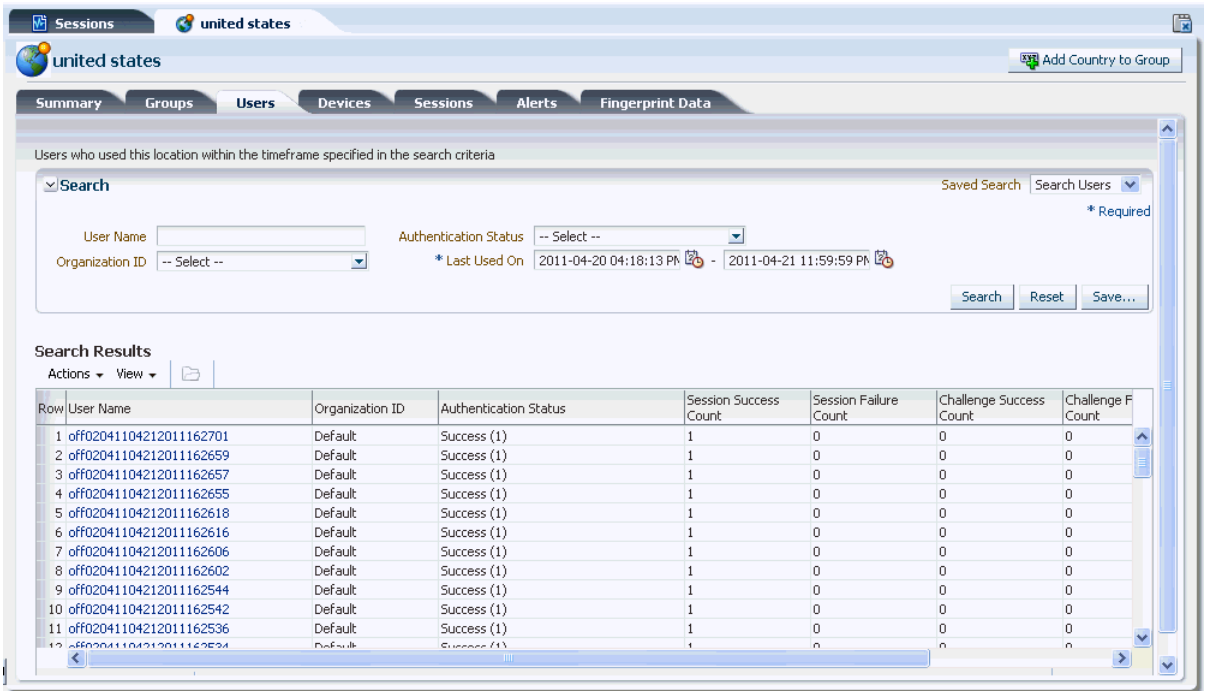
In fraud analysis an Investigator looks at sessions to learn more about what occurred. For example, to know if there was a pattern with a specific country or specific user, you would want to see more information about the user and country. For that, you would use the details pages. If you want to know if the United States belongs to a blacklist group or a monitor group, you can use the Groups tab of the Location Details page to search for those groups.

Figure 6–9 Location Details (USA): Groups



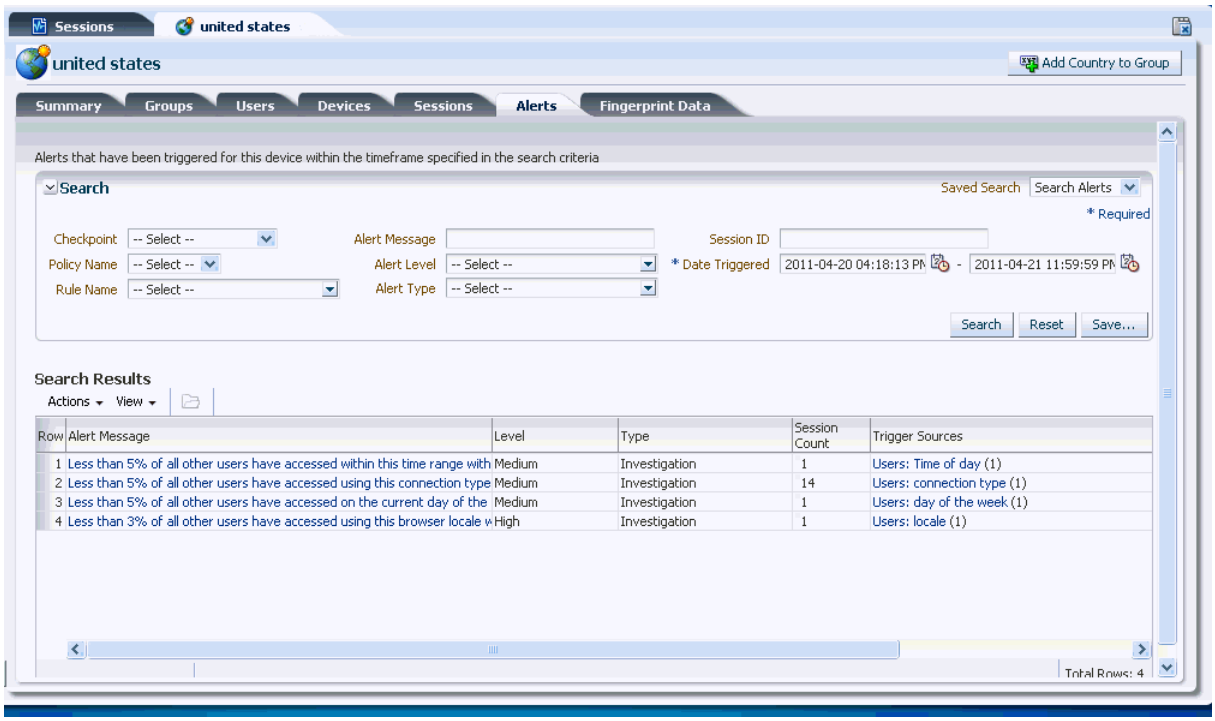
If you want to look at all the users who logged in from the United States, you can use the Users tab of the Location Details page to search on the authentication status for all the logins that were successful. You can also view the login failures from the country, the challenge success, and the challenge failure counts also.

Figure 6–10 Location Details: Users



You can also look at all the different alerts that were generated from the logins or sessions that occurred from the United States by using the Alerts tab of the Location Details page to search on the Alert ID, Alert Type, or Alert Level.

Figure 6–11 Location Details: Alert



6.10 Viewing Alerts

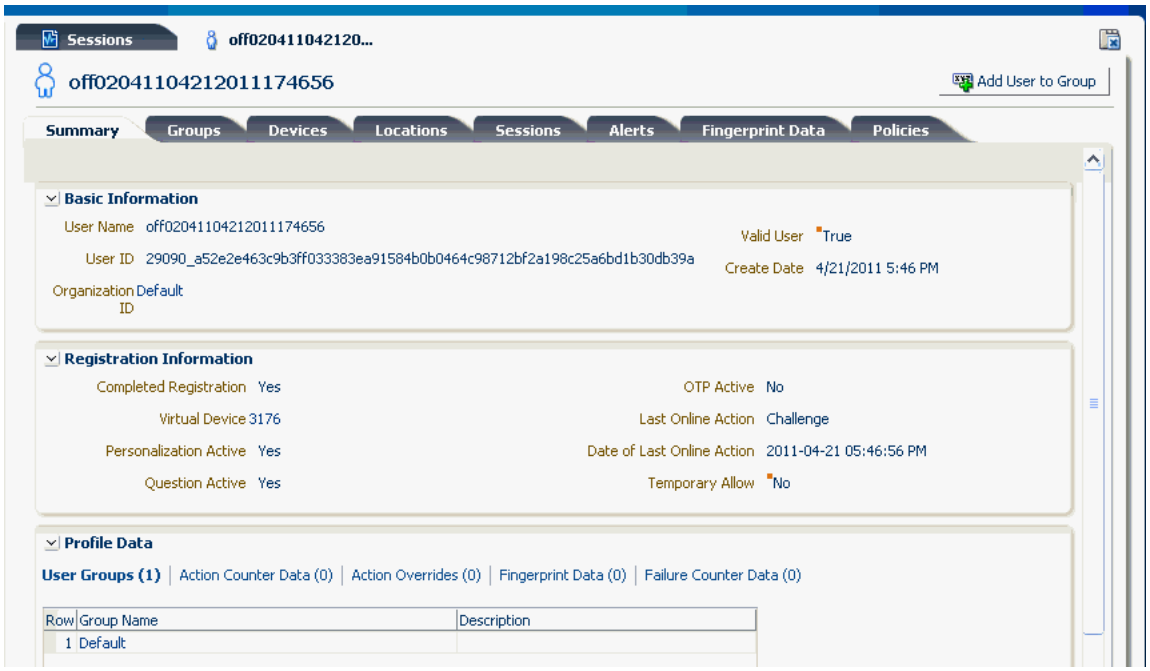
When an alert is generated it is associated with the user, device, and location that has taken part in the authentication. The login session holds information about the alert. Any changes to the alert type or alert message are automatically reflected in the alerts page. It shows the new information. Other than the Alerts tab, the detail pages display alert instances based on the level/type at the time they were triggered. Alert instances are grouped with the alert template they belong to. For example, if there were 10 sessions with alert level High last month and then the Administrator changed the level of that template to low, then the next 10 instances are displayed with the level Low.

6.11 User Details Page

The User Details page provides general details about the user and cross reference on other data types such as device, location, alerts, browser, OS, and so on. Also shown are details related to the user such as unique ID, Organization ID, groups the user belongs to, sessions and cache data, fingerprint, browser, OS, locale, and so on. You can open a User Details page to view details regarding that user by clicking the User Name or UserID link from the Sessions search, Session Details, and other pages.

Figure 6–12 shows a User Details page.

Figure 6–12 User Details: Summary



The User Details page is divided into the following tabs:

Table 6–8 User Details Tabs

User Details Tab	Function
Summary	The Summary tab contains basic, registration, and profile information for the user.
Groups	The Groups tab shows a listing of the user groups that the user is a member of. The user can belong to User ID and User Name groups.
Locations	The Locations tab lists successful and unsuccessful login attempts from all user locations. This tab enables you to view which locations and how many times a user logged in from a particular location.
Devices	The Devices tab lists all the devices that have been used in a session by the user during the time frame mentioned in the search criteria. It lists both successful and unsuccessful login attempts from all users' devices. This tab helps you to view which devices and how many times a device was used by the user.
Alerts	The Alerts tab lists alerts that are triggered and generated for a user by the application during the transaction process. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).
Sessions	The Sessions tab lists login sessions for a user for a particular period.
Policies	The Policies tab lists default and custom rules that are run for a user by the rules engine based on the checkpoints during authentication.
Fingerprint Details	The Fingerprint Details tab lists fingerprints created for the user during login.

Detailed information about the User Details tabs follow.

6.11.1 User Details: Summary Tab

The Summary tab contains basic, registration, and profile information for the user.

General Information

Table 6–9 summarizes the basic information about a user that is provided by the User Details: Summary Tab.

Table 6–9 User Details: Basic Information about the User

Field	Definition
User Name	Login name given by user to login.
User ID	Unique Identifier of that user
Organization ID	Identifies the organization to which the user belongs.
Valid User	True if the user has authenticated successfully at least once.
Created Date	Date on which the user was created. Also, this refers to the first login date of the user.

Registration Information

The first time a user logs in, he must go through the registration process. Information is capture during the process. Table 6–10 summarizes the properties and attribute values that identify the status of each action performed by the user during the registration process.

Table 6–10 User Details: Registration Information

Field	Definition
Completed Registration	(Yes/No) Identifies whether user has completed the registration process like registered challenge questions, image and phrase, which are unique for each user and used for identifying a user for security reasons.
Virtual Device Type	List of device IDs that the user registered as secure device during registration process. Maximum of three devices can be registered.
Personalization Active	(Yes/No) Identifies whether user registered Image and Phrase.
Question Active	(Yes/No) Identifies whether user registered Challenge Questions.
OTP Active	(Yes/No) Identifies whether user has been assigned One Time Password on SMS/Email Challenge.
Last Online Action	The last online action performed by user in his most recent transaction.
Date of Last Online Action	Date of last online action performed by user in his most recent transaction.
Temporary Allow	(Yes/No) Identifies whether the user was blocked and is allowed to access his account temporarily.

Profile Data

This Profile Data section lists important statistics about the user using cached data. Aggregate values are shown for User Groups, Action Counter Data, Action Override Data, Fingerprint Data, and Policies. These values use cache data and records are always shown even if the database is purged.

Figure 6–13 Profile Data

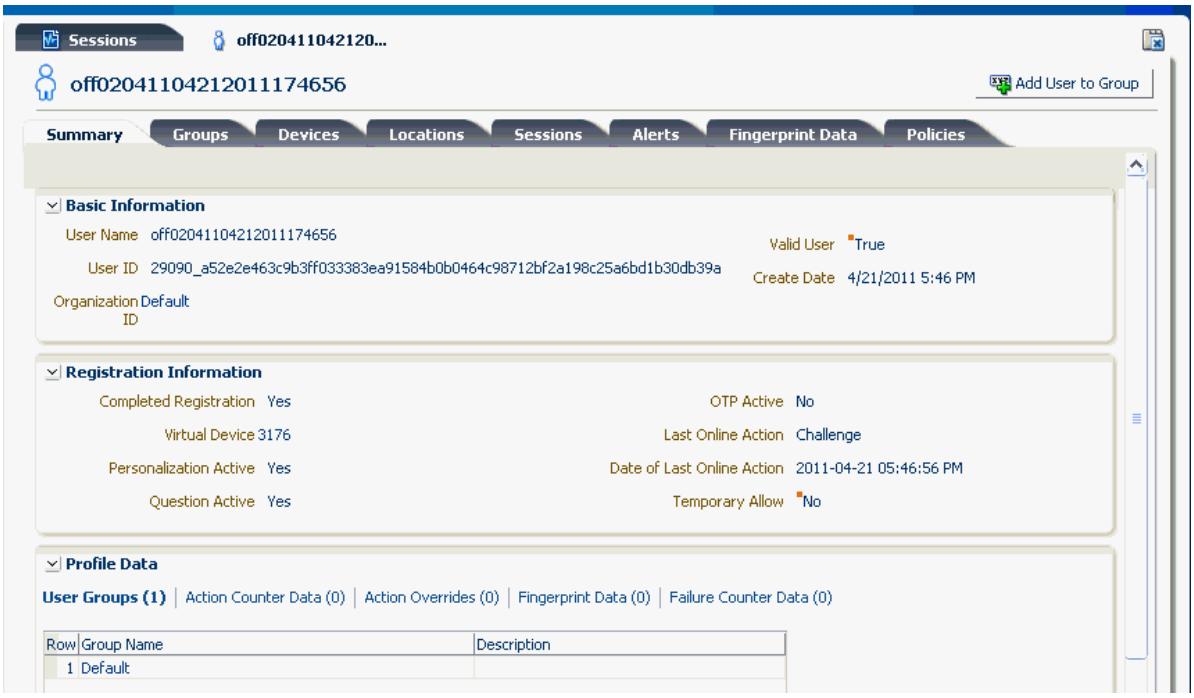


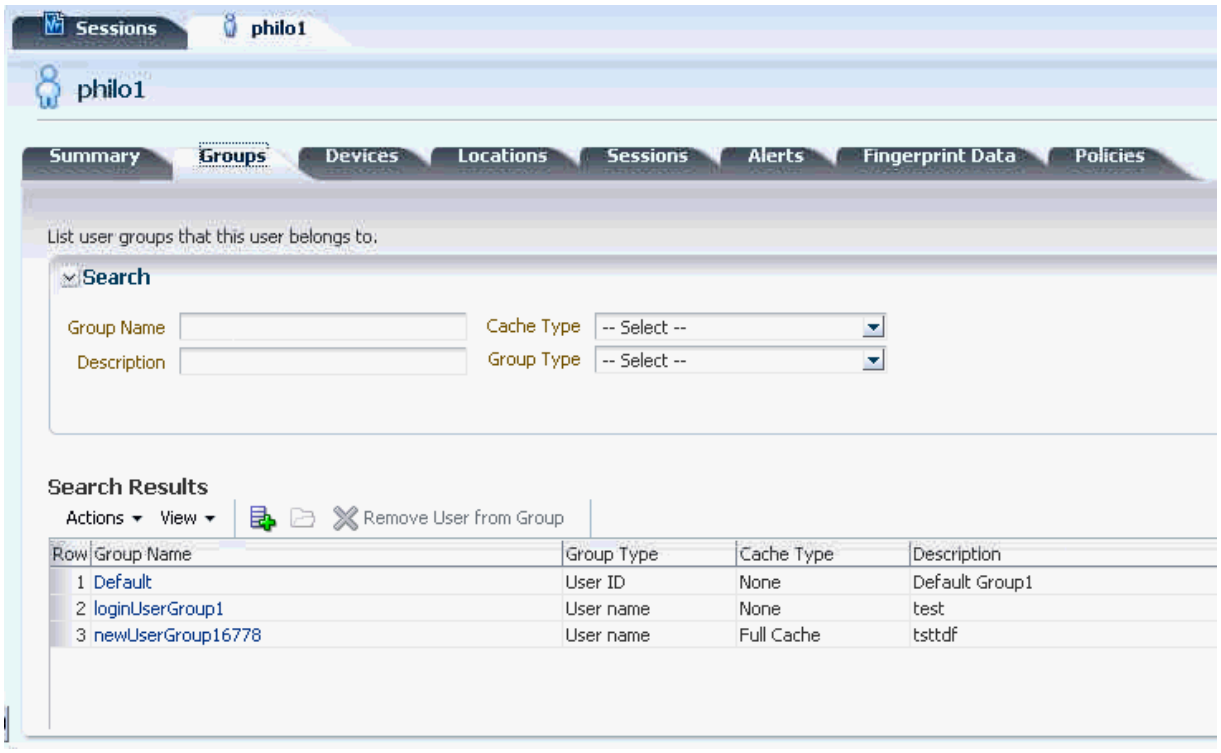
Table 6–11 User Details; Profile Data

Field	Definition
User Groups	Lists groups associated with the user.
Action Counter Data	Lists the different actions performed by the user along with the aggregate count for each one of them. The data is available only if the "incrementCacheCounter" property is set to true in the "rule.action.enum".
Action Overrides	Lists the checkpoints and the overriding actions for the user if an override is active like a temporary allow. For example, if the user was blocked earlier and is now allowed to access his account temporarily then, during Pre-Authentication, instead of blocking the user, the user is allowed to proceed with the transaction (i.e. Block action is overridden to Allow). The values for overriding actions are configured in properties file.
Fingerprint Data	The Fingerprint Data ID numbers shown on this panel is the same as those shown in the fingerprint data tab. The difference between Fingerprint Data and the Fingerprint Data tab is that the tab shows the ID numbers and other information such as the browser, locale, and so on.
Failure Counter Data	List of Challenges faced by the user and total number of times the user failed to answer each one of them respectively.

6.11.2 User Details: Groups Tab

The tab lists groups with which the user is associated. The user can belong to User ID and User Name groups.

Figure 6–14 User Details: Groups



The tab contains the following filter parameters.

Table 6–12 User Details: Group Filters

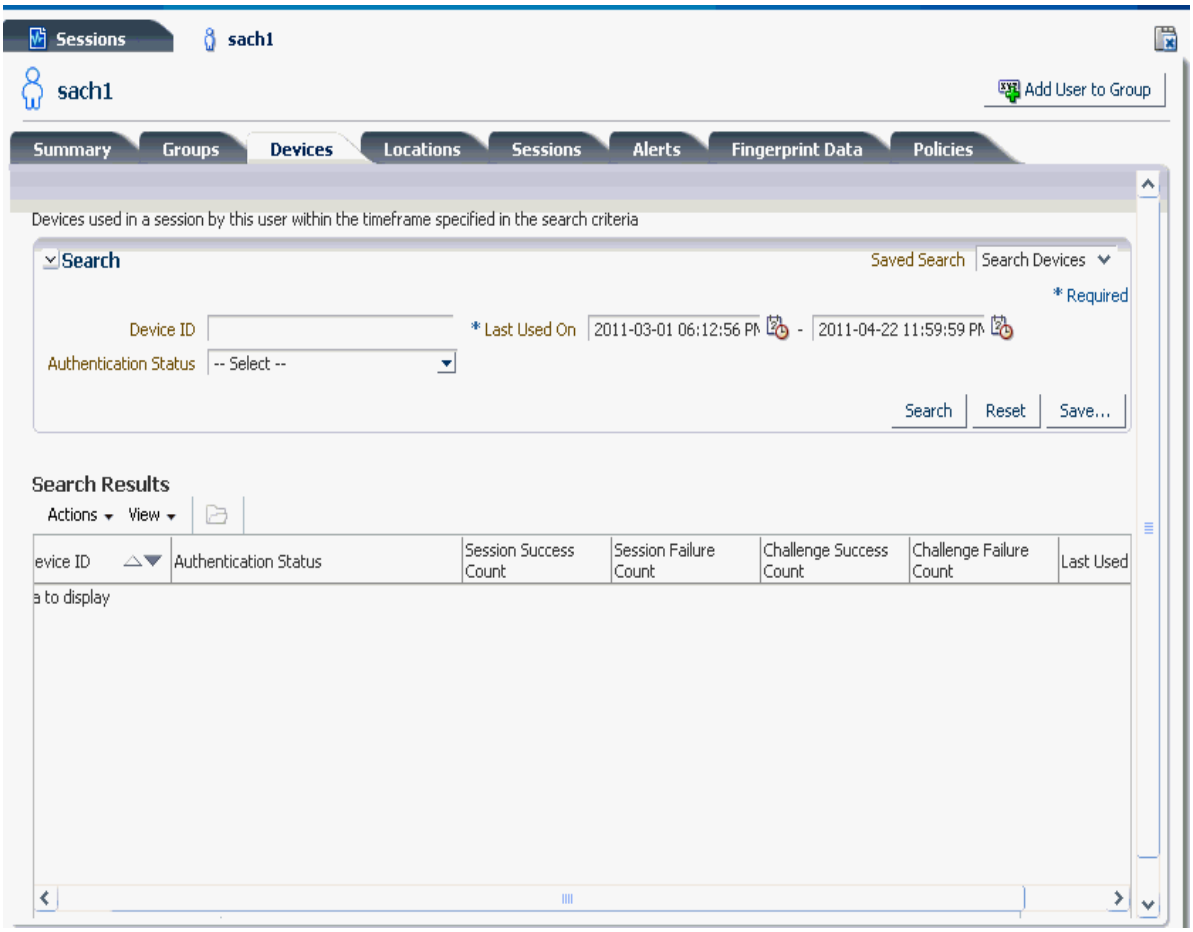
Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Description	This filter maps to the User Group: description field
Cache Type	Groups offer two Cache Type options: Full Cache or None. For information, refer to **Cache Policy**.
Group Type	Category to which the group belongs.

The search results show Group Name, Group Type, Cache Type, and Description columns. The default sorting is on Group Name. You can open the Group Details page by clicking the Group Name link.

6.11.3 User Details: Devices Tab

This tab lists all the devices that have been used in a session by the user during the timeframe mentioned in the search criteria.

Figure 6–15 User Details: Device Tab



The tab contains the following filter parameters:

Table 6–13 User Details: Device Tab

Field	Description
Device ID	Uniquely identifies each device and is auto-generated by the application.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the devices which were used by the user to login during the given time duration.

Device ID, Authentication Status, Session Success Count, Session Failure Count, Challenge Success Count, Challenge Failure Count, and Last Used On information are shown. The default sorting is on the Device ID. Device ID is unique and hence a Device ID is not repeated more than once in the results.

The login/challenge success and failure counts correspond to the aggregate counts for the timeframe.

Note: Failure counters do not affect these values.

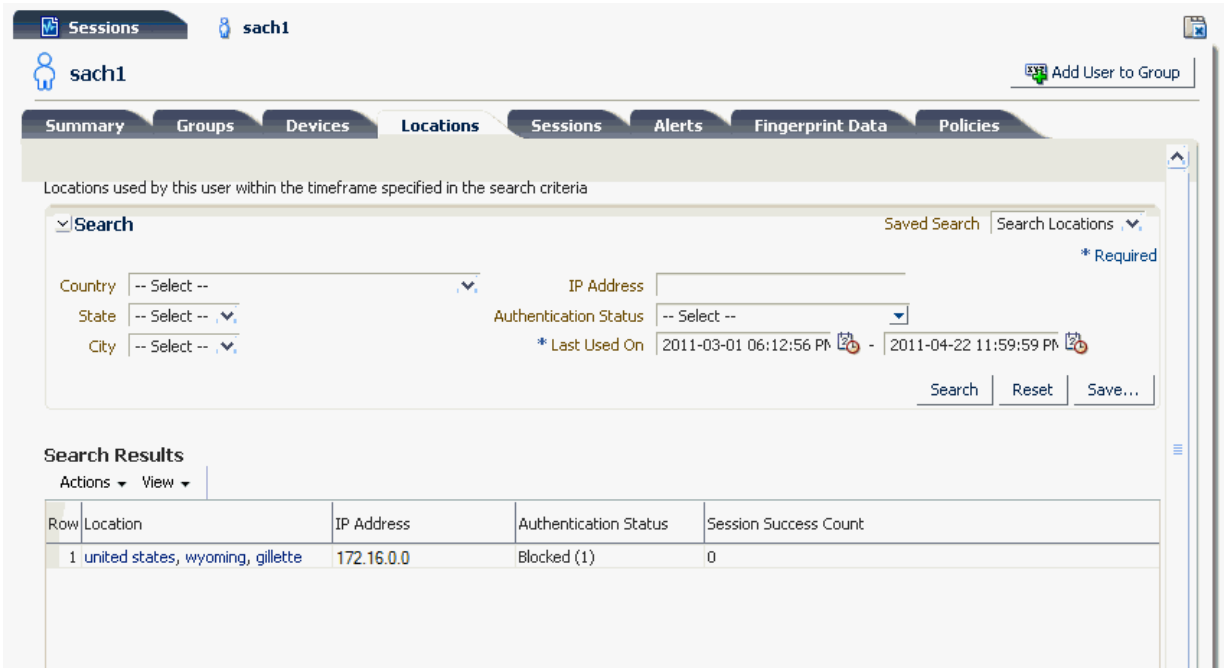
For example, if a user fails to answer two challenge questions and then answers the third successfully, the failure counter will be reset to 0, but the challenge counter will show 2 challenge failure counts.

You can open the Device Details page by clicking the Device ID link.

6.11.4 User Details: Locations Tab

This tab lists all the locations from where the user had made successful and unsuccessful login attempts.

Figure 6–16 User Details: Locations



The tab contains the following filter parameters:

Table 6–14 User Details: Locations Tab

Filters	Description
Country	Country ID
State	State ID. The State list is dynamically populated with respect to what has been selected for Country. For example, if United States is selected, whatever states are available for that country are shown under States.
City	City ID. The City list is dynamically populated with respect to what has been selected for in Country and State.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

Results show the location, IP address, authentication status, session success count, session failure count, challenge success count, challenge failure count, and so on.

If a location is chosen in the search, the location may appear in the results as many times as the different IP addresses the user has used for the location. For each location there are associated success and failure counts.

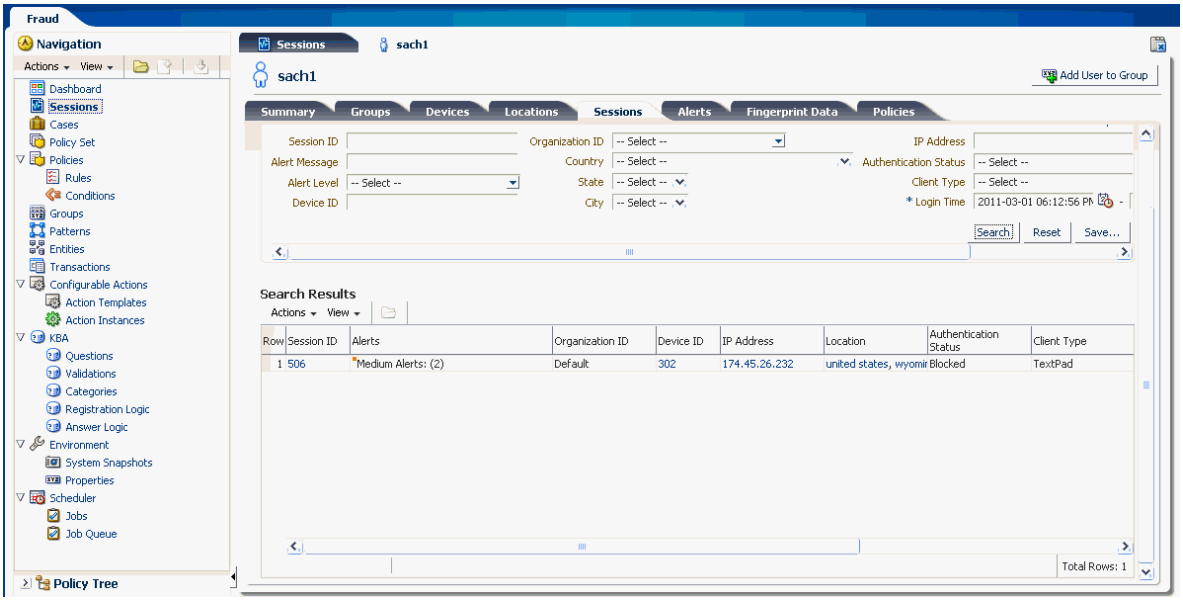
Authentication Status and success and failure count values are related. For example, if there is a Success (1) value in the Authentication Status column, the Session Success Count column should show "1." If there is a Pending (1) value in the Authentication Status column, the Session Failure Count column should show "1."

Location on the result is always detailed to city level. For example, United States, California, Fremont. The default sorting is on the location name. Data cannot be edited on this page.

6.11.5 User Details: Sessions Tab

This tab lists login sessions for a user for a particular period.

Figure 6–17 User Details: Sessions Tab



The tab contains the following filter parameters:

Table 6–15 User Details: Sessions tab

Filter	Description
Session ID	Unique session identifier.
Alert Message	Display name describing the alert. Partial searches can be performed on alert messages.
Alert Level	Severity of the alert whether high, medium, low.
Device ID	Uniquely identifies each device and is auto-generated by the application.
Organization ID	Identifies the organization the user belongs to
Country	Country where the login or transaction occurred.
State	State where the login or transaction occurred.

Table 6–15 (Cont.) User Details: Sessions tab

Filter	Description
City	City where the login or transaction occurred.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
Login time	Get all the sessions during which the device logged in for the given time duration.

Session ID, Alerts, Organization ID, Device ID, IP Address, Location, Authentication Status, Client Type, Pre-Authentication Action, and Login Time shown.

6.11.6 User Details: Alerts Tab

This tab lists alerts that are triggered and generated for a user by OAAM Admin during transaction process. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).

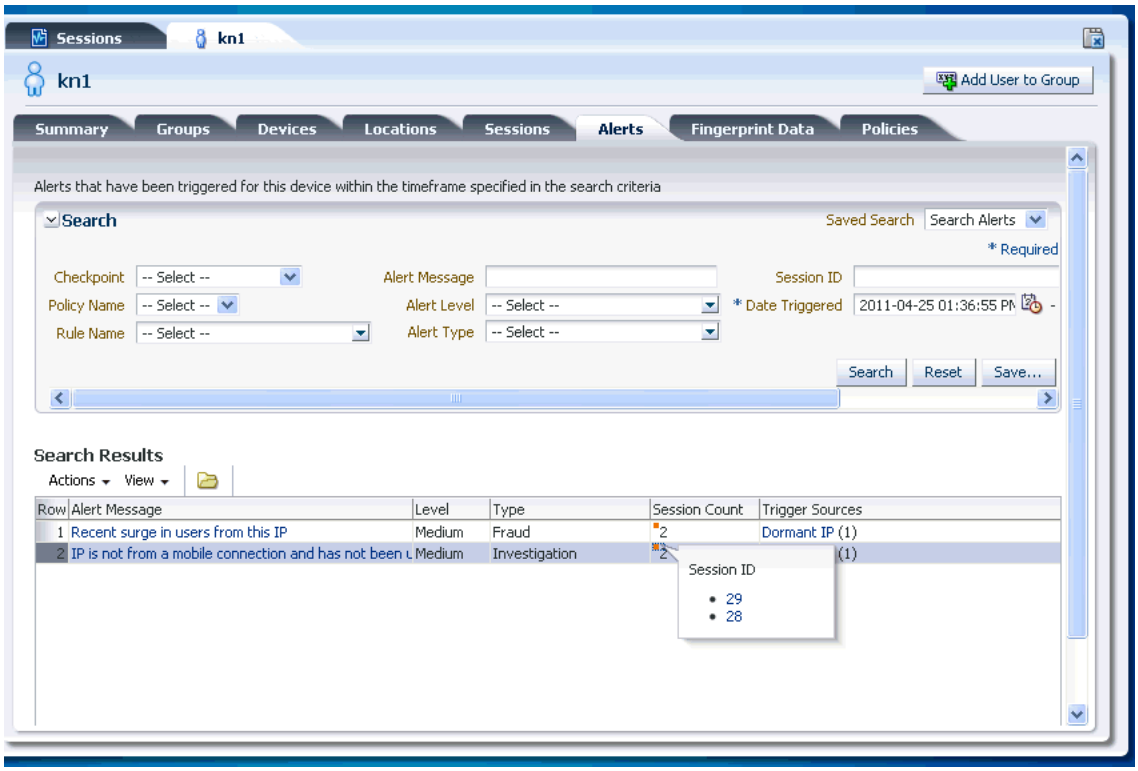
The tab contains the following filter parameters:

Table 6–16 User Details: Alert Filters

Filters	Description
Checkpoint	Decision and enforcement point when policies are call to run their rules. For information, refer to **Checkpoint**.
Policy Name	Name of the policy. The policy list is dynamically populated in respect to what has been selected for the checkpoint.
Rule Name	Rule that generated the alert. The rules list is dynamically populated in respect to what has been selected for the policy name.
Alert ID	ID of an alert.
Alert Message	Display name describing the alert.
Alert Level	Severity of the alert whether high, medium, low.
Alert Type	Type of the alert whether fraud, investigation, information, or other reason.
Session ID	Unique identifier for the session.
Date Triggered	Given time when the alerts triggered for the user.

Figure 6–18 shows the Alerts tab of the User Details page.

Figure 6–18 User Details: Alerts



If you click an Alert Message link, details about the particular alert are shown. Details are shown for the level, alert types, and session count. In the example graphic above, the alert on the second row, "IP is not from a local mobile...," had generated in two sessions (shown in Session Count). If you click the Session Count link and then the session number, the Session Details page is displayed.

The trigger sources (name of rules) shows the rules that generated this particular alert and each one is associated with a count.

6.11.7 User Details: Fingerprint Data

This tab shows all the fingerprint (browser, flash, custom) information collected when a particular user logs in. Custom fingerprint information can be collected for Native Mobile and Applet.

Figure 6–19 shows examples of browser, flash, and custom fingerprint types to search on.

Figure 6–19 Searching by Fingerprint Types

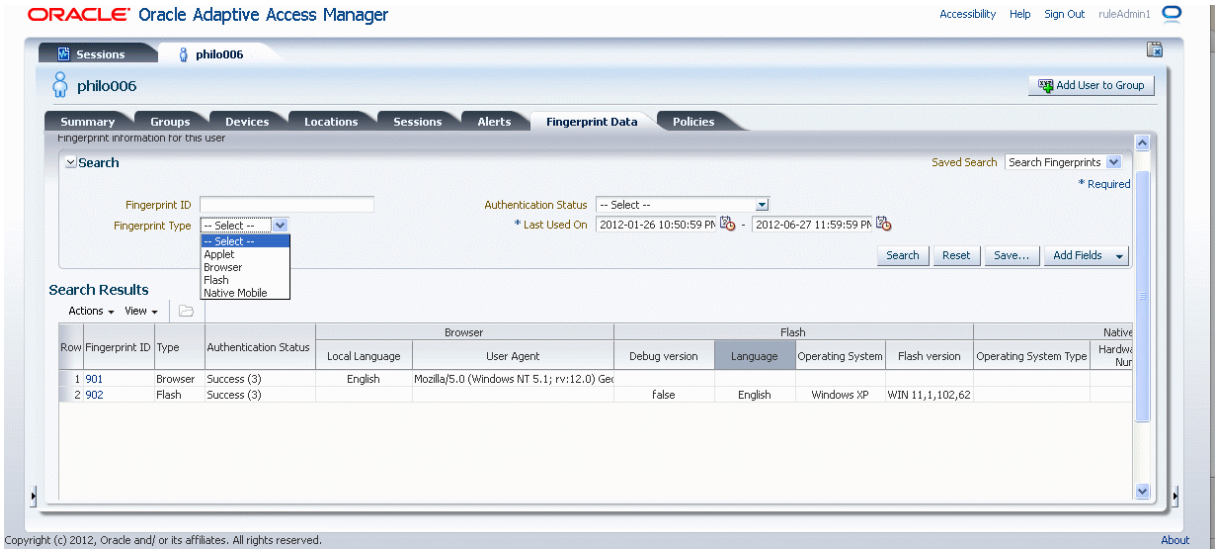


Figure 6–20 shows the Applet fingerprint search.

Figure 6–20 Applet Fingerprint Search

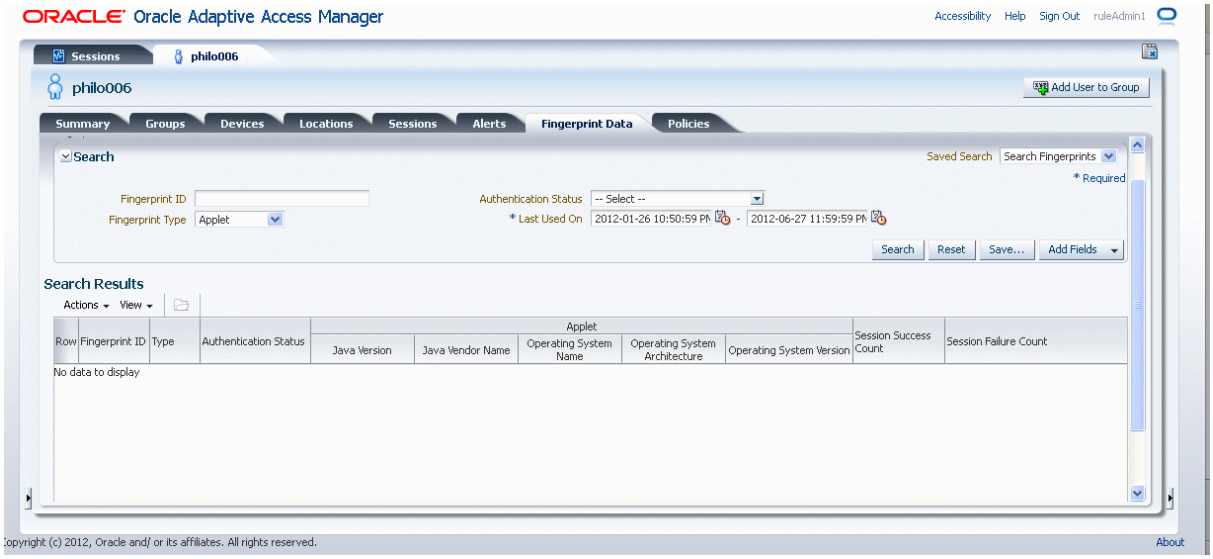
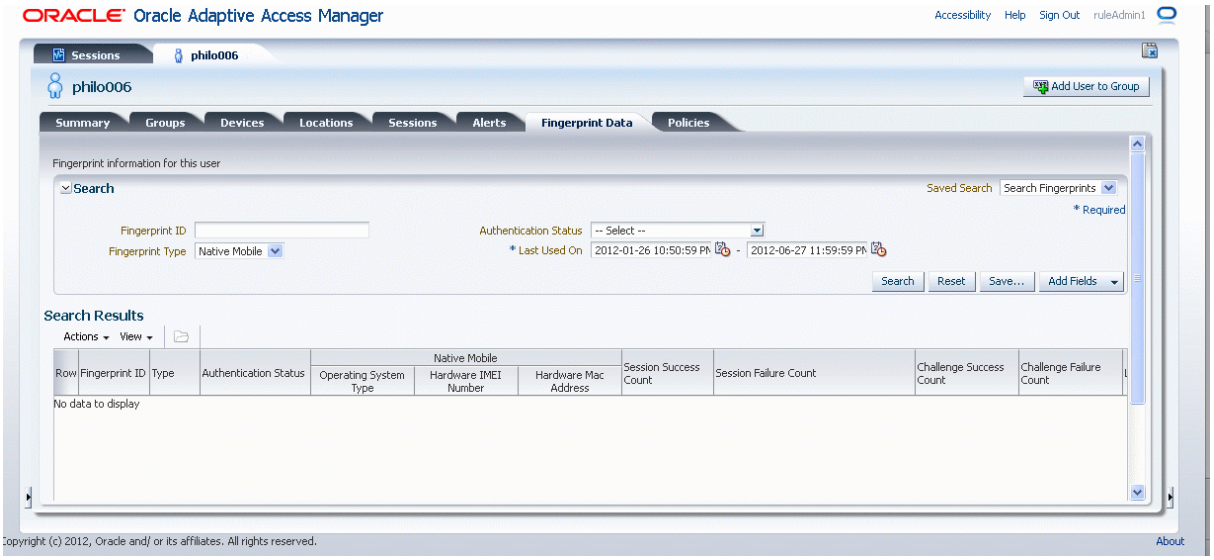


Figure 6–21 shows a Mobile fingerprint data search.

Figure 6–21 Mobile Fingerprint Search



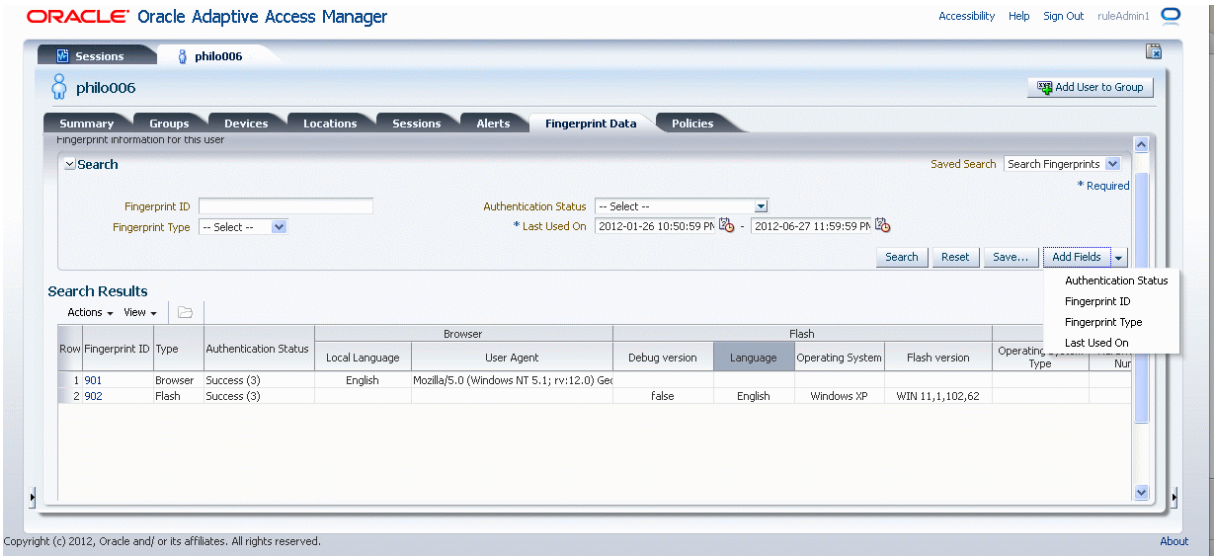
The Fingerprint Data tab contains the following filter parameters:

Table 6–17 User Details: Fingerprint Data Tab

Filters	Description
Fingerprint ID	The fingerprint identifier.
Fingerprint Type	Different fingerprint types that are supported: Custom (Applet, Native Mobile), Browser, Flash
Last Date Used	Get all the fingerprints created for the given time duration
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.

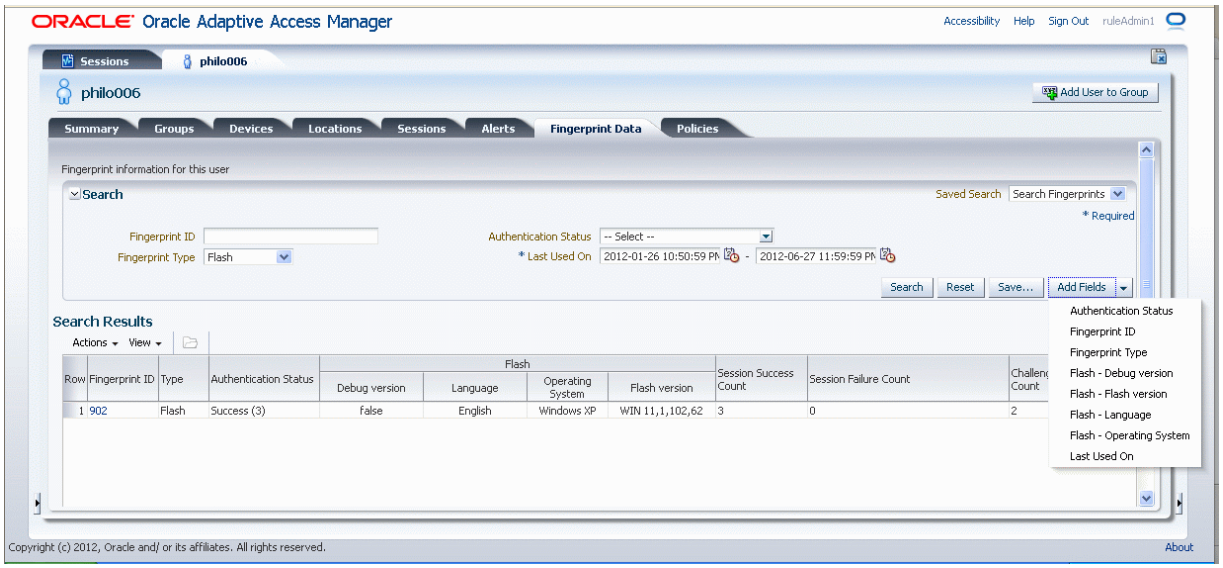
You can add or remove multiple fingerprint data parameters to the query.

Figure 6–22 Add Fields for Browser Fingerprint Search



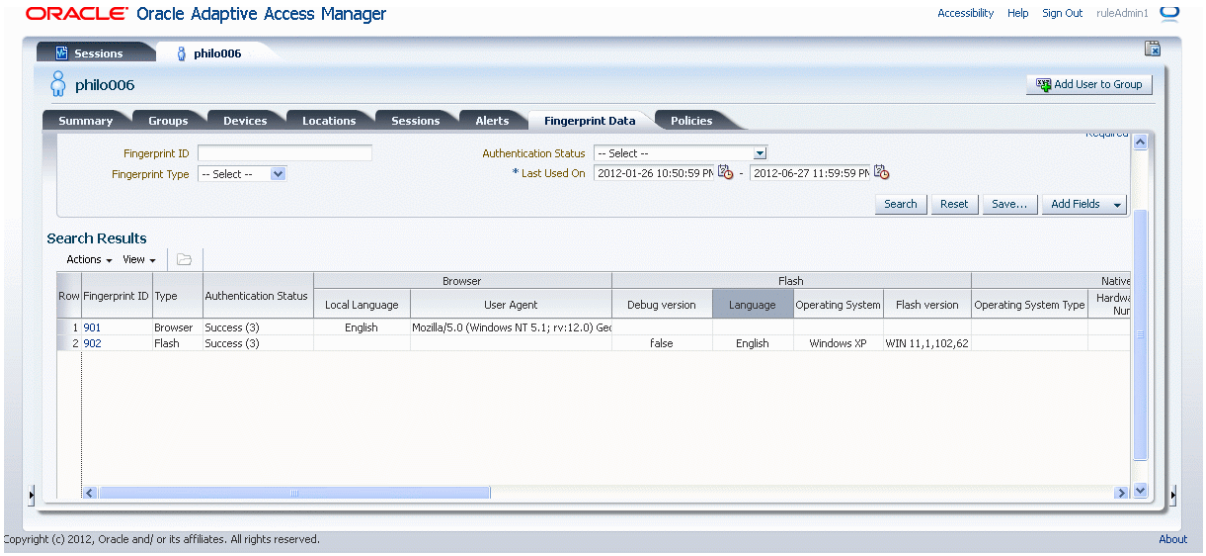
The Add Fields list only displays the search fields relevant to those fingerprint types.

Figure 6–23 Add Fields for Flash Fingerprint Search



By default, the fingerprint type is set to browser. If browser is the fingerprint type, the Add Fields drop down only shows browser fingerprint items.

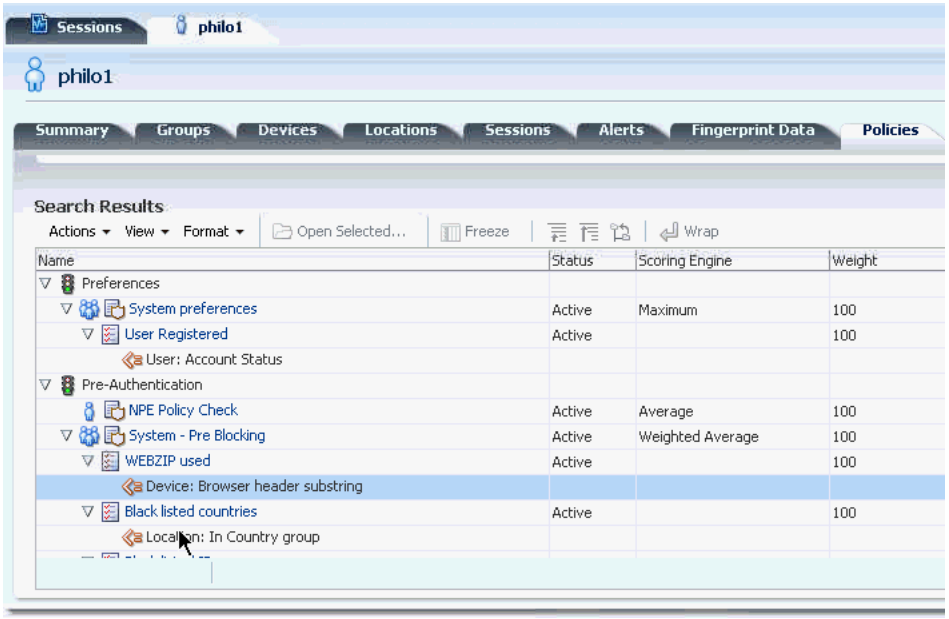
Figure 6–24 Browser and Flash Fingerprint Results Shown



6.11.8 User Details: Policies Tab

This tab lists default and custom rules that are run for a user by the rule engine based on the checkpoints during authentication. The policies tab displays all the policies and rules that are run for the user including any nested policies in trigger combinations.

Figure 6–25 User Details: Policies



Only active policies and rules are displayed on this tab. If a policy is disabled it is not listed in this tab. Users can search for a specific checkpoint. The default sorting is on the name. The checkpoints is sorted alphabetically at the global level and the policies within each checkpoint is also sorted alphabetically.

6.11.9 User Details Tasks

This section describes how to obtain information about the user through the use of the User Details pages.

6.11.9.1 View general user information, registration information, and profile information

To view general user information, registration information, and profile information, click the User ID or User Name link from the sessions page for a valid user and view the Summary page.

6.11.9.2 View the actions performed by the user during registration

To view the actions performed by the user during registration:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. View the Registration Information section of the Summary tab for the status of each action performed by the user during the registration process.

6.11.9.3 View statistics about the user

To view statistics about the user:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. View the Profile Data / Cache Data section of the Summary tab.

6.11.9.4 Search and view the different devices used for a user to get additional information like the number of times a device is used by a user and the successful and unsuccessful login attempts from each device

To search and view the different devices used for a user to get additional information like the number of times a device is used by a user and the successful and unsuccessful login attempts from each device:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Devices** tab.

3. Search for the different devices used for a user.

   This tab lists all the devices that have been used in a session by the user during the timeframe mentioned in the search criteria

4. In the search results, view the following information for the devices for each user:

   - Login Failures
   - Login Successes
   - Challenge Failures
   - Challenge Successes

6.11.9.5 Search and view the different user groups with which a user is associated

To search and view the different user groups with which a user is associated:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Groups** tab.

3. Search for the different groups with which the user is associated using the following parameters:

   A user can belong to User ID and User Name groups.

Table 6–18 Group Filters

Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Group Type	Category to which the group belongs.
Cache Type	Groups offer two Cache Type options: Full Cache or None. For information, refer to **Cache Policy**.
Group Description	This filter maps to the User Group: description field

6.11.9.6 Search and view the different locations used for a user to get additional information such as the number of times a location is used by a user and the successful and unsuccessful login attempts from each location

To search and view the different locations used for a user to get additional information such as the number of times a location is used by a user and the successful and unsuccessful login attempts from each location:

1. Click the User ID or User Name link from the Sessions page for a valid user.

The User Details page is displayed.

2. Click the **Locations** tab.
3. Search for the different locations using the following filter parameters:

Table 6–19 Location Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

4. In the search results, view the following information for the device from each location:
   - Login Failures
   - Login Successes
   - Challenge Failures
   - Challenge Successes

6.11.9.7 Search and view all the alerts triggered and generated for the user

To search and view all the alerts triggered and generated for the user. The alerts are shown with different color codes to indicate the alert levels whether it is high, medium or low:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.
2. Click the **Alerts** tab.

   This tab lists alerts that were triggered and generated for a user during the transaction process.
3. Search for the different alerts using the following filter parameters:

Table 6–20 Alert Filters

Filters	Description
Alert Message	Display name describing the alert.
Alert ID	ID of an alert.
Alert Type	Type of this alert whether fraud, investigation, information, or other types.
Alert Level	Severity of the alert whether high, medium, low.
Rule Name	Rule that generated the alert.
Date Triggered	Given time when the alerts triggered for the user.

4. In the search results, view the alerts triggered and generated for the user:

   The alerts are shown with different color codes to indicate the alert levels (whether is high, medium or low).

6.11.9.8 Search and view all the login sessions or search login sessions for a particular period for the user

To search and view all the alerts triggered and generated for the device. The alerts are shown with different color codes to indicate the alert levels whether it is high, medium or low:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Sessions** tab.

   This tab lists login sessions for a user for a particular period.

3. Search for the different sessions using the following filter parameters:

Table 6–21 Sessions tab

Filter	Description
Session ID	The unique identifier for a session.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
Alert Level	Severity of the alert whether high, medium, low.
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	The place where the login or transaction occurred
Session Date	Get all the sessions during which the device logged in for the given time duration.

6.11.9.9 View the rules run on the user

To view the rules run on the user:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Policies** tab.

   This tab lists default and custom rules that are run for a user.

6.11.9.10 Search and view the fingerprints created for the user

To search and view the fingerprints created for the user:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Fingerprints** tab.

   This tab lists fingerprints created for the user during login.

6.11.9.11 Add user to user group

You could add users to groups and create groups, using the **Add User to Group** button from search and details pages.

If you are viewing the details of a specific user, and based on the analysis, you identified this user as a fraudster, you could add this user to a blacklisted group from the dialog. You do not have to navigate away to the details page to add the user.

To add a user to a user group:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click **Add User To Group** at the upper right corner.

   The Add User to Group dialog is displayed.

3. Search for the group you want to add the user to by the group name.

   Only those groups that the user is not a member of are displayed.

4. Select the group to add the user to and click the **Add** button.

6.11.9.12 Create a new user group and add user to the newly created group

The Add User to Group and Add to Group dialogs allow you to search and view the details of a user group, before adding the user to that group. If you do not find the group to which this user belongs, a new group can be created.

If you perform a fraud analysis, and you identify that this particular user belongs to a certain group, but you do not have that group available, you can create that group. Then, you can add that particular user to that group.

To create a new user group and add user to the newly created group:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed.

2. Click the **Add User to Group** button at the upper right corner.

   The **Add to User** dialog is displayed.

3. Click **Create New Group** button and specify the details for the new group.

4. Select the **Open this Group's details tab when done** option.

5. Click the **Add** button.

   The group's details tab is displayed with the user added.

6.11.9.13 Remove user from user group

You can remove a user from the group from detail pages. For example, if you added a user to a monitor user group, and you have been monitoring the user for three months, and you realize that he or she is a valid user, you can remove that user from that group.

To remove a user from the user groups:

1. Click the User ID or User Name link from Sessions page for a valid user.

   The User Details page is displayed.

2. View the Groups tab.

   The Groups tab shows a listing of the groups.

3. Remove the user from a group by selecting a specific row and clicking the **Remove from group** button.

   You can select multiple rows to remove multiple users.

4. Click **Remove from Group**.

   The user is removed from the group selected.

> **Note:** You should not be able to remove a user from the Organization ID of the primary user group.

6.11.9.14 Navigate to other details pages for groups, alerts, devices, locations, sessions, policy, rules and fingerprints

You can click a link from a tab to open the corresponding details pages.

- From the Users tab: click the User Name link to open the User Details page.
- From the Groups tab: click the Group Name link to open the Group Details page.
- From the Locations tab, click the Location or IP link to open the Location Details page.
- From the Alerts tab, click the Alert Message link to open the Alert Details page.
- From the Devices tab: click the Device ID link to open the Device Details page.
- From the Fingerprint tab: click the Fingerprint ID to open the corresponding fingerprint details page.

Links for User Name, IP address, session, and location are available on the Sessions tab.

6.12 IP or Locations (Country, State, or City) Details Page

IP, Country, State, or City Details pages provide details for an IP Address, country, state, or city, including mapping of city, state, country, cross reference on other data types such as device, user, alerts, sessions, browser, OS, locales, fingerprints, and so on.

You can drill down to the respective Location Details page by selecting either the IP Address, Country Name, State Name, or City Name shown in the Sessions search result or Case's sessions tab.

The Location Details page is divided into the following tabs:

Table 6–22 Location Details Tabs

Location Details Tabs	Description
Summary	The Summary tab provides general location information.
Groups	The Groups tab lists groups which the location is associated to.
Users	The Users tab lists successful and unsuccessful login attempts by all users from the location.
Devices	The Devices tab lists successful and unsuccessful login attempts by all devices from the location.

Table 6–22 (Cont.) Location Details Tabs

Location Details Tabs	Description
Alerts	The Alerts tab lists alerts that are generated for the location by the application during transaction process. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).
Sessions	The Sessions tab lists login sessions for a location for a particular period.
Fingerprints	The Fingerprints tab lists fingerprints created for the location during login.

6.12.1 Location Details: Summary Tab

The Summary tab provides general location information. Information is displayed about country and state depending on the item selected. For example, if the user selected a city called "San Jose", the Summary tab displays the state and country name for that city. If the user selected the state called "California," only the country information is listed.

If you want to view IP Address details, you can click the IP Address link.

Country Details

Table 6–23, " Country Details" lists the general country details that are displayed in the Summary tab of a Country Details page.

Table 6–23 Country Details

Country Details	Description
Country ID	The ID of a country which is unique
Country Code	Geographical code (geocode) representing the country.
Country Name	Geographic name of country.

State Details

Table 6–24, " State Details" lists the general state details that are displayed in the Summary tab of a State Details page.

Table 6–24 State Details

State Details	Description
State ID	The ID of a state.
State Code	Geographical code (geocode) representing the state.
State Name	Geographic name of state
Country Name	Geographic name of country the state belongs to.

City Details

Table 6–25, " City Details" lists the general city details that are displayed in the Summary tab of a City Details page.

Table 6–25 City Details

City Details	Description
City ID	The ID of the city.
City Code	Geographical code (geocode) representing the city.
City Name	Geographic name of the city.
State Name	Geographic name of the state the city belongs to.
Country Name	Geographic name of the country the city belongs to.

IP Details

Table 6–26, " IP Details" lists the general IP information that are displayed in the Summary tab of the IP Details page.

Table 6–26 IP Details

IP Details	Description
IP Address	Address mapped to a location usually, although some addresses are unknown or private
City Name	Geographic name of the city.
State Name	Geographic name of the state.
Country Name	Geographic name of the country.
Connection Speed	Internet connection speeds or bandwidths (high, medium, low).
Connection Type	Describes the data connection between the device or LAN and the internet. See the Connection Type mapping.
Routing Type	Tells how the user is routed to the internet.
Carrier	The name of the entity that manages the ASN entry.
ASN	Globally unique number assigned to a network or group of networks that is managed by a single entity.
Top-level Domain	The top-level domain of the URL. For example, .com in www.company.com. This is mapped through the Quova reference file.
Second-level Domain	The second-level domain of the URL. For example, Name in www.company.com. This is mapped through the Quova reference file.
City Confidence Factor	The confidence factor (1-99) that the correct city has been identified.
State Confidence Factor	The confidence factor (1-99) that the correct state has been identified.
Country Confidence Factor	The confidence factor (1-99) that the correct country has been identified.

6.12.2 Location Details: Groups Tab

The Groups tab shows a listing of the geolocation groups the location belongs to.

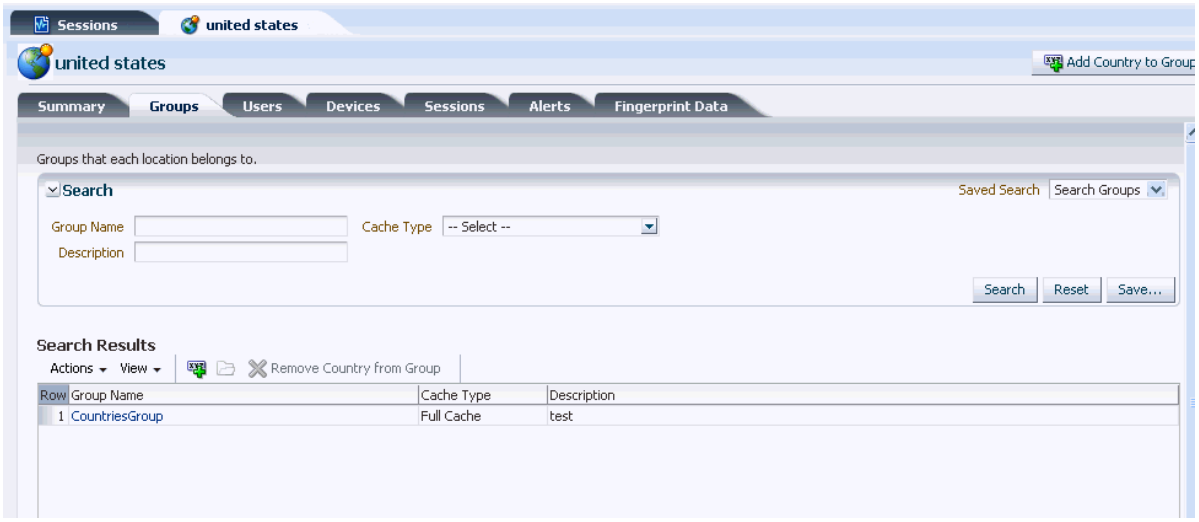
Table 6–27, " Location Details: Group Filters" lists the filter parameters available for group searches.

Table 6–27 Location Details: Group Filters

Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Group Description	This filter maps to the User Group: description field
Cache Type	Groups offer two Cache Type options: Full Cache or None. For information, refer to **Cache Policy**.

The group tab shows a listing of the groups which the location is associated to.

Figure 6–26 Location Details (USA): Groups



If the location belongs to multiple groups, all the groups are listed. Click the Group Name link to open the Group Details page. Click the IP Address link to view IP Address Details.

6.12.3 Location Details: Users Tab

This tab lists all the users who used the location during the timeframe mentioned in the search criteria

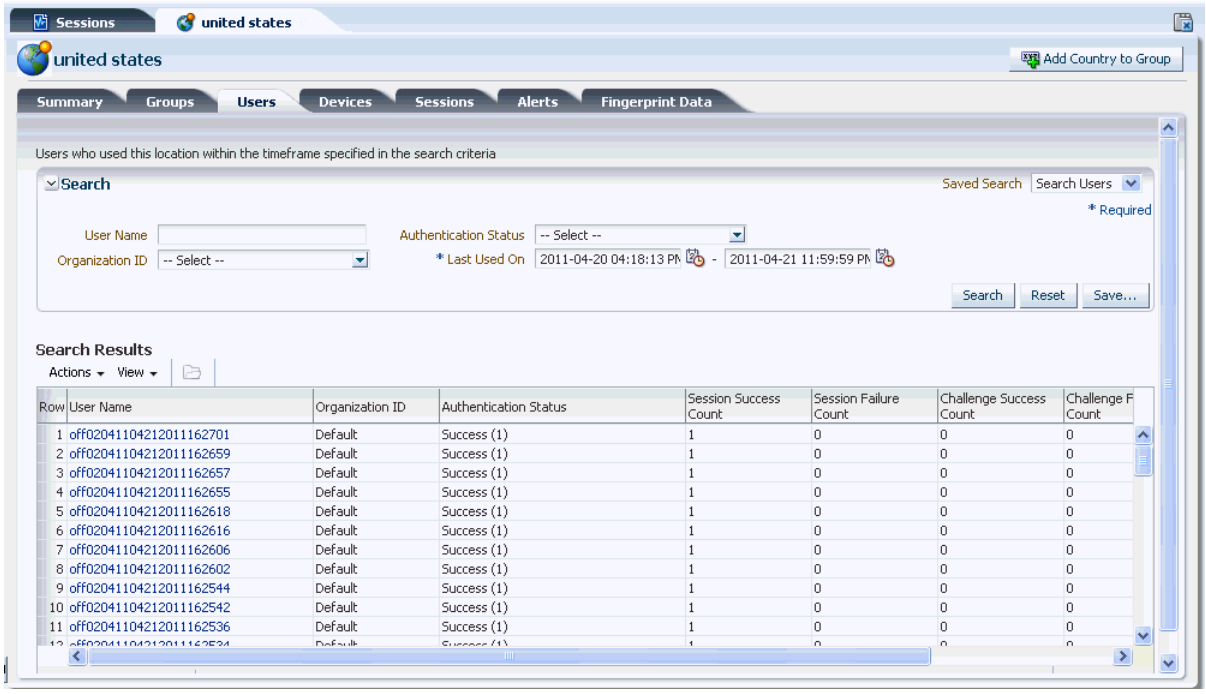
Table 6–28, " Location Details: Users Tab" lists filter parameters available for user searches.

Table 6–28 Location Details: Users Tab

Filter	Description
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	The last date the location was used to log in.

The search results display the User Name, Authentication Status, Last Used On, Login Failures, Login Successes, Challenge Failures, and Challenge Successes for each user.

Figure 6–27 Location Details: Users



By default, the results are displayed are sorted by User Name in ascending order. Only one row is displayed for each User Name. The login and challenge success and failure counts correspond to the aggregate counts for the timeframe.

The user can open the User Details page by clicking the User Name link.

6.12.4 Location Details: Devices Tab

This tab lists all the devices used from the location during the timeframe mentioned in the search criteria

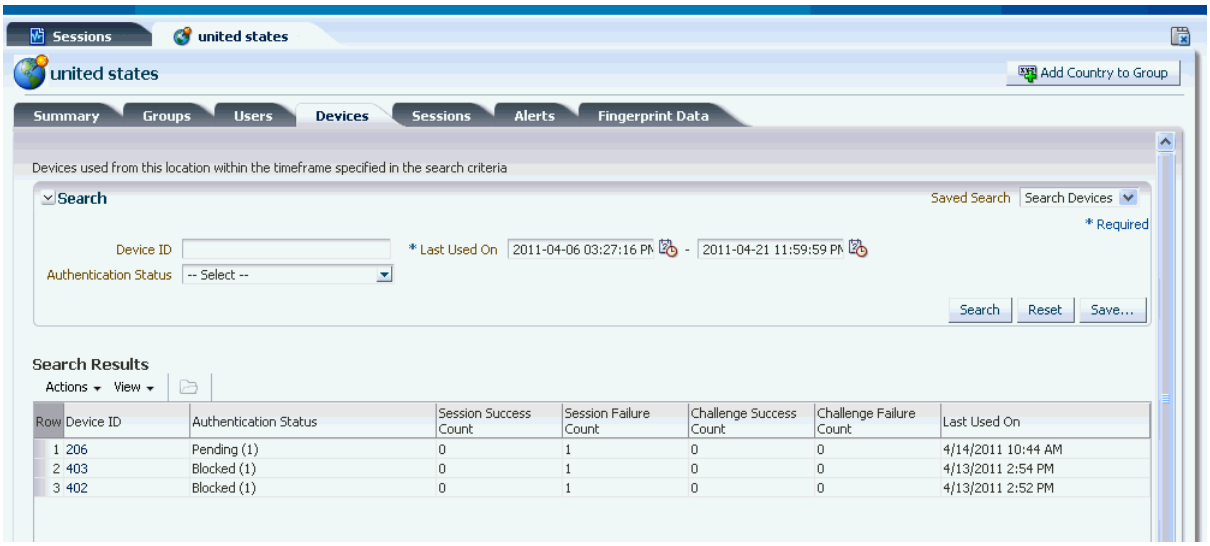
Table 6–29, " Location Details: Device Tab" lists the filter parameters available for device searches.

Table 6–29 Location Details: Device Tab

Field	Description
Device ID	Uniquely identifies each device and is auto-generated by the application. No results are shown if you provide an invalid Device ID.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**. By default, the Authentication status is set to "all." You can select multiple authentication status values.
Date Range	Get all the devices which were used by the user to login during the given time duration. No results are shown if you provide an invalid date range.

The search results display the Device ID, Authentication Status, Last Used On, Login Failures, Login Successes, Challenge Failures, and Challenge Successes for each user.

Figure 6–28 Location Details (USA): Devices



By default, the results are displayed are sorted by Device ID in ascending order. Only one row is displayed for each Device ID. The login and challenge success and failure counts correspond to the aggregate counts for the timeframe.

A device details page can be opened by clicking the Device ID link.

6.12.5 Location Details: Alerts Tab

This tab lists all the alerts that have been triggered from the location during the date range provided. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).

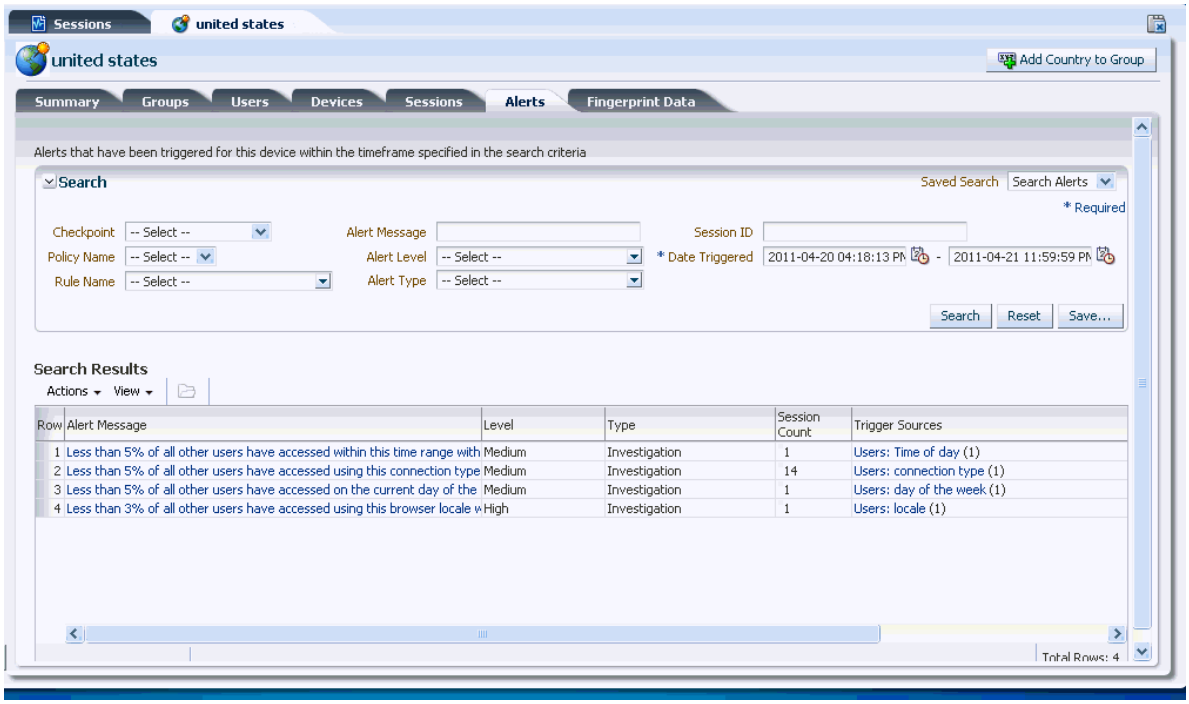
The tab contains the following filter parameters.

Table 6–30 Location Details: Alert Filters

Filters	Description
Alert Message	Display name describing the alert.
Alert ID	ID of an alert.
Alert Type	Type of the alert whether fraud, investigation, information, or other types. Multiple alert types can be selected.
Alert Level	Severity of the alert whether high, medium, low. Multiple alert levels can be selected.
Rule Name	Rule that generated the alert. Multiple rules can be selected.
Date Triggered	Get all the alerts triggered during the given time duration for the user.

The results display all the alert sources with the current details (level/type) for each alert message along with their count (total number of times the alert has been triggered).

Figure 6–29 Location Details: Alert



Clicking the Session ID in the search results opens the Sessions search page with pre-filled search parameters (Alert Level, Alert Message, Alert Type, Date, and so on).

6.12.6 Location Details: Sessions Tab

This tab lists login sessions for a location for a given timeframe. It contains the following filter parameters:

Table 6–31 Sessions tab

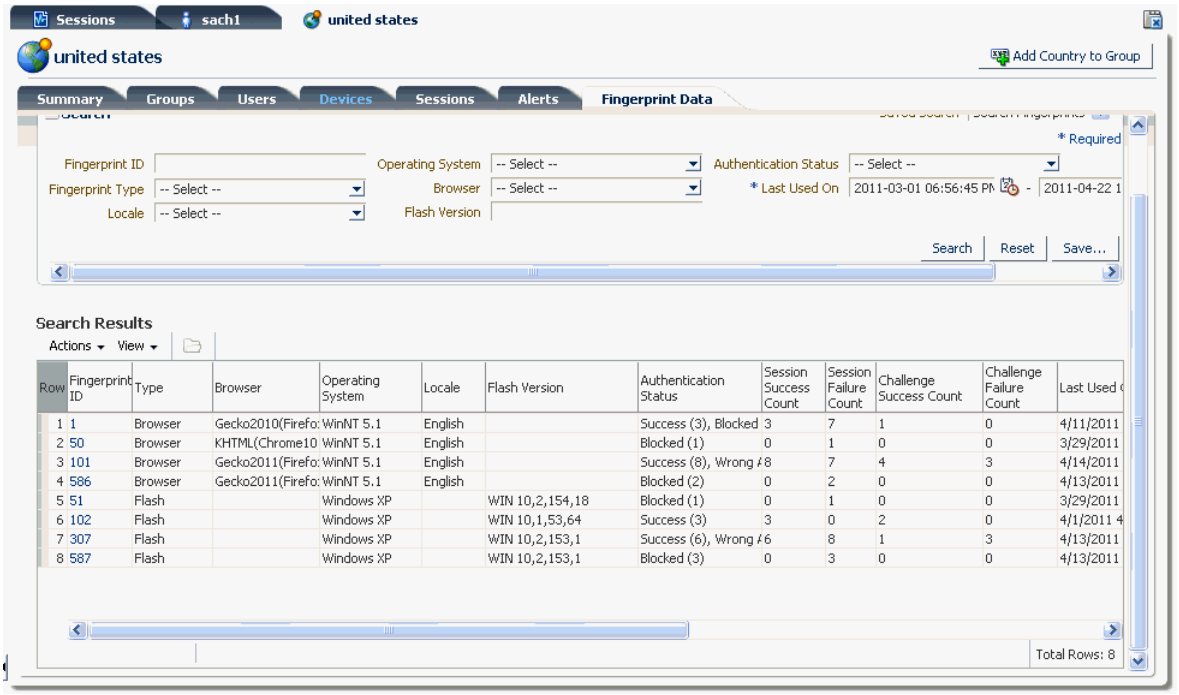
Filter	Description
Session ID	The unique identifier for a session.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used.
Alert Level	Severity of the alert whether high, medium, low.
Device ID	Uniquely identifies each device and is auto-generated by the application.
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Session Date	The date the login or transaction occurred.

By default the results are sorted by Session ID, which is unique. Clicking the Device ID, IP address, User Name, or alerts link opens the corresponding details page.

6.12.7 Location Details: Fingerprints Tab

This tab lists fingerprints created for the location during login.

Figure 6–30 Location Details: Fingerprint Data



The tab contains the following filter parameters:

Table 6–32 Fingerprint Data

Filters	Description
Fingerprint ID	Unique ID generated for fingerprint by the application
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Browser Type	The type of browser a user is viewing pages with
OS Type	Type of operating system
Locale	A set of parameters that defines the user's language, country and any special variant preferences that the user wants to see in their user interface
Last Date Used	Get all the fingerprints created for the given time duration

By default, the results are sorted by browser Fingerprint ID. The browser/digital fingerprint combination is unique and hence each combination has only one row in the results table. The Fingerprint ID has a link and opens the corresponding Fingerprint Details page.

6.12.8 Location (Country, State, City, or IP) Details Tasks

This section describes how to obtain information through the use of the Location Details pages.

6.12.8.1 View general information about the location

To view general information about a location:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. View the Summary tab.

   On the Summary tab, additional information is displayed about the country and state depending on the item selected.

   For example, if you select a city called "San Jose," the Summary tab displays the state and country names for that city. If you select the state "California," only the country information is listed.

   For details on the information displayed on the Summary tab, refer to Section 6.12.1, "Location Details: Summary Tab."

6.12.8.2 Search and view the different location groups to which a location is associated or belongs

To search and view the different location groups that a location is associated with or belongs to:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Groups** tab.

3. Search and view the different location groups to which a location is associated or belongs by using the following filters:

Table 6–33 Location Details: Group Filters

Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed. Group Name is not case sensitive. No records are shown if you enter an invalid Group Name.
Cache Type	Groups offer two Cache Type options: Full Cache or None. By default, the Cache Type should be set to "all." For information, refer to **Cache Policy**.
Group Description	The description for the group. Group Description is case insensitive. You can enter part of the group description. No results are shown if you enter special characters or a description that is too long.

   The group tab shows a listing of the geolocation groups the location belongs to. If the location belongs to multiple groups, all the groups are listed. You can open the Group Details page by clicking the Group ID link.

6.12.8.3 Add location to existing location group

Only Security Administrators, System Administrators, and Investigators have access to the **Add to Group** command. CSRs do not have access to the **Add to Group** command. The **Add to Group** button is available in the Sessions search and other details pages.

Locations can be added to geolocation group types. A location can be added to only one location group at a time.

To add a location to a location group:

1. In the Sessions search or other details page, click the location link.

   The Location Details page is displayed.

2. Click the **Add Location to Group** button at the upper right corner.

   The **Add to Group** dialog is displayed.

3. Search for the group you want to add the location to by the group name.

   Only those groups that the location is not a member of are displayed.

   If you do not find the country, state, or city group you need, you can create a new group. Information for doing so is provided later.

4. Select the group to add the location to and the **Open this Group's details tab when done** option.

5. Click the **Add** button.

   The group's details tab is displayed with the location added.

6.12.8.4 Create a location group and add location to it

To create a location group and add the location to it:

1. In the Sessions search or other details page, click the location link.

   The Location Details page is displayed.

2. Click the **Add Location to Group** button at the upper right corner.

   The **Add to Group** dialog is displayed.

3. Click **Create New Group** button and specify the details for the new group.

4. Select the **Open this Group's details tab when done** option.

5. Click the **Add** button.

   The group's details tab is displayed with the location added.

6.12.8.5 Search and view the different users that logged in from the location get additional information like the number of times a user logged in from the location and the successful and unsuccessful login attempts from the location by each user

To search and view the different users that logged in from the location get additional information like the number of times a user logged in from the location and the successful and unsuccessful login attempts from the location by each user:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Users** tab.

   - To see additional information such as the number of times a user logged in from the location, search by User Name. The Login Successes column displays the number of times a user logged in.
   - To see the number of successful and unsuccessful login attempts from the location by each user, select **Blocked** and **Success** as the Authentication Status.

Login failures and successes are displayed for each user.

6.12.8.6 Search and view the different devices that logged in from the location get additional information like the number of times a device logged in from the location and the successful and unsuccessful login attempts from the location by each device

To search and view the different devices that logged in from the location get additional information like the number of times a device logged in from the location and the successful and unsuccessful login attempts from the location by each device:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Devices** tab.

   - To see additional information such as the number of times a device was used to log in from the location, search by Device ID. The Login Successes column displays the number of times a device was used to log in.
   - To see the number of successful and unsuccessful login attempts from the location by each device, select **Blocked** and **Success** as the Authentication Status.

     Login failures and successes are displayed for each device.

6.12.8.7 Search and view all the alerts triggered and generated for the location

To search and view all the alerts triggered and generated for the location. The alerts are shown with different color codes to indicate the alert levels whether it is high, medium or low

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Alerts** tab and view the results table for the alert levels.

6.12.8.8 Search and view all the login sessions or search login sessions for a particular period for the location

To search and view all the login sessions or search login sessions for a particular period for the location:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Sessions** tab.
3. Enter session dates to get sessions for that period for the location.

6.12.8.9 Search and view the fingerprints created for the location

To search and view the fingerprints created for the location:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Fingerprint Data** tab.
3. Search by OS, locale, browser, Fingerprint ID, and so on.

6.12.8.10 Navigate to other details pages for groups, alerts, devices, users, sessions and fingerprints

You can click the links in tabs to open the corresponding details page:

- From the Summary tab: click the IP Address link to view IP Address Details.
- From the Groups tab: click the Group Name link to open the Group Details page.
- From the Devices tab: click the Device ID link to open the Device Details page.
- From the Users tab: click the User Name link to open the User Details page.
- From the Alerts tab: click the Session ID to open the Sessions search page with pre-filled search parameters (Alert Level, Alert Message, Alert Type, Date, and so on
- From the Fingerprint tab: click the Fingerprint ID to open the corresponding Fingerprint Details page.

On the Sessions tab, links are provided for the following pages

- For the Session Details - Links are provided for session ID
- For IP Details - Links are provided for Country, State and City
- For Country Details - Links are provided for IP, State and City
- For State Details - Links are provided for IP, Country and City
- For City Details - Links are provided for IP, Country and State

6.13 Device Details Page

The Device Details page displays details about a device including cross reference on other data types such as user, location, alerts, browser, sessions, full list of fingerprint data, and so on. You can open the Device Details page by clicking any Device ID link from the Sessions search, Session Details, or other listing pages.

The Device Details page is divided into the following tabs:

Table 6–34 Device Details Tabs

Device Details Tabs	Descriptions
Summary	The Summary tab provides general device information.
Groups	The Groups tab list groups with which the device is associated. For example Restricted Devices Group.
Users	The Users tab lists successful and unsuccessful login attempts from all users using the device. This report enables you to see which users and how many times a user used the device for login.
Locations	The Locations tab lists successful and unsuccessful login attempts from all devices' locations. This report enables you to see which locations and how many times a device logged in from a particular location.
Sessions	The Sessions tab lists login sessions for a device for a particular period.
Alerts	The Alerts tab lists alerts that are triggered and generated for a device by OAAM Admin during transaction process. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).
Fingerprint Data	The Fingerprint data tab shows browser and digital fingerprint information for the device.

6.13.1 Device Details: Summary Tab

The Summary tab provides general device information. The following information is provided:

Basic Information

Table 6–35 Device Details Basic Information

Device Details Summary Tab	Description
Device ID	Uniquely identifies each device and is auto-generated by the application. Even if the digital fingerprint changes for a particular device, the device ID is retained and a new device will not be created. This is because secure cookie is the same as the previous request, so it continues to be used as the existing Device ID.
Operating System	Device OS. The information is fetched from the fingerprint data associated with the device
Browser	Device Browser type. The information is fetched from the fingerprint data associated with the device
Create Date	Date on which the user has first used the device for authentication. Also, this refers to the first login date of the device.
Last Used On	This date refers to the most recent login time from the device.

Fingerprinting Details

The Device Detail summary page shows fingerprint type and its parameter in a hierarchical tree format. The Fingerprint Details section lists fingerprints created for the device during login. Out of the box, OAAM only supports two types of fingerprints, browser and digital. Digital fingerprints can be either flash or one of the custom types defined by the user. OAAM provides the framework so users can fingerprint types other than browser and flash if needed.

The Digital Fingerprint Type field in the Session Details summary page shows the fingerprinting type used to collect digital fingerprint. If custom fingerprinting is used, the field shows the custom fingerprinting type name.

Table 6–36 Device Details Fingerprint Information

Device Details Fingerprint Tab	Description
Fingerprint Details title	Fingerprint Details title shows the number of fingerprints in that device.
Browser Fingerprint	Information is shown such as: ■ ID ■ Browser ■ Local Country ■ Local Language ■ Local Variant ■ Operating System ■ User Agent
Digital Fingerprint	Information is shown for flash fingerprint or another custom fingerprint defined by the user. The fields show information such as: ■ ID ■ Digital Fingerprint Type ■ Aspect Ratio of Screen ■ Audio/Video disabled by user ■ Contains video encoder ■ Debug version ■ Dots per inch ■ Embedded video ■ Flash version ■ Has audio encoder ■ Has MP3 ■ Has accessibility ■ Has audio ■ Has input method editor installed ■ Is local file read disabled ■ Is screen color ■ Language ■ Manufacturer ■ Operating System ■ Player type ■ Screen resolution ■ Supports native SSL If a device has flash as the custom fingerprint, then the digital fingerprint shows flash fingerprint details such as OS type, browser type, Player Type, Has audio, Has mp3, Supports streaming audio, and so on. Flash fingerprint details and parameters are not displayed if flash is not associated with the device. If you decide to change the type of digital fingerprint to collect from flash to QuickTime (as an example), the Fingerprint Details panel shows only the current (latest) fingerprint (QuickTime). If you click Fingerprint Data tab, you see all the fingerprint details for that device (it shows Browser, Flash and QuickTime).

6.13.2 Device Details: Groups Tab

This tab lists groups to which the device is associated. For example, Restricted Devices. The tab contains the following filter parameters:

Table 6–37 Device Details: Group Filters

Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Description	This filter maps to the User Group: description field
Cache Type	Groups offer two Cache Type options: Full Cache or None. For information, refer to **Cache Policy**.

You can open the Group Details page by clicking the Group ID link.

6.13.3 Device Details: Users Tab

This tab lists successful and unsuccessful login attempts from all users using the device. The tab contains the following filter parameters.

Table 6–38 Device Details: User tab

Filter	Description
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the users who used the device to login during the given time duration.

The results are sorted by User Name and in ascending order. Each user is displayed only once in the results. You can open the User Details by clicking the User ID link

6.13.4 Device Details: Locations Tabs

This tab lists successful and unsuccessful login attempts from all locations. The tab contains the following filter parameters.

Table 6–39 Device Details: Location Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

The Locations are displayed multiple times, if the IP is different for the same device used to log in from the same location. Location is sorted by name and in ascending order. The login/challenge success and failure counts correspond to the aggregate counts for the timeframe.

You can open the IP Details page by clicking the IP address link.

6.13.5 Device Details: Alerts Tab

This tab lists alerts that are generated for a device during transaction process. The information shown is based on alert templates and not alert instances. Alert templates are displayed with the current details (level/type).

The tab contains the following filter parameters.

Table 6–40 Device Details: Alert Filters

Filters	Description
Checkpoint	Decision and enforcement point when the policies were called to run their rules
Policy Name	The name of the policy. The policy list is dynamically populated in respect to what has been selected for the checkpoint.
Rule Name	Rule that generated the alert.
Alert Message	Display name describing the alert.
Alert ID	ID of an alert.
Alert Level	Severity of the alert whether high, medium, low.
Alert Type	Type of the alert whether fraud, investigation, information, or other types.
Session ID	The ID of the session
Date Triggered	Given time when the alerts triggered for the user.

The results displays all the alert sources for each alert message along with their count (total number of times it has been triggered).

By default the results are sorted by alert messages in ascending order.

Clicking the Session ID opens the Sessions search page with pre-filled search parameters (Alert Level, Alert Message, Alert Type and Date).

6.13.6 Device Details: Sessions Tab

This tab lists login sessions for a device for a particular period. The tab contains the following filter parameters.

Table 6–41 Sessions tab

Filter	Description
Session ID	The unique identifier for the session.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
Alert Level	Severity of the alert whether high, medium, low.
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.

Table 6–41 (Cont.) Sessions tab

Filter	Description
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	The geolocation.
Session Date	The date the session occurred.

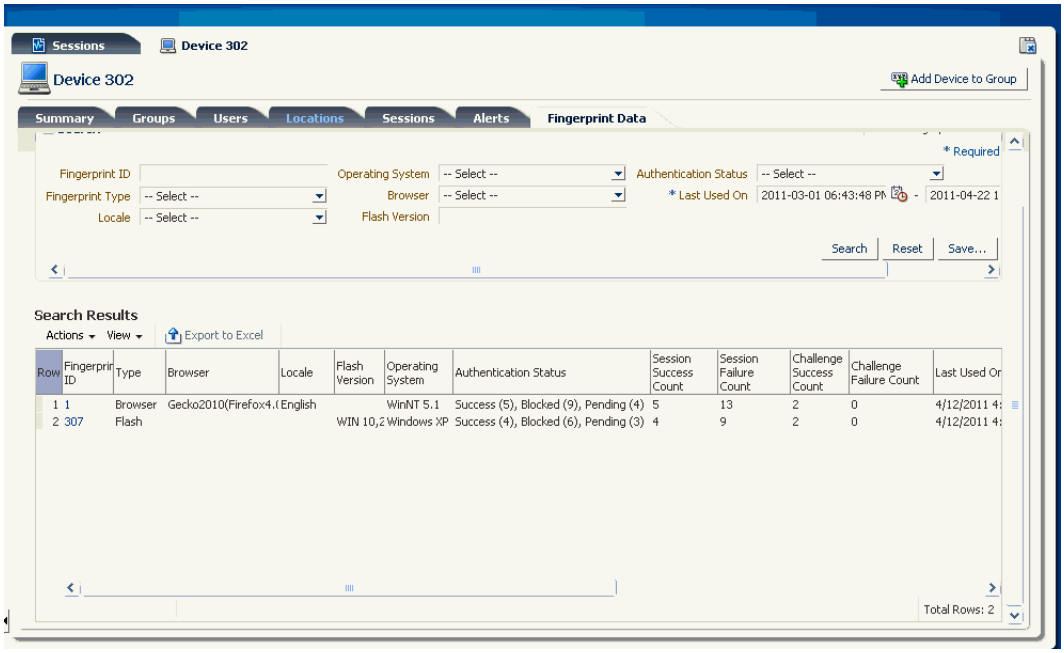
By default, the results are sorted by Session ID in descending order.

Session ID is usually unique unless the IP or device has changed while the session is in progress.

6.13.7 Device Details: Fingerprint Data Tab

This tab lists fingerprints created for the device during login.

Figure 6–31 Device Details: Fingerprint Data



The tab contains the following filter parameters.

Table 6–42 Device Details: Fingerprint Data

Filters	Description
Fingerprint ID	Unique ID generated for fingerprint by the application
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Browser Type	The type of browser a user is viewing pages with
OS Type	Type of operating system
Locale	A set of parameters that defines the user's language, country and any special variant preferences that the user wants to see in their user interface
Last Date Used	Get all the fingerprints created for the given time duration

6.13.8 Device Details Tasks

This section describes how to obtain information through the use of the Device Details pages.

6.13.8.1 View general information about the device

To view general information about the device:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. View the Summary tab.

   The following general data is displayed:

   - Device ID
   - OS
   - Browser
   - Created Date
   - Last Used On

6.13.8.2 View flash and browser fingerprint information created for the device

To view general information about the device:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. View the Fingerprint Data tab.

   Flash and Browser Fingerprint data is shown.

6.13.8.3 Search and view the different device groups to which a device is associated or belongs

To search and view the different device groups to which a device is associated or belongs:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. View the Groups tab.
3. Search groups using the following filters:

Table 6–43 Group Filters

Filters	Description
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Group Type	Category to which the group belongs.
Cache Type	Groups offer two Cache Type options: Full Cache or None. For information, refer to **Cache Policy**.
Group Description	This filter maps to the User Group: description field

6.13.8.4 Add/Remove Device from a Device Group

To add a device to a device group:

1. In the Sessions search or other details page, click the Device ID link.

   The Device Details page is displayed.

2. Click the **Add Device to Group** button at the upper right corner.

   The **Add to Group** dialog is displayed.

3. Search for the group you want to add the device to by the group name and device group type.

   Only those groups that the device is not a member of are displayed.

   If you do not find the device group you need, you can create a new group. Information for doing so is provided later.

4. Select the group to add the device to and the **Open this Group's details tab when done** option.

5. Click the **Add** button.

   The group's details tab is displayed with the device added.

To remove a device from a device group:

1. Click the Device ID link in the Session search page.

   The Device Details page is opened and shows additional details.

2. View the Groups tab.

   The Groups tab shows a listing of the groups. The device is a member of all these device groups.

3. Click the Device Group that contains the device.

4. In the details page of the group, click the Devices tab.

5. Remove the device from a group by selecting the specific row and clicking the **Delete selected members** button on the toolbar.

6. Click **Delete** on the **Confirmation** dialog.

7. Click **OK** to dismiss the **Information** dialog.

   The device is removed from the group selected.

6.13.8.5 Create a device group and add device to it

To create a device group and add the device to it:

1. In the Sessions search or other details page, click the Device ID link.

   The Device Details page is displayed.

2. Click the **Add Device to Group** button at the upper right corner.

   The **Add to Group** dialog is displayed.

3. Click **Create New Group** button and specify the details for the new group.

4. Select the **Open this Group's details tab when done** option.

5. Click the **Add** button.

   The group's details tab is displayed with the device added.

6.13.8.6 Search and view the different users that used the device to log in to get additional information like the number of times the device was used by a user and the successful and unsuccessful login attempts for the device by each user

To search and view the different users that used the device to log in to get additional information like the number of times the device was used by a user and the successful and unsuccessful login attempts for the device by each user:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. Click the **Users** tab.
3. Search for the different users using the following filter parameters:

Table 6–44 User tab

Filter	Description
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the users who used the device to login during the given time duration.

4. In the search results, view the following:
   - Failure Counter (the login fail count)
   - Success Counter (the login success count)

6.13.8.7 Search and view the different locations from which the device was used for log in to get additional information like the number of times the device was used from a location and the successful and unsuccessful login attempts for the device from each location

To search and view the different locations from which the device was used for log in to get additional information like the number of times the device was used from a location and the successful and unsuccessful login attempts for the device from each location:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. Click the **Locations** tab.
3. Search for the different locations using the following filter parameters:

Table 6–45 Location Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

4. In the search results, view the following for the device from each location:
   - Failure Counter (the login fail count)
   - Success Counter (the login success count)

6.13.8.8 Search and view all the alerts triggered and generated for the device

To search and view all the alerts triggered and generated for the device. The alerts are shown with different color codes to indicate the alert levels whether it is high, medium or low:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. Click the **Alerts** tab.

   This tab lists alerts that are triggered and generated for a device during transaction process.

3. Search for the different alerts using the following filter parameters:

Table 6–46 Alert Filters

Filters	Description
Alert Message	Display name describing the alert.
Alert ID	ID of an alert.
Alert Type	Type of the alert whether fraud, investigation, information, or other types.
Alert Level	Severity of the alert whether high, medium, low.
Rule Name	Rule that generated the alert.
Date Triggered	Given time when the alerts triggered for the user.

4. In the search results, view the alerts triggered and generated for the device:

   The alerts are shown with different color codes to indicate the alert levels (whether is high, medium or low).

6.13.8.9 Search and view all the login sessions or search login sessions for a particular period for the device

To search and view all the alerts triggered and generated for the device. The alerts are shown with different color codes to indicate the alert levels whether it is high, medium or low:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. Click the **Sessions** tab.

   This tab lists login sessions for a device for a particular period.

3. Search for the different sessions using the following filter parameters:

Table 6–47 Sessions tab

Filter	Description
Session ID	The unique identifier for a session.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
Alert Level	Severity of the alert whether high, medium, low.
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	Place where login or transaction occurred
Session Date	Get all the sessions during which the device logged in for the given time duration.

6.13.8.10 Search and view the fingerprints created for the device

To search and view the fingerprints created for the device:

1. Click the Device ID link in the Session search page or other pages.

   The Device Details page is opened and shows additional details.

2. Click the **Fingerprint Data** tab.

   This tab lists the fingerprints created for the device during login.

6.13.8.11 Navigate to other details pages for groups, alerts, users, locations, sessions and fingerprints

You can click links on a tab in a details page to open other details pages:

- From the Users tab: click the User Name link to open the User Details page.
- From the Groups tab: click the Group Name link to open the Group Details page.
- From the Locations tab, click the Location link to open the Location Details page.
- From the Alerts tab: click the Alert Message to open the Alert Details page.
- Links for User Name, IP address, session, and location are available on the Sessions tab.

6.14 Fingerprint Details

You can drill down to the Fingerprint Details page from the Sessions search results by selecting a Browser or Digital Fingerprint ID.

There are two different kinds of Fingerprint Details pages:

- Browser Fingerprint
- Digital Fingerprint

6.14.1 Fingerprint Details: Summary Tab

The Fingerprint Details Summary page shows general fingerprint information and the data collected during device fingerprinting.

The Fingerprint Details Summary tab shows the fingerprinting type (flash, browser, custom) and parameters.

Figure 6–32 shows the collected digital fingerprint data in the Summary tab.

Figure 6–32 Digital Fingerprint Data Shown

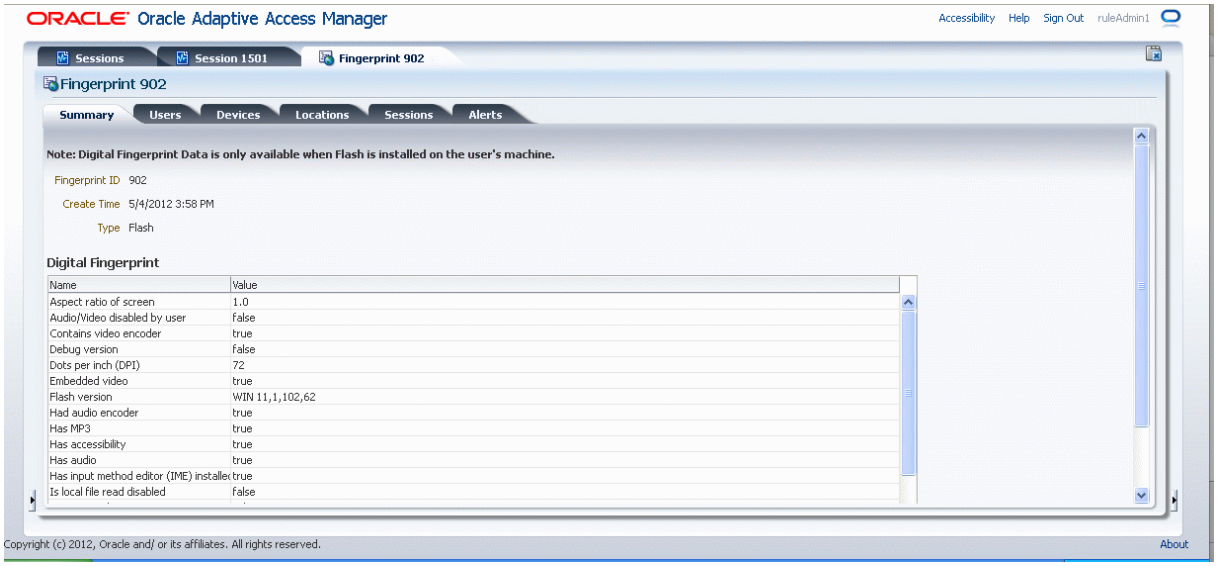
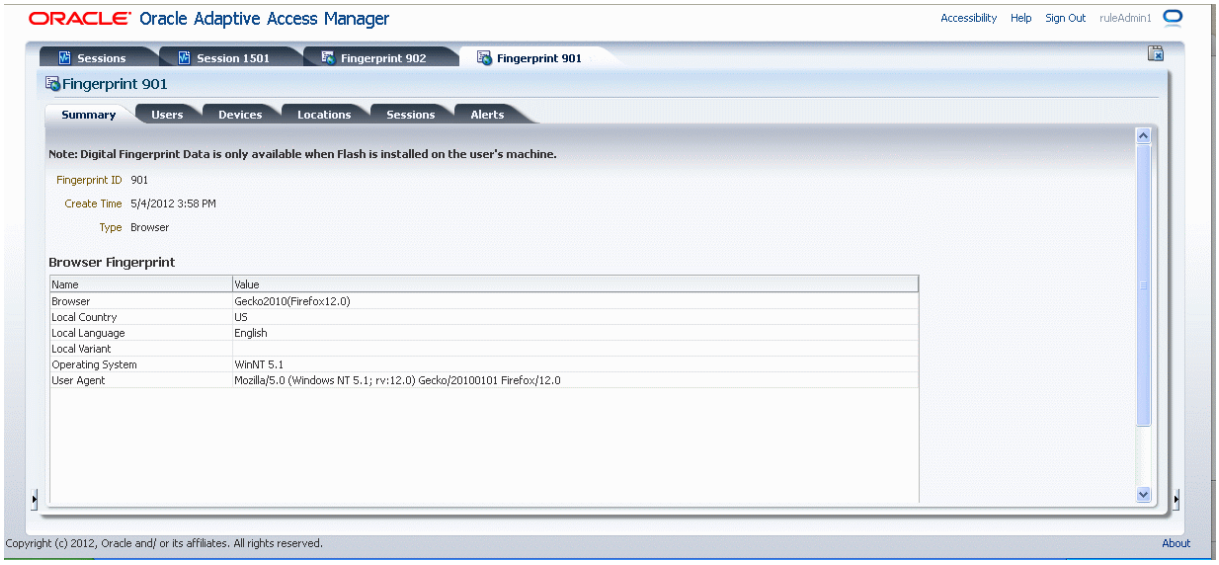


Figure 6–33 shows the collected browser fingerprint data in the Summary tab.

Figure 6–33 Browser Fingerprint Data Shown



The basic information provided by this tab include:

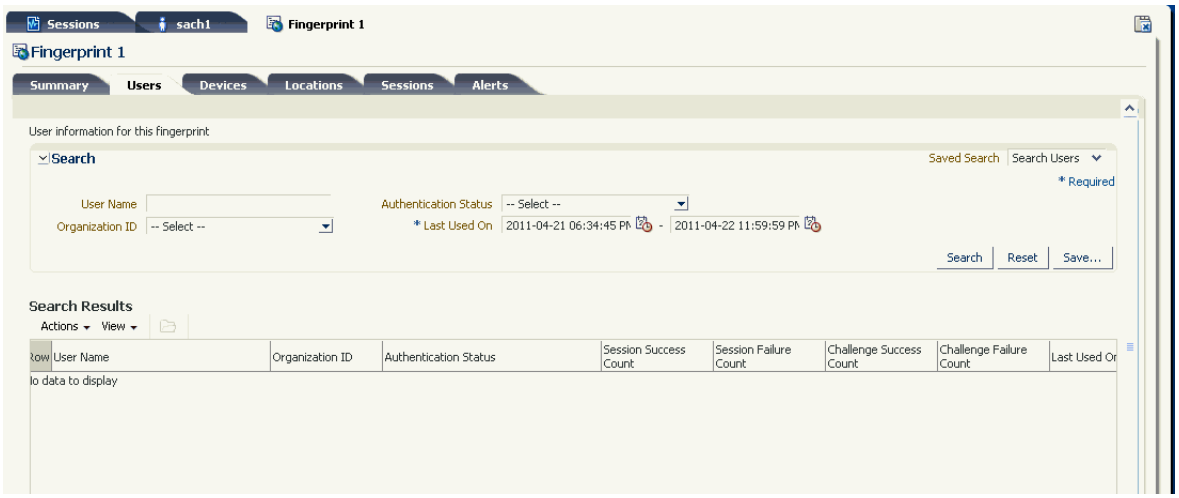
Table 6–48 Fingerprint Details Tab

Fingerprint Details	Description
Fingerprint ID	Unique ID generated for fingerprint by the application
Fingerprint Type	Type of fingerprint, whether the fingerprint is a flash or browser fingerprint.
Created Date	Date on which the fingerprint was created in the system

6.14.2 Fingerprint Details: Users Tab

This tab lists all the users who used the fingerprint during the timeframe specified. The Users tab of the Fingerprint Details page enables you to determine which users and how many times the fingerprint was used for each user during the login process.

Figure 6–34 Fingerprint Details: User



The tab contains the following filter parameters:

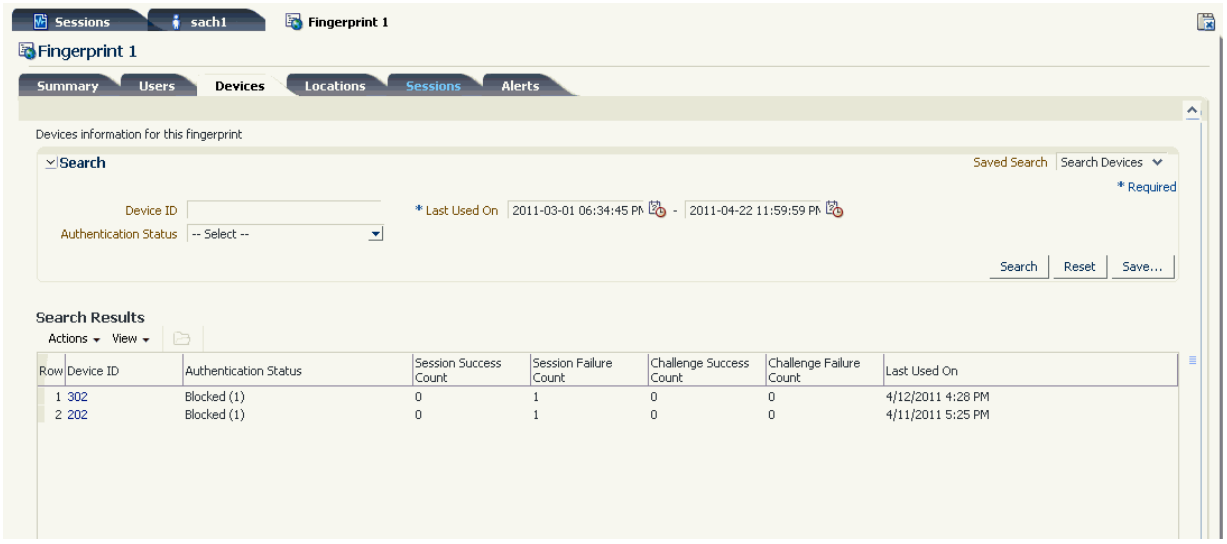
Table 6–49 Fingerprint Details: Users tab

Filter	Description
User Name	Login name given by user to login. (Not for Fingerprint)
Organization ID	Identifies the organization to which the user belongs. (Not for fingerprint)
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the users who used the device to login during the given time duration. (not for fingerprint)

6.14.3 Fingerprint Details: Devices Tab

This tab lists all devices for which the fingerprint was used.

Figure 6–35 Fingerprint Details: Devices



The Device tab of the Fingerprint Details page enables you to determine which devices and how many times the fingerprint was used for each device during login process.

The tab contains the following filter parameters.

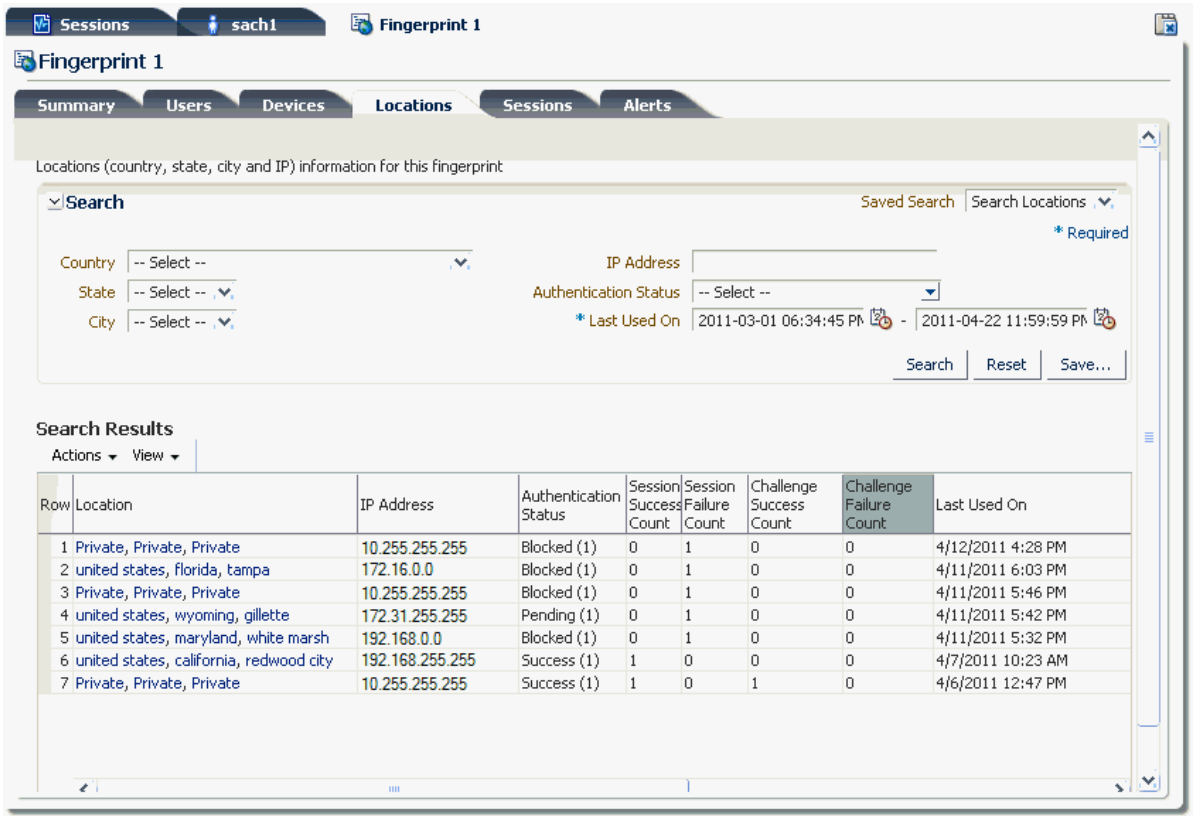
Table 6–50 Fingerprint Details: Devices Tab

Field	Description
Device ID	Uniquely identifies each device and is auto-generated by the application.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the devices which were used by the user to login during the given time duration.

6.14.4 Fingerprint Details: Locations Tab

This tab lists all locations for which the fingerprint was used.

Figure 6–36 Fingerprint Details: Locations



The Locations tab of the Fingerprint Details page enables you to determine which locations and how many times the fingerprint was used for each location during the login process.

The tab contains the following filter parameters.

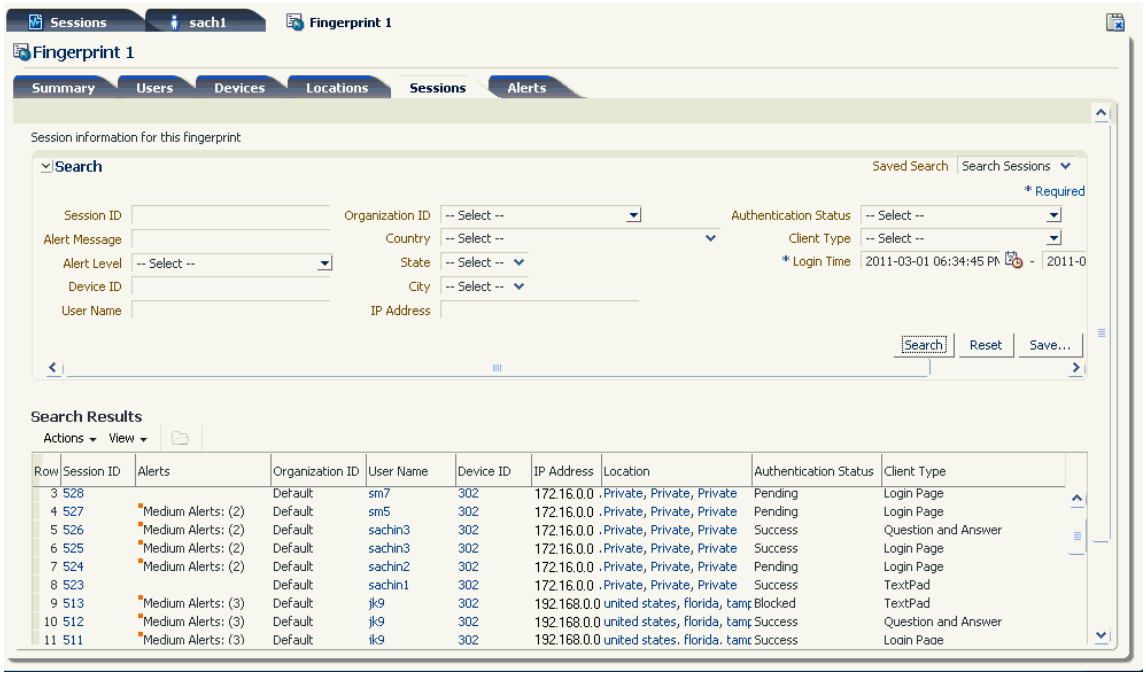
Table 6–51 Fingerprint Details: Locations Tab

Filters	Description
Country	Country ID
State	State ID
City	City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

6.14.5 Fingerprint Details: Sessions Tab

This tab lists of login sessions in which the fingerprint was generated for a particular period.

Figure 6–37 Fingerprint Details: Sessions



The tab contains the following filter parameters.

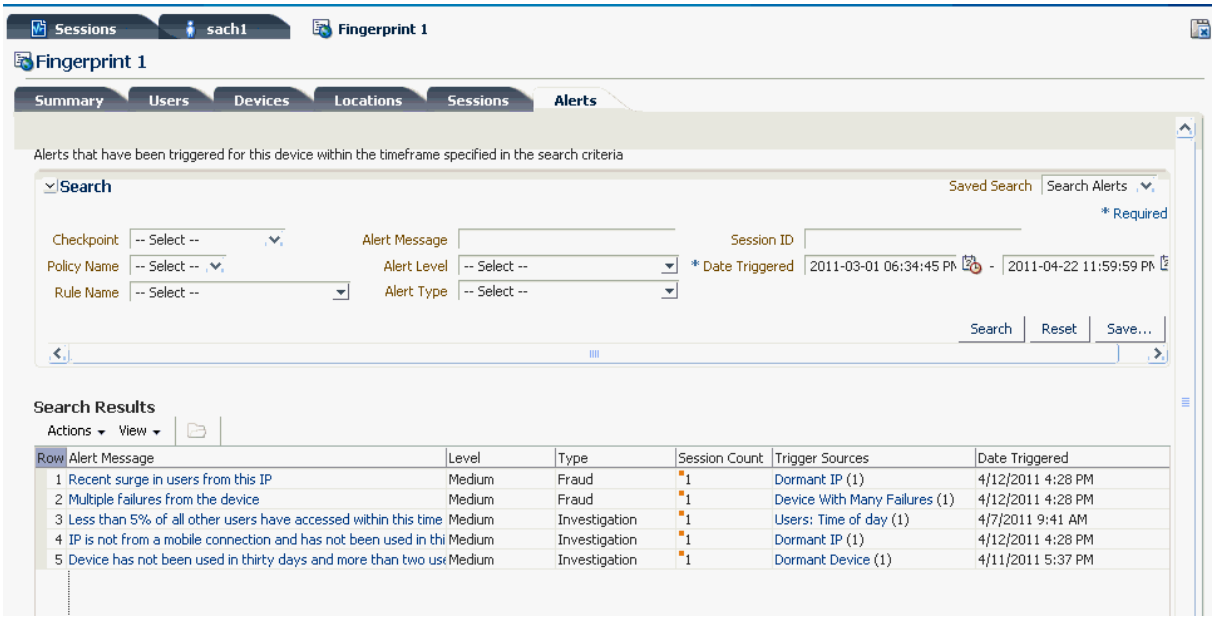
Table 6–52 Fingerprint Details: Sessions tab

Filter	Description
Session ID	ID of the session.
Alert Message	Display name describing the alert
Alert Level	Severity of the alert whether high, medium, low.
Device ID	Unique identifier of each device auto-generated by the application.
User Name	Login name given by user to login.
Organization ID	Identifier for the organization to which the user belongs.
Country	Country ID
City	City ID
State	State ID.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Login Time	Login time of the session. Field used to get all the sessions during which the device logged in for the given time duration.

6.14.6 Fingerprint Details: Alerts Tab

This tab lists alerts that have been triggered for this device within the timeframe specified in the search criteria.

Figure 6–38 Fingerprint Details: Alerts



The tab contains the following filter parameters.

Table 6–53 Fingerprint Details: Alerts Tab

Filter	Description
Checkpoint	Decision and enforcement point when the policies were called to run their rules
Policy Name	Name of the policy. The policy list is dynamically populated in respect to what has been selected for the checkpoint.
Rule Name	Name of the rule that generated the alert.
Alert Message	Display name describing the alert
Alert Level	Severity of the alert whether high, medium, low. Multiple alert levels can be selected.
Alert Type	Type of the alert whether fraud, investigation, information, or other types. Multiple alert types can be selected.
Session ID	Unique identifier for a session
Date Triggered	Date the alert was triggered for this device. Required field.

6.14.7 Fingerprint Details Tasks

This section describes how to obtain information through the use of the Fingerprint Details pages.

6.14.7.1 View digital fingerprint details

To view digital fingerprint details, click the Digital Fingerprint ID link from the session details or listing page.

The Fingerprint Details page opens with additional details.

6.14.7.2 View browser fingerprint details

To view browser fingerprint details, click the Browser Fingerprint ID link from the session details or listing page.

The Fingerprint Details page opens with additional details.

6.14.7.3 Search and view the different users for which the fingerprint was used

To search and view the different users for which the fingerprint was used:

1. Click the Fingerprint ID link in the Session details or listing page.

   The Fingerprint Details page is opened and shows additional details.

2. Click the **Users** tab.

   This tab lists all the users who used the fingerprint during the timeframe specified.

3. Search for the different users for which the fingerprint was used using the following filter parameters:

Table 6–54 Fingerprint Details: Users tab

Filter	Description
User Name	Login name given by user to login. (Not for Fingerprint)
Organization ID	Identifies the organization to which the user belongs. (Not for fingerprint)
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the users who used the device to login during the given time duration. (not for fingerprint)

6.14.7.4 Search and view the different devices for which the fingerprint was used

To search and view the different devices for which the fingerprint was used:

1. Click the Fingerprint ID link in the Session details or listing page.

   The Fingerprint Details page is opened and shows additional details.

2. Click the **Devices** tab.

   This tab lists all devices for which the fingerprint was used.

3. Search for the different devices for which the fingerprint was used using the following filter parameters:

Table 6–55 Fingerprint Details: Users tab

Filter	Description
User Name	Login name given by user to login. (Not for Fingerprint)
Organization ID	Identifies the organization to which the user belongs. (Not for fingerprint)
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the users who used the device to login during the given time duration. (not for fingerprint)

This report enables you to see which devices were used and how many times the fingerprint was used for each device during login process.

6.14.7.5 Search and view the different locations for which the fingerprint was used

To search and view the different locations for which the fingerprint was used:

1. Click the Fingerprint ID link in the Session details or listing page.

The Fingerprint Details page is opened and shows additional details.

2. Click the **Locations** tab.

   This tab lists all locations for which the fingerprint was used.

3. Search for the different locations for which the fingerprint was used using the following filter parameters:

Table 6–56 Fingerprint Details: Locations Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to location
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

This report enables you to see which locations and how many times the fingerprint was used for each location during login process.

6.14.7.6 Search and view all the login sessions or search login sessions for a particular period for the fingerprint

To search and view all the login sessions or search login sessions for a particular period for the fingerprint:

1. Click the Fingerprint ID link in the Session details or listing page.

   The Fingerprint Details page is opened and shows additional details.

2. Click the **Sessions** tab.

   This tab lists of login sessions in which the fingerprint was generated for a particular period.

3. Search and view all the login sessions or search login sessions by the Session Date for the fingerprint.

   Searching by Session Date gets all the sessions during which the device logged in for the given time duration.

6.14.7.7 Navigate to other details pages for users, devices, sessions and locations

You can access other details pages from a details page:

- From the Users tab: click the User Name link to open the User Details page.
- From the Locations tab, click the Location or IP link to open the Location Details page.
- From the Devices tab: click the Device ID link to open the Device Details page.
- Links for User Name, IP address, session, and location are available on the Sessions tab.

6.15 Alert Details Page

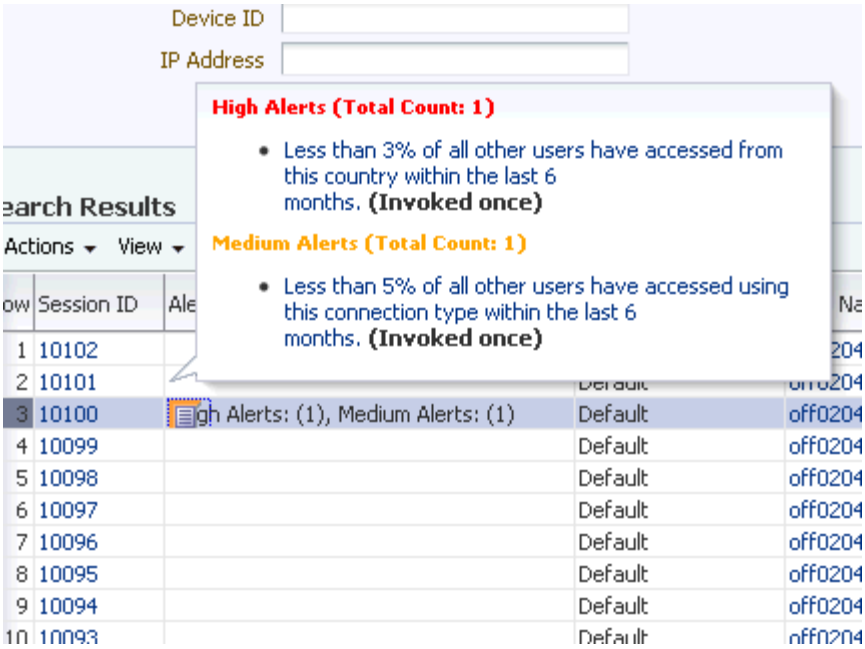
The Alert Details page provides information on the message, level, type of the message and cross references on other data types such as user, device, location, sessions,

browser, operating system, locales, and others. Additionally, information is provided about the generation of the alert.

The Alert Details page allows you to quickly see the relationship between not just the users who have generated the alert but also other data relationships that would be useful like locales that have been used while generating the alert.

You can open the **Alert Details** page from Alert Message links in the Sessions search page, Session Details and other details pages, and Agent cases.

Figure 6–39 Alerts Panel



The Alert Details page presents general information and relationships details in the following tabs:

Table 6–57 Alert Details Tabs

Alert Details Tabs	Description
Summary	General information about the alert and the alert template with the current details (level/type)
Users	List all users for which the alert was generated. This report enables you to see which users and how many times the alert was generated for each user during login process.
Devices	List all devices for which the alert was generated. This report enables you to see which devices and how many times the alert was generated for each device during login process.
Locations	List all locations for which the alert was generated. This report enables you to see which locations and how many times the alert was generated for each location during login process.
Sessions	List of login sessions in which the alert was generated for a particular period.
Fingerprint Data	List of fingerprints created in the login process during which the alert was generated.

6.15.1 Alert Details: Summary Tab

This tab provides general information about the alert and the alert template with the current details (level/type).

Figure 6–40 Alert Details: Summary

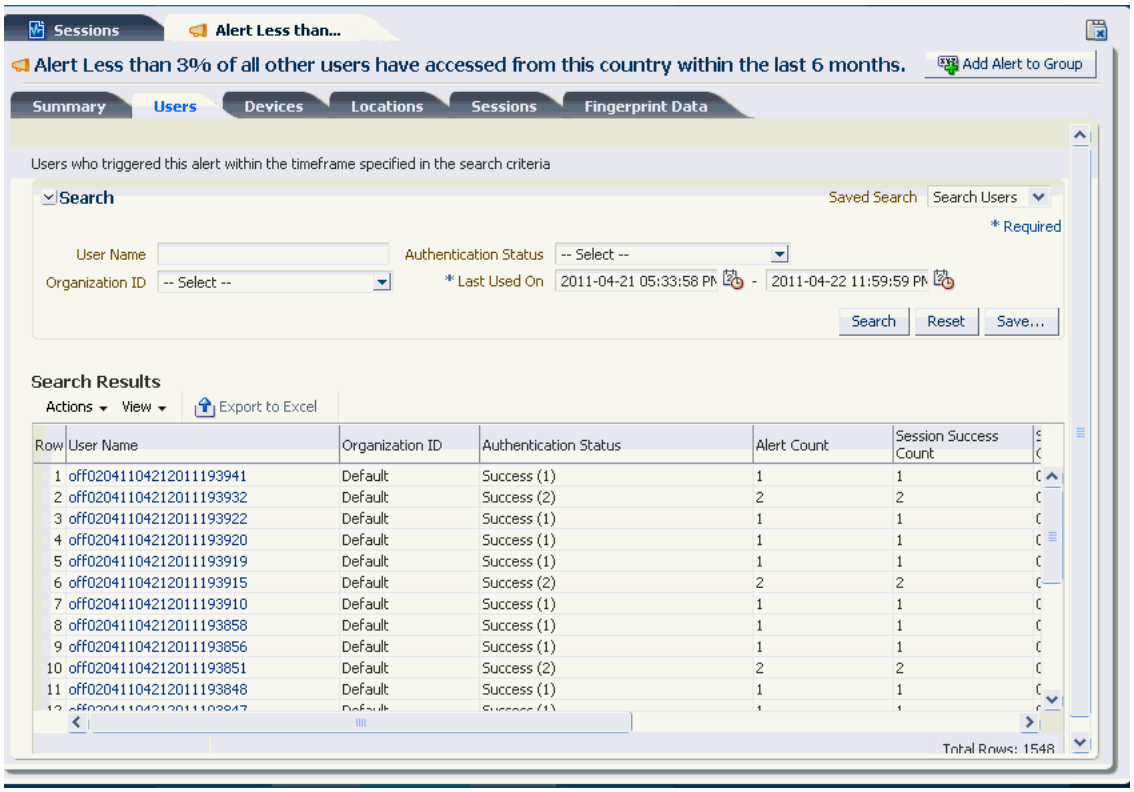
Table 6–58 Alert Details: Summary Tab

Alerts Summary	Description
Alert Message	Text message configured in the alert.
Alert Type	Type of alert template currently, whether it is for fraud, investigation, information, and so on.
Alert Level	Severity of the alert template currently, whether it is high, medium, low.
Alert Group	Group with which the alert template is linked/associated.

6.15.2 Alert Details: Users Tab

This tab lists the users that have a session in which the alert was triggered.

Figure 6–41 Alert Details: Users



The tab contains the following filter parameters.

Table 6–59 Alert Details: Users tab

Filter	Description
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Trigger Date	Date the alert was triggered.

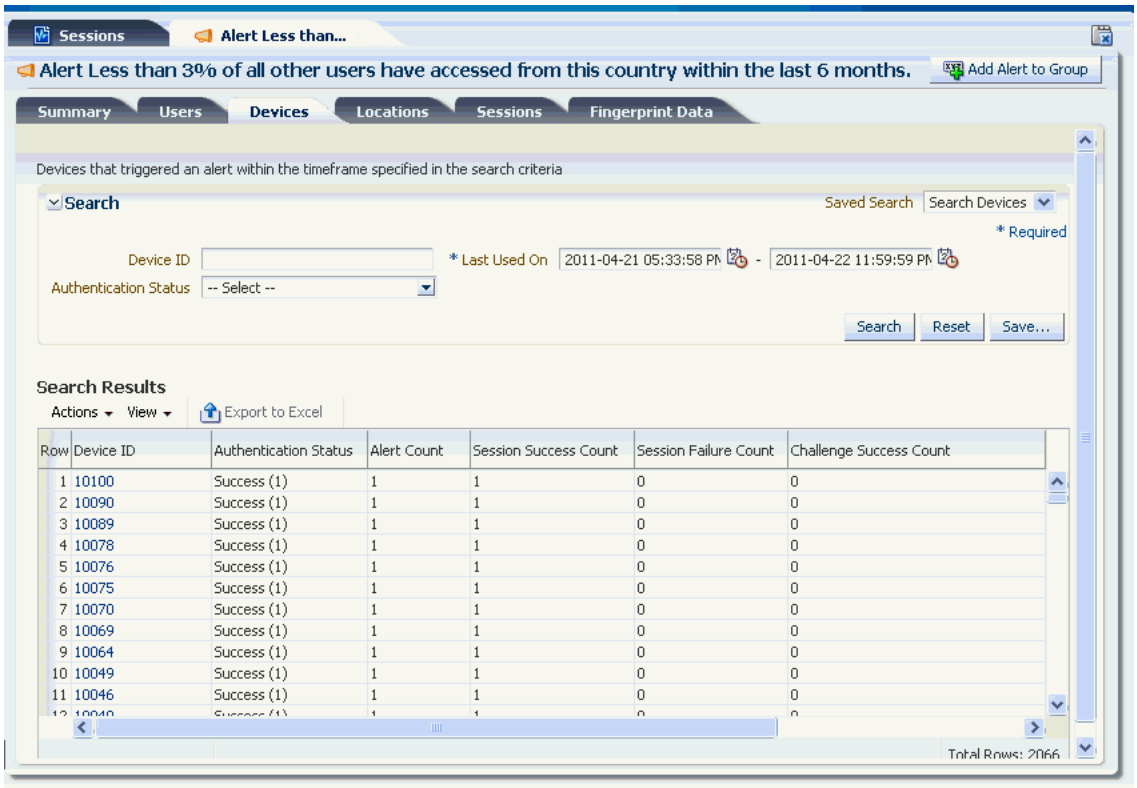
The search results display the User Name, Alert Count, and Last Date Trigger for each user. Each user is listed only one time. The Alert Count displays the number of times, the alert was triggered for the user during a timeframe. By default, the results are sorted by User Name.

You can open the User Details page by clicking the User Name link.

6.15.3 Alert Details: Devices Tab

This tab lists the devices that have been in a session in which the alert was triggered.

Figure 6–42 Alert Details: Devices



The page contains the following filter parameters.

Table 6–60 Alert Details: Device Tab

Field	Description
Device ID	Uniquely identifies each device and is auto-generated by the application.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the devices which were used by the user to login during the given time duration.

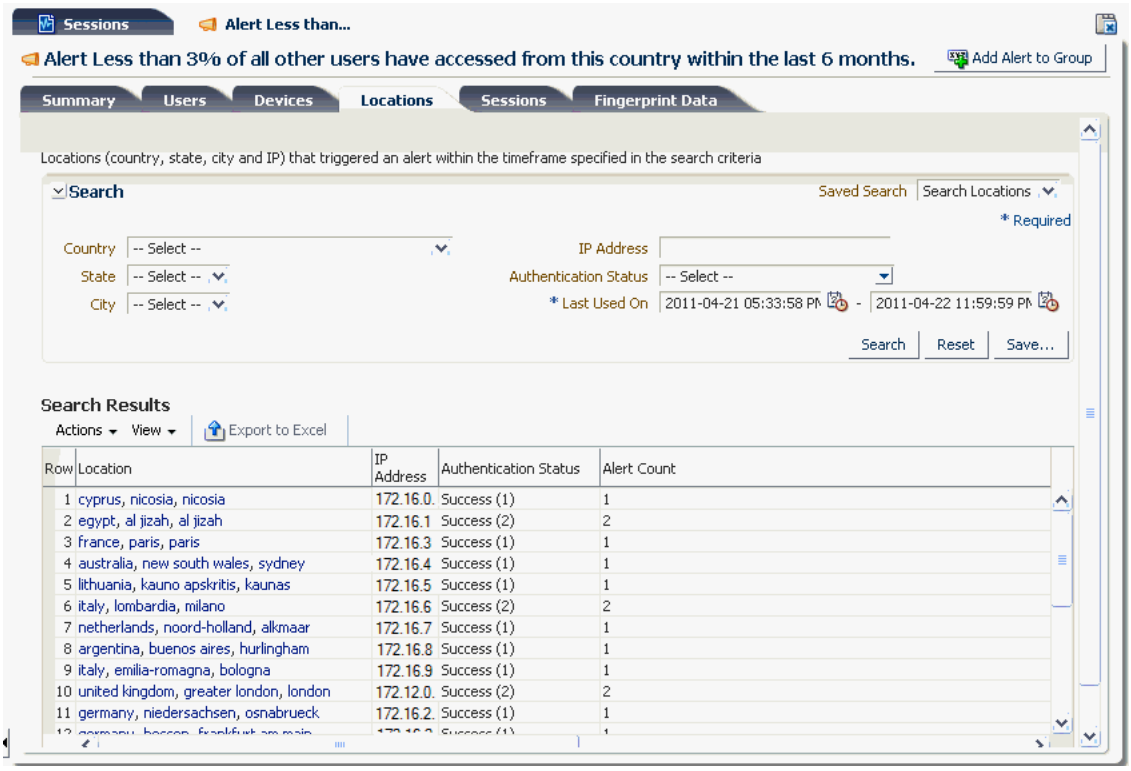
The search results display the Device ID, Alert Count, and Last Date Trigger for each device. By default, the results are sorted by Device ID in ascending order. Each Device ID is listed only one time. Alert Count displays the number of times, the alert was triggered for the device during a timeframe.

You can open the Device Details page by clicking the Device ID link.

6.15.4 Alert Details: Locations Tab

This tab lists the locations (country, state and city) that have been in a session in which the alert was triggered.

Figure 6–43 Alert Details: Locations



The page contains the following filter parameters.

Table 6–61 Location Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

The search results display the location, IP address, authentication status, last trigger date, user name, and alert count for each location. If the alert is generated from the same city but different IP then that city appears as many times as the unique IP. Alert Count displays the number of times, the alert was triggered from the location during a timeframe.

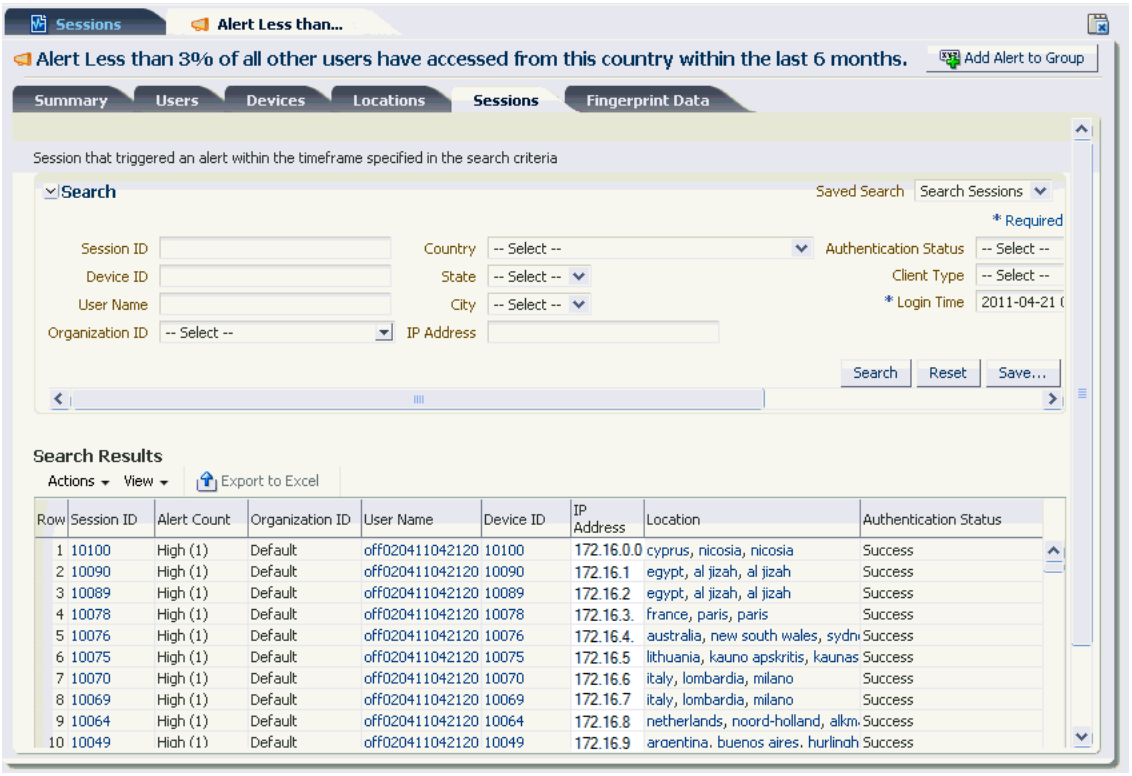
You can open the Location Details page by clicking the Location link.

Clicking the User Name or IP address link opens the corresponding details page.

6.15.5 Alert Details: Sessions Tab

This tab lists sessions in which the alert was triggered.

Figure 6–44 Alert Details: Sessions



The tab contains the following filter parameters.

Table 6–62 Sessions tab

Filter	Description
Session ID	The unique identifier for a session.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Client Type	Virtual Authentication Devices. Device or application used for authentication or fingerprinting. For example: TextPad, KeyPad, Question Pad, login page, flash tracker. auth.client.type.enum is the enum used
Device ID	Uniquely identifies each device and is auto-generated by the application.
User Name	Login name given by user to login.
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Location	Where the login occurred
Trigger Date	Generation date

By default the results are sorted by Session ID, which is unique.

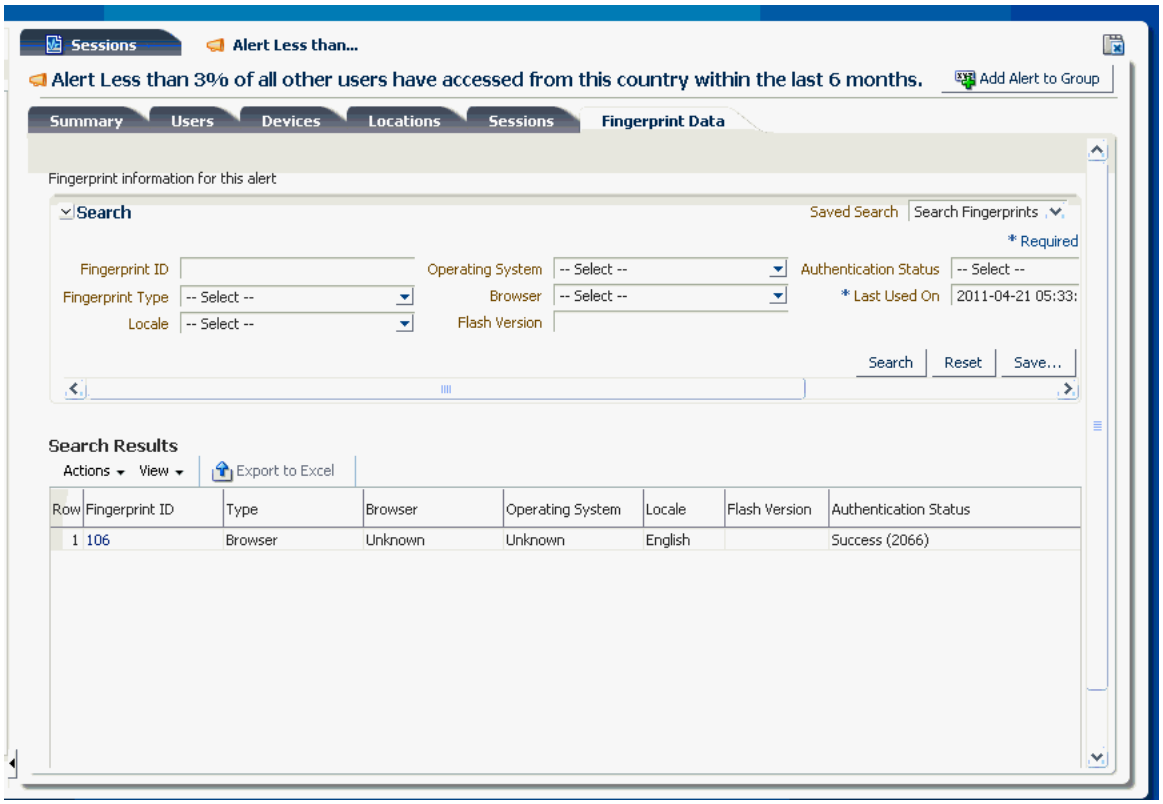
You can view the Session Details page by clicking the Session ID link.

Clicking the Device ID, IP address, user name, or location link opens the corresponding details page.

6.15.6 Alerts Details: Fingerprint Data

This tab displays the fingerprint information used when the alert was triggered during the timeframe specified.

Figure 6–45 Alert Details: Fingerprint Data



The tab contains the following filter parameters.

Table 6–63 User Details: Fingerprint Data Tab

Filters	Description
Fingerprint ID	Unique ID generated for fingerprint by the application
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Browser Type	The type of browser a user is viewing pages with
OS Type	Type of operating system
Locale	A set of parameters that defines the user's language, country and any special variant preferences that the user wants to see in their user interface
Last Date Used	Get all the fingerprints created for the given time duration

6.15.7 Alert Details Tasks

This section describes how to obtain information through the use of the Alert Details page.

6.15.7.1 View general information about the alert

To view general information about the alert, click the alert message links from the session details, other detail pages, or agent pages.

6.15.7.2 View alert groups with which an alert is associated

To view the alert group with which an alert is associated:

1. Open the Sessions search page.
2. Click the yellow box next to the Alert in the Search Results table.
3. Click the alert message link.

   The Alert group is displayed in the Summary tab.

6.15.7.3 Add alert from alert groups

To add an alert from alert groups:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.
2. Click **Add Alert To Group** at the upper right corner.

   The Add Alert to Group dialog is displayed.
3. Search for the group you want to add the alert to by the group name.

   Only those groups that the alert is not a member of are displayed.
4. Select the group to add the alert to and click the **Add** button.

6.15.7.4 Create an alert group and add an alert to it

To create an alert group and add the alert to it:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.
2. Click the **Add Alert to Group** button at the upper right corner.

   The **Add to Alert** dialog is displayed.
3. Click **Create New Group** button and specify the details for the new group.
4. Select the **Open this Group's details tab when done** option.
5. Click the **Add** button.

   The group's details tab is displayed with the alert added.

6.15.7.5 Search and view the different users for which the alert was generated

To search and view the different users for which the alert was generated:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.
2. Click the **Users** tab.

   This tab lists the users that have a session in which the alert was triggered.

3. Search for the different users for which the alert was generated using the following filter parameters:

Table 6–64 Alert Details: Users tab

Filter	Description
User Name	Login name given by user to login.
Organization ID	Identifies the organization to which the user belongs.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Trigger Date	Date the alert was triggered.

6.15.7.6 Search and view the different devices for which the alert was generated

To search and view the different devices for which the alert was generated:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.

2. Click the **Devices** tab.

   This tab lists the devices that have been in a session in which the alert was triggered.

3. Search for the different devices for which the alert was generated using the following filter parameters:

Table 6–65 Device Tab

Field	Description
Device ID	Uniquely identifies each device and is auto-generated by the application.
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the devices which were used by the user to login during the given time duration.

6.15.7.7 Search and view the different locations for which the alert was generated

To search and view the different locations for which the alert was generated:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.

2. Click the **Locations** tab.

   This tab lists the locations (country, state and city) that have been in a session in which the alert was triggered.

3. Search for the different locations for which the alert was generated using the following filter parameters:

Table 6–66 Location Tab

Filters	Description
Location	Country ID, State ID, City ID
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Last Used On	Get all the locations from which the user logged in during the given time duration

6.15.7.8 Search and view all the login sessions or search login sessions for a particular period for the alert

To search and view all the login sessions or search login sessions for a particular period for the alert:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.

2. Click the Sessions tab.

   This tab lists sessions in which the alert was triggered.

3. Search and view all the login sessions or search login sessions for a particular period for the alert using Trigger Date.

6.15.7.9 Search and view the fingerprints created

To search and view the fingerprints created:

1. Click the alert message links from the session details, other detail pages, or agent pages.

   The Alert Details page is displayed.

2. Click the **Fingerprint Data** tab.

   This tab displays the fingerprint information used when the alert was triggered during the timeframe specified.

3. Search and view the fingerprints created by using the following filters:

Table 6–67 User Details: Fingerprint Data Tab

Filters	Description
Fingerprint ID	Unique ID generated for fingerprint by the application
Authentication Status	Status of the session (each login/transaction attempt creates a new session). For information, refer to **Authentication Status**.
Browser Type	The type of browser a user is viewing pages with
OS Type	Type of operating system
Locale	A set of parameters that defines the user's language, country and any special variant preferences that the user wants to see in their user interface
Last Date Used	Get all the fingerprints created for the given time duration

6.15.7.10 Navigate to other details pages for groups, users, devices, locations, sessions and fingerprints

You can open details pages from other details pages:

- From the Users tab: click the User Name link to open the User Details page.
- From the Groups tab: click the Group Name link to open the Group Details page.
- From the Locations tab, click the Location link to open the Location Details page.
- From the Devices tab: click the Device ID link to open the Device Details page.
- From the Fingerprint tab: click the Fingerprint ID to open the corresponding Fingerprint Details page.
- Links for User Name, IP address, session, and location are available on the Sessions tab.

6.16 Uses Cases

This section describes example use cases for the Session Details page.

6.16.1 Use Case: Search Sessions

You are a member of the security team at Acme Corp. You work with Oracle Adaptive Access Manager on a regular basis, following up on escalated customer issues and security alerts. You perform a session search every couple hours throughout the day to identify any issues needing your attention and it is time to perform the next search. Directions: Search for sessions in the last 24 hours that have triggered high severity alerts and where access was blocked or locked.

To search sessions:

1. Log in to the OAAM Administration Console as an Investigator.
2. Click **Sessions**.

   The **Sessions Search** page is displayed.
3. Search through sessions in the last 24 hours with high alerts and a blocked or locked authentication status
   a. For **Authentication Status**, select **Blocked** and **Locked**.
   b. For **Login Time**, select the date and time, **24 hours ago**, and the current date and time.
   c. For **Alert Level**, select **High**.
   d. Click **Search**.

6.16.2 Use Case: Session Details Page

You see a session with a **Blocked** authentication status. This may be a case of stolen authentication credentials so you want to look into it. You open the details page for this session to take a closer look at exactly what went on in this session. You see that the login had triggered a block. Phillip, the user, was dynamically added to a high risk users group because of this rule. Directions: Part A: Drill in on the policy that caused the block to see what rules triggered. Part B: You also want to see if this user has any CSR cases related to this lockout. Search the CSR cases and determine if Phillip called in for a temporary allow.

To view session details:

1. In the **Sessions Search** page, view the **Search Results** table.

   You noticed that for Phillip, one of his sessions shows:

   - a "High alert" in the **Alerts** column. Clicking the information icon, you see a velocity alert.
   - a "Blocked" status in the **Authentication Status** column.

2. Click the **Session ID** in the **Search Results** table to open the **Session Details** page.

   In **Session Details** panel, the **Authentication Status** shows **Blocked**.

3. View the final outcomes of each checkpoint.

   a. Expand the checkpoints.

   b. View the Post-Authentication checkpoints.

   c. Expand the Post-Authentication policies.

   d. Click the policy of interest to show details about the policy.

   e. View the rules that are triggered.

   f. View the final outcomes of the rules.

      There are two final outcomes: the user is blocked and been added to a high risk group.

4. Because you want to see if Phillip has any CSR cases related to this lockout, search the CSR cases and determine if he called in to have his challenge questions reset.

   a. In the **Cases Search** page, select CSR as the Case Type.

   b. Enter Phillip's user name into **User Name** field.

   c. In **Search Results** table, look for **Temporary Allow** in the **Last Action Type** column.

   d. Click the **Case ID** for the case that has **Temporary Allow** in the **Last Action Type** column.

   e. In the **Log** subtab of the **Case Details** page, view notes.

      The notes said he was traveling overseas when his wife asked him to look at their account online.

6.16.3 Use Case: Checking for Fraudulent Devices and Adding Them to a Group

Before You Begin

Login with user who has an Investigator or Investigation Manager role.

Checking for Fraudulent Devices and Adding Them to a Group

1. Search by action and alert to see recent blocked sessions.

   For example, search for sessions that have been blocked in the last two hours.

   You should see blocked sessions and the user who was blocked because of a device.

   For example, you see a user jsmith who was blocked because he was logging in using device 123 that had been blocked more than three times in the last 24 hours.

2. View user details and check the Device tab to view the different devices the user used.

For example, you compare the blocked device with other devices jsmith has used in the past. You open the user details for jsmith and view devices for the last six months. Only three devices are shown (123, 511 and 333).

3. Compare the blocked device with other devices used using fingerprint details to see the OS, Browser, and Locale to get a general idea about the device.
4. Check to see if the blocked device looks different than the successful ones.

   For example, you open the fingerprint details for the blocked device 123 and for device 333 that had been used recently by jsmith successfully and it showed a high number of successful uses. From the user interface, you can see that the blocked device 123 was a Linux machine with Opera running in Russian locale among other fingerprint data points.

   The device 333 is a Windows XP machine with IE running in English locale which seems to be the one the user has used most of the time recently.

   You open the fingerprint details for device 511 also and check the fingerprint data. You see it also is Windows XP machine with IE running in English locale but jsmith has not used it in a while. This makes you think device 123 was used by someone impersonating jsmith.
5. Search sessions by Device ID to check to see whether the device has a lot of blocked sessions and if there are a lot of different users.

   For example, you search for all the sessions device 123 has been involved in to see what other users may have been victims. There were ten sessions all in the last two weeks and many of them were blocked. As well each session was for a different user.
6. Add the device to the blacklist group from the Sessions search tab.
7. Export the blocked session to Excel to use as reference to contact the real users who need to reset their password.

   You export table results to Excel. The Excel sheet should contain all the session details.

6.16.4 Use Case: Exporting the Sessions from the Last One Week

You can export sessions to use as reference or further study and investigation.

To export sessions:

1. Log in to the OAAM Administration Console.
2. In the Sessions search page, specify one week using the date editor and click **Search**.
3. Select the sessions from the Search Results table.
4. From **Actions** menu, select **Export to Excel**.
5. Click **Save File** or **Open** with and click **OK**.

   File shows Row, Session ID, Alerts, Organization ID, User name, Device ID, IP Address, Location, Authentication Status, Login Time, Pre-Authentication Score, Pre-Authentication Action, Post-Authentication Score, Post-Authentication Action, Client Type, User ID, and Internal Session ID.

6.16.5 Use Case: User Details, Fingerprint Details

Tom, a fraud investigator, opens the OAAM Administration Console and searches for sessions that contain high-level alerts in the last 24 hours. This search returns a number of sessions. He orders the results by the User Name column and notices "jsmith" had several sessions with the "device with implausible velocity alert". Because "jsmith" has completed registration, every session was challenged.

1. Tom opens the user details for jsmith by clicking the link in the Session page. He searches for IP addresses jsmith has used in the last six months. A large list of IP addresses is returned. It appears the jsmith has been logging in from a random location every login session.
2. Tom finds only two devices used by jsmith in the last six months in device page for jsmith.
3. Tom searches for all of jsmith's sessions in the last three months. He finds almost every session has the same device velocity alert. Tom then filters all the sessions to see how many KBA locks occurred. He finds only one.
4. Tom navigates to fingerprint details and finds that jsmith has logged in from the same browser and the same OS every time and has used the same locale also. Tom determines jsmith must be a typical user whose IP is being changed in some way. He adds jsmith to the group of "traveling users" and excludes this group from the rule that is triggering for him.

6.16.6 Use Case: Device and Location Details

Tom opens the OAAM Administration Console and searches for sessions that contain high-level alerts in the last 6 hours. This search returns 5 sessions.

1. Tom orders the results by the user name and notices none of them are from the same user.
2. Tom then orders on IP and sees there are different IP addresses used in each session.
3. He then orders by the device column and sees there is one device with 2 sessions and the other devices have one session each.
4. Tom opens the device details for the device with 2 sessions. He views sessions from that device in the last month. He sees there were five sessions from this device in the last 24 hours each for a different user. The most recent session was blocked.
5. Tom opens the blocked session details to see why it was blocked. He can see that the device with maximum users in a short timeframe rule triggered.
6. Tom drills in on the policy containing this rule and sees the policy and rules. The rule blocks when a device has had more than four users and from more than three cities in a 12-hour period. He goes back to the device details screen and sees that the locale is Finnish, which seems strange.
7. Tom opens another session screen and searches for sessions in the last three months using the Finnish locale. There are 23 sessions, all in the last week.
8. Ordering by location, it seems the sessions were all from unique places within Washington State. Ordering by devices however he can see there were ten devices used. Finally, ordering by user name Tom could see every session was for a different user. Feeling that this was not ordinary activity Tom puts together a call list of the affected users to verify if any of the activity was valid or not.

9. After calling 5 users Tom sees that none of them were in the locations these sessions seemed to come from. He decides to add the Finnish locale to a watch group that causes users in that locale to be challenged with an OTP via SMS every login. He also calls the rest of the users to confirm these sessions did not belong to them.
10. Once sure, he also selects all the devices used and adds them to a black list group.

6.16.7 Use Case: IP Details and Adding to Group

George is a Big Bank user. An impersonator of George gets blocked because he was logging in from a blocked IP.

1. The investigator, Tom, wants to compare the IP with other IP addresses George has used in the past. He opens the fingerprint details for the blocked IP and for another IP George has used many times successfully.
2. From the user interface Tom can see that the blocked IP was a Firefox browser running in Chinese locale. The IP George seems to use most of the time is a Windows XP machine with IE running at an private locale. As a result Tom adds the IP to Restricted IP addresses group directly from the Sessions IP screen.

6.16.8 Use Case: Viewing the Sessions from a Range of IP Addresses

To view sessions from a range of IP addresses:

1. Log in to the OAAM Administration Console.
2. Click the **Sessions** tab.
3. Enter the IP range in the IP range fields and click **Search**.

   Sessions in the IP range are displayed in the Search Results table.

6.16.9 Use Case: Checking If a User Failed to Login From a Particular Device or IP

To search and view the different devices that logged in from the location get additional information like the number of times a device logged in from the location and the successful and unsuccessful login attempts from the location by each device:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.
2. Click the **Devices** tab.
   - To see additional information such as the number of times a device was used to log in from the location, search by Device ID. The Login Successes column displays the number of times a device was used to log in.
   - To see the number of successful and unsuccessful login attempts from the location by each device, select Blocked and Success as the Authentication Status.

     Login failures and successes are displayed for each device.

6.16.10 Use Case: Checking If Users Logging In from This IP Used Spanish Browsers

To search and view the fingerprints created for the location:

1. From the results of a session search, click the country, state, city, or IP link.

   The Location Details page for that country, state, city, or IP is displayed.

2. Click the **Fingerprint Data** tab.
3. In the Search Results table, check to see if Spanish is listed as the Locale for the Fingerprint.

6.16.11 Use Case: Adding Devices Used for Fraud from a Location To a Risky Group

An investigator is viewing a table of devices used from a location and decides two of them were used for fraud. He can select them and add them to a "high risk devices" group to be used in future risk evaluations. He should not lose the context of what he was doing in the process.

1. Open the OAAM Administration Console.
2. Search for sessions.
3. Open location details page.
4. Search for devices used from this location.
5. Select two devices and add them to a high risk group.

6.16.12 Use Case: Adding Suspicious Device to High Risk Device Group

George is a user who gets blocked because he was logging in using a device that had been blocked more than three times in the last 24 hours. Jeff, an investigator wants to compare the blocked device with other devices this user has used in the past. He opens the fingerprint details for the blocked device and for another device the user has used many times successfully. From the user interface Jeff can see that the blocked device was a Linux machine with Opera running in Russian locale. The device the user seems to use most of the time is a Windows XP machine with IE running in English locale. As a result Jeff adds the blocked device to a high risk devices group, and adds the IP addresses used by the device to a high risk IP addresses group directly from the search screen.

1. Open the OAAM Administration Console.
2. Search for sessions.
3. Open 2 device details pages.
4. View the full list of fingerprint data for both devices.
5. Select device and add it to a high risk group.
6. Select IP and add it to a high risk group.

6.16.13 Use Case: Mark Devices and IP Addresses as High Risk

An investigator is searching for sessions with high alerts in the last hour. Out of the 30 sessions he thinks two were fraud so he wants to mark the devices and IP addresses used as high risk.

1. Open the OAAM Administration Console.
2. Search for sessions with high alerts in the last hour.
3. Select the two sessions and click the add to group button.

   A dialog appears asking what data types from these sessions to add.
4. Select devices and IP addresses.

Message appears which asks the user to select a device group and an IP address group.

5. Select and add the high risk devices and high risk IP addresses.

   A confirmation appears with message that the devices were added and that one IP was added and the other was already in the high risk IP address group.

6.16.14 Use Case: Search for Suspicious Sessions and Add Devices to High Risk Group

Before You Begin

Login with user who has a Fraud Investigator or Fraud Investigation Manager role.

Search for Suspicious Sessions and Add Devices to High Risk Group

Garry is an investigator searching sessions looking for suspicious situations not found by the currently configured rules. He filters for all sessions in the last month with block actions from Mexico because of a recent incident. He selects all other sessions and in a single operation adds all the devices to a high risk device group.

1. Open the OAAM Administration Console.
2. Search sessions.
3. Add to group from search page.

6.16.15 Use Case: Search Sessions by Alert Message

An investigator is searching for sessions with high alerts with a message containing "speed". The search returns 20 sessions containing high alerts with the following messages: "Excessive speed navigation" and "User air speed."

1. Open the OAAM Administration Console.
2. Search for sessions with high level alerts and messages containing "speed."

6.16.16 Use Case: Search Sessions by Geography

An investigator is searching for sessions with an ID number that starts with 40 from Los Angeles, CA, USA in the last two hours.

1. Open the OAAM Administration Console.
2. Search for sessions with an ID number starting with 40 from Los Angeles in the last two hours.

6.16.17 Use Case: Search by Comma Separated Values

Jeff wants to see what activity has occurred recently from a list of high risk IP addresses he pulled from a portal. To gauge the value of the IP data he decides to view the activity from those IP addresses in the last six weeks and determine if any of the activity was suspicious. Jeff starts by searching sessions that have used this comma separated list of IP addresses and viewing the sessions that come back.

1. Open the OAAM Administration Console.
2. Search for sessions by pasting a comma separated list of IP addresses into the search field and filtering to the last two weeks.

   Only sessions from the IP addresses in the list are shown.

6.16.18 Use Case: Export Search Sessions Results to Excel

An investigator is searching for sessions in the last two hours. He selects five rows and exports them to Excel format document that contains all columns.

1. Open OAAM Administration Console.
2. Search for sessions.
3. Select five sessions.
4. Export them to Excel.

6.16.19 Use Case: Export Search Sessions Results - Export Page to Excel

An investigator is searching for sessions in the last 2 hours. He selects the column heading to select all rows and exports them to Excel format document that contains all columns.

1. Open the OAAM Administration Console.
2. Search for sessions.
3. Click the heading to select all sessions on that page.
4. Export the rows to Excel document.

Part III

Managing KBA and OTP

This part of the book provides information on managing Knowledge-Base Authentication (KBA) and One-time Password (OTP).

The chapters are as follows:

7

Managing Knowledge-Based Authentication

This chapter introduces you to the concepts behind knowledge-based authentication (KBA), and provides information about managing tasks that impact challenge questions, validations and levels of logic algorithms used for answers, question categories, and levels of logic algorithms used for registration.

Sections in this chapter are:

7.1 Introduction and Concepts

This section describes knowledge based authentication (KBA) key concepts.

7.1.1 Knowledge Based Authentication

Oracle Adaptive Access Manager provides out-of-the-box secondary authentication in the form of knowledge based authentication (KBA). KBA is a secondary authentication method, an extension to the existing authentication method. It is presented after successful primary authentication (for example, a user entering a single factor credentials, such as a user name and password) to improve authentication strength.

KBA provides an infrastructure for

- Users to select questions and provide answers which are used to challenge them later on

  KBA is used to authenticate an individual based on the user's answers substantiated by a real-time interactive question and answer process.

- Levels of logic algorithm for registration

  Registration Logic manages the registration of challenge questions and answers.

- Levels of logic algorithm for answers

  Answer Logic is made up of advanced matching algorithms (fuzzy logic) used by the system to intelligently detect the correct answers in the challenge response process. The algorithms and the level of Answer Logic are factors in evaluating answers.

- Validations

  Validations are used to validate the answers given by a user at the time of registration.

KBA is used during online authentication of the user, which is automated, or a CSR challenge where the CSR interacts with the user to authenticate him before providing CSR services.

7.1.2 Challenge Response Process

The KBA solution consists of securing an application using a challenge/response process where users are challenged with one or more questions to proceed with their requested sign-on, transaction, service, and so on.

7.1.3 Challenge Response Configuration

The challenge/response process is controlled by a combination of properties and rules.

- Question presented at random or round robin

  Presentation logic (random versus round robin) is configurable through properties. If the deployment supports Oracle Identity Manager integration, the presentation is round robin. The user is expected to answer all the registered questions online.

- The number of attempts a user is allowed for each question is set by a property.
- The total number of KBA challenge failures a user is allowed before he is locked out by Oracle Adaptive Access Manager is configured in the rule condition, `User: Challenge Channel Failure`.

7.1.4 Registration

During registration, which could be enrollment, opening a new account, or another events such as a reset, the user is asked to select questions and provide answers. The order of questions that are presented to a user during the registration phase is random using configurable parameters.

Later on, the challenge questions selected at registration or during a reset may be used for challenge during high risk log ins, to access transactions, or sensitive information, or both, and so on. Oracle Adaptive Access Manager's Rules Engine and business rules are responsible for determining if it is appropriate to use challenge questions to authenticate the user.

7.1.5 Challenge Questions

The customer can configure a set of questions that are used to authenticate users. The Questions are grouped into several categories and the user can select questions from

these categories. The out-of-the-box categories that questions can be grouped into are listed. The customer can configure questions from these categories.

- Childhood
- Sports
- Your Birth
- Parents, Grandparents, Siblings
- Automobile
- Education
- Children
- Your Employment
- Significant Other
- Pets
- Miscellaneous

During registration, users are presented with several question menus. For example, he may be presented with three question menus. A user must select one question from each menu and enter answers for them during registration. Only one question from each question menu can be registered. These questions become the user's "registered questions."

When rules in OAAM Admin trigger challenge questions, the application displays the challenge questions and accepts the answers in a secure way for users. The questions can be presented in the **QuestionPad**, **TextPad**, and other pads, where the challenge question is embedded into the image of the authenticator, or simple HTML. These are configured through properties.

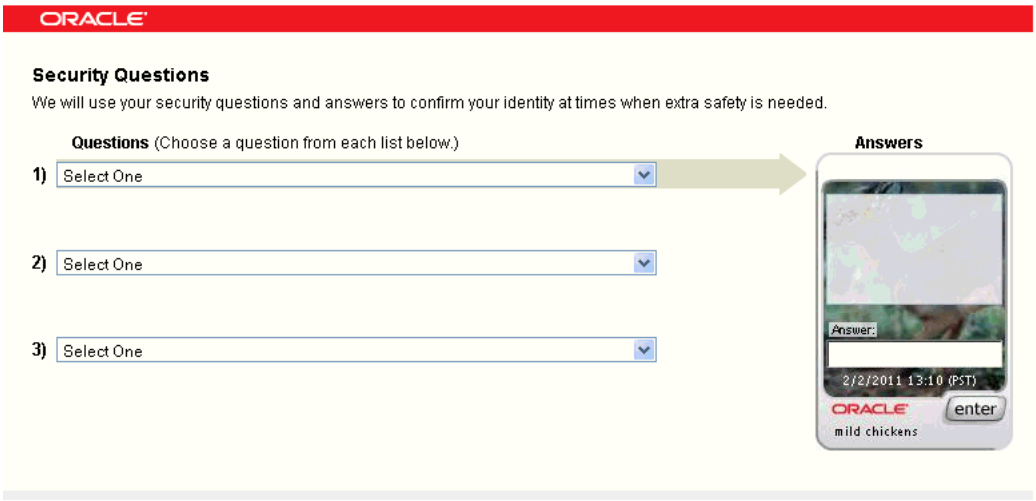
7.1.6 Question Set

KBA offers a large pool of questions, which is the framework for obtaining answers from the user during registration or reset. The Question Set is a fixed set of questions that is allotted to the user. This set is allotted at random and once for the user unless it is reset. It is generated based on the settings configured in the Registration Logic. This Question Set prevents any single user from having access to all the challenge questions. This is to prevent a fraudster from harvesting questions for use in a phishing exercise. A user can receive a new Question Set if a customer service representative resets it for the user.

7.1.7 Registration Logic

Registration Logic manages the registration of challenge questions and answers. During KBA registration each user is presented with a Question Set, a subset of the challenge questions library. The Question Set is generally broken up into several drop-downs that have questions to select from. The drop-down with questions is called a "menu."

Figure 7–1 Drop-Downs (Menus)



The number of questions that appear on each menu, the number of categories per menu, and the number of questions that a user must register is configurable. Out-of-the-box, questions are grouped into categories. The challenge questions in the questions menus do not change unless the question set is changed. The user is required to select one question from each menu and enter answers for them. Only one question from each question menu can be registered.

Validations are applied to the answers provided by the user during registration. For example, if the question, "What year did you start junior high school," is assigned the Month-Day-Year (MMDDYY) validation, a user registering for this question is not allowed to provide "April 1st 1920" for the answer.

To configure the Registration Logic, you specify the settings for:

- The question set generation
  - The number of questions to be registered
  - The number of questions per menu
  - The number of categories per menu

  The Question Set is generated based on the Registration Logic.
- The validations that are applied to the answers

For information on setting Registration Logic, see Section 7.8, "Configuring the Registration Logic."

How do the KBA Registration Logic Settings Affect a Customer's Question Set?

Example configurations are presented in the following table.

Example	Question/Menu	Categories/Menu	Questions/Category in a Menu
1	7	4	2+2+2+1
2	10	4	3+3+2+2
3	10	1	10

Example #1, shown on line 1, results in registration menus containing 2 questions from category A, and 2 questions from category B, and 2 questions from category C, and 1

question from category D. This continues in a round robin fashion as needed. If there are any categories with an insufficient number of questions or an insufficient number of categories duplicate questions can result. This scenario does not occur with the out of the box database of questions and default settings. It only occurs if you significantly reduce the questions or categories.

The following is an example of a configuration to avoid:

- Number of questions user registers: 3

  The number of questions that a user must register. The new user registration should display the same number of question menus as the number of questions that a user must register.

- Number of questions per menu: 5

  The number of questions that appear on each menu. The new user registration should display the same number of questions in each menu as the number of categories for each menu. The total number of questions from all the menus (number of questions multiplied by the questions in each menu) cannot exceed the total number of questions available in the database.

- Number of categories per menu: 5

  The number of categories per menu. The new user registration should display the same number of categories for each menu as the number of questions in each menu.

The Question Set is the fixed set of questions that is allotted to the user. This set is allotted at random and once for the user. This is to avoid the user from discovering all the questions. In the example, fifteen or more categories are required, each with at least one question enabled. But if there are fewer than 15 categories and one of these categories has only one question enabled, some Question Sets have that question twice. The algorithm tries to use as many available categories as possible.

For example to generate a Question Set with:

- 3 menus
- 5 questions per menu
- 5 categories per menu

The algorithm tries to pick one question each from 15 categories if 15 categories are available. The minimum number of questions per category should be equal to the number of questions in the Question Set divided by the total number of categories.

Pre-requisite for Configuring Registration Logic for Locales

The deployment administrator must ensure that there are enough questions in the database for each of the supported locale as configured in OAAM Admin during deployment; otherwise, the application displays only the English language questions during registration.

The number of locale-specific questions must be equal to or greater than the "Questions User Will Register" multiplied by the "Questions per Menu" multiplied by the "Categories per Menu."

7.1.8 Answer Logic

Answer Logic checks to see if the answer provided by the user matches closely to the ones provided during registration.

Answer Logic is made up of advanced matching algorithms used by the system to intelligently detect the correct answers in the challenge response process. The algorithms and the levels of logic are factors in evaluating answers.

Errors can be caused by simple input errors such as fat fingering, extra characters, misspellings, and so on. Common misspellings and abbreviations for example can be accepted if the basic information of the answer is correct.

The following algorithms are available and can be configured for your requirements:

- Phonetics
- Missing character(s)
- Extra character(s)
- Common misspellings
- Common abbreviations
- Common acronyms
- Keyboard fat fingering
- Common nicknames
- Regional spelling differences
- Date Format

The Answer Logic algorithms can be enabled or disabled and the intensity or strength of some algorithms (the level of Answer Logic used to evaluate answers given for challenge questions) can also be configured. For example, high risk transactions such as wire transfers may require a high degree of certainty (i.e. exact match) whereas accessing personal, non-sensitive information may require a lower degree of response certainty.

Answer Logic algorithms are available for both the online challenge and CSR phone challenge processes. Online settings are applied for answers the user provided online using the application. Phone challenge settings are applied for answers provided by users over the phone and entered by the CSR. The online challenge and CSR phone challenge Answer Logic are completely independent of each other. They can be configured separately.

For example, you can set the online challenge logic strength to high and the CSR phone challenge logic strength to low. For the CSR phone challenge logic strength, you may have provided more margin for error, because CSRs are listening to the answers over the phone and entering the answers.

7.1.9 Validations

Validations are used to validate the answers given by a user at the time of registration. Validations can be at the local level, to associated with each individual question, or at the global level, to be applied to all the questions presented to the user.

There are no automated validations to ensure that question specific validations and global validations do not conflict. Administrators must take care not to configure the same validations for local and global. For example, validation for a question should not be set to numeric only if the alpha only is set as a global validation.

Question Registration Validation (Local)

Each question can be assigned unique validations to control the answers a user is allowed to register. For example, if the business team wants to force users to answer a particular question using a specific date format.

The scope of validations applied to an individual question is local. Local validations are specified during the creation of a question.

Global Registration Validation (Global)

Global validations control the answers a user is allowed to register for all questions. Global validations influence all answer registration. For example, if the "Four-digit year (YYYY)" validation is applied globally then only numeral answers are accepted during KBA registration. This would be a problem if there are questions available to users that would normally have alphanumeric answers.

Global validations are specified during the configuration of Registration Logic.

Global-Local Validation

The scope of validations can be applied to individual questions or a combination of questions.

7.1.10 Failure Counters

Failure counters are used to lock out fraudsters so that they are unable to obtain the answers/questions.

KBA uses two failure counters. They are:

- the Online Counter
- the Phone Counter

The maximum number for online challenges and phone challenges are configurable. The phone counter maximum is "per question."

For the following example, assume:

- Max online = 3
- Max phone (per question) = 3

If the user is answering challenge questions online, and if the user is given three attempts to provide a correct answer, a total of three attempts is allowed. Each failure increments the Online Counter. The user is locked out of the session after three attempts. The online only challenge is designed to limit the exposure of questions to fraudsters.

If the user is answering challenge questions over the phone, and if the user is given three attempts at answering each question, a total of nine attempts is allowed. Each failure increments the Phone Counter. The user is locked out of the session after nine attempts.

For the next challenge, the next question is displayed. A success for an online or a phone challenge automatically resets all counters to zero.

7.1.11 KBA Resets

Authenticator uses questions as additional credentials to help prevent fraud. A customer service representative (CSR) can reset these questions for the user when necessary. The CSR can reset KBA-related items for a user, as described.

7.1.11.1 Reset Challenge Questions

The CSR resets a user's challenge questions. The system deletes the existing questions and answers and generates a new question set for the user to register from. Registration of challenge questions is required at the next log in to the website.

The Reset Action resets all challenge failure counters:

- Reset KBA: Re-register KBA; KBA and OTP counters are reset to zero
- CSR KBA reset: Re-register KBA; KBA and OTP counters are reset to zero
- Reset OTP: Re-register OTP; KBA and OTP counters are reset to zero

7.1.11.2 Reset Challenge Questions and the Set of Questions to Choose From

The CSR resets the user's challenge question set (challenge questions and the set of questions to register from). Registration of challenge questions is required at the next log in to the website.

The Reset Action resets all challenge failure counters:

- Reset KBA: Re-register KBA; KBA and OTP counters are reset to zero
- CSR KBA reset: Re-register KBA; KBA and OTP counters are reset to zero
- Reset OTP: Re-register OTP; KBA and OTP counters are reset to zero

7.1.11.3 Increment User to the Next Question

The CSR resets the user's next question so the system advances the user to the next challenge question in the list of registered questions. So if the user is currently being asked question A, question B or C is now asked. A different challenge question is presented at the next log in to the website.

7.1.11.4 Unlock a User

When the CSR unlocks the user that has been locked out of the system because of failed challenge questions. Unlocking the user resets the user's failure counter.

The Unlock action unlocks the user account for both KBA and OTP:

- Unlock KBA: KBA and OTP counters are reset to zero
- Unlock OTP: KBA and OTP counters are reset to zero.

7.1.11.5 Ask Question (KBA Phone Challenge)

The CSR uses the user's challenge questions for phone authentication and enters user's response. If the user answers the question correctly, the question failure counter and increment question counter are reset. The system automatically takes appropriate action depending on the status such as unlocking the user. Information about phone and online failures is provided in Section 7.1.10, "Failure Counters." High level flows for the Ask Question action is presented in Chapter 4, "Managing and Supporting CSR Cases." The matrix in Section 7.1.10, "Failure Counters" contains detailed examples for individual flows.

7.1.12 Disable Question and Category Logic

This section describes the logic to handle disabled questions and categories.

Disabling Logic

The disabling logic is as follows for KBA:

- If you disable the last remaining question in a category, the category is automatically disabled as well.
- The number of active categories must be equal to or greater than the maximum number of categories in the question menu. An error message results when you try to disable a category and this requirement is not met.

Consequences

The following table summarizes the disable results.

Table 7–1 Disable Results in Question and Category Logic

Disable Question or Category	New customers	user with question in question set	users with question registered
Question	The disabled question is not used to generate new users' question sets.	At re-registration or when a user changes his preference: Disabled question are replaced with another question from the same category.	The disabled question continues to be active. If the user is re-registering or changing user preference, the disabled question is replaced with another question from the same category.
Category	The disabled category is not used to generate new users' question sets.	At re-registration or when a user changes his preference: All questions in the disabled category are replaced with questions from a new category that has not been used to generate current question set.	Questions from the disabled category continue to be active. If the user is re-registering or changing user preference, all questions in the disabled category are replaced with questions from a new category that has not been used to generate the current question set.

7.1.13 Locked Status

Locked is the status that OAAM Admin sets if the user fails the question challenge. The "Locked" status is only used if the KBA or OTP Anywhere is in use. A user is locked out of the session after the failure counter reaches the maximum number of failures. After the user is locked out, a Customer Service Representative must reset the status to **Unlocked** before the account can be used to enter the system.

7.2 Setting Up KBA Overview

This section outlines the steps to manage the library, registration and answer processing of the challenge questions.

7.2.1 Loading Challenge Questions

The challenge questions must be loaded into Oracle Adaptive Access Manager before the users can be asked to register. For information on loading challenge questions, see Section 2.6, "Importing the OAAM Snapshot."

7.2.2 Setting Up KBA

To set up KBA:

- Create Category

If the out-of-the-box categories do not meet your needs, create categories that can hold relevant questions you plan to create.

For information, see Section 7.7.2, "Creating a New Category."

- Create Questions

  Create questions that can be applicable to the users accessing your application.

  For information, see Section 7.5.3, "Creating a New Question" and Section 7.12.3, "Guidelines for Designing Challenge Questions."

- Apply Validations

  Apply validations to the questions.

  For information, see Section 7.6.2, "Adding a New Validation."

7.2.3 Setting Up Challenge

To set up challenge:

- Set up the Registration Logic - Validations are used to validate the answers given by a user at the time of registration.

  For information, see Section 7.8, "Configuring the Registration Logic."

- Set up the Answer Logic - The Answer Logic settings can be configured for the exactness required for challenge question answers and for answering threshold/tolerance, such as the level of fat fingering, typos, abbreviations, and so on.

  For information, see Section 7.10, "Adjusting Answer Logic."

7.2.4 User Flow

The following sections illustrate the user experience with the KBA framework.

Use Case: New User Registration

This section illustrates an example of the new user registration experience.

The use case: You are Helen, a new Acme Corp customer. You have heard the horror stories about online identity theft and it has kept you from utilizing the online service Acme offers. This month however Acme did a customer education campaign showing the many ways customers are protected while online. You feel much better and your trust in the Acme brand has been bolstered. Today you are logging in for the first time.

Directions: Complete the registration flow to log in for the first time.

1. Open the application.
2. On the first sign in page, enter **<user name>** in the **User Name** field and press **Continue**.
3. On the second sign in page, enter **<password>** into the secure TextPad and click **Enter**.

   The **Your New Security Profile** page is displayed with information about **Security Image and Phrase** and **Security Questions and Answers**.
4. Click **Continue** to register your security profile.

The **Your Security Device** page is displayed with a personalized virtual authentication device. In the page you are given options to learn more about your device, obtain a new image and phrase, and upgrade to a higher security device.

5. If you want, you can select a new image and phrase by clicking the **image and phrase** link or select a new device by clicking the **Upgrade** link.

   Click the **image and phrase** link until you find a device you want.

   If you clicked **Upgrade** and decided against the upgrade, you can revert to the default security device by clicking the **Revert** link.

6. Click **Continue** to accept the security device, image and phrase.

   The **Security Questions set up** page is displayed.

7. Select a question from the dropdown menu, and then answer the question in the TextPad, and click **Enter**.

8. Repeat Step 7 until you have completed selecting the questions and entering the answers.

   A welcome page appears with a message that you are successfully logged in.

Use Case: User Login

This section illustrates an example of the user login experience.

Use case: It has been a week since you completed the registration process on your laptop at work. Today you are on a business trip to another state and you are logging in on your laptop from using free Wi-Fi at a local coffee shop.

Directions: Try to log in to the application using a different IP addresses (this should be a public IP addresses and should belong to a different state).

1. Log in on your laptop using free Wi-Fi at a coffee shop in another state.
   a. On the first sign in page, enter **<user name>** in the **User Name** field and press **Continue**.
   b. On the second sign in page, enter **<password>** into the secure TextPad and click **Enter**.

      A page appears asking you to answer a security question. The question appears in QuestionPad. You are asked a challenge question because the public IP addresses group and uncommon state rules are triggered.

      The public IP addresses group rule contains the `Location: in IP group` condition and the uncommon state rule contains the `User: state first time for user` condition.

2. Enter the answer to the security question in QuestionPad and press **Enter**.

   If you answer the question successfully, you are logged in.

7.3 Setting Up the System to Use Challenge Questions

This section provides the steps you must take to set up your system to use challenge questions.

7.3.1 Ensure Policies are Available

A full snapshot of policies, dependent components and configurations is shipped with Oracle Adaptive Access Manager. The snapshot is in the oaam_base_snapshot.zip file and located in the *MW_HOME*/*IDM_ORACLE_HOME*/oaam/init directory.

If you are using pre-packaged policies, ensure that the OAAM snapshot has been imported. If you are not using pre-packaged policies, use this chapter as a guideline for enabling challenge questions.

To import the snapshot, refer to the instructions in Section 2.6, "Importing the OAAM Snapshot."

7.3.2 Ensuring that KBA Properties/Default Properties are Set

Ensure that the bharosa.kba.active property is set to true. See Chapter 25, "Using the Properties Editor" for information on modifying properties.

You can control the listing of questions in the OAAM server. These are the default properties and their values:

```
challenge.question.registration.groups.minimum.questions.per.category.count=1
challenge.question.registration.groups.categories.count=5
challenge.question.registration.groups.questions.count=5
challenge.question.registration.groups.count=3
challenge.question.registration.groups.maxlimit=5
```

7.3.3 Ensure Challenge Questions are Available

The challenge questions must be present in Oracle Adaptive Access Manager before the users can be asked to register. Challenge questions are included in the OAAM snapshot. For information on importing the snapshot which contains the questions, see Section 2.6, "Importing the OAAM Snapshot."

If you are need to use challenge questions in languages other than English, import the appropriate oaam_kba_questions_*locale*.zip files from the *MW_HOME/IDM_ORACLE_HOME*/oaam/kba_questions directory. The locale identifier *locale* specifies the language version.

7.3.4 Delete or De-activate Challenge Questions (Migration)

If you are migrating to 11.1.2.0.0 and you have been using the KBA questions from previous releases, then you must delete or deactivate the questions listed in this section if they are active.

Children Category

Delete or deactivate the following 10 questions:

- What year was your oldest child born?
- What year did your oldest child start school?
- What year did your youngest child start school?
- What is your eldest child's middle name?
- What is the first name of your youngest child?
- What year was your youngest child born?
- What is the first name of your oldest child?

- What is your youngest child's birthday?
- What is your youngest child's middle name?
- What is your oldest child's birthday?

Education Category

Delete or deactivate the following 18 questions:

- What year did you graduate from high school?
- What year did you graduate from junior high school?
- What city was your high school in?
- What were your college colors?
- What year did you graduate from grade school?
- What was the mascot of your college?
- What were your high school colors?
- What was the mascot of your high school?
- What is the name of a college you applied to but did not attend?
- In what city was your first elementary school?
- What year did you start high school?
- What year did you start junior high school?
- What year did you start grade school?
- What year did you graduate from college?
- What year did you start college?
- What was your major in college?
- What was the first school you ever attended?
- What city was your college in?

Miscellaneous Category

Delete or deactivate the following 2 questions:

- What is the first name of your closest childhood friend?
- What is your height?

Parents, Grandparents, Siblings Category

Delete or deactivate the following 17 questions:

- What year was your father born?
- What is your father's birthday?
- What is your oldest sibling's nickname?
- In which city was your father born?
- In which city was your mother born?
- What is your parent's current street address number?
- What is your parent's current street name?

- What is your youngest sibling's nickname?
- What is your parent's current ZIP code?
- What year was your mother born?
- What are the last 4 digits of your parent's phone number?
- What is your maternal grandmother's first name?
- What is your paternal grandmother's first name?
- What is the first name of your youngest sibling?
- What is your paternal grandfather's first name?
- What is your mother's birthday?
- What is the first name of your eldest sibling?

Significant Other Category

Delete or deactivate the following 18 questions:

- Where did you go on your honeymoon?
- What year did you get married?
- What year was your significant other born?
- What is your significant other's birthday?
- What date is your wedding anniversary?
- In what city did you meet your spouse for the first time?
- What city was your significant other born in?
- What is the first name of your significant other's mother?
- What is the first name of your significant other's father?
- What is the last name of your significant other's eldest sibling?
- What is the first name of your significant other's youngest sibling?
- What high school did your significant other attend?
- What was the last name of your best man or maid of honor?
- What was the first name of your best man or maid of honor?
- Name of the place where your wedding reception was held.
- What is your spouse's nickname?
- What state was your significant other born in?
- What is the last name of your significant other's youngest sibling?

Sports Category

Delete or deactivate the following 4 questions:

- What is the mascot of your favorite sports team?
- What are the colors of your favorite sports team?
- What team is the biggest rival of your favorite sports team?
- What is your all time favorite sports team?

Your Birth Category

Delete or deactivate the following 9 questions:

- What is the ZIP code where you grew up?
- Who was the US President when you were born?
- How old was your father when you were born?
- How old was your mother when you were born?
- What is the name of the hospital you were born in?
- What is the ZIP code of your birthplace?
- What is the holiday closest to your birthday?
- What state were you born in?
- What city were you born in?

7.3.5 Enabling Policies

Link policies that pertain to your business and security needs to a user group to which you want KBA to be enabled. For information on importing policies, see Chapter 11, "Managing Policies, Rules, and Conditions."

7.3.6 Configuring the Challenge Question Answer Validation

Validations are used to validate the answers given by a user at the time of registration. For answers, you can restrict the users to alphanumeric and a few specific special characters by adding a Regex validation.

For information, see Section 7.6, "Setting Up Validations for Answer Registration."

7.3.7 Configuring the Answer Logic

The Answer Logic settings can be configured for the exactness required for challenge question answers. For example, high risk transactions such as wire transfers may require a high degree of certainty (i.e. exact match) whereas accessing personal, non-sensitive information may require a lower degree of response certainty.

Configure the Answer Logic for answering threshold/tolerance, such as the level of fat fingering, typos, abbreviations, and so on.

For information, see Section 7.10, "Adjusting Answer Logic."

7.4 Accessing Configurations in KBA Administration

This section describes how to navigate to KBA administration tasks in the OAAM Administration Console. You can navigate to KBA tasks through the Navigation tree. The KBA Infrastructure provides you with access to all questions, validations, categories, registration and Answer Logic, and other elements.

These are the subnodes under `KBA`, which provide access to the configurations in the KBA infrastructure:

- **Questions**: For managing the tasks that impact challenge questions, such as creating new questions; activating, disabling, and editing questions; and importing questions that belong to a category not currently in the system.

  Double-click **Questions** to open the **Questions Search** page.

- **Validations**: For managing the validation for the answers given by a user at the time of registration, such as creating validations based on the available validation schemes in the system, editing existing validations, and importing and exporting validations.

  Double-click **Validations** to open the **Validations Search and Edit** page.

- **Categories**: For managing the question categories in the system.

  Double-click **Categories** to open the **Categories Search** page.

- **Registration Logic**: For managing the level of logic algorithm used for the registration for challenge questions and answers.

  Double-click **Registration Logic** to open the **Registration Logic** configuration page.

- **Answer Logic**: For managing the level of logic algorithm used for answer validation.

  Double-click **Answer Logic** to open the **Answer Logic** configuration page.

For alternative methods to open search pages, refer to Section 3.10, "Search, Create, and Import." Validation Search and Edit, Registration Logic and Answer Logic pages can be opened in the same manner as the search pages.

Note that you cannot open the KBA node.

7.5 Managing Challenge Questions

The KBA functionality enables you to manage challenge questions.

You can perform the following task for challenge questions:

- Searching for a Challenge Question
- Viewing Question Details and Statistics
- Creating a New Question
- Creating a Question Like Another Question
- Editing a Question
- Importing Questions
- Exporting Questions
- Deleting a Question
- Disabling a Question
- Activating Questions

7.5.1 Searching for a Challenge Question

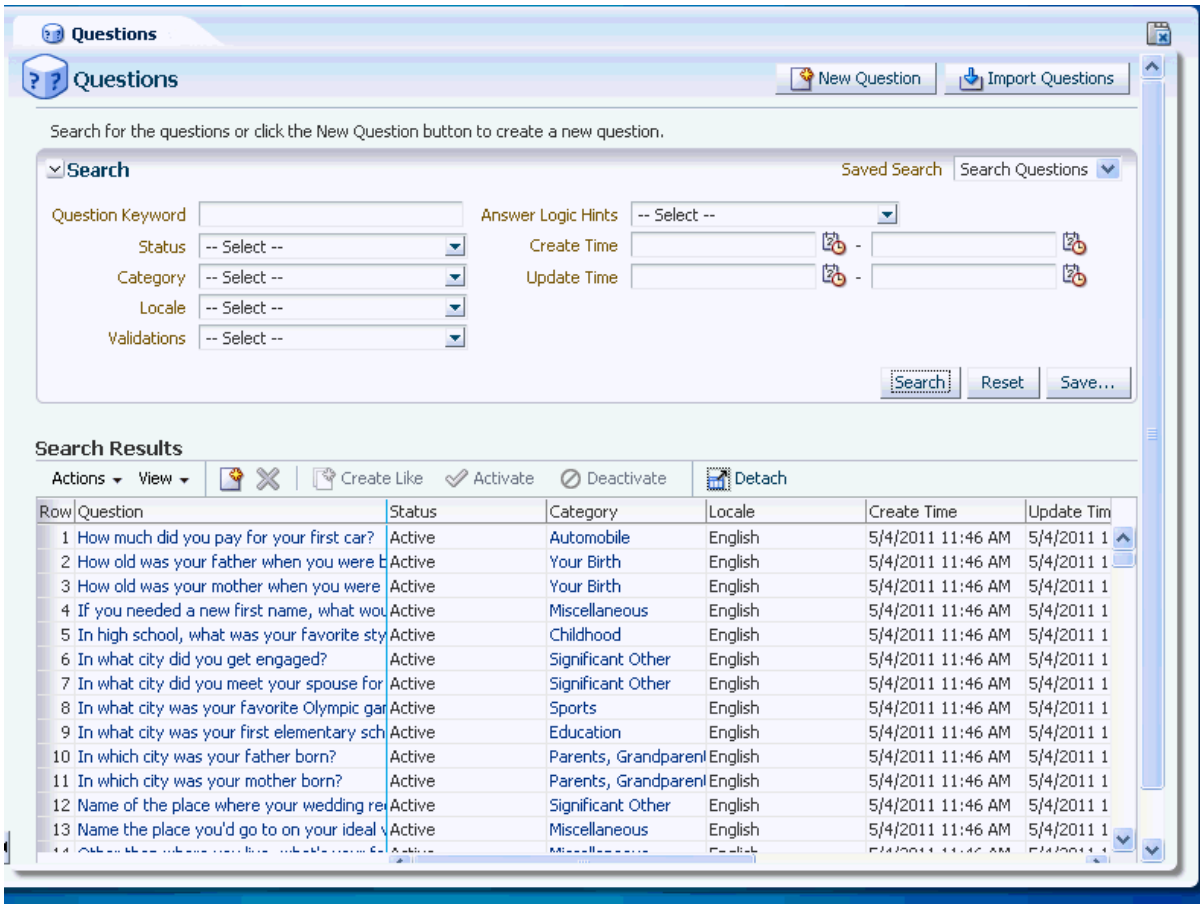
Use the **Questions Search** page to view a list of all challenge questions and search for a question based on various criteria. The **Questions Search** page provides access to the **Questions Details** page for any question. When the **Questions Search** page first appears, the **Search Results** table is displayed with default filter values.

To search for a question:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."

An example **Questions Search** page is shown in Figure 7–2.

Figure 7–2 Questions Search page



The **Questions Search** page displays a **Search** section and a **Search Results** table that shows a summary of the questions that match your search criteria.

2. Specify criteria in the Search Filter to locate the questions and click **Search**.

   The search filter criteria are described in Table 7–2.

   If you want to reset the search parameters to the default setting, use the **Reset** button.

Table 7–2 Question Search Criteria

Field	Description
Question Keyword	The keyword in the question.
Status	The status of the question: Active or disabled.
Category	The category to which the question belong. For example: education, pets, sports and so on.
Locale	The language the question is in. For example, English, Finnish, Czech, and so on.
Validations	Global validations. For example: Four-digit year (YYYY), Month Day (MMDD), and so on

Table 7–2 (Cont.) Question Search Criteria

Field	Description
Answer Logic Hints	A hint added to questions individually to affect the Answer Logic used to evaluate given answers. For example: Date Answer Hint.
Created Time	A timeframe within which the question was created
Update Time	A timeframe within which the question was modified.

The **Search Results** table displays a summary of questions that match the criteria specified. By default, questions are sorted on **Question Name**, but you can sort questions on **Update Time**, **Created Date**, **Status**, **Question**, and **Category**.

In the **Search Results** table, click the question link to view more details. The **Question Details** page appears.

Table 7–3, " Question Action menu commands" lists the commands that are available through the **Action** menu. You can select one or more questions and perform actions on those questions.

Table 7–3 Question Action menu commands

Command	Description
Create Like	Creates a new case that is similar— or "like"—an existing question.
New Question	Creates a new question. By default, the question is enabled on create. You can create a question for any locale.
Open Selected	Opens the selected question to the Questions details page.
Open Category	Opens the category for the question.
Delete Selected	Deletes questions. Deleted questions are not available for new registrations but users currently registered for these questions can continue to use them.
Deactivate Selected	Selected questions are disabled.
Select All	"Select All" helps select all the questions.
Deselect All	Deselect all helps deselect all questions.
Export Selected	Exports questions as .XML files
Export Delete Script	Export Delete Script exports a delete script for the questions you might want to delete in the future, and imports the delete script later to delete the questions if they are present.

Except for creating a question, edit selected, and edit category, all other operations are bulk operations.

7.5.2 Viewing Question Details and Statistics

The **Question Details** page provides information such as:

- Question Sets with Question
- Users Registered for Question
- Percentage of Users Registered For Question
- Percentage of Successful Challenges
- Percentage of Unsuccessful Challenges

- Question ID
- Last Updated Date

To view question statistics:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. From the **Questions Search** page, click the question of interest in the **Search Results** table

   The **Question Detail** page appears with the statistics.

7.5.3 Creating a New Question

To create a new question

1. In the Navigation tree, double-click **Questions** under **KBA**. The **Questions Search** page is displayed.
2. From the **Questions Search** page, click the **New Questions** button.

   The **New Questions** page appears where you can enter details to create a new question.

   Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

   When the **New Question** page first appears, the default value for the question status is Active.

   Question, **Category**, **Status**, and **Locale** are required fields.
3. Pick a locale from the list of locales available.

   By default, the **Locale** menu displays English and 26 other default locale languages.
4. Type the new question in the **Question** field.

   The question names must be unique across categories.
5. From the **Category** list, select the category of question you want.

   By default, there is no data in the **Category** list. You must import the challenge questions ZIP files (oaam_kba_questions_<locale>.zip) for data to appear in the **Category** menu. You can also create a new category.
6. In the **Locale** list, select the language you want.

   By default, the **Locale** menu displays English and 26 other default locale languages.
7. Each question can be assigned unique validations to control the answers a user is allowed to register. To assign a local validation, select the validation type from the **Registration Validation** list.

   The local validations you select in this step control the answers a user is allowed to register for this particular question. It does not control the registration of answers for all questions.

   For information on the difference between global and local validations, refer to Section 7.1.9, "Validations."
8. In the **Answer Logic Hints** list, select the type of **Answer Logic Hint** you want.

A hint can be added to questions individually to affect the Answer Logic used to evaluate given answers. This is performed to better tune the logic for the type of question. This is especially important for date related questions.

These hints help the Answer Logic function more successfully on some questions, for example, on date related questions. If a question has the date answer hint applied then the abbreviations, phonetics and fat fingering Answer Logic runs first, and then special date format logic is applied.

9. Click **Apply**. A confirmation dialog appears telling you that the question was created successfully.
10. Click **OK** to dismiss the dialog.

    The **Question Detail** page appears for the newly created question.

    After the question has been created, you can edit details.

Note: The deployment administrator must ensure that there are enough questions in the database for each of the supported locale as configured in OAAM Admin during deployment; otherwise, OAAM Server displays only the English language questions during registration.

The number of locale-specific questions must be equal to or greater than the "Questions User Will Register" multiplied by the "Questions per Menu" multiplied by the "Categories per Menu."

7.5.4 Creating a Question Like Another Question

To create a new question that is similar to an existing question:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. From the **Questions Search** page, select the row corresponding to the question of interest.
3. Click the **Create Like** icon.

   The **Create Like** dialog appears with pre-populated data from the original question. Pre-populated fields are **Category**, **Locale**, **Status**, **Answer Logic Hints**, and **Registration Validations**. **Question**, **Category**, **Status** and **Locale** are required fields. The **Create Like** icon is disabled if multiple rows are selected.

   You can create a question for any locale.
4. Type the new question in the **Question** field.
5. Edit any of the other fields if you want.
6. Click **OK**.

   The **Question Detail** page appears for the newly created question.

   If you click **Cancel**, the **Questions Search** page appears.

7.5.5 Editing a Question

The **Question Details** page enables you to activate/disable questions and edit the question, question category, locale, and registration and answer validation. Read-only

question statistics are available in the **Question Statistics** section. If you edit a question, users using that question receive the updated question.

To edit a question

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, search for the questions you are interested in.
3. Click the hyperlinked question you want to edit.

   The **Question Details** page appears.
4. Make the changes you want.

   You cannot edit the **Question ID** or last updated time.
5. Click **Apply** to save the changes or **Revert** to discard them.

   If you click **Revert**, the edited details are reverted to the initial state.

7.5.6 Importing Questions

To import questions:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, click **Import Questions** or select **Import Selected** from the **Actions** menu.
3. In the **Import Questions** dialog, type the path and name of the file; or use the **Browse** (...) button to locate the ZIP file that contains the questions, and then select the file.
4. Click **Open** and then click **Import**.

   If you import questions that belong to a category not currently in the system, the category is also imported. If you import a question with the same ID number as an existing question, the existing question is overwritten.

   A confirmation dialog displays the status of the operation and a list of questions that were imported into the system.
5. Click **Done**.

7.5.7 Exporting Questions

Multiple questions can be selected and exported.

To export questions:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, search for the questions you are interested in.
3. Select the rows corresponding to the questions of interest.
4. Select the **Export** icon or **Export** from the **Actions** menu.
5. In the **Export** dialog, click the **Export** button.

   The selected questions are exported.

7.5.8 Deleting a Question

To delete a question, follow these instructions.

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, search for the questions you are interested in.
3. Select the rows corresponding to the questions of interest and click **Delete** or select **Delete Selected** from the **Actions** menu.

   The **Delete** button and **Delete Selected** menu item are enabled only if a question is selected.

   A **Confirm Delete** dialog is displayed with a list of questions and question IDs.
4. Click **Delete** to delete the questions.

   Deleted questions are not available for new registrations but users currently registered for these questions can continue to use them.

   A confirmation dialog is displayed.
5. In the confirmation dialog, click **OK**.

An error is displayed when you try to delete a question that is in used by a registered user.

When a user tries to delete multiple questions and if a few questions are associated with the user, the system bypasses the associated questions and deletes the rest and displays a message to user that the following list was not deleted. Deleted questions are not available for new registrations but the user currently registered for these questions can continue to use them.

7.5.9 Disabling a Question

To disable a question

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, search for the question you want to disable.
3. Select the rows corresponding to the questions you want to disable.
4. Press the **Deactivate** button or select **Deactivate** from the **Actions** menu.

   The selected questions are disabled.

Alternatively, you can disable a question by clicking the hyperlinked question on the Questions Search page, and then selecting **Disable** in the Status field on the Questions Details page.

The following scenarios occur when a question is disabled:

- The disabled question cannot be used to generate a new user's Question Set.
- At re-registration or reset, the disabled question is replaced with another question from the same category for those users who had the disabled question in their question set.
- The disable question remains active for users who have registered the question. If the user is re-registering or changing user preference, the disabled question is replaced with another question from the same category.

7.5.10 Activating Questions

To activate questions:

1. Open the **Questions Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Questions Search** page, search for the questions you are interested in.
3. Select the rows corresponding to the questions you want to activate.
4. Press the **Activate** button or select **Activate** from the **Actions** menu.

   The selected questions are activated.

7.6 Setting Up Validations for Answer Registration

You can manage and define validations that are used on answers given by users at the time of registration.

This section provides instructions to set up global validations that control the answers a user is allowed to register for all questions. For information on the difference between global and local validations, refer to Section 7.1.9, "Validations."

7.6.1 Using the Validations Page

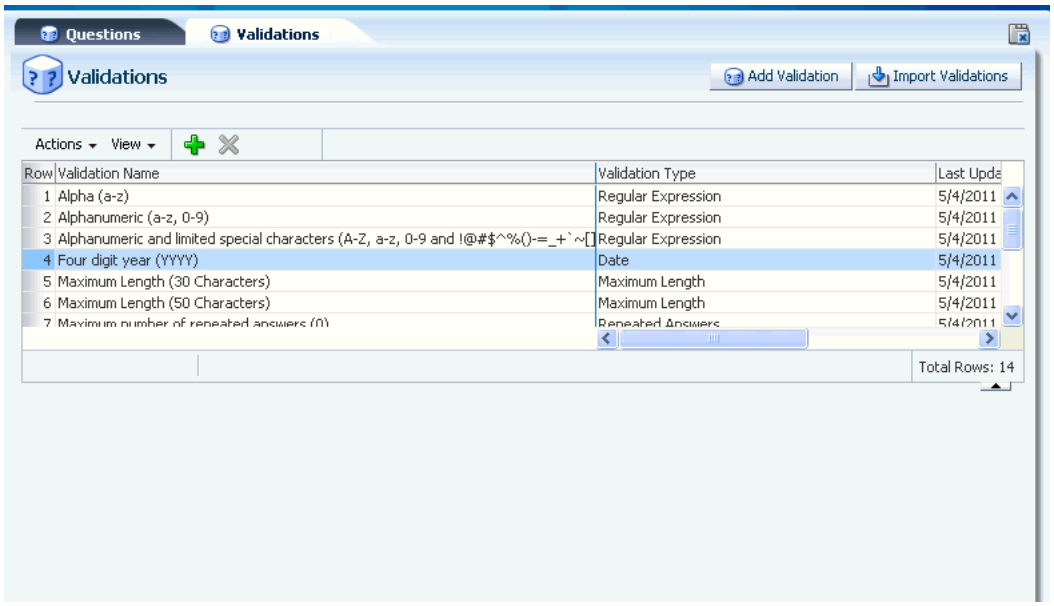
The **Validations** page enables you to perform the following functions:

- Adding a New Validation
- Editing an Existing Validation
- Importing Validations
- Exporting Validations
- Deleting Validations

Open the **Validations** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."

An example **Validations** page is shown in Figure 7–3.

Figure 7–3 Validations Page



By default, validations are sorted on **Validation Name**, but you can sort validations on **Updated**.

Table 7–4, " Validation Action menu commands" lists the commands that are available through the **Action** menu. You can select one or more validations and perform actions on those questions.

Table 7–4 Validation Action menu commands

Command	Description
Add	Adds a new validation.
Import	Imports validations
Export	Exports validations
Delete	Deletes validations

7.6.2 Adding a New Validation

You can add a new validation to the system when needed. Validations are defined for use during challenge questions registration.

To add a validation:

1. Open the **Validations** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. From the **Validations** page, click the **New Validation** button.

   The **Add a New Validation** page appears where you can enter details to create a new validation.

   Alternatively, you can open the **Add a New Validation** page by:

   - Selecting the **Add Validation** button from the **Search Results** toolbar.
   - Selecting **New Validation** from the **Actions** menu in **Search Results**.
3. In the **Validation Type** list, select the validation scheme you want to add.

You might, for example, select the validation type, **Maximum Length**. This validation scheme allows the customer to create a validation for the maximum allowed length for the answer.

The parameters of the validation appears in the **Validation Parameters Details** area of the **Validations** page.

Note: ·The fields displayed on the page depends on the validation type selected.

4. In the **Name** field, enter the name you want for this instance of the validation scheme.

   When you create a validation from available validation schemes in the system, you are adding an instance of validation. You can then customize that instance.

5. Specify validation parameter that correspond to your validation type.

   For example, validation parameter can be `30` for an instance of **Maximum Length** validation. This validation instance restricts the user from entering an answer longer than `30` characters in length.

Table 7–5 Validation Parameters

Validation Type	Label for Fields	Description for Validation Parameter	Example for note
Inappropriate Language	Enter Inappropriate Words	Inappropriate language for answer	Example: Sloppy,Wrong,Yucky The list of words should not contain blank spaces.
Regex	Enter Regex Pattern	Real expression pattern string for the answer. For example, pattern can be "[A-Za-z0-9]+" for Alpha-numeric validation. If the answer entered by the user is not as per the configured regular expression pattern; then, the validation fails and a configured error message is displayed.	Example: [0-9]+
Date	Enter Date Notation	Date/Time pattern string for the answer. For example, the pattern can be "MMddyy" for Month Day Year validation. If the date/time answer entered by the user is not as per the configured pattern, the validation fails and a configured error message is displayed.	Example: MMDDYY
Minimum Length	Enter Minimum Length	Minimum length (number) for the answer. If the length of the answer entered by the user is less than the configured value, the validation fails and a configured error message is displayed.	Example: 3
Maximum Length	Enter Maximum Length	Maximum allowed length (number) for the answer. If length of the answer entered by the user is above the configured value, the validation fails and a configured error message is displayed.	Example: 3

Table 7–5 (Cont.) Validation Parameters

Validation Type	Label for Fields	Description for Validation Parameter	Example for note
Repeated Character	Enter Number of Repeating Characters	Allowed number of repeated characters in the answer. If the answer entered by the user contains repeated characters more than the configured value, the validation fails and the user gets a configured error message.	Example: 3
Repeated Answers	Enter Number of Repeating Answers	Allowed number of repeated answers. For example parameter value can be '1' for unique answer validation. If the answer entered by the user is repeated more than configured number of times, the validation fails and the user gets a configured error message.	Example: 1
Character	Enter Disallowed Characters	Characters that are not allowed.	Example: *

6. Click **Add**.

   OAAM Admin adds this validation instance to the list of validations in the System.

7.6.3 Editing an Existing Validation

To edit an existing validation

1. Open the **Validations** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. From the **Validations** page, select the hyperlinked configured validation you want to edit.
3. In the **Validation Parameter Details** section, make the necessary changes. See Table 7–5, " Validation Parameters".

   You can edit strings, numbers, and characters in the validation parameters field.
4. Click **Save**

   OAAM Admin updates this validation instance in the system.

7.6.4 Importing Validations

You can add a global validation to the global validation list on the Registration Logic page by importing a global validation into the system. It is added automatically to the global validation list without any notification.

7.6.5 Exporting Validations

To export validations:

1. Open the **Validations** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Validations** page, search for the validations you are interested in.
3. Select the rows corresponding to the validations you want to export.
4. Select **Export Selected** from the **Actions** menu.
5. When the **Export** dialog appears, select **Save File**, and then **Save**.

The file is exported and saved as a ZIP file.

7.6.6 Deleting Validations

To delete validations:

1. Open the **Validations** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Validations** page, search for the validations you want to delete.
3. Select the rows corresponding to the validations of interest and click **Delete**.

   A dialog appears asking you if you want to delete the validation.
4. Click **Delete** to confirm.

   A dialog appears with the message that the validation was deleted successfully.
5. Click **OK** to dismiss the dialog.

7.7 Managing Categories

You can perform the following task for categories:

- Searching for a Category
- Creating a New Category
- Editing a Category
- Deleting Categories
- Activating Categories
- Deactivating Categories

7.7.1 Searching for a Category

On the **Categories Search** page you can view a list of all categories and search for a category based on various criteria. The **Categories Search** page provides access to the **Category Details** page for any category.

When the **Categories Search** page first appears, the **Search Results** table displays results from the default search values.

To search for a category:

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."

   The **Categories Search** page displays a **Search** section and a **Search Results** table that shows a summary of the categories that match your search criteria.
2. Specify criteria in the Search Filter to locate the specific question category and click **Search**.

   The search filter criteria are described in Table 7–2.

   If you want to reset the search parameters to the default setting, use the **Reset** button.

Table 7–6 Question Search Criteria

Field	Description
Category	The category name. For example: education, pets, sports and so on.
Status	The status of the category.
Created Date	A timeframe within which the category was created or modified.
Update Time	A timeframe within which the category was updated

The **Search Results** table displays a summary of categories that match the criteria specified.

In the **Search Results** table, click the hyperlinked category you interested in to view more details. The **Category Details** page appears.

7.7.2 Creating a New Category

If the out-of-the-box categories do not meet your needs, create categories that can hold relevant questions you plan to create.

To create a new category

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. From the **Categories Search** page, click the **New Category** button or the **New** icon.

   Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

   The **New Category** page appears where you can enter details to create a new category.
3. Type the new category in the **Category** field.
4. Enter a description.
5. Click **Apply**.

   The **Category Details** page appears for the newly created category.

7.7.3 Editing a Category

The **Category Details** page enables you to changed the status, name, and description for an existing category.

To edit a category

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Categories Search** page, search for the category you are interested in.
3. Click the hyperlinked category you want to edit.

   The **Category Details** page appears.
4. Make the changes you want.

   Category name edits do not affect the questions already registered or new registrations.
5. Click **Apply** to save the changes or **Revert** to discard them.

If you click **Revert**, the edited details revert to the initial state.

If questions that belonged to a category are moved to the new category, the user would be presented with the same questions.

7.7.4 Deleting Categories

To delete a category, follow these instructions.

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Categories Search** page, search for the categories you want to delete.
3. Select the rows corresponding to the categories you want and click **Delete**.

   A dialog is displayed asking if you want to delete the categories.
4. Click **Delete** to confirm.

   A dialog is displayed with a message that the categories were deleted successfully.
5. Click **OK** to dismiss the dialog.

You can delete a category if it is not referenced by questions. If the category is referenced by a question, an error message appears.

7.7.5 Activating Categories

To activate categories:

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Categories Search** page, search for the categories you want to activate.
3. Select the row for each category you want to activate.
4. Press the **Activate** button.

   A dialog is displayed with a message that the category was activated successfully.
5. Click **OK** to dismiss the dialog.

7.7.6 Deactivating Categories

The deactivated category is not used to generate a new question set. All questions in the deactivated category are replaced with questions from a new category that has not been used to generate a current question set at re-registration or the changing of user preferences for users with the question in their question set.

For users with the questions registered, the questions from the deactivated category continue to be active. If the user is re-registering or changing user preferences, all questions in the deactivated category are replaced with questions from a new category that has not been used to generate current question set.

To deactivate categories:

1. Open the **Categories Search** page, as described in Section 7.4, "Accessing Configurations in KBA Administration."
2. In the **Categories Search** page, search for the categories you are interested in.
3. Select the row for each category you want to deactivate.
4. Press the **Deactivate** button.

A dialog is displayed with a message that the category was deactivated successfully.

5. Click **OK** to dismiss the dialog.

7.8 Configuring the Registration Logic

You can use Registration Logic to set up the configuration for:

- Number of questions that appear on each menu
- Number of categories per menu
- Number of questions that a user must register
- Restriction of characters entered for answers

Configure Registration for Questions and Answers

To configure the registration for challenge questions and answers:

1. In the Navigation tree, double-click **Registration Logic** under **KBA**. The **Registration Logic** page is displayed.
2. To enter or change the values for the question set generation, you can specify the following settings.
   - Number of questions that a customer must register
   - Number of questions that appear on each menu
   - Number of categories per menu

     The categories per menu cannot be more than the number of categories available in the system.

     Note: Enter realistic numbers. For example, the number of questions that a user must register should be 3 to 7 questions
3. Click **Apply**.

   A confirmation dialog is displayed with the message, "Registration Logic details updated successfully."
4. Click **OK**.

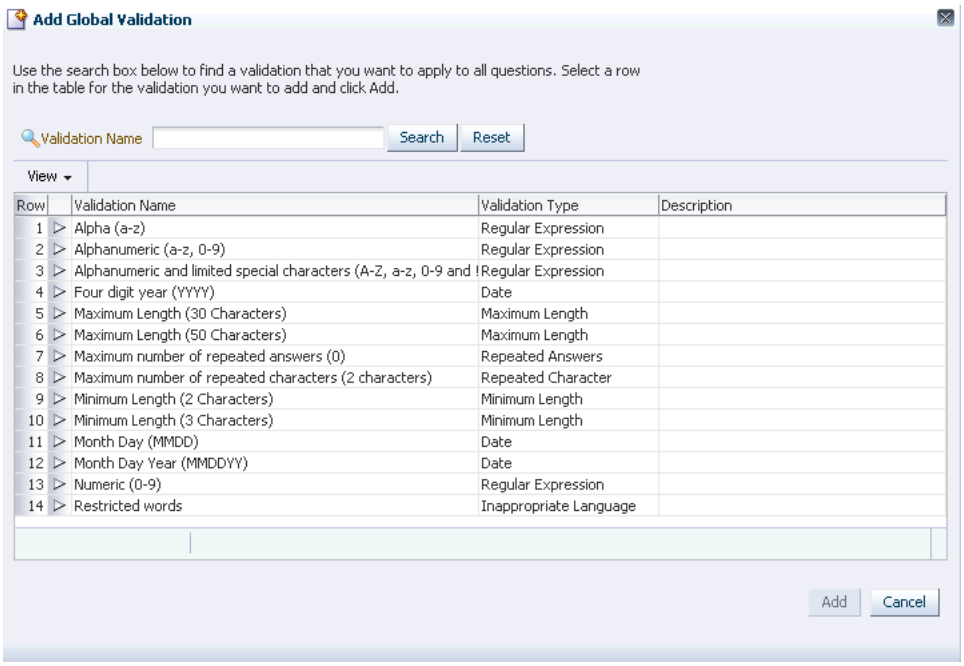
Add Global Validation

To add global validations (validations you want to apply to all questions):

1. In the Navigation tree, double-click **Registration Logic** under **KBA**. The **Registration Logic** page is displayed.
2. Click the **Add** button on the results header.

   The **Add Global Validation** dialog appears.

Figure 7–4 Add Global Validation



3. In the **Add Global Validation** dialog, search for the global validations you want to add.
4. Select the row corresponding to the validation you want to add.

   You cannot select more than one validation to add at a time.
5. Click **Add**.

   The selected validation is added.

Delete Global Validation

To delete global validations (validations you do not want to apply to all questions):

1. In the Navigation tree, double-click **Registration Logic** under **KBA**. The **Registration Logic** page is displayed.
2. Select the rows corresponding to the validations you want to delete and then click the **Delete** button on the results header

   A dialog appears asking if you want to delete the validation.
3. Click **Delete** to dismiss the dialog.

   A confirmation dialog appears.
4. Click **OK** to dismiss the dialog.

7.9 Randomizing KBA Questions

Set the `oaam.kba.questions.randomorder` property to `true` to present KBA questions in random order instead of sequentially. Randomization is performed Online only (OAAM Server) if the `oaam.kba.questions.randomorder` property is missing or is set to `true`. For the CSR Get Challenge Question flow, question access will always be sequential.

7.10 Adjusting Answer Logic

Answer Logic, a feature of KBA, increases the usability of security questions.

7.10.1 About Answer Logic

Administrators can adjust how exact the challenge answers given by end users must match the answers they gave at the time of registration. If the answer given by a user is fundamentally correct but there are minor variations such as typos, misspellings and abbreviations they should pass. The increased usability of KBA reduces or eliminates the need for unnecessary call center involvement in moderate risk situations and self service flows.

Answer Logic (fuzzy logic) algorithms can be configured on the Answer Logic page. The algorithms are divided into three categories: Common Abbreviations, Fat Fingering (accidentally pressing the nearest neighbor on the keyboard), and Phonetics. The algorithms are available for both the online challenge and phone challenge processes.

Out-of-the-box Answer Logic is only functional for English. Abbreviations can be globalized but creation of locale specific text equivalency files is required. For information, refer to *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

Example of How It Works

Question: Who was your favorite teacher in high school?

Registered answer: Mrs. Smith

Given answer: Misses Smuth

Logic level: If set to High, the answer is accepted.

Table 7–7 Answer Logic Algorithm Example

Algorithm	Description	Reason
Abbreviations	This algorithm handles common abbreviations, common nicknames, common acronyms, and date format. Looks at file for allowed matches.	If the file contains Mrs=Misses, the match can be made in either direction.
Phonetics	This algorithm handles Answers that "sound like" the registered answer, regional spelling differences, and common misspellings	Smiith sounds like Smith
Keyboard fat fingering	This algorithm handles Answers with typos due to the proximity of keys on a standard keyboard.	"u" is directly to the left of "i" so it is allowed

7.10.2 Common Response Errors

This section highlights the most common response errors and shows how Answer Logic algorithms are used for the system to intelligently detect the correct answers in the challenge response process. Examples of abbreviations, phonetics, and keyboard fat fingering are also provided.

7.10.2.1 Abbreviations

Common abbreviations, common nicknames, common acronyms, and date format are handled by this algorithm.

Common Abbreviations

This algorithm matches the words in the following pairs as equivalent. OAAM Admin has predefined list of word-pairs that cover common abbreviations, common nicknames and common acronyms.

- Street - St.
- Drive - Dr.
- California - CA

The list can be customized by creating a new abbreviation file, `custom_auth_abbreviation_config.properties`. For information, refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

Common Nicknames

Oracle has a predefined list of the most common nicknames that is used in the challenge response process.

- Timothy - Tim
- Matthew - Matt

Date Format

The questions that require date as the answer specify the format in which the user should enter the answer. The format is either `YYYY` or `MMDD`, but not both. However, from experience, users still use other formats during the challenge response process. The abbreviation logic for date format sees the following as the same:

- 0713
- 713
- July 13th
- July 13
- July 13, 1970

7.10.2.2 Phonetics

Answers that "sound like" the registered answer, regional spelling differences, and common misspellings are handled by this algorithm. The phonetics algorithm is only supported in English.

Common Misspellings

Oracle's Phonetic Answer Logic algorithm accounts for misspellings.

- ph - f
- Correct word: elephant - Spelling mistake: elefant

7.10.2.3 Keyboard Fat Fingering

Oracle's Fat Fingering algorithm accounts for typos due to the proximity of keys on a standard keyboard and transposed letters. Answers with typos due to the proximity of keys on a standard keyboard are handled by this algorithm.

The number of fat fingering characters allowed depends on the length of the original word and the level set. The algorithm returns a percentage score associated with the characters that have an exact match. The intensity determines the minimum score required to match the answer with the registered answer.

Note: The fat fingering algorithm is only supported in English.

Common Typos

- Switching "w" and "e"
- Switching "u" and "i"
- Switching "t" and "r"

Examples of Fat Fingering

- Correct word: signature - Fat finger: signatire

7.10.3 Level of Answer Logic

The level of Answer Logic, the intensity or strength of algorithms, used to evaluate answers given for challenge questions is adjustable. You can enable or disable each algorithm and you can also specify the following levels for the algorithms used:

- **Off** – No Answer Logic is used; answers must exactly match those previously registered by the user.
- **Low** – Less Answer Logic; answers provided by the user must be a match or near-match to the answers that were provided at the time of registration
- **Medium** – More Answer Logic; the user is given some leeway for the answers that are provided. For example, St. might be accepted for Street.
- **High** – Highest level of Answer Logic. The constraints are not strict for matching.

Each algorithm generates a score that represents how close the given answer is to the registered answer. OAAM Admin can be configured to accept different threshold score ranges for each algorithm individually. Separate threshold values for each algorithm (low/medium/high) are set in a properties file. The default thresholds are described as follows.

7.10.3.1 Abbreviation

For abbreviation:

- Return values: 0 or 100 (no-match OR match)
- Levels: **ON** or **OFF**
- Logic
  - If an abbreviation entry exists linking the given strings, score is 100
  - Else score is 0

7.10.3.2 Fat Fingering

For fat fingering:

- Return values: range 0 to 100
- Levels: **OFF**, **LOW** (90+), **MEDIUM** (75+), **HIGH** (60+)
- Logic
  - If the string lengths do not match, score is 0
  - If a position does not have the expected character or its neighbor, score is 0

- Else compute the number of positions that have the neighboring characters.
- Score = (StringLength – NeighborPositionCount) * 100 /StringLength

7.10.3.3 Phonetics

For phonetics:

- Return values: 0, 60, 75, 90
- Levels: **OFF**, **LOW** (90), **MEDIUM** (75), **HIGH** (60)
- Logic
  - Compute primary and alternative phonetic keys for the given strings, using DoubleMetaphone algorithm
  - If primary keys of both strings match, score is **HIGH**
  - Else if a primary key of one of the strings and alternate key of the other string match, score is **MEDIUM**
  - Else if the alternate keys of both string match, score is **LOW**
  - Else the score is **0**

7.10.3.4 Multiple Word Answers

Answers that contain multiple words are treated in a specific way by the Answer Logic. If the final score from a complete string match does not meet the "success" criteria, individual words in the answer are evaluated. If each individual word in an answer is accepted by any of the algorithms the whole answer is accepted.

Multiple word answers with missing/extra words must be an exact match to the registered answer. Answers must have the same number of words as the registered answer to be evaluated with Answer Logic. For example: If the registered answer is "Mead Elementary School" and the answer given at the time of challenge is "Mesd Elem Sch":

```
Abbreviation: Mead-Mesd=0; Elementary-Elem=100; School-Sch=100
Fat-finger: Mead-Mesd=75; Elementary-Elem=0; School-Sch=0
Phonetics: Mead-Mesd=0; Elementary-Elem=0; School-Sch=0
```

Assuming that abbreviation was set to anything besides off and fat fingering was set to medium or high, since all three words would be accepted individually, the whole answer would be accepted.

7.10.4 Configuring Answer Logic

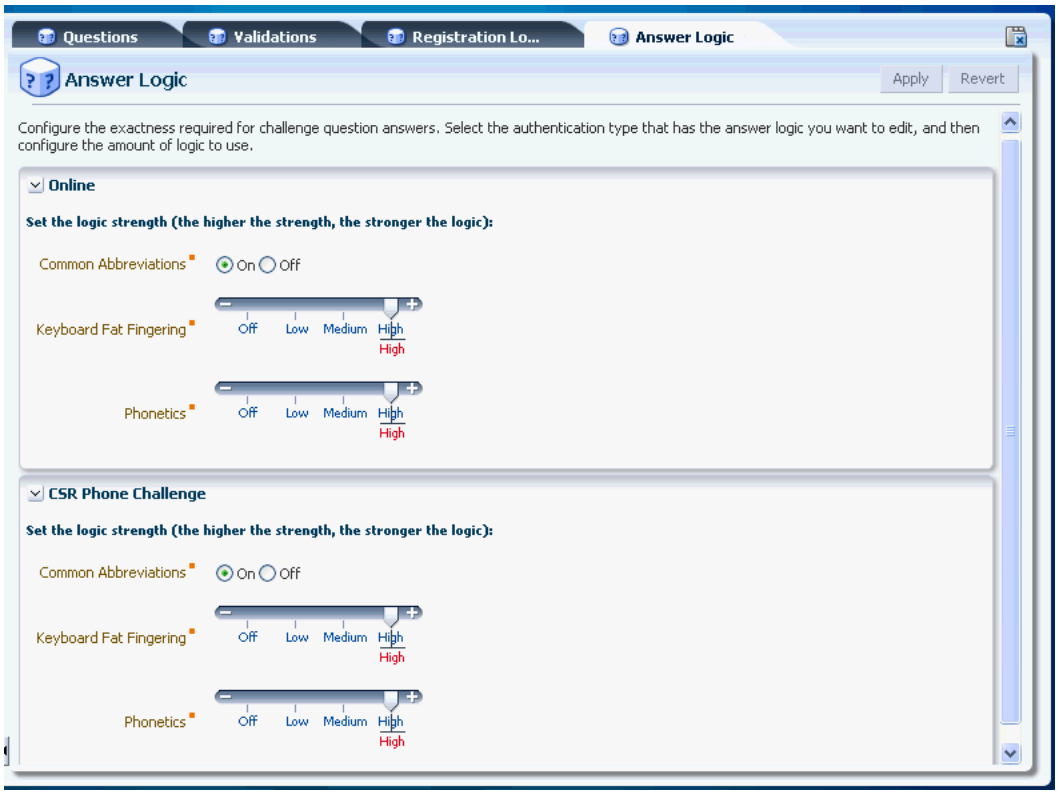
The KBA Answer Logic tab includes controls for the level of each Answer Logic algorithm used for answer validation. The higher the level the less exact answers need to be for acceptance.

To configure Answer Logic:

1. In the Navigation tree, double-click **Answer Logic** under **KBA**.

   You can specify different settings for Online Challenge and CSR Phone Challenge.

Figure 7–5 Answer Logic



2. To change the level of Answer Logic used for keyboard fat fingering and phonetics, select **Off**, **Low**, **Medium**, or **High**: the lower the setting the higher degree of exactness required.

   For information on logic levels, see Section 7.10.3, "Level of Answer Logic."

3. Click **OK**.

7.10.5 Customizing English Abbreviations and Equivalences for Answer Logic

Oracle Adaptive Access Manager supports the concept of "fuzzy logic." Fuzzy logic, in part, relies on pre-configured sets of word equivalents, commonly known as abbreviations.

Answer Logic checks if the answer provided by the user matches closely to the ones provided during registration. Answer Logic, in part, relies on pre-configured sets of word equivalents, commonly known as abbreviations.

Although there are several thousand English abbreviations and equivalences in the English version of Oracle Adaptive Access Manager, customers can perform customizations per their business requirements. For example, the customer might want the following to be considered a match.

Registered Answer	Given Answer
nineteen hundred ninety nine	1999

The out-of-the-box English abbreviations and equivalences are in a file named, bharosa_auth_abbreviation_config.properties. Changes cannot be made to this file.

To customize abbreviations, a new file must be created with a new set of abbreviations. This file takes precedence over the original file and all abbreviations in the original file are ignored.

To customize abbreviations:

1. Create a new abbreviation file, custom_auth_abbreviation_config.properties, and save it in the *IDM_ORACLE_HOME*/oaam/conf directory.

   If the conf folder does not exist, create one.

2. Add abbreviations and equivalences to custom_auth_abbreviation_config.properties.

   There are two different formats to use:

   ```
   Word=equivalent1
   Word=equivalent2
   ```

   or

   ```
   Word=equivalent1,equivalent2, equivalent3
   ```

   For example, in English, some equivalence for James are:

   ```
   Jim=James,\Jamie,\Jimmy
   ```

   With the addition of the equivalences, if a user were to enter a response as Jim, but had originally entered James, Jim would be accepted. Another example is that St may be equivalent to Street.

   Note: Retrieval of abbreviation values is not based on the browser language; values are retrieved from the properties files.

3. Add the file to the OAAM Extensions Shared Library (WEB-INF/classes).

4. Using the Properties Editor, change the property, bharosa.authenticator.AbbreviationFileName, to point to the complete path to the file, WEB-INF/classes/custom_auth_abbreviation_config.properties in the extensions folder.

   The default value for the property bharosa.authenticator.AbbreviationFileName is bharosa_auth_abbreviation_config.properties. Create the bharosa.authenticator.AbbreviationFileName property if it does not already exist.

   Restarting the system is not necessary for the change to take effect.

5. Configure the Answer Logic.

If you want to revert to the original out-of-the-box abbreviations, set bharosa.authenticator.AbbreviationFileName back to bharosa_auth_abbreviation_config.properties.

7.11 Use Cases

This section describes example use cases for KBA.

7.11.1 Use Case: Create Challenge Question

You have been asked to develop some new challenge questions to augment the existing out-of-the-box questions. Come up with a new question. Directions: Part A: Export the existing challenge questions as a backup. Part B: Create the new question in any category you like in English.

1. Log in to the OAAM Administration Console as an administrator.
2. In the Navigation tree, double-click **Questions** under **KBA**. The **Questions Search** page is displayed.
3. In the **Questions Search** page, click the column header on the **Search Results** table to select all the rows.
4. Select **Export Selected** from the **Actions** menu.
5. In the **Export** dialog, select **Save File** and click **OK**.
6. Browse for the location to save the ZIP file and click **Save**.
7. After backing up the questions, search for the question that you are interested in.
8. If the question does not exist, click **New Question**. The **New Question** page is displayed.

   Question, **Category**, **Status**, and **Locale** are required fields.

   When the **New Question** page first appears, the default value for the question status is **Active**.
9. In the **Question** field, type in the question.
10. In the **Category** field, select a category.
11. Select **English** as the locale.
12. Select the registration validation.
13. Select Answer Logic hints.
14. Click **Apply**. A confirmation dialog appears telling you that the question was created successfully.
15. Click **OK** to dismiss the dialog.

    The **Question Details** page appears with information about the question and the question statistics.
16. After the question has been created, you can edit details.

7.11.2 Use Case: KBA Registration Logic

The security team has determined that it only wants to have challenge questions about sports and pets. Part A: You must log in to the OAAM Administration Console and delete all the questions for all categories except Sports and Pets. Before doing this you should export all the challenge questions as a backup in case you want to revert. Part B: The security team has also decided that each user should register four questions and that each registration menu should contain questions from at least four categories. Configure this in the OAAM Administration Console.

To configure KBA Registration Logic:

1. Log in to the OAAM Administration Console as an administrator.
2. In the Navigation tree, double-click **Questions** under **KBA**. The **Questions Search** page is displayed.

3. Select all the questions in the **Search Results** table to export all the challenge questions as a backup in case she wants to revert.

   Clicking the **#** in the column header selects all rows in the **Search Results** table.

4. Select **Export Selected** from the **Actions** menu.
5. In the **Export** dialog, select **Save File** and click **OK**.
6. Browse for the location to save the ZIP file and click **Save**.
7. After the export, in the **Search Results** table of the **Questions Search** page, sort questions by **Category**.
8. Select questions that are not in the category of Sports and Pets, and click the **Delete**.
9. In the Navigation tree, double-click **Registration Logic** under **KBA**. The **Registration Logic** page is displayed.
10. In **Categories per Menu**, enter **4**.
11. In **Questions per Menu**, enter **4**.
12. In **Questions User will Register**, enter **4**.
13. Click **Apply**.

7.11.3 Use Case: KBA Phone Challenge

CSRs can authenticate a user by asking challenge questions over the phone. KBA Phone Challenge can be used for any registered user.

1. CSR sees the user's status (i.e. **Block**, **Locked**, and so on) and the date/time of the last login attempt when a user calls.
2. CSR requests a question with the **Ask Question** action and is presented with a challenge question and the field to enter the user's response.
3. The challenge question presented is not the same question the user has failed online if the user is currently locked out.
4. The next question in the user's registered questions is presented to the CSR.
5. The user has a limited number of over the phone attempts at each question. See Section 7.1.10, "Failure Counters" for details and examples.
6. Error messages are displayed to notify the CSR.
7. This process continues until the user runs out of questions and attempts or the user has answered a question correctly.

7.11.4 KBA Question Edits

Jeff is a Security Admin and needs to import and edit KBA questions in English and Spanish and add a new English question.

To do so:

1. Import KBA questions in multiple languages.

   See Section 2.6, "Importing the OAAM Snapshot."

2. Edit the questions.

   See Section 7.5.5, "Editing a Question."

3. Add a new question.

   See Section 7.5.3, "Creating a New Question."

7.11.5 KBA Answer Logic Edits

Jeff, a Security Admin, needs to set the KBA answer logic so sloppy users are impacted by typing errors less often.

1. Set fatfingering answer logic to high.

   See Section 7.10.3, "Level of Answer Logic."

2. Test against specifications.

7.12 KBA Guidelines and Recommended Requirements

These recommendations provide guidelines for implementing KBA authentication. They provide guidance to institutions for configuring and implementing custom enrollment and challenge procedures within the guidelines of best practices.

7.12.1 Best Practice for How Often to Challenge

Knowledge-based authentication (KBA) is a form of secondary authentication where during authentication, the user is prompted by challenge questions and must provide previously registered answers.

Since KBA is a secondary authentication method it should only be presented after successful primary authentication. KBA challenge is necessary in medium to high risk situations. Challenging users too often and without significant risk degrades the user experience and possibly the security. The goal is to challenge users often enough so they can successfully recall their answers but not so often that they view it as a hindrance. As well, displaying the questions excessively increases the slim possibility of exposure to fraudsters through over-the-shoulder or some other attack. In general, a challenge roughly every month for a normal user is a good rate. Suspicious users should be blocked and should not have access to the system.

7.12.2 Best Practices for Managing Questions

Applying Validations

Many validations may be applied locally or globally. You must be careful not to apply any validations globally that you do not want to influence all answer registration. For example, if the "Four-digit year (YYYY)" validation is applied globally then only numeral answers are accepted during KBA registration. This is a problem if there are questions available to users that normally have alphanumeric answers.

Deleting Questions and Categories

You can create, edit, and delete questions and categories. You should take care when deleting categories and questions. Insufficient numbers of questions and categories can impact the security of the solution and cause usability issues. For example, if the **Categories per menu** Registration Logic is set to a number that is more than the total number of categories in the system then there may be duplicate questions listed. This can be confusing to users so it should be avoided.

Questions per Menu Setting

The **Questions per menu** setting should be between 4 and 7. This range provides a good mix of questions in a question set but does not expose too many questions to any single user.

Question User will Register Setting

The **Questions user will register** setting should be between 3 and 7. This provides enough questions to offer good security but does not over burden a user's memory. The basic industry standard for KBA is 3 registered questions.

The maximum and minimum limits are configurable through the following properties.

```
bharosa.config.type.kba_config.enum.regQuestionsCount.validation.minValue=3
bharosa.config.type.kba_config.enum.regQuestionsCount.validation.maxValue=7
```

Challenge Questions Configuration

It is recommended that you completely configure all of the challenge questions, including locale, before making the question available to users.

Challenge Question Disabling

If you disable a challenge question, users who previously had that question continue to have the question even after it is disabled. However, users that are registering for the first time or re-registering are not presented with the disabled question.

7.12.3 Guidelines for Designing Challenge Questions

Guidelines for designing challenge questions are listed below:

- Question should not require answers that are personally identifiable information. For example, do not ask for Social Security Number, and other identifiers.
- Questions should not require answers that can easily be discovered via public sources such as the internet. For example, what college did you graduate from?
- Questions should not have answers that change over time. For example, what is your girlfriends name?
- Questions should not have answers that are easy to guess. For example, what is your favorite weekday?
- Questions should not be specific to any one religion, culture or sub-culture. For example, who is your favorite apostle? Which Smurf do you most closely identify with? What race would you prefer to be in the Star Wars Galaxy?

7.12.4 Guidelines for Answer Input

Recommended requirements for answers are listed below:

- Answers must be at least 4 characters.
- No more than 2 answers can be the same during registration.
- Answers cannot have more than 2 repeating characters.
- Special characters are not allowed.
- Answers are not case-sensitive.
- Extra white spaces are removed.

- Fuzzy logic implemented - degree configurable by client.

7.12.5 Other Recommended Requirements

Other tips for challenge questions are:

- A unique question set should be generated for each user.
- The user should register 3-5 questions. i.e. 15 total questions to select from, 3 drop-down menus of 5 questions each.
- There should be a maximum of 2 questions from the same category.
- There should be a maximum opt-out - i.e. 3 opt-out attempts before forcing registration.
- When challenged, the same question is to be presented until the user responds correctly or question is reset by customer service agent.

8

Setting Up OTP Anywhere

OTP Anywhere is a secondary risk-based challenge solution consisting of a server generated one time password delivered to an end user via a configured out of band channel. Supported OTP delivery channels include short message service (SMS), email, and instant messaging.

This chapter focuses on setting up Oracle Adaptive Access Manager to use OTP for secondary, risk-based user challenges. Out of the box, OAAM provides User Messaging Service (UMS) as the delivery method. For other custom methods, refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

This chapter contains the following sections:

8.1 Introduction and Concepts

This section introduces you to the concept of One Time Password (OTP) and how it is used in Oracle Adaptive Access Manager.

8.1.1 What is a One Time Password

A one-time password is a randomly generated, single-use authentication credential. OTP is a form of secondary authentication that is used in addition to standard user name and password credentials to strengthen the existing authentication and authorization process, thereby providing additional security for users. When the user is OTP-challenged, a one-time password is generated and delivered to the user through one of the configured channels. The user must retrieve the one-time password and enter it when prompted, before the one-time password expires.

The one-time password may be either numeric or alphanumeric and any configured length and the randomization algorithm is pluggable.

The following are major benefits of using out-of-band OTP:

- The one time password is delivered to the valid user through one of the configured channels. These can include SMS, IM, and email.
- The user does not require any proprietary hardware or client software of any kind.

8.1.2 About Out-of-Band OTP Delivery

Oracle Adaptive Access Manager 11*g* contains one time password authentication capabilities that support delivery of the OTP via the following three out-of-band channels:

- email
- SMS
- instant messaging

By default, only cell phone registration is displayed on the OTP Registration page.

8.1.3 How Does OTP Work?

During the Registration process in OAAM, the user is asked to register for questions, image, phrase and OTP (email, phone, and so on) if the deployment supports OTP. Once successfully registered, OTP can be used as a secondary authentication to challenge the user.

The administrator can enable the OTP if the deployment supports OTP. The login process begins with entering standard user name and password credentials. During a session, for example, when the user is making a large transaction, if the user is OTP-challenged, the password is delivered to the user through the configured delivery channel. The user retrieves the one-time password, then enters it.

If the correct answer is provided, the user is directed to continue with the operation. If the user answers incorrectly, he is allowed other attempts until he either answers correctly or is locked out of his account after a certain number of failures. By default, the user is allowed three attempts to provide the correct answer.

8.1.4 OTP Failure Counters

The failure counter is incremented when the user supplies an incorrect answer during a challenge.

OTP failure counters consolidate failures from different channels. For example, if multiple channels are used, the OTP status displays Locked if the combined OTP counters are above the threshold. So, if user failed SMS twice and Email once and threshold is 3, the user is locked.

The Reset Action resets all challenge failure counters:

- Reset KBA: Re-register KBA; KBA and OTP counters are reset to zero
- CSR KBA reset: Re-register KBA; KBA and OTP counters are reset to zero
- Reset OTP: Re-register OTP; KBA and OTP counters are reset to zero

The Unlock action unlocks the user account for both KBA and OTP:

- Unlock KBA: KBA and OTP counters are reset to zero

- Unlock OTP: KBA and OTP counters are reset to zero.

8.1.5 Challenge Type

The challenge type is the delivery channel used to send an OTP to challenge the user. For example, policies can challenge using OTP via the challenge type (email, SMS, or IM).

Table 8–1 OTP Challenge Types

Challenge Type	Description
ChallengeEmail	OTP challenge via email
ChallengeSMS	OTP challenge via SMS
ChallengeIM	OTP challenge via instant messaging

An integrator can create or configure a challenge type to handle a challenge that is required, such as generating the "secret" used for the challenge to delivering the "secret" to the user and finally validating the user's input.

The challenge type properties are used to associate a challenge type with a Challenge Processor, the java code needed to perform any work for challenges.

8.1.6 KBA vs. OTP

Oracle Adaptive Access Manager deployments may choose to use both KBA and OTP or each separately or no challenge mechanisms at all. If both KBA and OTP are being used in a deployment, the security team may choose to use OTP first for high risk situations and then KBA.

For example, a user logging in from a new IP addresses in a city he often logs in from is relatively low risk on its own, so a KBA challenge is a good option to gain additional verification that this is the valid user. If, however, a user is attempting a funds transfer of more than $1000 using a device and location he has never accessed from previously and the user has never performed a transfer, a stronger measure such as OTP Anywhere would be warranted.

If a customer has both KBA and OTP enabled, the priority is configurable through properties. The default is to OTP challenge first and then KBA challenge for high risk situations.

For information on KBA and OTP Anywhere priority, see Table 10–33, " OAAM Challenge Trigger Combinations".

8.2 Quick Start

The first step in starting to use OTP Anywhere is to enable it using the Properties Editor in the OAAM Administration Console.

This checklist provides you with the basic steps for enabling OTP Anywhere out of the box. Included are links to pertinent documentation and prerequisites.

Table 8–2 Quick Start for Enabling OTP Out of the Box

#	Task	Details
1	Enable OTP Anywhere Registration	OTP Challenge is not enabled by default. It has to be enabled by setting the following properties to true: ■ `bharosa.uio.default.register.userinfo.enabled` Setting this property to true enables OTP profile in the registration flow ■ `bharosa.uio.default.userpreferences.userinfo.enabled` Setting this property to true enables the OTP profile in User Preferences
2	Make SMS Challenge Type Available.	Enable the SMS Challenge Type by setting the following property to true: `bharosa.uio.default.challenge.type.enum.ChallengeSMS.available` This makes it possible for the policies to challenge using OTP via SMS.
3	Configure UMS URLs and Credentials.	Set the following properties: ■ `bharosa.uio.default.ums.integration.webservice` - UMS Web service URL ■ `bharosa.uio.default.ums.integration.parlayx.endpoint` - UMS ParlayX URL ■ `bharosa.uio.default.ums.integration.useParlayX=false` - Configures use of Web service or parlayx API. Value is false by default (preferred). ■ `bharosa.uio.default.ums.integration.userName` - UMS integration user name ■ `bharosa.uio.default.ums.integration.password` - UMS integration password

8.3 Setup Roadmap

Table 8–3 lists the high-level tasks for configuring OTP for use with OAAM.

Table 8–3 OTP Setup Tasks

Number	Task	Information
1	Enable and configure User Messaging Service (UMS) for SMS delivery gateways on the SOA that the OAAM Server is configured to send messages through and the SMS delivery channel. UMS comes with a number of drivers that handle traffic for a specific channel. Configure UMS to use SMS for sending the one-time password.	Section 8.4, "Prerequisites for Configuring OTP."
2	Set up UMS URLs and credentials so that OAAM can communicate with the UMS server via web services APIs to send the OTP code to the user via the challenge type.	Section 8.5, "Setting Properties in OAAM for UMS Integration."
3	Enable the SMS challenge type so that it can be used to challenge the user if secondary authentication is required.	Section 8.6, "Enabling OTP Challenge."
4	Enable registration and user preferences. The user can use the pages for profile registration and resetting OTP profile.	Section 8.7, "Enabling Registration and Preferences."

Table 8–3 (Cont.) OTP Setup Tasks

Number	Task	Information
5	Set up the registration and preferences page input fields for the user. Input properties includes maximum length for the email address the user can enter, validation for the email address field (expression), and so on. Note: Any user facing strings need to be duplicated into resource bundle.	Section 8.8, "Setting Up the Registration Page."
6	Configure your policies to use OTP challenges.	Section 8.9, "Configuring Your Policies and Rules to Use OTP Challenge."
7	The registration page could be fully customized using the resource bundle (client_resource_<locale>.properties file). Also, the challenge type message subject, the body of the message, and the message itself could be fully customized by specifying the custom values in resource bundle files and deploying the changes via OAAM extension shared libraries	Section 8.10, "Customizing OTP Registration Text and Messaging."

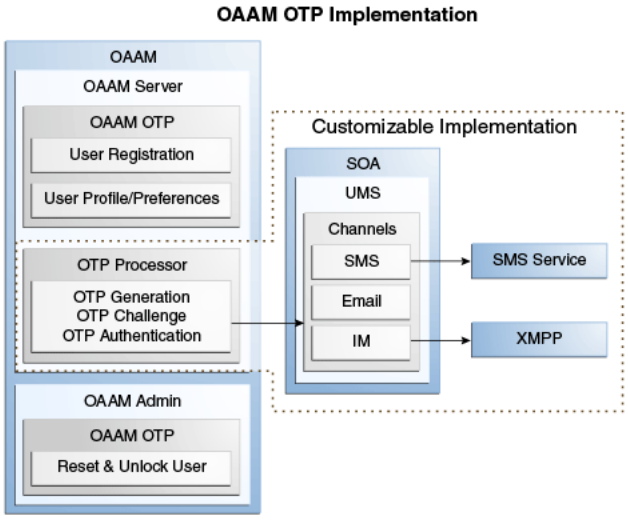
8.4 Prerequisites for Configuring OTP

Ensure that the following prerequisites are met before configuring OTP for your application:

- Install SOA Suite
- Configure the Delivery Channels

Figure 8–2 shows an OTP implementation.

Figure 8–1 An OTP Implementation



8.4.1 Install SOA Suite

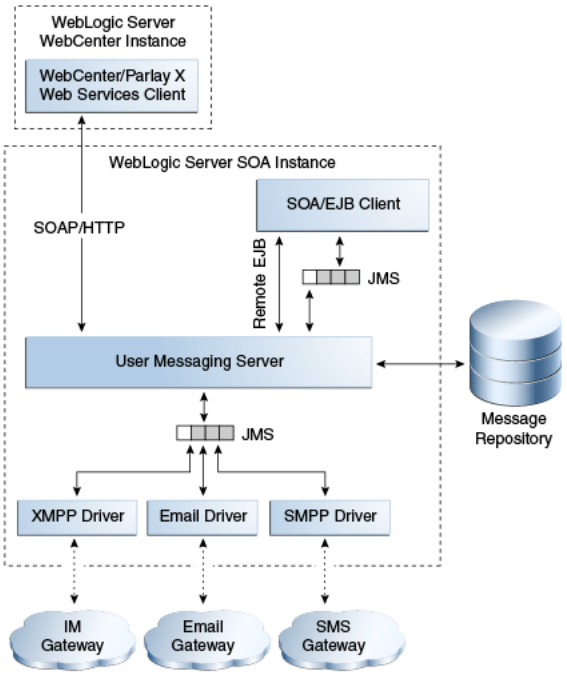
Install the Oracle SOA Suite, which contains UMS.

For information, refer to the *Oracle Fusion Middleware Installation Guide for Oracle SOA Suite and Oracle Business Process Management Suite*.

8.4.2 Configure the Delivery Channels

In addition to the components that comprise UMS itself, the other key entities in a messaging environment are the external gateways required for each messaging channel. These gateways are not a part of UMS or Oracle WebLogic Server. Since UMS drivers support widely-adopted messaging protocols, UMS can be integrated with existing infrastructures such as an email servers or XMPP servers. Alternatively, UMS can connect to outside providers of SMS service that support SMPP.

Figure 8–2 Oracle User Messaging Service



UMS must be configured for appropriate delivery gateways on the SOA that the OAAM Server is configured to send messages through.

UMS Drivers connect UMS to the messaging gateways, adapting content to the various protocols supported by UMS. Drivers can be deployed or undeployed independently of one another depending on what messaging channels are available in a given installation.

8.4.2.1 Email Driver

Configure the Email driver to a SMTP server. See the "Configuring the Email Driver" section of *Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite* for how to configure the Email driver.

8.4.2.2 SMPP Driver

Short Message Peer-to-Peer (SMPP) is one of the most popular GSM SMS protocols. User Messaging Service includes a prebuilt implementation of the SMPP protocol as a driver that is capable of both sending and receiving short messages.

Note: For SMS, unlike the Email driver that is deployed out-of-the-box, you need to deploy the SMPP driver first before modifying the configurations.

Configure the SMPP driver as described in the "Configuring the SMPP Driver" section of the *Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite*. You will need to provide parameter values for connecting to the driver gateway vendor.

Table 8–4 Connecting to the Vendor

Parameter	Description
SmsAccountId	The Account Identifier on the SMS-C. This is your vendor account ID which you need to get from the vendor.
SmsServerHost	The name (or IP address) of the SMS-C server. TransmitterSystemId
TransmitterSystemPassword	The password of the transmitter system. This includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, and Use Cleartext Password) and Password. This is the password corresponding to your vendor account ID
TransmitterSystemType	The type of transmitter system. The default is Logica.
ReceiverSystemId	The account ID that is used to receive messages. ReceiverSystemPassword
ReceiverSystemType	The type of receiver system. The default is Logica.
ServerTransmitterPort	The TCP port number of the transmitter server.
ServerReceiverPort	The TCP port number of the receiver server.
DefaultEncoding	The default encoding of the SMPP driver. The default is IA5. Choose from the drop-down list: IA5, UCS2, and GSM_DEFAULT.
DefaultSenderAddress	Default sender address

After providing the parameter values, press **Apply**. To have these settings take effect, the driver has to be restarted.

8.5 Setting Properties in OAAM for UMS Integration

To set up the UMS server for OAAM, proceed as follows:

1. Log in to the OAAM Administration Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. Enter `bharosa.uio.default.ums.integration.webservice` in the **Name** field and click **Search**.
4. Click to select the property in the Search Results section, change the value to the UMS Server Web service URL, and click **Save**.
5. Continue searching for properties and changing their values to set up the server for use with OAAM. The UMS server properties are shown in Table 8–5.
6. After you set up the UMS server properties, restart the application.

The properties to set for the UMS server URLs and credentials are listed below.

Note: End point is the Web Services URL that OAAM uses to send calls into UMS.

Table 8–5 UMS Server URLs and Credentials

Property	Default Value	Description
bharosa.uio.default.ums.integration.webservice		UMS Server Web service URL http://<UMS Server URL>:<UMS Port>/ucs/messaging/webservice
bharosa.uio.default.ums.integration.parlayx.endpoint		UMS Server ParlayX Endpoint URL http://<UMS Server URL>:<UMS Port>/sdpmessaging/parlayx/SendMessageService
bharosa.uio.default.ums.integration.useParlayX	false	Configures the use of web service or parlayx API. The value is false by default (Web services recommended)
bharosa.uio.default.ums.integration.userName		User name for UMS server
bharosa.uio.default.ums.integration.password		Password for UMS server
bharosa.uio.default.ums.integtaion.policies		UMS authentication policies
bharosa.uio.default.ums.integration.fromAddress	jane@mycompany.example.com	OAAM from address for OTP messages
bharosa.uio.default.ums.integration.message.status.poll.attempts	3	Number of times to attempt status poll each time the wait page is displayed
bharosa.uio.default.ums.integration.message.status.poll.delay	1000	Delay between status polls while the wait page is being displayed
bharosa.uio.default.ums.integration.sleepInterval	10000	
bharosa.uio.default.ums.integration.deliveryPage.delay	3000	

8.6 Enabling OTP Challenge

To enable the SMS challenge type on the OAAM Server, proceed as follows:

1. Log in to the OAAM Administration Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. If you want to enable the SMS challenge type, enter `bharosa.uio.default.challenge.type.enum.ChallengeSMS.available` in the **Name** field and click **Search**.

   If you want to enable the Email challenge type, enter `bharosa.uio.default.challenge.type.enum.ChallengeSMS.available` in the **Name** field and click **Search**.
4. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.
5. Continue searching for properties and changing their values to define the challenge type. SMS and Email challenge type properties are shown in Table 8–6 and Table 8–7.

SMS Challenge Type Properties

Properties defining the SMS challenge is provided below.

Table 8–6 Properties for SMS Challenge Type

Property	Default Value	Description
bharosa.uio.default.challenge.type.enum.ChallengeSMS	2	SMS Challenge enum value
bharosa.uio.default.challenge.type.enum.ChallengeSMS.name	SMS Challenge	Name of SMS challenge type
bharosa.uio.default.challenge.type.enum.ChallengeSMS.description	SMS Challenge	Description of SMS challenge type
bharosa.uio.default.challenge.type.enum.ChallengeSMS.processor	com.bharosa.uio.processor.challenge.ChallengeSMSProcessor	Processor class for SMS challenge type Specifies the java class for handling challenges of this type. The challenge mechanism is customizable through Java classes. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for information.
bharosa.uio.default.challenge.type.enum.ChallengeSMS.requiredInfo	mobile	Required fields to challenge user with SMS challenge type A comma separated list of inputs from registration input enum
bharosa.uio.default.challenge.type.enum.ChallengeSMS.available	false	Availability flag for SMS challenge type Specifies if the challenge type is available for use (service ready and configured). To enable/disable an OTP challenge type, the available flag should be set.
bharosa.uio.default.challenge.type.enum.ChallengeSMS.otp	true	OTP flag for SMS challenge type

Email Challenge Type

Properties to define the email challenge type are presented below:

Table 8–7 Properties for Email Channel Type

Property	Default Value	Description
bharosa.uio.default.challenge.type.enum.ChallengeEmail	1	Email Challenge enum value
bharosa.uio.default.challenge.type.enum.ChallengeEmail.name	Email Challenge	Name of email challenge type
bharosa.uio.default.challenge.type.enum.ChallengeEmail.description	Email Challenge	Description of email challenge type
bharosa.uio.default.challenge.type.enum.ChallengeEmail.processor	com.bharosa.uio.processor.challenge.ChallengeEmailProcessor	Processor class for email challenge type Specifies the java class for handling challenges of this type. The challenge mechanism is customizable through Java classes. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for information.

Table 8–7 (Cont.) Properties for Email Channel Type

Property	Default Value	Description
bharosa.uio.default.challenge.type.enum.ChallengeEmail.requiredInfo	email	Required fields to challenge user with email challenge type A comma separated list of inputs from registration input enum
bharosa.uio.default.challenge.type.enum.ChallengeEmail.available	false	Availability flag for email challenge type Specifies if the challenge type is available for use (service ready and configured). To enable/disable an OTP challenge type, the available flag should be set.
bharosa.uio.default.challenge.type.enum.ChallengeEmail.otp	true	OTP flag for email challenge type

8.7 Enabling Registration and Preferences

The following properties must be enabled so the registration and preferences pages can be used to enable profile registration and changing preferences.

Table 8–8 Enable OTP Profile Registration and Preference Setting

Property	Description
bharosa.uio.default.register.userinfo.enabled	Setting the property to true enables the profile registration pages if the OTP channel is enabled and requires registration.
bharosa.uio.default.userpreferences.userinfo.enabled	Setting the property to true enables the user to set preferences if the OTP channel is enabled and allows preference setting. User Preferences is a page that allows the user to change their image/phrase, challenge questions, un-register devices, and update their OTP profile.

To enable registration and preferences:

1. Log in to the OAAM Administration Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. Enter `bharosa.uio.default.register.userinfo.enabled` in the **Name** field and click **Search**.
4. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.
5. Enter `bharosa.uio.default.userpreferences.userinfo.enabled` in the **Name** field and click **Search**.
6. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.

8.8 Setting Up the Registration Page

Setting up the registration page involves the following tasks:

8.8.1 Enabling the Opt-Out for OTP Registration and Challenge

If you want the user to be able to opt-out of registering an OTP profile, you can enable a **Decline** button on the OTP registration page. If he chooses to decline registration of an OTP profile, he will not be asked again to register OTP, and he will not receive OTP challenges. However if a customer representative resets a user's OTP profile through a reset all, the user will have an opportunity to register OTP again.

Even if the user has opted out of OTP registration and challenge, he can still access the OTP page in User Preferences and add register for OTP.

To control the presence of the **Decline** button on the profile registration pages:

1. Log in to the OAAM Administration Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. Enter `bharosa.uio.default.otp.optOut.enabled` in the Name field and click Search.
4. Click to select the property in the Search Results section, change the value to true, and click Save. in the **Name** field and click **Search**.
5. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.
6. Enter `bharosa.uio.default.register.userinfo.decline.enabled` in the **Name** field and click **Search**.
7. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.
8. Enter `bharosa.uio.default.userpreferences.userinfo.enabled` in the **Name** field and click **Search**.
9. Click to select the property in the Search Results section, change the value to `true`, and click **Save**.

Note: The property to opt-out must be set to true for the Decline button to be available. If the other two properties are true and opt-out is false, the button will not be displayed.

8.8.2 Configuring Checkboxes and Fields on the Registration Pages

To configure terms and conditions checkboxes and fields in the OTP registration page, add the properties in the sections following to the `oaam_custom.properties` file.

To configure checkboxes and fields, follow these steps:

1. Create a work folder called `oaam_extensions`. (The folder can be created anywhere as long as it is outside the installation folder.)
2. Locate `oracle.oaam.extensions.war`, which is located in the *IAM_Home*`/oaam/oaam_extensions/generic` directory.
3. Explode `oracle.oaam.extensions.war` into the `oaam_extensions` folder.

4. Open the `oaam_custom.properties` file in the `WEB-INF/classes/bharosa_properties` directory of the `oracle.oaam.extensions.war` file.
5. Add properties from Section 8.8.2.1, "Configure Terms and Conditions Checkboxes" and Section 8.8.2.2, "Configuring Text Fields on Registration and Preference Pages."
6. Rejar `oracle.oaam.extensions.war` from the parent folder of `oaam_extensions` using the command:

   ```
   jar -cvfm oracle.oaam.extensions.war oaam_
   extensions\META-INF\MANIFEST.MF -C oaam_extensions/ .
   ```

7. Shut down the OAAM Admin and OAAM Server managed servers.
8. Start the WebLogic Server where Oracle Adaptive Access Manager is deployed and log in to the WebLogic Administration Console.
9. Navigate to Domain **Environment** > **Deployments** and lock the console.
10. Click the **Install** button.
11. Browse to the location of the `oracle.oaam.extensions.war` file and select it by clicking the radio button next to the .war file and clicking **Next**.
12. Ensure **Install this deployment as a library** is selected and click **Next**.
13. Select deployment targets, OAAM Admin and OAAM Server.
14. Click **Next** again to accept the defaults in this next page and then click **Finish**.
15. Click the **Save** button and then A**ctivate Changes**.
16. Start the OAAM Admin and OAAM managed servers.

8.8.2.1 Configure Terms and Conditions Checkboxes

Table 8–9 shows the properties to configure checkboxes in the registration page.

Table 8–9 Terms and Conditions Checkbox

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.terms	4	Terms and Conditions enum value
bharosa.uio.default.userinfo.inputs.enum.terms.name	Terms and Conditions	Name for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.description	Terms and Conditions	Description for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.inputname	terms	HTML input name for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.inputtype	checkbox	HTML input type for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.values	true	Required values for Term and Conditions checkbox during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.terms.maxlength	40	HTML input max length for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.required	true	Required flag for Term and Conditions checkbox during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.terms.order	5	Order on the page for Terms and Conditions checkbox

Table 8–9 (Cont.) Terms and Conditions Checkbox

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.terms.enabled	true	Enabled flag for Terms and Conditions enum item
bharosa.uio.default.userinfo.inputs.enum.terms.regex	.+	Regular expression for validation of Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.errorCode	otp.invalid.terms	Error code to get error message from if validation of Terms and Conditions fails
bharosa.uio.default.userinfo.inputs.enum.terms.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager	Java class to use to save / retrieve Terms and Conditions from data storage

8.8.2.2 Configuring Text Fields on Registration and Preference Pages

Set up text and fields on registration and preference pages. Input properties includes maximum length for the email address the user can enter, validation for the email address field (expression), and so on.

If user information registration or user preferences is set to true, the settings are used for the OTP registration and preferences page. The `bharosa.uio.default.userinfo.inputs.enum` property values are shown in Table 8–10.

Table 8–10 OTP Registration Input Properties

Property	Description
inputname	Name used for the input field in the HTML form
inputtype	Set for text or password input
maxlength	Maximum length of user input
required	Set if the field is required on the registration page
order	The order displayed in the user interface
regex	Regular expression used to validate user input for this field
errorCode	Error code used to look up validation error message (bharosa.uio.<application ID>.error.<errorCode>)
managerClass	java class that implements com.bharosa.uio.manager.user.UserDataManagerIntf (if data is to be stored in Oracle Adaptive Access Manager database this property should be set to com.bharosa.uio.manager.user.DefaultContactInfoManager)

Mobile Input Registration Field Properties

Add these properties to configure the mobile registration fields.

Table 8–11 Mobile Input - Properties File

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.mobile	0	Mobile phone enum value
bharosa.uio.default.userinfo.inputs.enum.mobile.name	Mobile Phone	Name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.description	Mobile Phone	Description for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.inputname	cell number	HTML input name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.inputtype	text	HTML input type for mobile phone field

Table 8–11 (Cont.) Mobile Input - Properties File

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.mobile.maxlength	15	HTML input max length for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.required	true	Required flag for mobile phone field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.mobile.order	1	Order on the page for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.enabled	true	Enabled flag for mobile phone enum item
bharosa.uio.default.userinfo.inputs.enum.mobile.regex	\\D?(\\d{3})\\D?\\D?(\\d{3})\\D?(\\d{4})	Regular expression for validation of mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.errorCode	otp.invalid.mobile	Error code to get error message from if validation of mobile phone entry fails
bharosa.uio.default.userinfo.inputs.enum.mobile.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager	Java class to use to save / retrieve mobile phone from data storage

Other Examples

Add the following properties to configure fields for a second mobile device to register:

Table 8–12 Mobile Input

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.mobile2	2	Mobile phone enum value
bharosa.uio.default.userinfo.inputs.enum.mobile2.name	Mobile Phone 2	Name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.description	Mobile Phone 2	Description for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.inputname	cell number 2	HTML input name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.inputtype	text	HTML input type for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.maxlength	15	HTML input max length for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.required	true	Required flag for mobile phone field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.mobile2.order	2	Order on the page for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.enabled	true	Enabled flag for mobile phone enum item
bharosa.uio.default.userinfo.inputs.enum.mobile2.regex	\\D?(\\d{3})\\D?\\D?(\\d{3})\\D?(\\d{4})	Regular expression for validation of mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.errorCode	otp.invalid.mobile	Error code to get error message from if validation of mobile phone entry fails
bharosa.uio.default.userinfo.inputs.enum.mobile2.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager	Java class to use to save / retrieve mobile phone from data storage

The follow properties are used for defining email registration on the OTP registration page of an authenticator:

Table 8–13 Email Input

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.email	1	Email address enum value
bharosa.uio.default.userinfo.inputs.enum.email.name	Email Address	Name for email address field
bharosa.uio.default.userinfo.inputs.enum.email.description	Email Address	Description for email address field
bharosa.uio.default.userinfo.inputs.enum.email.inputname	email	HTML input name for email address field
bharosa.uio.default.userinfo.inputs.enum.email.inputtype	text	HTML input type for email address field
bharosa.uio.default.userinfo.inputs.enum.email.maxlength	40	HTML input max length for email address field
bharosa.uio.default.userinfo.inputs.enum.email.required	true	Required flag for email address field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.email.order	2	Order on the page for email address field
bharosa.uio.default.userinfo.inputs.enum.email.enabled	false	Enabled flag for email address enum item
bharosa.uio.default.userinfo.inputs.enum.email.regex	.+@[a-zA-Z_]+?\\.[a-zA-Z]{2,3}	Regular expression for validation of email address field
bharosa.uio.default.userinfo.inputs.enum.email.errorCode	otp.invalid.email	Error code to get error message from if validation of email address entry fails
bharosa.uio.default.userinfo.inputs.enum.email.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager	Java class to use to save / retrieve email address from data storage

The following is an example of an enum for adding a second email to register:

Table 8–14 Email Input

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.email2	2	Email address enum value
bharosa.uio.default.userinfo.inputs.enum.email2.name	Email Address 2	Name for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.description	Email Address 2	Description for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.inputname	email2	HTML input name for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.inputtype	text	HTML input type for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.maxlength	40	HTML input max length for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.required	true	Required flag for email address field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.email2.order	2	Order on the page for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.enabled	false	Enabled flag for email address enum item
bharosa.uio.default.userinfo.inputs.enum.email2.regex	.+@[a-zA-Z_]+?\\.[a-zA-Z]{2,3}	Regular expression for validation of email address field
bharosa.uio.default.userinfo.inputs.enum.email2.errorCode	otp.invalid.email	Error code to get error message from if validation of email address entry fails
bharosa.uio.default.userinfo.inputs.enum.email2.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager	Java class to use to save / retrieve email address from data storage

8.9 Configuring Your Policies and Rules to Use OTP Challenge

Policies in the Challenge checkpoint determine the type of challenge to present the user. For more information, refer to Section 10.11.1, "OAAM Challenge."

To configure a policy with a rule that OTP-challenge users for specific scenarios, perform the following steps:

1. Log in to the OAAM Administration Console.
2. Double-click **Policies** in the Navigation pane.

   The Policies Search page displays.
3. In the **Policies Search** page, click the **New Policy** button.

   The **New Policy** page appears. In the **Summary** tab, create a post-authentication security policy:

   a. For Policy Name, enter **OTP Challenge for Many Failures**.

   b. For **Description**, enter a description for the policy.

   c. For **Checkpoint**, select **Post-Authentication**.

   d. Modify the policy status, scoring engine, and weight according to your requirements.

      By default, the policy status is **Active**. A policy that is disabled is not enforced at the checkpoint.

   e. Click **Apply**.

   f. Click **OK** to dismiss the confirmation dialog.
4. Click the Rules tab to select it.

   a. Add general summary information about the rule.

   b. On the conditions tab, add `User: Check OTP failures` condition or other OTP-related conditions.
5. On the Results tab, specify `OAAM challenge` as the Action group.
6. Link the policy to all users.

In default policies, if OTP is enabled, KBA challenges occurs after a user is OTP blocked.

High risk user are OTP challenged. The user is presented with the appropriate virtual authentication device and receives the OTP through the proper channel. If the user fails the OTP challenge, he is KBA-challenged.

8.10 Customizing OTP Registration Text and Messaging

The registration page text, the challenge type message subject, the body of the message, and the message itself could be fully customized by specifying the custom values in resource bundle files and deploying the changes via OAAM extension shared libraries.

To customize content and messaging of the registration pages you will add properties, described in the sections following, to the `client_resource_`*locale*`.properties` file.

1. Create a work folder called `oaam_extensions`. (The folder can be created anywhere as long as it is outside the installation folder.)

2. Locate `oracle.oaam.extensions.war`, which is located in the *IAM_Home*`/oaam/oaam_extensions/generic` directory.
3. Explode `oracle.oaam.extensions.war` into the `oaam_extensions` folder.
4. Create a `client_resource_`*locale*`.properties` in *IAM_Home\oaam\oaam_extensions\generic\WEB-INF\classes*.
5. Add the customized text and messages to this file.

   For example, to customize the terms and conditions, add the following line to `client_resource_`*locale*`.properties`:

   ```
   bharosa.uio.default.userinfo.inputs.enum.terms.name=I agree to the
   COMPANY A terms & conditions. Click to view full <a
   href="javascript:infoWindow('terms');">Terms & Conditions</a> and <a
   href="javascript:infoWindow('privacy');">Privacy Policy</a>.
   ```

   For example, to customize the message displayed when a user registers his mobile phone, add the following line to `client_resource_`*locale*`.properties`:

   ```
   bharosa.uio.default.register.userinfo.message=For your protection
   please enter your mobile telephone number so we may use it to verify
   your identity in the future. Please ensure that you have text messaging
   enabled on your phone.
   ```

6. Rejar `oracle.oaam.extensions.war` from the parent folder of `oaam_extensions` using the command:

   ```
   jar -cvfm oracle.oaam.extensions.war oaam_
   extensions\META-INF\MANIFEST.MF -C  oaam_extensions/ .
   ```

7. Shut down the OAAM Admin and OAAM Server managed servers.
8. Start the WebLogic Server where Oracle Adaptive Access Manager is deployed and log in to the WebLogic Administration Console.
9. Navigate to Domain **Environment** > **Deployments** and lock the console.
10. Click the **Install** button.
11. Browse to the location of the `oracle.oaam.extensions.war` file and select it by clicking the radio button next to the .war file and clicking **Next**.
12. Ensure **Install this deployment as a library** is selected and click **Next**.
13. Select deployment targets, OAAM Admin and OAAM Server.
14. Click **Next** again to accept the defaults in this next page and then click **Finish**.
15. Click the **Save** button and then A**ctivate Changes**.
16. Start the OAAM Admin and OAAM managed servers.

8.10.1 Customizing Terms and Conditions

To customize the Terms and Condition text, add the following properties to the resource bundle, client_resource_<locale>.properties:

Table 8–15 Messaging of Terms and Conditions

Property	Descriptions
bharosa.uio.default.userinfo.inputs.enum.terms.name	I agree to the [ENTER COMPANY OR SERVICE NAME HERE] terms & conditions. Click to view full Terms & Conditions and Privacy Policy.
bharosa.uio.default.userinfo.inputs.enum.terms.description	Message and Data Rates May Apply. For help or information on this program send "HELP" to [ENTER SHORT/LONG CODE HERE]. To cancel your plan, send "STOP" to [ENTER SHORT/LONG CODE HERE] at anytime. For additional information on this service please go to [ENTER INFORMATIONAL URL HERE]. Supported Carriers: AT&T, Sprint, Nextel, Boost, Verizon Wireless, U.S. Cellular®, T-Mobile®, Cellular One Dobson, Cincinnati Bell, Alltel, Virgin Mobile USA, Cellular South, Unicel, Centennial and Ntelos

The value for `bharosa.uio.default.userinfo.inputs.enum.terms.name` includes placeholder links that use OAAM Server popup messaging for "Terms & Conditions" and "Privacy Policy". The property and resource keys for the contents of the popups are listed as follows.

Table 8–16 Terms & Conditions and Privacy Policy Popup Messaging

Property	Descriptions
bharosa.uio.default.messages.enum.terms.name	Terms and Conditions
bharosa.uio.default.messages.enum.terms.description	PLACEHOLDER TEXT FOR TERMS AND CONDITIONS
bharosa.uio.default.messages.enum.privacy.name	Privacy Policy
bharosa.uio.default.messages.enum.privacy.description	PLACEHOLDER TEXT FOR PRIVACY POLICY

8.10.2 Customizing Mobile Input Registration Fields

To customize mobile input fields, these properties can be added to the resource bundle, client_resource_<locale>.properties:

Table 8–17 Mobile Input - Resource Bundle

Property	Default Value	Description
bharosa.uio.default.userinfo.inputs.enum.mobile.name	Mobile Phone	Name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.description	Mobile Phone	Description for mobile phone field

8.10.3 Customizing Registration Page Messaging

To customize the registration page messaging, add the following registration properties to client_resource_<locale>.properties:

Table 8–18 Registration Resource Bundle

Property	Default Value
bharosa.uio.default.register.userinfo.title	OTP Anywhere Registration
bharosa.uio.default.register.userinfo.message	For your protection please enter your mobile telephone number so we may use it to verify your identity in the future. Please ensure that you have text messaging enabled on your phone.
bharosa.uio.default.register.userinfo.registerdevice.message	Check to register the device that you are currently using as a safe device:
bharosa.uio.default.register.userinfo.continue.button	Continue
bharosa.uio.default.register.userinfo.decline.message	If you decline you will not be asked to register again.
bharosa.uio.default.register.userinfo.decline.button	Decline

8.10.4 Customizing Challenge Messaging

To customize the challenge type fields, add the following properties to the resource bundle, client_resource_<locale>.properties:

Table 8–19 Challenge Type Resource Bundle Items

Property	Default Value
bharosa.uio.default.ChallengeSMS.message	For your protection please enter the code we just sent to your mobile telephone. If you did not receive a code please ensure that text messaging is enabled on your phone and click the resend link below.
bharosa.uio.default.ChallengeSMS.registerdevice.message	Check to register the device that you are currently using as a safe device:
bharosa.uio.default.ChallengeSMS.continue.button	Continue

8.10.5 Customizing the OTP Messaging

To customize the OTP messaging, add these properties to the resource bundle, client_resource_<locale>.properties:

Note: User facing strings need to be duplicated into resource bundle. Resource bundle values can be customized by adding them to the `client_resource_<locale>.properties` and deploying the file in OAAM Extensions Shared Library.

Table 8–20 Challenge Type Resource Bundle Items

Property	Default Value
bharosa.uio.default.ChallengeSMS.incorrect.message	Incorrect OTP. Please try again.
bharosa.uio.default.ChallengeSMS.message.subject	Oracle OTP Code
bharosa.uio.default.ChallengeSMS.message.body	Your Oracle SMS OTP Code is: {0}

8.11 Other Configuration Tasks

If you want to change the defaults for expiry time, password generation, failure counter, and challenge type devices for OTP, the procedures are provided in this section for your reference.

8.11.1 Configuring One Time Password Expiry Time

> **Note:** This property works for the OTP API, but as of now OAAM Server does not use the API. Hence, by default, OAAM Server OTP is valid for the session or until used.

To set up OTP SMS password expiry time, add the following property:

`bharosa.uio.default.challenge.type.enum.ChallengeSMS.otpexpirytimeMs`

To set up OTP email password expiry time, add the following property:

`bharosa.uio.default.challenge.type.enum.ChallengeEmail.otpexpirytimeMs` to `oaam_custom.properties`.

The time is in milliseconds. If the value is not in milliseconds, you will have to perform a conversion. For example, if you want to set the expiration time for OTP to be 5 minutes, then you need to set the property to 300000 ms (5 minutes).

8.11.2 Configure One-Time Password Generation

You can configure the one-time password through properties edits. The following properties are used to generate the OTP:

```
# OTP pin generation config
bharosa.uio.otp.generate.code.length = 5
bharosa.uio.otp.generate.code.characters = 1234567890
```

The default OTP codes will be 5 characters made up of the numbers 0-9 (for example: 44569).

`bharosa.uio.otp.generate.code.length` designates the length of the OTP.

`bharosa.uio.otp.generate.code.characters` designates the characters to use when generating the OTP.

An example is shown below for generating a 4 character OTP code with numbers 0-9 and letters a-d (for example: 0c6a):

```
bharosa.uio.otp.generate.code.length = 4
bharosa.uio.otp.generate.code.characters = 1234567890abcd
```

8.11.3 Configuring Failure Counter

When a user fails the OTP challenge, a counter is updated to indicate that user has had a failure.

The failure counter is set by default in the OAAM Challenge Policy, but you can customize it by following these instructions:

1. Open the OAAM Challenge Policy.
2. Open the appropriate maximum failed OTP rule and edit the appropriate properties. For information, refer to the table below.

Table 8–21 OAAM Maximum OTP Failed Rule Details

Rule	Rule Condition and Parameters	Results
Max failed SMS attempts	User: Check OTP failures	Action = NONE
	OTP Challenge Type = ChallengeSMS	Alert = NONE
	Failure More than or Equal To = 3	Score = 0
	If above or equal = TRUE	
Max failed Email attempts	User: Check OTP failures	Action = NONE
	OTP Challenge Type = ChallengeEmail	Alert = NONE
	Failure More than or Equal To = 3	Score = 0
	If above or equal = TRUE	
Max failed Question attempts	User: Challenge Maximum Failures	Action = NONE
	Number of Failures More than or equal to = 3	Alert = NONE
	Current Question Count only? = False	Score = 0
	If above or equal, return = True	

8.11.4 Configuring Challenge Type Devices for OTP

If you want to change the default challenge type devices used for challenges, proceed as follows:

1. Log in to the OAAM Administration Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. Enter `bharosa.uio.default.use.authentipad.checkpoint` in the Name field and click Search.
4. Click to select the property in the Search Results section, change the value to `false`, and click Save. in the **Name** field and click **Search**.
5. Click the New Property button to add a new property:

   bharosa.uio.default.*ChallengeType*.authenticator.device=*Device*

   Then click **Save** to save the property.

   Examples of configuring SMS and Email challenges to use the device textpad are shown below:

```
bharosa.uio.default.ChallengeSMS.authenticator.device=DeviceTextPad
bharosa.uio.default.ChallengeEmail.authenticator.device=DeviceTextPad
```

Table 8–22 shows the properties for the various authentication device types. In the example, the SMS and Email authenticators will be the device text pad since the value, DeviceTextPad, was specified. If DeviceKeyPadAlpha was specified as the value, an alphanumeric KeyPad would be displayed.

Table 8–22 Authentication Device Type

Property	Description
None	No HTML page or authentication pad
DeviceKeyPadFull	Challenge user using KeyPad.
DeviceKeyPadAlpha	Challenge user with the alphanumeric KeyPad (numbers and letters only, no special characters)

Table 8–22 (Cont.) Authentication Device Type

Property	Description
DeviceTextPad	Challenge user using TextPad.
DeviceQuestionPad	Challenge user using QuestionPad.
DevicePinPad	Challenge user using PinPad.
DeviceHTMLControl	Challenge user using HTML page instead of an authentication pad.

After configuration, the OTP device will be displayed at the next log in to the application.

9

KBA and OTP Challenges

OTP Anywhere and KBA can be used alongside each other. OTP Anywhere can be used also to compliment KBA challenge or instead of KBA.

The chapter contains the following sections:

9.1 Using KBA and OTP

Oracle Adaptive Access Manager deployments may choose to use both KBA and OTP or each separately or no challenge mechanisms at all. If both KBA and OTP are being used in a deployment, the security team may choose to use OTP first for high risk situations and then fall back on KBA.

For example, a user logging in from a new IP address in a city he often logs in from is relatively low risk on its own, so a KBA challenge is a good option to gain additional verification that this is the valid user. If, however, a user is attempting a funds transfer of more than $1000 using a device and location he has never accessed from previously and the user has never performed a transfer, a stronger measure such as OTP Anywhere would be warranted.

If a customer has both KBA and OTP enabled, the priority is configurable through properties. The default is to OTP challenge first and then KBA challenge for high risk situations.

9.2 Risk Range for KBA and OTP

A KBA challenge is appropriate for the scores in the 500 to 700 risk range. An OTP challenge would have been appropriate for a score in the 701 to 900 range. For a score of 900 and over, the action triggered should be a "block." The user should be allowed to continue on if the score is under 500.

9.3 KBA and OTP Scenarios

KBA and OTP scenarios are presented in this chapter.:

- Registered Low Risk User (Risk Score 500 or Below)
- Unregistered High Risk User (Risk Score Above 500)
- Registered High Risk User (Risk Score Above 500)
- Register High Risk Lockout
- High Risk Exclusion
- OTP Challenge with Multi-Bucket Patterns

9.3.1 Always Challenge by Group

If a group of users should be considered high risk every time they log in (regardless of other factors), a policy can be configured to always challenge the group of users with OTP (High Risk).

Administrator

1. Log in to OAAM Admin.
2. Create a "High Risk Users" group and add high risk users to the group.
3. Create an Action group "High Risk User" with the following values:

   Alert type: Fraud

   Alert level: High

   Alert message: High risk user login attempt
4. Create a policy with the following values:

   Policy Name: OAAM OTP RR

   Policy Status: Active

   Checkpoint: Post-Authentication

   Scoring Engine: Average

   Weight: 100

   Description: OAAM OTP Release Readiness Policy
5. Add a rule with the following general values:

   Rule Name: In High Risk Group

   Rule Status: Active

   Rule Notes: Checks if user is in high risk user group.
6. Specify the results for if the rule triggers:

   Score: 1000

   Weight: 100

   Action Group: OAAM Challenge

   Alert Group: High Risk User
7. Add the condition `USER: User in Login Group` with the following values:

   Is in group: True

   User Group: High Risk Users

User

Note: User with user name "Henry" has already logged in once and completed registration.

"Henry" logs in to OAAM Server again. He is always challenged with SMS.

9.3.2 CSR OTP Profile Reset with High Risk Always Challenge by Group

A high risk login from a user, who is registered for KBA but has had his OTP profile reset by customer service, is challenged by other methods before he is allowed to register a new OTP profile.

Note: The user "Henry" has had his OTP reset.

1. The user logs in to OAAM Server with the user name "Henry."

   He is challenged with KBA (since OTP is not registered).
2. He answers the challenge question.
3. He completes OTP Registration
4. Later, he logs in again with user name "Henry."
5. He is OTP Challenged.

9.3.3 Unregistered Low Risk User (Risk Score 500 or Below)

An unregistered user in a low or no risk login situation is asked to register his image/phrase, challenge questions, and OTP profile.

1. The user logs in to OAAM Server with user name "Stanley." "Stanley" is a low risk user.

   He is presented with the registration screens.
2. He completes user registration.

9.3.4 Registered Low Risk User (Risk Score 500 or Below)

A registered user logging in with a low risk situation is challenged with KBA.

1. "Frank" logs in to OAAM Server at 1:00 pm.
2. He does not have to register, so he presses **Skip** on the Registration page.
3. "Phil" logs in to OAAM Server with the same device as "Frank" at 2:00 pm.
4. He does not have to register, so he presses **Skip** on the Registration page.
5. "Stanley" logs in to OAAM Server with the same device at 3:00 pm.
6. "Stanley" is challenged because four users are logging in from the same device within 8 hours. The risk score is 500 (Rule Score is 1000, Weight is 100, Scoring Engine is Average), causing a KBA challenge.

9.3.5 Unregistered High Risk User (Risk Score Above 500)

A high risk login by an unregistered user is not be permitted to register.

1. High risk user, "Henry," logs in to OAAM Server with an invalid password four times.
2. High risk user, "Henry," logs in to OAAM Server with the correct password.
3. The user is locked since the risk score is 600 because of the invalid login attempts and the user is not registered.

9.3.6 Registered High Risk User (Risk Score Above 500)

A registered user logs in under a high risk situation and an OTP challenge to occur.

1. "Stanley" logs in to OAAM Server with the correct password.
2. He is OTP (SMS) challenged since his risk score is up to 600 because of the invalid login attempts.

9.3.7 Register High Risk Lockout

A user who has failed too many challenges can have their failure attempts reset by customer service.

In this scenario, a user is locked out by failing to correctly answer a challenge. The CSR must unlock the user, allowing him to log in. The user logs in and is challenged again.

1. "Stanley" logs in to OAAM Server with the correct password
2. He is OTP (SMS) challenged and types in an incorrect challenge value three times.
3. He is asked to answer KBA challenge.
4. He incorrectly answers KBA three times.
5. He is blocked.
6. He attempts to log in again but remains blocked.
7. The CSR who has logged in to OAAM Admin with CSR privileges, creates a case for "Stanley."
8. She unlocks OTP for him.
9. "Stanley" logs in to OAAM Server with the correct password.
10. He is challenged via OTP.

9.3.8 High Risk Exclusion

If a user is unable to use OTP, he can be added to an exclusion group to prevent the high risk challenge from occurring.

1. The Security Administrator logs in to OAAM Admin.
2. He adds "Stanley" to the "High Risk Exclusion" user group.
3. He modifies the OAAM Challenge Policy "Check for High Risk Score" rule to use "High Risk Exclusion" as the Excluded User Group in Pre-Conditions.
4. "Stanley" logs in to OAAM Server.
5. He is KBA challenged instead of OTP challenged even though he has a high risk score.

9.3.9 OTP Challenge with Multi-Bucket Patterns

"User: IP" is a multi-bucket pattern that creates a bucket for each IP address used by a user. It enables evaluations such as the following: if Jen falls into an IP address bucket that is less than 30% of all application users falling into that bucket, then OTP challenge her.

1. The Security Administrator logs in to OAAM Admin.
2. He creates a multi-bucket pattern for the member type "user" with an operator, "For each" and attribute "IP."
3. He confirms a policy which contains a rule with the following conditions- Has this user logged in at least twice in the last 3 months, Compare User Entity with all entities in picture (30%), and has this user OTP registered.
4. Jen logs in the Access Manager Server
5. She performs OTP registration
6. She logs in 2 more times from the same IP address.
7. For her 4th login, she logs in from a different IP address.
8. The rule triggers.
9. At a different IP address, she logs in again.
10. The rule triggers again.

Part IV

Managing Policy Configuration

This part contains information about managing policy configurations in Oracle Adaptive Access Manager 11*g*.

It contains the following chapters:

10

OAAM Policies Concepts and Reference

This chapter introduces you to the terminology and concepts that relate to policies and rules and describes the flow for the main scenarios in authentication, the policies and rules that are available with OAAM, including the autolearning policies.

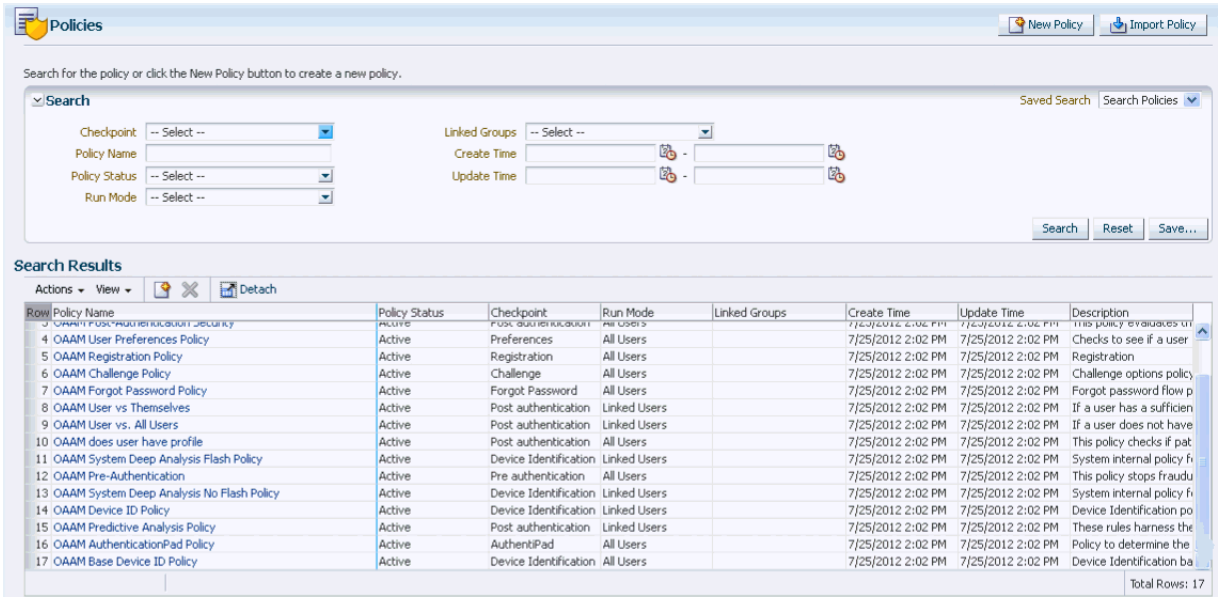
10.1 Policies Available with OAAM

The OAAM security and autolearning policies are available as part of the base snapshot or as a separate policy zip file. The `oaam_base_snapshot.zip` is located in the `Oracle_IDM1/oaam/init` directory of your install. If you want to only import policies, but not the snapshot, import the policies zip file. To import the base snapshot, you need the `envAdmin` role assigned. If you are importing policies as a separate file, you need the `ruleAdmin` role assigned. These administrative roles are usually exclusive roles, but depending on your deployment needs, both roles can be assigned to the same user.

The OAAM policies address basic registration and authentication flows in OAAM. KBA as a challenge mechanism and images are available when using the OAAM server if you import these policies. All required entities, patterns, conditions, rules, and actions for the basic registration and authentication flows are part of the snapshot.

In 11.1.2, there are 17 policies and 104 rules of the box. The out of the box policies are active when imported from the snapshot and linked to the user group called `Default`. If you have any other groups, you need to change the linking accordingly.

Figure 10–1 Policies Search Page



10.2 Basic Concepts

This section introduces you to the terminology and concepts and terminology that relate to the OAAM security policies.

10.2.1 What Are Rules?

Rules are used by OAAM to identify suspicious or potentially fraudulent transactions. Security Administrators configure rules so that OAAM knows which datapoints and attributes to look at for fraud, how to evaluate the data, and the appropriate actions to take after the evaluation.

10.2.2 How Do Rules Work?

When data comes into the system, OAAM runs rules against that data. Oracle Adaptive Access Manager evaluates the level of risk for specific situations by analyzing event/transaction and contextual data from a variety of sources, including application data, user profiles, device fingerprints, IP addresses, geolocation, other network data and third-party data feeds. By looking at various risk factors simultaneously Oracle Adaptive Access Manager can determine the relative risk level, alert investigators and in realtime deployments take steps to proactively prevent fraud using challenge methods and blocking.

Rules compare the datapoints and attributes against the conditions. Conditions are configurable evaluation statements. A rule evaluates the conditions and the outcomes of rules are alerts, an action, and a score. The rule is evaluated to `True` when all preconditions are met and all conditions evaluate to `True`. When a rule is evaluated to `True`, specified alerts are created and the associated actions and score are triggered. Examples of actions are `ALLOW`, `CHALLENGE`, and `BLOCK`. The security team might determine that devices found to be exceptionally high risk should be blocked and login attempts should not even be allowed from these devices. Alerts might be sent to Investigators so they can easily see that a velocity rule, such as `User appears to have traveled faster than 500 MPH since last login`, was triggered and why.

For conditions that identify high risk traits, you can apply weights to the rules so that they may be considered as being more risky than other rules. Other rules can run based on the outcome of other rules. You can implement new rules or edit rules based on new fraud data to fit business needs.

10.2.3 Security Administrator Role in Rule-Related Activity

A Security Administrator devises and configures business and security policies in OAAM. He manages every aspect of policy administration and all its dependent components as seen in the scenarios that follow:

Security Administration Has a New Installation and Needs to Import Policies

The Security Administrator needs to import the policies available with OAAM for business use cases. He browses for the policies zip file from the `Oracle_IDM1/oaam/init` directory of the install and imports it into the system.

1. He browses for the policies zip file from the `Oracle_IDM1/oaam/init` directory of the install.
2. He imports it into the system.

For information on browsing and importing policies, refer to Section 11.9.2, "Importing Policies."

Security Administrator Adjusts Rule Parameters of Existing Policies

1. The Security Administrator searches for the policy.

   For information on searching for policies, refer to Section 11.6.2, "Searching for a Policy."

2. In the policy, he selects a rule and modifies rule parameter.

   For information on modifying a rule parameters, refer to Section 11.8.3, "Editing Rule Parameters."

Security Administrator Links User Groups to a Policy to Enable the Policy to Execute for the Set of Users within the Linked Group

1. The Security Administrator searches for a policy.

   For information on searching for policies, refer to Section 11.6.2, "Searching for a Policy."

2. He links a User ID group to that policy.

   For information on group linking, refer to Section 11.3, "Linking a Policy to All Users or a User ID Group."

Security Administrator Models a Fraud Scenario (A Simple Example)

1. The Security Administrator frames the fraud scenario on paper and identifies the groups, rules, transactions, action groups and alerts for the scenario.

   For information on framing the fraud scenario, refer to Section 11.1, "Discovery and Policy Development."

   For information on creating groups, actions and alerts, refer to Chapter 12, "Managing Groups."

   For information on creating entities and transactions, refer to Chapter 18, "Modeling the Transaction in OAAM."

2. He then creates a new policy.

   For information on creating policies, refer to Section 11.2, "Creating Policies."

3. He selects conditions and creates rules that he adds to the new policy. During rule creation he may add transactions to the rules.

   For information on creating rules, refer to Section 11.4, "Creating Rules."

   For use cases of OAAM Transaction implementations, refer to Section 20.8, "OAAM Transaction Use Cases."

4. He selects appropriate action groups and alerts for the policy.

   For information on adding action groups and alerts, refer to Section 11.7.5.3, "Specifying the Results for a Rule."

Security Administrator Models a Fraud Scenario (A Complex Example)

1. After designing on paper, the Security Administrator realizes that he needs to create custom groups, custom rule, custom entities, custom transactions, custom actions, and so on.
2. He creates appropriate action groups and alerts for the policy.
3. He creates groups that he needs.

   For information on creating groups, actions and alerts, refer to Chapter 12, "Managing Groups."

4. He creates entities that he needs.

   For information on creating entities, refer to Chapter 19, "Creating and Managing Entities."

5. He creates transactions that he needs.

   For information on creating transactions, refer to Chapter 20, "Managing Transactions."

6. He creates configurable actions that he needs.

   For information on creating configurable actions, refer to Chapter 16, "Managing Configurable Actions."

7. He creates the patterns that he needs.

   For information on creating patterns, refer to Chapter 15, "Managing Autolearning."

8. He then creates a new policy.

   For information on creating policies, refer to Section 11.2, "Creating Policies."

9. He selects conditions and creates rules that he adds to the new policy. During rule creation he may add transactions to the rules.

   For information on creating rules, refer to Section 11.4, "Creating Rules."

   For use cases of OAAM Transaction implementations, refer to Section 20.8, "OAAM Transaction Use Cases."

10. He selects appropriate action groups and alerts for the policy.

    For information on adding action groups and alerts, refer to Section 11.7.5.3, "Specifying the Results for a Rule."

For information on configuring trigger combinations, refer to Section 11.5, "Setting Up Trigger Combinations."

Security Administrator Runs Reports or Queries to Validate Policies

1. He runs various fraud/business scenarios in the customer applications that should trigger various policies and rules within.

   For running OAAM offline for rule evaluation, refer to Chapter 21, "OAAM Offline."

   For running jobs, refer to Chapter 22, "Scheduling and Processing Jobs in OAAM."

2. He searches for the sessions related to those scenarios to verify that proper policies and rules were triggered.

   For information on viewing session information, refer to Section 6.8.2, "Using Session Details to View Runtime Information."

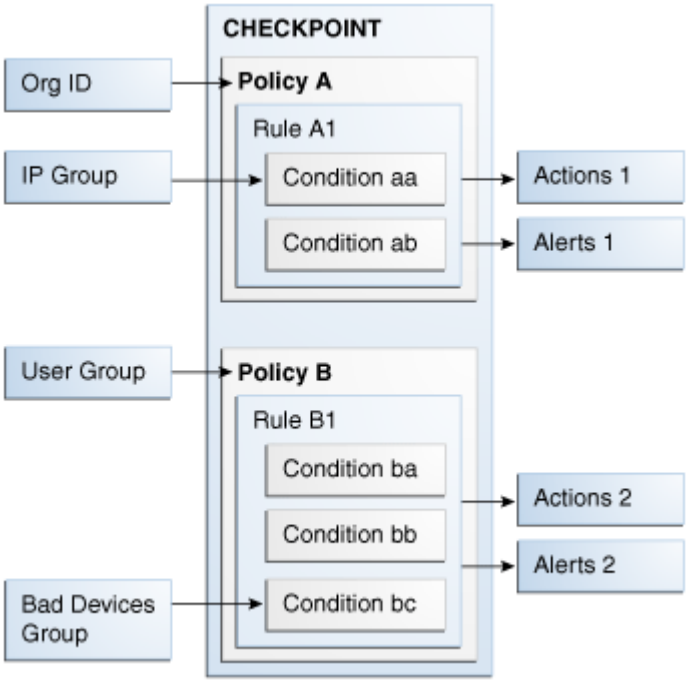
10.2.4 What are Conditions?

Rules are made up of conditions. Conditions are configurable evaluation statements that are the basic building blocks of decision making in they OAAM rule evaluation process and flow. They use datapoints from historical and runtime data to evaluate risk or business logic. Conditions are grouped based on the type of data used in the condition. For example, user, device, and location. Conditions are pre-packaged in the system and cannot be created by a user. Conditions may take user inputs when adding them to a rule.

10.2.5 What are Policies?

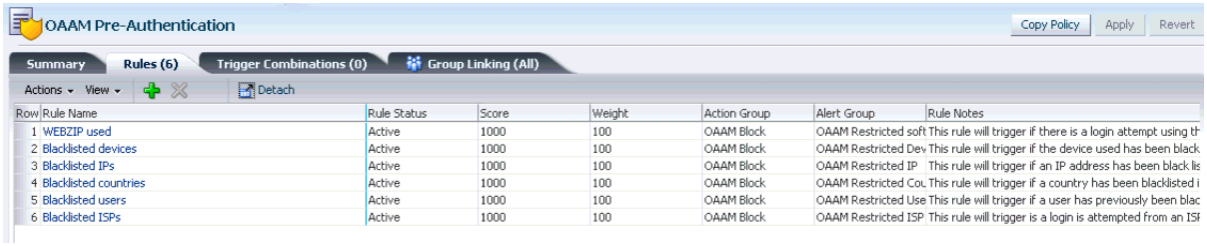
A policy is a collection of rules associated with a checkpoint. Figure 10–2 introduced policy-related components. The policy's structure along with examples of groups are explained in this section.

Figure 10–2 Policy Structure



A checkpoint is a decision and enforcement point that control user flow. A group is a collection of like items. Examples, of user groups, excluded groups, groups used as parameters, and action and alert groups are shown.

Figure 10–3 Policy Details Rules Tab



The attributes/databanks of the activities you are interested in are mapped to conditions and the evaluations to perform are translated into rules. These rules are added to a policy. Checkpoints are set up in the session for when the policy evaluates the activity. For example, a policy can be executed during the Pre-Authentication checkpoint. The Pre-Authentication checkpoint is a point in time before the user enters the password. When the rules are run, data is collected. For information, see Section 10.4.1, "Authentication Flow." The policy outcomes can be used to enforce decisions by client applications.

A rule evaluates to True when all the conditions match. The outcome of a rule is a score and optionally actions or alerts, or answers and alerts. The outcome of a policy evaluation is decided by applying a scoring policy on the rule scores of the policy. In addition to the score, you can optionally configure trigger combinations which are combinations of rule results of the policy and that can invoke actions and/or generate alerts. For more information about trigger combinations, see Section 10.2.13, "What are Trigger Combinations?."

10.2.6 What are Action and Alerts?

During the normal course of business, the system looks for datapoints the conditions were mapped to. When the set of conditions are met, the system calculates a score, and depending on the policy that you defined earlier for handling the situation, it may generate alerts in real-time, or trigger actions, or both. For example, outcomes can be challenging or blocking the user or activating an alert.

10.2.7 What is a Policy Set?

A policy set is a logical collection of policies that has been used to assess risk at checkpoints. There is one policy set per application. Through the policy set, you can specify the scoring engine and the weight multiplier that you want to use for evaluating the risk for checkpoints.

10.2.8 What is a Scoring Engine?

A scoring engine is provided at the policy level and at the checkpoint level. The policy scoring engine is applied to rule scores to determine the risk for each policy. The policy set scoring engine is applied to the scores of the policies under a checkpoint to determines the score for the checkpoint. The default scoring engine at the checkpoint level is "Aggregate."

Table 10–1 Scoring Engines

Scoring Engine	Policy	Checkpoint	When to Use
Maximum	Higher score out of all triggered rules	Higher score out of all policies	Use this engine when you want to score based on the single rule with the highest level of risk. The rule and policy weights are not used by this scoring engine.
Minimum	Lower score out of all triggered rules	Lower score out of all policies	Use this engine when you want to score based on the single rule with the lowest level of risk. The rule and policy weights are not used by this scoring engine.
Aggregate	Sum of the scores of all triggered rules divided by count of rules.		Similar to a percentage evaluation for what rules triggered versus the total number of rules. Use this engine when you do not want to score based on any single rule but instead want to make one based on the average level of risk computed based on the number of rules triggered. The rule and policy weights are not used by this scoring engine. Total score of triggered rules divided by the total number of rules
Average	Sum of the scores of all triggered rules divided by count of triggered rules	Sum of the scores of all policies within the checkpoint divided by the count of all policies	Use this engine when you do not want to score based on any single rule but instead want to make one based on the average level of risk found. The rule and policy weights are not used by this scoring engine.Total score of triggered rules divided by the total number of triggered rules

Table 10–1 (Cont.) Scoring Engines

Scoring Engine	Policy	Checkpoint	When to Use
Weighted Average	Sum of the scores (Score * weight modifier specified by the policy) of all triggered rules divided by the count of all rules	Sum of policies (S* weight multiplier specified by the policy set) within the checkpoint divided by count of all policies	Use this engine when you do not want to score based on any single rule but instead want to make one based on the average level of risk found. The weights in this case would be determined by how much each rule or policy indicates a risky situation.
Weighted Maximum	Larger score (S * weight modifier specified by the policy) out of all triggered rules	Larger score out of all policies (s* weight multiplier specified by the policy set)	Use this engine when you want to score based on the single rule with the highest level of risk. The weights in this case would be determined by how much each rule or policy indicates a risky situation.
Weighted Minimum	Lower score (S * weight modifier specified by the policy) out of all triggered rules	Lower score out of all policies (s* weight multiplier specified by the policy set)	Use this engine when you want to score based on the single rule with the lowest level of risk. The weights in this case would be determined by how much each rule or policy indicates a risky situation.

10.2.9 What is a Score?

Oracle Adaptive Access Manager incorporates risk scoring into its decision making. OAAM risk scoring is a product of numerous fraud detection inputs such as a valid user, device, location, and so on. These inputs are weighted and analyzed within the OAAM fraud analytics engine. The policy generates a risk score based on dozens of attributes and factors. Depending on how the rules in a policy are configured, the system can yield an elevated risk score for more risky situations and lower scores for lower-risk situations. The degree of elevation can be adjusted with the weight assigned to the particular risk. The risk score is then used as an input in the rules engine. The rules engine evaluates the fraud risk and makes a decision on the action to take.

The score is expressed as a number the user configured as an outcome to the rule if the rule evaluates to TRUE. The checkpoint score is a combination of the scores from the policies with that particular checkpoint. Higher scores indicate higher risk. The maximum score is 1000. The lowest score is 0, which means that the situation is safe.

10.2.10 What is Weight?

Weight is the multiplier values that are applied to policy scores to influence the impact the policy has on determining the total score. Policies have default weights. Weight is used only when a given policy or checkpoint uses a "weighted" scoring engine. The weighted scoring engine uses weights from subcomponents. For example, if you choose the weighted scoring engine at the policy level, Oracle Adaptive Access Manager uses the weight specified for each rule level when calculating the policy score. Similarly, when you choose a weighted scoring engine at the policy set level, Oracle Adaptive Access Manager uses weights specified for each policy. The score of each policy multiplied by weight is divided by total number of policies multiplied by 100. The range is 0 to 1000.

10.2.11 What is Score Propagation?

A rule defines datapoints for suspicious patterns or practices, or specific activities, and the outcome when the pattern, practice or specific activity is detected. The possible outcomes of a rule are actions, a list of actions, alerts, a list of alerts, and a score. A rule score is always calculated; the other outcomes are optional.

A policy is a collection of rules specifically assembled and tuned to run inside a specific checkpoint and at a single time. The policy score is evaluated from the score results of the policy's rules.

There are multiple policies under one checkpoint. The scores of all policies in the checkpoint are "picked up" and the policy set scoring engine is applied to the scores to determine the checkpoint score. For example, if the policy set defines the scoring engine as Aggregate and two policies in the checkpoint result in a score of 100 and 200 each, the score of the checkpoint will be 300. Oracle Adaptive Access Manager performs a separate evaluation for each checkpoint and provides a score for each. The default scoring engine at the checkpoint level is "Aggregate." The score for a particular checkpoint must be between 0-1000.

The checkpoint score and action are the final score and action in the assessment. The alerts are propagate from the rules level to the final level.

10.2.12 How Does Risk Scoring Work?

To determine a risk score, each level applies its scoring engine to the results from one level below. For example, to determine the policy score, the scoring engine of the policy is applied to the scores of the rules within the policy. To determine the checkpoint score, the scoring engine of the checkpoint is applied to the scores of the policies within the checkpoint. The checkpoint score and action are the final score and action in the assessment. The alerts are propagate from the rules level to the final level.

Example

If three rules in policies had scores 100, 200, and 300 and policy scoring engine is Maximum, the score of the policy will be 300. If three policies had scores of 300, 200 and 100 respectively in the checkpoint and policy set scoring engine is Aggregate then the checkpoint score will be sum of those three that is 600.

Example

Checkpoint = Policy A + Policy B +Policy C

Policy = Rule A + Rule B + Rule C

Policy C = Policy D + Policy F (if nested policies)

1. Each triggered rule returns a score.

   Each rule has its own default score and weight. The score and weight are used for the calculation of the rule score.

   The alerts configured at the rule level are propagated to the final level.

2. Each policy returns a score.

   To obtain the policy score, the policy scoring engine is applied to the scores of the rules underneath.

   If the policy does not use a "weighted" scoring engine, the scores of the individual rules are used in determining the policy score.

   If the policy uses a "weighted" scoring engine, a percentage value is applied to the individual rule scores before the policy score is determined. The "weight" is specified in the policy.

   As seen in Figure 10–4, if a weighted policy scoring engine is used, the score for Policy A would be:

   Scoring Engine (Rule A * weight, Rule B * weight)

For example, if the policy scoring engine is "Weighted Maximum Score" and the policy weight is 50% and if Rule A returned 1000 and Rule B returned 500, the policy score for Policy A is 500.

Policy A = Maximum of (1000* 50%, 500*50%)

Policy A = Maximum of (500, 250)

Policy A = 500

3. The checkpoint returns a score

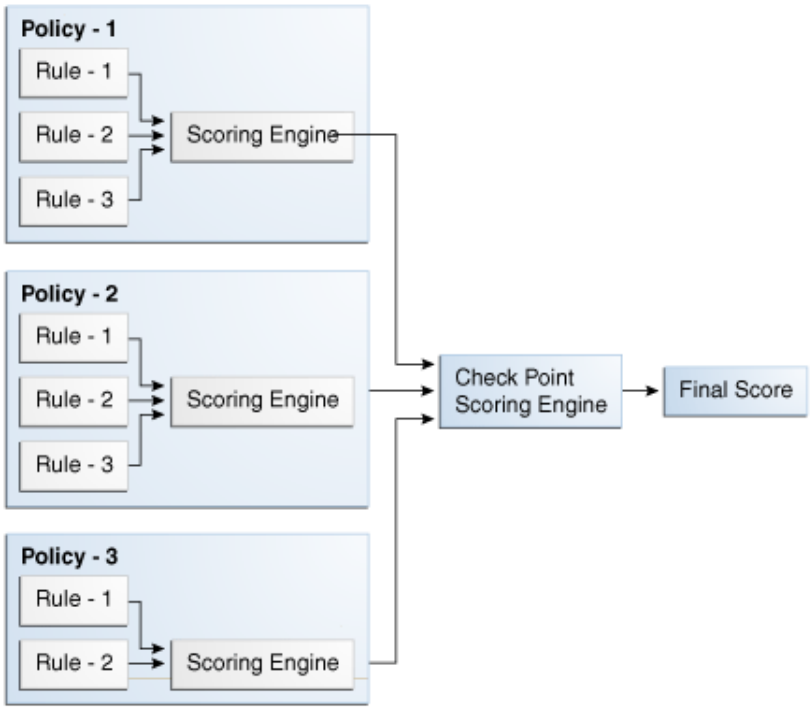
   The checkpoint score is determined by applying the policy set scoring engine to the score result of the policies underneath the checkpoint.

   The default scoring engine at the checkpoint level is Aggregate.

   The checkpoint score and the action is the final score and action returned.

   All the alerts are propagated from rule configurations.

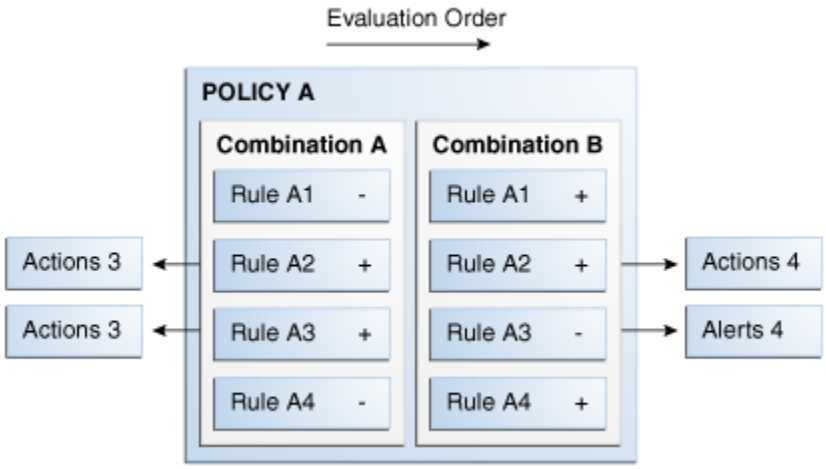
Figure 10–4 Scoring



10.2.13 What are Trigger Combinations?

Trigger combinations are additional results and policy evaluation that are generated if a specific set of rules trigger. Figure 10–5 shows the structure of a trigger combination.

Figure 10–5 Trigger Combination Structure



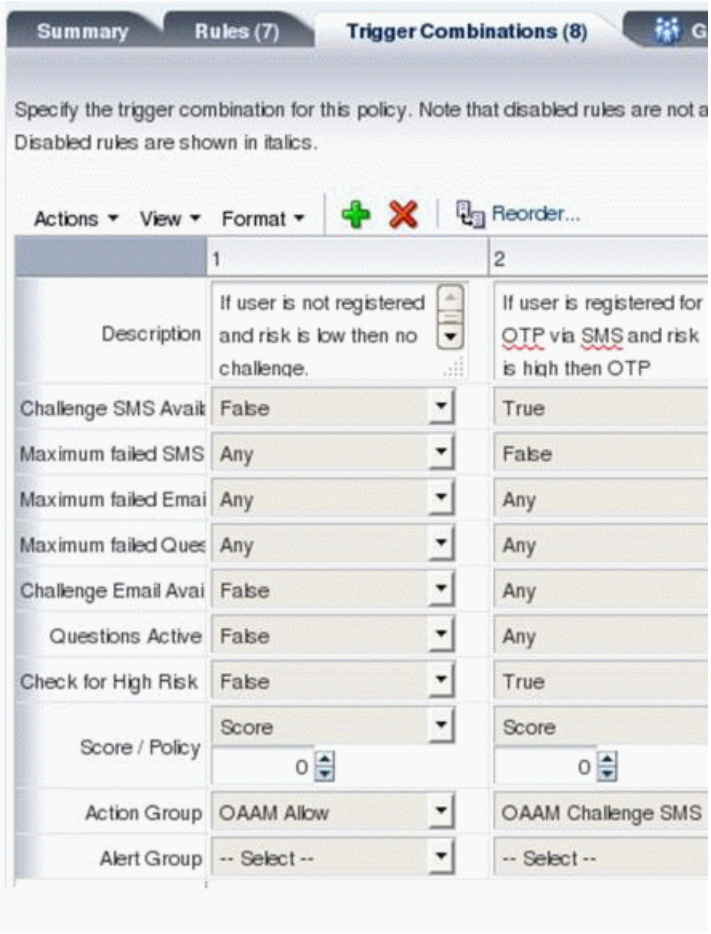
Trigger combinations are used to override the outcome of rules. Policies may or may not contain trigger combinations. If the policy contains trigger combinations, the Trigger Combinations tab contains a table with all the trigger combinations possible in the policy. Each trigger combination (vertical column) represents a combination of rules that are triggering or not triggering and can specify alerts, actions and either a score or another policy to run. Each row represents a rule. Trigger combinations evaluate sequentially, stopping as soon as a Trigger Combination is matched. For example, if the rule returns in Combination A are met, Combination B is not evaluated.

Alerts are added to any actions and alerts triggered by individual rules. Action group replace the actions returned by the individual rules. When a trigger combination triggers another policy, that policy is said to be nested within the policy. A policy can be nested within other policies and also can be evaluated on its own.

10.2.14 How Do Trigger Combinations Work?

An example of how trigger combinations work is presented in this section. Figure 10–6 shows a trigger combination

Figure 10–6 Trigger Combination Example



Each column in the table represents a unique trigger combination. The trigger combinations evaluate sequentially, moving from column 1 to columns 2, 3, 4 and so on, and stop as soon as a trigger combination is matched. The columns are rules that can have a value of **False**, **True**, or **Any**. False means that the rule evaluates to **False**. In the illustration, the **Challenge SMS Available**, and **Email Available**, and **Question Active** rules are **False** which means that the user is not registered; The **Check for High Risk** rule is **False** which means "if the risk is low"). The **Any** value for a rule means that the rule can be either **False** or **True**.

Note: All rules (or rows) are joined with "AND." Therefore, trigger combination 1 in the example means: "If user is not registered and the risk is low, no challenge."

The last three rows in the trigger combination define the outcome of the trigger combination. The outcome could be a score or a nested policy or an action or alert group (or a combination of any of these). The example of the trigger combination in column 1, translates to "if user is not registered and the risk is low, Action Group **OAAM Allow** is assigned (which means no challenge).

Trigger combinations are useful because they allow administrators to create dependencies between various rules and provide outcomes that are based on the net result of all those dependencies. The rules on the Rules tab, on the other hand, are evaluated independent of each other, with their own unique independent outcomes.

Note: The rules specified in the Rules tab are evaluated before trigger combinations.

10.2.15 What are Nested Policies?

A nested policy is a secondary policy used to further quantify the risk score in instances where the original result output by the system is inconclusive. Nested policies can be assigned to ensure a higher degree of accuracy for the risk score.

A nested policy in a trigger combination is executed only when a specific sequence of rule results is sent from the primary policy. Nested policies therefore reduce false positives and negatives. You see nested policy being used as an output of a trigger combination.

Nested policies are evaluated based on scoring overrides. If the trigger combination itself is a policy, the score for the parent policy is retained, and the new policy gets its own score to be used for the evaluation of the checkpoint. If m1 has two rules, r1 and r2, and in the trigger combination, r1 contains m2. If the override triggers, r1 is used to calculate m1's score, and m2 is evaluated and used in the evaluation of the checkpoint. In calculating a score for the policy set, the score from m1 is used and the score from m2 is evaluated and used for the checkpoint score.

For example the scores for s1 and s2 from two policies are obtained and a scoring engine of policy set is used to determine the checkpoint score. If S1 was 100 and S2 was 300 and policy set specified the scoring engine is Maximum, then 300 will be the outcome of the checkpoint score.

10.2.16 What is a Scoring Override?

Score overrides are used within a policy and within a policy set.

In policies, score overrides are specified in trigger combinations. Each rule has scores assigned. In trigger combinations, you can specify scores that are different from the defaults for the rules. Then, if the trigger combination is executed (triggered), the score of the trigger combination places the default score. If the trigger combination does not trigger, then the default score is used.

In a policy set, you can create a score override in which you specify an action group, or an alert group, or an action and an alert group you want to be triggered when a score falls within a specific range.

10.2.17 What are Action and Alert Overrides?

You can create an Action or Alert Override to specify the action or alert to triggered as a final alert or action for a checkpoint.

10.2.18 What are Groups?

Groups simplify configuration workload and help to administer a collection of similar items as a single group instead of administering the individual members of a group. Types of groups include User ID, User Name, Location, Device, Action, and Alert.

10.2.18.1 Using Groups

Groups are used in the following ways:

1. Policies: A policy is linked to all users or a set of user ID groups. The Policy Tree shows the linking of User ID groups to policies.

2. Rules within policies: OAAM Admin applies rules on specified users, devices, or location groups to evaluate whether a fraud scenario occurred and to determine an outcome. A rule can trigger an action group, or an alert group, or both.
3. Conditions: Some conditions use groups as a parameter type—for example, `IP in IP Group`. The condition takes IP Group name or IP as a parameter.
4. Trigger combinations: Alerts in groups are specified in the trigger combination.
5. Pre-condition: User groups can be excluded in a policy. Rules can also be configured such that it will not be evaluated for certain userID group, in spite of the group linking of the policy that contains it.
6. Configurable Actions: Members of a User ID group can be added to a User ID group dynamically using configurable actions.

10.2.18.2 User Group Linking

In Group Linking, the Run mode can be specified to execute policies for all users or selected user groups. Group linking enables the policy to execute/run for the set of users within the linked group. The "Linked Users" option links a policy to a User ID group or several User ID groups.

The "All Users" option links a policy to all users. If group linking shows "All Users," all the available linking is ignored. If a user selects group linking as "All Users," the link option would be disabled.

10.2.18.3 Using Action and Alert Groups

Action groups are used as results within rules so that when a rule is triggered all of the actions within the groups are activated.

Alert groups are used as results within rules so that when a rule is triggered all of the alerts within the groups are created.

10.3 Rule Processing

This section describes how rules and policies are executed in the basic authentication flow.

10.3.1 Rules Engine

The rules engine takes the information that you specify for the rule and the information specified in other rules in the policy and returns rule results to the policy. All the policies in the policy set result in multiple actions and multiple scores and multiple alerts. All these are propagated to the checkpoint. The score, the weight, and so on, result in one final score, one final action, and a couple of alerts.

10.3.2 Order of Condition

Conditions in the rule are evaluated sequentially. Subsequent conditions are evaluated only if the current one was evaluated to be true. In other words, the evaluation stops when a condition is evaluated to be false. For the rule to be triggered, all the conditions that constitute the rule must be evaluated to true; if any of the conditions is evaluated to false, the rule is evaluated to false, and the rule does not trigger.

10.3.3 Condition Evaluation

Conditions evaluate to True or False based on the available data. When multiple conditions are added, the conjunction between the conditions is always AND, that is, Condition A (True) and Condition B (True) result in an outcome of True (rule is triggered), whereas for Condition A and B being False, the outcome is False (rule is not triggered). If one of the conditions is True and the other is False, the outcome is always False.

Refer to the example in Table 10–2.

Table 10–2 Multiple Conditions

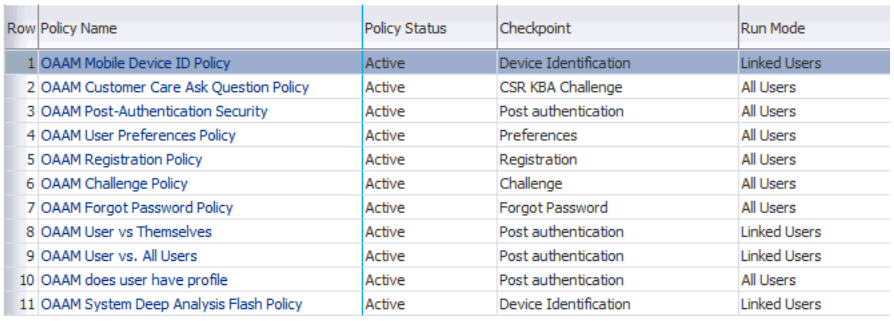
Condition 1	Condition 2	Rule Result
True	True	True
False	False	False - Rule is not triggered
True	False	False
False	True	False

For information on the conditions available in the system, see Appendix B, "Conditions Reference."

10.3.4 Checkpoints

The checkpoint is a decision and enforcement point when policies are called to run specific rules to evaluate the risk for user actions. OAAM Server uses out-of-the-box policies and checkpoints to control user flow. API-based integrations can create new checkpoints, configure policies, and drive the flow. There can be multiple policies in the checkpoint.

Figure 10–7 Policies and checkpoints



Row	Policy Name	Policy Status	Checkpoint	Run Mode
1	OAAM Mobile Device ID Policy	Active	Device Identification	Linked Users
2	OAAM Customer Care Ask Question Policy	Active	CSR KBA Challenge	All Users
3	OAAM Post-Authentication Security	Active	Post authentication	All Users
4	OAAM User Preferences Policy	Active	Preferences	All Users
5	OAAM Registration Policy	Active	Registration	All Users
6	OAAM Challenge Policy	Active	Challenge	All Users
7	OAAM Forgot Password Policy	Active	Forgot Password	All Users
8	OAAM User vs Themselves	Active	Post authentication	Linked Users
9	OAAM User vs. All Users	Active	Post authentication	Linked Users
10	OAAM does user have profile	Active	Post authentication	All Users
11	OAAM System Deep Analysis Flash Policy	Active	Device Identification	Linked Users

All policies that are configured for a checkpoint are evaluated and the outcome is a score, an action, or both. The scores of these policies are used to determine a score for the checkpoint. The score for a particular checkpoint must be between 0–1000.

10.3.5 Controlling the Application Flow

Actions are used to control the application flow. An action is an event that is activated when a rule is triggered. For example: block access, challenge question, ask for PIN or password, and so on. An action can be also activated based on a score for particular checkpoint.

The client applications like OAAM Server or the native integrated client influence the resultant out-of-the-box actions. Users may also create custom actions that are used by their policies and applications.

For information on native integration, refer to "Integrating with Virtual Authentication Devices and Knowledge-Based Authentication" and "Building a Custom Application" in *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

10.3.6 Messaging

Alerts are messages that indicate the occurrence of an event. An event can be that a rule was triggered, a trigger combination was met, or an override was used.

For information on creating an alert, see Chapter 12, "Managing Groups."

10.3.7 Rule Processing Example: How the OAAM Device Max Velocity Rule Settings Work?

The "Device Max Velocity" rule is used to detect "man in the middle" attacks where a hacker obtains the MAC address for devices that users log in from. Hackers replay the user's login and provide the user's computer MAC address. By doing this they fool the system into thinking the user is logging in from a known and trusted device that is in the user's OAAM profile.

The "Device Max Velocity" rule can detect this type of attack, trigger an alert and block the hacker from successfully signing in. This is accomplished in conjunction with the Quova subscription data. The rule checks to see if the MAC address is in the list of known devices the user is logged in from. Then it examines the IP address location where the user is logged in from. If a hacker then tries to log in by replaying the user's session and also using the user's device MAC address from another location, such as 100 miles away, the rule uses a formula that determines the possibility of that user's device traveling at that velocity.

It is possible for a user to log in to his application, then take a Jet to fly to another city and once again log in to the same application. Therefore you want to be able to adjust the variables of the formula to allow for a portable device to travel at least the speed of a Jet. The "Device Max Velocity" rule has two values that the administrator can configure. Those value fields are called "Last Login Within (Seconds)" and "Miles Per Hour is More Than". Using these two field values you can customize the allotted velocity that a physical device can travel before an alert is triggered.

How the Rule Formula Works

1. The rule first picks up the last successful login in the last N seconds. (If there are multiples, the last one (with the highest timestamp) is picked.
2. The rule looks at cityLastLogin and currentCurrentLogin and calculate the distance between them which "= the distance."
3. Then it calculates thisDistance divided by the difference in login times. That becomes the velocityCalculated.
4. If velocityCalculated is more than velocityConfigured in the rule (from the user interface), the rule triggers.

Solution

Using the following testing assumptions and steps you can make the "Device Max Velocity" rule alert trigger, and also see how to avoid not triggering the rule alert. Before starting your test:

The user's authentication status should be "success" in the previous login (N seconds ago).

Assume you only have one minute to test the "Device Max Velocity" rule. Assuming that point A and point B are 900 miles apart, in order to travel from point A to point B in 60 seconds, you need to be traveling at 54000 miles an hour.

1. Set your "Miles Per Hour is More Than" to 54000
2. Set the "Last Login Within (Seconds)" to 60 seconds.

Setting up the Test:

Pick two IP addresses for the test that you know are far away from each other. You are using the following IP addresses from the Quova data:

63.232.120.161 Austin, Texas

63.229.250.34 Phoenix, Arizona

These two cities are a distance of 867 miles apart.

Make sure that the rule is not triggered by logging in twice and not exceeding the "Device Max Velocity" settings you already set to 60 seconds and 54000 miles per hour. Log in twice with the same user and device with logins no less than 75 seconds apart. Make sure that each time you log in you use a tool like Firefox "Modify Headers" to change the IP address between logins using the two IP Addresses mentioned earlier in this section. This simulates a device logging in from two different locations 867 miles apart. The Device Max Velocity alert does not trigger.

Now perform the same test again where you log in twice less than 30 seconds apart, again, changing the IP address between logins. The Device Velocity alert is triggered.

Understanding the relationship between the "Miles Per Hour is More Than" and the "Last Login Within (Seconds)" settings: You cannot change one of these settings and not consider what the other needs to be set to. In other words, you cannot only set the "Mile Per Hour is More Than" setting and not properly adjust the "Last Login within (Seconds)" setting. These two settings work together with the formula to calculate a devices velocity. The relationship between these two settings is not an "OR". It is an "AND". Last Login AND Mile per hour work together. Remember the following two rules before changing these two settings.

1. You cannot only consider the "Miles Per hour" when setting the velocity. You must also consider the "Last Login within (Seconds)" setting.
2. When testing, you must consider and calculate the distance between point A and point B, the time taken to conduct the test, and further factor in the distance between the two points and how long the testing takes. If you want to use one minute as the time allotted for the testing, then make sure you know the distance between point A and Point B. You must also know how long it takes to get from point A and point B in 60 seconds, again, if you plan to conduct your test in less than one minute.

10.3.8 Condition Evaluation Example: User: Velocity from Last Success

The User: Velocity from Last Success condition evaluates to check to see if

- The user's login was successful earlier, and
- The velocity in miles per hour is more than the specified value, and
- The user belongs to the same Device ID

Parameters

The following table summarizes the parameters in the condition.

Parameter	Description	Possible Value	Can be Null?
Miles per hour is more than	The velocity in miles per hour is more than specified value	Positive integer Default: 60	No
ignore if last login device is same	See possible value.	True/False The flag is set to true ■ if there are more than one successful login from the same user from the same Device ID. The condition returns false and no action/alert is triggered. ■ if there are more than one successful login from the same user from different Device IDs and the condition returns true and an action/alert is generated. The flag is set to false `False` ignores the parameter and the condition evaluates based on miles per hour only.	Yes
Exclude IP List	This parameter allows you to specify a list of IPs to ignore. If a user's IP is from that list, then this condition always evaluates to false. If the user's IP is not in that list or if the list is null or empty, then the condition evaluates the velocity of the user or the device from the last login and evaluates to true if the velocity exceeds the configured value.		

Scenario

Condition evaluates if the users login was successful earlier and the velocity in miles per hour is more than specified value and user belong to the same Device ID. If there are multiple logins of the same user from the same device, then the parameter "ignore if last login device is same" will act. In order for the condition to be false, there must be multiple logins that are successful from the same user that is using the same Device ID. The location database is used to determine the location of the user for this login and the previous login.

Use Case 1

User: karen1, Device ID: 2106, Previous Device ID: None, rule-flag: true

1. Log in from device from IP1

2. Log in from the same device from IP2 (which is 60 miles away). There is no alert generated.
3. Log in from the same device and IP2 (which is 60 miles away). There is no alert generated.

Table 10–3 Use Case 1

User name	Auth Status	Device ID	Location	IP	Alert
karen1	Success	2106	US, Texas, Austin	IP1	No alert
karen1	Success	2106	US, Arizona, Gila Bend	IP2	No alert. An alert is not generated since the same user has the same device and the flag is set to true.
karen1	Success	2106	US, Arizona, Gila Bend	IP2	No alert. An alert is not generated since the same user has the same device and the flag is set to true.

Use Case 2

User: karen1, Device ID: 2107, Previous Device ID: 2106, rule-flag: true

1. Log in from the same device from IP1.
2. Log in from the same device from IP2 (which is 60 miles away). There is no alert triggered.
3. Log in from the same device and IP2 (which is 60 miles away). There is no alert triggered.

Table 10–4 Use Case 2

User name	Auth Status	Device ID	Location	IP	Alert
karen1	Success	2107	US, Arizona, Gila Bend	IP1	New device
karen1	Success	2107	US, Texas, Austin	IP2	No alert. An alert is not generated since the same user has the same device and the flag is set to true.
karen1	Success	2107	US, Texas, Austin	IP2	No alert. An alert is not generated since the same user has the same device and the flag is set to true.

Use Case 3

User: karen1, Device ID: 2109, Previous Device ID: 2108, rule-flag: false

1. Log in from Device 2108 from IP1.
2. Log in from Device 2109 from IP2 (which is 60 miles away). Alerts are triggered.
3. Log in from the same device (Device 2109) and IP2 (which is 60 miles away). No alert is triggered.

Table 10–5 Use Case 3

User name	Auth Status	Device ID	Location	IP	Alert
karen1	Success	2108	US, Texas, Austin	IP1	New device
karen1	Success	2109	US, Arizona, Gila Bend	IP2	Device High Velocity User High Velocity
karen1	Success	2109	US, Arizona, Gila Bend	IP2	No alert

10.4 OAAM Flows

This section describes Oracle Adaptive Access Manager authentication, password management, and customer care flows.

10.4.1 Authentication Flow

Figure 10–8 shows the authentication flow of OAAM server when a user logs in to an application that is protected by Oracle Adaptive Access Manager.

The basic authentication flow is presented as follows:

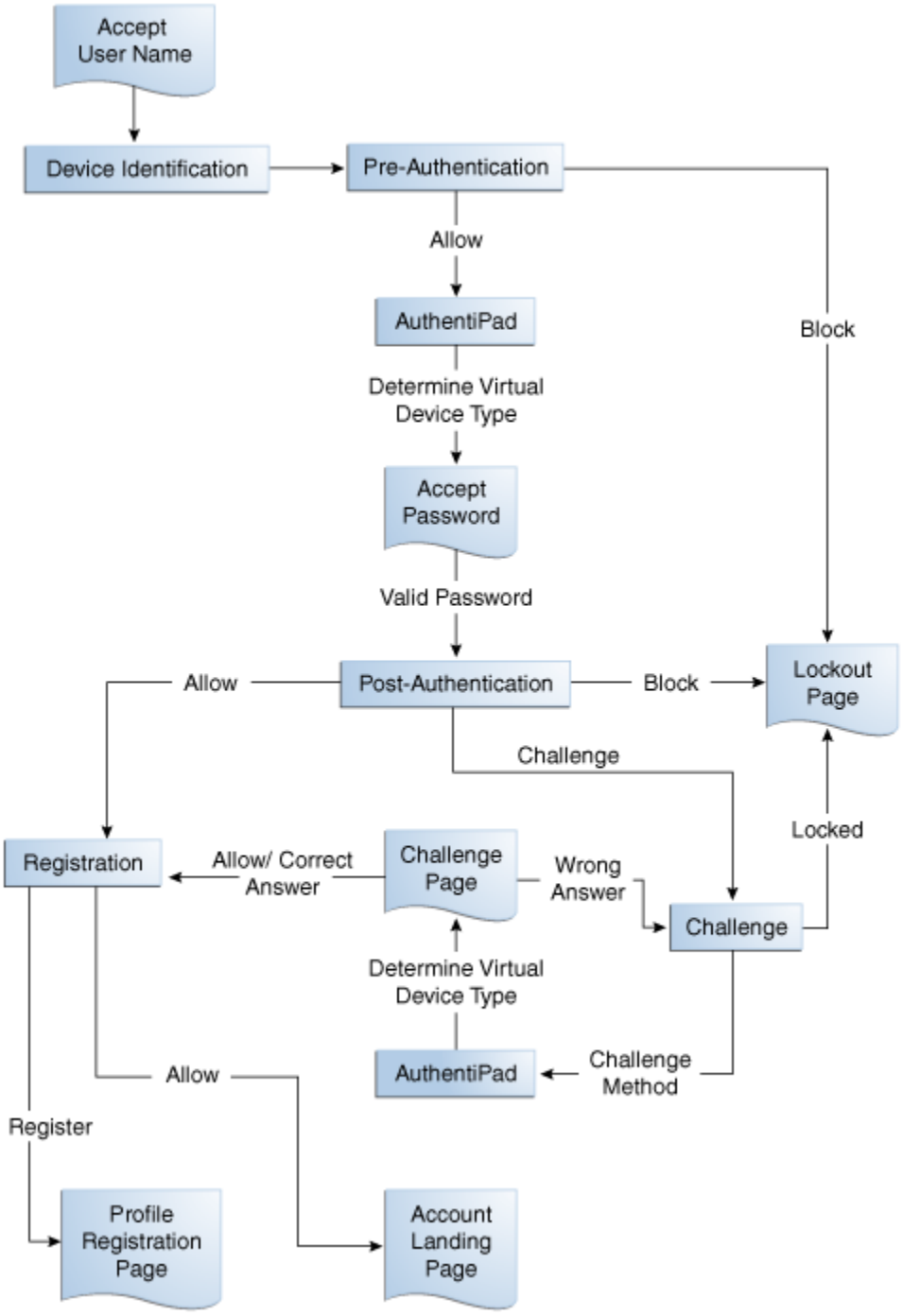
1. The OAAM Server presents the user with the OAAM user name page and the user submits his user name on the OAAM user name page.
2. Oracle Adaptive Access Manager runs the Device Identification checkpoint to fingerprint and identify the user device and the Pre-authentication checkpoint to determine if the user should be allowed to proceed to the OAAM password page. Does this user need to be blocked? For example, if the session is coming in from a bad IP address or if the device is not to be trusted, OAAM will block the user and take the user to the Lockout page.
3. If the user is allowed to proceed, the virtual authentication device rules are run during the Authentication Pad checkpoint. These rules determine if a virtual authenticator is registered and which virtual authenticator to display in the OAAM password page. If none have been registered, a generic textpad is displayed. The user is prompted to enter his password.
4. If the credentials collected are correct, Oracle Adaptive Access Manager runs the Post-authentication checkpoint (policies). It determines the user's risk score and executes any actions (for example, KBA or OTP) or alerts that are specified in the policy. Based on the policies (for example, the risk score), OAAM might allow, challenge, or block the user.
5. If the outcome of Post-Authentication is ALLOW then OAAM runs the Registration checkpoint which determines if the user has KBA and images registered. If the user is not registered, he will be taken to the profile registration pages. If already registered, the user is shown the landing page since he has successfully logged in.

   If the user is not registered, he may be taken to the profile registration page to register, for example, KBA or OTP. Registration is required depending on security requirements, which specify whether the registration is mandatory or optional.
6. If the outcome of Post-Authentication is CHALLENGE, the user is taken to the Challenge page. The Challenge checkpoint is run to determine the type of challenge to run. If the user is able to answer the challenge (the challenge flow is successful) then he would be allowed to the Registration checkpoint. If he is

unable to answer the challenge, he can be locked or challenged again. He can also be blocked by the Challenge checkpoint. For example, he does not have KBA, OTP, or appropriate profile registered, but he is not necessarily coming in from a good score, depending on registry so far, he actually could be locked or he will be shown the challenge question. If correct he gives the correct answer, he proceeds to the landing page.

7. If the outcome of Post-Authentication is BLOCK then user would be taken to the Lock Out page and blocked and he will not be able to access the web application that he tried accessing. For example, he is blocked because his risk score was sufficiently high and he did not complete registration. Without registration, it was not be possible to take him to the challenge flow.

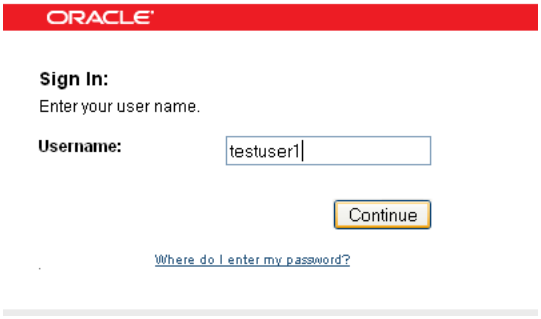
Figure 10–8 Authentication Flow



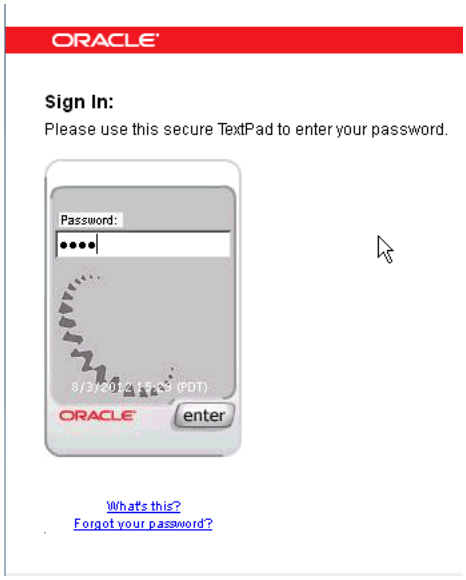
New User Authentication Flow Example

The following screens illustrate these tasks from a new user-experience perspective.

1. The user is presented with a page in which he is asked to submit his user name.

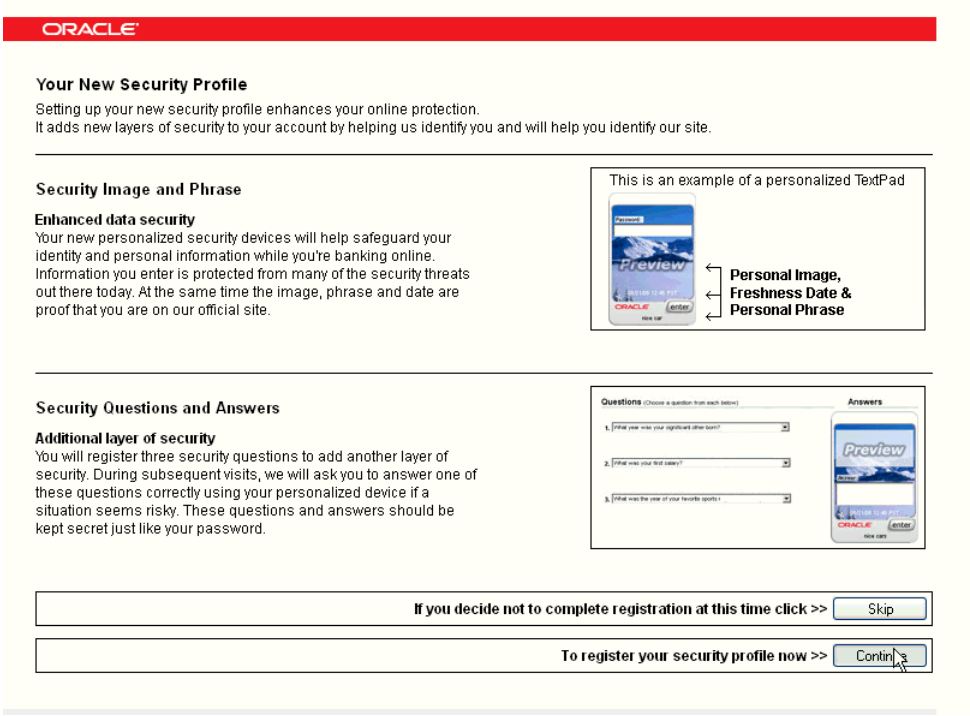


2. The user is prompted to enter his password. Since a profile has not been registered, a generic textpad is displayed. It does not contain an image or phrase, but it does contain a timestamp.

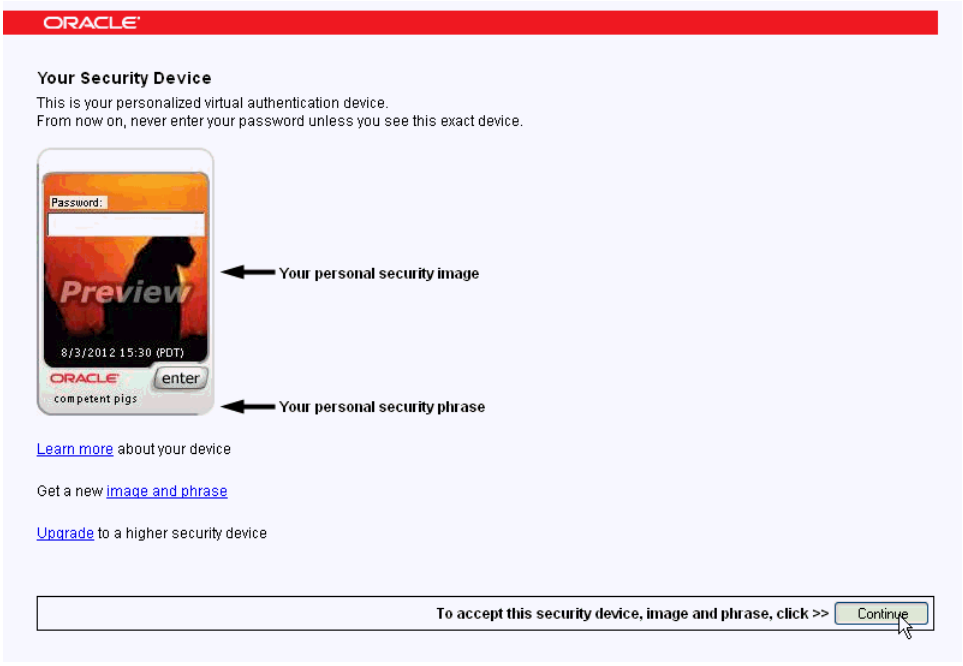


3. The user fills in the password and clicks the **Enter** button on the device. OAAM verifies the user's password.
4. If the user is not register, he sees a registration information page that describes the registration process.

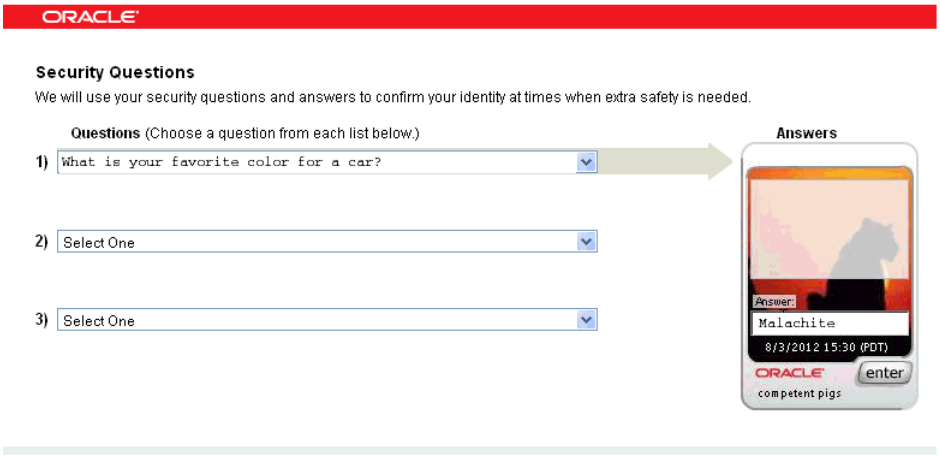
   He can continue through the registration process or "skip" registration and perform the process at another time.



5. The next step in the registration process is the selection of an image and phrase. The user may click the link to **Get a new image and phrase**, which will generate a new image and phrase.

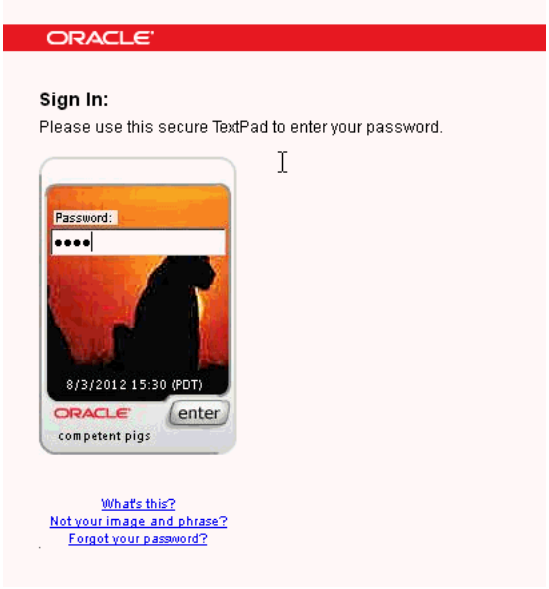


6. Next the user is required to select challenge questions from the drop-down menus provided, and enter the answers to those questions in the authentication device. His selected image and phrase is embedded in the device along with a current timestamp of his local timezone.



7. After the questions are selected and answers are provided, the user is logged in to the system. The user performs his required tasks and logs out of the system.
8. The next time the user tries to log in, he is presented with the user name page in which to enter his user name.

9. If the session passes the pre-authentication rules, the password page is displayed. Since the user is registered, the password page contains his selected image and phrase embedded in the device along with a current timestamp of his local timezone.



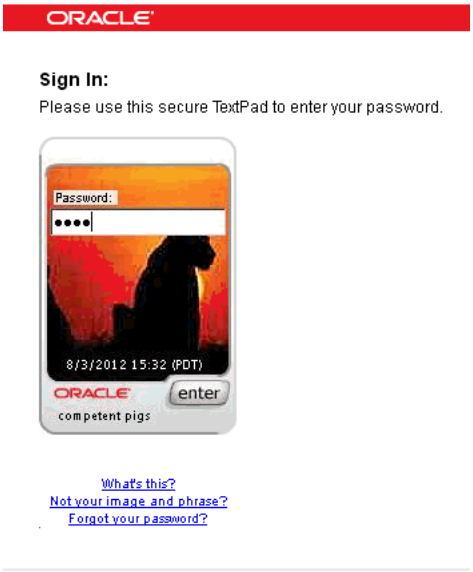
10. The user fills in the password and clicks the Enter button on the device. OAAM verifies the user's password.
11. If the password is correct and the session does not require an additional challenge/response for authentication, the user is logged in to the system.

User Logging In From Different Location Example

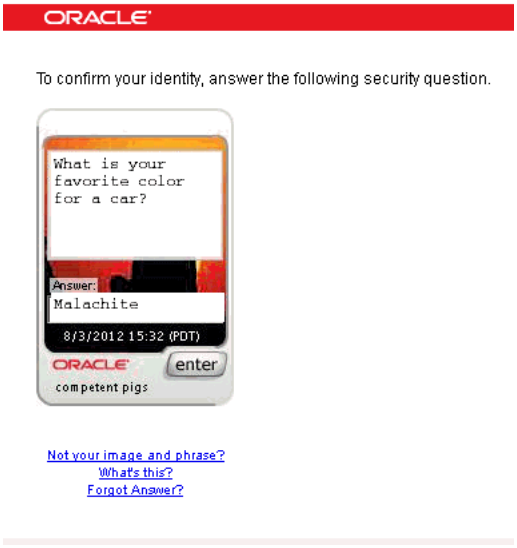
The following screens illustrate an example of the user flow when he logs in using a different IP address and he is challenged.

1. The user is presented with a page in which he is asked to submit his user name.

2. If the user name is accepted and the user is allowed to proceed, he is presented with a password page which contains his selected image and phrase embedded in the device along with a current timestamp of his local timezone.



3. The user fills in the password and clicks the Enter button on the device. OAAM verifies the user's password. Since OAAM determined the session requires an additional challenge/response for authentication because of the user's location, one of the questions he had selected in registration is displayed. The Challenge Question Authentication Pad device has phishing image and phrase embedded along with a current timestamp.



4. The user answers the question correctly and is then logged in to the system.

10.4.2 Forgot Password Flow

The Forgot Password flow allows the users to reset their password after successfully answering all challenge questions.

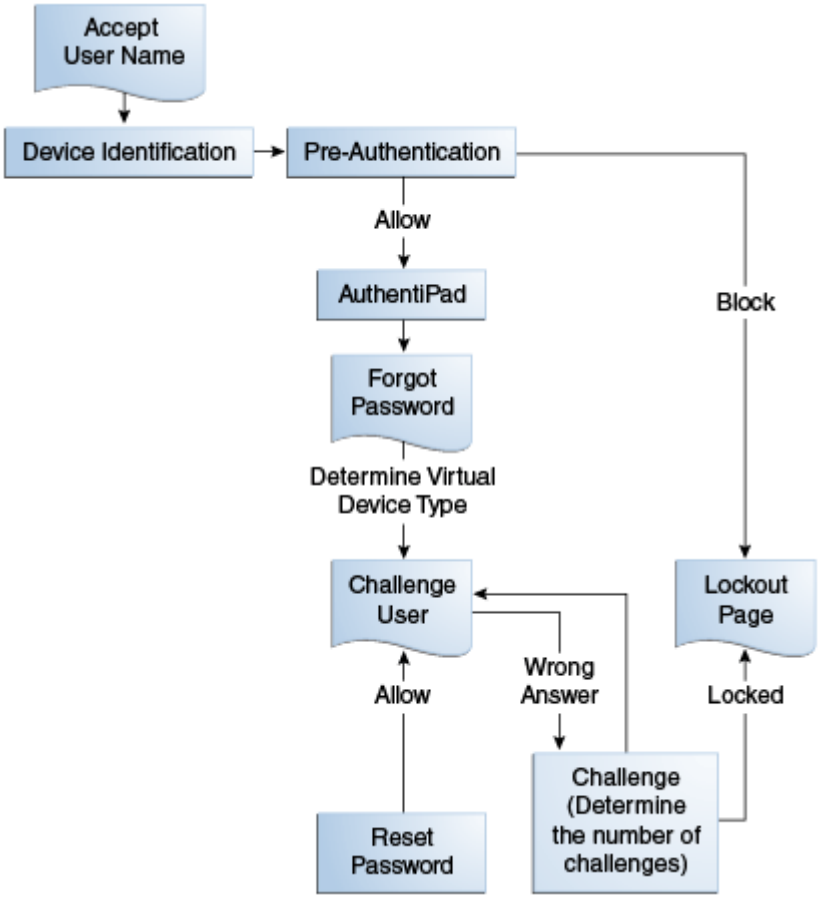
The forgot password feature is made available as a link from the OAAM password page. The flow starts when the user is at the OAAM password page and clicks the **Forgot your password** link.

> **Note:** The Forgot Password feature requires Oracle Identity Manager integration. For more information on Access Manager, Oracle Adaptive Access Manager, and Oracle Identity Manager integration, see *Oracle Fusion Middleware Integration Guide for Oracle Identity Management Suite*.

The flow is as follows:

1. The OAAM Server presents the user with the OAAM user name page and the user submits his user name on the OAAM user name page.
2. Oracle Adaptive Access Manager runs the Device Identification checkpoint to fingerprint and identify the user device and the pre-authentication checkpoint to determine if the user should be allowed to proceed to the OAAM password page. Does this user need to be blocked? For example, if the session is coming in from a bad IP address or if the device is not to be trusted, OAAM will block the user and take the user to the Lockout page.
3. The virtual authentication device rules are run to determine if a virtual authenticator is registered and which virtual authenticator to display in the OAAM password page. If none have been registered, a generic textpad is displayed. The user is prompted to enter his password.
4. Because the user is unable to remember his password during the authentication, he clicks the **Forgot your password?** link below the password authentication device.
5. If the user is already registered, the forgotten password reset process is initiated and the Challenge checkpoint is run to determine the type of challenge to use. Then OAAM presents the user with challenges that must be answered.
6. If the user answers the challenges incorrectly, he will be challenged again and locked out of his account after "n" number of failed attempts.
7. If the user provides correct responses, he is redirected to the Password Reset page.
8. The user enters and confirms the new password. If the user's new password fulfills the password rules, his password is reset.

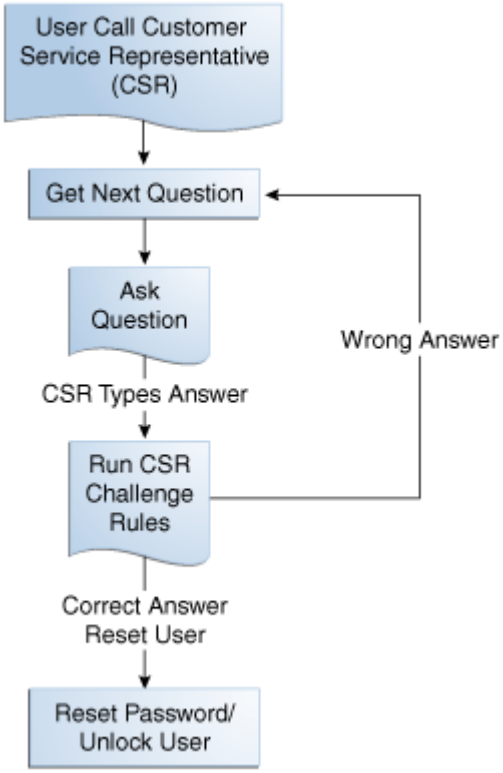
Figure 10–9 Forgot Password Flow



10.4.3 Reset Password (KBA-Challenge) Flow

Challenge Reset enables users to reset their challenge registration.

Figure 10–10 Reset Password



10.4.4 Mobile Service Flows with OAAM

A mobile device is a device that runs a mobile operating system, such as the iOS mobile operating system from Apple, while a non-mobile device is a device that runs a non-mobile operating system, such as Mac OS X, Windows 7, and Linux desktop. Because mobile devices and non-mobile devices present different security challenges, mobile authentication and non-mobile authentication are managed separately in Mobile and Social. New mobile devices come online much more frequently and therefore require greater scrutiny, including fraud detection measures.

OAAM can be used to make runtime authentication decisions, such as blocking authentication if the user is authenticating from an unauthorized country or location. The following functionality is also supported:

- Multi-part login flows: OAAM can challenge the user with knowledge-based authentication questions, or require the user to authenticate using one-time password (OTP) functionality if OAAM detects a risky or unusual usage pattern (using the device at unusual hours or if the user is geographically distant from the place where authentication last took place).
- Check device attributes (such as the MAC Address assigned to a device) and verify that the device is not jail broken. Based on device attributes, OAAM can allow or deny access.
- Device-selective wipeouts are also an option when using OAAM together with Mobile and Social.
- Based on registered device information, OAAM can white-list or black-list specific devices.

10.5 OAAM Security Policies

OAAM comes standard with out-of-the-box policies pre-built to detect suspicious activity.

Note: In the tables, bold text is used to indicate parameters driving the outcome of the policies.

Table 10–6 presents the OAAM out of the box checkpoints and policies.

Table 10–6 OAAM Checkpoints and Responsibilities

CheckPoint Name	Responsibilities	Policies
Pre-Authentication	Determine if the request has to be BLOCKED	OAAM Pre-Authentication. For information, see Section 10.6.1, "OAAM Pre-Authentication."
Device Identification	Determine how to identify the device	▪ OAAM Base Device ID Policy. For information, see Section 10.7.1, "OAAM Base Device ID Policy." ▪ OAAM Mobile Device ID Policy. For information, see Section 10.7.2, "OAAM Mobile Device ID Policy."
AuthentiPad	Determine which authentication pad to use	OAAM AuthenticationPad. For information, see Section 10.8.1, "OAAM AuthenticationPad."
Post Authentication	Determine if the user has to be ALLOWED or BLOCKED	▪ OAAM Post-Authentication Security. For information, see Section 10.9.1, "OAAM Post-Authentication Security." ▪ OAAM Predictive Analysis. For information, see Section 10.9.2, "OAAM Predictive Analysis." ▪ Auto-learning (Pattern-Based) Policy: OAAM Does User Have Profile. For information, see Section 10.9.3, "Auto-learning (Pattern-Based) Policy: OAAM Does User Have Profile." ▪ Auto-learning (Pattern-Based) Policy: OAAM Users vs. Themselves. For information, see Section 10.9.4, "Auto-learning (Pattern-Based) Policy: OAAM Users vs. Themselves." ▪ Autolearning (Pattern-Based) Policy: OAAM Users vs. All Users. For information, see Section 10.9.5, "Autolearning (Pattern-Based) Policy: OAAM Users vs. All Users."
Registration	Determine which pieces of user information is pending registration	OAAM Registration. For information, see Section 10.10.1, "OAAM Registration."
Challenge	Determine which mechanism to use to challenge the user	OAAM Challenge. For information, see Section 10.11.1, "OAAM Challenge."
CSR KBA Challenge	Applicable when customer calls in for service. Reset settings is performed through CSR KBA Challenge.	OAAM Customer Care Ask Question. For information, see Section 10.12.1, "OAAM Customer Care Ask Question."

10.6 Pre-Authentication Policies

Pre-authentication policies are summarized in this section.

10.6.1 OAAM Pre-Authentication

This policy stops fraudulent login attempts before the password is entered.

10.6.1.1 Policy Summary

Table 10–7 summarizes the OAAM Pre-Authentication Policy.

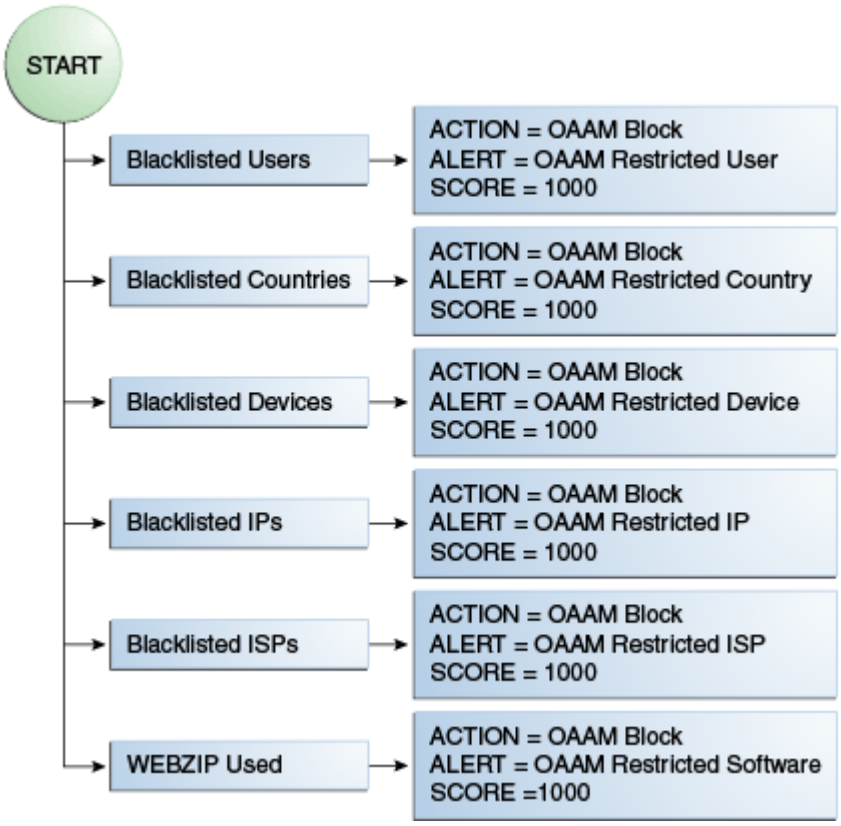
Table 10–7 OAAM Pre-Authentication Policy Summary

Summary	Details
Purpose	This policy stops fraudulent login attempts before the password is entered.
Scoring Engine	Maximum
Weight	100
Group Linking	All Users

10.6.1.2 OAAM Pre-Authentication Flow Diagram

Figure 10–11 shows the OAAM Pre-Authentication flow.

Figure 10–11 OAAM Pre-Authentication Flow



10.6.1.3 OAAM Pre-Authentication: Details of Rules

Table 10–8 shows the rule conditions and parameters in the OAAM Pre-Authentication Policy.

Table 10–8 OAAM Pre-Authentication Policy Rules Details

Rule	Rule Condition and Parameters	Results
Blacklisted countries	**Location: In Country group**	Action = OAAM Block
	Is In List = TRUE	Alert = OAAM Restricted Country
	Country in country groupName Restricted Countries	Score = 1000
Blacklisted devices	**Device: Device in group**	Action = OAAM Block
	Is in group = TRUE	Alert = OAAM Restricted Device
	Device in group = OAAM Restricted Devices	Score = 1000
WebZIP used	**Device: Browser header substring**	Action = OAAM Block
	Substring to check = WebZIP	Alert = OAAM Restricted Software
	Note: WebZip is a source code compressor for web languages, such as HTML, CSS, Javascript, or AJAX. For information, refer to Section 10.13.1, "Use Case: WebZIP Browser."	Score =1000
Blacklisted IPs	**Location: IP in group**	Action = OAAM Block
	Is in List = TRUE	Alert = OAAM Restricted IP
	IP List = OAAM Restricted IPs	Score = 1000
Blacklisted ISPs	**Location: ISP in group**	Action = OAAM Block
	Is in List = TRUE	Alert = OAAM Restricted ISP
	ISP List = OAAM Restricted ISPs	Score = 1000
Blacklisted users	**User: In Group**	Action = OAAM Block
	Is in group = TRUE	Alert = OAAM Restricted User
	User Group = OAAM Restricted Users	Score = 1000

10.6.1.4 Trigger Combinations

There are no trigger combinations for this policy.

10.7 Device Identification Policies

The Device Identification policy is summarized in this section.

10.7.1 OAAM Base Device ID Policy

This policy determines as to which device id policy to execute for client device identification.

10.7.1.1 Policy Summary

Table 10–9 summarizes the OAAM Base Device ID Policy.

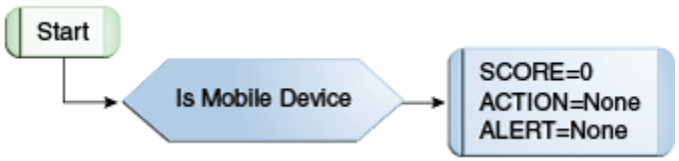
Table 10–9 OAAM Base Device Policy Summary

Summary	Details
Purpose	This policy determines as to which device id policy to execute for client device identification.
Scoring Engine	Maximum
Weight	100
Group Linking	All Users

10.7.1.2 OAAM Base Device ID Flow Diagram

Figure 10–12 shows the OAAM Base Device ID flow.

Figure 10–12 OAAM Base Device ID Flow Diagram



10.7.1.3 OAAM Base Device Policy: Details of Rules

Table 10–10 shows the OAAM Base Device Policy rule conditions and parameters.

Table 10–10 OAAM Base Device Policy Rules Details

Rule	Rule Condition and Parameters	Results
Is Mobile Device	**Device: Check if device is using Mobile Browser** Default return value in case of errors = FALSE **DEVICE: Browser header substring** Substring to check for = OIC Note: You are checking for the substring "OIC".	Action = None Alert = None Score = 0

10.7.1.4 OAAM Base Device ID Policy: Trigger Combinations

Table 10–11 shows the OAAM Base Device ID Policy trigger combinations.

Table 10–11 OAAM AuthenticationPad Policy Trigger Combinations

Description	Combination Detail	Result
Mobile Device	**Is Mobile Device = TRUE**	Action = None Alert = None **Policy = OAAM Mobile Device ID Policy**
Fall through (Is mobile device is not true)	Is Mobile Device = Any	Action = None Alert = None **Policy = OAAM Device ID Policy**

10.7.2 OAAM Mobile Device ID Policy

This policy identifies the mobile devices specific to Oracle Access Management Mobile and Social (Mobile and Social) integrations

10.7.2.1 OAAM Mobile Device ID Policy Summary

Table 10–12 summarizes the OAAM Mobile Device ID Policy.

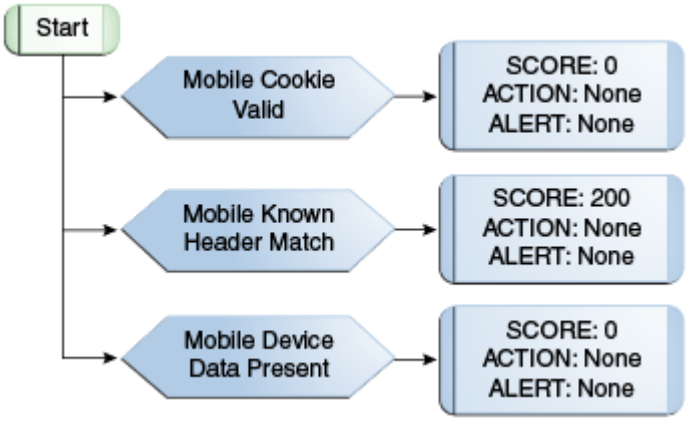
Table 10–12 OAAM Mobile Device ID Policy Summary

Summary	Details
Purpose	This policy identifies the mobile devices specific to Oracle Access Management Mobile and Social (Mobile and Social) integrations
Scoring Engine	Maximum
Weight	100
Group Linking	All Users

10.7.2.2 OAAM Mobile Device ID Flow Diagram

Figure 10–13 shows the OAAM Mobile Device ID flow.

Figure 10–13 OAAM Mobile Device ID Flow Diagram



10.7.2.3 OAAM Mobile Device ID Policy: Details of Rules

Table 10–13 shows the OAAM Mobile Device ID Policy rule conditions and parameters.

Table 10–13 OAAM Mobile Device ID Policy Rules Details

Rule	Rule Condition and Parameters	Results
Mobile Cookie Valid	**Device ID: Is cookie valid** Select cookie type= Mobile Cookie **Note**: OAAM sends a token to the mobile client or browser. The mobile client or browser sends the token back in the next request.	Action = None Alert = None Score = 0
Mobile Known Header match	**Device ID: Header data match** Cookie to use= Mobile Cookie Should check history node = true Data Type = Mobile Cookie Negative check = False	Action = None Alert = None Score = 200
Mobile Device Data Present	**Device ID: Header data present** Data Type = Mobile Cookie	Action = None Alert = None Score = 0

10.7.2.4 OAAM Mobile Device ID Policy: Trigger Combinations

Table 10–14 presents the OAAM Mobile Device ID Policy trigger combinations.

Table 10–14 OAAM Mobile Device ID Policy Trigger Combinations

Description	Combination Detail	Result
Device coming in with valid cookie and header match	**Mobile Cookie Valid = TRUE** **Mobile Known Header match = TRUE** Mobile Device Data Present = Any	Action = **OAAM Device By Mobile Cookie** Alert = None Score = 0
Cookie is valid but known header mismatch	**Mobile Cookie Valid = TRUE** **Mobile Known Header match = FALSE** Mobile Device Data Present = Any	Action = **OAAM Device By Mobile Cookie** Alert = None Score = 600
Mobile cookie is invalid	**Mobile Cookie Valid = FALSE** Mobile Known Header match = Any Mobile Device Data Present = Any	Action = **OAAM New Device** Alert = None Score = 200
Mobile Data is not present	Mobile Cookie Valid = Any Mobile Known Header match = Any **Mobile Device Data Present = FALSE**	Action = **OAAM New Device with BG Check** Alert = None Score = 0

10.8 Authentipad Policies

The Authentication Pad policy is summarized in this section.

10.8.1 OAAM AuthenticationPad

This policy determines the OAAM Authentication Pad to use.

10.8.1.1 OAAM AuthenticationPad Policy Summary

Table 10–15 summarizes the OAAM AuthenticationPad Policy.

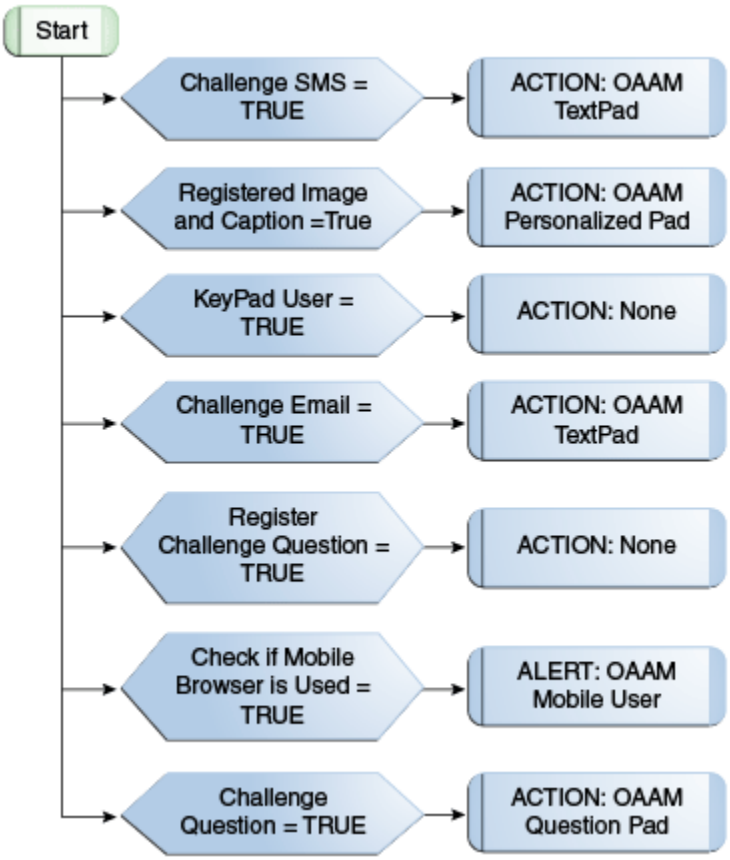
Table 10–15 OAAM AuthenticationPad Policy Summary

Summary	Details
Purpose	This policy determines which OAAM Authentication Pad to use.
Scoring Engine	Average
Weight	100
Group Linking	All Users

10.8.1.2 OAAM AuthenticationPad Flow Diagram

Figure 10–14 shows the OAAM AuthenticationPad flow.

Figure 10–14 OAAM AuthentiPad Flow



10.8.1.3 OAAM AuthenticationPad: Details of Rules

Table 10–16 shows the rule conditions and parameters in the OAAM AuthenticationPad Policy.

Table 10–16 OAAM Authentication Pad Policy Rules Details

Rule	Rule Condition and Parameters	Results
Challenge SMS	**Session: Check value in comma separated values** Parameter Key = AvailableChallengeTypes Value to Check = ChallengeSMS Return if in list = TRUE	Action = OAAM Text Pad Alert = NONE Score = 0
Registered Image and Caption	**User: Authentication Image Assigned** Is Assigned = TRUE	Action = OAAM Personalized Pad Alert = NONE Score = 0
Key Pad User	**User: Authentication Mode** Authentication Mode is = Full Keypad	Action = OAAM KeyPad Alert = NONE Score = 0
Challenge Email	**Session: Check value in comma separated values** Parameter Key = AvailableChallengeTypes Value to Check = ChallengeEmail Return if in list = TRUE	Action = OAAM Text Pad Alert = NONE Score = 0
Register Challenge Question	**Session: Check value in comma separated values** Parameter Key = AvailableChallengeTypes Value to Check = RegisterChallengeQuestion Return if in list = TRUE	Action = NONE Alert = NONE Score = 0
Check if mobile browser is used	**DEVICE: Check if device is a given type** Device Type = Mobile device Return Value when device of given type = TRUE	Action = NONE Alert =OAAM Mobile Users Score = 0
Challenge Question	**Session: Check value in comma separated values** Parameter Key = AvailableChallengeTypes Value to Check = ChallengeQuestion Return if in list = TRUE	Action = OAAM Question Pad Alert = NONE Score = 0

10.8.1.4 OAAM AuthenticationPad: Trigger Combinations

Table 10–17 presents the OAAM AuthenticationPad trigger combinations.

Table 10–17 OAAM AuthenticationPad Policy Trigger Combinations

Description	Combination Detail	Result
Registering challenge questions using mobile browser	**Register Challenge Question = TRUE** **Check if Mobile Device = TRUE** **Challenge SMS = FALSE** **Challenge Email = FALSE** **Challenge Question = FALSE** Registered Image and Caption =Any Key Pad User = Any	**Action = OAAM HTML Pad** Alert = NONE Score = 0
Registering challenge questions using non mobile browser.	**Register Challenge Question = TRUE** **Check if Mobile Device = FALSE** Challenge SMS = Any Challenge Email = Any Challenge Question = Any Registered Image and Caption =Any Key Pad User = Any	**Action = OAAM Question Pad Personalized** Alert = NONE Score = 0
Password while upgraded to Key-Pad without registered image.	**Register Challenge Question = FALSE** **Check if Mobile Device = FALSE** **Challenge SMS = FALSE** **Challenge Email = FALSE** **Challenge Question = FALSE** **Registered Image and Caption = FALSE** **Key Pad User = TRUE**	**Action = OAAM Key Pad** Alert = NONE Score = 0

Table 10–17 (Cont.) OAAM AuthenticationPad Policy Trigger Combinations

Description	Combination Detail	Result
Password while upgraded to KeyPad with registered image. Adds personalized pad sub-action.	**Register Challenge Question = FALSE** **Check if Mobile Device = FALSE** **Challenge SMS = FALSE** **Challenge Email = FALSE** **Challenge Question = FALSE** **Registered Image and Caption = TRUE** **Key Pad User = TRUE**	**Action = OAAM Key Pad Personalized** Alert = NONE Score = 0
Password without registered image	Register Challenge Question = Any Check if Mobile Device = Any **Challenge SMS = FALSE** **Challenge Email = FALSE** **Challenge Question = FALSE** **Registered Image and Caption = FALSE** Key Pad User = Any	**Action = OAAM Text Pad** Alert = NONE Score = 0
Password with registered image. Adds personalized pad sub-action.	Register Challenge Question = Any **Check if Mobile Device = Any** **Challenge SMS = FALSE** **Challenge Email = FALSE** **Challenge Question = FALSE** **Registered Image and Caption = TRUE** Key Pad User = Any	**Action = OAAM Text Pad Personalized** Alert = NONE Score = 0

10.9 Post-Authentication Policies

This section summarizes the Post-Authentication policies.

10.9.1 OAAM Post-Authentication Security

This policy evaluates the level of risk after authentication is successful. The possible actions are allow block or challenge.

10.9.1.1 OAAM Post-Authentication Security Policy Summary

Table 10–18 summarizes the OAAM Post-Authentication Security Policy.

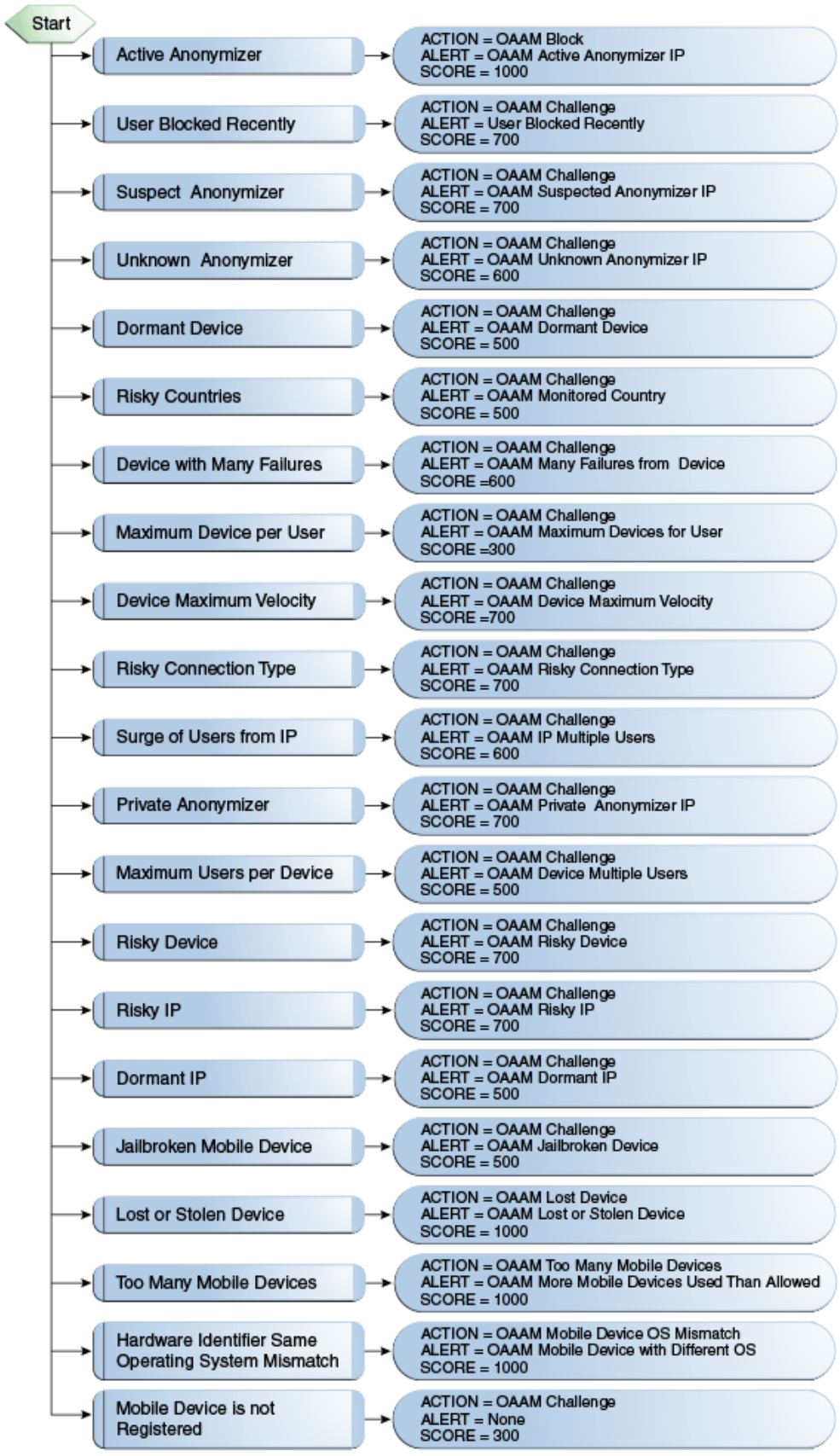
Table 10–18 OAAM Post-Authentication Security Policy Summary

Summary	Details
Purpose	This policy evaluates the level of risk after authentication is successful. The possible actions are allow block or challenge.
Scoring Engine	Maximum
Weight	100
Group Linking	All Users

10.9.1.2 OAAM Post-Authentication Security Flow Diagram

Figure 10–15 shows the OAAM Post Authentication Security flow.

Figure 10–15 OAAM Post Authentication Security Flow



10.9.1.3 OAAM Post-Authentication Security: Details of Rules

Table 10–19 shows the rule conditions and parameters in the OAAM Post-Authentication Security Policy.

Table 10–19 OAAM Post Authentication Security Policy Rules Details

Rule	Rule Condition and Parameter Values	Results
Active Anonymizer	**Location: IP in Group** Is in List = TRUE IP in group = anonymizer_active	Action = OAAM Block Alert = OAAM Active Anonymizer IP Score = 1000
Suspect Anonymizer	**Location: IP in Group** Is in List = TRUE IP in group = anonymizer_suspect	Action = OAAM Challenge Alert = OAAM Suspected Anonymizer IP Score = 700
Unknown Anonymizer	**Location: IP in Group** Is in List = TRUE IP in group = anonymizer_active	Action = OAAM Challenge Alert = OAAM Unknown Anonymizer IP Score = 600
Private Anonymizer	**Location: IP in Group** Is in List = TRUE IP in group = anonymizer_private	Action = OAAM Challenge Alert = OAAM Private Anonymizer IP Score = 700
Risky Connection Type	**Location: IP Connection Type in Group** Is in List = TRUE Connection type in group = OAAM High Risk Connection Types	Action = OAAM Challenge Alert = OAAM Risky Connection type Score = 700
User Blocked Recently	**User: Action Timed** Check Action = BLOCK In seconds = 28800 More than = 2	Action = OAAM Challenge Alert = User Blocked Recently Score = 700
Maximum Users per Device	**Device: User Count** Seconds Elapsed = 2592000 Max number of users allowed = 5	Action = OAAM Challenge Alert = OAAM Device Multiple Users Score = 500
Dormant IP	**Location: IP Connection type in group** Is in List = FALSE Connection type group = OAAM Mobile Connections **Location: IP Excessive Use** Number of Users = 4 Within (hours) = 24 And not used in days = 30	Action = OAAM Challenge Alert = OAAM Dormant IP Score = 500

Table 10–19 (Cont.) OAAM Post Authentication Security Policy Rules Details

Rule	Rule Condition and Parameter Values	Results
Surge of Users from IP	**Location: IP Connection type in group** Is in List = FALSE Connection type group = OAAM Mobile Connections **Location: IP is AOL** Is AOL = False **Location: IP Maximum Users** Seconds Elapsed = 300 Max number of users = 3	Action = OAAM Challenge Alert = OAAM IP Multiple Users Score = 600
Risky countries	**Location: In Country Group** Is in List = TRUE Country in country group = OAAM Monitoring Countries	Action = OAAM Challenge Alert = OAAM Monitored Country Score = 500
Dormant Device	**Device: Excessive Use** Number of Users = 4 Within (hours) = 24 And not used in (days) = 30	Action = OAAM Challenge Alert = OAAM Dormant Device Score = 500
Device with Many Failures	**Device: Timed not status** Authentication status is not = SUCCESS Within duration (seconds) = 28800 For more than 4 (times)	Action = OAAM Challenge Alert = OAAM Many Failures from Device Score =600
Maximum Devices per User	**User: Check Devices Used** Maximum number of devices = 2 Within duration (seconds) = 28800	Action = OAAM Challenge Alert = OAAM Max Devices for User Score =300
Risky Device	**Device: In List** Is in group= TRUE Device in group = OAAM Risky Devices	Action = OAAM Challenge Alert = OAAM Risky Device Score = 700
Device Maximum Velocity	**Device: Velocity from last login** Last Login within (Seconds) = 72000 Miles per Hour is more than = 600	Action = OAAM Challenge Alert = OAAM Device Maximum Velocity Score =700
Risky IP	**Location: IP in group** Is in List = TRUE IP List = OAAM Risky IPs	Action = OAAM Challenge Alert = OAAM Risky IP Score = 700

Table 10–19 (Cont.) OAAM Post Authentication Security Policy Rules Details

Rule	Rule Condition and Parameter Values	Results
Too many mobile devices	**Device: Check if device is of given type** Device Type = Mobile Device Return Value = True **DEVICE: Is registered** Is Registered then return = False **User: Check Number of Registered Devices of a Given Type** Number Of Devices = More than Number Of Devices to compare = 4 Device Of Type = Mobile Device	Action = OAAM Too Many Mobile Devices Alert = OAAM More Mobile devices used than allowed Score = 1000
Lost or Stolen Device	Device: Check if device is of given type Device Type = Mobile Device Return Value = True Device: Device in group Is in group = True Device in group = OAAM Lost or stolen Device	Action = OAAM Lost Device Alert = OAAM Lost or Stolen Device Score = 1000
Jail broken Mobile Device	**Device: Check if device is of given type** Device Type = Mobile Device Return Value = True **Session: Check string parameter value** Parameter Key = isJailBroken Value = true	Action = OAAM Challenge Alert = OAAM Jailbroken Device Score = 500
Hardware Identifier same but Operating System mismatch	Precondition: Device Risk Score between 599 and 601 **Device: Check if device is of given type** Device Type = Mobile Device Return Value = True **Device: Browser Header Substring** Substring = "OIC"	Action = OAAM Mobile Device OS Mismatch Alert = OAAM Mobile Device with Different OS Score = 1000
Mobile device is not registered	Device: Check if device is of given type Device Type = Mobile Device Return Value = True Device: Is registered If registered then, return = False	Action = OAAM Challenge Alert = None Score = 300

10.9.1.4 OAAM Post-Authentication Security: Trigger Combinations

There are no trigger combinations for this policy.

10.9.2 OAAM Predictive Analysis

This policy harnesses the predictive capabilities of Oracle Data Miner. The rules in this policy are only functional if Oracle Data Miner is configured.

10.9.2.1 OAAM Predictive Analysis Policy Summary

Table 10–20 summarizes the OAAM Predictive Analysis Policy.

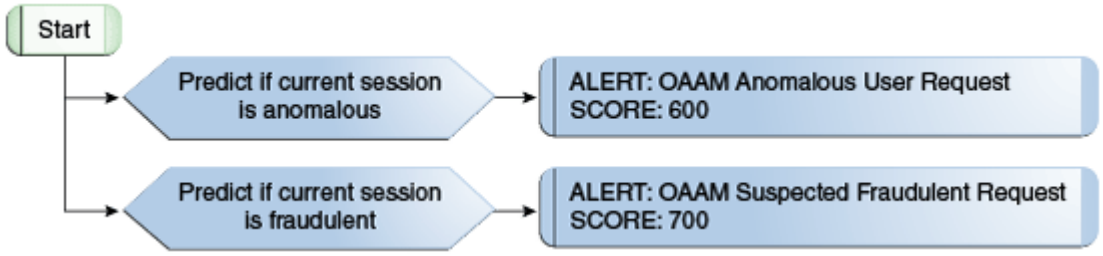
Table 10–20 OAAM Predictive Analysis Policy Summary

Summary	Details
Purpose	Harnesses the predictive capabilities of Oracle Data Miner. These rules are only functional if Oracle Data Miner is configured.
Scoring Engine	Maximum
Weight	100
Group Linking	Linked Users

10.9.2.2 OAAM Predictive Analysis Flow Diagram

Figure 10–16 shows the OAAM Predictive Analysis flow.

Figure 10–16 OAAM Predictive Analysis Policy Flow



10.9.2.3 OAAM Predictive Analysis Policy: Details of Rules

Table 10–21 shows the rule conditions and parameters in the OAAM Predictive Analysis Policy.

Table 10–21 OAAM Predictive Analysis Policy Rules Details

Rule	Rule Condition and Parameters	Results
Predict if current session is fraudulent	**USER: Check Fraudulent User Request** Classification Model = OAAM Fraud Request Model Required Classification = Fraud Minimum Value of Probability required = 0.70 Maximum Value of Probability required = 1.00 Default Value to return if error = FALSE	Action = NONE Alert = OAAM Suspected Fraudulent request Score = 700
Predict if current session is anomalous	**USER: Check Anomalous User Request** Anomaly Model = OAAM Anomalous Request Model Minimum Value of Probability required = 0.60 Maximum Value of Probability required = 1.00 Default Value to return if error = FALSE	Action = NONE Alert = OAAM Anomalous Request Score = 600

10.9.2.4 OAAM Predictive Analysis Policy: Trigger Combination

There are no trigger combinations for this policy.

10.9.3 Auto-learning (Pattern-Based) Policy: OAAM Does User Have Profile

This policy checks if pattern auto-learning is enabled and if a user has past behavior recorded. Users with enough recorded behavior will be evaluated against their own profile while users without enough recorded behavior will be evaluated against the profiles of all other users.

10.9.3.1 OAAM Does User Have Profile Policy Summary

Table 10–21 summarizes the OAAM Does User Have Profile Policy.

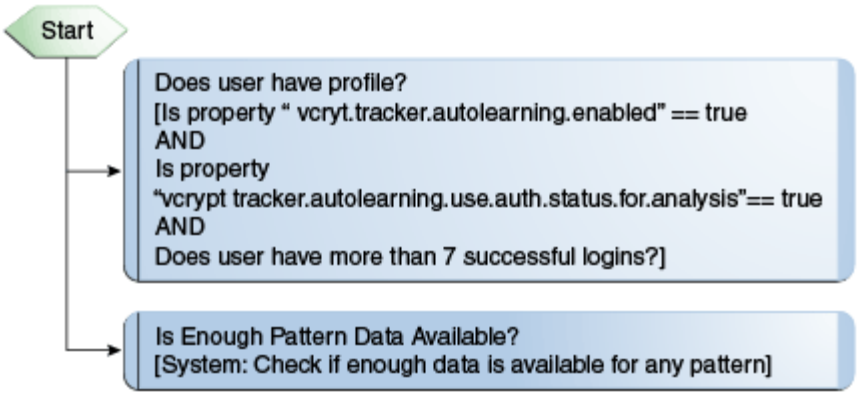
Table 10–22 Auto-learning (Pattern-Based) Policy: OAAM Does User Have Profile Summary

Summary	Details
Purpose	This policy checks if pattern auto-learning is enabled and if a user has past behavior recorded. Users with enough recorded behavior will be evaluated against their own profile while users without enough recorded behavior will be evaluated against the profiles of all other users.
Scoring Engine	Maximum
Weight	100
Group Linking	All Users

10.9.3.2 OAAM Does User Have Profile Flow Diagram

Figure 10–17 shows the OAAM Does User Have Profile flow.

Figure 10–17 Autolearning (Pattern-Based) Policy: OAAM Does User Have Profile Flow



10.9.3.3 OAAM Does User Have Profile: Details of Rules

Table 10–23 shows the OAAM Does User Have Profile rule conditions and parameters.

Table 10–23 Auto-learning (Pattern-Based) Policy Rules Details: OAAM Does User Have Profile

Rule	Rule Condition and Parameters	Results
Does user have a profile	System - Check Boolean Property Property = vcrypt.tracker.autolearning.enabled Value = True Default Return Value = True System - Check Boolean Property Property = vcrypt.tracker.autolearning.use.auth.status.for.analysis Value = True Default Return Value = False User - Check Login Count Check only current user = True Authentication Status = Success In seconds = 0 With Login more than = 7 If Error return = False Consider current request or not = True	Action = None Alert = None Score = 0
Is enough pattern data available	System: Check if enough data is available for any pattern Number of days of data =90 Is Pattern data available = True Error Return Value = False	Action = None Alert = None Score = 0

10.9.3.4 OAAM Does User Have Profile: Trigger Combination

Table 10–24 shows the OAAM Does User Have Profile trigger combinations.

Table 10–24 Auto-learning (Pattern-Based) Policy: OAAM Does User Have Profile Trigger Combination

Description	Combination Detail	Result
If a user has enough recorded behavior in their profile they will be evaluated by this policy	Does User have profile = TRUE Is enough pattern data available = TRUE	Policy = OAAM users v/s themselves Alert = NONE
If a user does not have enough recorded behavior in their profile they will be evaluated by this policy.	Does User have profile = ANY Is enough pattern data available = TRUE	Policy = OAAM users v/s all users Alert = NONE

10.9.4 Auto-learning (Pattern-Based) Policy: OAAM Users vs. Themselves

If a user has a sufficient amount of historical data captured this policy will be used to evaluate their current behavior against their own historical behavior. This policy uses pattern-based rules to evaluate risk.

10.9.4.1 OAAM Users vs. Themselves Policy Summary

Table 10–25 summarizes the OAAM Users vs. Themselves Policy.

Table 10–25 Auto-learning (Pattern-Based) Policy: OAAM Users vs. Themselves Summary

Summary	Details
Purpose	If a user has a sufficient amount of historical data captured this policy will be used to evaluate their current behavior against their own historical behavior. This policy uses pattern-based rules to evaluate risk.
Scoring Engine	Maximum
Weight	100
Group Linking	Linked Users (It is a nested policy)

10.9.4.2 OAAM Users vs. Themselves Flow Diagram

Figure 10–18 shows the OAAM Users vs. Themselves flow.

Figure 10–18 Auto-learning (Pattern-Based) Policy: OAAM Users vs. Themselves Flow

10.9.4.3 OAAM Users vs. Themselves: Details of Rules

Table 10–26 shows the OAAM Users vs. Themselves rule conditions and parameters.

Table 10–26 Auto-learning (Pattern-Based) Policy Rules Details: OAAM Users vs. Themselves

Rule	Rule Condition and Parameters	Results
ISP	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 6 Pattern name for membership = User: ISP profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: ISP Score = 600
Connection type	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 6 Pattern name for membership = User: ASN profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: connection type Score = 600
Routing type	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 6 Pattern name for membership = User: Routing type profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: Routing type Score = 600
Device	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 10 Pattern name for membership = User: Device profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: Device Score = 700
Day of the week	ENTITY: Entity is member of pattern bucket for firsttime in certain time period Pattern name for membership = User: Day of Week profiling pattern Is ConditionTrue = True Time period type for pattern membership = Months Time period for pattern membership = 3 Member type for pattern membership = User First time count = 1	Action = OAAM Challenge Alert = OAAM User: day of the week Score = 500

Table 10–26 (Cont.) Auto-learning (Pattern-Based) Policy Rules Details: OAAM Users vs. Themselves

Rule	Rule Condition and Parameters	Results
Country and State	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 10 Pattern name for membership = User: State profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: state Score = 600
Time of Day	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 3 Pattern name for membership = User: timerange profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: time of day Score = 500
ASN	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 6 Pattern name for membership = User: ASN profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 1 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: ASN Score = 600
Country	ENTITY: Entity is member of pattern less than some percent times Pattern Hit Percent less than = 20 Pattern name for membership = User: Country profiling pattern Is Membership Count Less than patternHitPercent = True Time period type for pattern membership = Months Time period for pattern membership = 3 Member type for pattern membership = User	Action = OAAM Challenge Alert = OAAM User: Country Score = 700

10.9.4.4 OAAM Users vs. Themselves: Trigger Combinations

There are no trigger combinations for this policy.

10.9.5 Autolearning (Pattern-Based) Policy: OAAM Users vs. All Users

If a user does not have a sufficient amount of historical data captured this policy will be used to evaluate their current behavior against the historical behavior of all other users. This policy uses pattern-based rules to evaluate risk.

10.9.5.1 OAAM Users vs. All Users Policy Summary

Table 10–27 summarizes the OAAM Users vs. All Users Policy.

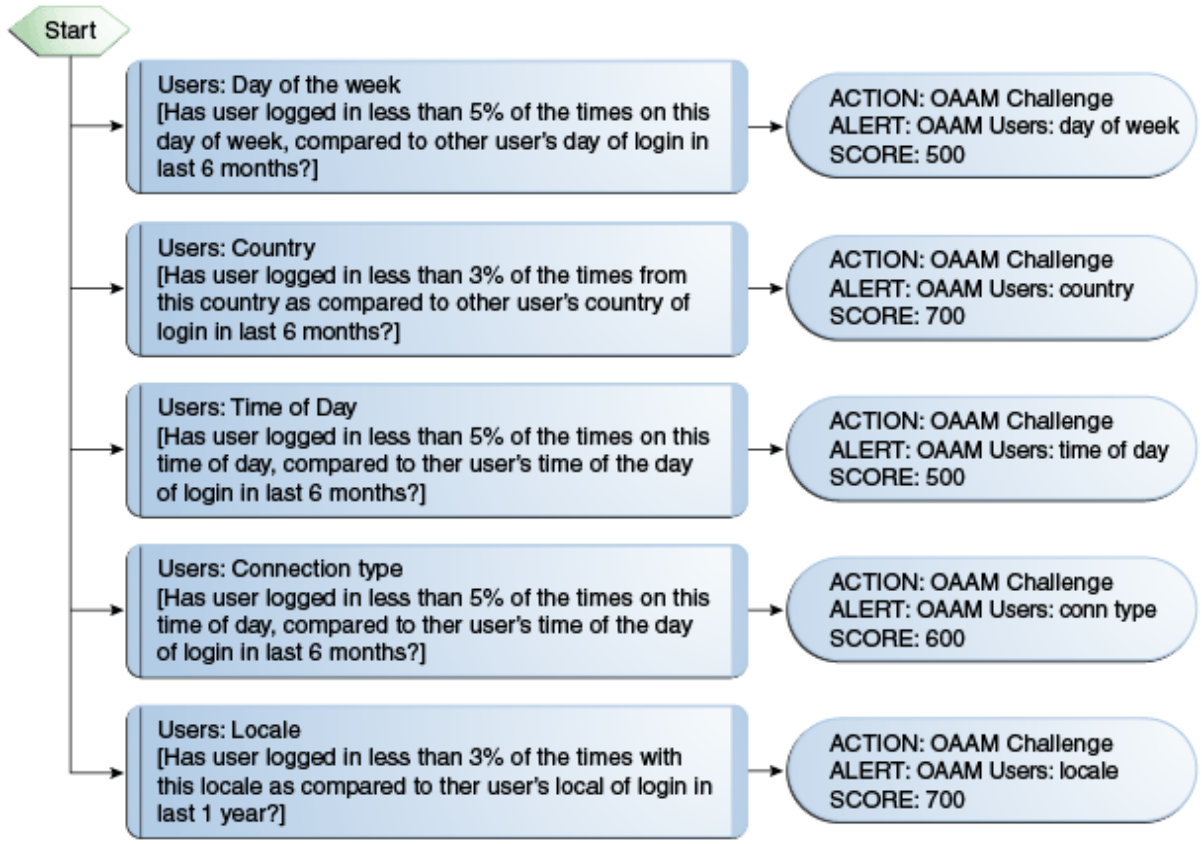
Table 10–27 Auto-learning (Pattern-Based) Policy: OAAM users vs. All Users Summary

Summary	Details
Purpose	If a user does not have a sufficient amount of historical data captured this policy will be used to evaluate their current behavior against the historical behavior of all other users. This policy uses pattern-based rules to evaluate risk.
Scoring Engine	Maximum
Weight	100
Group Linking	Linked Users (It is a nested policy)

10.9.5.2 OAAM Users vs. All Users Flow Diagram

Figure 10–19 shows the OAAM Users vs. All Users flow.

Figure 10–19 Auto-learning (Pattern-Based) Policy: OAAM Users vs. All Users Flow



10.9.5.3 OAAM Users vs. All Users: Details of Rules

Table 10–28 shows the OAAM Users vs. All Users rule conditions and parameters.

Table 10–28 Auto-learning (Pattern-Based) Policy Rules Details: OAAM Users vs. All User

Rule	Rule Condition and Parameters	Results
Users: Day of the week	ENTITY: Entity is member of pattern bucket less than some percent with all entities in picture Pattern Bucket Hit Percent less than = 5 Pattern name for membership= User: Day of the week profiling pattern Is membership count less than pattern hit percent = true Time period type for pattern membership = Months Time period for pattern membership = 6 Member Type for pattern membership = User	Action = OAAM Challenge Alert = Users: Day of the week Score = 500
Users: Country	ENTITY: Entity is member of pattern bucket less than some percent with all entities in picture Pattern Bucket Hit Percent less than = 3 Pattern name for membership= User: Country profiling pattern Is membership count less than pattern hit percent = true Time period type for pattern membership = Months Time period for pattern membership = 6 Member Type for pattern membership = User	Action = OAAM Challenge Alert = Users: Country Score = 700

Table 10–28 (Cont.) Auto-learning (Pattern-Based) Policy Rules Details: OAAM Users vs. All User

Rule	Rule Condition and Parameters	Results
Users: Time of Day	ENTITY: Entity is member of pattern bucket less than some percent with all entities in picture Pattern Bucket Hit Percent less than = 5 Pattern name for membership= User: Time of day profiling pattern Is membership count less than pattern hit percent = true Time period type for pattern membership = Months Time period for pattern membership = 6 Member Type for pattern membership = User	Action = OAAM Challenge Alert = Users: Time of day Score = 500
Users: Connection type	ENTITY: Entity is member of pattern bucket less than some percent with all entities in picture Pattern Bucket Hit Percent less than = 5 Pattern name for membership= User: Connection type profiling pattern Is membership count less than pattern hit percent = true Time period type for pattern membership = Months Time period for pattern membership = 6 Member Type for pattern membership = User	Action = OAAM Challenge Alert = Users: Connection type Score = 600
Users: Locale	ENTITY: Entity is member of pattern bucket less than some percent with all entities in picture Pattern Bucket Hit Percent less than = 3 Pattern name for membership= User: Time of day profiling pattern Is membership count less than pattern hit percent = true Time period type for pattern membership = Years Time period for pattern membership = 6 Member Type for pattern membership = User	Action = OAAM Challenge Alert = Users: Locale Score = 700

10.9.5.4 OAAM Users vs. All Users: Trigger Combinations

There are no trigger combinations for this policy.

10.10 Registration Policies

Registration policies are summarized in this section.

10.10.1 OAAM Registration

This policy is used to determine the user information that needs to be registered.

10.10.1.1 OAAM Registration Policy Summary

Table 10–29 summarizes the OAAM Registration Policy.

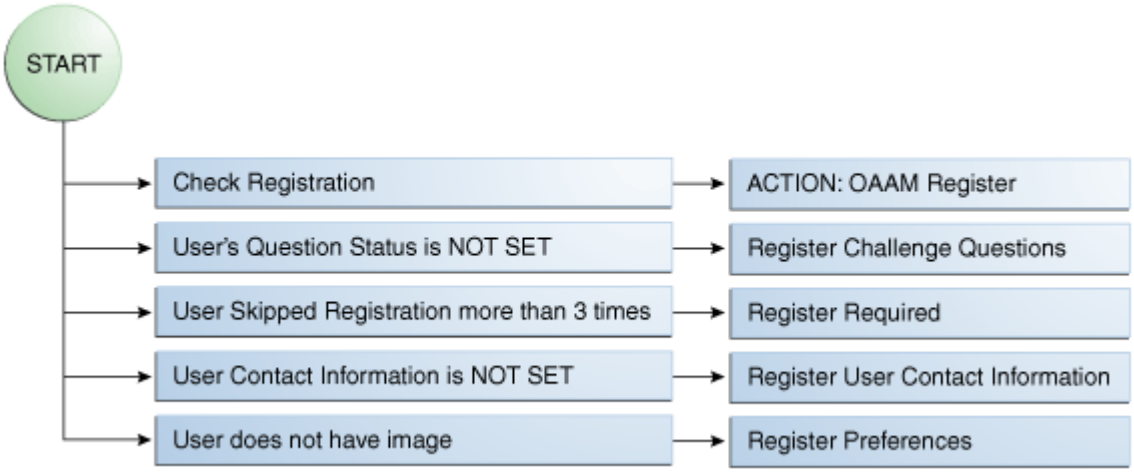
Table 10–29 OAAM Registration Policy Summary

Summary	Details
Purpose	Determines what parts of user information has to be registered
Scoring Engine	Weighted Average
Weight	100
Group Linking	All Users

10.10.1.2 OAAM Registration Flow Diagram

Figure 10–20 shows the OAAM Registration flow.

Figure 10–20 OAAM Registration Flow



10.10.1.3 OAAM Registration: Details of Rules

Table 10–30 shows the OAAM Registration rule conditions and parameters.

Table 10–30 OAAM Registration Policy Rules Details

Rule	Rule Condition and Parameters	Results
Check Registration	User: Account Status User Account Status = ACTIVE Is = FALSE	Action = OAAM Register Alert = NONE Score = 0
Register Questions	User: Question Status User Question Status = Set Is = FALSE	Action = OAAM Register Challenge Questions Alert = NONE Score = 0
Skipped registration more than 3 times	User: Action Count Timed Checkpoint (Optional) = NONE Action = Register User Optional In seconds = 300 Count Action only once per session? = TRUE More Than = 3	Required Alert = NONE Score = 0
Register User Information	User: Check Information Key to comma separated values to check = RequiredChallengeInfo If Information is set, return = FALSE	Action = OAAM Register User Information Alert = NONE Score = 0
Register Image and Caption	User: Authentication Image Assigned Is Assigned = FALSE	Action = OAAM Register Preferences Alert = NONE Score = 0

10.10.1.4 OAAM Registration: Trigger Combinations

There are no trigger combinations for this policy.

10.11 Challenge Policies

Challenge policies are presented in this section.

10.11.1 OAAM Challenge

Policy to determine how the User has to be Challenged. All the decision making in this policy is achieved using trigger combinations.

10.11.1.1 OAAM Challenge Policy Summary

Table 10–31 summarizes the OAAM Challenge Policy.

Table 10–31 OAAM Challenge Policy Summary

Summary	Details
Purpose	Policy to determine how the User has to be Challenged. All the decision making in this policy is achieved using trigger combinations.

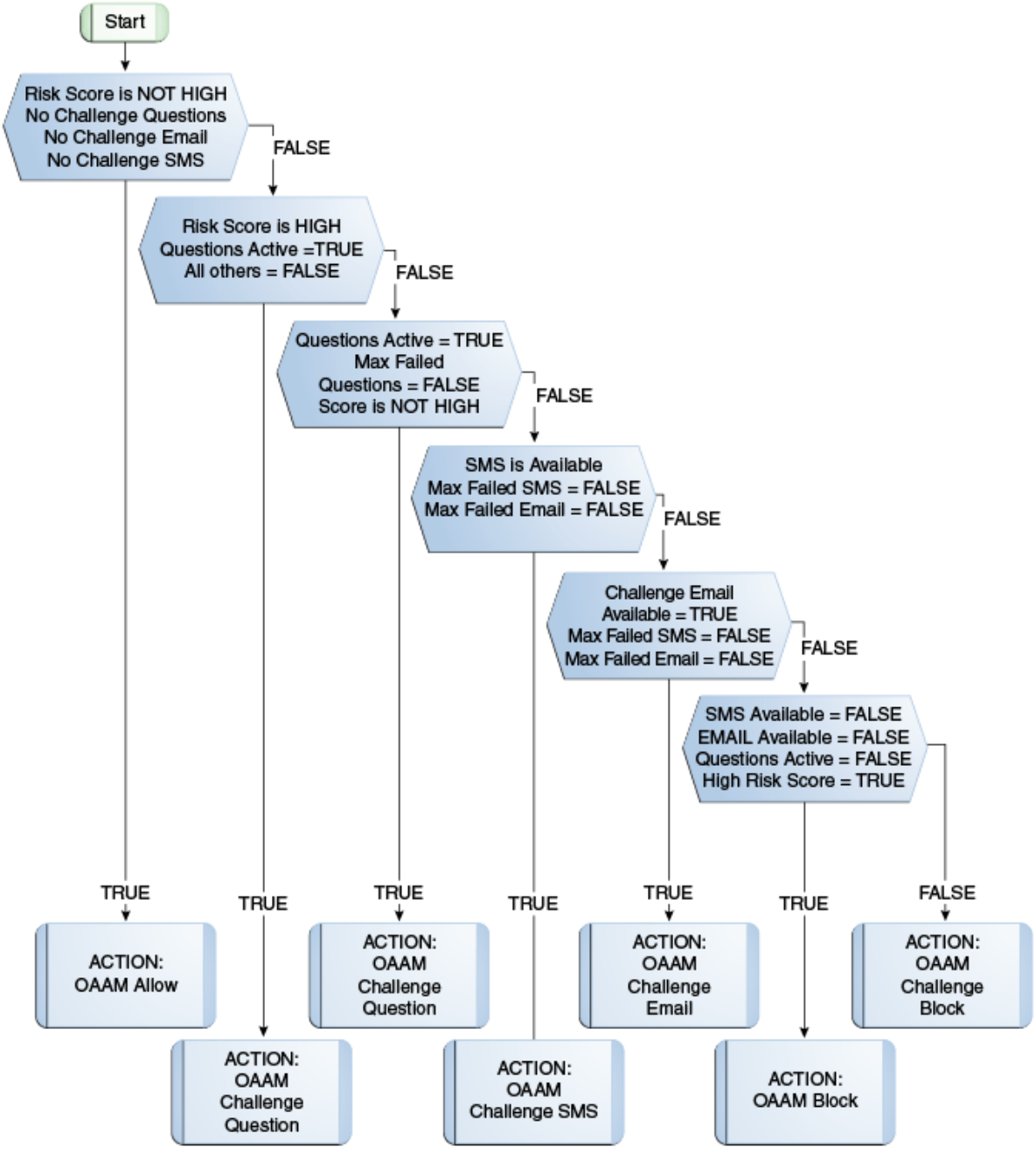
Table 10–31 (Cont.) OAAM Challenge Policy Summary

Summary	Details
Scoring Engine	Weighted Average
Weight	100
Group Linking	All Users

10.11.1.2 OAAM Challenge Flow Diagram

Figure 10–21 shows the OAAM Challenge flow.

Figure 10–21 OAAM Challenge Flow



10.11.1.3 OAAM Challenge: Details of Rules

Table 10–32 shows the OAAM Challenge rule conditions and parameters.

Table 10–32 OAAM Challenge Policy Rules Details

Rule	Rule Condition and Parameters	Results
Max failed SMS attempts	User: Check OTP failures	Action = NONE
	OTP Challenge Type = ChallengeSMS	Alert = NONE
	Failure More than or Equal To = 3	Score = 0
	If above or equal = TRUE	
Max failed Email attempts	User: Check OTP failures	Action = NONE
	OTP Challenge Type = ChallengeEmail	Alert = NONE
	Failure More than or Equal To = 3	Score = 0
	If above or equal = TRUE	
Max failed Question attempts	User: Challenge Maximum Failures	Action = NONE
	Number of Failures More than or equal to = 3	Alert = NONE
	Current Question Count only? = False	Score = 0
	If above or equal, return = True	
Questions Active	User: Question Status	Action = NONE
	User Question Status = Set	Alert = NONE
	Is = True	Score = 0
Challenge Email Available	Session: Check value in comma separated values	Action = NONE
	Parameter Key = AvailableChallengeTypes	Alert = NONE
	Value to Check = ChallengeEmail	Score = 0
	Return if in list = True	
Challenge SMS Available	Session: Check value in comma separated values	Action = NONE
	Parameter Key = AvailableChallengeTypes	Alert = NONE
	Value to Check = ChallengeSMS	Score = 0
	Return if in list = True	
Check for HIGH Risk Score	Session: Check Risk Score Classification	Action = NONE
	Risk score classification to check = High Risk	Alert = NONE
	Default value to return in case of errors = False	Score = 0

10.11.1.4 OAAM Challenge: Trigger Combinations

Table 10–33 shows the OAAM Challenge trigger combinations.

Table 10–33 OAAM Challenge Trigger Combinations

Description	Combination Detail	Result
If user is not registered and risk is low then no challenge.	Check for High Risk Score = False Questions Active = False Challenge Email Available = False Challenge SMS Available = False Max failed Question Attempts = Any Max failed Email Attempts = Any Max failed SMS Attempts = Any	Policy = NONE Action = OAAM Allow Alert = NONE Score = 0
If risk score is high and user is registered for KBA challenge and has active questions and has not exceeded maximum challenge failures for KBA, then challenge using KBA.	Check for High Risk Score = TRUE Questions Active = TRUE Challenge Email Available = FALSE Challenge SMS Available = FALSE Max failed Question Attempts = FALSE Max failed Email Attempts = FALSE Max failed SMS Attempts = FALSE	Policy = NONE Action = OAAM Challenge Question Alert = NONE Score = 0
If user is registered for KBA and has active questions then KBA challenge.	Check for High Risk Score = FALSE Questions Active = TRUE Challenge Email Available = Any Challenge SMS Available = Any Max failed Question Attempts = FALSE Max failed Email Attempts = Any Max failed SMS Attempts = Any	Policy = NONE Action = OAAM Challenge Question Alert = NONE Score = 0
If user is registered for OTP via SMS only then OTP challenge via SMS.	Check for High Risk Score = Any Questions Active = Any Challenge Email Available = Any Challenge SMS Available = TRUE Max failed Question Attempts = Any Max failed Email Attempts = FALSE Max failed SMS Attempts = FALSE	Policy = NONE Action = OAAM Challenge SMS Alert = NONE Score = 0

Table 10–33 (Cont.) OAAM Challenge Trigger Combinations

Description	Combination Detail	Result
If user is registered for OTP via Email only then OTP challenge via Email.	Check for High Risk Score = Any Questions Active = Any Challenge Email Available = TRUE Challenge SMS Available = Any Max failed Question Attempts = Any Max failed Email Attempts = FALSE Max failed SMS Attempts = FALSE	Policy = NONE Action = OAAM Challenge Email Alert = NONE Score = 0
If user is not registered for any challenge method and risk score is high then block. This block can be overridden using "Temp Allow" functionality	Check for High Risk Score = TRUE Questions Active = FALSE Challenge Email Available = FALSE Challenge SMS Available = FALSE Max failed Question Attempts = Any Max failed Email Attempts = Any Max failed SMS Attempts = Any	Policy = NONE Action = OAAM BLOCK Alert = NONE Score = 0
If user has max failures for their registered challenge methods, then challenge-block (locked out). Note: This block cannot be overridden through "Temp Allow" functionality.	All rules with result = ANY	Policy = NONE Action = OAAM Challenge BLOCK Alert = NONE Score = 0

10.12 Customer Care Policies

Customer care policies are presented in this section.

10.12.1 OAAM Customer Care Ask Question

This policy determines if the user has active questions, more questions left for the challenge, and how many challenges have failed.

10.12.1.1 OAAM Customer Care Ask Question Policy Summary

Table 10–34 summarizes the OAAM Customer Care Ask Question Policy.

Table 10–34 OAAM Customer Care Ask Question Policy

Summary	Details
Purpose	Determines if the user has active questions, more questions remaining for challenges, and how many challenges have failed.
Scoring Engine	Weighted Maximum
Weight	100
Group Linking	All Users

10.12.1.2 OAAM Customer Care Ask Question: Details of Rules

Table 10–35 describes the OAAM Customer Care Ask Question rule conditions and parameters.

Table 10–35 OAAM Customer Care Ask Question Rule Details

Rule	Rule Condition and Parameters	Results
No Questions	Triggers when users do not have questions registered. Two possible scenarios are un-registered users and users with questions reset by customer care. User: Question Status User Question Status: Not set Is: True	Action = OAAM No User Questions Alert = none Score = 100
Maximum Answers Failed	Triggers when user failed maximum allowed answers with current question. Count is combination of customer care and online challenge. User: Challenge Channel Failure Challenge Channel: Cases or Online Current Question Count only? : True Failures greater than or equal to: 3	Action = OAAM Next Question Alert = none Score = 100
Question Blocked	At least one question is blocked for challenge. User: Challenge Questions Failure Failures more than or equal to: 1	Action = OAAM Reset Questions Alert = none Score = 100
Maximum Questions Failed	Checks how many questions have failures User: Challenge Questions Failure Failures more than or equal to: 3	

10.12.1.3 OAAM Customer Care Ask Question: Trigger Combinations

Table 10–36 shows the OAAM Customer Care Ask Question trigger combinations.

Table 10–36 OAAM Ask Question Trigger Combinations

Description	Combination Detail	Result
Trigger1	No questions = Any	Policy = NONE
	Maximum Answers Failed = True	Action = OAAM Question Care Locked
	Question Blocked = Any	Alert = NONE
	Maximum Question Failure = True	Score = 0

10.13 Use Cases

The following sections provide security policy use case scenarios.

10.13.1 Use Case: WebZIP Browser

All users using a WebZIP browser must be blocked from attempting a login.

1. user1 uses WebZip and tries to log in to the application.
2. user1 is blocked.
3. The administrator logs in to the OAAM Administration Console.
4. The administrator views the session for user1.
5. The administrator sees that **Rule: "WebZIP" used** was triggered.

10.13.2 Use Case: IP Address Risky User OTP Challenge

User "User1" is a registered user. He is traveling on business to a different country and does not have access to email or phone. The IP address he logs in from is considered a risky IP address and hence, he is challenged by SMS. Since he cannot access his OTP, he fails to answer the OTP challenge by SMS. He is now challenged via KBA and unfortunately, he forgot the answers to his challenge questions. He guesses and answers the questions incorrectly. He is now locked out of the system. He calls the CSR and proves his identity. The CSR unlocks the user so he can log in again.

1. OTP is set up for SMS and Email.
2. The auto-learning policy (OAAM does user have profile) is disabled.
3. The user is registered as `User1`.
4. His IP address is in the Risky IP address group.
5. User1 tries to log in to the application.
6. User1 is challenged via SMS.
7. User1 answers incorrectly 3 times.
8. User1 is challenged via KBA.
9. User1 answers challenge question incorrectly 3 times.
10. User1 is locked out.
11. CSR must create a case and then unlock challenge questions for the user.
12. User1 is able to log in to the application successfully.

10.13.3 Use Case: Anonymizer IP Address - From the Group

User "anonymizer" logs in using an IP address which is considered an anonymizer in the Quova geolocation database. The user is blocked and a case is automatically created with the proper information. The investigator works on the case, adds a disposition, and closes the case.

Administrator

1. The administrator logs in to the OAAM Administration Console.
2. He creates a new action instance using the action template "Create customer care case".
3. He selects the "post -authentication" checkpoint, the Block action, a score of "1000," and case type "2".

User

1. New user "anonymizer" tries to log in to the application.
2. The user is blocked.

   A fraud case is automatically created.

Investigator

1. The investigator logs in to the OAAM Administration Console as an Investigator.
2. He opens the case and adds notes.
3. He closes the case with a disposition.

10.13.4 Use Case: Pattern Based Evaluation

User "User2" is a registered user. He resides in the United States and hence, all his logins are normally from the United States. He is traveling on business to China and performs a few logins from there. Since OAAM identifies that this is not the normal behavior, it challenges the user.

Rules:

- The rule only triggers when the device used appears to have traveled faster than 600 MPH in the last 20 hours. A trigger results in a challenge action and appropriate and informative alerts sufficient enough to determine why the challenge was generated.
- The following rule only triggers a challenge action when both conditions are false: Has this user used this country more than 2 times ever?

  AND

  Has this user used this country more than 10% in the last month?
- If a user is challenged Post-Authentication, and he has KBA active, and he does not have OTP active and the risk is above 600, then he should be asked a KBA question.

11

Managing Policies, Rules, and Conditions

Policies are created and managed by organizations to prevent fraud and misuse across multiple channels of access and for business processes. They contain security rules used to evaluate the level of risk at each decision and enforcement point.

A full snapshot of policies, dependent components and configurations is shipped with Oracle Adaptive Access Manager. The `oaam_base_snapshot.zip` file is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory.

OAAM provides out of the box security policies and rules. For more information on these policies and rules, refer to Chapter 10, "OAAM Policies Concepts and Reference." When working with policies, it is important that you understand how they work, and how to create new policies and rules to suit your business.

This chapter explains how to plan, create, configure, and manage policies.

11.1 Discovery and Policy Development

This section shows the security policy development and modeling process in which high-level requirements are translated into security policies.

11.1.1 Security Policy Development Process

The process for developing policies are outlined in this section.

11.1.1.1 Overview

Table 11–1 summarizes examples of actors who would take part in the security policy development process.

Table 11–1 Example of Policy Development Actors

Actors	Description
Investigators and Customer Service Representatives	Investigators and Customer Service Representatives (CSR) use Oracle Adaptive Access Manager's case management tools to handle security and customers cases day-to-day. They have detailed knowledge about user activity and security issues. Analysts work with investigators and CSRs to identify if policies need to be adjusted or new policies need to be created.
Business/Security Analyst	Analysts gather intelligence from various sources to identify needs and develop requirements to address them. Some sources for intelligence include Investigators, industry reports, antifraud networks, compliance mandates, and company polices.

Table 11–1 (Cont.) Example of Policy Development Actors

Actors	Description
Security Administrator	Administrators plan, configure and deploy policies based on the requirements from analysts.
System Administrator	A System Administrator configures environment-level properties and transactions.
Quality Assurance	Quality Assurance (QA) tests the policies to confirm that they meet requirements.

Edit an Existing Policy

Editing an existing policy involves the following tasks:

- Research/Troubleshooting
- Requirements and Planning
- Configuration
- Testing
- Deployment to production

Create a New Policy

Creating a new policy involves the following tasks:

- Discovery/Research
- Requirements and Planning
- Configuration
- Testing
- Deployment to production

11.1.1.2 Edit Policy: Research and Troubleshooting

Business Analysts gather intelligence from various sources to identify issues and develop requirements to address them.

Table 11–2 Edit Policy: Research/Troubleshooting

Source	Details
OAAM Reports	In an existing OAAM deployment analysts can run reports using BIP to identify security or customer issues that need to be addressed.
Investigator/CSR feedback	Interviews with staff can reveal customer and security issues. Are customers complaining they are challenged too often without valid cause? Are there a number of fraud cases where the current policy was not strict enough to prevent access?
Industry Reports	There may be a new type of threat not covered by the current rules. Do thresholds need to be adjusted?
Anti-Fraud Networks	Are there new rule thresholds being suggested by peers/experts? Do they make sense for the business?

11.1.1.3 New Policy: Discovery and Research

Business and Security Analysts gather intelligence from various sources to identify needs and develop requirements to address them.

Table 11–3 New Policy: Discovery/Research

Source	Details
OAAM Reports	In an existing OAAM deployment analysts can run reports using BIP to identify security or customer issues that need to be addressed.
Investigator/CSR feedback	Interviews with staff can reveal customer and security issues. Are customers complaining they are challenged too often without valid cause? Are there a number of fraud cases where current policy was not strict enough to prevent access?
Industry Reports	There may be a new type of threat not covered by the current rules. Do thresholds need to be adjusted?
Anti-Fraud Networks	Are there new rule thresholds being suggested by peers/experts? Do they make sense for your business?
Compliance	Is there a new mandate for security measures not addressed by your current policies?
Company policy	Are there new requirements for employee access that can be addressed with OAAM?

11.1.1.4 Edit Existing or Create New Policy: Requirements and Planning

Business/Security Analysts develop requirements to address needs identified during discovery.

- What new policies are needed and why?
- What are the use cases?
- What are the expected outcomes (actions, alerts, score)?
- What applications are involved?
- What user groups are involved?

11.1.1.5 Edit Existing or Create New Policy: Configuration

Security Administrators plan, configure and deploy policies based on the requirements from analysts.

- What data points should be profiled by autolearning?
- What rules need to be configured to fulfill use cases?
- What thresholds should be defined for rules?
- What rule outcomes are needed?

11.1.1.6 Edit Existing or Create New Policy: Testing

QA tests the policies to confirm that they meet requirements.

- Do the expected outcomes occur?
- Are the rule thresholds triggering as expected?
- Is the profiling working as expected?
- Following common "normal" end user flows, do the new polices cause user experience issues? Too many challenges, users blocked, and so on.
- Offline can be used to test new/edited policy based on historical control date.

11.1.1.7 Edit Existing or Create New Policy: Deployment to Production

Security Administrator:

- Deploy new policies to the production environment once QA has signed off.
- Export policy set and groups from development/QA environment
- Import to production

11.1.2 Discovery Process Overview

The high-level steps involved in security policy development are as follows:

1. Determine what you are trying to accomplish (problem statement).
2. Break the problem statement into:
   - Inputs: What data is available to evaluate?
   - Rules: What types of evaluations do I need to perform on the data?
   - Outcomes: What should happen based on the analysis?
3. Translate the wording of the problem statement into a security policy by mapping the data, evaluations, and outcomes to an OAAM configuration. For example:
   - Datapoints to profile
   - Rules for use cases
   - Thresholds defined by rules
   - Outcomes needed - scores, actions, and alerts
   - Exclusion groups
4. Configure entities, transactions, patterns, groups, policies, rules, actions and alerts based on your preparation.

11.1.3 Example Scenario: Transaction Security

In this scenario, a Security Administrator must configure OAAM to notify the security team if there are more than 4 orders to a shipping address in a 24 hour period.

11.1.3.1 Problem Statement

Notify the security team to perform a manual review if there are more than 4 orders placed to any single shipping address in a 24 hour period regardless of the number of users.

11.1.3.2 Inputs Available

The following data is required to perform the stated evaluation described in the problem statement:

- Date/time of each order
- Shipping address for each order
- Count of orders using each shipping address

11.1.3.3 Evaluation

It is recommended to form a logical statement to describe the risk evaluation required by your problem statement.

The logical statement for this scenario is:

"For a shipping address, if total # of orders > 4 in last 24 hours, then review order."

11.1.3.4 Outcomes

The outcome required by the problem statement in this case is to generate a single Fraud Alert for the security team.

11.1.3.5 Translation

In the translation step, the problem statement that was broken down is mapped to the OAAM security policy components.

Table 11–4 Problem Statement Mapping

Problem Statement Breakdown	Oracle Adaptive Access Manager Security Policy Components
Notify the security team to perform a manual review	An alert with specific messaging
Shipping address	An address entity
Orders	A custom checkpoint for this transaction is needed
	A policy scoped to the "order" checkpoint will contain any rules needed.
If there are more than 4 orders placed to any single shipping address in a 24 hour period	A rule configured using a generic transaction rule condition

11.1.3.6 Alert

The best practice is for every evaluation to have a separate alert message.

11.1.4 Example Scenario: Login Security

In this scenario, a Security Administrator wants users that login from a state they have used less than 5% of the time in the last month to answer a KBA challenge question before being allowed into the protected application.

11.1.4.1 Problem Statement

Profile users' login behaviors including the geographic locations they login from. Use their unique profile to determine how risky a login attempt is and challenge with a KBA question when required based on risk level. If the login is from a state the user have come from less than 5% of the time in the last month them with a KBA challenge before allowing them into the protected application.

11.1.4.2 Inputs Available

The following data is required to perform the stated evaluation described in the problem statement:

- User
- Time period
- Geographic location
- Percentage for total logins used for the comparison
- Registration status

11.1.4.3 Evaluation

It is recommended to form a logical statement to describe the risk evaluation required by your problem statement.

The logical statement for this scenario is:

"For a user (logging in from state(s)), if % of logins < 5% of all his logins from this state in last month, then challenge user."

11.1.4.4 Outcome

The outcome required by the problem statement in this case is to challenge the user with a KBA question if the percentage of logins to a state is less than 5% of his total log ins to states in the last month.

11.1.4.5 Translation

In the translation step, the problem statement that was broken down is mapped to the OAAM security policy components.

Table 11–5 Problem Statement Mapping

Problem Statement Breakdown	Oracle Adaptive Access Manager Security Policy Components
if logins from a state	Pattern to track the user's logins from different states. Multi-bucket pattern with user as actor and state as attribute and for each as the compare operator.
challenge user	An action group to KBA Challenge
with a KBA question	Is registered is an attributes and equals as the compare operator and yes as the compare value. He has to have questions registered before the system can challenge him with a KBA question
percentage for state vs. percentage of total	Condition: "Pattern (Authentication): Entity is a Member of the Pattern Less Than Some Percent of Time"
5%	Percentage basis specified in rule
last 1 month	Time period specified in rule
before allow to proceed to protected resource	Post-Authentication checkpoint policy In best practices, KBA challenges occur in the Post-Authentication checkpoint.

11.1.4.6 Action

KBA challenge users logging in from a state that they do not log in from, specifically one that they use less than 5% of their total logins to states in a month

11.1.5 Evaluation and Deployment

After building the policies, you would perform the following tasks:

Evaluate the Policy and Rules

Evaluate the effectiveness.

Test the rule to ensure that it is functioning as expected by running predictable data through it using your offline system.

Deploy the Policy and Rules

When you are satisfied that the policy is functioning as expected, migrate the policy in pre-production where performance testing can be run.

This is an important step since the new rule, or policy, or both can potentially have a performance impact. For example, if you define a new policy to check that a user was not using an email address that had been used before (ever). If the customer has more than 1 billion records in the database, performing that check against all the records for every transaction has great impact on performance. Therefore, testing the policy under load is important.

Develop New Rules for New Fraud Scenarios

Develop the new rule using your offline system (a separate installation of Oracle Adaptive Access Manager set up for testing or staging).

11.2 Creating Policies

OAAM provides out of the box security policies and rules, but you may want to create new policies and rules depending on business requirements. This section provides basic instructions to create a policy. Figure 11–1 illustrates the pages that you will configure for the policy.

Figure 11–1 Policy Pages

Table 11–6 provides brief descriptions of the configuration pages.

Table 11–6 Policy Configuration

Policies Pages	Description
Summary	Specify details of the new policy.
Rules	Configure the rules for the policy. For information on creating rules, see Section 11.4, "Creating Rules."
Trigger Combination	Configure trigger combinations. These are additional results and policy evaluations that are generated if a specific set of rules trigger. For information on creating trigger combinations, see Section 11.5, "Setting Up Trigger Combinations."
Group Linking	Link the policy to a group so that the policy is executed for the set of users within the linked group. For information on group linking, see Section 11.3, "Linking a Policy to All Users or a User ID Group."

To start creating a policy, proceed as follows:

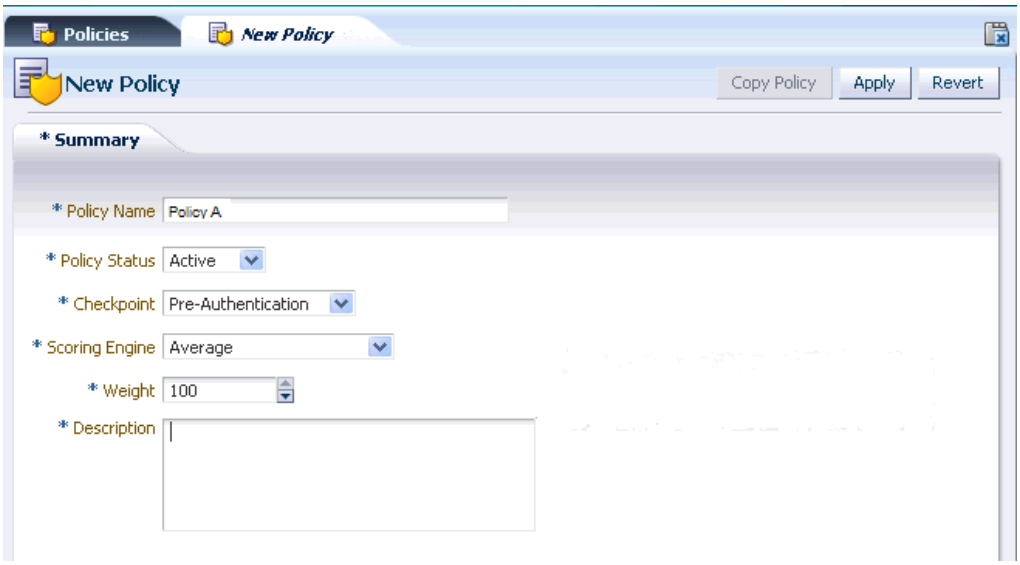
1. After you have logged into the OAAM Administration Console, double-click **Policies** in the Navigation pane on the left. The Policy page is displayed.

2. Click the New Policy button. The New Policy page is displayed where you can specify details to create a new policy.

   Alternatively, you can open a **New Policy** page by:

   - Right-clicking the **Policies** node and selecting **New Policy** from the context menu.
   - Selecting the **Policies** node and then choosing **New Policy** from the **Actions** menu.
   - Clicking the **Create new Policy** button in the Navigation toolbar.
   - Selecting the **Create New Policy** button from the **Search Results** toolbar.
   - Selecting **New Policy** from the **Actions** menu in **Search Results**.

Figure 11–2 New Policy



Details you need to provide are as follows:

- **Policy Name**: Enter a name that is meaningful and relevant to the policy.
- **Policy Status**: The option to activate the policy. If you want the policy to function as soon as it is created, keep the default, Active, for the Policy Status.

  If you want to policy to be disabled, select Disabled. A policy that is disabled is not enforced at the checkpoint. Disabling a policy does not remove it from the system. You can enable the policy at a later date.
- **Checkpoint**: Select the point when you want the policy to be executed. For example, set the checkpoint to post-authentication if you want to initiate an action after successful authentication. For information on checkpoints, see Section 10.3.4, "Checkpoints."
- **Scoring Engine**: Select the fraud analytic engine that you want to use to calculate the numeric score that determines the risk level. For information on the scoring engine, see Section 10.2.8, "What is a Scoring Engine?."
- **Weight**: Enter a value from `0` to `100` as the multiplier if you want to use a weighted scoring engine to influence the total score.

If the policy uses a "weighted" scoring engine, both score and weight (multiplier value) are used to influence the total score calculations. If the policy is not using a "weighted" scoring engine, only the score is used to influence the total score. For information on weight, refer to Section 10.2.10, "What is Weight?."

- **Description**: Enter a description that is meaningful and relevant.

3. Click **Apply** to create the policy.

   A confirmation dialog appears with a message that the policy was created successfully. Click **OK** to dismiss the confirmation dialog.

   The **Rules**, **Trigger Combinations**, and **Group Linking** tabs are enabled after you click **OK**. You must provide information about the policy in these tabs to fully configure the policy.

Example: Create a Policy where Users are Challenged with KBA

You must configure a login use case that can result in a KBA challenge. It is usually best practice to use KBA challenges only after successful authentication by the primary method. A Post-Authentication KBA challenge policy did not already exist so you must create a new one. The security team wants this policy to be applied to all users in the deployment. Directions: Create a new Post-Authentication KBA challenge policy that applies to all users. Name the policy, **KBA Challenge**.

To create a policy:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node.
3. In the **Policies Search** page, click the **New Policy** button.

   The **New Policy** page appears. In the **Summary** tab, the default values for the new policy are displayed as follows:

   - Policy Status: **Active**
   - Checkpoint: **Pre-Authentication**
   - Scoring Engine: **Average**
   - Weight: **100**

4. Create a new Post-Authentication security policy.
   a. For Policy Name, enter **KBA Challenge**.
   b. For **Description**, enter a description for the KBA Challenge policy.
   c. For **Checkpoint**, select **Post-Authentication**.
   d. Modify the policy status, scoring engine, and weight according to your requirements.

      By default, the policy status is **Active**. A policy that is disabled is not enforced at the checkpoint.

   e. Click **Apply**.

      A confirmation dialog displays the status of the operation. If you click **Apply** and the required fields are not filled in an error message is displayed.

   f. Click **OK** to dismiss the confirmation dialog.
5. Configure the policy to run for all users.

a. Click the **Group Linking** tab.

b. For **Run Mode**, select **All Users**.

   Since **All Users** is selected for the run mode, the policy is executed (run) for all users.

   Specifying a run mode is a mandatory step in order for the policy to execute. It enables the policy to execute/run for a set of users or all users. For information, see Section 11.3, "Linking a Policy to All Users or a User ID Group."

c. Click **Apply**.

   A confirmation dialog displays the status of the operation.

d. Click **OK** to dismiss the confirmation dialog.

If the KBA Challenge policy was created successfully, it would be listed in the **Search Results** table of the **Policies Search** page.

Although not covered in this example, for the policy to function, you must add a rule to the policy either by creating a new rule within a policy (Section 11.4, "Creating Rules") or by copying an existing one (Section 11.7.1, "Copying a Rule to a Policy") to the policy.

Example: Checking for Blacklisted Country

Jeff a Security Administrator has a brand new installation and must import the base security policies into the development environment of the Oracle Adaptive Access Manager Server. To support the base policies he also configures a black-listed country group. As well he links user groups to the proper roll-out phase policies to test phase two for a group of test users.

To import a policy:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node. The **Policies Search** page is displayed.
3. Click **Import Policy** in the **Policies Search** page. The **Import Policy** screen is displayed.
4. Click **Browse** and search for the policies ZIP file.
5. Click **OK** to upload the policies ZIP file.

   A confirmation dialog displays the status of the operation. The imported policies are listed in the **Imported List** section. An error is displayed if you try to import files in an invalid forma or an empty ZIP file.
6. Click **OK** to dismiss the confirmation dialog.
7. In the **Policy Search** page, verify that the policy appears in the **Search Results** table.
8. Double-click the **Groups** node. The **Groups Search** page is displayed.
9. From the **Groups Search** page, click the **New Group** button or icon.

   The **New Group** screen is displayed.

   You could also open the **New Group** screen by right-clicking the **Groups** node and selecting **Create** from the context menu that appears.
10. In the **New Group** screen, enter **Black-listed Country Group** as the name and provide a description.

11. From the **Group Type** list, select **Countries**.
12. Set the cache policy to **Full Cache** or **None**.
13. Click **OK** to create the **Black-listed Country Group**.
14. Click **OK** to dismiss the dialog.

    The **Group Details** page for the **Black-listed Country Group** is displayed.
15. In the **Countries** tab of the **Group Details** page, click **Add**.

    The **Add Member** dialog is displayed.
16. From the **Available Countries** table, select one or more countries to add to the group.
17. Click **Add**.
18. Open the **Policies Search** page.
19. Search for the Post-Authentication policy.
20. In the **Results** table, click the **Post-Authentication policy**.

    The **Policy Details** page appears.
21. Link the **Test Users** group to the policy.
22. In the **Policy Details** page, click the **Rules** tab.
23. In the **Rules** tab, click **Add**.
24. In the **New Rule** page, enter the rule name as `Location: In Country Group`.
25. Click the **Conditions** tab.
26. In the **Conditions** page, click **Add**.

    The **Add Conditions** page is displayed where you can search for and select the `Location: In Country Group` condition and add it to the rule.
27. Click **OK**.

    The parameters for the condition are displayed in the bottom panel.
28. In the parameters area, for **Country in country group**, select the **Blacklisted Country** group and for **Is In Group**, select **True**.
29. Click **Save**.
30. In the **Results** tab, select **RegisterUserOptional** as the **Action** group.

    RegisterUserOptional allows the user to opt in or out of selecting a personalized image.
31. Click **Apply**.

Example: Conditions: IP Login Surge

William is a Security Administrator and he must configure a policy and rule to track the number of logins from the same IP address and if there are more than 10 logins in 1 hour from an IP address, a high alert should be triggered.

1. Log in to the OAAM Administration Console as an administrator.
2. Create a **Monitor IP** group
   a. Double-click the **Groups** node.
   b. In the **Groups Search** page, click the **New Group** button.

The **Create Group** screen appears.

c. Enter the group name, **Monitor IP addresses**, and select **IP** as the **Group type** and click **Create**.

d. In the **Monitor IP addresses** group page, click the **IP** tab.

e. In the **IP** tab, click the **Add** button.

f. In the **Add IPs** screen, select the **Search and select from the existing IPs** option, enter criteria, then click **Search**.

g. From the **Search Results** table, select one of the IP addresses that you want to monitor and click **Add**.

A confirmation dialog appears.

h. Click **OK**.

i. Add IP addresses to monitor as needed.

3. Create an **IP Surge High Alert** group

a. In the **Groups Search** page, click the **New Group** button.

The **Create Group** screen appears.

b. Enter the group name, **IP Surge**, and select **Alerts** as the **Group type** and click **Create**.

A confirmation message appears.

c. Click **OK** to dismiss the confirmation dialog.

The new **IP Surge alert** group is created successfully and the **Group Details** page is displayed.

d. Click the **Alerts** tab to add alerts to the group.

e. In the **Alerts** tab, click the **Add** (Add Member) button.

f. In the **Add Member** page, select **Create new element**.

g. For **Alert Type**, select **Investigator**.

h. For **Alert Level**, select **High**.

i. For **Alert Message**, enter "More than 10 logins from the same IP address in 1 hour."

j. Click **Add** to add the alert to the group.

A confirmation dialog appears.

k. Click **OK** to dismiss the dialog.

4. Double-click the **Policies** node.

5. In the **Policies Search** page, click the **New Policy** button.

The **New Policy** page appears. In the **Summary** tab, the default values for the new policy are displayed as follows:

- Policy Status: **Active**
- Checkpoint: **Pre-Authentication**
- Scoring Engine: **Average**
- Weight: **100**

6. Create a new Pre-Authentication security policy.
   a. For **Policy Name**, enter **Logins_SameIP**.
   b. For **Description**, enter **Track the number of logins from the same IP address and if there are more than 10 logins in the last hour from an IP address**.
   c. Select **Active** as the policy status; otherwise the policy is not enforced at the checkpoint.
   d. Enter **Weighted Maximum Score** for the scoring engine and **100** as the weight.
   e. Click **Apply**.

      A confirmation dialog displays the status of the operation.

      If you click **Apply** and the required fields are not filled in an error message is displayed.
   f. Click **OK** to dismiss the confirmation dialog.
7. Configure the policy to run for all users.
   a. Click the **Group Linking** tab.
   b. For **Run Mode**, select **All Users**.

      Since **All Users** is selected for the run mode, the policy is executed (run) for all users.

      Specifying a run mode is a mandatory step in order for the policy to execute. It enables the policy to execute/run for a set of users or all users. For information, see Section 11.3, "Linking a Policy to All Users or a User ID Group."
   c. Click **Apply**.

      A confirmation dialog displays the status of the operation.
   d. Click **OK** to dismiss the confirmation dialog.
8. Create **IP Excessive Use** rule for the policy.
   a. Click the **Rules** tab.
   b. In the **Rules** tab, click **Add** to add a new rule.

      The **New Rule** page is displayed.
   c. In the **Summary** tab, enter **IP Excessive Use** as the rule name.
   d. Enter a description for the rule.
   e. Select **Active** as the rule status.
   f. Add the `Location: IP excessive use` rule condition to create the new rule.
      a. To add the `Location: IP excessive use` condition, click the **Conditions** tab.
      b. In the **Conditions** tab, click **Add**. The **Add Condition** page appears.
      c. Search for the `Location: IP excessive use` condition by entering **IP** in the **Condition Name** field and then clicking **Search**.
      d. In the **Search Results** table, select that condition and click **OK**.
      e. In the **New Rule/IP** page, select `Location: IP excessive use` in the top panel.

The bottom panel displays the parameters of the condition.

f. In the bottom panel, modify the parameters.

Enter **10** for "Number of Users."

Select **1** for "Within (hours)."

Enter **0** for "and not used in (days)."

9. Create the **Location: IP in Group** rule for the policy.
   a. Click the **Rules** tab in the **Policy Details** page.
   b. In the **Rules** tab, click **Add** to add a new rule.

      The **New Rule** page is displayed.
   c. In the **Summary** tab, enter **IP in Group** as the rule name.
   d. Enter a description for the rule.
   e. Select **Active** as the rule status.
   f. Add the `Location: IP in Group` rule condition to create the new rule.
      a. To add the `Location: IP in Group` condition, click the **Conditions** tab.
      b. In the **Conditions** tab, click **Add**. The **Add Condition** page appears.
      c. Search for the `Location: IP in Group` condition by entering **IP** in the **Condition Name** field and then clicking **Search**.
      d. In the **Search Results** table, select that condition and click **OK**.
      e. In the **New Rule/IP** page, select `Location: IP in Group` in the top panel.

         The bottom panel displays the parameters of the condition.
      f. In the bottom panel, modify the parameters.

         Select **true** for "Is in List."

         Select the **Monitor IP addresses** group.
10. Create a trigger combination in which if both conditions are true, trigger the **Block** action and the **IP Surge Alert.**
    1. In the **Policy Details** page, click the **Trigger Combination** tab.
    2. Click the **Add** button.
    3. For the **IP Excessive Use**, select **True**.
    4. For the **IP in Group**, select **True**.
    5. For **Action Group**, select **Block**.
    6. For **Alert Group**, select **IP Surge High Alert**.
    7. Click **Apply**.

11.3 Linking a Policy to All Users or a User ID Group

Group linking enables you to specify the users that a policy links to. You must link the policy to a group for the policy to function. Linking a policy to a group enables the policy to execute or run for the set of users within the linked group. The All Users option links a policy to all users. If group linking shows All Users, all available linking is ignored. If a user selects group linking as All Users, the link option will be disabled.

The total number of groups that are linked in the policy appears in parentheses next to the Group Linking tab title.

After the policy is created, you can link the policy to a User ID group or several User ID groups, which enables the policy and rules to execute/run for that set of users.

1. Open the **Policy Details** page.
   a. Double-click the **Policies** node. The **Policies Search** page is displayed.
   b. Search for the policy that you want.
   c. Click the policy name to open its **Policy Details** page.
2. From the **Policy Details** page, click the **Group Linking** tab.
3. For **Run Mode**, specify **Linked Users**.
4. In the table header, click the **Link** icon.

   The **Link Group** screen appears where you can enter details to link a group to the policy.
5. The available target sets appear in the associated box.

   From the **Group Name** list, select the group you want to link to the policy.

   Only user groups are listed.

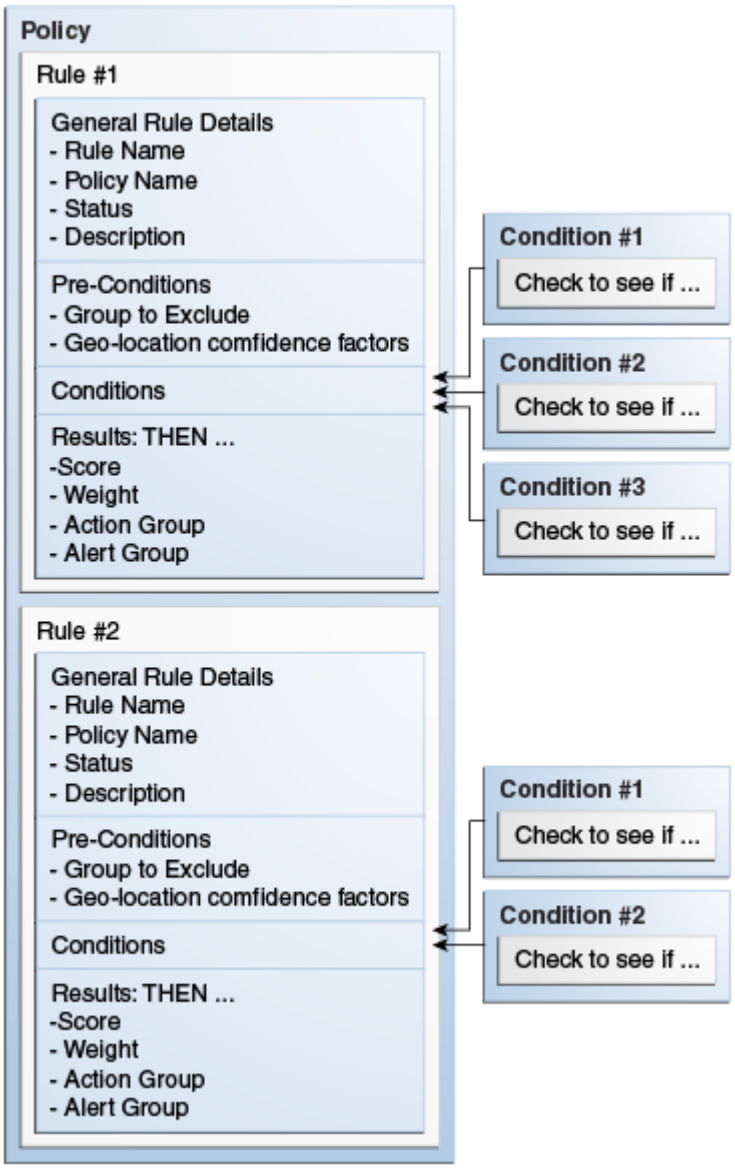
   Group Name is a required field.
6. Enter linking notes.
7. Click **Link Group**.

11.4 Creating Rules

You can only create a rule from within a policy. The new rule cannot be saved until you add a condition to it.

Figure 11–3 illustrates the pages you will use and information you will provide for each page when creating a rule.

Figure 11–3 Rule Creation



Results Tab

Results are responses, such as the activation of an action and a message, when a rule is triggered—for example, action (event activated) and alert (message activated).

As part of the process, specify the following:

- Rule score and weight value. For information on score and weight, see Section 10.2.12, "How Does Risk Scoring Work?."
- Actions. For information on actions, see Section 10.2.6, "What are Action and Alerts?."
- Alerts. For information on alerts, see Section 10.2.6, "What are Action and Alerts?."

Action

An action is an event that is activated when a rule is triggered—for example, block access, challenge question, ask for PIN or password, and so on.

Alerts

An alert is a message that is generated when a rule is triggered—for example, login attempt from a new country for this user.

Excluded User Group

On the Preconditions tab, you can specify the group to exclude and the geolocation confidence factor parameters.

All preconditions filter whether or not a rule evaluates. The conditions do not process the rule if the preconditions are not met. The process stops at the preconditions level.

In the Excluded User Group field, select the User ID group that you do not want the policy to applied to.

Device Risk Gradient

Device fingerprinting is a mechanism to recognize the device that a customer typically uses to log in. Identification is based on combinations of the Device ID attributes, secure cookie, flash movie, user agent string, browser characteristics, device hardware configuration, network characteristics, geolocation, and historical context. Device risk gradient is a value calculated by the OAAM engine.

Different use cases and exceptions are taken into account and help to define the device risk gradient. The device risk gradient specifies the certainty of the device being identified. It is standard in almost all rules as a precondition.

The score ranges to specify the amount of device identification risk are:

- 400 and lower: Low risk
- 401-700: Moderate risk
- 701 and higher: High risk

Device Gradient of 0 means an exact match with the secure cookie; 500 means similar device with reasonable matching attributes; 1000 means similar device with much less confidence.

Country Confidence Factor, State Confidence Factor, and City Confidence Factor

Geolocation confidence factors are specific to Quova geolocation data. This factor is not provided by other vendors so the precondition is only operable when Quova data is being utilized. Quova assigns a confidence level to each of the three elements: city, state, and country. This confidence factor is based on the IP geolocation information.

The higher the value, the higher the level of confidence from Quova that the mapping of the location is correct. If you want the rule that you are creating to be dependent on IP location identification accuracy, specify the amount of geolocation accuracy with which you want to run the rule. For example, the rules are triggered when it is below 60% since we are not sure of the location.

11.4.1 Starting the Rule Creation Process

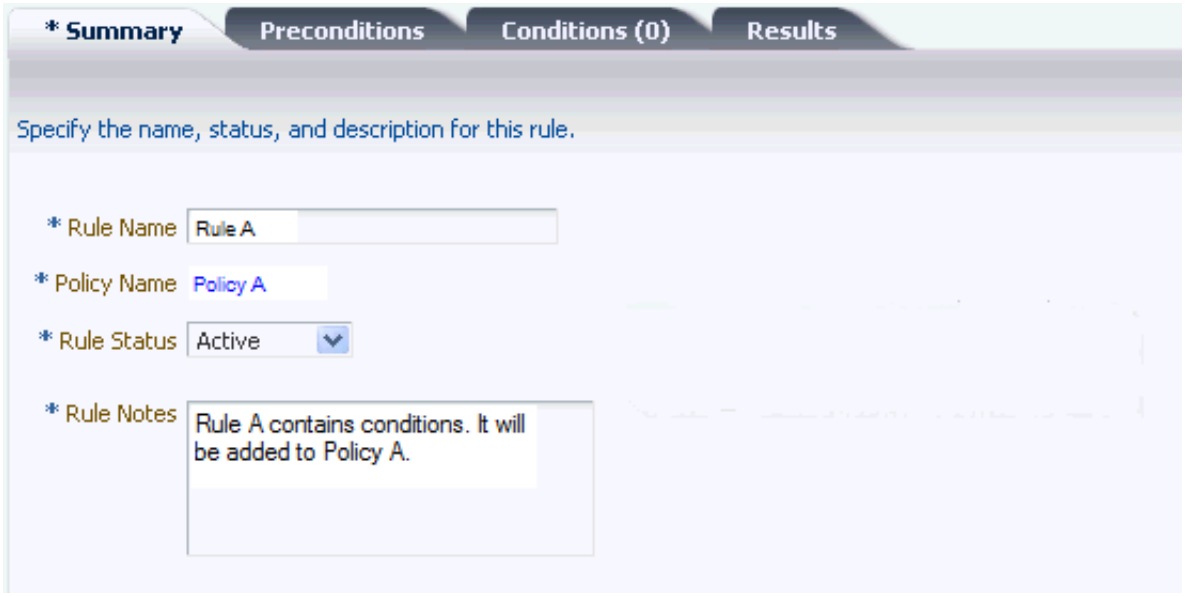
To start the rule creation process:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.

2. Search for the policy that you are interested in.
3. In the **Search Results** table, click the name of the policy. The **Policy Details** page for that policy is displayed.
4. In the **Policy Details** page, click the **Rules** tab.
5. In the **Rules** tab, click the **Add** button on the row header or select **New Rule** from the **Action** menu.

   The **New Rule** page is displayed.

Figure 11–4 New Rule



11.4.2 Specifying General Rule Information

Table 11–7 summarizes the general information of a rule.

Table 11–7 New Rule Page

Field	Description
Rule Name	Name of the rule. Enter between 1 and 4000 characters.
Policy Name	Name of the policy. (Read-only)
Rule Status	Status of the rule: Active or Disabled. If the rule status is changed from Active to Disabled, the rule is disabled and cannot be added to a policy. A policy that already contains the rule is not affected and continues to function as before.
Description	Description for the rule. Enter between 1 and 4000 characters.

To add general information about the rule, the procedure is as follows:

1. In the **Summary** tab, enter the name of the rule and a description. Duplicate rule names are allowed across policies, but not within the same policy.

   If you try to navigate to one of the other tabs before entering a rule name or description, an error message reminds you that a value is required.

   The policy name cannot be changed.

2. If you want to disable the rule, select **Disabled**. **Rule Status** has the default value of **Active**. A rule that is disabled is not run when the policy is enforced.

11.4.3 Configuring Preconditions

To configure preconditions for the rule, follow the procedure in Section 11.7.5.2, "Specifying Preconditions."

Through preconditions, you can specify the group to exclude and the geolocation confidence factor parameters.

Example: Adding a Rule Exception Group

Jeff, a Security Administrator, must create an exception user group to be used as a rule precondition. Jeff is creating a blacklisted country rule and realizes he should have an exception group so he creates a new user group named "BLC: exception users." In the description he enters a note that CSR managers can add users that need to be permanently allowed access from a blacklisted country. When created, the user group is added as the precondition. After the rule is in production a CSR manager assists a user who has moved to a blacklisted country. He manually adds his User ID to the group so he has an exception to the rule and adds a note in his case to this effect.

1. Create a new user group named "BLC: exception users."

   Group name: **BLC: exception users**

   Group type: **User ID**

   In the description, enter a note to tell investigators, **Add users that need to be permanently allowed access from a blacklisted country**.

2. Select existing User IDs to add to the **BLC: exception users** group.

   For information on creating user groups and then adding members, refer to Section 12.13, "Searching for and Adding Existing Elements or Creating and Adding a New Element."

3. Create a rule in a Post-Authentication blacklisted country policy.

   - For rule condition, choose `Location: IP in group`.
   - In **Pre-condition**, select **BLC: exception users** as the exception group.

4. After the rule is in production an investigator assists a user who has moved to a blacklisted country. He manually adds his User ID to the group so he has an exception to that rule and adds a note in his case to this effect.

11.4.4 Adding Conditions

To add conditions for the rule, follow the procedure in Section 11.8.2, "Adding Conditions to a Rule."

11.4.5 Specifying Results for the Rule

To specify the results for if the rule triggers, follow the procedure in Section 11.7.5.3, "Specifying the Results for a Rule."

You can select from the following types of results:

- Score and Weight
- Actions

An action is an event activated when a rule is triggered. For example: block access, challenge question, ask for PIN or password, and so on. For information about action groups, see Chapter 12, "Managing Groups."

- Alerts

  An alert is a message generated when a rule is triggered. For example: login attempt from a new country for this user. For information about alert groups, see Chapter 12, "Managing Groups."

11.4.6 Adding or Copying a Rule to a Policy

The **Copy Rule** button enables you to copy an existing rule to other policies.

Example: Add New Rule to the Policy

After you have created a security policy (see Example: Create a Policy where Users are Challenged with KBA) you are ready to create a new rule to perform the risk evaluation in your use case. The use case requires an evaluation of the physical distance between the location a user is logging in from now verses the last location he came from. This rule calculates the velocity/speed required to travel between the location given the time. The security team has determined that if the user appears to travel faster then 500 miles per hour between location and the device used is different then the user should be given a KBA challenge. Directions: Create a new rule, `User Velocity` and use the out-of-the-box condition, `User: Velocity from last successful login`.

To add a new rule:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node. The **Policies Search** page is displayed.
3. Search for KBA Challenge.
4. In the **Search Results** table, click **KBA Challenge**. The **Policy Details** page for KBA Challenge is displayed.
5. In the **Policy Details** page, click the **Rules** tab.
6. In the **Rules** tab, click **Add** to add a new rule.

   The New Rule page is displayed.
7. Enter **User Velocity** as the rule name.
8. Enter a description for the rule.
9. Select the rule status.

   When the **New Rule** page first appears, the default value for the rule status is **Active**.
10. Add the `User: Velocity from last successful login` rule condition to create the new rule.
    a. To add the `User: Velocity from last successful login` condition, click the **Conditions** tab.
    b. In the **Conditions** tab, click **Add**. The **Add Condition** page appears.

c. Search for the `User: Velocity from last successful login` condition by entering **velocity** in the **Condition Name** field and then clicking **Search**.

d. In the **Results** table, select that condition and click **OK**.

e. In the **New Rule/User Velocity** page, select `User: Velocity from last successful login` in the top panel.

The bottom panel displays the parameters of the condition.

f. In the bottom panel, modify the parameters.

a. Enter **500** for **Miles per Hour is more than**.

b. Select **true** for **Ignore if last login device is same**.

g. Click **Save** to save your changes. A confirmation dialog appears with a message that the modified rule parameters were saved successfully.

h. Click **OK** to dismiss the confirmation dialog.

11. Add a KBA challenge as a result of the **User Velocity** rule.

a. Click the **Results** tab.

The **Results** tab enables you to specify the results for the rule if the conditions are met.

b. To set up a KBA challenge to occur if the rule is triggered, select **ChallengeQuestionPad** in the **Actions Group** list.

12. Click **Apply**. A confirmation dialog appears with a message that the modified rule details were saved successfully.

If the required fields are not filled in and the user clicks **Apply**, an error is displayed.

If the rule was successfully created, the new rule should be listed in the **Rules** tab of the **Policy Details** page.

13. Click **OK** to dismiss the confirmation dialog.

Example: Canceling Rule Creation

William is a Security Administrator and he creates a new policy. He is not sure which rule condition would apply for his business use case. Hence he decides to close the rule without adding any condition.

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node.
3. In the **Policies Search** page, click the **New Policy** button.
4. Create a new policy.
5. In the **Policy Details** page, click the **Rules** tab.
6. In the **Rules** tab, click **Add** to add a new rule.

The **New Rule** page is displayed.

7. Enter the rule name.
8. Enter a description for the rule.
9. To add the condition, click the **Conditions** tab.
10. In the **Conditions** tab, click **Add**. The **Add Condition** page appears.

11. Search for the condition by entering a name into the **Condition Name** field and then clicking **Search**.
12. In the **Results** table, select that condition.
13. Click **Cancel**.

    You are not sure which rule condition would apply for your business use case.
14. Click the **Delete** button in the upper-right corner.

    An Unsaved Data Warning dialog appears with the message, "You have unsaved data. Are you sure you want to continue?"
15. Click **Yes**.

    You are returned to the **Rules** page.
16. Click the **Delete** button in the upper-right corner again.

    You are returned to the **Policies Search** page.
17. In the **Search Results** table, click the policy you created.

    The rule has not been created.

11.5 Setting Up Trigger Combinations

Trigger combinations are additional results and policy evaluation that are generated if a specific set of rules trigger. You can set up trigger combinations using the **Policy Details** page. There is no limit to the number of trigger combinations that you can add. The total number of trigger combinations in the policy appears in parenthesis next to the tab title. The first column is frozen to enable you to scroll and see all of the data in the table while having the labels available for reference.

By default, if a policy does not have any trigger combination, a table is created with all the rules in the policy and one column for the trigger combination. You can make edits to the combination and then save it. You can edit multiple trigger combinations and save them all at once.

Figure 11–5 Trigger Combinations

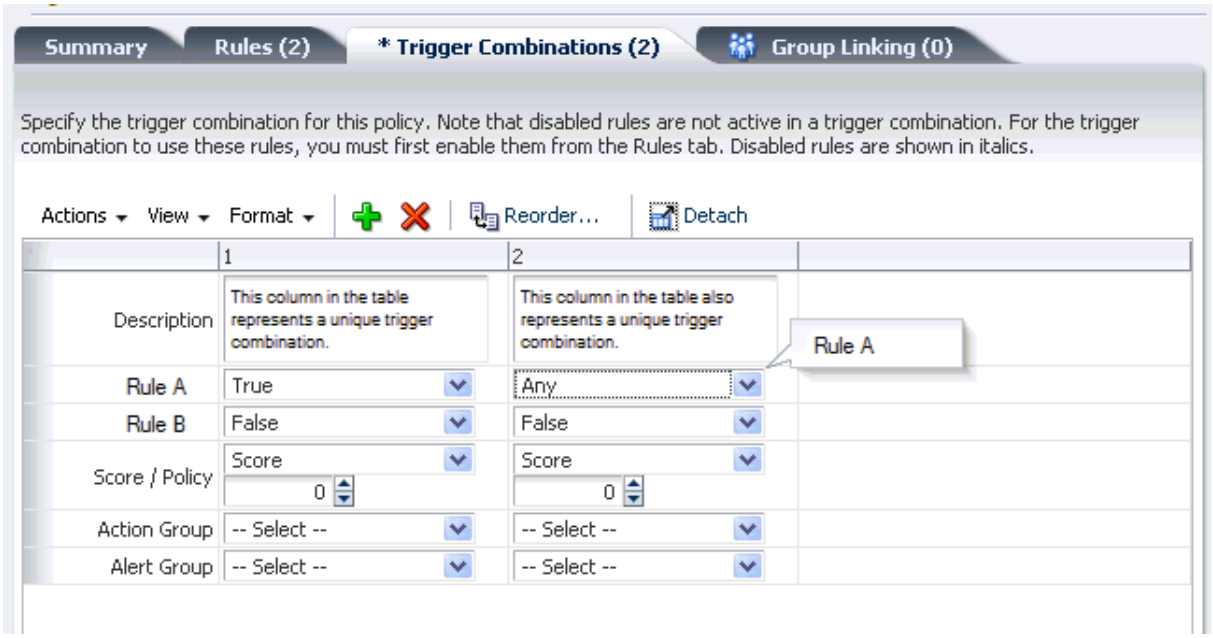


Table 11–8 describes the fields in a trigger combination. For information about Action and Alert groups, see Chapter 12, "Managing Groups."

Table 11–8 Trigger Combination

Fields	Description
Description	Description for the trigger combination. Each trigger combination has a description. If the description is too long to display and part of it is obscured, you can place the mouse over the text to see the entire description.
Name	Name of the rule.
Score/Policy	If you select score, the score box appears where you can enter an integer value from 0 to 1000. The minimum and maximum scores for the Score are defined as properties. Scores of 0 or less than 0 are ignored. If you select Policy, a policy list appears with policies of same checkpoint.
Policy	If you select policy, the nested policy must be configured to run in the same checkpoint.
Action Group	An action group indicates all the actions that must occur when the rule is triggered.
Alert Group	An alert group is made up of graded messages that are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

If you navigate away from the tab while editing the trigger combination, the trigger combination is saved in the session and available when you navigate back.

Note: Note that the **Add**, **Delete**, and other operations are irreversible. Ensure that you are ready to perform these operations before proceeding.

Table 11–9, " Trigger Combination Toolbar Options" lists the commands that are available through the toolbar.

Table 11–9 Trigger Combination Toolbar Options

Command	Description
Add 	This button adds a new column (trigger combination).
Delete 	This button is enabled only if a column or row is selected. The Delete button also enables you to delete multiple trigger combinations. When the **Delete** button is clicked, a warning message appears, asking for confirmation.
Reorder 	This button invokes the Reorder screen. Columns can be reordered using the Reorder button.

To specify trigger combinations:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Search for the policy which you want.
3. Click the policy name to open its **Policy Details** page.
4. Click the **Trigger Combinations** tab.
5. Select the return value permutations you want for each rule in the first column.
6. In the **Score/Policy** row, select **Score** or **Policy** to specify whether the result return a score or point to a nested policy.
   - If you selected **Score**, in the field directly below, specify the score you want to assign to that combination.
   - If you selected **Policy**, in the field directly below, specify the policy you want to run to further evaluate the risk.

     Only the list of policies of the same checkpoint are available.
7. Set an action outcome.
8. Set an alert outcome:
9. If you want to specify other trigger combinations, click **Add** to add another column.
10. Repeat Steps 5 through 8 for each trigger combination you want.
11. In the **Trigger Combinations** tab, click **Apply** after making all your edits.

You cannot add two trigger combinations of the same combination. When you add new combinations, each combination is saved and validated automatically.

If you navigate away from the tab while editing trigger combinations, the unsaved trigger combinations are saved in the session and available when you navigate back.

Trigger Combination Example: Nest Policy Containing Rules That Can Result in a KBA Challenge

To KBA challenge a user Oracle Adaptive Access Manager must check two things:

- First, check to see whether the user has challenge questions registered.
- Second, if the user has a questions set active challenge him if a challenge scenario has to be performed.

To configure this behavior you must nest your new security policy, which contains rules that can result in a KBA challenge, under the policy, which contains KBA business rules to check for registration status.

Directions: Nest the **KBA Challenge** policy under the **System - Questions check** policy using policy trigger combinations.

The **KBA Challenge** policy was created in Example: Create a Policy where Users are Challenged with KBA.

To create a trigger combination:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node. The **Policies Search** page is displayed.
3. Search for the **System - Questions** check policy.
4. In the **Search Results** table, click **System - Questions check**. The **Policy Details** page for the **System - Questions check** policy is displayed.
5. In the **Policy Details** page, click the **Trigger Combinations** tab.
6. In the **Trigger Combinations** tab, click **Add**.

   The column added to the table corresponds to a trigger combination.

   By default, trigger combinations are created with all the rules in the policy. The rules used in the policy are represented by a row name.

   For example, the rules to check for registration status would appear as rows:

   - Registered User with condition `User: Account Status`
   - Question Registered
   - Unregistered User
7. In the trigger combination, enter a description in the **Description** field.
8. For each rule specify the rule result based on which trigger combination must be executed (performed)

   - **True**: The rule is triggered
   - **False**: the rule is not triggered
   - **Any**: Ignore the rule whether or not it triggers

   By default, a trigger combination is executed for a rule result of **Any**.
9. For a trigger combination, specify that if the trigger combination triggers, the result returns a nested policy.

   Select **Policy**, and in the field directly below, specify **KBA Challenge** as the policy you want to run to further evaluate the risk.

   A nested policy is a secondary policy used to further quantify the risk score in instances where the original result output by the system is inconclusive. Nested policies can be assigned to ensure a higher degree of accuracy for the risk score.
10. Select the **Action Group**.

    The action is an event generated when the combination is triggered.
11. Select the **Alert Group**.

    The alert is a message generated when the combination is triggered.

12. Click **Apply**. A confirmation dialog is displayed, saying that the policy details were updated successfully.
13. Click **OK** to dismiss the dialog.

Example Trigger Combination and Rule Evaluation

Jeff, a Security Administrator, must configure two levels of authentication to challenge the user using KBA for any single rule trigger and OTP for specific combinations of rules triggering.

The tasks he must perform are the following:

- Create a pattern to profile user login times into 4 hour time range buckets.
- Create a second pattern to profile states users log in from.
- Create the rules to use these patterns in the KBA challenge policy so these evaluations only run if the user has KBA active.
- Create a rule to challenge using KBA if the user falls into a login time bucket he has fallen into less than 10% of the time in the last month.
- Next, create a rule to challenge using KBA if the user logs in from a state he has used less than 20% of the time in the last two weeks.
- Then, create a rule that checks to see if a user has an OTP delivery channel active.
- Finally, configures a trigger combination to OTP challenge the user if all three of these rules returns true.

The steps to accomplish these tasks are:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Patterns** node. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.

   Create a pattern, Pattern 1, where:

   - Member Type: **User**
   - Creation Method: **Multi-bucket**
4. Click the **Attribute** tab.
5. Click the **Add** icon.
6. Select **Time** (Time when the user is logged in) as the attribute.
7. Click **Next**.
8. Select **For Each** as the **Compare Operator** and 4 as the compare value.
9. Press **Add**.
10. Click the **Patterns** tab.
11. Create a pattern, Pattern 2, where:

    - Member Type: **User**
    - Creation Method: **Multi-bucket**
12. Click the **Attribute** tab.
13. Click the **Add** icon.
14. Select **State** as the attribute.

15. Select compare operator as for each state.
16. Click **Next**.
17. Create **Rule1**: Add pattern condition, `Entity is member of bucket less than some percentage of times`. (Select Pattern 1 and percentage = 10 and select 1 month as time period.)
18. Add condition to rule, `User: Question status to check if he has registered questions.`
19. Add action, **KBA Challenge** to Rule 1." (This rule triggers if the user has registered questions and he has logged in from time bucket less than 10% of time. The Result, he is challenged with KBA).
20. Create **Rule 2**: Add pattern condition, `Entity is member of bucket less than some percentage of times`. (Select Pattern 2, percentage =20 and select 15 days as time period)
21. Create **Rule 3**: Add pattern condition, `User: Is OTP enabled`. (Using condition `Challenge Channel Status`)
22. Create a policy and add all three rules.
23. Add trigger combination to policy such that if all rules are triggering (true) then action is **Challenge OTP**.

For more information on patterns, see Chapter 15, "Managing Autolearning."

Example: Disable Trigger Combination

Jim is a Security Administrator. He wants to inactivate his trigger combinations and enable them later, but he does not want to lose his settings.

He can accomplish that by not setting the Score/Policy, Actions, and Alerts for the combinations and they are automatically in disabled state. No action would be taken based on these combinations.

To disable trigger combinations:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Search for the policy which you want.
3. Click the policy name to open its **Policy Details** page.
4. Click the **Trigger Combinations** tab.
5. Select **0** as the score or make sure no nested policy is specified.
6. Deselect the actions in the action group lists.
7. Deselect the alert sin the alert group lists.
8. In the **Trigger Combinations** tab, click **Apply** after making all your edits.

11.6 Managing Policies

This section explains how to manage policies.

11.6.1 Navigating to the Policies Search Page

To open the **Policies Search** page, double-click the **Policies** node. The **Policies Search** page is displayed.

Alternatively, you can open the **Policies Search** page by:

- Right-clicking the **Policies** node and selecting **List Policies** from the context menu.
- Selecting the **Policies** node and then choosing **List Policies** from the **Actions** menu.
- Clicking the **List Policies** button in the Navigation toolbar.

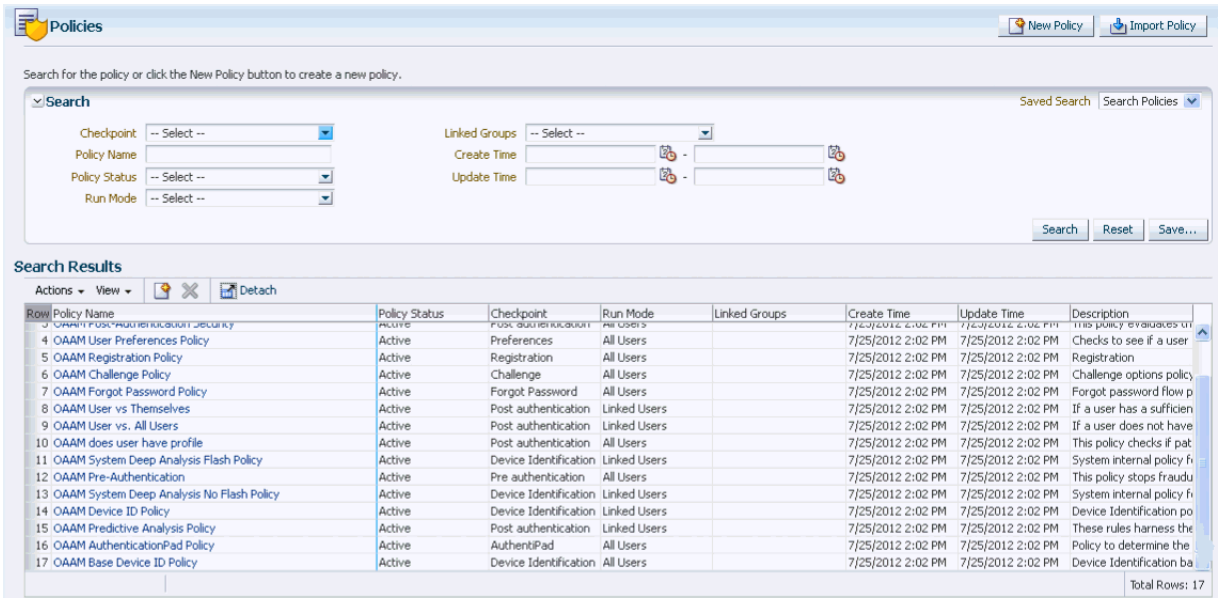
The **Policies Search** page is the starting place for managing your policies. It is also the home page for the Security Administrator.

From the **Policies Search** page, you can:

- Search for a policy
- View a list of policies
- Create a new policy
- Import a policy
- Export policies
- Export policies and create a delete script
- Delete policies
- Open the **Policy Details** page

An example of a **Policies Search** page is shown in Figure 11–6, "Policies Search Page".

Figure 11–6 Policies Search Page



11.6.2 Searching for a Policy

In the **Policies Search** page, you search for a policy by specifying criteria in the Search filter.

When the **Policies Search** page first appears, the **Search Results** table is empty. You must press **Search** to see a list of policies in the Oracle Adaptive Access Manager environment.

To search for policies:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Specify criteria in the Search Filter to locate the policy and click **Search**.

   Clicking **Reset** instead of **Search** resets the search criteria.

   The search filter criteria are described in Table 11–10.

Table 11–10 Policies Search Filter Criteria

Filters and Fields	Descriptions
Linked Groups	Users can filter policies based on the user groups they are linked with. The Linked Groups filter is disabled when the Run Mode is "Not Linked" since there are no associated User ID groups.
Policy Name	Name of the policy. You can enter the complete name or part of a policy name. For example, if you enter HTTP, any policy with HTTP in any part of its name will appear.
Policy Status	Status of the policy: Active or Disabled. Defines the state of the policy or its availability for business processes. For information, refer to **Policy Status**.
Checkpoints	Point during the session the rules in a policy are evaluated.
Run Mode	Run mode enables you to select whether to link the policy to all users, a specified User ID group, or not to link the policy. Linking a policy to a group enables the policy to execute/run for the set of users within the linked group. ▪ The "All Users" option links a policy to all users. The policy is targeted for all users. ▪ The "Linked Users" option links a policy to a User ID group or several User ID groups. The policy is targeted to a specified set of users.
Created Date	Time when policy was created.
Update Time	Time when policy was last updated.

11.6.3 Viewing a Policy or a List of Policies

Depending on the search performed, a policy or a list of policies is displayed in the Search Results table. The policies that are displayed from a search are those that match the criteria specified in the **Linked Groups**, **Policy Name**, **Policy Status**, **Checkpoint**, and **Run Mode** fields.

You can sort the **Search Results** table by sorting on a column.

Each policy has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

The **Search Results** table provides quick access to the **Policy Details** page for a policy. Click the policy name for the policy you are interested in to view more details.

11.6.4 Viewing Policy Details

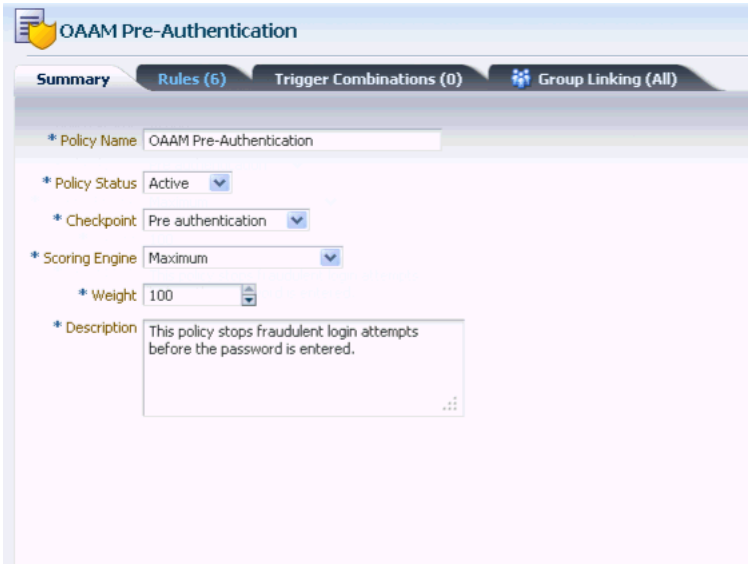
By clicking the policy name, the **Policy Details** page for the specific policy is displayed.

The **Policy Details** page enables you to view and edit the details of a policy. You can also access the **Policy Details** page through the Policy Tree. For information, refer to Chapter 3, "Getting Started with Common Administration and Navigation."

The Policy Details page provides the following four tabs:

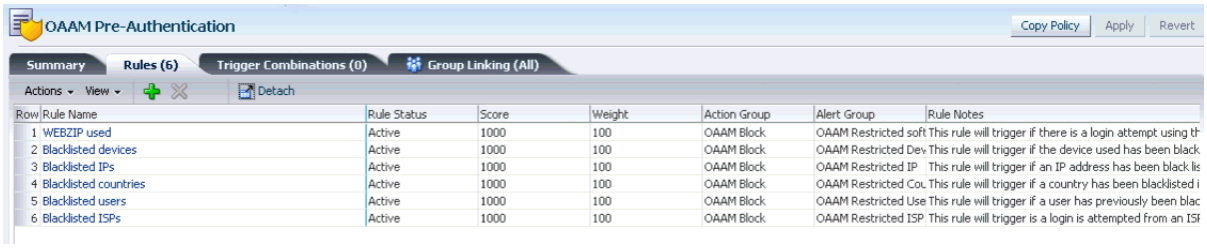
- **Summary** - Enables you to view and edit the general details of the policy

Figure 11–7 Policy Details Summary Tab



- **Rules** - Enables you to view a list of all the rules of the policy, and add and delete them.

Figure 11–8 Policy Details Rules Tab



- **Trigger Combinations** - Enables you to view the trigger combinations of the policy and to add, delete, and to edit them.
- **Group Linking** - Enables you to link a policy to a User ID group

The number of rules, trigger combinations, and group links present in the policy is shown in parenthesis in the **Policy Details** page tabs. Disabled rules are also included in the count.

11.6.5 Editing a Policy's General Information

To edit a policy's general information:

1. Search for the policy you are interested in, as described in Section 11.6.2, "Searching for a Policy."
2. In the **Search Results** table, click the name of the policy you want to edit.

   The **Summary** tab displays general details about the policy, as shown in Table 11–7, "Policy Details Summary Tab".

Table 11–11 Policy Details Summary Tab

Field	Description
Policy Name	Name of the policy.
Policy Status	Status of the policy: Active or Disabled. Defines the state of the policy or its availability for business processes. For information, refer to **Policy Status**.
Checkpoint	Point during the session the rules in a policy are evaluated.
Scoring Engine	Fraud analytic engine you want to use to calculate the numeric score that determines the risk level.
Weight	Multiplier used to influence the total score at various evaluation levels. Weight is an integer value from 0 to 100
Description	Description for the policy.

3. To edit the policy's general information, make the changes you want in the **Summary** tab and then click **Apply**.

   The policy details are updated successfully.

Example: Edit Existing Security Policy

Jeff, a Security Administrator wants to change the maximum number of attempts at a challenge question. He must edit a rule parameter to do this.

Best practice is to set the maximum number of failed KBA challenges to one less than the total number of challenge questions each user registers. For example, if all users register for four questions the maximum failures allowed should be three.

To edit an existing Security Policy, follow these steps:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policies** node. The **Policies Search** page is displayed.
3. In the **Search Results** table, click **Fraud Blocking**.
4. In the **Rules** tab of the **Policy Details** page, click **Maximum Number of Failed Challenges**.
5. In the **Conditions** tab of the **Rule Details** page, select `User: Challenge Maximum Failures` on the top panel.

   This condition checks to see if the user failed to answer the challenge question for specified number of times.
6. On the bottom panel, change the value of **Number of Failures More than or equal to** so that it is one less than the total number of challenge questions each user registers.

11.6.6 Activate/Disable Policies

To activate/disable a policy:

1. Search for the policy you are interested in, as described in Section 11.6.2, "Searching for a Policy."
2. In the **Search Results** table, click the name of the policy you want to activate/disable.
3. Changes the policy status in the **Summary** tab and then click **Apply**.

For information, refer to **Policy Status**.

11.6.7 Deleting Policies

To delete policies:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. In the **Policies Search** page, search for the policy or policies you want to delete.

   For information on searching for a policy, see Section 11.6.2, "Searching for a Policy."
3. Select the policies you want to delete and click the **Delete** button or select **Delete Selected** from the **Action** menu.

   A **Confirm Delete** dialog appears, asking for confirmation. If you selected to delete more than one policy, a list of policies is shown in the dialog.
4. Click **Delete**.

   An information screen appears.
5. In the information screen, click **OK**.

   The policy deleted successfully.

   You cannot undo the delete. The changes are permanent.

11.6.8 Copying a Policy to Another Checkpoint

You can copy a policy to other checkpoints.

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Enter the search criteria you want and click **Search**.
3. Click the policy name to open its **Policy Details** page.
4. In the **Policy Details** page, click **Copy Policy**.

   You can access the **Copy Policy** button from any tab in the **Policy Details** page.

   The **Copy Policy** screen appears with all the fields pre-populated.

   Table 11–12, " Copy Policy to Checkpoint" lists the fields in the **Copy Policy** screen.

Table 11–12 Copy Policy to Checkpoint

Field	Description
Checkpoint	The checkpoint you are copying the policy to. By default the field is pre-populated with the checkpoint from the policy that is being copied.
Policy Name	Default value for Policy Name field is *policy_name*Copy. You can edit the policy name, if needed.
Status	The policy status of "disabled" is set as the default value. Defines the state of the policy or its availability for business processes. For information, refer to **Policy Status**.
Description	Current description is set as the default description.

5. In the **Copy Policy** screen, select the checkpoint and status.
6. Enter a policy name and description.

7. In the **Copy Policy** screen, click **Copy**.

   If you click **Copy**, the policy is copied to the checkpoint.

If the rules of the policy are not applicable (cannot be copied) to the new checkpoint, a "The following rules are not applicable for this checkpoint" message appears.

You are given the option either to abort the copy operation or to continue copying the policy without those rules.

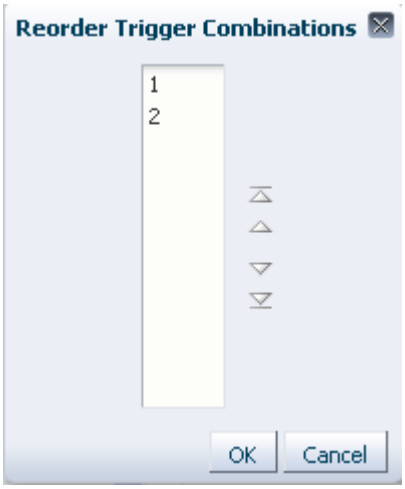
When policies are copied, all the details are copied including the nested policies, trigger combinations, preconditions, group linking, and so on.

11.6.9 Changing the Sequence of the Trigger Combination

To change the order of trigger combinations:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Search for the policy which you want.
3. Click the policy name to open its **Policy Details** page.
4. Click the **Trigger Combinations** tab.
5. To reorder columns, click the **Reorder** button.

   The **Reorder Trigger Combinations** screen appears.



6. Reorder the trigger combinations and click **OK**.
7. In the **Trigger Combinations** tab, click **Apply**.

Reordering of trigger combinations takes effect only after you click **Apply**. The changes are lost if you close the tab before you click **Apply**.

11.6.10 Deleting a Trigger Combination

To delete a trigger combination:

1. Double-click the **Policies** node. The **Policies Search** page is displayed.
2. Search for the policy which you want.
3. Click the policy name to open its **Policy Details** page.
4. Click the **Trigger Combinations** tab.

5. Select the column header corresponding to the trigger combination and click **Delete**.

11.7 Managing Rules

This section explains how to manage rules.

11.7.1 Copying a Rule to a Policy

You can copy a rule to a different policy under any checkpoint. For example, you want to move the rule to a different checkpoint.

To copy a rule to a policy:

1. Double-click the **Rules** node. The **Rules Search** page is displayed.
2. Enter the search criteria you want and click **Search**.
3. In the **Search Results** table, click the name of the rule you want to copy to a policy.

   The **Rule Details** page for that rule is displayed.
4. In the **Rule Details** page, click the **Copy Rule** button.

   The **Copy Rule** page appears pre-populated with the rule name and description from the original rule.
5. In the **Policy** field, select the policy you want to copy the rule to.
6. In the **Rule Name** field, enter a new name for the rule that you are copying.
7. In the **Description** field, enter a description for the rule.
8. Click **Copy** to copy the rule to the policy.

11.7.2 Navigating to the Rules Search Page

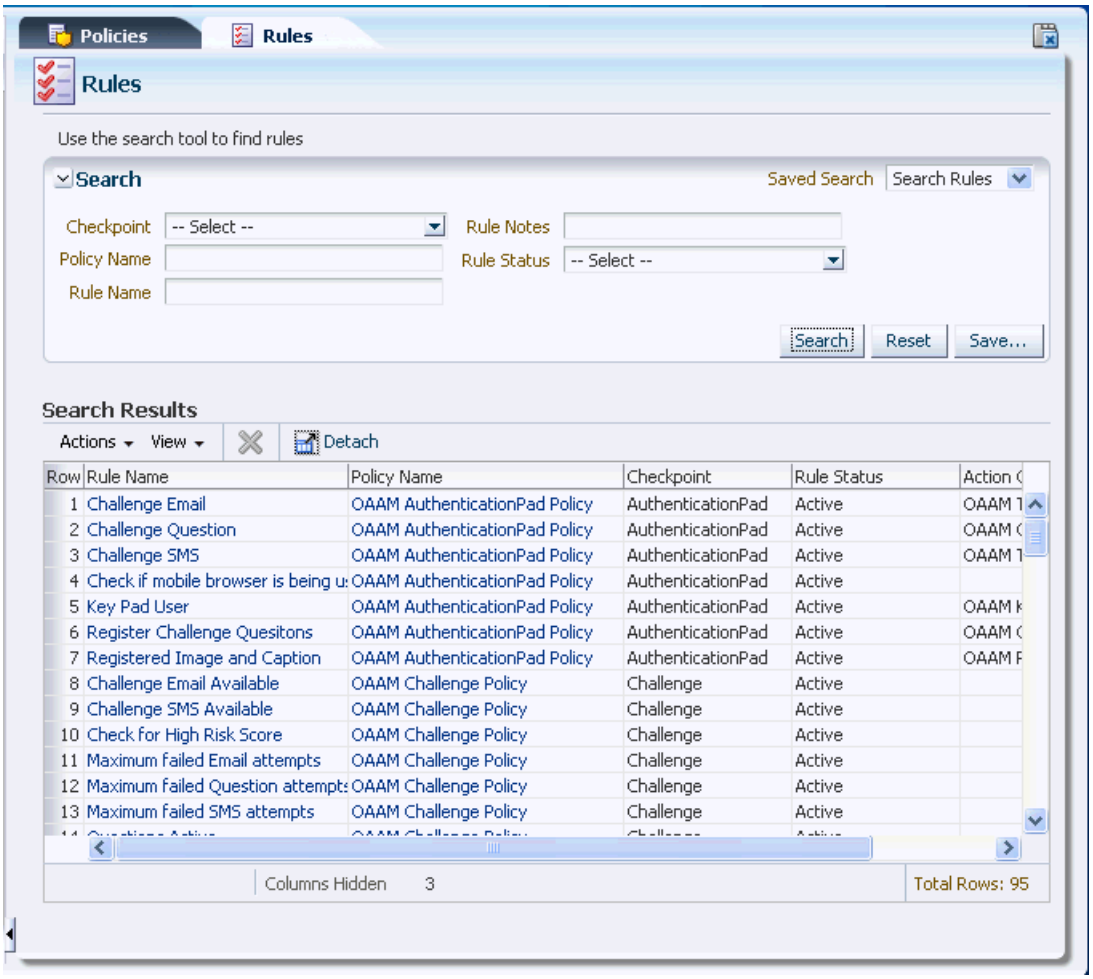
To open the **Rules Search** page, right-click the **Rules** node. The **Rules Search** page is displayed.

Alternatively, you can open the **Rules Search** page by:

- Right-clicking the **Rules** node and selecting **List Rules** from the context menu.
- Selecting the **Rules** node and then choosing **List Rules** from the **Actions** menu.
- Clicking the **List Rules** button in the Navigation toolbar.

An example of a **Rules Search** page is shown in Figure 11–9, "Rules Search Page".

Figure 11–9 Rules Search Page



11.7.3 Searching for Rules

The **Rules Search** page displays a Search filter and a **Search Results** table that shows a summary of the rules that match your search criteria.

From the **Rules Search** page, you can view and edit the details of the rule, but you cannot create a rule. Rules can only be created in the context of policies.

1. Double-click the **Rules** node. The **Rules Search** page is displayed.
2. In the **Rules Search** page, enter the search criteria you want.
3. Click **Search**.

   Clicking **Reset** instead of **Search** resets the search criteria.

The **Search Results** table displays a summary of rules that meet the criteria you specified.

Table 11–13 Rules Results

Field	Description
Rule Name	Name of the rule
Policy Name	Name of the policy where the rule resides.
Checkpoint	Point during the session the rules in a policy are evaluated.
Rule Notes	Description for the rule.
Rule Status	Status of the rule: Active or Disabled. If the rule status is changed from Active to Disabled, the rule is disabled and cannot be added to a policy. A policy that already contains the rule is not affected and continues to function as before.
Action Group	Group of actions. An action group indicates all the actions that must occur when the rule is triggered. By default, actions are not specified. You must specify a set of results for the rule.
Score	Integer value from 0 to 1000. The minimum and maximum scores for the Score are defined as properties.
Weight	Integer value from 0 to 100

The **Delete** button or **Delete Selected** from the **Action** Menu enables you to delete rules. The **Delete** and **Delete Selected** are enabled only if a row is selected.

The delete operation either succeeds or fails. There are no partial updates made.

The option to sort is provided on every column in the **Search Results** table.

Each rule has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

To view and edit the rule details, click the rule name in the **Search Results** to open the rule.

11.7.4 Viewing More Details of a Rule

To view the details of a rule:

1. Double-click the **Rules** node. The **Rules Search** page is displayed.
2. Search for the rule in which you want to view the details.
3. Click the rule name in the **Search Results** table or select the row and select **Open Selected** from the **Action** menu to open its **Rule Details** page in a new tab.

   The **Rule Details** page enables you to access the complete details of a rule through four tabs. These pages allow the management of the rule.

   The **Rule Details** page has four tabs

   - General
   - Preconditions
   - Conditions
   - Results

   These tabs allow the management of the rule.

11.7.5 Editing Rules

To edit a rule:

1. Double-click the **Rules** node. The **Rules Search** page is displayed.
2. Search for the rule which you want to edit.
3. Click the rule name in the **Search Results** table to open its **Rule Details** page in a new tab.

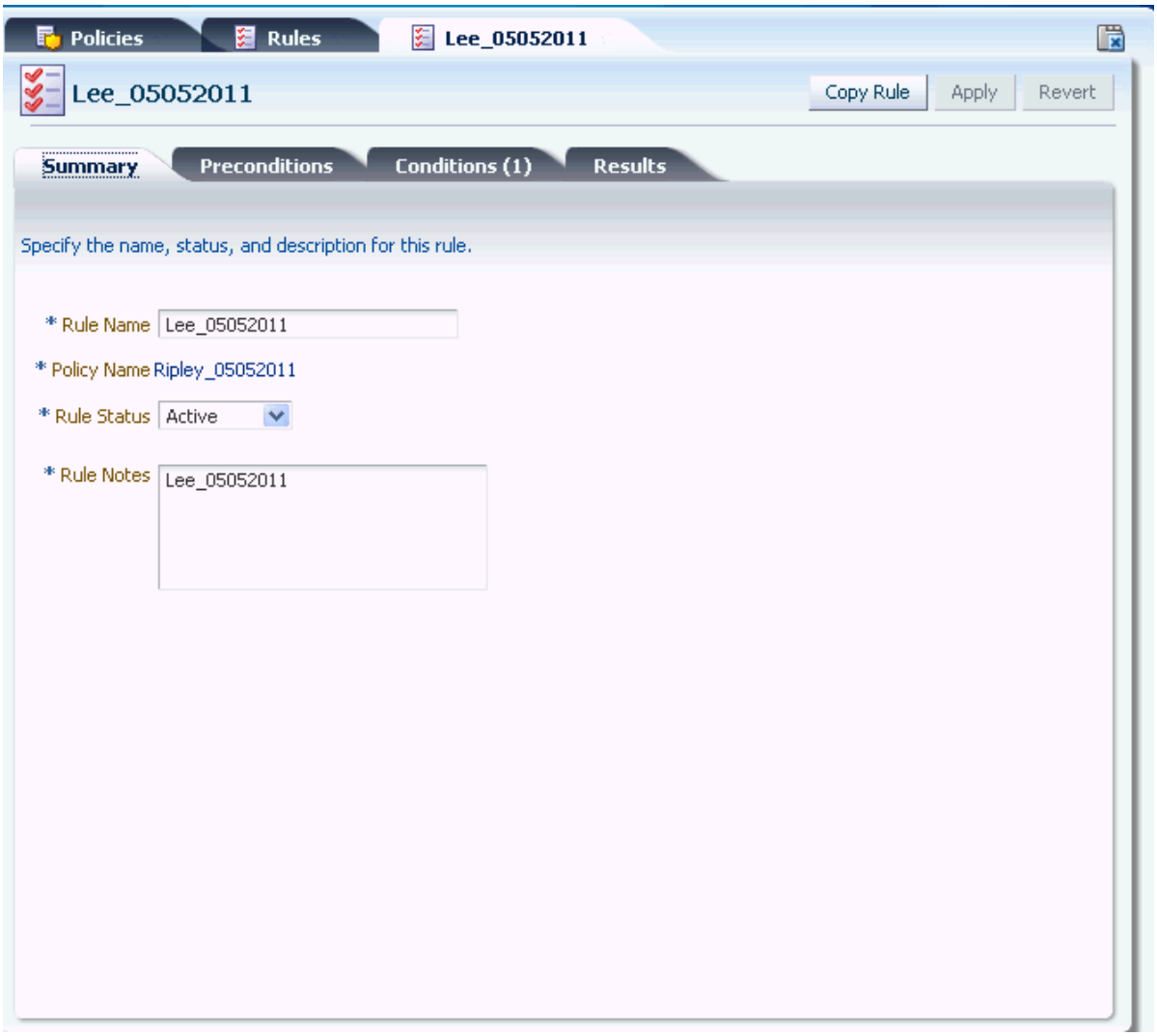
   The **Rule Details** page provides tabs to the **Summary**, **Preconditions**, **Conditions**, and **Results** page.

   The total number of conditions in the rule appears in parenthesis next to the Conditions tab title.
4. Edit the rule's general information (Section 11.7.5.1, "Modifying the Rule's General Information").
5. Edit the Preconditions (Section 11.7.5.2, "Specifying Preconditions").
6. Edit/Add Conditions (Section 11.8.2, "Adding Conditions to a Rule").
7. Edit the Results (Section 11.7.5.3, "Specifying the Results for a Rule").
8. Click **Apply** to save the changes or **Revert** to discard them.

11.7.5.1 Modifying the Rule's General Information

From the **Summary** tab, you can modify the rule name, status, and description.

Figure 11–10 Rule Details Summary Tab



The fields displayed are listed in Table 11–14.

Table 11–14 Rule Details Summary Tab

Field	Description
Rule Name	Name of the rule
Policy Name	Name of the policy. (Read-only)
Status	Status of the rule: Active or Disabled. If the rule status is changed from Active to Disabled, the rule is disabled and cannot be added to a policy. A policy that already contains the rule is not affected and continues to function as before.
Description	Description for the policy.

11.7.5.2 Specifying Preconditions

From the **Preconditions** tab, you can specify the group to exclude and the geolocation confidence factor parameters.

All preconditions filter whether or not a rule evaluates. The conditions do not process the rule if the preconditions are not met. The process stops at the preconditions level.

To specify preconditions for the rule:

1. Open the **Rule Details** page.
   a. Double-click the **Rules** node. The **Rules Search** page is displayed.
   b. Search for the rule in which you want to specify preconditions for.
   c. In the **Search Results** table, click the name of the rule. The **Rule Details** page for that rule is displayed.
2. In the **Rule Details** page, click the **Preconditions** tab.
3. **Excluded User Group**: In the **Excluded User Group** field, select the User ID group you do not want the policy to applied to.
4. **Device Risk Gradient**: Device fingerprinting is a mechanism to recognize the device a customer typically uses to log in. Identification is based on combinations of the Device ID attributes, secure cookie, flash movie, user agent string, browser characteristics, device hardware configuration, network characteristics, geolocation and historical context.

   Different use cases and exceptions are taken into account and help to define the device risk gradient. The device risk gradient specifies the certainty of the device being identified. It is standard in almost all rules as a precondition.

   The score ranges to specify the amount of device identification risk are:

   - 400 and lower - low risk
   - 401-700 - moderate risk
   - 701 and higher - high risk
5. **Country Confidence Factor**, **State Confidence Factor**, and **City Confidence Factor**: The IP address location vendor can assign a confidence level to each of the three elements: city, state, and country. This confidence factor is based on IP geolocation information.

   The higher the value, the higher the level of confidence from Quova that the mapping of the location is correct.

   If you want the rule you are creating to be dependent on IP location identification accuracy, specify the amount of geolocation accuracy with which you want to run the rule.

   For example, if the range is 60 to 100, you may specify for the rule to run only if the IP location is greater than 60% positive.

11.7.5.3 Specifying the Results for a Rule

Results are the responses, such as the activation of an action and message, when a rule is triggered. For example, action (event activated) and alert (message activated).

As part of the process, specify:

- Rule score and weight value
- Actions
- Alerts

To specify the results for if the rule triggers, follow these steps:

1. Open the **Rule Details** page if you are not on the **Rule Details** page of the rule you want.

a. Double-click the **Rules** node. The **Rules Search** page is displayed.

b. Search for the rule for which you want to specify the results.

c. In the **Search Results** table, click the name of the rule. The **Rule Details** page for that rule is displayed.

2. In the **Rule Details** page, click the **Results** tab.

3. Enter a rule score and weight value.

   You can change the weight value for a rule to instruct OAAM Admin to give more or less value to the total score.

   By default the score is 1000 and the weight is 100.

4. In the **Actions Group** list, select the actions you want triggered by this rule, if actions are required.

   By default, an **Actions Group** is not selected.

5. In the **Alerts Group** list, select the alerts you want sent if this rule is triggered.

   By default, an **Alerts Group** is not selected.

6. Click **Apply** to save the modified rule details.

The rules engine takes the information you specify for the rule and information specified in other rules in the policy and returns rule results to the policy. All the policies in the policy set results in multiple actions and multiple scores and multiple alerts. All these are propagated to the checkpoint. The score, the weight, and so on result in one final score, one final action, and a couple of alerts.

An example of a final action is **Block**. An example action list is **Block**, **Challenge**, **Background Check** and an example score is 800.

Table 11–15 Results Tab

Field	Description
Score	Integer value from 0 to 1000. The minimum and maximum scores for the Score are defined as properties.
Weight	Integer value from 0 to 100
Action Group	Group of actions. An action group indicates all the actions that must occur when the rule is triggered.
Alert Group	Group of graded messages that are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

11.7.6 Activate/Disable Rule

To activate/disable a rule:

1. In the Summary tab of Rule Details, select **Active** or **Disable** for **Status**.

   If the rule status is changed from **Active** to **Disabled**, the rule is disabled and cannot be added to a policy. A policy that already contains the rule is not affected and continues to function as before.

2. Click **Apply**.

11.7.7 Deleting Rules

To delete rules:

1. Double-click the **Rules** node. The **Rules Search** page is displayed.
2. Search for the rule you want to delete.
3. Select the rows corresponding to the rules of interest and press the **Delete** button or select **Delete Selected** from the **Actions** menu.

   A **Confirm Delete** dialog appears withe a list of rules to be deleted.

   The delete operation either succeeds or fails. There are no partial updates made.
4. Click the **Delete** button.
5. When the confirmation appears, click **OK**.

If you delete the rule, the corresponding row are deleted in the trigger combinations where this rule was used.

11.8 Managing Conditions

This section explains how to manage conditions.

11.8.1 Searching Conditions

The Conditions Search page displays a Search filter and a Search Results table that shows a summary of the conditions that match your search criteria.

For a list of conditions, see Appendix B, "Conditions Reference."

From the Conditions Search page, you can search for a condition or a list of conditions in the system.

1. Double-click the **Conditions** node.

   The **Conditions Search** page is displayed.

   Alternatively, you can open the **Conditions Search** page by:

   - Right-clicking the **Conditions** node and selecting **List Conditions** from the context menu.
   - Selecting **Conditions** in the Navigation tree and then choosing **List Conditions** from the **Actions** menu.
   - Clicking the **List Conditions** button in the Navigation tree toolbar.
2. Enter the search criteria you want and click **Search**.

   Clicking **Reset** instead of **Search** resets the search criteria.

Table 11–16, " Conditions Search fields" lists the fields in the Search section.

Table 11–16 Conditions Search fields

Field	Description
Condition Name	Name given to the condition.
Description	Description of the condition
Type	Type of condition. For example, Device, Location, and User.
Checkpoints	Point during the session the rules in a policy are evaluated.

Each condition has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

Click the name of the condition you are interested in to view more details.

11.8.2 Adding Conditions to a Rule

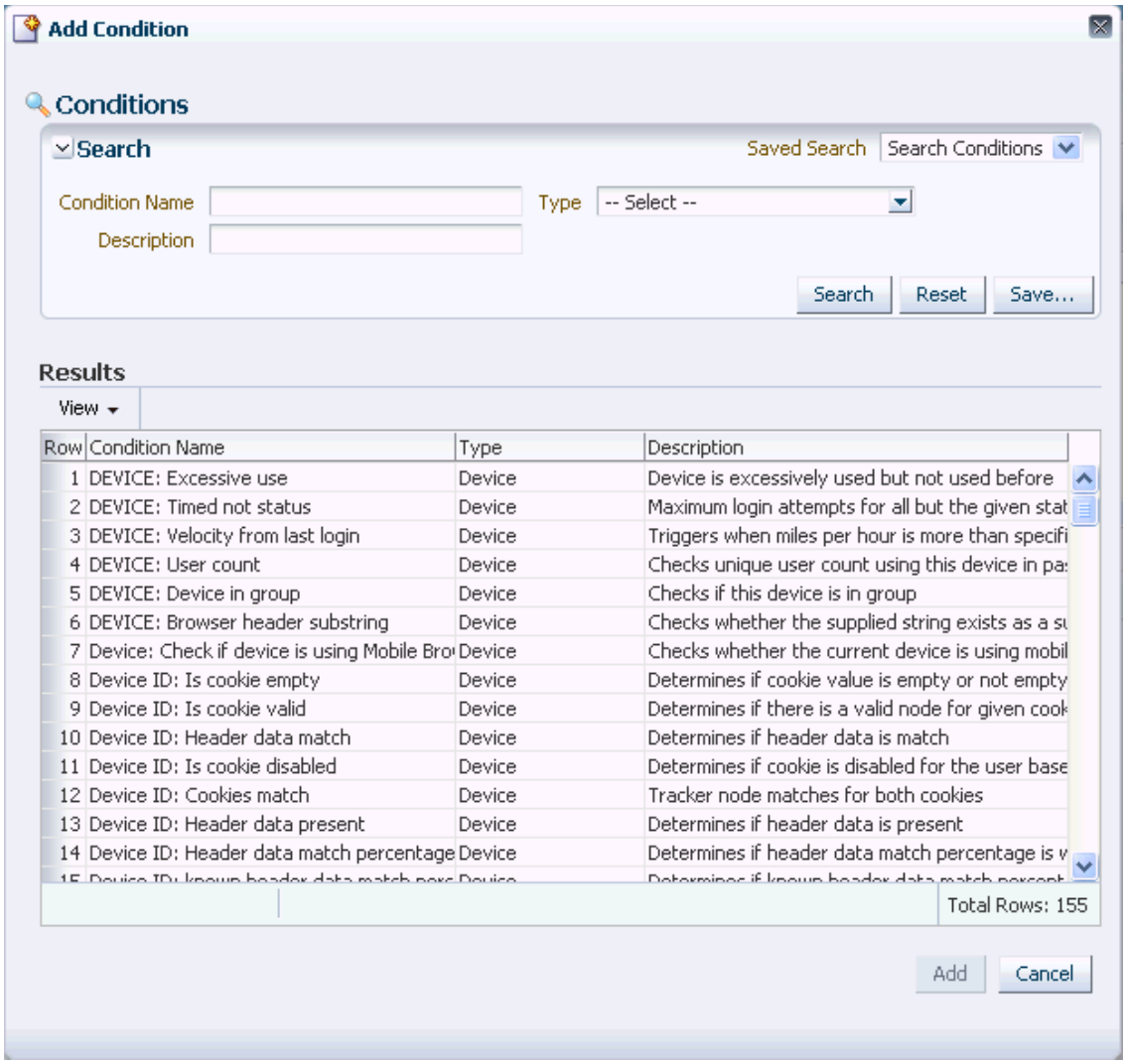
The **Rule page**'s **Condition** tab displays the conditions in the rule and enables you to add other conditions and customize them.

Figure 11–11 Adding conditions

Follow these steps to add a condition:

1. If you are not on the **Rule Details** page of the rule in which you want to add the condition to, navigate to that page.
   a. In the Navigation tree, select **Rules**. The **Rules Search** page is displayed.
   b. Search for the rule in which you want to add the condition for.
   c. In the **Search Results** table, click the name of the rule. The **Rule Details** page for that rule is displayed.
2. In the **Rule Details** page, click the **Conditions** tab.
3. In the **Conditions** tab, click **Add**. The **Add Condition** page appears.
4. Search for the condition you want for the rule.
5. In the **Search Results** table, select that condition and click **Add**.

Figure 11–12 Add Conditions



6. In the **Conditions** edit page, select the condition in the top subtab.

   The bottom subtab displays the parameters of the condition.

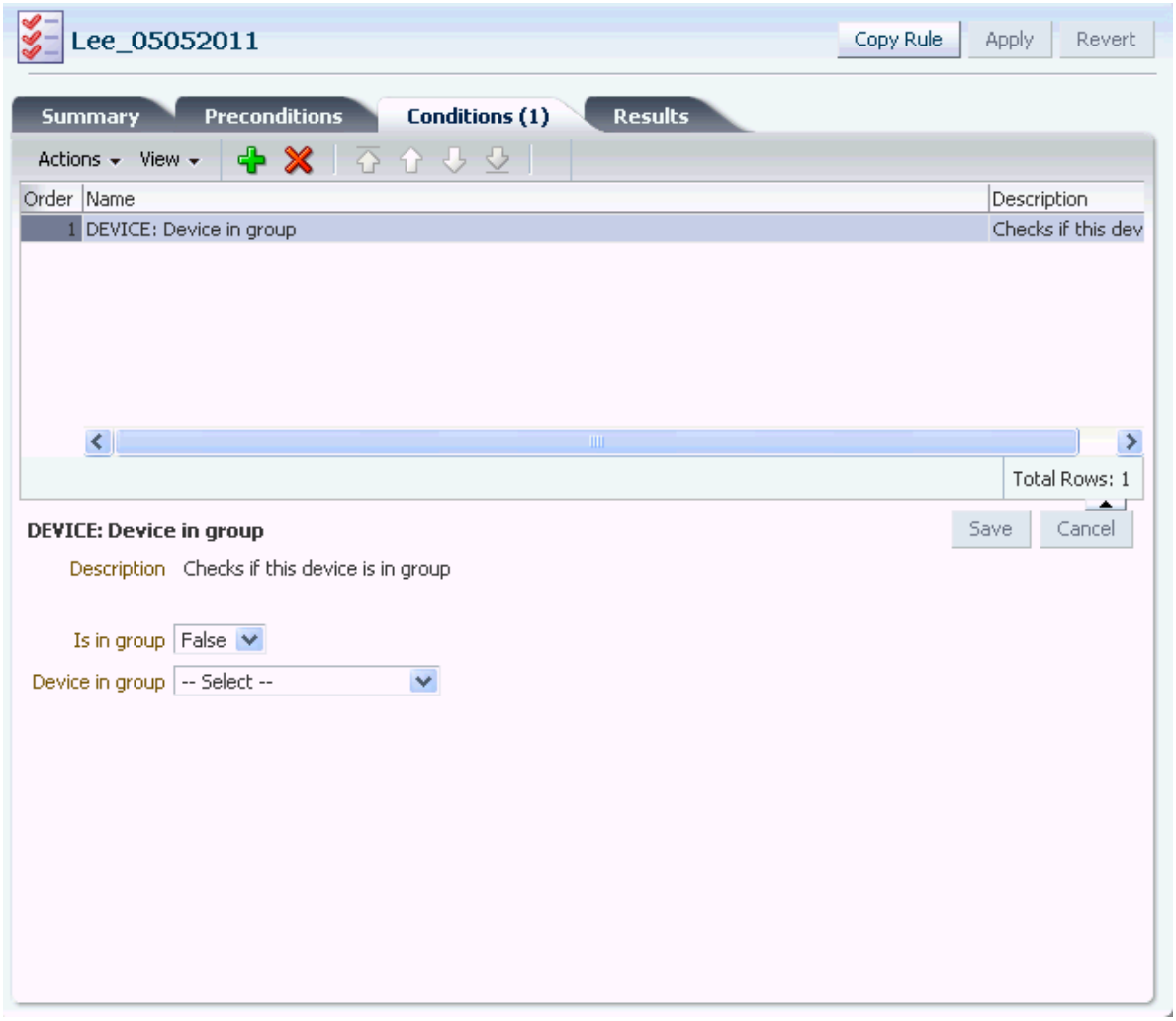
7. In the bottom subtab, modify the parameters per your requirements.
8. Click **Save** to save your changes.

   A confirmation dialog displays the status of the operation.

9. Click **OK** to dismiss the confirmation dialog.
10. Click **Apply**. The modified rule details were saved successfully.

An example of the **Conditions** tab is shown in Figure 11–13, "Condition Parameters".

Figure 11–13 Condition Parameters



The top tab displays the conditions in the rule.

Table 11–17 lists the fields in the top subtab of the **Conditions** tab.

Table 11–17 Rule Details Conditions Tab

Fields	Descriptions
Order	Order of the condition. Conditions in the rule are evaluated sequentially. Subsequent conditions are evaluated only if the current one was evaluated to be true. In other words, the evaluation stops when a condition is evaluated to be false. For the rule to be triggered all the conditions that constitute the rule must be evaluated to true; if any of the conditions is evaluated to false, the rule is evaluated to false, and the rule does not trigger.
Condition Name	Name of the condition.
Description	Description of the condition.

You can only view/edit one condition's parameters at a time.

Example: Link Group to Rule Condition

In this use case, you must link an existing high risk countries group used for various purposes to a rule in the policy, **System - Pre Blocking**, you imported in Section , "Example: Importing a Policy."

Directions: Find a high risk countries group and link it to the rule in the **KBA Challenge** policy, you created.

To link a group to a rule condition:

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Rules** node. The **Rules Search** page is displayed.
3. Search for the **Blacklisted countries** rule.
4. In the **Search Results** table, click **Blacklisted countries**. The **Rule Details** page for the **Blacklisted countries** rule is displayed.
5. Select the **in group** rule condition in the **Blacklisted countries** rule.
   a. In the **Rule Details** page, click the **Conditions** tab.
   b. In the **Conditions** tab, click **Add**. The **Add Conditions** page appears.
   c. Search for the condition, `Location: In Country group`.

      The condition checks to see if the IP address is in the given country group.
   d. In the **Search Results** table, select the `Location: In Country group` condition and click **OK**.
6. Link the existing high risk countries group to the rule condition.
   a. In the **Conditions** edit page, select the `Location: In Country group` condition in the top panel.

      The bottom panel displays the parameters of the condition.
   b. In the bottom panel, modify the parameters by setting:

      Is in list: **true**

      Country in country group: **Restricted countries**.
7. Click **Save** to save your changes. A confirmation dialog appears with a message that the modified rule parameters were saved successfully.
8. Click **OK** to dismiss the confirmation dialog.
9. Click **Apply**. A confirmation dialog appears with a message that the modified rule details were saved successfully.

11.8.3 Editing Rule Parameters

The **Conditions** tab of the **Rule Details** page displays the conditions in the rule and enables you to edit parameters of the rule.

To edit rule parameters:

1. In the Navigation tree, select **Rules**. The **Rules Search** page is displayed.
2. Search for the rule which you want to edit.
3. Click the rule name in the **Search Results** table to open its **Rule Details** page in a new tab.

The **Rule Details** page provides the **Summary**, **Preconditions**, **Conditions**, and **Results** tabs.

4. In the **Rule Details** page, click the **Conditions** tab.
5. In the **Conditions** tab, select the condition in the top subtab.

   The bottom subtab displays the parameters of the condition.
6. Use the **Reorder** buttons on the tool menu to change the order of the conditions.

   See Section 11.8.5, "Changing the Order of Conditions in a Rule" for details.
7. In the bottom subtab, modify the parameters per your requirements.
8. Click **Save** to save your changes.

   A confirmation dialog displays the status of the operation.
9. Click **OK** to dismiss the confirmation dialog.
10. Click **Apply**. The modified rule details were saved successfully.

11.8.4 Viewing the Condition Details of a Rule

To view the details of a condition:

1. Open the **Rule Details** page of the rule.
   a. In the Navigation tree, select **Rules**. The **Rules Search** page is displayed.
   b. Search for the rule in which you want to add the condition for.
   c. In the **Search Results** table, click the name of the rule. The **Rule Details** page for that rule is displayed.
2. In the **Rule Details** page, click the **Conditions** tab.
3. In the **Conditions** tab, highlight the condition you are interested in.

   The bottom subtab displays the parameters for the condition.

11.8.5 Changing the Order of Conditions in a Rule

Conditions in the rule are evaluated sequentially. Subsequent conditions are evaluated only if the current one was evaluated to be true. In other words, the evaluation stops when a condition is evaluated to be false.

To change the order of a condition in a rule:

1. In the Navigation tree, select **Rules**. The **Rules Search** page is displayed.
2. Search for the rule which you want to edit.
3. Click the rule name in the **Search Results** table to open its **Rule Details** page in a new tab.

   The **Rule Details** page provides the **Summary**, **Preconditions**, **Conditions**, and **Results** tabs.
4. In the **Rule Details** page, click the **Conditions** tab.
5. In the **Conditions** tab, select the condition in the top subtab.
6. Use the **Reorder** buttons reorder the condition.
7. Click **Save** to save your changes.

   A confirmation dialog displays the status of the operation.

8. Click **OK** to dismiss the confirmation dialog.
9. Click **Apply**. The modified rule details were saved successfully.

11.8.6 Deleting Conditions

To delete conditions:

1. In the Navigation tree, select **Conditions**. The **Conditions Search** page is displayed.
2. Enter the search criteria for the conditions you are interested in and click **Search**.
3. Select the conditions in the **Search Results** table and click **Delete**.

> **Note:** If rules are using the condition, deleting it affects the rules and policies that use it.

11.8.7 Deleting Conditions from a Rule

To delete a condition from a rule:

1. In the Navigation tree, select **Rules**. The **Rules Search** page is displayed.
2. Search for the rule that contains the conditions you want to delete.
3. Click the rule name in the **Search Results** table to open its **Rule Details** page.
4. In the **Rule Details** page, click the **Conditions** tab.
5. Select the condition of interest and click **Delete**.

   The **Delete** button is enabled only if a row is selected or the search result has at least two rows.

   You cannot delete multiple conditions at a time in a given rule; you must select one condition at a time.

   You can delete more than one condition, but not all conditions can be deleted.

   When the **Delete** button is clicked, the deletion is performed. You do not receive a message asking if you are sure you want to delete. The change is permanent.

11.9 Exporting and Importing

Policies can be exported and imported.

For example, you can export the policies defined in a system and import them into another system.

11.9.1 Exporting a Policy

To export policies:

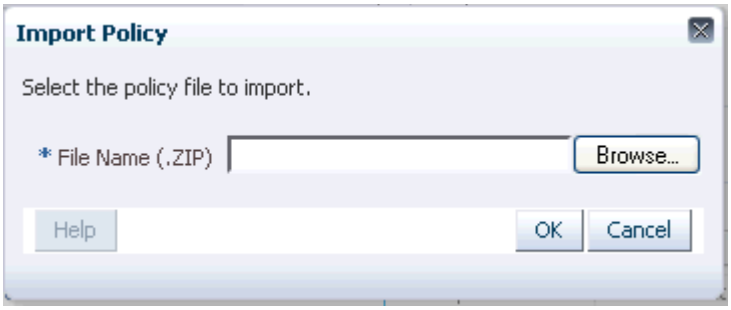
1. In the Navigation tree, select **Policies**. The **Policies Search** page is displayed.
2. Enter the search criteria you want and click **Search**.
3. Select the rows corresponding to the policies you want to export.
4. From the **Actions** menu, select **Export selected** or **Export Delete Script**.
5. When the export screen appears, select **Save File**, and then **OK**.

11.9.2 Importing Policies

To import policies:

1. In the Navigation tree, select **Policies**. The **Policies Search** page is displayed.
2. In the **Policies Search** page, click the **Import Policy** button. The **Import Policy** screen appears.

Figure 11–14 Import Policy



3. In the **Import Policy** dialog box, type the path and name of the file; or use the **Browse** (...) button to locate the ZIP file that contains the policies, and then select the file.

   Note: a validation is performed for the imported file's MIME type. The MIME type of the export file should be "Application/ZIP."

4. Click **Open** and then click **OK**.

   A confirmation dialog appears with the list of policies and the number of policies that were added, updated, not updated, or not deleted in the system after the import.

   The policies are imported into the system unless the ZIP file contains a delete script or files in an invalid format or the ZIP file is empty.

   If you are importing a delete script, the policies are deleted from the system.

   An error occurs if you try to import policies in an invalid format or an empty ZIP file.

5. Click **Done** to dismiss the confirmation dialog.

Note for Policies Migrated from 10*g* to 11*g*

Business, third-party, workflow policy types have been removed from Oracle Adaptive Access Manager.

In 10*g*, scoring was not used by business policies. In 11*g*, when business policies are loaded from the Oracle Adaptive Access Manager database, the policy set scoring engine is applied by default and these policies are treated as security policies from 11*g* onward.

Example: Importing a Policy

You are Jennifer, a member of the security team at Acme Corp. You must configure Oracle Adaptive Access Manager to accomplish one of the use cases the team came up with focusing on high risk countries. Chuck, another team member, configured a Pre-Authentication policy in the Oracle Adaptive Access Manager offline environment to block login requests from high risk countries before authentication. You know this

policy can work for your purposes. Chuck already exported the policy and now you must import it into production. Directions: Import the ZIP file that contains Chuck's configured policies. He has name the file, PreAuth_Block_policy.zip.

To import a policy:

1. Log in to the OAAM Administration Console as an administrator.
2. In the Navigation tree, select **Policies**. The **Policies Search** page is displayed.
3. Click **Import Policy** in the **Policies Search** page. The **Import Policy** screen is displayed.
4. Click **Browse** and search for `PreAuth_Block_policy.zip`.
5. Click **OK** to upload `PreAuth_Block_policy.zip`.

   A confirmation dialog displays the status of the operation.

   A list also appears showing numbers for **Number of Policies Added**, **Number of Policies Updated**, **Number of Policies Not Updated**, and **Number of Policies Deleted**.

   The imported policy is listed in the **Imported List** section.

   The policy is added to the system or it overwrites/updates an existing policy depending on whether the same policy name exists. If the name already exists, the policy is updated. If the name does not exist, the imported policy is added to the system.

   An error is displayed if you try to import files in an invalid format or an empty ZIP file.
6. Click **OK** to dismiss the confirmation dialog.
7. In the **Policy Search** page, verify that the policy appears in the **Search Results** table.

11.9.3 Importing a Policy With the Same Name as an Existing Policy

When you import policies to overwrite an existing policy with the same name to update changes in the actions with the actual rules remaining the same, if the replacement action is blank it does not overwrite the original value. To import the policy with the same name as an existing policy, you must first delete the policy and then import the new version of that policy.

11.9.4 Importing Conditions

To import a condition:

1. From the Navigation tree, click **Conditions**.

   The **Conditions Search** page is displayed.
2. Click **Import Conditions**.
3. In the **Import Conditions** dialog box, type the path and name of the file; or use the **Browse** (...) button to locate the ZIP file that contains the conditions, and then select the file.
4. Click **Open** and then click **OK**.

   A confirmation dialog appears with the list of conditions and the number of conditions that were added, updated, not updated, or not deleted in the system after the import.

5. Click **Done** to dismiss the confirmation dialog.

11.9.5 Exporting a Condition

1. In the Navigation tree, select **Conditions**. The **Conditions** page is displayed.
2. Enter the search criteria you want and click **Search**.
3. Select the rows corresponding to the conditions of interest.
4. From the **Actions** menu, select **Export selected**.
5. When the export dialog appears, select **Save File**, and then **OK**.

11.10 Evaluating a Policy within a Rule

The System: Evaluate Policy condition can be used to evaluate the policy (execute the policy by name) and then see if the actions returned by the policy contains a particular action. This condition is added to rule and works as follows.

1. Create a rule and add this as only condition.
2. Specify the name of some policy and expected action (for example, Block) for the condition parameters.
3. If at runtime this policy returns a list of actions and one of the actions is Block, then this rule will trigger.

Example: Evaluate Policy

Jeff has two policies. One of the policies **Policy B** is like a pre-cursor to **Policy A** so this policy should be executed every time, no matter what the other rule evaluations turn out to be. Hence nesting this policy under **Policy A** may not work all the time. (trigger combinations)

So Jeff decides to add a new rule condition to **Policy A** such that it executes **Policy B** every time.

1. Open **Policy A**.
2. In the **Rules** tab of the **Policy Details** page, click the **Add Rule** button.
3. Create a rule, **Rule C**.
4. In the **Condition** tab of the **Rule Details** page, click **Add Condition**.
5. Add **System: Evaluation Policy** condition.
6. In **Trigger Combination**, select **Policy B** as action.

11.11 Best Practices

This section outlines some best practices for using policies, rules, and conditions.

Simple Conditions First in the Rules

Order conditions within a rule such that the conditions that are simple are first in the rule. Usually Session type conditions are ones that are more efficient. Usually Autolearning type conditions and conditions that use location data are more expensive--they should be placed after the simple ones.

Organize Policies So Conditions Do Not Evaluate Many Times in the Flow

Organize the policies such that you do not have to evaluate the same condition again and again in the flow. This could help prevent getting the same result at different checkpoints in the same session. Use nested policies to prevent evaluating the same conditions.

Adding and Editing Policies and Rules

These general steps outline the process for adding or updating of policies or rules into a production environment:

1. Develop the new rule using your offline system (a separate installation of Oracle Adaptive Access Manager set up for testing or staging).
2. Test the rule to ensure that it is functioning as expected by running predictable data through it using your offline system.
3. When you are satisfied that the policy is functioning as expected, migrate the policy in pre-production where performance testing can be run.

   This is an important step since the new rule, or policy, or both can potentially have a performance impact. For example, if you define a new policy to check that a user was not using an email address that had been used before (ever). If the customer has more than 1 billion records in the database, performing that check against all the records for every transaction has great impact on performance. Therefore, testing the policy under load is important.
4. Only when you are satisfied that your new rule/policy is functioning as expected and does not adversely affect performance should it be migrated into production.

Using a Maximum Scoring Engine

Whether a high score or low score is considered "bad" is dependant on the policy and how the developer models the policy. For example, the higher the score in device policies, the higher the risk for the situation.

For example, if you want "1000" to be considered a "bad" score, use the Maximum scoring engine. Then, model the rules so that whatever generates a maximum score is "bad." For example, you can model the policy such that if a user logs in from a particular location, the score is 200 points, and if a user logs in from a bad device, the score is 500 points. In this case, the one that has the maximum score is considered the worse of the two.

Using an Aggregate Scoring Engine

If you do not know how risky a situation is, you can use an aggregate scoring engine. For example, for a Device ID, you can apply six or seven rules. For each rule, specify a score of 200 or 300 weight. If you the scores are more than this, it is considered "bad." If there are six rules, and two of them trigger, you would get the lower aggregate. If six rules triggers, you get the higher aggregate, which means that this situation is the riskier.

Using an Average Scoring Engine

Use the Average scoring engine when none of the rules are more important than the others or there are a lot of rules that trigger for the evaluation. For example, each rule can view a particular part of a situation, but each part is not enough for you to base a decision on.

Score Does Not Matter for Some Policies in a Checkpoint

If there are multiple policies in a checkpoint and if the score does not matter for some of the policies, set the rule score to 0 for these policies, so that they are ignored when scores are aggregated.

12

Managing Groups

Groups are like items that have been collected to simplify configuration workloads.

This chapter introduces you to the concept of groups and the different types of groups used in Oracle Adaptive Access Manager, and provides information on creating groups and editing group memberships, and group details. It also provides details on importing and exporting groups.

12.1 About Groups

As the security administrator, you must configure rules for actions and alerts, and rule conditions for users, locations and IPs, and so on.

For example, to create a rule "Restricted IPS," you must add a condition to find out if the user IP used for login is in the list of restricted IPs configured. The restricted IPs are grouped together as RestrictedIPSGroup of type IP and the rule condition uses this group.

12.2 Group Types

The following types of groups are available:

Table 12–1 Group Types

Type	Description
ASN	This group holds ASNs. Autonomous System numbers (ASNs) are globally unique identifiers for Autonomous Systems. An Autonomous System (AS) is a group of IP networks having a single clearly defined routing policy, run by one or more network operators.
Actions	This group holds the different out-of-the-box actions. An action is an event activated when a rule is triggered. For example, block access, challenge question, ask for PIN or password, and so on. This is an enum group type.
Alerts	This group contains four kinds of alerts with four levels of severity. An alert is a message generated when a rule is triggered. For example, "login attempt from a new country for this user." Kinds of alerts are Fraud, Customer Care, Information, and Investigation. Alert levels are Low, Medium, High, and Info. Alerts are a special enum group type.
Authentication Status	This group contains the status of the user when logging in. This is an enum group type.

Table 12–1 (Cont.) Group Types

Type	Description
Cities	This group contains cities. For example, Presque Isle, Alakanuk, Chattahoochee, and so on.
Connection Speed	This group contains the internet connection speeds or bandwidths (high, medium, low). This is an enum group type.
Connection Type	This group contains connection types. Common connection types to the internet are Optical, T1/T3, Satellite, Cable, ISDN, Wireless, and so on. This is an enum group type.
Countries	This group contains countries. For example, black-listed countries.
Devices	This group contains devices IDs. Device IDs are unique identifications for devices such as PDA, cell phone, kiosk, and so on. For example, black-listed devices.
Generics	This group contains members related to string, integer, or long number information.
Generic Longs	This group contains long numbers. For example, stolen Social Security numbers, credit card numbers, or MAC addresses.
Generic Strings	This group contains generic strings. For example, if you wanted to permit anyone who has a variation of Smith to log in (Smithson, Smithberg, Smithstein, and so on), then you could define a prefix string of "Smith" for comparison. Another example: if you want to block anyone from Pennsylvania, Transylvania, Spotsylvania, and so on, from logging in, you can define a suffix string.
IP Carriers	This group contains carriers of Internet Protocol (IP) traffic.
IP Ranges	This group contains a range of IPs.
IPs	This group contains the IP addresses of the users. Addresses may map to locations, although some addresses are unknown or private (for example, 10.0.0.1).
ISP	This group contains Internet Service Providers. Examples of ISPs are Comcast, Verizon, AOL, and so on.
User Name	This group contains login names of users. It is set up by the user. For example: "Bob" is the login and the user is "xyz123." User name may not be unique across applications. The unique combination would be the Organization ID with the user name.
Routing Type	This group contains routing types. Examples of routing types are POP, Satellite, Anonymizer, International, and so on. This is an enum group type.
Second-level Domains	This group contains second-level domain names. A second-level domain is a domain directly below a top-level domain (TLD). Second-level domains commonly refer to the organization that registered the domain name. Second-level domain names can be used to pass and block whole sites such as *.example.org or entire intranet levels such as *.sales.* or *.admin.*
States	This group contains states. For example, black-listed states.

Table 12–1 (Cont.) Group Types

Type	Description
Top-level Domains	This group contains top-level domain names (the last part of an Internet domain name, that is, the letters that follow the final dot of any domain name). Top-level domain names can be used to pass and block whole countries, for example,.uk, .ru, or .ca, and entire communities, for example, .mil, .info, .gov, or edu.
Transaction Status	This group contains the status of the user when a transaction is being performed. This is an enum group type.
User ID	This group contains User IDs. The customer uses a scheme to uniquely identify users. The User ID may not be unique across applications. The unique combination would be the Organization ID with the User ID. A special type of group is the Organization ID. Organization ID is a primary user group. A flag is set so that when users log in from the application, they are autopopulated into the group if they are not already members. You can use members of that group to scope policies.

12.3 Group Usage

Groups are used in the following items:

- Policies

  A policy is linked to a User ID group or all users and members of the user group or all users that are evaluated.

  The Policy Tree shows the linking of User ID groups to policies.

- Rules within policies

  OAAM Admin applies rules on specified users, devices, or location groups to evaluate whether a fraud scenario occurred and to determine an outcome.

  A rule can trigger an action group, or an alert group, or both.

- Conditions

  Some conditions use groups as a parameter type. For example, IP in IP Group. The condition takes IP Group name / IP as a parameter.

- Trigger combinations

  Alerts in groups are specified in the trigger combination.

- Pre-condition

  User groups can be excluded in a policy.

- Configurable Actions

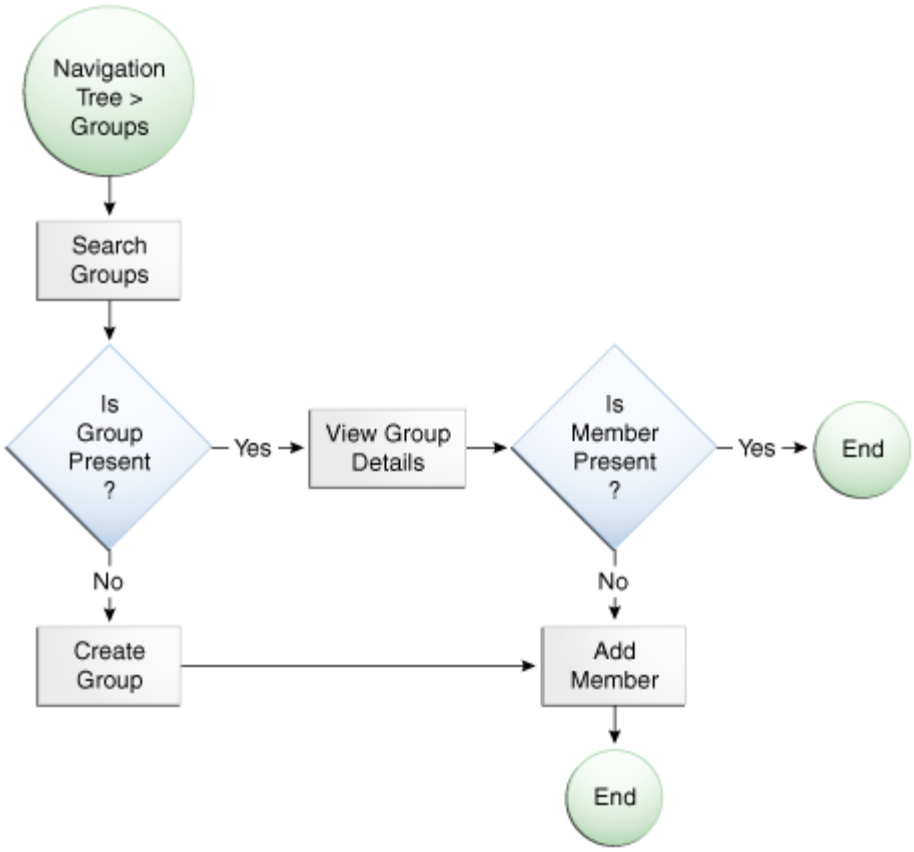
  Members of a User ID group can be added to a User ID group dynamically using configurable actions.

12.4 User Flows

In the create and edit user flow, you always begin by searching for a group and then viewing the details before deciding if you want to update group membership, edit group details, or edit group members, or if you want to define a group.

As an example user flow, the group creation flow, is shown in Figure 12–1.

Figure 12–1 Group Creation Flow



12.5 Navigating to the Groups Search Page

From the **Groups Search** page, you can search, view, create, import, export, and delete groups.

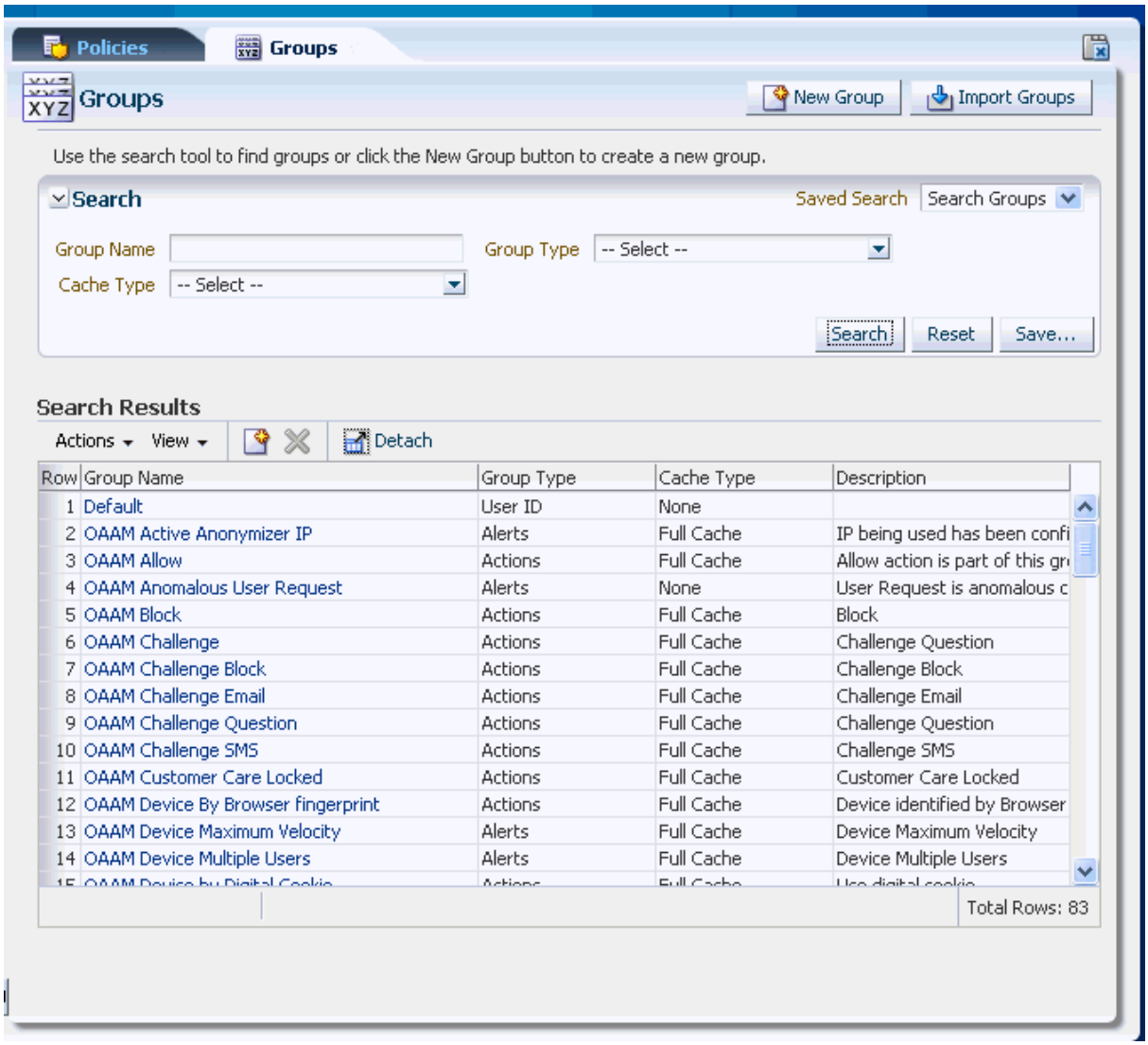
To open the **Groups Search** page:

1. Log in to the OAAM Administration Console.
2. From the Navigation tree, select **Groups**. The **Groups Search** page is displayed.

   Alternative methods to open search pages are listed in Section 3.10, "Search, Create, and Import."

   The **Groups Search** page displays a Search section and a **Search Results** table that shows a summary of the groups that match your search criteria.

Figure 12–2 Groups Search page



12.6 Searching for a Group

When the **Groups Search** page first appears, the **Search Results** table is empty. You must press **Search** to see a list of groups in the Oracle Adaptive Access Manager environment.

In the **Groups Search** page, you can search for a specific group you are interested in by using the specific criteria in the search filter.

To search for a group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. Specify criteria to locate the group and click **Search**.

   Clicking **Reset** instead of **Search** resets the search criteria.

   Search parameter values are not required. If you choose to leave the fields blank, all groups are displayed in your search results.

The search filters are described in Table 12–2.

Table 12–2 Groups Search Filter Criteria

Filters and Fields	Descriptions
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.
Cache Policy	Groups offer two Cache Policy options: Full Cache or None. The "Full Cache" option caches group contents in server memory for the lifetime of the server. Static lookup groups and read-only groups are good candidates for the "Full Cache" option. Administrators must be careful using this option as it uses server memory. A long list of elements can have an adverse affect since groups are re-cached if there are changes to the list. The "None" Cache Policy option does not use cache and consults the database every time. Device group types are set to "None" because in most cases, they are dynamic and manipulated while the server is running. If you have groups that stay static for the lifetime of the server, you can use the "Full Cache" option instead of "None."
Group Type	Category to which the group belongs. The types are listed in Table 12–1

The groups that are displayed are those that match the criteria specified in the **Group Name**, **Group Type,** and **Cache Policy** fields.

The option to sort is provided on every column in the **Search Results** table.

Each group has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

In the **Search Results** table, click the hyperlinked group name of the group you are interested in to view more details.

12.7 Viewing Details about a Group

The **Group Details** tab has summary, member, and usage tabs.

To view details about a group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. Enter the name of the group in the **Group Name** field and click **Search**.
3. Click the group name to view the **Group Details** page for that group.

   The **Summary** tab shows general information about the group, such as the name, type, cache policy, and description of the group.

   Note: You cannot change the group type in the **Group Details** page.

4. From the members tab, you can add members to the group or select members of the group to remove.

   The members tab is labeled with the data type the group contains. For example, a User ID group has a member tab labeled **User ID**.

   The members tab shows all the members of the group. The members tab normally shows member name/ ID, description, and any other critical attributes of members. The exact information differs depending on the group type.

Note: ·You cannot edit existing **Action** elements and their properties.

5. From the Usage tab, you can view all the different locations a group is used (conditions, overrides, configurable actions and so on) in a hierarchical fashion. If the group is not used, you are not able to access the tab.

   You can view the details of any node in the usage tree. For example, when you click Rule A above Precondition xyz, the right hand side panel shows brief details about Rule A and you can view additional details, if needed.

6. To view details about the entity that the group is used in, click its link.

   Clicking the link opens the details page of that particular item in a new tab.

12.8 Adding an Entity to a Group

You could add an entity to a group or create a group and add the entity to it, or remove an entity from a group, using the Add to Group button from details pages.

The Add to Group feature is described below:

Table 12–3 Add to Group

Feature	Description
Add entity to entity group	You can select an entity group from a list of entity groups with which the entity is not already associated and add the entity to it. A User Group can be either a User ID or User Name group type. An entity cannot be added to the same entity group multiple times with the exception of the alert. An alert can be added to an Alert Group multiple times, since whenever an alert is added to an Alert Group, a new instance of the existing alert is created and added to the group.
Create a new entity group and add entity to the newly created group.	You can create a new entity group and add the entity to it. A user group can be of either User ID or User Name group type.
Remove entity from entity group	You can select multiple entity groups with which it is already associated and remove the entity from the selected groups. Note: Removing users from Organization ID is not recommended.

12.9 Group Characteristics

The following table shows a summary of group characteristics.

The **Group** column shows the type of groups available in the system.

The **Group Member Type** column shows whether the record is a primitive type (long, string, and integer) or a structured type. An example of a structured type is Actions, which has name, ID, and message

The **Cache** column shows the cache option that is recommended for the group.

The **Create** column shows whether the group can be created using the user interface for groups.

The **Edit** column shows whether the group can be edited using the user interface for groups.

Table 12–4 Summary of Group Characteristics

#	Group	Group Member Type	Cache	Create	Edit
1	Actions	Struct	Yes	No	No
2	Authentication Status	Long	Yes	No	No
3	Connection type	Long	Yes	No	No
4	Connection speed	Long	Yes	No	No
5	Routing Type	String	Yes	No	No
6	Transaction Status	Struct	Yes	No	No
7	Alerts	Struct	Yes	Yes	Yes
8	Generic Integers, Generic Strings, Generic Long	Integer, String, Long	Yes	Yes	Yes
9	ASN	String	Yes	Yes	Yes
10	IP Carriers	String	Yes	Yes	Yes
11	Top-level Domains	String	Yes	Yes	Yes
16	Second-level Domains	String	Yes	Yes	Yes
12	Cities	String	Yes	No	No
13	Countries	String	Yes	No	No
14	States	String	Yes	No	No
15	ISPs	String	No	Yes	Yes
17	Device ID	Long	Yes	Yes	Yes
18	IPs	IP	Yes	Yes	Yes
19	IP Ranges	Struct	Yes	Yes	Yes
20	User Name	String	Yes	Yes	Yes
21	UserId groups	String	Yes	Yes	Yes

12.10 Creating a Group

The process for creating a group involves:

1. Defining a Group
2. Adding Members to a Group

12.10.1 Defining a Group

The same group name cannot exist across the group types. For example, if an action group called "Block" exists, you cannot create user name group called "block".

The steps for defining a group are:

Group Name and Group Type are required fields.

1. In the Navigation tree, double-click **Groups**. The **Groups Search** page is displayed.
2. From the **Groups Search** page, click the **New Group** button or icon.

Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

The **Create Group** screen is displayed.

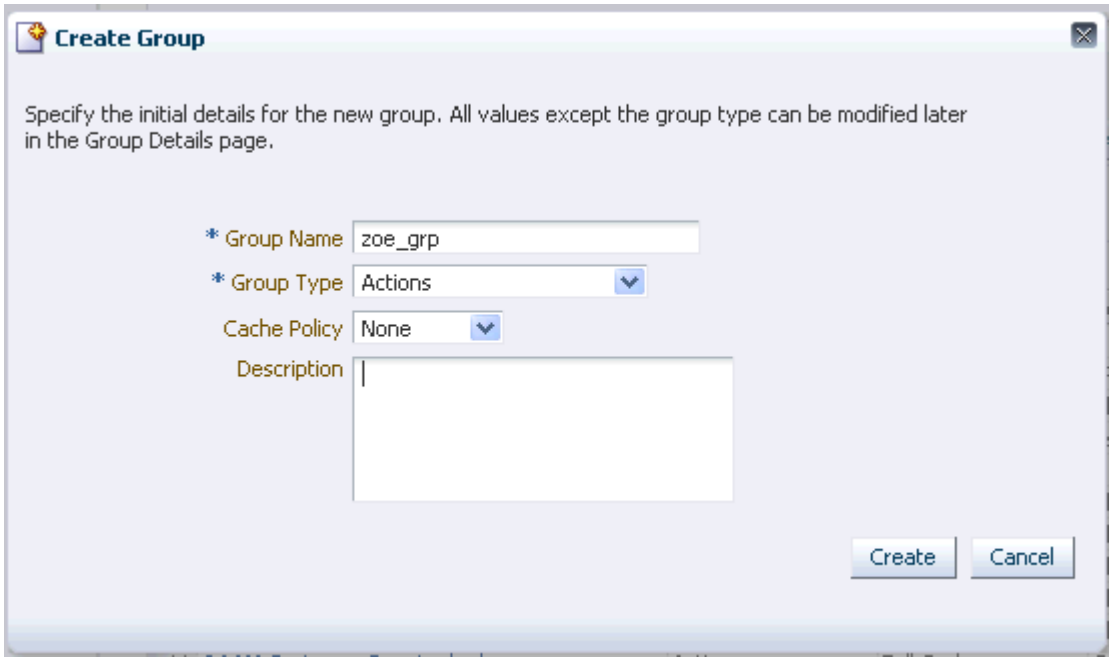
3. In the **Create Group** screen, enter a group name and description.

   The group name must be unique.

4. From the **Group Type** list, select a group type.

   The types are listed in Table 12–1

Figure 12–3 Create Group screen



5. Set the cache policy to **Full Cache** or **None**.

   Note: ISP groups cannot be cached.

6. Click **OK** to create the group or **Cancel** to disregard the changes.

   If you click **OK**, a new group is created.

   A confirmation dialog is displayed.

7. Click **OK** to dismiss the dialog.

   The **Group Details** page for the new group is displayed.

   Now, you can add members to the new group.

12.10.2 Adding Members to a Group

You can add members to a new or an existing group.

Because there are multiple group types, the procedure you perform to add members to a group depends on the group type. Refer to the following tables for the appropriate procedure for the group you are creating.

Note: When group members are added to certain group types like "blacklisted countries," they are processed automatically since the rules are pre- configured.

For example, the rule "Check if login is from a blacklisted country" is pre-configured and attached to "blacklisted countries" by default. Hence adding members to this group automatically starts rules processing.

When you search for members, the ones that are already part of your group are not available in your search results.

Note: The server must be restarted for enum elements to take effect. Enum group types are actions, connection speed, connection type, and so on.

Create a new member to add to the group (no search/ filter option)

Table 12–5 lists groups that add members without an option to search or filter.

If you are adding members to a group listed in Table 12–5, see Section 12.11, "Creating a New Element/Member to Add to the Group (No Search and Filter Options)."

Table 12–5 Create New Member (No Search Option)

Group	Group Type	Member Type	Create
Generic Integers, Generic Strings, Generic Long	Database	Integer, String, Long	Yes
ASN	Database	String	Yes
IP Carriers	Database	String	Yes
Top-level Domains	Database	String	Yes
Second-level Domains	Database	String	Yes

Add members from cities, states, and countries by filtering an existing list (no creation option)

Table 12–6 lists groups that add members from cities, states, or countries by filtering an existing list to find members and then adding the members to the group. The element cannot be created for these groups.

If you are adding members to a group listed in Table 12–6, see Section 12.12, "Filtering an Existing List to Select an Element to Add to the Group (No Creation of a New Element)."

Table 12–6 Add Members by Filtering Existing (No Creation Option)

Group	Group Type	Member Type	Create
Cities	Database	String	No
Countries	Database	String	No
States	Database	String	No

Search for existing elements or create new elements

Table 12–7 lists groups that add elements by searching existing elements or creating new elements and then adding them to the group.

If you are adding elements to a group listed in Table 12–7, see Section 12.13, "Searching for and Adding Existing Elements or Creating and Adding a New Element."

Table 12–7 Search for existing or create new elements

Group	Group Type	Member Type	Create
ISPs	Database	String	Yes
Device ID	Database	Long	Yes
IPs	Database	IP	Yes
IP Ranges	Database	Struct	Yes
User Name	Database	String	Yes
UserId groups	Database	String	Yes

Adding Alerts

For alerts you have the option to either search for an existing alert or create a new alert before adding it to the Alert group.

If you are adding alerts to an Alert group, see Section 12.14, "Adding Alerts to a Group."

Search and add existing elements only (No Creation)

Table 12–8 lists the groups that add members by searching for existing elements and then adding them to the group. You do not have the option to create a new element through the Groups user interface. To create a new element, you must use the Properties Editor.

If you are adding elements to a group listed in Table 12–8, see Section 12.15, "Searching for and Adding Existing Elements."

Table 12–8 Search and add existing only (no creation option)

Group	Group Type	Member Type	Create
Actions	Enum	Struct	No
Authentication Status	Enum	Long	No
Connection type	Enum	Long	No
Connection speed	Enum	Long	No
Routing Type	Enum	String	No
Transaction Status	Enum	Struct	No

12.11 Creating a New Element/Member to Add to the Group (No Search and Filter Options)

The following groups add new elements/members by entering values for the elements.

- ASN
- Generic Integers
- Generic Longs
- Generic Strings

- IP Carriers
- Second-level Domains
- Top-level Domains

To add an element to a group:

1. In the **Group Details** page, click **Add Member**.

   The **Add Member** dialog is displayed.

2. In the **Add Member** dialog, enter the value for the new member that are added to the group.

Table 12–9 Create Parameters

Group	Create Parameters
Generic Integers, Generic Strings, Generic Long	Value
ASN	ASN
IP Carriers	Name
Top-level Domains	Name
Second-level Domains	Name

3. Click **Add** to add the member to the group or **Cancel** to disregard the changes.

   If you click **Add**, the member is created and added. A confirmation is displayed with the message, "The new element created successfully."

4. Click **OK**.

   The **Group Details** page is displayed.

12.12 Filtering an Existing List to Select an Element to Add to the Group (No Creation of a New Element)

The following groups listed add members by filtering an existing list and then selecting an element to add. The element cannot be created for these groups.

- Cities
- States
- Countries

> **Note:** To create a city, state, or country location group, you must populate the geolocation data. Geolocation data provides information about countries, states, and cities.

12.12.1 Adding a City to a Cities Group

To add cities to a cities group:

1. In the Cities tab of the **Group Details** page, click **Add**.

   The **Add Cities** dialog is displayed.

2. Select the country from the available country drop-down.

   The states of that country are made available in the states drop-down.

3. Select the state from the available states drop-down.

   Based on the selection of the state, the cities are listed in the **Available Cities** table.
4. From the **Available Cities** table, select one or more cities to add to the group.
5. Click **Add**.

   The cities are added successfully to the group.

12.12.2 Adding a State to a States Group

To add states to a states group:

1. In the **States** tab of the **Group Details** page, click **Add**.

   The **Add Member** dialog is displayed.
2. Select a country.

   On selection of the available country, the available states are listed in the **States** table.
3. From the **Available States** table, select one or more states to add to the group.
4. Click **Add**.

   The states are added successfully to the group.

12.12.3 Adding a Country to a Country Group

To add countries to a countries group:

1. In the **Countries** tab of the **Group Details** page, click **Add**.

   The **Add Member** dialog is displayed.
2. From the **Available Countries** table, select one or more countries to add to the group.
3. Click **Add**.

   The countries are added successfully to the group.

12.13 Searching for and Adding Existing Elements or Creating and Adding a New Element

For the following groups listed you have the option to either search for and add existing elements or create a new element to add.

- IP Range
- User ID
- Devices
- User Name
- IP
- Internet Service Provider

When you search for members, the ones that are already part of your group are not available in your search results.

Because the procedures for alert groups are different from the other groups listed earlier, separate sections are provided.

12.13.1 Selecting an Element to Add as a Member to the Group

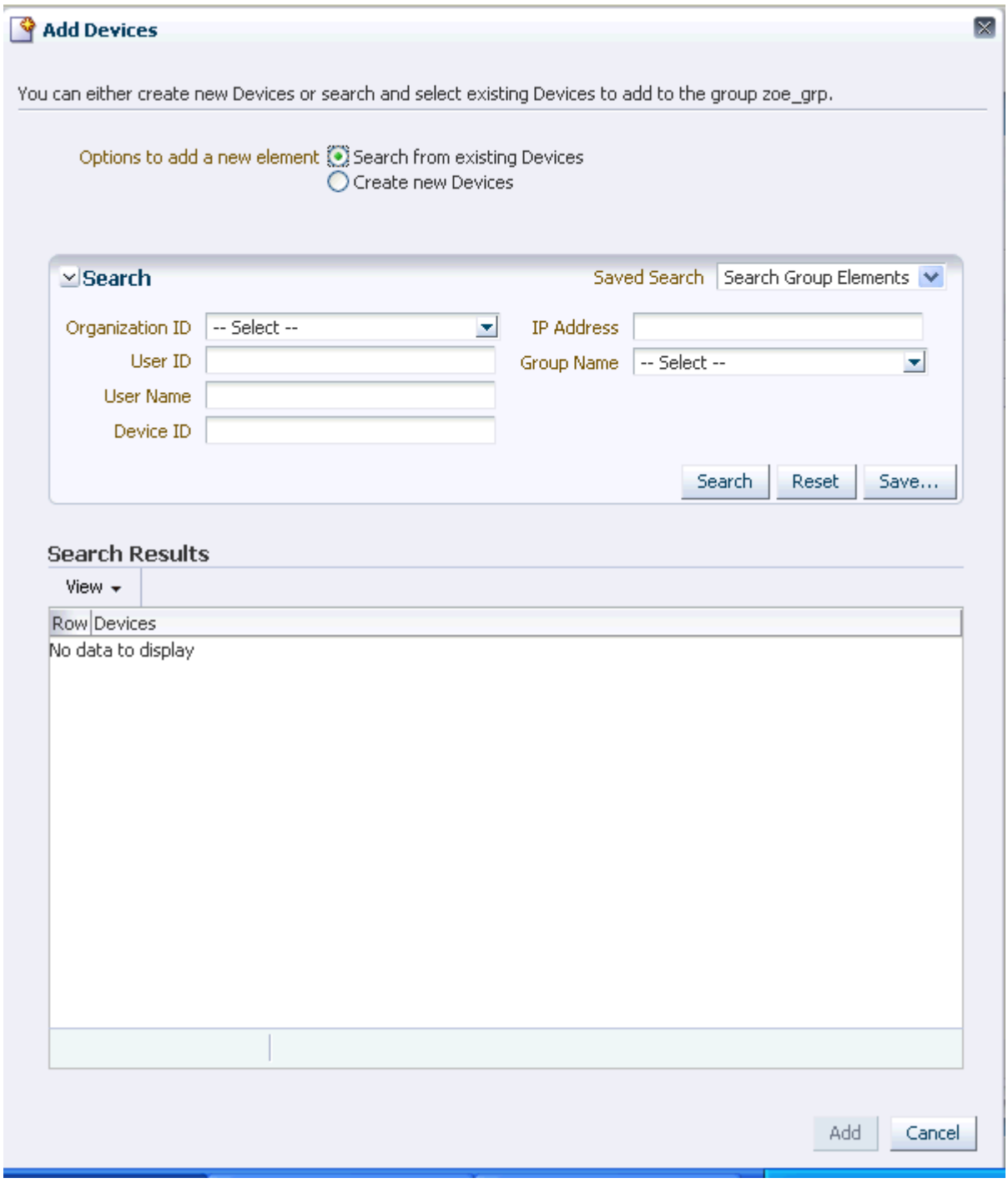
To add an existing element as a member of the group, follow these steps:

1. In the **Group Details** page, click **Add Member**.

   The **Add Member** page is displayed.

2. In the **Add Member** page, select **Search and select from the existing elements**.

Figure 12–4 Search and Select Member



3. Specify the filter criteria to find an element or list of elements and click **Search**.

Table 12–10 Searching for Elements

Search Filter	Description
Application ID	An application identifier used to look up properties based on application.
User ID	User's identification number
User Name	Login name of the users
Device ID	String that uniquely identifies each device and is auto-generated by the application
IP Address	Address mapped to a location usually, although some addresses are unknown or private
Group Name	Name of the group. You can enter the complete name or part of a group name. For example, if you enter new, any group with new in any part of its name is displayed.

4. Select each element you want to include in the group.
5. Click **Add** to add the element as a member of the group or **Cancel** to disregard the changes.

   If the element is added successfully, a confirmation is displayed.
6. Click **OK** to dismiss the dialog.

Example 1: Adding a Device to a Group of Interest Using Groups Interface

To add an existing device to a group:

1. Log in to the OAAM Administration Console.
2. Double-click **Groups** in the Navigation tree.
3. Search for the Device group.
4. In the Search Results table, click the name of the Device group. The Device Details page appears.
5. Click **Members** tab.
6. Click the **Add Member to this Group** icon on the toolbar. The **Add Devices** dialog appears.
7. Choose the **Search and select from the existing Devices** option and search for the Device ID.
8. Select the Device ID and click **Add**.
9. Click **OK** to dismiss the confirmation dialog.

Example 2: Adding an IP to a Group of Interest Using the Groups Interface

To add an existing IP to a group:

1. Log in to the OAAM Administration Console.
2. Double-click **Groups** in the Navigation tree.
3. Search for the Device group.
4. In the Search Results table, click the name of the Device group. The Device Details page appears.
5. Click **IPs** tab.

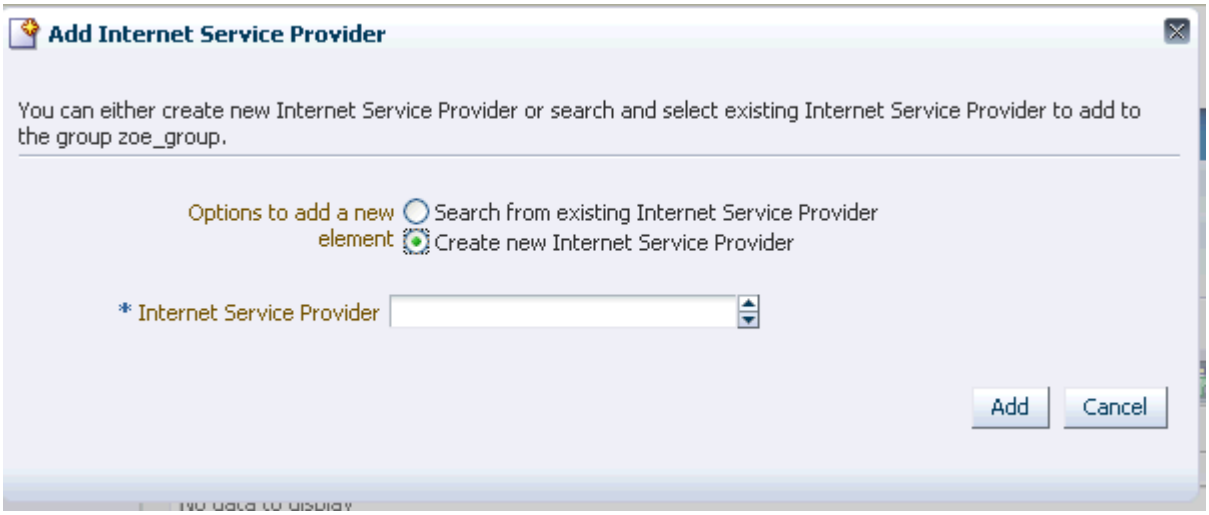
6. Click the **Add Member to this Group** icon on the toolbar. The **Add Devices** dialog appears.
7. Choose the **Search and select from the existing IPs** option and search for the IP address.
8. Select the IP address and click **Add**.
9. Click **OK** to dismiss the confirmation dialog.

12.13.2 Creating an Element (Member) to Add to the Group

To create a new member and add it to the group:

1. In the member tab of the **Group Details** page, click **Add Member**.
2. In the **Add Member** page, select **Create New Element**.

Figure 12–5 Add Member



3. Type in the values for the member.

Table 12–11 Create Parameters

Group	Create Parameters
ISPs	NA
Device ID	Device ID
IPs	IP
IP Ranges	From IP To IP Description
Login Ids	Login ID
UserId groups	User ID

4. Click **Add** to create and add the new member to the group or **Cancel** to disregard the changes.

   If the new element was created successfully, a confirmation dialog is displayed.
5. Click **OK** to dismiss the dialog.

12.14 Adding Alerts to a Group

Procedures for adding alerts to an alert group are provided in the following sections.

12.14.1 Selecting an Existing Alert to Add to the Alert Group

To select from existing alerts to add to an alert group:

1. In the **Alerts** tab of the **Group Details** page, click **Add Member**.
2. In the **Add Member** page, select **Search and select from the existing elements**.
3. Specify the criteria for the specific alert or a list of alerts you are interested in and click **Search**.

Table 12–12 Searching for Alerts

Search Criteria	Description
Alert Message	Message to notify administrators
Level	High, Information, Low, Medium
Type	CSR, Fraud, Information, Investigation

4. In the **Search Results** table, select the alerts you want to include in the alert group.
5. Click **Add** to add the alerts to the group or **Cancel** to disregard the changes.

   If you click **Add**, the alerts are added.

   A confirmation dialog is displayed.
6. Click **OK** to dismiss the dialog.

   The **Group Details** page is displayed with the added alerts.

When an existing alert is added to another group, a copy of the alert is added with a different unique Alert ID. If you were to change the message in one of the alerts, the change does not propagate to the other alerts.

12.14.2 Creating a New Alert to Add to the Alert Group

To create a new alert to add to the alert group:

1. In the **Alerts** tab of the **Group Details** page, click **Add Member**.
2. In the **Add Member** page, select **Create new element**.

Table 12–13 Create Parameters for Alerts

Group	Create Parameters
Alerts	Alert Type
	Alert Level
	Alert Message

3. Select the alert type.

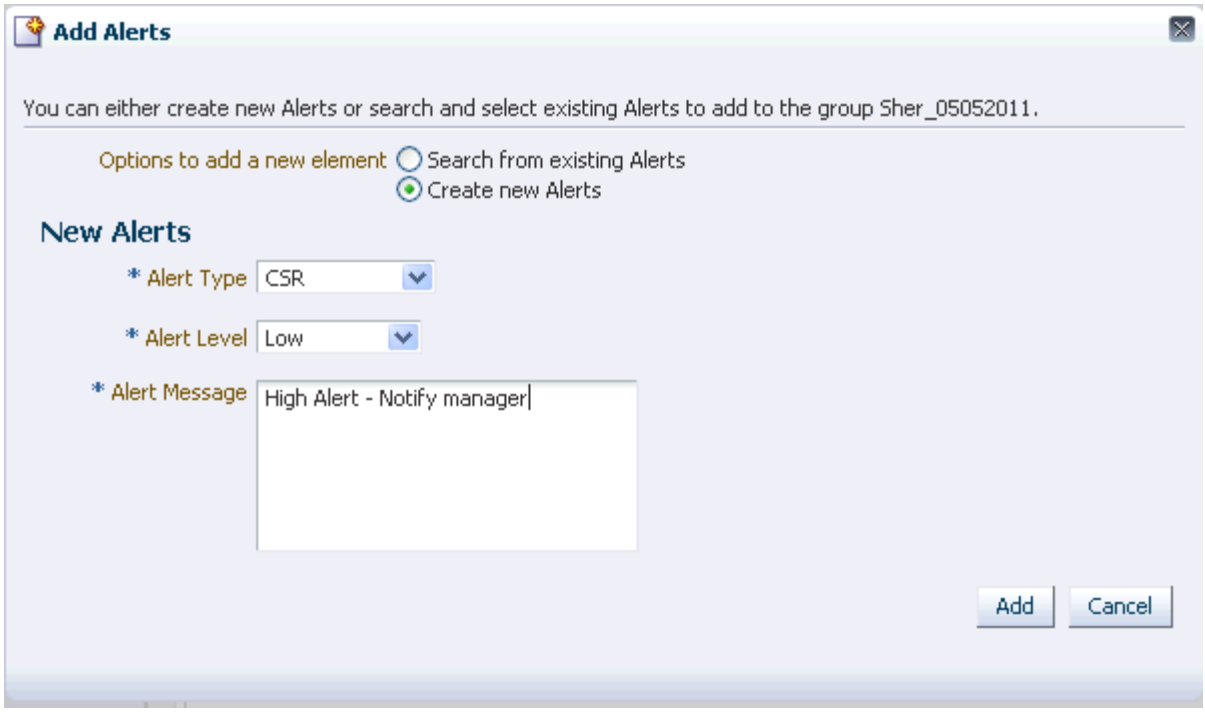
   The alert types you can select from are **Fraud**, **Customer Care**, **Information**, **Investigation**.
4. Select the alert level.

   The alert levels to select from are **Low**, **Medium**, **High**, and **Information**.

5. Type in the alert message in the **Alert Message** box.

   For example: a "High Fraud" alert may require that you notify a manager (and the customized message has the manager's phone number), whereas an "Info" Information alert may have no message at all.

Figure 12–6 Create an alert



6. Click **Add** to create and add the new alert to the alert group or **Cancel** to disregard the changes.

   If you click **Add**, the alert is added.

7. When the confirmation dialog appears, click **OK** to dismiss the dialog.

12.15 Searching for and Adding Existing Elements

For the following groups listed you can only search and add existing elements to the group. You do not have the option to create a new element.

- Authentication Status
- Connection Type
- Connection Speed
- Routing Type
- Transaction Status
- Actions

To create or edit elements, you must use the Properties Editor.

When you search for members, the ones that are already part of your group are not available in your search results.

Because the procedure for the action group is different from the other groups listed earlier, a separate section is provided for actions.

12.15.1 Selecting an Element to Add as a Member to the Group

To add an existing element as a member of the group, follow these steps:

1. In the **Group Details** page, click **Add Member**.

   The **Add Member** page is displayed.
2. In the **Add Member** page, select **Search and select from the existing elements**.
3. Specify the filter criteria to find an element or list of elements and click **Search**.
4. Select each element you want to include in the group.
5. Click **Add** to add the element as a member of the group or **Cancel** to disregard the changes.

   If the element is added successfully, a confirmation is displayed.
6. Click **OK** to dismiss the dialog.

12.15.2 Adding Actions to an Action Group

Follow these steps for adding actions to an action group:

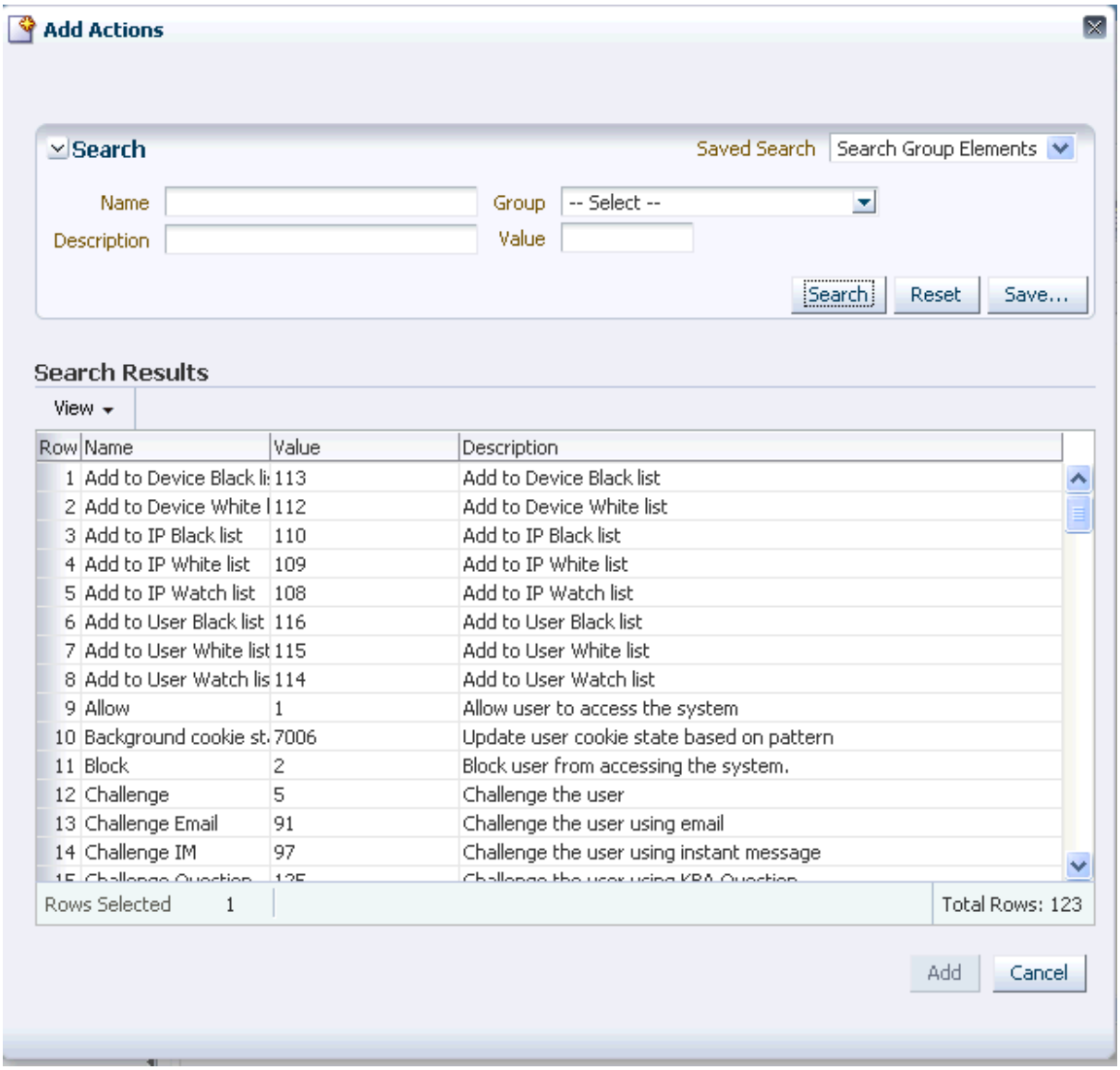
12.15.2.1 Selecting an Existing Action to Add to an Action Group

To search and select an action from existing actions:

1. In the **Actions** tab of the **Group Details** page, click **Add Member**.
2. In the **Add Member** page, select **Search and select from the existing elements**.
3. Search for a specific action or a list of actions by using the Search filter and clicking **Search**.

   The list of actions includes actions, such as **Allow**, **Block**, **Challenge**, and others.

Figure 12–7 Search for an Action



4. Select the row for each action you want to include in the group and click **Add**.
5. When the confirmation dialog is displayed, click **OK**.

   The actions are added to the **Action Group** and the **Group Details** page displays the new action.

12.15.2.2 Creating a New Action to Add to an Action Group

You can only search and add existing actions to the Action group. To create or edit actions, you must use the Properties Editor.

The actions that you create are only intended to be used as trigger actions for configurable actions. These actions do not have any effect on applications directly.

12.16 Editing a Member of a Group

To edit a member of a group, follow these steps:

For a list of the groups in which members can be edited, see Table 12–14, " Editing a Member of a Group".

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. Specify criteria in the Search filter to locate the group that contains the member you want to edit.
3. Click **Search**.
4. In the list of groups, click the name of the group that contains the member.
5. In the **Members** tab, select the member and click the **Edit** button.
6. In the **Edit Element** screen, make the appropriate modifications.
7. Click **Apply** to save the changes or **Revert** to discard them.

Table 12–14 Editing a Member of a Group

Group	Edit
Actions	No
Authentication Status	No
Connection type	No
Connection speed	No
Routing Type	No
Transaction Status	No
Alerts	Yes
Generic Integers, Generic Strings, Generic Long	Yes
ASN	Yes
IP Carriers	Yes
Top-level Domains	Yes
Second-level Domains	Yes
Cities	No
Countries	No
States	No
ISPs	Yes
Device ID	Yes
IPs	Yes
IP Ranges	Yes
Login Ids	Yes
UserId groups	Yes

12.17 Removing Members of a Group

To remove members of a group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."

2. Specify criteria in the Search filter to locate the group with the members you want to delete.
3. Click **Search**.
4. In the **Results** table, select the group you want to remove members from.

   The **Group Details** page is displayed.
5. In the **Members** tab, select members of the group you want to remove and click **Delete**.

   A confirmation appears, asking if you want to delete the member from the group.
6. Click **Yes**.

   A dialog appears with the message that the selected member is deleted successfully.
7. Click **OK** to dismiss the dialog.

12.18 Removing a User from a User Group

To remove a user from a user group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. Specify criteria to locate the group you want to remove the user from.
3. Click **Search**.
4. In the **Results** table, click the name of the user group.
5. In the **Group Details** page, click the **User ID** tab.
6. Select the row with the user ID of the user you want to remove and click **Delete**.

   A dialog appears with the message, "Are you sure you want to delete the member from the group?"
7. Click **Yes** to confirm.

   A confirmation dialog appears with the message, "Selected members are deleted successfully."
8. Click **OK** to dismiss the dialog.

12.19 Exporting and Importing a Group

You can use the Export and Import Groups commands to export and import a group as a ZIP file.

12.19.1 Exporting a Group

To export a group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. Specify criteria in the Search filter to locate the group.
3. Select all the rows corresponding to the groups you want to export.
4. Select **Export Selected** from the **Actions** menu.

5. When the export dialog appears, select **Save File**, and then **OK**.

   The file is exported and saved as a ZIP file.

12.19.2 Importing a Group

To import a group:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. In the **Groups Search** page, click the **Import Group** button. The **Import Groups** screen appears.
3. In the **Import Groups** dialog box, type the path and name of the file; or use the **Browse** (...) button to locate the ZIP file that contains the groups, and then select the file.
4. Click **Open** and then click **OK**.

   An **Imported List** dialog appears with the list of groups that have been imported along with the general details.
5. Click **OK**.

   If the file contains groups with the same names as the existing groups, the groups are updated/overwritten. If the file contains groups with names that do not exist, the groups are added to the system.

   If you are importing a delete script, the groups are deleted from the system.

   If you try to import groups in an invalid format, an error is displayed.

12.20 Deleting Groups

To delete groups:

1. Open the **Groups Search** page, as described in Section 12.5, "Navigating to the Groups Search Page."
2. In the **Groups Search** page, search for a specific group or a list of groups you are interested in by using the specific criteria in the Search filter and clicking **Search**.
3. Select the rows corresponding to each group you want to delete and click **Delete**.

   If the groups selected for deletion are not used or linked to a policy, a confirmation dialog is shown asking for a confirmation. If you answer "yes," those groups are deleted.

   When multiple groups are selected for deletion and if some of the groups are used or linked to other systems, a message appears, telling you which ones can be deleted and which ones are in use or linked and cannot be deleted. Links to a usage tree are available for each of the used/linked groups. In the dialog, you are also given the option to delete the ones that are not in use.

   A confirmation is displayed, asking if you are sure you want to delete the group.
4. Click **Yes** to delete the groups.

   A dialog is displayed with the message that selected groups are deleted successfully.
5. Click **OK** to dismiss the dialog.

12.21 Updating a Group Directly

You can update a group directly in the XML file. For example, you can perform a bulk update to a blacklisted IP group based on a monthly list of high risk IPs gained from a 3rd party service.

To update a group directly:

1. Export the group you want to update.

   For information, see Section 12.19.1, "Exporting a Group."

2. Open the XML and make the edits you want.
3. Import the group to either overwrite or append to the previous version.

   For information, see Section 12.19.2, "Importing a Group."

12.22 Use Cases

This section describes example use cases for groups.

12.22.1 Use Case: Migration of Groups

Chuck is an Administrator migrating a 10.1.4.5 deployment to 11*g* R1+. He must import his existing groups into the upgraded environment. All group types must be tested for proper migration between 10.1.4.5 and 11*g* R1+.

1. Open **Group** in the Navigation tree.
2. Click **Import Group** in **Groups Search** page.
3. Import ZIP file of exported groups.
   a. Browse for ZIP file containing groups.
   b. Click **OK**.
4. Import Groups confirmation screen appears with information about the groups imported (Group Name, Group Type, Cache Type, and Notes). Click **OK**.

12.22.2 Use Case: Create Alert Group and Add Members

You created a velocity rule but it needs an alert group assigned to it so investigators can easily see that a rule was triggered and why. Directions: Create a new alert group named "High velocity user." Craft a message about the velocity rule that would be useful to an investigator such as this "User appears to have traveled faster than 500 MPH since last login."

To create an alert group and add members:

1. Log in to the OAAM Administration Console as a security administrator.
2. In the Navigation tree, double-click **Groups**. The **Groups Search** page is displayed.
3. In the **Groups Search** page, search for an existing alert group you can reuse.
   a. Search for a group with **Alerts** as the **Group Type** and "velocity" as part of the **Group Name**.
   b. Select the group from the **Search Results** table.
   c. From the **Group Details** page, click the **Alerts** tab.

Alerts in the alerts group appear.

d. Check to see whether any alerts suit your needs.

e. Repeat Steps b, c, and d.

The alert groups do not contain the message that applies to your use case, so you decide to create a new one.

4. Create an **Alerts** group.

a. Click the **New Group** to create a new alert group. The **New Group** screen is displayed.

b. In the **Group Name** field, enter **High velocity user**.

c. From the **Group Type** list, select **Alerts**.

d. From the **Cache Policy** list, select the cache policy as "Full Cache."

e. Enter a description in the **Description** field.

f. Click **OK**. A confirmation message appears.

g. Click **OK** to dismiss the confirmation dialog.

The new High velocity user group is created successfully and the Group Details page is displayed.

5. Add an alert with messaging about a user with non-plausible velocity.

a. Click the **Alerts** tab to add alerts to the group.

b. In the **Alerts** tab, click the **Add Member** button.

c. In the **Add Member** page, select **Create new element**.

d. For **Alert Type**, select **CSR**.

e. For **Alert Level**, select **Medium**.

f. For **Alert Message**, enter "User appears to have traveled faster than 500 MPH since last login."

g. Click **Add** to add the alert to the group.

A confirmation dialog appears with the message, "The new element created successfully."

h. Click **OK** to dismiss the dialog.

The High velocity user group appears in the **Search Results** table of the Groups Search page.

An alternative scenario for this adding the alert is to search for the message, "User appears to have traveled faster than 500 MPH since last login" and add that to the group.

12.22.3 Use Case: Remove User from Group

The restricted users group is intended for users who have had high risk activity. This practice helps protect the company and the users. The security team reviews the users in this group on a quarterly basis or when a customer issue is being looked at. Directions: Part A: Do a session search filtered to show only Phillip's activity for the last six months. Add Phillip to the restricted users group. Part B: Oops you made a mistake, please remove Phillip from the restricted users group since security team practices recommend this.

1. Log in to the OAAM Administration Console as an investigator.
2. In the Navigation tree, double-click **Sessions**. The **Sessions Search** page is displayed.
3. In the **Sessions Search** page, perform a search using the following criteria.
   a. In the **Login Time** fields, enter start and end dates for the last six months.
   b. In **User Name** field, enter Phillip's user name.
   c. In the **Alert Level**, select **High**.

   There are no other high severity security alerts.
4. Copy Phillip's User ID from the search result's **User ID** column.
5. In the Navigation tree, double-click **Groups**.
6. In the **Groups Search** page, search for the **Restricted User** group.
7. In the **Results** table, click the group name, **Restricted User**.
8. In the **Group Details** page, click the **User ID** tab.
9. Click **Add**.
10. In the **Add Member** screen, select **Create new element**.
11. For **User ID**, enter Phillip's User ID and click **Add**.

    A confirmation dialog appears with the message, "The new element created successfully."
12. Click **OK** to dismiss the dialog.

    You learn that you made a mistake and must remove Phillip from the restricted users group since security team recommended this.
13. In the Navigation tree, double-click **Groups**.
14. In the **Groups Search** page, search for the **Restricted User** group.
15. In the **Results** table, click the group name, **Restricted User**.
16. In the **Group Details** page, click the **User ID** tab.
17. Select the row with Phillip's User ID and click **Delete**.

    A dialog appears with the message, "Are you sure you want to delete the member from the group?"
18. Click **Yes** to confirm.

    A confirmation dialog appears with the message, "Selected members are deleted successfully."
19. Click **OK** to dismiss the dialog.

12.22.4 Use Case: Block Users from a Black-listed Country

To block a user if the IP is in a given country group:

1. Open the **Policies Search** page.
2. Enter the search criteria you want and click **Search**.
3. In the **Results** table, click the name of the policy you want to edit.

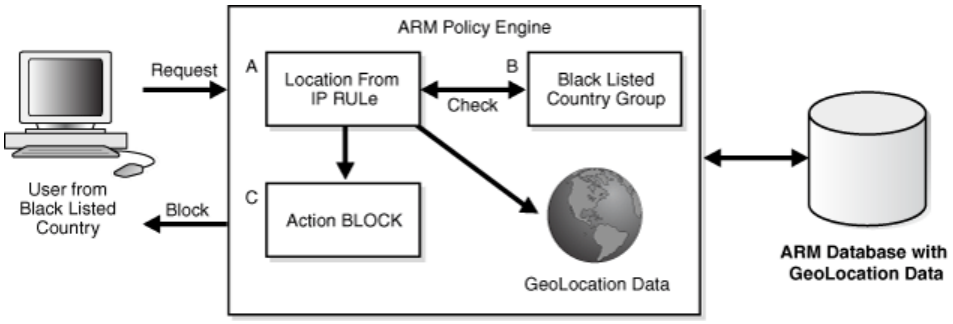
   The **Policy Details** page appears.

4. In the **Policy Details** page, click the **Rules** tab.
5. In the **Rules** tab, click **Add**.
6. In the **New Rule** page, enter the rule name as **Location: From IP**.
7. Click the **Conditions** tab.
8. In the **Conditions** page, click **Add**.

   The **Add Conditions** page is displayed where you can search for and select the **Location: In Country Group** condition and add it to the rule.
9. Click **OK**.

   The parameters for the condition are displayed in the bottom panel.
10. In the parameters area, for **Country in country group**, select the **Blacklisted Country** group.
11. Click **Save**.
12. In the **Results** tab, select **Block** as the action group.
13. Click **Apply**.

Figure 12–8 Black-Listed Countries



12.22.5 Use Case: Company Wants to Block Users

An example of how groups work in policies and rules is described in this section.

In this example, Company A observes a significant increase in high-risk alerts from a collection of countries where customers do not normally log in from. Company A wants to block users in those countries.

The steps to create a policy that blocks user of high-risk countries are summarized in the following subsections. Three groups are created for this policy.

12.22.5.1 Create Country Blacklist Policy (1): Create Fraudulent Country Policy and Rule

You must first create a Fraudulent Country policy with the following attributes:

Table 12–15 Fraudulent Country Policy

Attribute	Value
Name	BlackListCountry
Checkpoint	Post-Authentication (executed after the user enters the password)
Status	Active
Scoring Engine	Maximum
Weights	100
Rule and Condition	Rule contains "Condition: Location: In Country group - True"

12.22.5.2 Create Country Blacklist Policy (2): Create Country Group

A group type, "countries" contains the names of countries that have committed fraud.

Next, create a country group with the following attributes and then edit the group to add members.

Table 12–16 Country Group

Attribute	Value
Group Name	Country_Blacklist
Group Type	Countries
Cache Policy	Full Cache
Description	OAAM Country Blacklist Group

12.22.5.3 Create Country Blacklist Policy (3): Create Fraud High Alert Group

Alerts are indicators to fraud analysts. This alert group is used when a user from a blocked country logs in, the rule triggers and outputs a high alert. The group contains the alerts to trigger.

Create a Fraud High Alert group with the following attributes:

Table 12–17 Fraud High Alert Group

Attribute	Value
Group Name	Loc_Blacklist
Group Type	Alerts
Cache Policy	Full Cache
Description	OAAM Location Blacklist Group

Then, edit the group by setting:

- Alert Level to ALERT_HIGH
- Alert Type to Fraud
- Alert Message to LOC_BLACK LIST COUNTRY

12.22.5.4 Create Country Blacklist Security Policy (4 of 5): Create Block Action Group

The result of a rule is an action that is executed as what should take place if the user logs in from blocked country and in this case you block him indicating the client

application to redirect the user to a page with an appropriate message, "You Have Been Blocked."

Create a Block Action group with the following attributes:

Table 12–18 Block Group

Attribute	Value
Group Name	Block
Group Type	Actions
Cache Policy	Full Cache
Description	Blacklist Action Group

Edit group by selecting Block from Available Actions.

12.22.5.5 Create Country Blacklist Security Policy (5 of 5): Attach Groups to Fraudulent Country Rule

Attach the Blacklisted country group to the rule so that when the rule triggers all users logging in from the countries in this list are blocked.

1. In the OAAM Administration Console, query for **BlackListCountry** policy.
2. Add **LocCountry_Rule** that has **Location: In Country group** condition.
3. Define policy so that:
   - Is in group: **True**
   - Country in Country Group: **Country_blacklist**
   - Score: **1000**
   - Weight: **100**
   - Action Group: **Block**
   - Alert Group: **Loc_Blacklist**
4. **Group Link** - Set Group type to **User ID**
5. From **Group** select a group.

12.22.6 Use Case: Block Users from Certain Countries

If the policy is to block users from countries that have been identified for suspicious activities, you could create Block Country, Fraud High Alert, and Block Action groups.

- **Block Country group** - Country names are populated in a group type "countries" that have been identified for fraud
- **Fraud High Alert group** - This group contains the alerts to trigger to indicate to analysts that a fraud scenario has occurred. This group is used when a user from a blocked country logs in and the rule triggers and outputs a high alert.
- **Block Action group** - The result of a rule is an action that is executed--what should take place--if the user logs in from a blocked country. In this case you block him and indicate to the client application to redirect the user to a page with an appropriate message "You Have Been Blocked."

12.22.7 Use Case: Allow Only Users from Certain IP Addresses

If the policy is to allow only users from IP Addresses that have been whitelisted as safe zones, you could create IP and Investigation Medium Alert groups:

- **IP group** - IP addresses are populated in a group type "IPs" that have been whitelisted as safe zones by an institution. Allow only users from IP Addresses that have been whitelisted as safe zones.
- **Investigation Medium Alert group** - Alerts are indicators to fraud analysts. Users who log in from IP addresses that are not in the white list group generate a medium alert. Alert type to Investigation.

12.22.8 Use Case: Check Users from Certain Devices

If the policy is to check users from devices reported for fraudulent activities, you could create Device and Information Alert groups:

- **Device group** - Devices that have been identified as suspicious are populated in a group type "devices." The devices are basically IDs that are generated based on many attributes such as browser, characteristics, flash, cookie, and so on.
- **Information Alert group** - Alerts are indicators to fraud Analysts. When a user from a device that is identified as fraudulent active [registered in the device group] logs in the rule triggers and outputs an information type alert.

12.22.9 Use Case: Monitor Certain Users

If the policy is to monitor users who have been reported for fraudulent activities, you could create User ID and Customer Care Alert groups:

- **User ID group** - Users who have been identified for fraud activity are populated in a group of type "User ID."
- **Customer Care Alert group** - Alerts are indicators to fraud Analysts as well as for Customer care representatives. When a suspicious user logs in the rule triggers and outputs a customer care alert.

12.23 Best Practices

This section outlines some best practices for using groups.

- Do not set the Cache Policy to "Full Cache" if you are using the group only for reports or for a group that is only collecting members and not used in any evaluation. For example, you should not cache a group if you have a long list of elements since groups are re-cached if there are any changes to the group.
- Ensure that the caching is set to "Full Cache" for action and alert groups.

13

Managing the Policy Set

This chapter explains the management and use of the policy set in Oracle Adaptive Access Manager.

This chapter contains these topics:

13.1 Introduction and Concepts

This section introduces you to the concept of policy set and how it is used in Oracle Adaptive Access Manager. It includes the following sections:

13.1.1 Policy Set

The policy set is a level of evaluation logic above the individual policies. The policy set logic is a collection of functionality that executes after all the policies have executed for a checkpoint. This functionality includes the calculation of the final risk score and any overrides.

The policy set can be used to create action or score based overrides. The overrides allow an administrator to account for special circumstances where the actions or score generated by the policies may have an undesired effect. For example, to prevent a call center from being swamped by calls if a rule is configured too conservatively, an administrator can create an action override to convert a "Block" action if there are an extremely high number of blocks in a short period of time.

The policy set has a few key features:

- The scoring engine used to combine the scores generated by the individual policies into the final risk score is configured here.

- It can be used to create an action or a score override.

Example: Policy Set Scoring Engine

Jeff is a Security Administrator who wants the final risk score at each checkpoint to be based on the highest individual policy risk score. To meet this requirement he selects **Maximum** as the scoring engine at the Policy Set level.

1. Log in to the OAAM Administration Console as an administrator.
2. Double-click the **Policy Set** node. The **Policy Set** page is displayed.
3. Click the **Summary** tab.
4. Select **Maximum** from the **Scoring Engine** list.

   The **Maximum Scoring Engine** takes the highest policy score and uses it as the checkpoint score. This scoring engine ignores the policy weights.
5. Click **Apply**.

   A confirmation dialog appears with the message, "Policy Set details updated successfully."
6. Click **OK**.

13.1.2 Action and Score Overrides

Action and score overrides can be used to change the outcomes of a checkpoint.

When you create an Action Override, you specify an action to replace the action triggered by individual rule. For example, an action override, which is based on "time" and "action," can be used to limit the number of blocks or to control the number of registrations with a specified time frame.

When you create a Score Override, you specify an action group, or an alert group, or both to be triggered when the final risk score for a checkpoint falls within the specified range. For example, if you set the score range to 500 - 1000 and specify an alert group, the alerts are generated if the checkpoint risk score falls between 500 and 1000.

13.1.3 Before You Begin

Oracle Adaptive Access Manager is shipped with action overrides disabled (default). If you want this feature enabled, set the following property to "true."

```
vcrypt.tracker.rules.allowControlledActions
```

13.2 Navigating to the Policy Set Details Page

Only one policy set is available.

To access the **Policy Set Details** page:

1. Expand the Navigation tree.
2. From the Navigation tree, select **Policy Set**.

Policy Set Details is displayed.

Alternatively, you can open the **Policy Set Details** page by:

- Right-clicking **Policy Set** in the Navigation tree and selecting **Open Policy Set** from the context menu.
- Selecting **Policy Set** in the Navigation tree and then choosing **Open Policy Set** from the **Actions** menu.
- Clicking the **Open Policy Set** button in the Navigation tree toolbar.

13.3 Viewing Policy Set Details

The **Policy Set Details** page enables you to view and edit the details of a policy set.

It provides the following four tabs:

- **Summary** - Shows general details of the policy set and enables you to edit the details and select a scoring engine.
- **Score Overrides** - Enables you to set a score override
- **Action Overrides** - Enables you to set an action override

13.4 Adding or Editing a Score Override

To add or edit a score override:

1. Open the **Policy Set Details** page.
2. Click the **Score Overrides** tab.

   A list of existing score override appears.
3. To add a score override, click **Add**.

   To edit a score override, select the override and click **Edit**.

   The **Add Score Override** or **Edit Score Override** dialog appears.
4. Select the checkpoint you want this override to be applied to.
5. Enter the minimum and maximum scores.

   The override triggers if the score falls between the minimum and maximum scores.
6. Select the action that you want triggered in an override.
7. Select the alert to which you want triggered in an override.
8. Click **Apply**.

13.5 Adding or Editing an Action Override

To add or edit an action override:

> **Note:** If a user/device/IP is already presented with the action in the given duration, it continues with the same action and override is not supplied.

1. Open the **Policy Set Details** page.
2. Click in the **Action Overrides** tab.

   A list of existing action overrides appears.

3. To add an action override, click **Add**.

   To edit an action override, select the override and click **Edit**.

   The **Add Action Override** or **Edit Action Override** dialog appears.

4. Select the checkpoint you want this override to be applied to.

5. In the **From Action** field, select the action that you want replaced.

   For example, you might select **Block** so that you can convert the block to a challenge question.

   Specifying the **To Action** is optional. The **From Action** and **To Action** can be same.

6. In the **To Action** field, select the action you want to use for the replacement.

   For example, you might select **Challenge** to convert a block to a challenge.

7. From the **Alert Group** list, select the alert you want generated when this event occurs.

   Alerts are indicators (messages) to personnel (CSR, Investigators, and so on). An alert group contains graded messages that can be triggered by a rule.

   Alert groups are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

8. For **Duration**, enter the number of minutes within which you want the **To Action** to be triggered.

   For example, you might enter the number "30" so that if within 30 minutes there are more than 100 block, the system stops blocking people and starts challenging those people who would have been blocked.

9. For **Count**, enter the number of events generated by the From Action.

   For example, you might enter "100" to indicate more than ten blocks.

   The count of the actions are incremented only if the action is from a different user, IP, and device.

   The count is updated only when the user, IP, and device are *all* unique. For example, if these are not unique and if a device is blocked, the device continues to be block in the specified duration instead of being challenged.

10. Click **Apply**.

13.6 Editing a Policy Set

To edit a **policy set**:

1. Open the **Policy Set Details** page.

2. To edit the policy set's general information, make the changes you want in the **Summary** tab and then click **Apply**.

   You can change the **Policy Set**'s scoring engine and description.

   For information on Scoring Engines, see Section 10.2.8, "What is a Scoring Engine?" OAAM Admin uses the scoring engine to calculate the numeric score applied when calculating risk level.

   If the changes are successful, a confirmation that the policy set details have updated successfully appears.

3. To add or edit the score overrides, follow the instructions in Section 13.4, "Adding or Editing a Score Override."
4. To edit the action overrides, follow the instructions in Section 13.5, "Adding or Editing an Action Override."

13.7 Use Cases

This section describes example use cases for using policy set.

13.7.1 Use Case: Policy Set - Overrides

William is a Security Administrator and he must set the score and action overrides such that when the score is between 500 and 700 for Pre-Authentication, a special alert is triggered for immediate attention by the fraud investigators and the users are "blocked instead of being "challenged."

1. Edit Score Override

   When you create a Score Override, you specify an action group, or an alert group, or an action and an alert group you want to be triggered when a score falls within a specific range. For example, if you have set a minimum score of 500, you can specify an action or alert group that you want to be triggered when the score reaches 501.

   a. Checkpoint: **Pre-Authentication**
   b. Minimum score: **500**

      500 is the minimum score allowed before the score override is triggered.

   c. Maximum score: **700**

      700 is the maximum score allowed before the score override is triggered.

   d. Alert Group: **new alert**

      Alerts are indicators (messages) to personnel (CSR, Investigators, and so on). An alert group contains graded messages that can be triggered by a rule.

      Alert groups are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

   e. Action Group: **Block**

      Oracle Adaptive Access Manager does not allow the user to access the system if he is blocked.

2. Edit Action Override

   When you create an Action Override, you specify an action to replace the action triggered by individual rule. For example, an action override, which is based on "time" and "action," can be used to limit the number of blocks or to control the number of registrations with a specified time frame.

   a. Checkpoint: **Pre-Authentication**
   b. From Action: **Challenge**
   c. To Action: **Block**
   d. Alert Group: **new alert**

13.7.2 Policy Set - Overrides (Order of Evaluation)

William is a Security Administrator and he must set the score and action overrides such that when the score is between 500 and 700 for Pre-Authentication, a special alert is triggered for immediate attention by the fraud investigators and the users are "blocked instead of being "challenged." But there are about 10 training folks and they are given temp allows for the next 1 week. How do the action and score overrides affect these users?

1. Edit Score Override

   When you create a Score Override, you specify an action or alert group, or an action and an alert group you want to be triggered when a score falls within a specific range. For example, if you have set a minimum score of 500, you can specify an action or alert group that you want to be triggered when the score reaches 501.

   a. Checkpoint: **Pre-Authentication**

   b. Minimum score: **500**

      500 is the minimum score allowed before the score override is triggered.

   c. Maximum score: **700**

      700 is the maximum score allowed before the score override is triggered.

   d. Alert Group: **new alert**

      Alerts are indicators (messages) to personnel (CSR, Investigators, and so on). An alert group contains graded messages that can be triggered by a rule.

      Alert groups are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

   e. Action Group: **Block**

      Oracle Adaptive Access Manager does not allow the user to access the system if he is blocked.

2. Edit Action Override

   When you create an Action Override, you specify an action to replace the action triggered by individual rule. For example, an action override, which is based on "time" and "action," can be used to limit the number of blocks or to control the number of registrations with a specified time frame.

   a. Checkpoint: **Pre-Authentication**

   b. From Action: **Challenge**

   c. To Action: **Block**

   d. Alert Group: **new alert**

3. Create **Training Folks** group.

4. Select group in **Exclude group** of **Pre-conditions** of all **Challenge** rules.

13.8 Best Practices for the Policy Set

This section outlines some best practices for using policy sets.

- Before you import a policy set into a production system, you should be aware that you are about to replace the entire system configuration in the production system. Export the current policy set before the actual import since you do not want to lose

the current configuration. If the import fails or if there are any other issues that you did not anticipate. After you have imported the policy set, there is no way for you to perform an undo. When you have a backup available, you can import that configuration into your system immediately if the import fails.

- Only when an export is successful, should you import the policy set from the offline system into the online system.
- When the configurable actions are exported with a policy set. You should copy the Java classes to the specified directory after the import so that the configurable actions are not broken when they are imported back into a system.

14

Managing System Snapshots

This chapter describes the Universal Risk Snapshot feature, which is new in Oracle Adaptive Access Manager 11*g*.

14.1 Concepts

This section introduces you to the concept of snapshots and how they are used in Oracle Adaptive Access Manager.

Using Universal Risk Snap shot, system snapshots can be created allowing security administrators to simply and easily migrate security data across environments or restore security configuration to a known state.

14.1.1 Snapshots

A snapshot is a backup of the current system configuration. In the event of an error on the original system, you can restore the system to a pre-defined point.

Universal Risk Snapshot enables System Administrators to store and manage a system image. They can:

- Back up the system configuration for safety, security, or versioning purposes
- Replicate the system configuration for use with other servers--for example, from test to production environment, for production troubleshooting, and others.
- Restore the system configuration from a pre-defined point

Universal Risk Snapshot only handle configuration data (metadata). It does not handle runtime data, such as sessions, transaction data, cases, rule logs, action logs, and others.

14.1.2 Snapshot Storage

When the snapshot is created, the OAAM Server metadata is copied from the database.

A snapshot can be restored from a file or from the database depending on where it was stored.

14.1.3 Snapshot Metadata

For snapshots, the metadata is stored with the following items:

Artifact	Comments	Additional clarifications
Policy Sets	Policy Set overrides	
Policies	All Policies	Trigger combinations are included
Rule Instances	All rule instances	
Conditions	All rule conditions	
Groups	Group Definitions for all groups whether linked or not	Group Members for alerts and actions only will be exported
Patterns	All patterns	
Transaction Definitions	All transaction definitions	
Entities	All entities whether linked or not	
Properties	Only the ones in the database	
Enums	Only the ones in the database	
Configurable Actions		
Challenge Questions	Includes validations, categories, and configurations (Answer Logic and others)	

14.1.4 Backup

A backup saves all the existing configurations (both active and inactive items) including all group definitions. Only Action and Alert group members are included in the backup. Other group members can be exported using the group user interface if needed.

You can choose to create a backup snapshot in the database or to a local file system or both.

14.1.5 Restore

You can restore the new system configuration from a file or database.

Restore replaces the current system configuration with the restored configuration and also deletes and disables the additional configurations in the existing system.

> **Note:** The exception is when a group definition is imported into the system. The restore does not delete the additional group members that are already available.

- When you create a snapshot, all the configurations for functional areas are selected, both active and disabled. For example, if you have ten policies within your policy set, and five of them are active and five of them are disabled, all policies, their configuration, and their status information are included when the snapshot is created.
- Snapshots do not include the members of any groups with the exception of actions and alerts. However the groups themselves are included in the snapshot. To back up group members, the export groups function must be used separate from snapshot. These group members must be imported using the **Group** user interface if needed

- Though configurable action definitions are included on restore, you must ensure that the necessary java classes are manually copied into the required folders.
- The status of the items are preserved on backup and restore. For example. disabled items should remain disabled on backup and restore.
- You cannot selectively select individual items to include in a snapshot or perform selective restoration. If you only want to include certain configurations in your snapshot, you can export them from their module (separate user interfaces), and import them back and then create the snapshot.

14.1.6 How Restore Works

The metadata existing in the system is deactivated. Data cannot be deleted (policies or patterns) because it would violate database constraints. Therefore, all the active artifacts are set to an "inactive" or a "deleted" state as appropriate.

Afterward, the artifacts being imported are inserted into the current database.

During this insert process, if there are artifacts in the old system and also in the incoming snapshot, the artifacts are re-stored as they appear in the incoming snapshot.

Groups in the incoming snapshot do not contain members. If the same group exists (by name) in the existing system, after the system restore, the restored group contains members.

14.2 Navigating to the System Snapshot Search Page

To go to the System Snapshot Search page, perform the following steps:

1. Log in to the OAAM Administration Console as a user with the environment administrator role assigned.
2. In the Navigation tree, select **System Snapshots** under **Environment**.

   Alternative methods to open search pages are listed in Section 3.10, "Search, Create, and Import."

   In the **System Snapshot Search** page, you can perform the following tasks:

   - Search for a snapshot
   - Restore a snapshot from the database
   - Restore a snapshot from a file
   - Back up the current system to a file or database
   - Delete selected snapshots from the database

14.3 Searching for a Snapshot

In the System Snapshots Search page, you search for a snapshot by specifying criteria in the Search filter.

When the System Snapshot Search page first appears, the Search Results table shows a list of snapshots in the Oracle Adaptive Access Manager environment.

To search for snapshots:

1. In the Navigation tree, open **System Snapshots** under **Environment**.

   The **System Snapshots Search** page is displayed.

2. Specify criteria in the Search Filter to locate the snapshot and click **Search**.
   - Searches are not case sensitive
   - Searches can return results if you enter part of the name in the search.
   - Searches trim the spaces entered.

   Clicking **Reset** instead of **Search** will reset the search criteria.

   The search result is shown based on the entered search criteria.

Table 14–1 System Search Filter Criteria

Filter and fields	Description
Snapshot Name	Name of the snapshot. For a snapshot from a database, it is the name provided by the user; for file based backups, it is the file name. The snapshot with the specified name is displayed in the Results Table.
Notes	Notes describing why the snapshot was created. All backup names with the specified Notes keyword is displayed in the Results Table.
Backup date	Date at which the backup was taken. To locates a backup taken within a given create date range, enter the start and end dates you want for the range. All backup names that were backed up during the specified date range is displayed.

14.4 Importing a Snapshot

To import a snapshot for use in the system, follow the instructions in Section 14.7.2, "Loading and Restoring a Snapshot."

1. Open **System Snapshot** under **Environment** in the Navigation tree.

   The **System Snapshots Search** page is displayed.

2. Click the **Load from File** button.

   A Load and Restore Snapshot dialog appears. You are given the opportunity to back up your current system since importing a snapshot will overwrite what you have in the current system.

3. If you want to keep a backup of your current system, select the **Back up the current system now** box, enter the name and notes for the backup, and click **Continue**.

   When the Load and Restore Snapshot dialog appears with a message that the current system has been successfully stored in the database, click **OK**.

   Then, the Load and Restore Snapshot page appears for you to choose a snapshot to load into the server so you can run the basic authentication flows.

4. If you are sure you do not want to back up your current configuration or you are importing the snapshot into an empty system, you can leave the dialog blank and click **Continue**.

   Since you did not choose to back up your system, you are given a warning that you are loading a new snapshot and the details of the metadata may be overwritten. If you decide to take a backup, you can click the **Back** button to take you to the previous page where you can provide details for a backup. If you want to proceed with the import, click **Continue**.

The Load and Restore Snapshot page appears for you to choose a snapshot to load into the server so you can run the basic authentication flows.

5. Now that you are ready to load the snapshot, click the **Browse** button on the dialog in which you can enter the filename of the snapshot you want to load. A screen appears for you to navigate to the directory where the snapshot file is located. Click **Open**. Then, click the **Load** button to load the snapshot into the system.

   If you are loading the snapshot out of the box for the first time, the snapshot file, `oaam_base_snapshot.zip` is located in the `Oracle_IDM1/oaam/init` directory where the OAAM base content is shipped.

6. Click **OK**.

   Once the snapshot has been loaded, a summary of the snapshot is displayed.

   The Preview tab is available, in which you are given the option to do the following:

   - View the conditions, rules, policies, and so on, in the snapshot.
   - View the actions that are taken on the objects. For example, if you are loading a snapshot with configurable actions and you do not have configurable actions in the system, the system will disable the configurable actions.
   - Filter the objects to see only the updates, or only the changes, or only the additions, and so on.

     In general, you want to see all that changes in your system when you load the snapshot because it has the potential to invalidate all the content in your system or overwrite your existing metadata.

   The Update button is available so that you can update or change to another snapshot to view what the changes would be as compared to existing system snapshot.

   So far, you have loaded the snapshot into the system and viewed the changes as compared to the existing metadata. The items in the snapshot are not effective yet. Unless you click the **Restore** button, the items in the snapshot have not been applied.

7. To apply the snapshot, click **Restore**.

   Once you have applied the snapshot, make sure it appears in the System Snapshots page. Perform a search to view all snapshots that have been loaded into the database. You can click on any snapshot to view it and you can click **Restore** to apply changes. You can use this feature to back up your system periodically and it will be stored in memory of the database or a file or in both.

14.5 Viewing Details of a Snapshot

To view details for a snapshot:

1. In the Navigation tree, select **System Snapshots** under **Environment**.

   The **System Snapshots Search** page is displayed.

2. Specify criteria in the Search Filter to locate the snapshot and click **Search**.

   Clicking **Reset** instead of **Search** will reset the search criteria.

3. Click the snapshot name in the **Results** table, the **Snapshot Details** page for the specific snapshot is displayed.

The backup name, notes, system user, client IP, server IP, and server name for the backup is displayed in the **Summary** tab.

The **Snapshot Preview** tab displays the configuration details for the following

- Answer Hint
- Question Category
- Conditions
- Validations
- Questions
- Groups
- Policies
- Entity Definition
- Scheduler Task Group
- Pattern

14.6 Creating a Backup

To create a backup:

1. In the Navigation tree, open **System Snapshots** under **Environment**.

   The **System Snapshots Search** page is displayed.

2. Click the **Backup** button in the right upper corner of the page or **Back up** from the Actions menu.

   The **Backup Current System** page is displayed.From this page, you can choose an option and provide the necessary information.

   The current system can be backed up to the system database or to a file or to both.

3. Select **Backup** type.
   - Database
   - Database and File
   - File

14.6.1 Backing Up the Current System to the System Database

To back up the current system to the system database:

1. From the **Backup Current System** page, select **Database** for the **Backup Type**.
2. Enter a name for the backup.
3. Enter notes for the backup.
4. Click **Back Up**.

   A dialog appears with a message that the current system has been successfully stored in the database.

5. Click **OK**.

   The system snapshot is created in the database.

14.6.2 Backing Up the System Configuration in Database and File

To back up the current system in a database and file:

1. From the **Backup Current System** page, select **Database and File** for the **Backup Type**.
2. Enter a name for the backup.
3. Enter notes for the backup.
4. Enter a file name for the ZIP file.
5. Click **Back Up**.

   A dialog appears with a message that the current system has been successfully stored in the database.
6. Click **OK**.

   The system snapshot is created in the database and file.
7. Verify that the snapshot is saved in database and file

   Search by the snapshot name in the **System Snapshots Search** page.

   If backup is saved in the database, the snapshot name is listed in the results table.

14.6.3 Backing Up the Current System to a File

To back up the current system to a file:

1. From the **Backup Current System** page, select **File** for the **Backup Type**.
2. Enter a name for the backup.
3. Enter notes for the backup.
4. Enter a file name for the ZIP file.
5. Click **Back Up**.

   A dialog appears with a message that the current system has been successfully stored in the database.
6. Click **OK**.

   The system snapshot is created in the file.

14.7 Restoring a Snapshot

You can restore a system configuration from a snapshot of the same system or another system. You cannot choose to restore only a subset of the snapshot.

Restoring a snapshot replaces the system configuration completely.

If an error occurs during an operation, you can restore the system to a snapshot that predates the error.

14.7.1 Steps to Restore Selected Snapshot

To perform the restore operation:

1. Open **System Snapshot** under **Environment** in the Navigation tree.

   The **System Snapshots Search** page is displayed.

2. Click **Search** to populate the **Results** tab or search for the snapshot you want to use to restore the system.
3. Select a snapshot from the **Results** table.
4. Click **Restore** or select **Restore** from the **Actions** menu.

   A **Back Up Current Configuration** dialog appears, which offer you the option to back up the current system before replacing it. You can press **Back up**, **Skip**, or **Cancel**.
5. Enter a name for the backup.
6. Enter notes for the backup.
7. If you press **Back up** and the backup is successful, a message appears with a message that the current system was successfully stored in the database.
8. Click **Restore**.

   A summary displays a list of items being imported and the status of the operation.
9. Click **OK**.

An error message appears if the file was in the wrong format.

14.7.2 Loading and Restoring a Snapshot

To load a snapshot into the system database:

1. Open **System Snapshot** under **Environment** in the Navigation tree.

   The **System Snapshots Search** page is displayed.
2. Click the **Load from File** button.

   A Load and Restore Snapshot dialog appears for you to enter the name and notes for the current system configuration you are backing up in the database.
3. Enter the name and notes for the current system configuration and click **Continue**.

   The Load and Restore Snapshot dialog appears with a message that the current system has been successfully stored in the database.
4. Click **OK**.

   The Load and Restore Snapshot page appears for you to choose a snapshot to load.
5. Browse for a snapshot, and click the **Load** button to load the snapshot into the system database.

   If you press **Load**, the loaded snaphot is restored and becomes the current snapshot. If you select this option, you cannot preview the snapshot before restoring it.
6. Click **OK**.
7. Click **Restore**.

14.7.3 Snapshot Restore Considerations

Snapshot restore considerations are described in this section.

14.7.3.1 Snapshot in Live System (Single Server)

Snapshot ZIP files will have the server version from which it was taken. When re-storing if the version is determined to be in-compatible then the snapshot restore fails.

If the snapshot is restored in a system that is running, the effect is applicable in about 30 seconds when all the database artifacts are reloaded.

14.7.3.2 Snapshot Restore in Multi-Server System (Connected to the Same Database)

When the snapshot is restored in a system running with multiple servers connected to the same database, the snapshot is effective in approximately 20 seconds when servers reload their database artifacts.

All the servers are running on the same version of Oracle Adaptive Access Manager.

14.7.3.3 Snapshot Restore in Multi-Server Running Different Versions

The snapshot restore is checked by the server in which the restore was performed. If a server in a cluster is not compatible with the snapshot being restored, the server does not function since it is trying to read information from a database that it does not understand. The database schema might be compatible, but servers could differ in interpretation of features/ column value.

14.8 Deleting a Snapshot

To delete snapshots:

1. In the Navigation tree, select **System Snapshots** under **Environment**.
2. Click **Search** to view a list of snapshots in the system.
3. Select the snapshot to delete and click the **Delete** icon or **Delete Selected** from the Action menu.

   A Confirm Dialog appears with the message, "Are you sure you want to delete the selected Snapshot?"
4. Click **Delete**.

   A confirmation dialog appears with the message, "Selected Snapshots are deleted successfully."
5. Click **OK**.

14.9 Limitations of Snapshots

The following limitations apply to snapshots:

- Data that is not stored or restored is listed as:
  - Runtime data (examples: user-node logs, session and transaction logs, fingerprints, pattern collected data, generated alerts data, rule / policy logs data)
  - Geolocation data.
  - User action logs as related to server API logs
- The command-line utility is not available for this feature

14.10 Diagnostics

All the logs related to snapshot creation and restoration are contained in the server log.

14.11 Use Cases

This section describes example use cases for using snapshots.

14.11.1 System Snapshot Import/Export

Jeff a Security Administrator must migrate the policy changes and all dependent items from the test environment to the production environment.

1. Jeff goes into OAAM Admin in the test environment and exports the policy set
2. As part of the export process the policies, rules, conditions, linked patterns, linked groups (alert and action groups have members included by default. Other group types do not include member unless specified), enumerations used in policies, transactions and entities used in the policies and configurable actions used in the policies are all selected for export to a file.
3. On import into the production environment a warning message alerts Jeff to the files that will be overwritten.

14.11.2 Use Case: User Exports Policy Set as a Record for Research

A snapshot is a record of how the rules and policies were configured; it contains the session information.

1. The user creates a snapshot so that historical data can be viewed later and research conducted using an offline system.
2. A timestamp is put on the snapshot.
3. Later, the user restores the older snapshot to perform fraud analysis.
4. The user runs rules and policies to determine how the system acted at that time in the past.
5. The user has multiple snapshots saved from different points in time and re-uses them in an offline system for performing research.

14.11.3 Use Case: User Replaces Entire System

A snapshot is a copy of the system configuration and contains the configuration for policies, rules, groups, and other elements in the system.

1. The user makes modifications to the policy set in the production system.
2. The user realizes that the changes were not the ones wanted.
3. The user restores the snapshot, replacing the entire system all together.

14.11.4 Use Case: User Identifies Policy Set to Import

The user is working on several snapshots offline, testing the rules and ensuring that the policies work as expected. He has finished work on SnapshotID 1 and SnapshotID 3, and he is now working on another configuration. Out of all the snapshots he has worked on, he wants to restore SnapshotID 3. He identifies SnapshotID 3 by Snapshot ID and restores it in the production system.

14.12 Best Practices for Snapshots

This section outlines some best practices for using snapshots.

- Before you perform a restore in a production system, you should be aware that you are about to replace the entire system configuration in the production system. Create a snapshot of the current policy set before the actual restore since you do not want to lose the current configuration if the restore fails or if there are any other issues that you did not anticipate. After you have restored the snapshot, there is no way for you to perform an undo. When you have a backup available, you can restore that configuration into your system immediately if the restore fails.
- Only when a snapshot is successfully created, should you restore the snapshot from an offline system to the online system.
- When the configurable actions are included with a snapshot. You should copy the Java classes to the specified directory after the snapshot creation so that the configurable actions are not broken when they are brought back into a system.

Part V

Autolearning

This part of the book contains instructions to configure the Autolearning, Configurable Actions, and Predictive Analysis features in Oracle Adaptive Access Manager.

It contains the following chapters:

- Chapter 15, "Managing Autolearning"
- Chapter 16, "Managing Configurable Actions"
- Chapter 17, "Predictive Analysis"

15

Managing Autolearning

This chapter focuses configuring patterns to profile users, devices, and location to evaluate the risk of the current behavior. It contains the following sections:

15.1 Introduction and Concepts

Autolearning is a set of features in Oracle Adaptive Access Manager that is used to dynamically profile behavior in real-time. The behavior of entities such as users, devices, locations, credit cards, addresses, account numbers, and so on, are recorded and used to evaluate the risk of current behavior.

Autolearning patterns optimize the way OAAM captures and evaluates risk in two ways. First the patterns are capturing only the specific entity and data combinations defined which limits data growth by allowing the full session data to be purged while maintaining only the data required for risk analysis. Second, autolearning rules evaluate against the optimized patterns so the underlying queries are less expensive than standard rules from a performance perspective.

This section introduces you to the concepts of autolearning and how they are used.

15.1.1 Autolearning

The Autolearning feature tracks transactions and authentications being performed by different actors based on patterns you create. This process establishes what is normal or average behavior for an individual or a population.

15.1.2 Patterns

Patterns record the behavior of the users, device and locations accessing the system by creating a digest of the access data. The digest or profile information is then stored in a historical data table and used for calculating the current risk using rules.

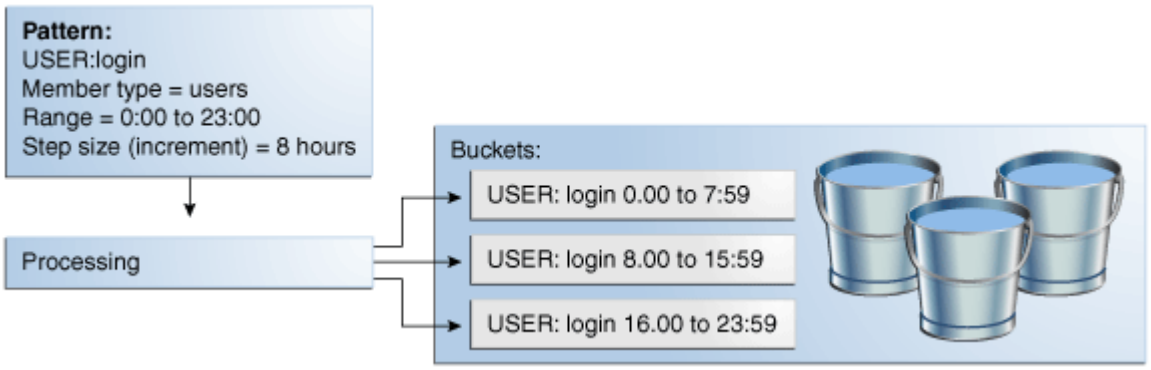
Patterns are defined by configuring the bucket creation method, member types, and attributes to be profiled. As well, rules must be configured to evaluate the profiling conducted by the patterns.

Patterns are used by Oracle Adaptive Access Manager to either define one bucket or dynamically create buckets. Oracle Adaptive Access Manager collects data and populates these buckets with members based on pattern parameters, and rules perform risk evaluations on dynamically changing membership and distributions of the buckets. Pattern evaluation and population occurs only when the result of the transaction is successful.

Bucket Creation and Population

Figure 15–1 shows a bucket creation and population example.

Figure 15–1 Login Times



If you want to track employee login times, you would:

- Set up a pattern where the member type is **User** and the attribute is **Time**.
- Choose multi-bucket as the creation method for the pattern. A multi-bucket pattern creates as many buckets as required to capture behaviors as opposed to a single-bucket pattern which only creates one to capture a specific behavior.
- Set start time as 0:00 and end time as 23:59, which are the hours of the day, and a increment step size of 8 hours.

During the processing of the transaction/login data, Oracle Adaptive Access Manager creates the buckets as required and populates them with counts for each member. Each bucket automatically keeps from overlapping with each other based on the other buckets already in the system. As shown in Figure 15–1, Oracle Adaptive Access Manager builds a maximum of 3 buckets with 8-hour periods in which logins have occurred.

For example, if Jeff logs in at 8:27, his counter in the 7:00 and 14:59 bucket is incremented by one. If no user has ever logged into this system between 7:00 and 14:59 then Oracle Adaptive Access Manager also creates that bucket as part of the processing. This 7:00 and 14:59 bucket then is used to record login time behavior for all users going forward.

After creation, the buckets are populated with the logins of users that have fallen within each 8-hour time range.

Oracle Adaptive Access Manager only records that Jeff has logged in at this time if he authenticates successfully. This validates that what is recorded is most likely Jeff's real behavior and not a fraudulent attempt. The memberships and associated statistics are saved in each user profile.

15.1.3 Member Types and Attributes

To profile behavior, members and attributes are defined.

Members and attributes act as a guide for Oracle Adaptive Access Manager to analyze data. A member is either an entity involved in an access request or transaction. Some example entities include user, IP address used for logging in, state, credit card used to make a purchase, destination account used in a funds transfer, and so on.

Attributes are the particular pieces of information associated with the activity being tracked. An example is the time of day for a login. Patterns collect data about members. If the member type is **User**, the pattern collects data about users.

In defining the Pattern you specify which data points you are interested in for the members.

For example, if Joe lives in San Francisco, logs into a protected application from home at 9:00 am on a Friday; **City**, **Time**, and **Day of Week** are attributes associated with the user, Joe. A pattern could be configured to capture all the city, time, and day of the week combinations Joe uses to log in. Or separate patterns could be created for time, city and day of the week to be evaluated together or independently. The configuration you choose is based on the business use cases.

If you are interested in profiling the cities that users log in from, the attribute to profile would be **City**.

Another example, if you want to track users based on the devices they use, you would set up a pattern with User as the member type since you want to collect information about users. You would then select Device ID as the attribute since you want to know the devices each user is using.

Because members and their attributes are tracked by Oracle Adaptive Access Manager when configured to do so, it is possible to capture complex behavior. However, often times the best practice is to keep the patterns relatively simple in terms of the number of attributes and then use rules to perform complex evaluations involving multiple patterns tracking different attributes. This strategy is more flexible and manageable in the long run.

15.1.4 Buckets

Patterns are configured by an administrator and Oracle Adaptive Access Manager uses that configuration to create buckets as it needs them. Administrators do not deal or see buckets directly in any way.

Patterns are configured to create either one bucket or multiple buckets. Buckets are containers that are used to capture the frequency of behaviors. Rules evaluate the

counters in these buckets for specific members to determine if a situation is anomalous.

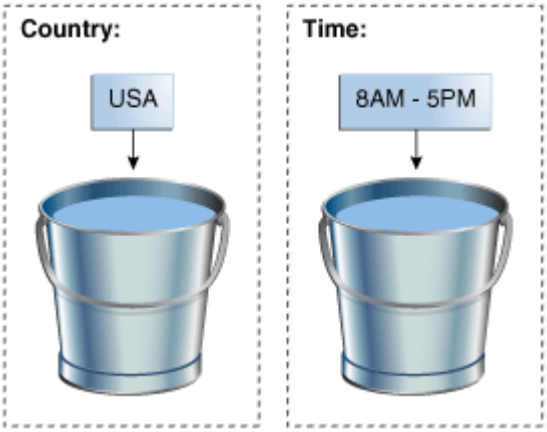
- Single-Bucket

  Single-bucket patterns create and populate one bucket with the exact data points and value ranges specified in the pattern.

  For example, if you choose to create an authentication pattern for users (member type) with the country United States (attribute), exactly one bucket is created and populated with users. If a user logs in from the United States, he or she becomes a member of the bucket and the bucket counts are incremented; if he or she does not log in from the United States, the bucket count is not incremented.

  Another example, if you choose to create an authentication pattern for users (member type) with time 8am to 5pm (attribute), exactly one bucket is created and populated with users. If a user logs in from 8am to 5pm, he or she becomes a member of the bucket and the bucket counts are incremented; if the user does not log in between 8am to 5pm, the bucket count is not incremented.

Figure 15–2 Single Bucket



- Multi-Bucket

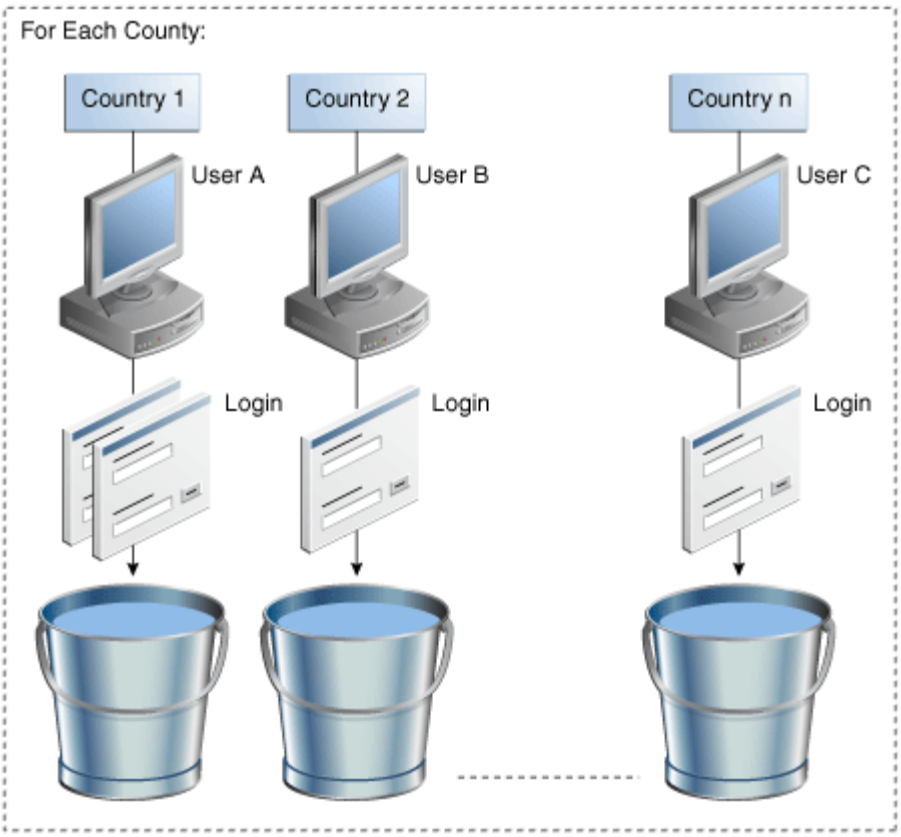
  Multi-bucket patterns usually create more buckets than single-bucket patterns. They create buckets as required based on the parameter configurations.

  You configure the data types and samples you want Oracle Adaptive Access Manager to generate buckets from, and then during pattern processing Oracle Adaptive Access Manager creates buckets as needed to capture behaviors. Buckets are only created when the data combinations occur.

  For example:

  If you specify a pattern with device as the member type and add a country as the attribute with "For each" as the compare operator, Oracle Adaptive Access Manager creates a bucket dynamically for each device and country combination as activity occurs. The first time any user logs in from Canada, Oracle Adaptive Access Manager creates a Canada bucket and adds that user's device as a member with a count of one. The next user to log in from Canada has their device added to that same bucket as a member with a count of one. Each subsequent time a user logs in from Canada with the same device the Canada bucket counter is incremented.

Figure 15–3 Countries Multi-Bucket

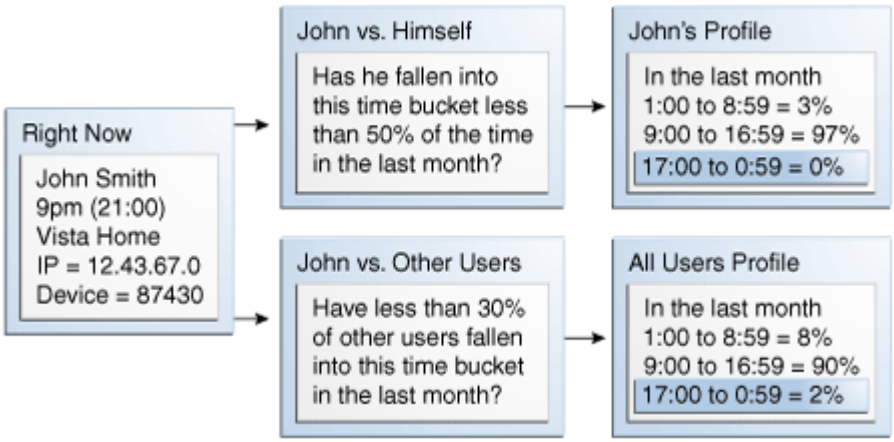


15.1.5 Pattern Rules Evaluations

OAAM uses patterns and the buckets they generate to capture the frequencies at which specific behaviors occur for each individual user, device, location, and so on. Since the pattern buckets are updating in real-time rules can be run against them to dynamically determine if the current behavior seems abnormal. The rules evaluations can view either the individual's current behavior versus his past behavior or the individual's current behavior versus the past behavior of all individuals.

Autolearning tracks transactions and authentications being performed by different users based on patterns you create. This process establishes what is normal behavior for an individual or a population.

Figure 15–4 Bucket Evaluation



In this example John's login behavior is being evaluated against his own profile and the profile of all users.

Bucket Evaluation Example

In this example a pattern was created to capture user login time behavior. The multi-bucket pattern was configured to create buckets to cover the entire 24 hours of the day in eight hour samples. Consequently, OAAM ended up creating three time buckets as login activity occurred within each time range.

Buckets	Time Range
Bucket #1	1:00 - 8:59
Bucket #2	9:00 - 16:59
Bucket #3	17:00 - 00:59

Last month all users had 100 successful access requests and John had 25 successful access requests. The buckets were populated with members and counters for each member. The table below shows bucket membership for John in the last month and for all users.

Bucket s	John	All Users
Bucket #1	1	8
Bucket #2	24	90
Bucket #3	0	2

15.1.6 Bucket Population

Buckets are created, populated and the counters incremented only after the transaction is successful.

Example

Joe logs in from three cities (home, office A and office B). A city pattern records how often he logs in from each.

Bucket	Location
City Bucket #1	home
City Bucket #2	office A
City Bucket #3	office B

Joe's company wants users to be challenged with an OTP two sessions in a row if they are logging in from a city they have not used in the last month. If Joe stops working at office B for 37 days and does not access from anywhere else in that city he is challenged for an OTP the next time he logs in from that city. To accomplish this use case a rule is configured to check on the membership count for the current city bucket in the last month. The count threshold is set to two so the rule triggers until the user has been a member at least twice in the last rolling month window.

15.2 Quick Start for Enabling Autolearning for Your System

The chapter has been organized into sections by topic. If you have used autolearning before, use this chapter effectively in any order that is convenient for you.

If you want profiling and autolearning enabled in your system, proceed as follows:

1. Make sure entities are imported.

   See Section 15.3.1, "Importing Base Authentication-Related Entities."

2. Create patterns.

   Define patterns, add attributes, and activate /enable the patterns so that the system can start collecting pattern data.

   See Section 15.9, "Creating and Editing Patterns."

3. Finally, use the patterns in rule evaluation.

   For information on using autolearning, see Section 15.12, "Using Autolearning Data/Profiling Data."

   To verify that autolearning is turned on and working, see Chapter 29, "FAQ/Troubleshooting."

15.3 Before You Begin to Use Autolearning

Before using the Autolearning feature, read through Section 15.1, "Introduction and Concepts." The section is useful in helping you to understand the concepts presented in this chapter.

To use the Autolearning feature, you must perform the following procedures.

15.3.1 Importing Base Authentication-Related Entities

The actors that are tracked during authentication are called authentication entities and include user, city, device, and so on. These base entities are required to enable conditions that are used for patterns. Before you begin using the Autolearning feature, you must import these base entities into your system. Refer to Section 14.4, "Importing a Snapshot."

To import the entities into the server:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. Click **Import Entities**.
3. In the **Import Pattern** dialog, click **Browse** and locate **Auth_EntityDefinition.zip**.
4. Click **OK**.

   The OAAM Administration Console shows the entities in that file.
5. Select and import all of them.

15.3.2 Enabling Autolearning Properties

Enable autolearning so that OAAM collects profiling data.

1. Ensure that vcrypt.tracker.autolearning.enabled is set to true.

   The default value is true. It is like a "master (on/off) switch" for autolearning.

   If the property is not available, you need to create a new property and set it to true.
2. Set the following properties to true:
   - vcrypt.tracker.autolearning.use.auth.status.for.analysis

     This property must be set to true for the authentication patterns to work. It is set to true by default. Authentication patterns are the patterns that are used in processing the data relevant to authentication (login) related information only.
   - vcrypt.tracker.autolearning.use.tran.status.for.analysis

     This property must be set to true for the transaction-related patterns to work. It is set to true by default. Transactional patterns profile the entities involved in transactions. For example, capture all the destination accounts and frequency of each that a user transfers funds to in an online banking application.
   - `oracle.oaam.transactions.analyzepatterns`

     This property is set to true by default, so pattern data can be collected for transactions. If the property does not exist, create it.

15.3.3 Importing Autolearning Policies into the Server

Import the out-of-the-box autolearning policies, refer to Section 14.4, "Importing a Snapshot."

15.3.4 Using Autolearning in Native Integration

Before autolearning can be used for monitoring of transactions and authentications, native integration clients need to use updateStatus or updateTransaction APIs which use the autolearning flags.

Alternatively native integration can also use the processPatternAnalysis API for processing the session data for autolearning.

The API helps to provide OAAM with information about user activity (logins or transactions). For example, updateAuthStatus or updateTransaction is called when a customer login is complete or a login is blocked, and so on.

For the UpdateAuth Status API, an analyzePatterns value of "true" triggers the pattern processing for the login. If no value is passed, a value of false is assumed. If the authentication status value, resultStatus, is "success" and the analyzePatterns value is "true," OAAM processes the users's data and autolearning/profiling data is collected for the user.

For any login, autolearning is performed only once if the authentication status is "success." If the authentication or transaction status is not "success," the buckets are not updated. If the buckets are not updated, the data that autolearning rules use may not be accurate.

For information on autolearning APIs, see Appendix H, "Pattern Processing."

15.4 User Flows

User flows are presented for:

- Creating a New Pattern
- Editing a Pattern

15.4.1 Creating a New Pattern

These steps describe the Create New Pattern flow:

1. Search for a pattern.
2. If pattern exists, view pattern details.
3. If pattern does not exist, create new pattern.
4. Specify pattern name, member type, evaluation priority, and description.
5. Add attributes.

   If there are no validation errors, the new Pattern is created successfully.

15.4.2 Editing a Pattern

The following steps describe the Edit Pattern flow.

> **Note:** If you edit a Pattern the data that is already collected based on that pattern could potentially become unusable. For example, if a user edits a Pattern and removes one of the attributes, the data that was collected previously may not be usable since the buckets created in the past for this Pattern would have taken into account the attribute that is now being removed.

1. Search for a pattern.
2. If Pattern exists, view pattern details.
3. Change details.
4. Add attributes.

If there are no validation errors, the pattern is edited successfully.

15.5 Navigating to the Patterns Search Page

To open the Patterns Search page:

1. In Fraud Prevention, expand the Navigation tree.
2. Double-click **Patterns**.

   The **Patterns Search** page is displayed with results based on the default search criteria.

   Alternative methods to open the search page are listed in Section 3.10, "Search, Create, and Import."

The **Patterns Search** page is the starting place for managing your patterns. From the **Patterns Search** page, you can:

- search patterns
- view a list of patterns
- create new patterns
- delete patterns
- activate patterns
- deactivate patterns
- import patterns
- export patterns

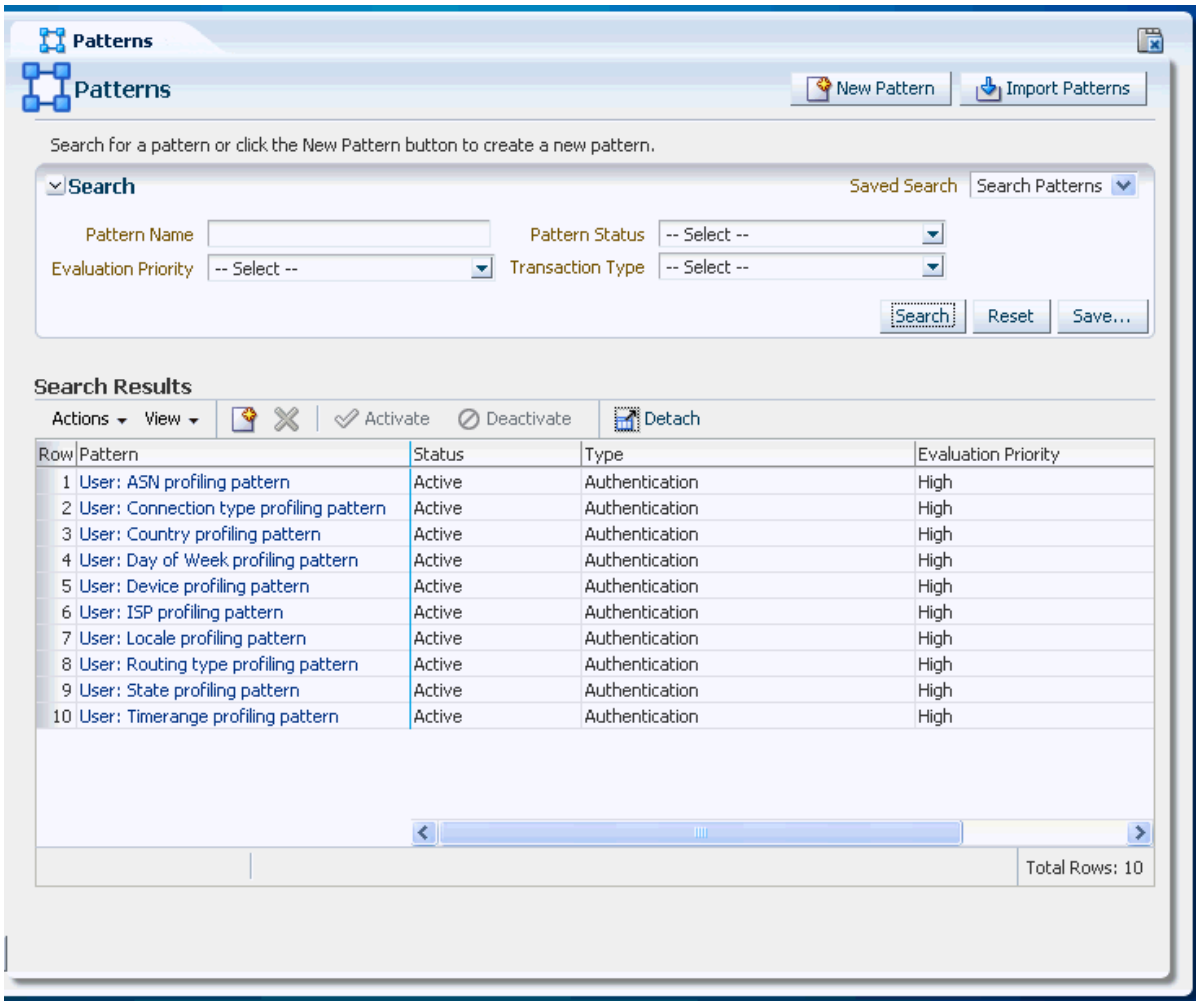
15.6 Searching for a Pattern

To search for a Pattern:

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."

   An example **Patterns Search** page is shown in Figure 15–5.

Figure 15–5 Patterns Search Page



The **Pattern Search** page displays a Search section and a **Results** table that shows a summary of the patterns that match your search criteria.

2. Specify criteria in the Search Filter to locate the pattern and click **Search**.

   The search filter criteria are described in Table 15–1.

   If you want to reset the search parameters to the default setting, use the **Reset** button.

Table 15–1 Search Filter Criteria

Field	Description
Pattern Name	The name of the pattern. You can enter the complete name or part of a Pattern name.
Evaluation Priority	The priority in which the collected data is evaluated. ■ High Most of the resources are assigned for the data to be evaluated. ■ Low The resources assigned to data evaluation is half as much as the High priority.
Pattern Status	The state of the pattern. These are the pattern states: ■ Active If data must be collected, the pattern must be in the active state. ■ Inactive If the pattern definition is complete, but you do not want to collect data, select "Inactive." ■ Incomplete If pattern creation has started, but you need to save it for completion later, select "Incomplete." Data is not collected for this state. ■ Invalid If there is a problem with the pattern, you can mark the pattern as invalid to signal other operators. No autolearning data analysis is performed for a pattern in this state. ■ Deleted The pattern has been deleted, but system must keep this record to maintain data integrity. No autolearning data analysis is performed for the pattern in this state. It is recommended that you do not use the **Deleted** status. This status may not be available in future releases.
Transaction Type	The Transaction Definitions that have been configured in this specific Oracle Adaptive Access Manager installation. The type of process such as authentication (login), bill pay, wire transfer, address change, and so on that autolearning is profiling entities for.
Creation Method	The type of bucket the Pattern had been created as. ■ Single Bucket - Single-bucket patterns create and populate one bucket with the exact data points and value ranges specified in the pattern ■ Multi- Bucket – Multi-bucket patterns have buckets for sub-ranges of a parameter range

The **Search Results** table displays a summary of patterns that match the criteria specified in the **Evaluation Priority**, **Pattern Name**, **Pattern Status**, and **Transaction Type** fields.

Clicking the **Pattern** column header sorts all the pattern names in ascending or descending order. Sorting is available for all columns.

A tool tip is available to display the complete description of a pattern if the description is not shown fully in the user interface.

15.7 Navigating to the Patterns Details Page

Follow these steps to navigate to a **Pattern Details** page.

1. If you are not in the **Patterns Search** page, follow the instructions in Section 15.5, "Navigating to the Patterns Search Page."
2. Search for the pattern of interest, by following the instructions in Section 15.6, "Searching for a Pattern."

   There is a link on the pattern name in the **Search Results** table.
3. Click the pattern name and the **Pattern Details** page for the specific pattern appears.

From **Pattern Details**, you can select the member type and change the pattern name, pattern status, evaluation priority, and description after the pattern is created; add attributes, and view the pattern usage points.

15.8 Viewing Pattern Details

This section provides details on viewing patterns.

15.8.1 Viewing Details of a Specific Pattern

By clicking the pattern name in the **Patterns Search** page, the **Pattern Details** page for the specific pattern appears. For instructions, see Section 15.7, "Navigating to the Patterns Details Page."

The **Pattern Details** page provides such general details about the pattern as the pattern name, status, member type, evaluation priority, and description.

The **Pattern Details** page provides the following three tabs:

- **Summary** - General details such as pattern name, status, transaction type, and so on
- **Attributes** - Displays attribute details such as definition, status, description and so on.

The number of attributes are displayed in the tab (in parenthesis).

15.9 Creating and Editing Patterns

This section explains how to create and edit patterns. It contains the following topics:

- Creating a Pattern
- Editing the Pattern
- Adding Attributes
- Editing Attributes
- Deleting Attributes

15.9.1 Creating a Pattern

Best Practices for Autolearning and Pattern Creations

Best practices for autolearning and pattern creations are:

- For autolearning configurations: Administrators should keep in mind that any tracking of behavior warrants computational power and storage space and be prudent in configuring the system for the most returns on the efforts.

- Best practices for pattern creation: When creating patterns, you must ensure that other patterns in your system are not already collecting the same kind of information. For example, if you create a pattern to collect login time information on user and IP, and then you create another pattern on user and login time, you are creating two patterns that are collecting the same information.
- Best practices to keep Oracle Adaptive Access Manager current and relevant given the evolving online security threats: autolearning technology automatically adjust to changing activity and behaviors. For example, autolearning profiles what normal behavior is for each user and all users. In this way security policies are dynamically adjusting in real-time to how users really acts rather than a guess at how they will act. In addition to the automated features it is recommended that security policy be reviewed on a regular basis to make sure they are behaving as expected.
- For heavy pattern usage: You might assign different evaluation priorities to various patterns. For example, you can set login patterns to High and other patterns to Low.
- For evaluation property: Ensure that you do not set "High" as the evaluation priority for all your patterns, since performance will be impacted by doing so.

Procedure to Create a New Pattern

Follow this procedure to create a new pattern.

All values except transaction type can be modified later in the **Pattern Details** page.

Transaction type, **Creation Method**, **Member Type**, **Evaluation Priority**, and **Description** are required fields.

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."
2. In the **Patterns Search** page, click the **New Pattern** button or the **New** icon.

   Alternative methods to open the **New Pattern** page are listed in Section 3.10, "Search, Create, and Import."
3. In the **New Pattern** page, enter the pattern name.

   A unique pattern name must be entered.
4. Select the transaction type.

   The default transaction type is **Authentication**.

   Other transaction types shown are the transaction definitions that have been set up in your system.

   Only active transaction types are available in the list.

   Examples of transaction types are authentication, bill pay, money transfer, merchant purchase, credit card, and others. For example, if you select merchant purchase as the transaction type, you want to gather data on the activity of all the members during merchant purchases.
5. From the **Creation Method** list, select the method you want to use to create the pattern.
   - Single-Bucket
   - Multi-Bucket
6. Select a member type.

The member type is the actor for which data must be captured.

For example, if you select city as the member type, the pattern created collects city data.

Member type list values depend on the transaction type selected.

If the **Transaction Type** selected is **Authentication**, member types available are **User**, **City**, **State**, **Country**, and others.

If, the **Transaction Type** selected is any transaction from the database, for example, Retail Commerce, Internet, Bill Pay, the member types available are data elements for that transaction. For example, if the **Transaction Type** is Internet Banking, the member type data elements could be customer and bank name.

One or more member types can be selected for a pattern

7. Select a evaluation priority

   Evaluation priority is the priority in which data is evaluated. There are two evaluation priorities: **High** and **Low**.:

   - High

     There is double the amount of resources made available to process the pattern data in this category as compared to the "Low" priority.

     Resources include processing resources and database resources.

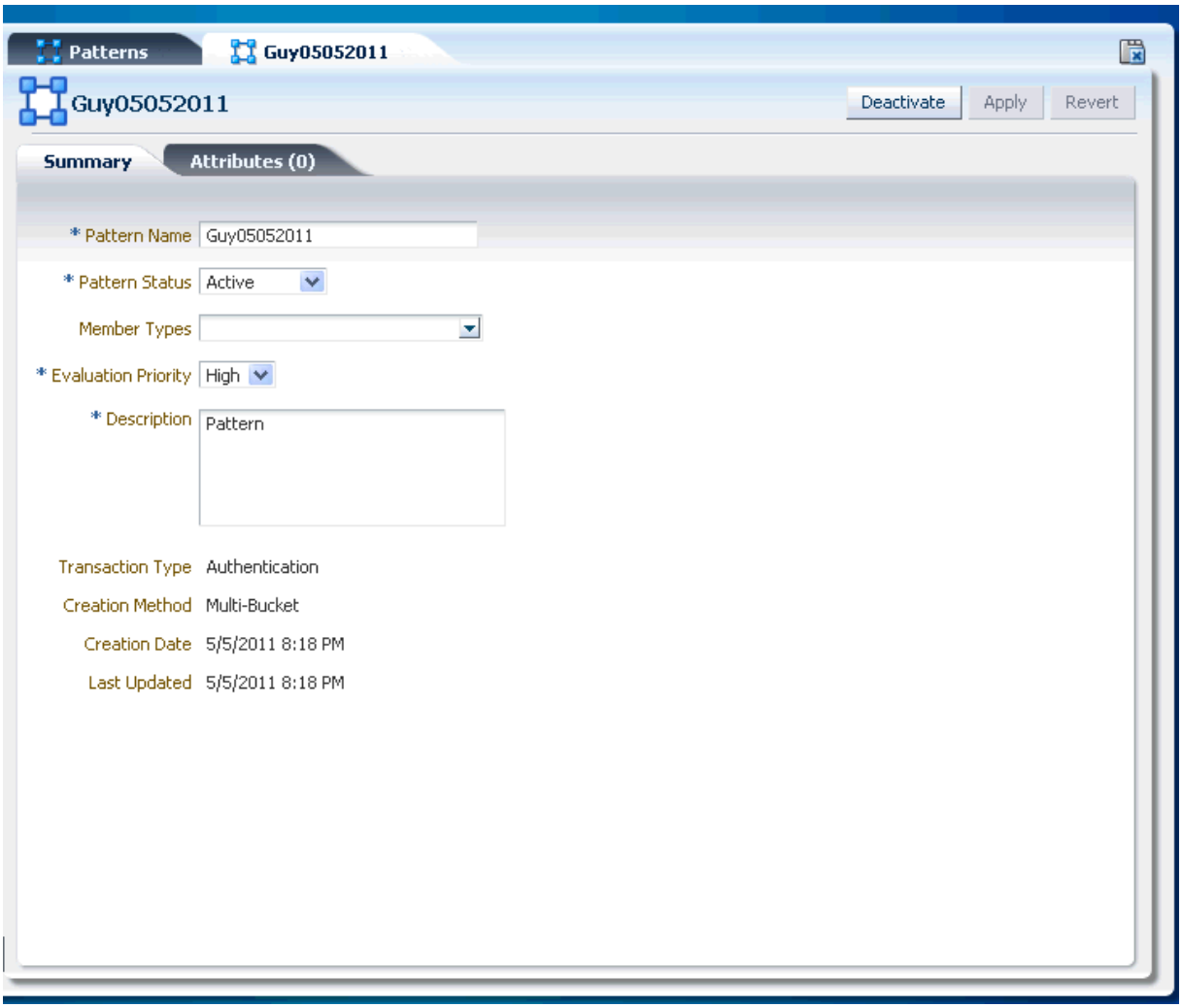
   - Low

     There is half the amount of resources made available to process the pattern data in this category as compared to the "High" high priority.

   The chances for finishing the processing of high priority pattern data are doubled the chances for finishing the low priority patterns.

8. Enter a description.
9. Click **Apply**.

Figure 15–6 New Pattern



The **Pattern Details** page is opened with the **Summary** and **Attributes** tabs.

If you try to create a pattern that already exists in the database, an error occurs.

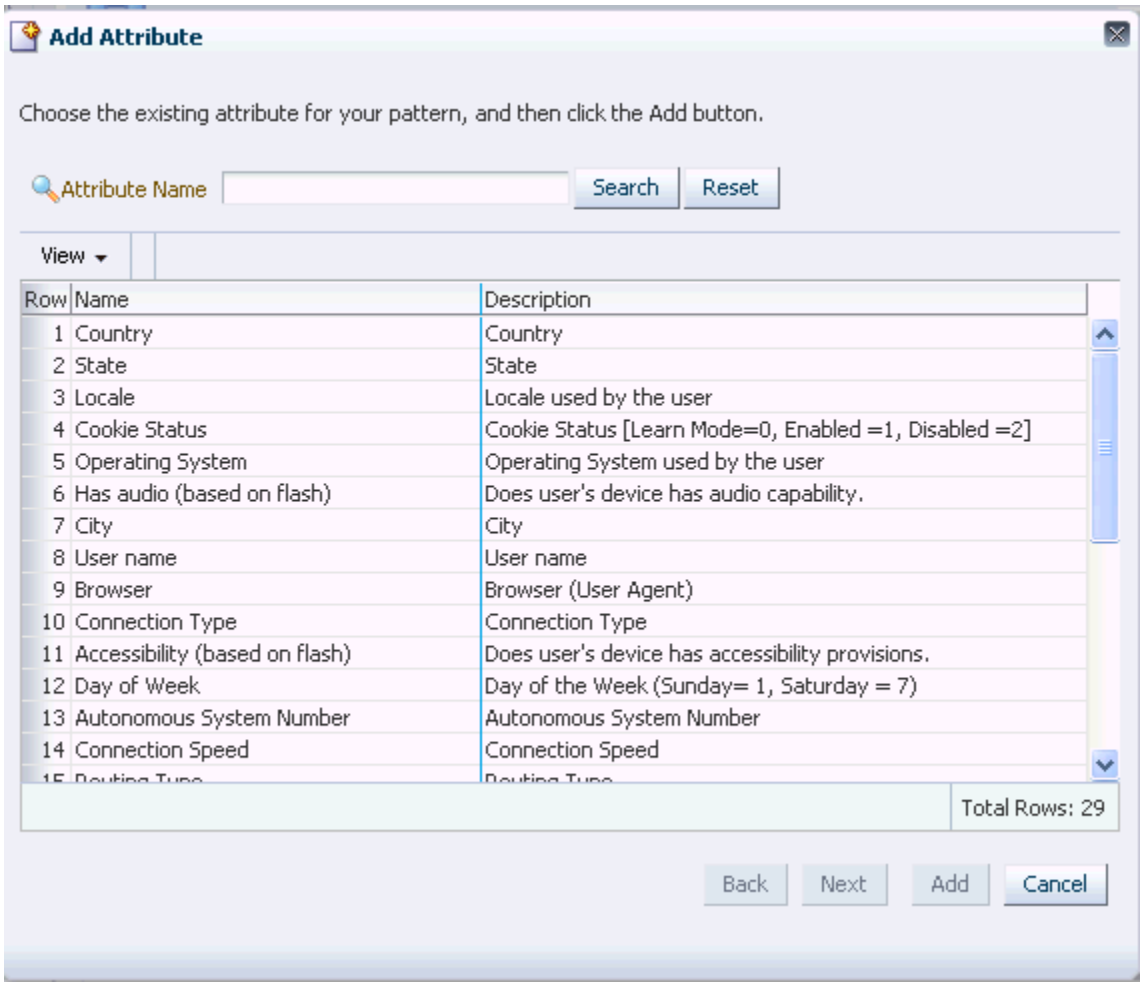
If you try to create a pattern with the same members as another pattern, a message appears: "A pattern with the same member configuration already exists. Are you sure you want to create a new pattern? If you answer "yes," you are allowed to create the pattern.

The pattern is enabled upon creation and the **Pattern Details** page is displayed. You can edit or review the pattern.

Patterns can be created without any attributes.

10. Add attributes.

Figure 15–7 Add Attribute



For information, see Section 15.9.2, "Adding Attributes."

For information on attributes, see Section 15.1.3, "Member Types and Attributes."

11. Activate the pattern.

    To activate the pattern, see Section 15.9.3.1, "Activating Patterns."

To use the patterns in rule evaluation, see Section 15.12, "Using Autolearning Data/Profiling Data."

To verify that autolearning is working, see Chapter 29, "FAQ/Troubleshooting."

15.9.2 Adding Attributes

For information on attributes, see Section 15.1.3, "Member Types and Attributes."

Follow these steps to add attributes.

1. If you are not in the **Pattern Details** page of the pattern, follow the instructions in Section 15.8.1, "Viewing Details of a Specific Pattern."
2. In the **Attributes** tab, click the **Add** button in the **Search Results** toolbar.
3. In the **Add Attributes** dialog, select an attribute or attributes from the **Add** list.

Select attributes (data points) you are interested in for the member type. OAAM collects data on the attributes to determine if the member belongs to the profile.

For example, if you select "user" as the member type and the attributes: IP (NNN.N.N.N), City (Redwood City) and Is Registered (False); OAAM records when users match all of these attributes--the user has an IP address of NNN.N.N.N, who lives in Redwood City, and who is not registered. This profiling can then be used to evaluate risk for the "user."

For example, if you want OAAM to track the login times for "user" and "IP" (member type), you would select "time" as an attribute.

After the attributes are added, they are not available in the list for further selection.

4. Specify the condition information for the attribute.
   a. Select the **Status**.

      For example, "Active" if you want OAAM to collect data on the attribute to be used in the pattern membership.

   b. Enter the description.

      For example, "This pattern creates buckets to track login times for users and IPs."

   c. Select a compare operator.

      For example, "range" with start value of 0 and end value of 23 if you want to collect data for a range of 24 hours.

      The list of compare operators depends on the value of the attribute and the type of pattern (multi-bucket or single bucket) you have chosen.

      For detailed information about compare operators, see Section 15.20, "Pattern Attributes Operators Reference."

   d. Enter **Increment Step**.

      The sample size (interval)

      For example, 2 for 2 hour intervals.

   e. Click **Add**.
5. In the **Attributes** tab, use the arrow controls to reorder the attributes if you want.

   Order is not required and is automatically pre-filled.
6. Click **Apply**.

   A dialog appears, with the message that the attribute was added successfully to pattern.
7. Click **OK** to dismiss the dialog.

15.9.3 Activating and Deactivating Patterns

This section explains how to activate and deactivate patterns.

If you select an active pattern, you have the option to deactivate it. Whereas if you select an inactive pattern, you have the option to activate it.

15.9.3.1 Activating Patterns

To activate patterns:

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."
2. In the **Patterns Search** page, enter the search criteria you want and click **Search**. For information, see Section 15.6, "Searching for a Pattern."
3. Select the row for each pattern you want to activate.
4. Press the **Activate** button.

15.9.3.2 Deactivating Patterns

You should be extremely careful when disabling patterns. The system does not check to see whether the pattern being disabled is used in any policy.

When patterns are disabled, the data collection stops.

Also when rules are executed and the pattern being used by the rule condition is not active, the condition evaluates to false (unless you have configured it to return true).

To deactivate patterns:

1. To deactivate a pattern, from the **Patterns Search** page select the row for each pattern you want to deactivate and press the **Deactivate** button.
2. To deactivate a pattern from the **Pattern Details** page, press the **Deactivate** button.

15.9.4 Editing the Pattern

Care should be taken when editing patterns. Potentially, data that is already collected based on that pattern may no longer be usable after the edit.

For example the data would be unusable if you remove one of the attributes and the buckets created in the past for the pattern had taken into account the attribute that is being removed.

To edit the details of a specific pattern:

1. If you are not in the **Pattern Details** page of the pattern you want to edit, follow the instructions in Section 15.7, "Navigating to the Patterns Details Page."
2. To change the pattern name, evaluation priority, and description, edit the appropriate fields in the **Summary** tab of the **Pattern Details** page.
3. To change the status, select from the status you want.

   To change the status of the pattern, see Section 15.9.5, "Changing the Status of the Pattern."
4. Add or change the member types.

   For information, see Section 15.9.6, "Adding or Changing Member Types."

   For information about member types, see Section 15.1.3, "Member Types and Attributes."
5. Change the evaluation priority

   To change the evaluation priority, see Section 15.9.7, "Changing the Evaluation Priority."
6. To add attributes, see Section 15.9.2, "Adding Attributes."

   For information on attributes, see Section 15.1.3, "Member Types and Attributes."
7. To edit attributes, see Section 15.9.8, "Editing Attributes."

8. To delete attributes, see Section 15.9.9, "Deleting Attributes."
9. Click **Apply**.

15.9.5 Changing the Status of the Pattern

Active is the default status of the pattern, but you can change the status to one you want.

These are the pattern states:

- Active

  If data must be collected, the pattern must be in the active state.

- Inactive

  If the pattern is complete, but you do not want the pattern to collect data, select **Inactive**.

- Incomplete

  If the pattern has been created, but you are not ready to decide what attributes to choose yet, select **Incomplete**. Data is not collected for this state.

- Invalid

  If you do not want the pattern to be used, select **Invalid**. Data is not collected for this state.

- Deleted

  The pattern has been deleted, but the system must keep this record to maintain data integrity. No autolearning data analysis is performed for a pattern in this state.

Note: It is recommended that you do not use the **Deleted** status. This status may not be available in future releases.

15.9.6 Adding or Changing Member Types

You can select more than one member type to add or change.

If you try to select the same members as another pattern, a message appears: "A pattern with the same member configuration already exists. Are you sure you want to create a new pattern? If you answer "yes," you are allowed to create the pattern.

For information on member type, see Section 15.1.3, "Member Types and Attributes."

Follow these steps to add or change member types.

1. If you are not in the **Pattern Details** page of the pattern, follow the instructions in Section 15.7, "Navigating to the Patterns Details Page."
2. In the **Summary** tab, add or change the actor you want to capture data.

   For example, user is the member type if you want to collect information about the user.

15.9.7 Changing the Evaluation Priority

Follow these steps to change the evaluation priority.

1. If you are not in the **Pattern Details** page of the pattern, follow the instructions in Section 15.7, "Navigating to the Patterns Details Page."
2. In the **Summary** tab, change the evaluation priority.

15.9.8 Editing Attributes

Follow these steps to edit attributes.

1. Click the **Attributes** tab of the **Pattern Details** page.

   If you are not in the Pattern Details page of the pattern you want to edit, follow the instructions in Section 15.8.1, "Viewing Details of a Specific Pattern."
2. In the **Attributes** page, select the attribute you want to edit.
3. Edit the attribute details and click **Save**.
4. Reorder the attributes if you want.
5. Click **Apply**.

15.9.9 Deleting Attributes

Care should be taken when deleting attributes.

For example the data would be unusable if you remove one of the attributes and the buckets created in the past for the pattern had taken into account the attribute that is being removed.

Follow these steps to delete attributes.

1. Click the **Attributes** tab of the **Pattern Details** page.

   If you are not in the **Pattern Details** page of the pattern you want to edit, follow the instructions in Section 15.8.1, "Viewing Details of a Specific Pattern."
2. In the **Attributes** page, click the checkbox next to the **Attribute(s)** you want to delete from the pattern.
3. Click **Delete**.

   If you delete an attribute, it is added to the **Add** list and becomes available the next time you select **Attributes**.

15.10 Importing and Exporting Patterns

You may want to import and export patterns from other applications. This section explains how to import and export patterns.

15.10.1 Importing Patterns

To import patterns:

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."
2. In the **Patterns Search** page, click **Import Pattern**.
3. In the **Pattern Import** dialog, click **Browse** and locate the pattern file you want to import.
4. Click **OK**.

You cannot create your own pattern import files. There is an extension ".zip" that is used when patterns are exported and only files in zip formats can be used. Other files, such as .xml files cannot be imported as patterns import files.

15.10.2 Exporting Patterns

To export patterns:

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."
2. In the **Patterns Search** page, enter the search criteria you want and click **Search**. For information, see Section 15.6, "Searching for a Pattern."
3. Select the row for each pattern you want to export.
4. Select **Export Selected** from the **Actions** menu.
5. In the **Export Patterns** dialog, click **Export**.
6. In the **Save** dialog, click **OK**.

15.11 Deleting Patterns

If you have an active pattern and it has collected data, you are not allowed to delete the pattern.

Patterns can be deleted only if there is no association with data and rules. A message appears, saying: "There might be pattern data or associated rules using the data and may become out of sync. Are you sure you want to update?"

When multiple patterns are selected for deletion and if some of the patterns are used or linked to other systems, a warning message appears, stating: "The following instances are linked and cannot be deleted. Do you want to delete the other patterns?" If you answer "yes," the unlinked patterns are deleted.

To delete patterns:

1. Open the **Patterns Search** page, as described in Section 15.5, "Navigating to the Patterns Search Page."
2. In the **Patterns Search** page, enter the search criteria you want and click **Search**. For information, see Section 15.6, "Searching for a Pattern."
3. Select the row for each pattern you want to delete and press the **Delete** button.

   If the patterns selected for deletion are not used or linked to a policy, a warning message is shown asking for confirmation. If you answer "yes," those patterns are deleted.

15.12 Using Autolearning Data/Profiling Data

After you have configured patterns (created buckets with members and attributes), activated them, and started collecting data, you are ready to use autolearning.

Setting up OAAM to process autolearning data is described in the following subsections.

15.12.1 Create a Policy that Uses Autolearning Conditions

Create a policy that uses the autolearning conditions.

For instructions to create a policy, see Section 15.14.1, "Use Case: Challenge Users If Log In Different Time Than Normally."

15.12.2 Associate Autolearning Condition with Policy

For the autolearning condition, associate the pattern you created and modify the condition parameters per your requirements.

There are conditions specific to autolearning that use the collected profiling data to perform certain calculations. These conditions are only applicable to autolearning profiling data and cannot be used for other risk analysis.

For information, see Section 15.14.4, "Use Case: User Logs in During a Certain Time of Day More Than X Times."

The rule evaluates the pattern you selected and autolearning processing is performed.

To learn more about autolearning conditions, see Appendix B, "Conditions Reference."

15.12.3 Check Session Details

Perform logins/transactions and check the session details to make sure that the policy that was created triggers and data is collected for patterns and buckets.

For information on how to determine whether the pattern is working properly, see Section 15.14.2, "Use Case: Test a Pattern."

15.13 Transaction-Based Patterns

Starting in 11.1.2.0, transactions can be used in autolearning so that entities can be used as pattern members and entity data elements and transaction data can be used as pattern attributes. The benefit is that it brings the power and flexibility of pattern based fraud analysis to transactions.

The transaction-based patterns use the same framework as the authentication-based patterns and processing of the pattern data is performed in an asynchronous matter. Patterns are bound to transactions, so changes to the transaction metadata affects pattern data collection. Pattern data collection in OAAM Offline only works correctly if the data is loaded in chronological order.

You can:

- Create patterns based on a transaction definition. The relationship between a pattern and its transaction definition, once created, cannot be modified. These patterns can incorporate transaction data, entity data, and implicit data such as user, time, location data, and browser/flash fingerprinting.
- Define policies that incorporate these transaction-based patterns.
- View pattern processing details in Session logs
- Use new conditions that allow you to create policies involving transaction-based patterns. When you add attributes to patterns based on entities from a user-defined transaction, the transaction data is available. The following rule conditions are available:
  - Pattern (Transaction): Entity is Member of Pattern N Times
  - Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period

- Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period
- Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time
- Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture
- Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods
- Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods

For more information, refer to Section B.3, "Autolearning Conditions" and Section 15.14, "Use Cases."

15.14 Use Cases

This section describes example use cases for autolearning and patterns.

15.14.1 Use Case: Challenge Users If Log In Different Time Than Normally

Jeff is a Security Administrator at Dollar Bank. He wants to challenge users with an OTP if they are logging in at a time of day they do not normally come in. To do this he must configure a security policy and associated groups, rules and patterns.

1. Jeff starts with the pattern. He performs a search for patterns that have users as members since his use case focuses on the behavior of users.

   He sees there are two patterns that have users as members. Neither of them has a time range attribute that works for his use case so Jeff must create a new one.

2. Jeff creates a multi-bucket login checkpoint pattern with "user" member type and first evaluation priority. He then adds a time range attribute from 0:00 - 23:00 and a step size of 4. This pattern creates and populates 6 time range buckets as users log in.

3. Jeff searches for the Post-Authentication checkpoint policies already in the system. There are four of them. Since he wants to challenge with an OTP he wants a policy that contains other rules with OTP challenge outcomes.

4. Next Jeff requires a rule to evaluate the bucket memberships. Jeff searches the rules for one that evaluates if a member has fallen into the current bucket less than a specified percentage in the last specified period. He does not find one so he create one using a user in bucket less than % of time condition.

5. Jeff adds the rule to the policy and links the pattern.

6. He then must link action and alert groups. Jeff searches for an action group that contains the challenge OTP action. He finds that there is one already so he links it to the rule.

7. He searches for an alert group by "time" in the alert message text. He finds one alert group that has an alert with the alert text "device has failed to log in successfully more than 10 times". This alert is not appropriate for his rule so he decides to create a new alert group and alert.

8. Jeff creates a new alert group for his alert. He then adds a new medium alert to the group with the text "User has fallen into this login time bucket less than 5% of the time in the last 3 months".

9. Finally Jeff links the alert group to the rule.
10. He performs log ins to the system to start autolearning.

15.14.2 Use Case: Test a Pattern

Jeff a Security Administrator must make sure the pattern he configured in his use (see Section 15.14.1, "Use Case: Challenge Users If Log In Different Time Than Normally") is working properly.

To test the pattern:

1. One morning at 9:30 am he creates a new test user and then performs 7 successful logins.
2. At 3 pm of that day, he performs 3 successful logins.
3. The next day he logs in at 7 pm and is challenged with an OTP.

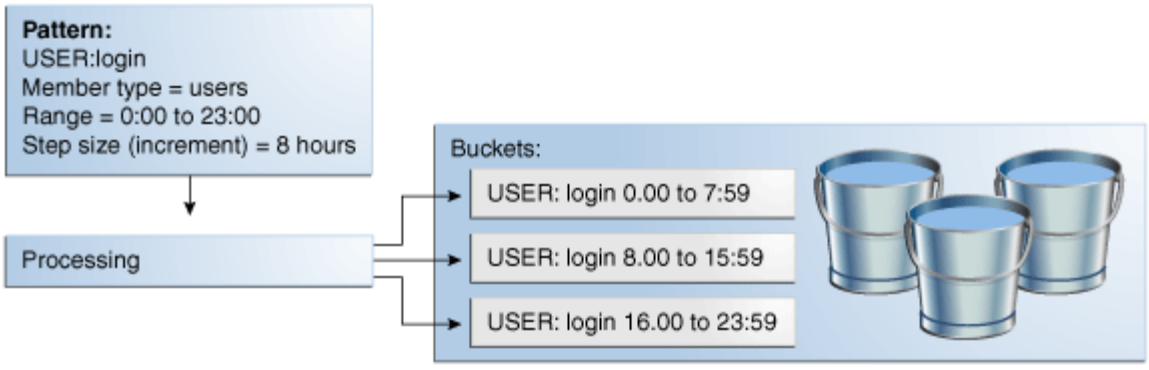
   This occurs because he has fallen into the 7 pm time bucket less than 5% of the time in the last month.
4. After the policy and pattern have been in the production system for a month he checks to see if the bucketing in the rule evaluation is accurate. Jeff runs a report to find users that triggered the rule by searching for sessions with the alert, "User has fallen into this login time bucket less than 5% of the time in the last 3 months".
5. He then selects a few of them and searches for their bucket memberships for this pattern in the last month.

   In this way Jeff can see the session where the alert was triggered was at a time that fell into a bucket it had not previously fallen into more than 5% of the time in the last month. From that, Jeff confirms that the policy configuration and pattern are functioning as designed.

15.14.3 Use Case: Track Off-Hour Access

Jeff is a Security Administrator at Dollar Bank. He wants to track off-hour access by employees based on a standard day shift. To do this, he must create a pattern for behavior-based profiling on time.

Figure 15–8 Using Buckets to Track Off-Hour Access



To create a pattern that profiles the login times of users into three 8-hour buckets:

1. Log in to the OAAM Administration Console as an administrator.

2. Create a multi-bucket pattern to capture the count of access over each 8-hour period for a day.
   a. After you have logged in to the OAAM Administration Console, double-click **Patterns** in the Navigation pane. The Patterns Search page is displayed.
   b. Click the **New Pattern** button on the upper right of the console. This displays the New Pattern screen for creating a new pattern.

Parameter	Values
Pattern Name	User: Work hours
Transaction Type	Authentication
Creation Method	Multi Bucket
Member Type	User
Evaluation Priority	High
Description	Pattern to capture the count of access over each 8-hour period for a 24-hour day

   c. Click **Create**. A page with details of your pattern is displayed.
   d. Click the **Attribute** tab to specify the attributes you will be checking.
   e. Click the **Add** button. This will provide a search screen allowing you to search for attributes you want to check. Enter your search criteria and click **Search** to see a list of attributes you want to use.

Parameter	Values
Attribute	Time
Status	Active
Compare operator	Range
Start Value	0
End value	23
Increment Step	8
Description	This creates three 8-hour buckets

3. Click **Add**.

OAAM creates buckets as needed for the behavior.

15.14.4 Use Case: User Logs in During a Certain Time of Day More Than X Times

Jeff is a Security Administrator at Dollar Bank. He wants to be notified with an alert if a user logs in between 10 am to 5 pm more than 3 times. To do this, he must create a pattern that profiles users and time, and an alert group.

1. Create a single bucket pattern called, TimeLog10AM-5PM_PS, with the member type, user.
2. Add the Attribute, Time.
   - Compare operator is Range
   - Start value is 10 (10 am)

- End value is 17 (5 pm)

3. Create an Alert Group so that an alert is used to notify you about either anomalies or information in the system when rules are triggered.

   For information on Action and Alert groups, see Chapter 12, "Managing Groups."

4. Create a policy that uses autolearning conditions in the Post-Authentication checkpoint.
5. Create a rule within the policy that uses conditions to associate the pattern.
   - Ensure that the rule contains the autolearning condition, Pattern (Authentication): Entity is Member of Pattern N Times
   - Fill in the values for the condition

Label	Name	Default
Pattern Hit Count More than	Pattern Hit Count More than	3
Pattern Name For Membership	Pattern Name for Membership	TimeLog10AM-5PM_PS
is Membership Count more than the Pattern Hit Count for User	isMoreThan	true
Time period type for pattern membership	Time Period Type for Patternmembership	hours
Time Period Type for Pattern Membership	Time Period Type for Pattern Membership	1
Member Type for pattern Membership	MemberType for pattern Membership	user

   - Add the Alert group as a result of the rule.
6. Group link to user group.
7. Verify that the alerts are generated, starting with the fourth login.

15.14.5 Use Case: Patterns Can have Multiple Member Types

Jeff is a Security Administrator at Dollar Bank. He wants to track logins by employees based on days of the week and devices. To do this, he must create a pattern to profile the days of the week, users, and devices login.

If Joe logs in on Monday, his User ID and the Device ID of the computer he is using are added to the Monday bucket once. If Fred uses the same computer to log in on Monday, his User ID and the Device ID of the computer will be added once. At that point, the Monday bucket will have one count for Joe, one count for Fred, and two counts for the device. Rule conditions are then used to evaluate the bucket memberships.

A rule could be created to evaluate one member type of multiple member types.

For example,

- Joe logged in on Tuesday less than 5% of the time in the last two months
- Joe and this computer logged in on Tuesday less than 5% of the time in the last two months

To set up patterns so that they can have multiple member types with the members independently profiled by the pattern, you perform the following steps.

1. Create a pattern with User and Device as entities. It will have "Day of the Week" as the attribute and the operator for the attribute will be "for each."

   Describe the bucket population correctly.

   For information, see Section B.3.2, "Pattern (Authentication): Entity is a Member of the Pattern Less Than Some Percent of Time."

2. Create one rule.
   a. Set the percent value to be 5% in the rule.
   b. Set the pattern described in Step1 as the pattern in the rule.
   c. Set the entity to be user.
   d. Set time period to 2.
   e. Set time period type to months.
   f. Leave the other values to the default.
3. Create another rule.
   a. Set the percent value to be 5% in the rule.
   b. Set the pattern described in Step1 as the pattern in the rule.
   c. Set entity to be device this time.
   d. Set time period to 2.
   e. Set time period type to months.
   f. Leave the other values to the default.

15.14.6 Use Case: City Usage

Joe's company wants all users to be challenged with an OTP if they are logging in from a city they are not a member of.

Joe logs in from three cities (home, office A and office B). A city pattern records how often he logs in from each.

Bucket	Location
City Bucket #1	home
City Bucket #2	office A
City Bucket #3	office B

Joe's company wants users to be challenged with an OTP two sessions in a row if they are logging in from a city they have not used in the last month. If Joe stops working at office B for 37 days and does not access from anywhere else in that city he will be challenged for an OTP the next time he logs in from that city. To accomplish this use case a rule will be configured to check on the membership count for the current city bucket in the last month. The count threshold will be set to two so the rule will trigger until the user has been a member at least twice in the last rolling month window.

To set up the system so that users are challenged with an OTP if they are logging in from a city they are not a member of, perform the following steps.

1. Create a pattern with **User** as the actor, **City** as the attribute, and **For Each** as the compare operator.
2. Use the condition, Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period
3. Set the rule parameters for conditions as:
   a. **Pattern Name** as the pattern that you have created.
   b. **Time period type** is **month**.
   c. **Time period** is **1**.
   d. **Count** is **3**.
   e. Operator if required is **less than**.

The rule will trigger (and challenge) the user, if the user has not used that city more than 2 times in the last month (in last 30 days).

15.14.7 Use Case: Autolearning Adapts to Behavior of Entities

In addition to profiling, collecting data, and checking it, autolearning adjusts so that the system acts depending on the user's behavior. Conditions and the specified percentage remain unchanged.

If you log in to the bank application from California everyday, but then you locate to Seattle without informing your bank. When you log in for the first time from Seattle, you are challenged. The second time, you are challenged again because you are logging in from a city less than 50% of your total logins within 1 month. The system knows Seattle is not the usual place you log in from. You are annoyed, but do not consider it a hindrance yet. Challenging you again will degrade your user experience.

The condition, therefore, has to be configured in such a way that there is a percentage when the system knows that it should no longer challenge you. The system should automatically be smart enough to understand that you are logging in from Seattle every time now going forward and that it should not challenge you.

The system does not challenge you when you log in a third time from Seattle. When you fly to California after three months the system challenges you when you log in. The system wanted to make sure that you are the person logging in to the system.

Example

You want the system to KBA challenge the user if the user logs in from a city less than 50% of the time within a month.

1. Create a multi- bucket pattern for each city called, UserLoginsCity.
   - Member type is user
   - Attribute is City; compare operator is "for each"

   When a user logs in from different cities a bucket will be created for each city
2. Create an Action Group to KBA challenge the user for each city less than % membership.
3. Create policy that will use autolearning conditions in the Post-Authentication checkpoint.
4. Create a rule within the policy that uses conditions to associate the pattern.

   The rule will calculate the percentage membership of a user belonging to a pattern

- Ensure that the rule contains the autolearning condition, "Pattern (Authentication): Entity is member of pattern less than some percent times".

  For information on this condition, see "Pattern (Authentication): Entity is a Member of the Pattern Less Than Some Percent of Time".

- Fill in the values for the condition

Label	Default
Pattern Hit Percent less than	50
Pattern name for membership	UserLoginsCity
Is Membership Count Less than patternHitPercent	True
Time period type for pattern membership	Month
Time period for pattern membership	1
Member type for pattern membership	User

- Add the Action group as a result of the rule.

5. Group link to user group.
6. If the user logs in from a city < than 50% of the total logins within 1 month, the user is challenged.

15.14.8 Use Case: Single Bucket Pattern

Single-bucket (manually created) patterns create and populate one bucket with the exact data points and value ranges specified in the pattern. You can create a pattern that describes behavior that has been deemed to be high risk based on industry expertise.

You can configure a bucket so that OAAM can look for any traffic that falls in:

- 8am -10am pattern
- New location
- New device
- New transfer account, not owned by this user is created
- Wire transfer to new account

This specific combination has been known to be a very high fraud risk in the past so you want to challenge with an OTP through SMS any time this pattern is seen.

15.14.9 Use Case: Using Pattern

A Security Administrator must configure a policy that challenges a user with a challenge question if the user is logging in from a state that he or she does not log in from very often, specifically one that he or she uses less than twice in a month.

The outcome should include a score and an alert.

Why use patterns for this scenario

This evaluation involves both profiling (patterns) and the rules to evaluate those patterns.

Patterns are used in this scenario for the following reasons:

- If rules are to track the frequency of behavior, the period for evaluating the frequency might be relatively long, especially if the evaluation requires months or even years. Using a pattern is recommended in these cases because rules will not have to perform large queries for results. Oracle Adaptive Access Manager checks the bucketing to see if the user is a member of the current state bucket that he is falling into now and the frequency at which he has fallen into that bucket.
- Other rules that run can use the pattern, which tracks the state or frequency of state usage, for other types of risk evaluations. By using the same pattern, no overhead is incurred to impact performance.

Steps

1. Log in to the OAAM Administration Console as an administrator.
2. In the Navigation tree, double-click **Patterns**. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.

   Create a pattern where:

   - **Creation Method**: Multi-bucket
   - **Member Type**: User
   - E**valuation Priority**: High
   - **Description**: Pattern to track the state usage and frequency

   Click **Create**.
4. Click the **Attribute** tab.
5. Click the **Add** button.
6. In the **Add Attribute** dialog, select **State** as the attribute and click **Next**.
7. In the page following, select **for Each** as the **Compare Operator** and click **Add** and then **OK**.

   The compare operator **for Each** is selected to profile every state that users log in from (a bucket is created for each state and populated with users as they fall into the buckets).
8. In the Navigator tree, double-click **Group**.
9. Click **New Group**. The **Create Group** dialog is displayed.
10. Create a new `StateNotUsedOften` alert group.

    - **Group name**: State not used often
    - **Group type**: alerts
    - **Caching policy**: Full cache since the group is used in rules and conditions.
11. Click **Create** and then **OK**. The **Group Details** page is display.
12. In the **Alerts** tab of the **Group Details** page, click **Add Member**.
13. In the **Add Member** page, select **Create new element**.
14. Select the **Customer Care** as the alert type.
15. Select the **Medium** as the alert level.
16. Type in the alert message in the **Alert Message** box.

For example, user is logging in from a state he or she has used less than 2 times in a month.

17. Click **Add** to create and add the new alert to the alert group.
18. When the confirmation dialog appears, click **OK** to dismiss the dialog.
19. In the Navigation tree, double-click **Policies**. The **Policies Search** page is displayed.
20. Search policies for Post-Authentication policies that are available.

    In best practices, KBA challenges occur in the Post-Authentication checkpoint.

    Because the rule being created will have the outcome of a KBA challenge, it will have to be in the Post-Authentication checkpoint. It must also be in a policy in which there is a check for KBA registration before this rule runs.
21. Open the policy to the details page and click the **Rules** tab.
22. Click **Add**.
23. Plan the rule:

    A rule should be created to KBA-challenge the user if it is triggered; therefore the rule must be contained in a policy with other rule challenges.

    Because the rule will result in a KBA challenge, the best practice is for the scoring that you set and configure for the rule to have a relationship to the action/outcome of that rule and to the severity of that rule that is being evaluated. The severity of the situation, the action for which the rule would trigger, and the score in which the rule would generate must be proportional to each other.

    The rule is checking if the user is logging in from a state that he has logged in from recently, but the situation does not necessarily mean fraud. The situation is one of medium risk--that is why a KBA challenge is used instead of a block. A KBA challenge is appropriate for the scores in the 500 to 700 risk range. For this example, a score of 600 is specified. An OTP challenge would have been appropriate for a score in the 701 to 900 range. For a score of 900 and over, the action triggered should be a "block." The user should be allowed to continue on if the score is under 500.
24. Enter the summary information and click the **Results** tab.
25. Enter `600` as the score.
26. Enter `100` as the weight.
27. Select **ChallengeQuestionPad** as the action.
28. Select **StateNotUsedOften** as the alert.
29. Click the **Conditions** tab.
30. Click **Add** and select Pattern (Authentication): Entity is Member of Pattern N Times.

    Enter the following values:

Label	Name	Default
Pattern Hit Count More than	Pattern Hit Count More than	2
Pattern Name For MemberShip	Pattern Name for MemberShip	user:state

Label	Name	Default
is MemberShip Count more than the Pattern Hit Count for User	isMoreThan	false
Time period type for pattern membership	Time Period Type for Patternmembership	month
Time Period Type for Pattern MemberShip	Time Period Type for Pattern MemberShip	1
MemberType for pattern Membership	MemberType for pattern Membership	user

31. Click **Save** to save your changes.

    A confirmation dialog displays the status of the operation.

32. Click **OK** to dismiss the confirmation dialog.

15.14.10 Use Case: Logins from Out of State

Acme is a small business group and all their clients are local to the city and are not expected to travel out of the state very often. The business group wants to track all logins occurring from other states, so they can challenge the users and also trigger a high alert so they can investigate to ensure that it is a valid user logging in from the other state. If they are valid, they will be added to an "Allow User group" so they will not be challenged the next time they log in from another state.

1. Create a single bucket pattern with the following parameters so the pattern tracks all logins not occurring from this state. Essentially the counter will be incremented every time the login occurs from another state.
   - Transaction Type: Authentication
   - Attribute: State
   - Compare Operator: Not in
   - Compare Value: State name
   - Member Type: User
   - Evaluation Priority: First
2. Use this pattern in a rule condition.
   a. Create a rule.
   b. Add the condition, Pattern (Authentication): Entity is Member of Pattern N Times.
      - Pattern hit count more than: count
      - Pattern Name for membership: Pattern name
      - Is Membership Count More than patternHitCountForUser: True
      - Time period type for pattern membership-- Hours
      - Time period for pattern membership: 1
      - Member type for pattern membership-- User
3. Save the policy and rule.

4. Simulate a few logins from different states. The users should be challenged and a high alert should be triggered.
5. Add a user to the "Whitelisted User Group".
6. Add this user group to "excluded user group" in the pre-conditions in the rule.
7. Save the policy and rule.
8. Repeat step 5. Users in the White User Group will not be challenged.

15.14.11 Use Case: Wire Transfer Dollar Amount Pattern

Mike is a security administrator who needs to profile user behavior based on the online banking wire transfers they complete. Mike wants to track the ranges of dollar amounts each user normally transfers. He creates a user multi-bucket pattern to create dollar ranges of $100. Mike then implements a rule to challenge the user if the current dollar range bucket transfer has fallen into one the user has had less than 10% of the time in the last three months.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents a banking wire transfer, such as the "Internet Banking" transaction from the OAAM sample application.

1. Log in to the OAAM Administration Console as an administrator.
2. Create a user multi-bucket pattern to create dollar ranges of $100.
   a. After you have logged in to the OAAM Administration Console, double-click **Patterns** in the Navigation pane. The Patterns Search page is displayed.
   b. Click the **New Pattern** button on the upper right of the console. This displays the New Pattern screen for creating a new pattern.
   c. Enter the Pattern Name. In this example it is `User: wire transfer profiling pattern`.
   d. Select **Internet Banking** as the Transaction type since you will be profiling the user's behavior based on internet transactions.
   e. Select **Customer** as the Member Type.
   f. Select **Multi Bucket** as the Creation Method since you need to create dollar ranges of $100.
   g. Select **High** as the Evaluation Priority so that it is processed first.
   h. Enter a description and click **Create**. A page with details of your pattern is displayed.
   i. Click the **Attribute** tab to specify the attributes you will be checking.
   j. Click the **Add** button. This will provide a search screen allowing you to search for attributes you want to check. Enter your search criteria and click **Search** to see a list of attributes you want to use.
   k. Select **Amount** from the list and click **Next**.
   l. Enter a description for this attribute.
   m. Select **Range** as the Compare Operator.
   n. Enter **0** as the Start Value and leave the End Value blank.
   o. Enter `100` as the Increment Step since the transaction amount is collected in ranges of 100.

p. Click **Add**.

3. Creates a rule to challenge if the current dollar range bucket transfer has fallen into is one the user has been a member of less than 10% of the time in the last three months.

   a. Double-click **Policies** in the Navigation pane. This will provide the Policies Search page allowing you to search for OAAM Users vs. Themselves policy. Enter the search criteria and click Search.

   b. Open the OAAM User vs. Themselves policy.

   c. Click the **Rules** tab and the **Add** button.

   d. Enter details about the Rule in the Summary tab such as the Rule Name and Description. Do not change the Rule Status. Leave it as **Active**.

   e. Click the **Conditions** tab and add the "Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time" condition.

      Enter the following values:

Parameter	Value
Pattern hit count less than	10
Pattern name for membership	User: wire transfer
is membership count less than the pattern hit percent	True
Time period type for pattern membership	months
Time period for pattern membership	3
Member type for pattern membership	customer

      The pattern rule triggers when the transaction amount is less than 10% of all the other transactions.

   f. Open the Results tab.

   g. Enter a score.

   h. Enter the weight.

   i. Set the rule result Action Group to "OAAM Challenge."

4. Click **Save** to save your changes.

   A confirmation dialog displays the status of the operation.

5. Click **OK** to dismiss the confirmation dialog.

Post conditions: Users who perform a wire transfer for an amount in a dollar range that is different from 90% of their wire transfers over the previous three months are challenged.

(The pattern rule triggers when the wire transfer transaction amount is less than 10% of all the other transactions.)

15.14.12 Use Case: HR Employee Record Access Pattern per User

Mike is a security administrator who needs to profile and evaluate users behavior based on the frequency and volume of access requests they make to an HR application for employee records. Mike wants to track the number of records per 8-hour time period normally accessed by each HR representative. He creates a multi-bucket pattern

to capture the count of requests over each 8-hour period for a day. Mike then implements a rule to generate an alert if the current access falls into an 8 hour range that exceeds the user's average over the last month by 40%.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents employee record access.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the employee record access transaction to capture the count of requests over each 8-hour period for a day.
    a. In the "New Pattern" dialog, the Analyst selects Transaction Type as "HR Record Access," Creation Method as "Multi-Bucket," Member Types as "HR Rep," and Evaluation Priority as "High."
    b. In the Attributes tab, the Analyst adds a new attribute, selecting "Time" from the list. For the Attribute Details, the Analyst selects Compare Operator as "Range," Start Value as "0," End Value as "23," and Increment Step as "8."
5. The Analyst creates a rule to generate an alert if the current access falls into an 8 hour range that exceeds the user's average over the last month by 40%.
6. The Analyst opens the OAAM User vs. Themselves policy and adds a new rule.
7. The Analyst adds the "Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods" condition to the rule, with Pattern Hit Percent greater than as "40, Pattern name for membership: the name of the pattern created in step 4, Time period type for pattern membership as "Days," Time period for pattern membership as "30," and Member type for pattern membership as "HR rep."
8. The Analyst sets the rule result to generate an alert.

Post conditions: Users who perform a number of access requests in an 8-hour period that is 40% higher than their average number of the access requests over the previous month cause an alert.

15.14.13 Use Case: HR Employee Record Access Pattern for All Users

Mike is a security administrator who needs to profile and evaluate users behavior based on the frequency and volume of access requests they make to an HR application for employee records compared to the access requests of others. Mike wants to track the number of records per 8-hour time period normally accessed by any HR representative. He creates a multi-bucket pattern to capture the count of requests over each 8-hour period for a day. Mike then implements a rule to generate an alert if the current access falls into an 8-hour range that exceeds the average for all users over the last month by 30%.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents employee record access.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the employee record access transaction to capture the count of requests over each 8-hour period for a day.

a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "HR Record Access," Creation Method as "Multi-Bucket," Member Types as "HR Rep," and Evaluation Priority as "High."

b. In the Attributes tab, the Analyst adds a new attribute, selecting "Time" from the list. For the Attribute Details, the Analyst selects Compare Operator as "Range," Start Value as "0," End Value as "23," and Increment Step as "8" to generate an alert if the current access falls into an 8 hour range that exceeds the average for all users over the last month by 30%.

5. The Analyst opens the OAAM User vs. All Users policy and adds a new rule.

6. The Analyst adds the "Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods" condition to the rule, with Pattern Hit Percent greater than as "30," Pattern name for membership: pattern created in step 4, Time period type for pattern membership as "Days," Time period for pattern membership as "30," and Member type for pattern membership as "HR Rep."

7. The Analyst sets the rule result to generate an alert.

Post conditions: Users who perform a number of access requests in an 8-hour period that is 40% higher than the average number of the access requests for all users over the previous month cause an alert.

15.14.14 Use Case: Shipping Address Country Pattern

Mike is a security administrator who needs to profile ecommerce transactions based on the country the goods are shipping to. He creates a pattern to create a bucket for each country and count the transactions shipped to each. He then implements a rule to generate an alert if a transaction is one where the goods are shipping to a country that less than 5% of all other orders have shipped to in the last 3 months.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction, such as the "Retail Ecommerce" transaction from the OAAM sample application. The transaction has an entity or an attribute that indicates the country in the shipping address.

1. The Analyst opens the OAAM Administration Console.

2. The Analyst sees only the appropriate user interface controls afforded his role.

3. The Analyst selects the action to create a new pattern.

4. The Analyst creates a new multi-bucket pattern on the Retail Ecommerce transaction to create a bucket for each country in the shipping address.

   a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Type as "Shipping Address," and Evaluation Priority as "High."

   b. In the Attributes tab, the Analyst adds a new attribute, selecting "Country" from the list and selecting "for Each" as the Compare Operator.

   A pattern is created for the Retail Ecommerce Transaction type. It collects country information for every transaction.

5. The Analyst creates a rule to generate an alert if goods in a transaction is shipping to a country that less than 5% of all other orders have shipped to in the last 3 months.

6. The Analyst opens the OAAM User vs. Themselves policy and adds a new rule.

7. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time" condition to the rule, with Pattern Hit Percent less than as "5, "Pattern name for membership: pattern created in step 4, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "Shipping Address."
8. The Analyst sets the rule result Action Group to "OAAM Challenge."

Post conditions: Users who ship to a country that has been used in transactions less than 5% of the time over the past three months generate an alert.

Table 15–2 Shipping Address Country Pattern

Pattern Statement Breakdown	Oracle Adaptive Access Manager Security Policy Components
Profile ecommerce transactions	Transaction type is Retail Ecommerce
User is shipping goods to countries	Entity is user
Country the goods are shipping to	Attribute is Shipping.Address.Country
Create a bucket for each country	Creation method is multi-bucket; compare operator "For each"
Count the transactions shipped to each [country]	Pattern to collect country information for transactions Pattern tracks each user's shipping address country for Retail Ecommerce transactions
Rule	An alert triggers when the user ships to a country that is less than 5% of all the other countries shipped to
Condition	Pattern (Transaction): Entity is member of pattern less than some percent times condition
Policy to evaluate their current behavior against their own historical behavior.	OAAM User vs. Themselves
Percentage basis specified in rule	5%
Time period specified in rule	last 3 months
Checkpoint	Rule created in a policy that runs in the Transaction Update checkpoint
Rule result Action Group to "OAAM Challenge"	OAAM Challenge

15.14.15 Use Case: Shipping Address Country Pattern and Billing Mismatch

Mike is a security administrator who needs to profile ecommerce transactions based on the country the goods are shipping to and if the billing and shipping addresses are from different countries. He creates a pattern to create a bucket for each country and count the transactions shipped to each. He then implements a rule to generate an alert if a transaction is shipping to a country that less than 5% of all other orders have shipped to in the last 3 months and if the shipping address country and billing address country are not the same.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction, such as the "Retail Ecommerce" transaction from oaam_sample. The transaction has entities or attributes that indicates the country in the shipping address and the country in the billing address.

1. The Analyst opens the OAAM Administration Console.

2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the ecommerce transaction to create a bucket for each country and count the transactions shipped to each.
    a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "Shipping Address," and Evaluation Priority as "High."
    b. In the Attributes tab, the Analyst adds a new attribute, selecting "Country" from the list and selecting "for Each" as the Compare Operator.
5. The Analyst creates a rule to generate an alert if a transaction is shipping to a country that less than 5% of all other orders have shipped to in the last 3 months and if the shipping address country and billing address country are not the same.
6. The Analyst opens the OAAM User vs. All Users policy and adds a new rule.
7. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time" condition to the rule, with Pattern Hit Percent less than as "5," Pattern name for membership: pattern created in step 4, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "Shipping Address."
8. The Analyst adds the "Session: Compare two parameter values" condition to the rule, with Parameter key 1 as "Transaction.billingAddress.country," Operation as "Not Equal To," Parameter key 2 as "Transaction.shippingAddress.country," Ignore case as "True," and if no data, return as "False".
9. The Analyst sets the rule result to generate an alert.

Post conditions: If a user ships to a country different from his billing address, and the shipping country is one that is used less than 5% of the time, then an alert is generated.

15.14.16 Use Case: Shipping Address Country IP Pattern

Mike is a security administrator who needs to profile if it is normal for any credit cards to be used in an ecommerce transaction to be made from an IP in the USA and ship to Nigeria. He creates a pattern to create a bucket for transactions made from an IP mapped to anywhere in the USA and shipped to anywhere in Nigeria and maintain counts for every credit card used. He then implements a rule to generate an alert if a card has at least 5 orders in the last year and has had a combination captured in this pattern and it has occurred in less than 25% all other orders from this card in the last 4 months.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction. The transaction has an entity to represent the credit card and entities or attributes that indicate shipping country and user's country as resolved from their IP address.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new single-bucket pattern on the ecommerce transaction to for transactions made from an IP mapped to anywhere in the USA and shipped to anywhere in Nigeria and maintain counts for every credit card used.

a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Single-Bucket," Member Types as "Credit Card," and Evaluation Priority as "High."

b. In the Attributes tab, the Analyst adds a new attribute, selecting "Country" for the shipping address from the list, selecting "In" as the Compare Operator, and typing "nigeria" as the Compare Value.

c. In the Attributes tab, the Analyst adds a new attribute, selecting "Country" for the IP address from the list, selecting "In" as the Compare Operator, and typing "united states" as the Compare Value.

5. The Analyst creates a rule to generate an alert if a card has at least five orders in the last year and has had a combination captured in this pattern and it has occurred in less than 25% all other orders from this card in the last 4 months.
6. The Analyst opens the OAAM User vs. All Users policy and adds a new rule.
7. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time" condition to the rule, with Pattern Hit Percent less than as "5, "Pattern name for membership: pattern created in step 4, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "4," and Member type for pattern membership as "Credit Card."
8. The Analyst adds the "Transaction: Check Count of any entity or element of a Transaction using filter conditions" condition to the rule, with Select Transaction to check as "Retail Ecommerce," Select Entity or Element to count as "Credit Card," Specified Condition for Count as "Greater Than Equal," Specified Check value for Count as "5," Duration as "1 Rolling years," Ignore Current Transaction in count? as "True," for the same user? as "False," and apply the filter checks on Current Transaction as "False."
9. The Analyst sets the rule result to generate an alert.

Post conditions: If a user logged in from the US places an order with a shipping address in Nigeria, and does so with a card that has not been used in this manner 25% or more of the time over the last 4 months, an alert will be generated.

15.14.17 Use Case: Browser Locale Pattern

Mike is a security administrator who needs to profile users based on the browser locales they utilize when accessing. He creates a multi-bucket pattern for users by locale. This creates a bucket for each locale. He then develops a rule to challenge if the locale being used is one this user has never used previously.

Prerequisites: Default snapshot is loaded.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the authentication transaction to track each browser locale.

a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Internet Banking," Creation Method as "Multi-Bucket," Member Types as "Customer," and Evaluation Priority as "High."

b. In the Attributes tab, the Analyst adds a new attribute, selecting "Locale" from the list and selects Compare Operator as "for Each".

5. The Analyst creates a rule to challenge if the locale being used is one this user has never used previously.
6. The Analyst opens the OAAM User vs. Themselves policy and adds a new rule.
7. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period" condition to the rule, with Is condition True as "True," Time period type for bucket membership as "Years," Time period for bucket membership as "999," Member type for pattern-bucket membership as "Customer," and First Time count as "1."
8. The Analyst sets the rule result Action Group to "OAAM Challenge."

Post conditions: A user who is using a locale that she has never used before is challenged.

15.14.18 Use Case: Credit Card by Shipping Address Country Pattern

Mike is a security administrator who needs to profile ecommerce transactions based on the credit card and country the goods are shipping to. He creates a pattern to create a bucket for each credit card and shipping address country and count the transactions. He then implements a rule to alert if a transaction uses a credit card that has been used more than five items and has shipped to the current country less than 5% of the time in the last 3 months.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction. The transaction has entities that represent the credit card and the shipping address.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the ecommerce transaction for each credit card and shipping address country and count the transactions.
   a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "Credit Card," and Evaluation Priority as "High."
   b. In the Attributes tab, the Analyst adds a new attribute, selecting "Country" for the shipping address from the list and selects "for Each" as the Compare Operator.
5. The Analyst creates a rule to alert if a transaction uses a credit card that has been used more than five items and has shipped to the current country less than 5% of the time in the last 3 months.
6. The Analyst opens the OAAM User vs. Themselves policy and adds a new rule.
7. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time" condition to the rule, with Pattern Hit Percent less than as "5," Pattern name for membership: pattern created in step 4, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "Credit Card."
8. The Analyst adds the "Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions" condition to the rule, with Select Transaction to check as "Retail Ecommerce," Select Entity or Element to count as "Credit Card," Specified Condition for Count as "Greater Than," Specified Check value for Count

as 5, Duration as "3 Rolling months," Ignore Current Transaction in count? as "True," for the same user? as "False," and Apply the filter checks on Current Transaction as "False."

9. The Analyst sets the rule result to generate an alert.

Post conditions: If a user ships to a country that has not been associated with his credit card at least 5% of the time in the last 3 months, and the card has been used more than 5 times in the last 3 months, the transaction triggers an alert.

15.14.19 Use Case: Credit Card by Dollar Amount Range and Time Pattern

Mike is a security administrator who needs to profile ecommerce orders based on the credit card, the frequency of orders and dollar amount ranges. He creates a pattern to create a bucket for each order amount range of $10 to profile credit cards. He then creates a pattern to profile the frequency ranges of orders by credit card. He then implements a rule to generate an alert if a transaction uses a credit card a number of times in the last 24 hours that is 40% higher than the average over the last three months and the credit card has had more than four orders falling into the same dollar amount range bucket in the last 24 hours.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction. The transaction has an entity to represent the credit card and an entity or an attribute that indicates the dollar amount.

1. The Analyst opens the OAAM Administration Console.
2. The Analyst sees only the appropriate user interface controls afforded his role.
3. The Analyst selects the action to create a new pattern.
4. The Analyst creates a new multi-bucket pattern on the ecommerce transaction to create a bucket for each order amount range of $10 to profile credit cards.
    a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "Credit Card," and Evaluation Priority as "High."
    b. In the Attributes tab, the Analyst adds a new attribute, selecting "Transaction Amount" from the list. For the Attribute Details, the Analyst selects Compare Operator as "Range," Start Value as "0," End Value as blank, and Increment Step as "10."
5. The Analyst creates a new multi-bucket pattern on the ecommerce profile the frequency ranges of orders by credit card.
    a. In the "New Pattern" Dialog, the Analyst selects Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "Credit Card," and Evaluation Priority as "High."
    b. In the Attributes tab, the Analyst adds a new attribute, selecting "Day of Month" from the list and selecting Compare Operator as "for Each."
6. The Analyst creates a rule to generate an alert if a transaction uses a credit card that has fallen into frequency range bucket in the first 24 hours that it has not in the first three months and the credit card has had more than four orders falling into the same dollar amount range bucket in the last 24 hours.
7. The Analyst opens the OAAM User vs. Themselves policy and adds a new rule.
8. The Analyst adds the "Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period" condition to the rule, with Pattern name for membership: pattern created in step 4, Time period for pattern membership as

"24," Time period type for pattern membership as "Hours," Member type for pattern membership as "Credit Card," Bucket hit count as "4," Compare operator for the count as "Greater than," Return value for condition is true as "True," and Return value if condition encounters an error as "False".

9. The Analyst adds the "Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods" condition to the rule, with Pattern Hit Percent greater than as "40," Pattern name for membership: pattern created in step 4, Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "Credit Card".
10. The Analyst sets the rule result to generate an alert.

Post conditions: If a credit card falls into a 24-hour period frequency bucket that it has not been in the last three months, and has four transactions in the same dollar range in the past 24 hours, an alert will be generated.

15.15 Autolearning Properties

Autolearning properties and their default values out of the box are listed in this section.

Property	Default Value	Property Type	Is Dynamic	Comments
vcrypt.bharosa.autolearning.numPriorities	2	Integer	No	This creates the number of threadpools as the number of priorities. These threadpools are used for post processing the autolearning data. This number should be more than 1.
vcrypt.bharosa.autolearning.threadMultiplier	7	Integer	No	This number is used to create the number of threads for post processing. These threads are part of the threadpool that is used for post processing autolearning data. Keep this number to at least 5.
vcrypt.tracker.autolearnin.enabled	true	Boolean	Yes	This flag is used to control the status for the product level. Setting the value to false disables some of the post processing for autolearning. Rules continue to run but may be using stale data.

Property	Default Value	Property Type	Is Dynamic	Comments
vcrypt.tracker.autolearning.use.auth.status.for.analysis	false	Boolean	Yes	This flag is used when the client code does not explicitly call the autolearning API. If you want autolearning (post processing) to occur but do not want to change the client code, setting this flag to true results in autolearning processing for the authentication type of updateAuthStatus requests if the status is SUCCESS for that authentication request. However if the status is not SUCCESS, autolearning does not occur. Running autolearning rules with this flag set to false runs the rules on the data that is stale. If this flag is set to false and autolearning rules are running, and if the log level is set to "debug" for "com.bharosa.vcrypt.tracker.rules.impl.VCryptTrackerAutoLearningImpl" class; then a message is written to the log saying that this property is disabled and rules are still being run.
oracle.oaam.transactions.analyzepatterns	false	Boolean		Property must be set to true for pattern data to be collected for transactions.

Property	Default Value	Property Type	Is Dynamic	Comments
vcrypt.tracker.autolearning.use.tran.status.for.analysis	false	Boolean	Yes	This flag is used when the client code does not explicitly call the autolearning API. If you want autolearning (post processing) to occur but do not want to change the client code, setting this flag to true results in autolearning processing for updateTransactionStatus requests if the status is SUCCESS for that transaction request. However if the status is not SUCCESS, autolearning does not occur. Running autolearning rules with this flag set to false runs the rules on the data that is stale. If this flag is set to false and you have autolearning rules running, and if the log level is set to "debug" for the "com.bharosa.vcrypt.tracker.rules.impl.VCryptTrackerAutoLearningImpl" class; a message is written to the log saying that this property is disabled and rules are still running.
vcrypt.tracker.autolearning.use.synchronous.execution.for.pattern.analysis	false	Boolean	Yes	This property controls whether the pattern analysis occur in synchronous mode. If set to true, pattern analysis is performed in synchronous fashion. The updateAuthStatus or updateTransactionStatus call may take longer to complete since all the pattern data update occurs as part of the same updateStatus call.

Property	Default Value	Property Type	Is Dynamic	Comments
vcrypt.tracker.autolearning.update.entity.profile.for.auth.patterns	true	Boolean	Yes	If this property is set to false, profiles for entities are not updated as part of pattern analysis.
bharosa.menu.queries.entities	false	Boolean	Yes	This flag determines whether the menu item to view historical data should be shown in the OAAM Admin Console.
bharosa.arm.pagetitle.queries.entities.patternworkflow		String	Yes	Default location of the menu for the pattern historical data. Use this historical data page to check to see whether pattern data collection is functioning properly.

15.16 Checking if Autolearning Pattern Analysis Functioning

To quickly determine if Autolearning is functioning, perform the following steps:

1. Ensure that the base authentication-related entities are installed and that the following properties are set to true.
   - vcrypt.tracker.autolearnin.enabled
   - vcrypt.tracker.autolearning.use.auth.status.for.analysis
   - vcrypt.tracker.autolearning.use.tran.status.for.analysis
2. Make sure that patterns are defined and active. You should have at least one pattern that has **User** as a member type and **time**, **city**, **state**, or **country** as an attribute. For time choose **Range** as the operator. If you choose the other attributes, choose **For Each** as the operator. You should choose only one attribute so that you can use this pattern as a test pattern.
3. Log in to the OAAM Server a few times.
4. Perform the following database queries on the v_fprints table.

   Run

   ```
   "select * from v_fprints where pattern_id is not null and create_time >
   sysdate - 1/96"
   ```

   This will return pattern based fingerprints created in last 15 minutes.

   Run

   ```
   "select * from vt_wf_days where fprint_id in ( select fprint_id from v_
   fprints where pattern_id is not null and create_time > sysdate - 1/96)"
   ```

   If this returns records and the record shows a positive integer in "todays day column," autolearning is working. Note: If today is the 15th then look into the Day_15 column in the records returned by this database query.

15.17 Checking if Autolearning Rules are Functioning

To check to see whether the rule was triggered, create a time based pattern that tracks the user.

1. Create a policy (Post-Authentication) and add the User first time bucket rule to it. Select the time based pattern and leave all other values to default.
2. Save the policy.
3. Perform logins from the authenticator using new user names.

   If autolearning processing worked then the rule added to the policy should trigger.
4. After this perform the same logins again in the same hour.

   If autolearning rule is working the rules should not trigger for this second login.

15.18 Autolearning Classes and Logging

Important classes for logging to debug level is summarized below.

Table 15–3 Autolearning Classes and Logging

Class Name/Logger	What does debug logging do
com.bharosa.vcrypt.tracker.autolearning.VCryptAuthPatternAnalysisRequest AND com.bharosa.vcrypt.tracker.autolearning.VCryptTransactionPatternAnalysisRequest	Prints debug log when processing the request. Time required to process the autolearning request is printed as milliseconds. All function entry and exit points are logged along with incoming and outgoing parameters
com.bharosa.vcrypt.tracker.rules.impl.VCryptTrackerAutoLearningImpl	Prints debug log when processing autolearning rules. Request ID is printed along the log statements so you can track the log with the session. All function entry and exit points are logged along with incoming and outgoing parameters
com.bharosa.vcrypt.tracker.autolearning.VCryptAutoLearningRulesUtil	This class implements most of the logic in autolearning rules. Request ID is printed along the log statements so you can track the log with the session. All database queries are also printed. The time required to database query is available from the time in log statements. All function entry and exit points are logged along with incoming and outgoing parameters

15.19 Pattern Attributes Reference

Information about the pattern attributes is presented in this section.

Table 15–4 Pattern Attributes

Name	Description	Type	Operators	Valid Values	Buckets	Comments (Applicable Rules)
dayOfMonth	Day Of the Month (First day as 1, Last Day will vary)	Integer	Equal, not equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	1 through 31	multi-bucket	User - themselves and all
monthOfTheYear	Month Of the Year (January as 0, December as 11)	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	0 through 11	multi-bucket	User - themselves and all
Connection Type	Connection Type for the authentication request. The value for this attribute is a positive integer number that indicates the connection type. Examples of connection type are optical connection, wireless connection, dialup connection, T1/T3 type of connection, DSL connection, cable connection, and so on. Refer to location.connection.type.enum for more information on connection type.	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	lookup location.connection.type.enum	multi-bucket	■ User - themselves ■ Device - themselves and all ■ Location - themselves
Connection Speed	Connection Speed for the authentication request. The value for this attribute is a positive integer number that indicates the connection speed. Examples of connection speed are High, Medium, Low, and so on. Refer to connection.linespeed.enum for more information.	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	lookup connection.linespeed.enum	multi-bucket only	■ User - themselves ■ Device - themselves and all
Routing Type	Connection routing type for the authentication request. The value for this attribute is a positive integer number that indicates the routing type. Examples of routing type are POP, Proxy, AOL, and so on. More information on routing type can be found in location.routing.type.enum.	Integer	Equal, not equal, for each, less than, less than equal to, greater than, greater than equal to, in, not in, range	lookup location.routing.type.enum	multi-bucket only	■ User - themselves and all ■ Device - themselves and all

Table 15–4 (Cont.) Pattern Attributes

Name	Description	Type	Operators	Valid Values	Buckets	Comments (Applicable Rules)
Browser	Browser used for the authentication request. Examples of browser are Mozilla, Opera, and so on.	String	For each, in, not in, like, not like	Any string value	multi-bucket only (rarely single)	■ User - themselves and all ■ Device - themselves and all
Operating System	Operating System used for the authentication request. Examples of Operating System are Unix, Linux, Windows, and others.	String	For each, in, not in, like, not like	Any string value	multi-bucket	■ User - themselves and all ■ Device - themselves and all
locale	Locale used for the authentication request. Examples of Locale are en_US, fr_CN, en_GB, and so on.	String	For each, in, not in, like, not like	Any string value	multi-bucket only	■ User - themselves and all ■ Device - themselves and all ■ IP - themselves and all
Device Fingerprint Identifier	Device Fingerprint Identifier available for the authentication request. This number is calculated depending on the device used by the user for this authentication request.	Long	For each, equals, less than, less than equal to, greater than, greater than equal to, in, not in, not equal, range	Any positive number (java.lang.Long)	multi-bucket	■ User - themselves ■ Device - themselves
Cookie Enabled Status	This boolean variable tracks if the cookie was enabled or disabled on the user's device/browser for this authentication request.	Boolean	For each, not equal, equal	True or False	multi-bucket	User - themselves
Cookie Status	This variable tracks the status of the device/browser cookie. This is a positive integer that corresponds to status of the browser cookie. Examples of the status are Learn mode (0), Enabled (1) and Disabled (2), and so on. More information on cookie state can be found in cookie.state.enum.	Integer	Equal, not equal, for each, less than, less than equal to, greater than, greater than equal to, in, not in, range	lookup cookie.state.enum	multi-bucket	User - themselves
Screen Resolution (based on flash)	This variable tracks the screen resolution used by the user.This attribute is usually available in the form of MxN (M by N) pixels. One of the example is 1600x1200 (pixels).	String	For each, in, not in, like, not like	Any string value. Usually the resolution will appear like MxN. For example: (1600x1200)	multi-bucket only	Device - themselves

Table 15–4 (Cont.) Pattern Attributes

Name	Description	Type	Operators	Valid Values	Buckets	Comments (Applicable Rules)
Color screen (based on flash)	This variable tracks whether the user's device has color screen.	Boolean	For each, not equal, equal	True or False	multi-bucket	Device - themselves
Audio encoder (based on flash)	This variable tracks whether the user's device has audio encoder.	Boolean	For each, not equal, equal	True or False	multi-bucket	Device - themselves
Accessibility (based on flash)	This variable tracks whether the user's device has accessibility provisions.	Boolean	For each, not equal, equal	True or False	multi-bucket	User - themselves
Has audio (based on flash)	This variable tracks whether the user's device has audio capabilities.	Boolean	For each, not equal, equal	True or False	multi-bucket	Device - themselves
Country	Country	String	For each, in, not in, like, not like	Any string value	single and multi-bucket	■ User - themselves and all ■ Device - themselves and all
State	State	String	For each, in, not in, like, not like	Any string value	single and multi-bucket	■ User - themselves and all ■ Device - themselves and all
City	City	String	For each, in, not in, like, not like	Any string value	single and multi-bucket	■ User - themselves and all ■ Device - themselves and all
Time	Time when the user is logged in	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	Integer values (0-23)	multi-bucket	User - themselves and all
Day of Week	Day of the week (Sunday as 1, Saturday as 7)	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	Integer (1-7)	single and multi-bucket	User - themselves and all

Table 15–4 (Cont.) Pattern Attributes

Name	Description	Type	Operators	Valid Values	Buckets	Comments (Applicable Rules)
ASN	A unique identifier of an autonomous system on the Internet. Along with other comparators, "for each" is available because if you come from another ASN, you could track that as another bucket. For this attribute, the "equal to" comparator is not available because users will not know the ASN since it is not exposed.	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	Positive integer value	multi-bucket	■ User - themselves and all ■ Device - themselves and all ■ Location - themselves and all
User ID	User's Identification Number	String	For each, in, not in, like, not like	String value	multi-bucket	■ Device - themselves ■ Location - themselves
Group ID	Group Identification Number	String	For each, in, not in, like, not like	any String value	multi-bucket	■ Device - themselves ■ Location - themselves
Device ID	Device Identification Number	Integer	Equal, Not Equal, For Each, Less than, Less than Equal to, greater than, greater than equal to, in, not in, range	any String value	multi-bucket	■ User - themselves ■ Location - themselves
Remote IP	This is the IP address where the authentication is from. It could be the real IP of the user, anonymizer, proxy, or gateway, and so on, to which the end user is connected to.	String	For each, in, not in, like, not like	format a.b.c.d	multi-bucket	■ User - themselves ■ Device - themselves
Is Registered	This attribute tracks if the user needs to be tracked on the "isRegistered" criterion. So if the user is a registered user (completed registration), he is treated in the pattern one way, and if he is not a registered user (has not completed registration), he is treated another way.	Boolean	For each, not equal, equal	True or False	multi-bucket	User - themselves
ISP	The ID for an Internet connection service provider.	Long	For each, equals, less than, less than equal to, greater than, greater than equal to, in, not in, not equal, range	Any positive number	multi-bucket	■ User - themselves and all ■ Device - themselves and all

15.20 Pattern Attributes Operators Reference

Information about the pattern attribute operators is presented in this section.

The **Day of Week** and **City** attributes are used in the examples that follow to illustrate how operators work.

Numbers corresponding to the days of the week are:

- 1 as Sunday
- 2 as Monday
- 3 as Tuesday
- 4 as Wednesday
- 5 as Thursday
- 6 as Friday
- 7 as Saturday

Oracle Adaptive Access Manager will create buckets dynamically as necessary. The first time the criteria specified is fulfilled, Oracle Adaptive Access Manager will create a bucket for the criteria and add the actor as a member with a count of one. The next time the criteria is fulfilled, the actor is added to that same bucket as a member with a count of one. Each subsequent time the criteria is fulfilled, the bucket counter will be incremented.

15.20.1 For Each

If the **For each** attribute is set, a bucket is created for each distinct value of the attribute.

When the user specifies For Each, and **Day of Week** as the attribute, a bucket will be created dynamically for each day of the week as required and the counts updated for the buckets as logins occur.

15.20.2 Equals

If the **Equals** operator is set, the bucket is created and then the count updated only when the attribute value equals the value specified in the Compare Value field.

When the user specifies **Day of Week** as the attribute and enters 7 (Saturday) in the Compare Value field, a bucket is created for Saturday and the count updated as soon as he logs in on Saturday. The other days do not fulfill the criteria he specified.

15.20.3 Less Than

If the **Less Than** operator is specified, a bucket is created and the count updated only when the attribute value is less than the value specified in the Compare Value field.

When the user specifies **Day of Week** as the attribute and enters 4 (Wednesday), a single bucket is created for Sunday (day as 1), Monday (day as 2), and Tuesday (day as 3) and all his logins on Sunday, Monday, and Tuesday will be counted as part of that bucket.

15.20.4 Greater Than

If the **Greater Than** operator is specified, a bucket is created and the count updated only when the attribute value is greater than the value specified in the Compare Value field.

If the user specifies **Day of Week** as the attribute and enters 3 (Tuesday), a single bucket is created and the count updated only for Wednesday (day as 4), Thursday (day as 5), Friday (day as 6), and Saturday (day as 7). A bucket will not be created nor will the count be updated for the user for Tuesday (day as 3).

15.20.5 Less Than Equal To

If the **Less Than Equal To** operator is specified, a bucket is created and the count updated only if the attribute value is less than or equal to the value specified in the Compare Value field.

When the user specifies Day of Week as the attribute and enters 3 (Tuesday), a bucket will be created and the count updated when the user logs in on Sunday (day as 1), Monday (day as 2), and Tuesday (day as 3). In Less Than Equal To 3, Tuesday (day as 3) also qualifies as meeting the bucket population criteria.

15.20.6 Greater Than Equal To

If the **Greater Than Equal To** operator is specified, a bucket is created and the count updated only if the attribute value is greater than or equal to the value specified in the Compare Value field.

When the user specifies Day of Week as the attribute and entered 3 (Tuesday), a bucket will be created and the count updated when the user logs in on Tuesday (day as 3), Wednesday (day as 4), Thursday (day as 5), Friday (day as 6), and Saturday (day as 7). In Greater Than Equal To 3, Tuesday also qualifies as meeting the bucket population criteria.

15.20.7 Not Equal

If the **Not Equal** operator is set, a bucket is created and the count updated when the authentication/transaction attribute has a value not equal to the value specified in the Compare Value field by the user.

In the Day of Week example, if the user specifies a value of 1 (Sunday), a single bucket will be created for all logins other than Sunday (day as 1).

15.20.8 In

The **In** operator works like the **Equals** operator except all the comma separated values in the Compare Value field are used for an "equals to" comparison. In the Day of Week example, if the user enters 1,2,3,4,5, a single bucket is created for all logins that fall on Sunday (day as 1) through Thursday (day as 5).

15.20.9 Not In

The **Not In** operator works exactly the opposite of **In**. In the Day of Week example, if the user enters the values 1,2,3,4,5 for the day of the week, a single bucket is created for Friday (day as 6) and Saturday (day as 7) only.

15.20.10 Like

The **Like** operator is applicable and enabled only for string type attributes. If the user's login "city" is used as the attributes and he specifies "San" for the city attribute, his logins from the cities, "San Francisco," "Santa Clara," "San Jose," and "Sangamner" will result in a single bucket and updates to the count.

"Like" compares the string attribute's value with the one specified by the user.

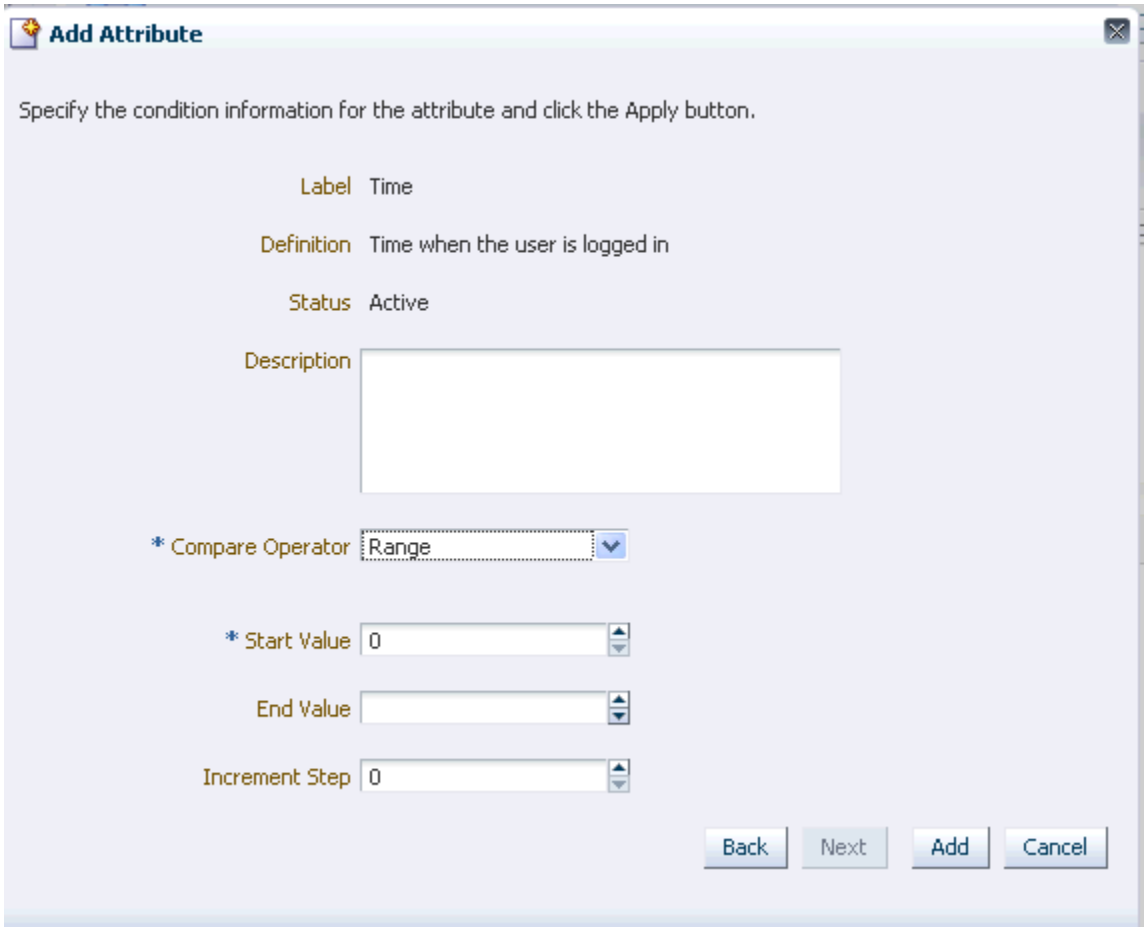
15.20.11 Not Like

The **Not like** operator is applicable and enabled only for string type attributes. If the user's login "city" is used as the attribute and he specifies "San" for the **City** attribute, his logins from the cities, "San Francisco," "Santa Clara," "San Jose," and "Sangamner" will not result in the creation of a bucket or updates to the count. His logins from Redwood City, Austin, and other cities that do not have "San" in the name will result in a single bucket and updates for this pattern.

15.20.12 Range

Range is usually used with numerics.

Figure 15–9 Range Compare Operator



15.20.12.1 Fixed Range

When the user enters values for **Start Value** and **End Value** and leaves the **Increment Step** value as 0, he wants to create a bucket for the activity when the attribute value is **Greater Than Equal To** the **Start Value** and **Less Than Equal To** the **End Value**. Using the Day of Week example, if the user enters 1 (Sunday) as the **Start Value** and 5 (Thursday) as the **End Value**, all the logins from Sunday (day as 1) through Thursday (day as 5) will result in the creation and updates to the count of a single bucket. A fixed range is when the upper and lower limit are fixed and there are no steps "in between" (the increment step is not entered by user).

15.20.12.2 Fixed Range with Steps (or Increment)

When the user enters values for **Start Value** and **End Value** and also provides a value for the **Increment Step**, he wants to create a bucket for the activity when the attribute value is **Greater Than or equal** to the **Start Value** and **Less Than Equal To** the **End Value** and he wants to create finer level buckets which are separated by the "increment" value of the attribute. Using the Day of Week example, if the user enters 1 (Sunday) as the **Start Value** and 5 (Thursday) as the **End Value** and the **Increment Step** as 1, all the logins from Sunday (day as 1) through Thursday (day as 5) will result in the creation and updates to the count of multiple buckets. A bucket will be created and updated for the day starting Monday and then for each day (since the increment is one).

15.20.12.3 Upper Unbound Ranges with Steps

Upper unbounded ranges with increment steps are used for items, such as numbers, such as amounts. Basically, multiple-tiered ranges can be configured.

For example you can configure

0 to 100 with Step 10.

101 to 1000 with Step 100.

1001 to 10000 with Step 1000.

10001 to ... with Step 10000.

All the ranges but the last one works the same way as the earlier range example with **Start Value** and **End Value** with **Increment Step**.

The last range works as if the upper limit is infinity. In this scenario, buckets are created for each 10000 (ten thousand) after 10001 (ten thousand one).

If a user has an amount of 200,123 (two hundred thousand 123), a bucket would be created for him for 200,000 through 210,000. His transaction for this amount will fall into this bucket.

16

Managing Configurable Actions

Oracle Adaptive Access Manager provides many standard actions that are handled by a web application. These standard actions include block, KBA challenge, password TextPad, and others. The standard actions can also be used as trigger actions for **Configurable Actions**. Configurable actions are external Java code that is triggered by OAAM Server. Customers can write any java code they want to perform custom operations without any change to Oracle Adaptive Access Manager. The Configurable Actions feature enables endless customizations.

This chapter provides an overview on configuring a configurable action and instructions on how to define, view, edit, and delete an action instance, and on how to associate action instances to a **Checkpoint**.

16.1 Introduction and Concepts

This section introduces you to the concept of configurable actions and how they are used in Oracle Adaptive Access Manager.

16.1.1 Configurable Actions

OAAM enables you to configure actions, called configurable actions, that are triggered based on the result action or risk scoring or both after a checkpoint execution. The configurable action can be specified so that it executes either in synchronous mode or asynchronous mode. An example of a configurable action is an email that is sent to you whenever a checkpoint execution returns "block" as an action in the result. In this case, "Send Email" is the configurable action and "block" is the trigger criteria. Similarly, there could be configurable actions that can be based on a "risk score" as the trigger criteria.

Java classes and action templates for certain configurable actions are provided by OAAM, but you have the option to develop custom configurable actions based on your particular requirements. For detailed steps on configuring the default configurable actions, see Section 16.20, "Out-of-the-Box Configurable Actions."

16.1.2 Action Templates

Action Templates let you define the common details of the configurable action. You can specify the java class that is tied to the action and also specify default parameter values of the action.

The configurable actions are built using action templates. You can create only one action template per Java class file. You can create custom Java class files and corresponding action templates for your needs.

For example, if you had an action template, "add to a group," you could create four instances of the action template:

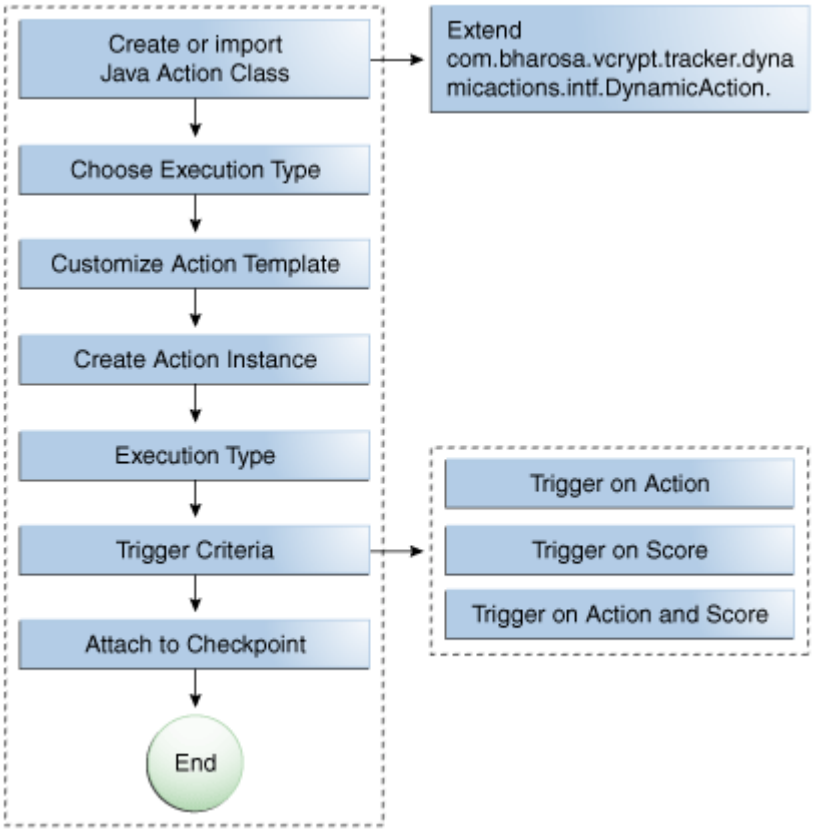
- Add user to a white-list group
- Add user to black-list group
- Add IP to IP white-list group
- Add IP to IP black-list group

Using the action template, you create an action instance based on your scenario. For example, you could have an instance such as "create a case whenever there is a block action" or another instance such as "create a case whenever there is a challenge action."

16.1.3 Deploying a Configurable Action

A flow chart illustrating the deployment of a Configuration Action is shown in Figure 16–1.

Figure 16–1 Develop and Deploy a Custom Configuration Action



Note: Steps to install newly created java class are included in this illustration.

The chapter has been organized into sections by topic. If you have configured configurable actions before, use this chapter as a reference.

If you want configurable actions enabled in your system, follow this process:

1. Enable the configurable action property.

   Set `dynamicactions.enabled` to `true`.

2. Make sure the configurable action definitions are configured in the Oracle Adaptive Access Manager database. For each custom action there should be a corresponding definition in the OAAM database. Configurable action templates shipped with OAAM are imported when you import the snapshot when you are setting up OAAM's base environment. A user can view the list of available configurable actions before adding a new one.

3. Determine what configurable actions have to be added to which checkpoint and the preconditions for executing those configurable actions.

4. Associate the configurable action to the checkpoint. During this step, you select the checkpoint and add the configurable action along with the trigger criteria and execution type to the checkpoint. For the configurable action that is added, you specify the values for all the parameters of that action.

5. Once the configurable action is associated to a checkpoint, it is ready to be triggered after the rules execution of a checkpoint is complete. After the checkpoint is executed, the rules engine returns a result that specifies the final action, score, and the other result actions. Based on the final action and score, relevant configurable actions are executed in synchronous or asynchronous mode.

Custom Configurable Actions

If the existing Configuration Actions are not sufficient, develop and deploy custom ones. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details on developing a configurable action.

Although some configurable actions are provided with the product, you may have to develop custom templates for your particular requirements.

1. Define the custom action template
2. Load the action template

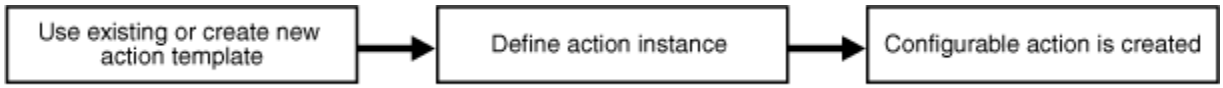
16.2 Creating Configurable Actions

The configurable action creation flow is presented in this section.

You can:

- Use an existing action template or create a new one to create a configurable action.
- Define an action instance/create a configurable action

Figure 16–2 Configurable Action wizard Flow



16.2.1 Define New Action Template

If you want to define a new action template, see Section 16.6, "Creating a New Action Template" for detailed information.

16.2.2 Use Existing Action Template

If you want to use an existing action template, see Section 16.4, "Searching for Action Templates."

16.2.3 Create Action Instance

To define an action instance, see Section 16.9, "Creating an Action Instance and Adding it to a Checkpoint" for detailed information.

16.3 Navigating to the Action Templates Search Page

You manage action templates in Oracle Adaptive Access Manager from the Action Templates Search page. From this page, you can search, view, create, export, and delete action templates.

1. In the Navigation tree, expand **Configurable Actions**.
2. Click **Action Templates**.

   The **Action Templates Search** page is displayed.

   Alternative methods to open search pages are listed in Section 3.10, "Search, Create, and Import."

16.4 Searching for Action Templates

In the Action Templates Search page, you can narrow down the number of action templates that are shown by specifying criteria in the Search Filter.

To search for action templates:

1. Open the **Action Templates Search** page, as described in Section 16.3, "Navigating to the Action Templates Search Page."

   The **Search Results** table will display no results when the **Action Templates Search** page first appears.
2. Specify criteria in the Search Filter to locate the action template.
3. Click **Search**.

   If you do not want to perform the search, click **Reset** to reset the search parameters to the default setting.

The action templates displayed are those that match the criteria specified in the Name, Java Class Name, and Keyword fields (Table 16–1).

Table 16–1 Action Template Search Filter Criteria

Filters and Fields	Descriptions
Name	Name of the action template. You can enter the complete name or part of an action template name. For example, if you enter new, any action template with new in any part of its name is shown.
Java Class Name	The fully qualified classpath of the java class file.
Keyword	Keyword in the description.

Each action template has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

By default, action templates are sorted on **Action Template Name**, but you can sort action templates on Description and Java Class name.

In the **Search Results** table, click the row for the action template you are interested in to view more details.

16.5 Viewing Action Template Details

In the Results table of the Action Template Search page, click the row of the action template you are interested in to review the details of a specific action template. The Action Template Details page provides such general details about the case as the Java class name, action name, description, and Java class parameters.

To view details about an action template:

1. Search for the action template, as described in Section 16.4, "Searching for Action Templates."
2. In the **Results** table, click the row of the action template you are interested in. The **Action Template Details** page appears.

   The fields are pre-populated with default values.

   You can edit the values of the parameters, action names, and description, but you cannot edit the Java Class name.

16.6 Creating a New Action Template

To define a new action template:

1. Create the Java Class file for the configurable action template.
2. Copy the Java Class file.

   Now you are ready to create the action template.

   You can create only one action template per class file.
3. Open the **Action Templates Search** page, as described in Section 16.3, "Navigating to the Action Templates Search Page."
4. From the **Action Templates Search** page, click **New Action Template**.

   Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

   The **New Action Template** page appears where you can enter details to create a new action template.
5. In the **Java Class Name** field, enter the *fully qualified* classpath of the configurable action.

   You will have created the Java Class during the creation of the configurable action. For information on creating a configurable action, see the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

   An example of a Java Class is com.bharosa.vcrypt.tracker.dynamicactions.impl.AddItemToWatchListAction.

   You must enter the *fully qualified* Java class name.

   If you enter an incorrect Java class name, an error occurs when you click **Load Parameters**.

   Also, you must ensure that the Java Class is in the correct directory.

6. Click **Load Parameters**.

   Oracle Adaptive Access Manager obtains the list of parameters and displays the names, labels, types, and values.

   Examples of parameters are shown in the following table.

Name	Label	Type	Value
Item Type	Item Type:	String	<value>
Watch-List Name	Enter the Watch-List Name:	String	<value>
White-List Name	Enter the White-List Name:	String	<value>
Black-List Name	Enter the Black-List Name:	String	<value>

   Only one action template can be created per Java Class file. If you try to create an action template using the same Java Class file, a warning appears after you click **Load Parameters**.

7. In the **Action Name** field, enter a name for the action.
8. In the **Description** field, enter a description of the action.
9. Enter values for the parameters.

   All parameter values are required. You cannot save the template until all values are entered.

10. Click **Apply**.

    The message, "Action template created successfully," is displayed.

11. Click **OK** to dismiss the dialog.

After you defined the action templates, the next step is to configure the action instance. A single action template can have multiple instances. For details on configuring the action instance, see Section 16.9, "Creating an Action Instance and Adding it to a Checkpoint."

16.7 Navigating to the Action Instances Search Page

You manage configurable actions in Oracle Adaptive Access Manager from the Action Instances Search page. From this page, you can search, view, create, activate, deactivate, and delete action instances.

1. In the Navigation tree, expand **Configurable Actions**.
2. Click **Action Instances**.

   The **Action Instances Search** page is displayed.

   Alternative methods to open search pages are listed in Section 3.10, "Search, Create, and Import."

16.8 Searching for Action Instances

In the **Action Instances Search** page, you can narrow down the number of configurable action instances that are shown by specifying criteria in the Search Filter.

To search for action instances:

1. Open the **Action Instances Search** page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. Specify criteria in the Search Filter to locate the action instance.
3. Click **Search**.

The action instances shown are those that match the criteria specified in the **Name**, **Checkpoint**, **Keyword**, and **Execution Type** fields (Table 16–2).

Table 16–2 Action Instances Search Filter Criteria

Filters and Fields	Descriptions
Name	Name of the configurable action instance. You can enter the complete name or part of a name.
Checkpoint	The specified point in a session when rules in a policy are run. For example, at Pre-Authentication, Post-Authentication, and In-Session.
Execution Type	There are two execution types: Synchronous and Asynchronous ▪ Synchronous actions are executed in the order of their priority in the ascending order. For example, if you want to create a CSR case and then send an email with the Case ID, you would choose synchronous actions. Synchronous actions will trigger/execute immediately. If the actions are executing in sequential order and one of the actions in the sequence does not trigger, the other actions will still trigger. ▪ Asynchronous actions are queued for execution but not in any particular sequence. For example, if you want to send an email or perform some action and do not care about executing it immediately and are not interested in any order of execution, you would choose asynchronous actions.
Keyword	Keyword in the description.

Each action instance has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

In the **Results** table, click the row for the action instance you are interested in to view the **Action Instance Details** page.

16.9 Creating an Action Instance and Adding it to a Checkpoint

To create an action instance, follow the procedure in this section.

Create Action Instance and Associate it to a Checkpoint

1. Open the **Action Instance Search** page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. Click **New Action Instance**.

   Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

   The **New Action Instance** page is displayed.
3. Next to **Action Instance Template Details**, click **Choose Action Template**.
4. In the **Existing Action Templates** page, select a template and click **OK**.
5. In the **Action Instance** section, enter values for the action instance.
   - Name
   - Description

- Log Level

  The log level indicates whether the execution status of instance should be recorded.

  - **Disable** turns off logging
  - **Enable** turns on logging
  - **Log if error** turns on logging when errors occur

    Only if there is an error will the execution status be recorded in the logs. Otherwise, the instance triggering is not recorded in the logs.

- Checkpoint to associate the configurable actions to

  For example, a checkpoint could be Pre-Transaction (a custom checkpoint)

Choose Execution Type for the Configurable Action

1. Select from two **Execution Types**: "Synchronous" or "Asynchronous."

   Synchronous actions are executed in the order of their priority in the ascending order.

   Synchronous is selected as the execution type so that the action is executed immediately after the rules action is triggered.

   For the synchronous execution type, if actions are executing in sequential order and one of the actions in the sequence does not trigger, the other actions will still trigger.

   Synchronous actions can also be used to pass/share data across the configurable actions. This is useful when developing custom configurable actions. Refer to "Configurable Actions" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details.

   Asynchronous actions are queued for execution and are executed not in any particular sequence.

2. Enter the execution order if execution type is **Synchronous**.

   Priority is unique within a checkpoint. An error is displayed when the execution order is not unique.

3. Select **Action Priority** and **Time to Live** if execution type is **Asynchronous**.

   Actions are aligned in different queues based on the action priority. When it is time to execute the next action from the queue, the highest-priority action is executed first.

   Time to Live denotes the maximum time to wait before the action can be discarded.

Enter Preconditions for the Configurable Action

1. Select the trigger criteria.

   Trigger criteria determines when to trigger the action in the session.

   The criteria should be either a score or an action or both. These are compared against the values for the selected checkpoint.

   - If the evaluated action matches the action provided, the configurable action is triggered.

- If the Rules Engine returns a score in the range provided, the configurable action is executed.

For example, if you want to create a case whenever the action type is block, Oracle Adaptive Access Manager will create a case whenever there is an action, "block," in the policy. If you want to create a case whenever the score is greater than 500, Oracle Adaptive Access Manager will create a case when the score is greater than 500 in that particular session.

When both action and score are specified, the configurable action is executed only if both of criteria match with the outcome from the Rules Engine.

2. Enter the values for the action.

   Choose an action. For example, the trigger criteria may be that if the Rules Engine returns "Allow" as the action, the action instance is executed.

   Normal actions from the Rules Engine are "Allow," "Block," "PasswordTextPad," and others.

   In the example, Challenge is selected as the action trigger. When a KBA challenge is returned as a rules result, the configurable action is triggered.

3. Select **Only if this is the final action** if you want the action to be the final action.

   In the example, "Only if this is the final action" is not selected so that the configurable action is triggered for the challenge even though it may not be a final action.

4. Select the score range

   A typical score from the Rules Engine is a numeric value between 0 and 1000.

   Select a range. For example, if the Rules Engine returns a score between "x" and "y," the configurable action is executed.

5. Enter values for all the parameters related to the action.

   For the example, the Watch-List Name is changed to AmtTransferSuspectedList.

Apply Changes

To apply the changes:

1. Click **Apply**.

   If the action instance is created successfully, a confirmation appears.

2. Click **OK** to dismiss the dialog.

16.10 Creating a Custom Action Instance

To add a custom action instance, you will need to:

1. Develop the action instance by implementing the com.bharosa.vcrypt.tracker.dynamicactions.intf.DynamicAction java interface.

   Note: Implementing means writing java code based on the contract specified by the Java interface com.bharosa.vcrypt.tracker.dynamicactions.intf.DynamicAction.

2. Test the implementation of the action instance thoroughly.

3. Compile the Java class and create a jar file of the compiled class files.
4. Extend/customize Oracle Adaptive Access Manager to add the custom jar.

   Refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for steps on adding the custom jar to Oracle Adaptive Access Manager.
5. Restart OAAM Server and OAAM Admin Server.
6. Log in to the OAAM Administration Console and create an action definition entry for the newly deployed configurable action.
7. Make sure all the parameters required for the configurable action are displayed in the user interface.
8. Use the newly available configurable action by adding it to the required checkpoints.

16.11 Editing an Action Template

To edit details about a specific action template:

1. Search for the action template, as described in Section 16.4, "Searching for Action Templates."
2. In the **Results** table, click the row of the action template you are interested in. The **Action Template Details** page appears.

   The default values are pre-populated in the **Action Template Details** page.
3. Edit the values of the parameters, action name, and description in the action template.

16.12 Exporting Action Templates

To export action templates:

1. Search for the action template, as described in Section 16.4, "Searching for Action Templates."
2. Select the row for each action template you want to export.
3. Click the **Export** button or select **Export Selected** from the **Actions** menu.
4. In the **Export Action Template** dialog, click **Export**.
5. In the **Save** dialog, click **OK**.

16.13 Importing Action Templates

To import action templates:

1. Open the **Action Templates Search** page, as described in Section 16.3, "Navigating to the Action Templates Search Page."
2. In the **Action Templates Search** page, click **Import**.
3. In the **Action Templates Import** dialog, click **Browse** and locate the action templates file you want to import.
4. Click **OK**.

16.14 Moving an Action Template from a Test Environment

To move an action template from a test environment to a production environment, perform the tasks listed:

1. Export the action template from the test environment. Refer to Section 16.12, "Exporting Action Templates."
2. Import the action template into the target system. Refer to Section 16.13, "Importing Action Templates."
3. If the configurable action is a customized one, skip Steps 1 and 2. Use the OAAM Extensions Shared Library (oracle.oaam.extensions.war) to package the configurable action and related jars and deployed the war into the target system.

   For information on adding custom jars, see "Add Customizations/Extensions using Oracle Adaptive Access Manager Extensions Shared Library" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

Note: From 11*g*, do not copy the custom jars to OAAM webapp folders.

Migrating 10*g* Action Templates to 11*g*

In the 11*g* user interface for Action Templates, the Notes field has been removed. If the Notes field contains text in the 10*g* Action Templates, after migration to 11*g*, these notes will be appended (combined) with the description text.

16.15 Deleting Action Templates

To delete action templates:

1. Search for the action template, as described in Section 16.4, "Searching for Action Templates."
2. Select the row for each action template you want to delete and click **Delete Action Templates** from the **Actions** menu.

If you select an action template to delete that is used in a checkpoint, an error about the configurable action currently being used by checkpoints is displayed.

When multiple action templates are selected for deletion and if there are checkpoints that contain the instances of some of the action templates selected, a warning message is provided, stating that the instances are linked to Checkpoints and cannot be deleted. You have the option to delete the unlinked action templates.

16.16 Viewing a List of Configurable Action Instances

1. Open the Action Instances Search page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. In the Search Filter, select a checkpoint to see all the action instances for that checkpoint or select **All** to see all action instances for the checkpoints.
3. Click **Search**.

   In the **Results** table, a list of action instances is displayed.

   If you want to view a particular instance, click the row of the action instance you are interested in. The **Action Instance Details** page appears.

16.17 Viewing the Details of an Action Instance

To view the details of an action instance:

1. Open the **Action Instance Search** page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. Click the row of the action instance you are interested in viewing.

   The details page of the action instance is displayed.

16.18 Editing an Action Instance

To edit an action instance:

1. Open the **Action Instance Search** page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. Click the action instance you are interested in editing.
3. In the **Action Instance** section, change the values for the action instance.
   - Name
   - Description
   - Log Level
   - Checkpoint
4. Change the execution type.
5. Change the trigger criteria.
6. Enter values for all the parameters related to the action.
7. Apply the changes.

16.19 Deleting an Existing Action Instance

To delete an action instance:

1. Open the **Action Instances Search** page, as described in Section 16.7, "Navigating to the Action Instances Search Page."
2. In the Search Filter, select a checkpoint to see all the action instances for that checkpoint or select All to see all action instances for the checkpoints.
3. Click **Search**.
4. Select the checkbox next to an existing action definition you want to delete.
5. Click **Delete**.

If an action is associated with a checkpoint, you cannot delete it.

16.20 Out-of-the-Box Configurable Actions

The following configurable actions are available out of the box:

- CaseCreationAction - Used to create a case
- AddItemToWatchListAction - Used to add item to a watch list.

Before these configurable actions can be configured for checkpoints, the definitions of these should be added.

Note: To use system provided configurable actions, you must import the configurable action definition. Refer to Section 14.4, "Importing a Snapshot."

16.20.1 Defining CaseCreationAction

To define CaseCreationAction:

1. Log in as a security administrator.
2. In the Navigation tree, expand **Configurable Actions**.
3. Click **Action Templates**.

   The **Action Templates Search** page is displayed.
4. From the **Action Templates Search** page, click **New Action Template**.

   The **New Action Template** page appears where you can enter details to create a new action template.
5. Enter the java class name for the configurable action as

   `com.bharosa.vcrypt.tracker.dynamicactions.impl.CaseCreationAction`
6. In the **Action Name** field, enter a name for **CaseCreationAction**.
7. In the **Description** field, enter a description for **CaseCreationAction**.
8. For the **Case Type** parameter, enter **1** for CSR Case or **2** for Agent Case.
9. For the **Severity** parameter, enter **1** for "Low", **2** for "Medium", or **3** for "High."
10. Enter a value for the **Case Description** that should be set while creating the case.
11. Enter the userId for **Case Creator UserId**. Make sure that userId has a proper role and access permissions for creating the case.

16.20.2 Defining AddItemtoListAction

To define AddItemToListAction:

1. Log in as a security administrator.
2. In the Navigation tree, expand **Configurable Actions**.
3. Click **Action Templates**.

   The **Action Templates Search** page is displayed.
4. From the **Action Templates Search** page, click **New Action Template**.

   The **New Action Template** page appears where you can enter details to create a new action template.
5. Enter the Java class name as com.bharosa.vcrypt.tracker.dynamicactions.impl.AddItemToWatchListAction
6. In the **Action Name** field, enter a name for **AddItemToWatchList**.
7. In the **Description** field, enter a description for the action.
8. For the **Item Type** parameter, enter any one of the following:
   - **vtusers** - If UserId of current session has to be added to the Watch List
   - **devices** - If DeviceId of current session has to be added to the Watch List

- **ips** - If IP Address of current session has to be added to the Watch List
- **countries** - If Country ID of current session has to be added to the Watch List
- **states** - If State ID of current session has to be added to the Watch List
- **cities** - If City ID of current session has to be added to the Watch List
- **userLogin** - If LoginId of current session has to be added to the Watch List

9. For the **Watch-List Name** parameter, enter the name of the Watch List. Make sure there is a group with the same name.
10. For the **White-List Name** parameter, enter the name of the White List. Make sure there is a group with the same name. Action checks this list before adding an item to Watch List.

    If the item is present in the white list, it will not be added to the watch list.
11. For the **Black-List Name** parameter, enter the name of the Watch List. Make sure there is a group with the same name. Action checks this list before adding an item to Watch List

    If the item is present in the blacklist, it will not be added to the watch list.

16.20.3 Add to Group

The property to add an item to a group is:

com.bharosa.vcrypt.tracker.dynamicactions.impl.AddToListConfigurableAction

16.21 Use Cases

This section describes example use cases for configurable actions

16.21.1 Use Case: Add Device to Black List

Jeff is a Security Administrator at Dollar Bank. He must configure an action to add a device to a black list group whenever there is a device that has more than three failed login attempts from a blacklisted country within a month.

For example, if there were two login attempts from a device in blacklisted country today and two login attempts two weeks ago from the same device, it would be automatically added to the group by the configurable action.

To configure the action:

1. Search for a device rule that evaluates in-group membership.

   Look for a rule with a maximum count or authentication status check.
2. If a rule does not exist, create one.
   a. Find an existing Post-Authentication policy used for general security rules.
   b. Create and add the rule.
3. Configure a new trigger action enumeration named add **device to black list** and an action group for it.
4. In the group, add a block action.

5. Configure a configurable action to trigger on **add device to black list** which will add the device to a black list group.

16.21.2 Use Case: Add Device to Watch-list Action

Jeff is a Security Administrator at Dollar Bank. He needs to configure an action to add a device to a watch list group whenever there is a device that has more than three failed login attempts within a month. He starts with the rule he will need. He searches for a device rule that evaluates in-group membership. He finds one for device in-group but it does not have a max count or authentication status check. Jeff decides he must create one. He finds an existing Post-Authentication policy used for general security rules, and then creates and adds the rule. Jeff also configures a new trigger action enumeration named "add device to watch list" and an action group for it. In the group he also adds a block action. Next Jeff configures a configurable action to trigger on "add device to watch list" action which will add the device to a watch list group. Today there were two login attempts from a device in North Korea and two weeks ago the same device so it was automatically added to the group by the configurable action.

Implementation Notes:

The requirement can be implemented by following these steps:

1. Create a group called **Device Watch List** that will store the devices that have to be monitored before they can be classified as white-listed or black-listed.
2. Similarly create groups called **Device While List**, **Device Black List**.
3. Create a custom rule action called **add_device_to_watch_list**.
4. Add a rule with the rule condition "USER: Check login count" to a policy for the "PreAuthentication" checkpoint. Configure it such a way that it will trigger and return the action **add_device_to_watch_list** whenever there are more than three failed login attempts within last 30 days.
5. Now create an action instance of the action template **AddItemToWatchListAction** and associate it to the Pre-Authentication checkpoint.
6. Set the trigger criteria as the action by selecting **add_device_to_watch_list** action and set the score range as 0 to 1000.
7. Set the **Item Type** parameter value as **devices** since deviceid needs to be added to the list.
8. Set the **Watch List Name** parameter value as **Device Watch List**.
9. Set the **Black List Name** parameter value as **Device White List**.
10. Set the **White List Name** parameter value as **Device Black List**.
11. Save the action instance

Simulate logins so that the rule triggers and returns **add_device_to_watch_list** as the rule action. Whenever that happens you will see the current device added to the **Device Watch List**.

16.21.3 Use Case: Custom Configuration Action

Jeff is a Security Administrator. He has defined a custom configurable action in the test environment. Now he has to export the custom action template from test and import it into Production. (Tip: He has to manually link the custom jar (custom class) before the import action, if not import would fail. In 11*g*, he does this by adding his custom jars

to the OAAM Extensions Shared Library. The server should be restarted for the changes to take effect)

Implementation Notes:

The use case can be achieved by following these steps:

1. Jeff implements his custom configurable action by writing a java class that implements `com.bharosa.vcrypt.tracker.dynamicactions.intf.DynamicAction` java interface.
2. He can compile his class by linking the Oracle Adaptive Access Manager jars from `$IDM_ORACLE_HOME\oaam\native\java\lib` folder.
3. He should then test his custom configurable action to make sure it is working correctly.
4. He should then package his class as a jar file and create the shared library by following the structure of the OAAM Extensions Shared Library that is available in `$IDM_ORACLE_HOME\oaam\oaam_extensions\generic` folder
5. He should then overwrite the existing oracle.oaam.extensions shared library or deploy his extensions shared library with a different implementation version.
6. He can then create action template and an action instance for the custom configurable action.
7. He should test it by creating an action instance and attach it to a checkpoint and set the trigger criteria and then simulate logins/sessions from OAAM Server to trigger the custom configurable action.
8. Once he is done with testing, he can export his custom action template.
9. Now he has export file that has the custom action template and also the shared library that has custom java code related to his custom configurable action.
10. He can deploy his custom configurable action by redeploying the OAAM Extensions Shared Library using his shared library and then import his custom configurable action template from his export file.

16.21.4 Use Case: Create Case

Matt is a Security Administrator. He needs a configurable action such that an Agent case is created automatically, whenever a user is blocked more than 3 times in the last one month. The Fraud investigator will work on these cases to determine if the user is a risky user.

Implementation Notes:

The requirement can be implemented by following these steps:

1. Create a custom rule action called **Create customer care case**.
2. Add a rule with the rule condition "USER: Check login count" to a policy for the Post-Authentication checkpoint. Configure it such a way that it will trigger and return the action **Create customer care case** whenever there are more than three blocks for the user within last 30 days.
3. Now create an action instance of the action template **CaseCreationAction** and associate it to the Post-Authentication checkpoint.
4. Set the trigger criteria as the action by selecting **Create customer care case** action and set the score range as 0 to 1000.
5. Set the parameters of **CaseCreationAction** as follows:

a. Enter "2" as value of **Case Type** parameter

b. Enter "2" (for Medium) or "3" (for High) as **Severity** parameter value

c. Enter "Case Description" parameter value.

d. Enter the userId for "Case Creator UserId" parameter. Make sure that userId has a proper role and access permissions for creating the case

6. Save the action instance.
7. Try few logins for a user so that it triggers and returns at least three blocks
8. After third block, you should see automatic creation of an agent case by the configurable action.

17

Predictive Analysis

Oracle Adaptive Access Manager's Predictive Analysis feature compliments configurable rules and behavioral profiling by enabling you to perform statistical risk analysis in real time using its out-of-the-box predictive analytic application that integrates ODM features, such as data mining and data analysis algorithms. Risk analysis is trained over time.

This chapter contains the following sections:

17.1 Important Terms

Important terms for predictive analysis are presented in this section.

17.1.1 Predictive Analysis

Predictive analytics encompasses a variety of techniques from statistics, data mining and game theory that analyze current and historical facts to make predictions about future events.

- Individual User Behavior Profiling: End user login behaviors are evaluated to determine how abnormal it is currently compared to their own past behavior, if there is past behavior captured.
- Individual Device Profiling: Devices used for login have behavior that is evaluated to determine how abnormal it is currently compared to their own past behavior if past behavior has been recorded.
- New Device Profiling: If a device does not have any historical data to profile then predictive techniques are used to determine how risky the device is.

- User Type and Location Profiling: Predictive models evaluate the degree of anomaly based on the type of user (groups, Organization ID) rather than each individual user.
- User Type and Time Profiling: Similar to location profiling, time profiling uses predictive techniques to identify anomalies in behavior when there is not much historical data for the specific user but there is production data related to users of the same type.

17.1.2 Data Mining

Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD).

Data mining can answer questions that cannot be addressed through simple query and reporting techniques.

17.1.3 ODM

Oracle Data Mining (ODM) is an option that extends Oracle Database 11g Enterprise Edition's out-of-the-box capabilities. ODM implements data mining and data analysis algorithms for prediction and anomaly detection and enables deployment of data mining models inside the database. The ODM option is not a separate component; functionality is built into the Oracle database kernel and operates on data stored in the database tables. There is no need to move data out of the database into files for analysis and then back from files into the database for storing. The data never leaves the database -- the data, data preparation, model building, and model scoring results all remain in the database.

17.1.4 Predictive Models

Predictive models are supervised learning functions. Using predictive models, OAAM fine tunes its analysis; the more each model is trained, the more accurate the risk analysis becomes. The out-of-the-box predictive models are trained in two ways: the anomaly detection model trains automatically when fed historical access data, and the fraud classification model trains on the findings of human fraud investigators. You can configure additional models as required to meet specific deployment use cases. This approach to predictive risk analysis enables you to clearly see on which decisions outcomes are based and enables augmentation as required.

17.2 Prerequisites

Make sure the following prerequisites are met before you activate the Predictive Analysis functionality:

- Oracle 11*g* Enterprise Edition release of the database is being used
- Oracle Data Mining (ODM) option
- Identity Management Suite is installed
- A reasonable amount (at least 100) of OAAM sessions exists that represent a variety of usual OAAM sessions
- At least 100 or more sessions exist that are classified as "Fraud" and "Not Fraud" using the Agent Case functionality.

Note: To mark a session as Fraud/Not Fraud, create an agent case link the session and close the Agent case with Disposition as either "Confirmed Fraud" or "Not Fraud".

For testing purposes remember the criteria for marking sessions as "Fraud" or "Not Fraud" since the ODM (Oracle Data Mining) model will use that as the training data.

17.3 Initial Setup

1. Create an ODM database user. Execute the SQL script `create_odm_user.sql`.

   When it prompts for inputs, enter the ODM user name as the value of first parameter and then the password of ODM User as the value of second parameter.

   The script is located in the `$MW_HOME\oaam\cli\odm` folder.

2. Set up the OAAM CLI environment. Make sure you have added the following to the CSF/Credential Store using Oracle Enterprise Manager Fusion Middleware Control:

   a. OAAM Database User Name and Password with **oaam_db_key** as the keyname under the map **oaam**.

   b. ODM Database User Name and Password with **oaam_odm_db_key** as the keyname under the map **oaam**.

   c. Set the property `oaam.db.url` with the JDBC URL of the OAAM database in `oaam_cli.properties`.

3. By default Predictive Risk uses the OAAM_CLASSIFIED_REQUEST_VIEW. For predictive risk to work for sessions from non-flash devices you need to use "OAAM_CLASSIFIED_REQ_NOFLASH_VW".

   OAAM_CLASSFIED_REQ_NOFLASH_VW view has all the requests (both flash and no-flash).

   To set the OOTB ODM Model "OAAM Fraud Request Model" to use the no-flash data set the following properties before running initODM.sh:

   ```
   oracle.oaam.odm.model.enum.oaam_fraud_request_model.data_table_name=OAAM_
   CLASSFIED_REQ_NOFLASH_VW
   oracle.oaam.odm.model.enum.oaam_fraud_request_model.inputdata_
   mapping=oracle.oaam.odm.datamapping.enum.user_request_data_noflash
   ```

4. Run the shell script **initODM.sh** in the OAAM CLI folder. This script does the following:

   - Seeds the ODM tables that have the normalized data of the browser and flash fingerprints
     - OAAM_DEVICE_BROWSER_FPRINTS
     - OAAM_DEVICE_FLASH_FPRINTS
   - Creates the following database views that are used as input data by the ODM models:
     - OAAM_CLASSIFIED_REQUESTS_VW
     - OAAM_INVESTIGATED_REQUESTS

  - OAAM_UNCLASSIFIED_REQUESTS_VW
  - OAAM_CLASSIFIED_REQ_NOFLASH_VW
  - OAAM_UNCLASSIFIED_REQ_NOFLASH_VW
- Creates the following ODM Models if required data is present:
  - OAAM_ANOMALY_REQUEST
  - OAAM_FRAUD_REQUEST

5. Log in to **OAAM Admin Server** and link the Predictive Analysis Policy to **All Users** or the required user groups.
6. Log in to WebLogic Admin Server using the WebLogic Console and create a **DataSource** with JNDI name such as **jdbc/OAAM_SERVER_ODM_DS** and point it to the ODM Database User and add the Managed server of **OAAM Server** as the **target**.
7. Restart OAAM Server since ODM initialization updates some enum-related properties.
8. To test anomaly detection, try to log in from a different kind of browser or location which is not yet present in the OAAM database.
9. To test "fraudulent session prediction" functionality, log in in a similar session that is linked to an Agent case which is closed with the **Confirmed Fraud** disposition.

OAAM_CLASSFIED_REQ_NOFLASH_VW

By Default Predictive Risk uses the OAAM_CLASSIFIED_REQUEST_VIEW. For predictive risk to work for sessions from non-flash devices you need to use "OAAM_CLASSIFIED_REQ_NOFLASH_VW".

OAAM_CLASSFIED_REQ_NOFLASH_VW view has all the requests (both flash and no-flash).

To set the OOTB ODM Model "OAAM Fraud Request Model" to use the no-flash data set the following properties and run initODM.sh:

```
oracle.oaam.odm.model.enum.oaam_fraud_request_model.data_table_name=OAAM_
CLASSFIED_REQ_NOFLASH_VW
oracle.oaam.odm.model.enum.oaam_fraud_request_model.inputdata_
mapping=oracle.oaam.odm.datamapping.enum.user_request_data_noflash
```

17.4 Rebuild the ODM Models to Provide Feedback and Update Training Data

Important points about rebuilding the ODM models are presented in this section.

- Rebuilding the ODM models is one way to provide feedback to ODM with latest case creation data so that sessions can be appropriately flagged.
- You can rebuild the ODM models at regular intervals so that ODM models are trained with the latest data in OAAM.
- Based on the volume of requests, you can determine the frequency of rebuilding the models. It is recommended to rebuild the models every month at the end of the month.
- You can set the date range of requests that have to be considered by the ODM models by setting the property `oracle.oaam.predictive_analysis.request.period` as follows:

  - Format of value is `<Number of Years>,<Number of Months>,<Number of Days>,<Number of Hours>`
  - **Examples:**
    * Everything can be indicated using 0 (zero). Use this option with caution, if there are more than a couple of million OAAM requests this could result in a very high model build times and database errors related to out-of-memory.
    * Last two years can be indicated using **2,0,0,0** or just **2**.
    * Last two years and three months can be indicated using **2,3,0,0** or just **2,3**.
    * Last 3 days can be indicated using **0,0,3,0**
    * Last four hours can be indicated using **0,0,0,4**
- Setup OAAM CLI environment and run the script `initODM.sh`.

17.5 Policy Evaluation

The following steps describe the flow of Predictive Analysis evaluation:

1. OAAM User Request goes for Post-Authentication checkpoint evaluation.
2. Predictive Analysis policy executes as part of Post-Authentication.
3. The **Check if the current request is fraudulent rule** is executed. As part of the execution it takes the required classification type and values of attributes from current request and executes the ODM SQL function prediction_probability() with the given model name. This call returns a prediction probability value which is tested to see if it falls in the given range. If so then the OAAM Suspicious Fraudulent Request alert is generated and risk score is set to **700**.
4. The **Check if the current request is anomalous** rule is executed. As part of the execution it takes values of attributes from current request and executes the ODM SQL function prediction_probability() with the given model name. This call returns a prediction probability value which is tested to see if it falls in the given range. If so then the OAAM Anomalous Request alert is generated and the risk score is set to **600**.

17.6 Tuning the Predictive Analysis Rule Conditions

The following parameters of Predictive Analysis rule conditions can be tuned/changed:

- ODM Model Name that is used for evaluation/scoring
- Range of prediction probability to trigger the rule condition
- Default return value in case of errors
- Classification Type (applies only to the **Check Fraudulent User** rule condition)

To set the parameters you can go to the **Predictive Analysis Policy** and open the required rule and update the parameters.

Note: The following sections describe advanced functionality which is typically performed by integrators who have Java coding knowledge and knowledge of both OAAM and ODM.

17.7 Adding Custom Database Views

- Add the custom view definitions to `$MW_HOME\oaam\cli\odm\custom_oaam_odm_views.sql`.

> **Note:** Make sure the view definition SQL ends with ";" and there are no extra lines or comments in the file

- If you do not want to hard-code the OAAM Database User name then use the variable <oaam_user> wherever you refer to the OAAM schema. This will be replaced with the actual OAAM Database user name by `initODM.sh` when you run it next time.
- When you run `initODM.sh` the next time, it will execute the SQL statements in `custom_oaam_odm_views.sql` that will create the custom views.

17.8 Adding Custom Grants

- Add the SQL statements that grant select access OAAM tables to the file `$MW_HOME\oaam\cli\odm\custom_oaam_grants_to_odm_user.sql`.

> **Note:** **Note:** Make sure the view definition SQL ends with ";" and there are no extra lines or comments in the file

- If you do not want to hard-code the ODM Database User name then use the variable <odm_user> wherever you refer to ODM Database User. This will be replaced with actual ODM Database user name by `initODM.sh` when you run it next time.
- When you run `initODM.sh` next time, it will execute the SQL statements in `custom_oaam_odm_views.sql`.

17.9 Adding New ODM Models

To add a new ODM Model, follow these steps:

1. Determine the type of model. Currently OAAM supports only CLASSIFICATION models.
2. Determine if the existing ODM view can be used to build the model. If not, create a new view and add that definition to `$MW_HOME\oaam\cli\odm\custom_oaam_odm_views.sql`.

> **Note:** Make sure the view definition SQL ends with ";" and there are no extra lines or comments in the file.

3. Determine if any of your new views require additional grants to access the OAAM tables or any custom tables. Add those custom grants to `$MW_HOME\oaam\cli\odm\custom_oaam_grants_to_odm_user.sql`.

> **Note:** Make sure the grant statements end with ";" and there are no extra lines or comments in the file.

4. Create a new ODM model using Oracle Data Miner or using the SQL command call dbms_data_mining.drop_model(). Refer to ODM documentation for details.
5. Test your ODM model using sample data. You can typically do this by executing the following:
   - For anomaly detection models:

     Select prediction_probability(<model_name>, '0' using <value1> as attribute1, <value2> as attribute2, …. <valueN> as attributeN> from dual
   - For other classification models:

     Select prediction_probability(<model_name>, <classificationValue> using <value1> as attribute1, <value2> as attribute2, …. <valueN> as attributeN> from dual
6. Once you are done with testing, add a new enum element to `oracle.oaam.odm.model.enum` with the following properties:

Table 17–1 Properties for oracle.oaam.odm.model.enum

Property Name	Notes
name	Name of the model
description	Description of the model
type	Type of the model. **Anomaly Detection:** `oracle.oaam.odm.modeltypes.enum.oneclasssvm` **Classification:** `oracle.oaam.odm.modeltypes.enum.classification`
odm_model_name	Exact name of the ODM model. The OAAM setup script uses this to create the ODM model.
data_table_name	Exact name of the input data table/view name. The model will be built using this table/view name.
case_id_column	Column in the data table/view that uniquely identifies each row.
target_column	Do not specify this for Anomaly Detection models. For classification models, specify the column whose value has to be predicted. Typically this column should have the values ('fraud' or 'not_fraud') as mentioned in the `oracle.oaam.odm.fraud_classification_types.enum`'
settings_table_name	Name of the database table that has settings for the ODM model. You can use the existing tables 'OAAM_ANOMALY_MODEL_SETTINGS' for Anomaly Detection models and 'OAAM_ANOMALY_MODEL_SETTINGS' for Classification models if you don't have any explicit settings.

inputdata_mapping	Specify how the input required for evaluation/scoring is mapped to OAAM Data. You can use the following existing mappings if you do not have any new requirements. Otherwise refer to Section 17.10, "Adding Custom Input Data Mappings":
	`oracle.oaam.odm.datamapping.enum.user_request_data`
	`oracle.oaam.odm.datamapping.enum.user_request_data_noflash`

is_available	Set it as 'false' so that `initODM.sh` script can build the ODM model and set this value to 'true'. If you already built the ODM model by yourself then set this value to 'true' so that the OAAM rules can use this model to evaluate/score against input data.

17.10 Adding Custom Input Data Mappings

This section contains information about adding custom input data mappings.

17.10.1 When to Use

Custom input data mappings are needed if any of the following conditions apply:

- You want to use fewer attributes (than what is available out-of-the-box) to evaluate/score the out-of-the-box ODM models
- You want to create a custom ODM model based on custom table/view that has different set of attributes than the existing input data mappings.

17.10.2 Using OAAM Attributes to Build a Custom Input Data Mapping

You can use existing OAAM attributes and create custom input data mappings. This approach is useful if you are reusing the existing database view that uses OAAM request data that includes session, browser-fingerprint, flash-fingerprint, and location data.

Steps to create an input data mapping are as follows:

1. Add a new enum element to `oracle.oaam.odm.datamapping.enum`.
2. Set the `inputdata_mapping` property of model enum element to point to the newly added enum element.
3. Add the required list of name-values from the following list to the newly added enum element:
    - request_minute=request.minute
    - request_hour=request.hour
    - request_day_of_week=request.day_of_week
    - request_day_of_month=request.day_of_month
    - request_day_of_year=request.day_of_year
    - request_week_of_month=request.week_of_month
    - request_week_of_year=request.week_of_year
    - request_month=request.month
    - request_quarter=request.quarter
    - request_year=request.year
    - auth_status=request.auth_status
    - user_identifier=request.user_identifier
    - login_id=request.login_id
    - user_group_id=request.user_group
    - request_ip_address=request.ip_address
    - is_registered=request.is_registered
    - auth_client_type=request.auth_client_type
    - secure_client_type=request.secure_client_type
    - pre_auth_action=request.pre_auth_action
    - post_auth_action=request.post_auth_action
    - device_id=device.device_id
    - device_cookie_disabled=device.cookie_disabled

- device_flash_disabled=device.flash_disabled
- browser_country=browser.country
- browser_language=browser.language
- browser_language_variant=browser.language_variant
- browser_name=browser.browser_name
- browser_operating_system=browser.os
- browser_user_agent_string=browser.user_agent_string
- audio_video_disabled=flash_fingerprint.audio_video_disabled
- has_accessibility=flash_fingerprint.has_accessibility
- has_audio=flash_fingerprint.has_audio
- has_audio_encoder=flash_fingerprint.has_audio_encoder
- embedded_video=flash_fingerprint.embedded_video
- has_ime_installed=flash_fingerprint.has_ime_installed
- has_mp3=flash_fingerprint.has_mp3
- supports_printer=flash_fingerprint.supports_printer
- supports_screen_broadcast=flash_fingerprint.supports_screen_broadcast
- supports_playback_screen_brd=flash_fingerprint.supports_playback_screen_brd
- supports_streaming_audio=flash_fingerprint.supports_streaming_audio
- supports_streaming_video=flash_fingerprint.supports_streaming_video
- supports_native_ssl=flash_fingerprint.supports_native_ssl
- contains_video_encoder=flash_fingerprint.contains_video_encoder
- debug_version=flash_fingerprint.debug_version
- flash_language=flash_fingerprint.flash_language
- is_local_file_read_disabled =flash_fingerprint.is_local_file_read_disabled
- manufacturer=flash_fingerprint.manufacturer
- flash_operating_system =flash_fingerprint.flash_operating_system
- aspect_ratio_of_screen =flash_fingerprint.aspect_ratio_of_screen
- player_type=flash_fingerprint.player_type
- is_color_screen=flash_fingerprint.is_color_screen
- dots_per_inch=flash_fingerprint.dots_per_inch
- screen_resolution=flash_fingerprint.screen_resolution
- flash_version=flash_fingerprint.flash_version
- country_id=location.country_id
- state_id=location.state_id
- city_id=location.city_id
- metro_id=location.metro_id

- isp_id=location.isp_id
- routing_type=location.routing_type
- connection_type=location.connection_type
- connection_speed=location.connection_speed
- top_level_domain=location.top_level_domain
- sec_level_domain=location.secondary_level_domain
- asn=location.asn
- carrier=location.carrier
- zip_code=location.zip_code
- region_id=location.region_id
- phone_area=location.phone_area

17.10.3 Using Custom Attributes to Build a Custom Input Data Mapping

If you want OAAM to use custom attributes while evaluating/scoring an ODM model then you can develop custom java class that can be used to get values of the custom attributes.

Follow these steps to use custom attributes for building and evaluating ODM models

1. Add a new enum element to 'oracle.oaam.predictive_analysis.attribute_ resolvers.enum'.
2. Add 'class' property with value as the fully qualified class name of the Java class that will have logic to return values for the custom attributes.
3. Add all the custom attributes as properties to the newly added enum element. Value of these properties can be the name/description of the attribute. Do not use 'name', 'description', 'class' as attribute names.
4. Develop the custom Java class that handles custom attributes.
   - It should extend the OAAM class oracle.oaam.integration.datamining.rules. OAAMAttributesResolver
   - It should implement a public constructor that takes requestId as the parameter. That constructor should call the super constructor.
   - It should extend the method **public Object getValue(String attributeName)** and have logic to return the value of given attribute. AttributeName will be in the format of '<enumElement>.<property>'
   - Deploy the custom Java class as an OAAM Extension using OAAM Extensions Shared Library. Refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for deploying OAAM Extensions.
5. If you are using a custom database view then add a custom mapping by adding new enum element to 'oracle.oaam.odm.datamapping.enum' enum and add all the column names of the database view as properties to this enum element. Add the related custom attribute name as the value for these properties. Value should be in the format of <enumElement>.<property>.
6. If you are not using custom database view but just want to create custom mapping of existing request data then pick the required columns from the following and add them to your custom mapping enum element:

Table 17–2 Custom Mapping

A	B	C
request_minute	device_flash_disabled	flash_language
request_hour	browser_country	is_local_file_read_disabled
request_day_of_week	browser_language	manufacturer
request_day_of_month	browser_language_variant	flash_operating_system
request_day_of_year	browser_name	aspect_ratio_of_screen
request_week_of_month	browser_operating_system	player_type
request_week_of_year	browser_user_agent_string	is_color_screen
request_month	audio_video_disabled	dots_per_inch
request_quarter	has_accessibility	screen_resolution
request_year	has_audio	flash_version
auth_status	has_audio_encoder	country_id
user_identifier	embedded_video	state_id
login_id	has_ime_installed	city_id
user_group_id	has_mp3	metro_id
request_ip_address	supports_printer	isp_id
is_registered	supports_screen_broadcast	routing_type
auth_client_type	supports_playback_screen_brd	connection_type
secure_client_type	supports_streaming_audio	connection_speed
pre_auth_action	supports_streaming_video	top_level_domain
post_auth_action	supports_native_ssl	sec_level_domain
device_id	contains_video_encoder	asn
device_cookie_disabled	debug_version	carrier
		zip_code
		region_id
		phone_area

Part VI

Managing Transactions

This part of the book contains information about managing transactions in Oracle Adaptive Access Manager.

It contains the following chapters:

18

Modeling the Transaction in OAAM

In order for Oracle Adaptive Access Manager to perform analysis on transactions, you must determine how to represent the transactions in Oracle Adaptive Access Manager, how to process the data coming in, how to use the data, and how to display the data. For example, in an ecommerce transaction, the data involved are credit card numbers, shipping and billing addresses, names, dollar amounts and so on; for a wire transfer, the data involved are Amount, Name, To account, From account, Routing Number, Bank Address, Bank Phone, and so on.

This chapter describes how to use entity and transaction definitions in OAAM.

18.1 Introduction

Determining which items in a transaction are entities and creating the entities saves time, improves performance in the system, decreases the amount of data created, and enables rules using the entity to run faster than if they had used transactional data.

An entity can be used and reused in multiple places, which makes creating transaction definitions much easier. An example of an entity that can be reused is an address. A shipping address and billing address can be created for different transactions from the address entity. If you had defined address as transactional data, you would have to define it twice.

18.2 Use Case

The use case may be to notify the security administrator if a customer is trying to make a purchase and his billing and shipping addresses (street, city, state, and zipcode) are different. A mismatch may indicate that the customer is sending the item to an address different from the address the bill is sent to. A mismatch may mean that a fraudster is using a stolen credit card to buy the item, but there might be valid reasons like the customer might want his purchase sent to his work or he may be purchasing a gift for someone who lives at a different address.

18.3 Set Up the Use Case

To set up this use case:

1. Develop the security policy that will accomplish the use case.
    1. Determine what you are trying to accomplish (problem statement).
    2. Break the problem statement into:

        Inputs: What data is available to evaluate?

Rules: What types of evaluations do I need to perform on the data?

Outcomes: What should happen based on the analysis?

3. Translate the wording of the problem statement into a security policy by mapping the data, evaluations, and outcomes to an OAAM configuration.

18.4 Determine How to Model the Transaction in OAAM in Terms of OAAM Entities and Transactions

An outline for determining how to model the transaction is as follows:

1. After receiving the source data from the customer, identify the mapping between the source data and OAAM entities and transaction. Source data elements are the fields from the customer application.

Table 18–1 Data Fields and Source Keys

Data Name	Internal ID of Source Fields
Item	itemId
Price	itemPrice
Count	itemCount
First Name	customer.firstName
Last Name	customer.lastName
Credit Card	creditCard.number
CC Expiration Date	creditCard.expDate
CC Issuing Country	creditCard.issuingCountry
Is Shipping Address Same?	shippingAddress.addressSame
Address Line1	shippingAddress.addressLine1
Address Line2	shippingAddress.addressLine2
Address Line3	shippingAddress.addressLine3
City	shippingAddress.city
State	shippingAddress.state
Country	shippingAddress.country
Pin Code	shippingAddress.pinCode
Address Line1	billingAddress.addressLine1
Address Line2	billingAddress.addressLine2
Address Line1	billingAddress.addressLine3
City	billingAddress.city
State	billingAddress.state
Country	billingAddress.country
Pin Code	billingAddress.pinCode

2. Use the OAAM Administration Console to create and activate the entities and transaction definitions for the transaction based on the model you came up with.

18.5 After Creating Entities and Transaction Definitions

The following steps occur after entities and transaction creation.

1. Determine the OAAM checkpoint that can be used to trigger the fraud policies that can perform fraud checks on the transaction. If an existing checkpoint can be reused, there is no need to create a checkpoint. Otherwise, create an OAAM checkpoint for the transaction.
2. Now, look at the requirements for what kind of rules should go into the fraud policy for this transaction.
3. Look at the list of transaction rule conditions to see which rule condition is needed. Go through the "Example Usage" section of those rule conditions.
4. Create an OAAM policy and add the rule.
5. Once the rule condition is configured, specify what should be the **Results** if the rule condition is satisfied. You can configure **Alert** and **Action** groups that indicate that the user has reached his threshold and also a **score**. The client application can interpret the result and take appropriate action in terms of redirecting the user to the relevant pages that indicate that the user action is not allowed.
6. Now, you have the setup ready in OAAM so that the transaction can be created in OAAM and fraud policies and rules can be triggered.
7. Integrate the client application with OAAM using OAAM shared libraries. Refer to "Integrating Native Java Applications" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details of the integration. This is required since transactions functionality is available through native integration. As part of this integration, the client application does two things:
   - Call the OAAM Data Collection API to pass the transaction data. OAAM Data Collection APIs persist the transaction data based on the transaction definition into the OAAM database. This results in the creation of OAAM entities and transaction data. The output of these APIs is a Transaction ID.
   - Call the OAAM Rules API to trigger the fraud policies/rules associated to the checkpoint. This step results in triggering the rules engine that would execute the policies and rules associated to this checkpoint and creating Alerts if the associated rules trigger. The output of these APIs is a set of actions and risk score as returned by the policies and rules.
8. Once the integration with client application is done, you can perform a sample transaction and verify the end-to-end flow.

18.6 Healthcare Domain Deployment

A healthcare organization that cannot provide secure access to its data will suffer significant damage to their institution's reputation, the loss of trust by patients, stakeholders, and the community, and suffer severe penalties. Maintaining secure data is a process that affects all healthcare facility employees, including IT and all partners, insurers, and vendors that work with the provider. OAAM has a set of fraud auditing and detection tools, which can be used to assist organizations. During the discovery phase in a healthcare domain deployment, the business analyst identifies user activities that need to be monitored. User activities could be read-only access of sensitive data such as patient information or actions to add or manage data. Some examples of user activities are:

- Sensitive Record Access

- VIP Patient Record Access
- Coworker Patient Record Access
- Unusually High Frequency of Patient Record Access
- Unauthorized Access to Patient Record
- Unauthorized Access to VIP Patient Record

For these use cases, entity-attribute information must be mapped out and a policy must be developed for "Patient Record Access". During the design phase, Entities, Transactions, Rules, Policies, Alerts and Configurable actions are defined.

- Entities and Transactions - User activities and data identified during the discovery phase are mapped to Transactions and Entities definitions in Oracle Adaptive Access Manager. Policies are then configured using these Entities and Transactions.
- Policies and Rules - Based on the requirements, Policies and Rules are defined in Oracle Adaptive Access Manager. Appropriate actions are configured for each rule.
- Alerts - Alerts can be generated for privacy and fraud incidents. Alerts are defined in Oracle Adaptive Access Manager admin console and associated with rules. Alerts can be classified as High, Medium or Low.
- Configurable actions - A configurable action provides a mechanism to add additional tasks to the static actions returned by the rules. A configurable action uses Java classes to implement custom behaviors. Out of the box configurable actions like automatic case creation and email notification can be configured to create cases or sending email notifications. Other customized actions can be written to meet any specific requirements.

Unusually High Frequency of Access by Employee to Patient Records

Description: Frequency of employee's access to patient records increases to unusually high frequency.

Conditions:

IF employee has accessed patient records during each of the last 12 months

AND Employee has accessed > 500% more patient records in the last six months than in the previous six months

THEN report on potential inappropriate patient record access.

Parameters

Required data:

- Employee demographics:
  - Person ID
  - Name
- Patient demographics:
  - Medical Record Number
  - Name

Reported As

"Employee [Person ID, Name,] accessed > 500% more patient records in the last six months than in the previous six months."

19

Creating and Managing Entities

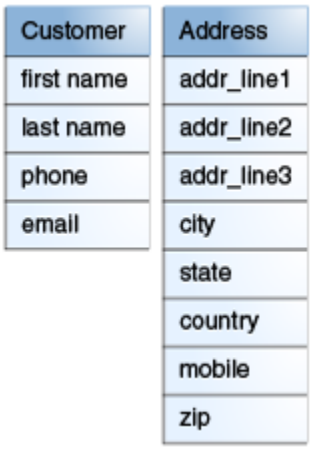
Oracle Adaptive Access Manager can evaluate the risk associated with a transaction in real-time to prevent fraud and misuse. Any process a user performs after successfully logging in can be termed as a transaction. The core elements of an Oracle Adaptive Access Manager transaction are entities and transaction data. This chapter focuses on creating and managing entities that are used in an OAAM transaction.

This chapter includes the following topics:

19.1 Concepts

An entity is a data structure that can be reused in multiple transactions. For example, the Address entity could be used as a shipping address, billing address, home address, and so on. Most entities also combine multiple data points into the structure for data optimization. For example, the set of properties in an address could include addr_line1, addr_line2, addr_line3, city, state, zip, country, and mobile entity properties. The properties of a customer could include first name, last name, phone, and email entity properties, as shown in Figure 19–1.

Figure 19–1 Simple Entities

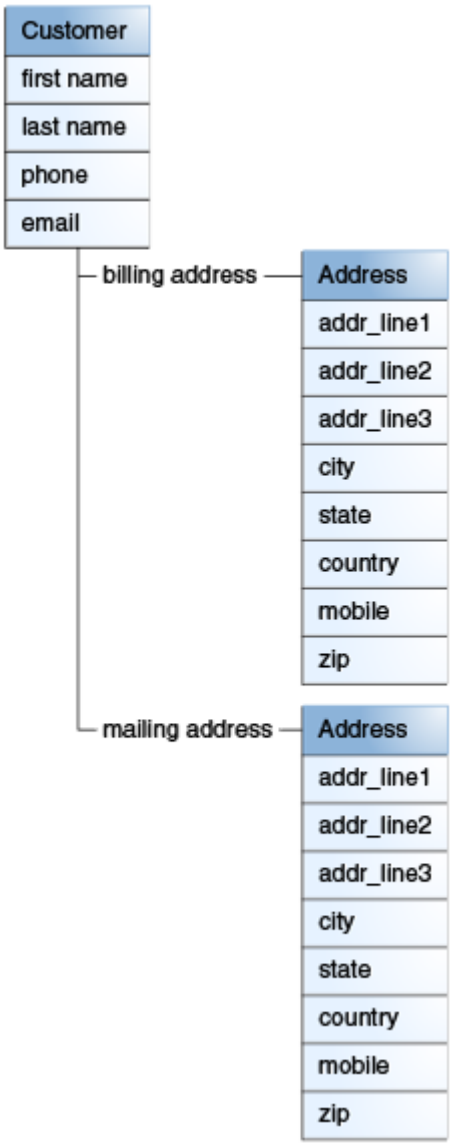


Entities

- Reduce configuration time since they are only set up once
- Minimize stored data. For example, John's shipping address is saved in the database once and all transactions from John refer to that instance.
- Increase processing speed. For example, John's credit card is stored as a hash and compared as such.

Entities can be defined and associated as an instance of a transaction. The following example shows the Address entity. A security administrator can define a Customer entity to be used in an ecommerce transaction. As part of the Customer entity definition, he can link the Address entity as a Shipping Address and as a Billing Address, as shown in Figure 19–2. The Address entity is shown below with its two instances, Shipping Address and Billing Address. An entity definition is the original model on which the entity instance is patterned. Entity instance creation will only be possible if its corresponding entity definition already exists in the database.

Figure 19–2 Address Entity



An entity can be linked to another entity. A relationship is the association between entities. The Patient entity can be linked to another entity of type Address. The relationship between "Patient" and "Address" entities can be said to be one-to-one (1:1) because they have a one to one direct mapping. The Address entity is not dependant on the Patient and can reside by itself. It can be linked to other entities like Customers and Providers.

An entity can have many references to other entities. For instance, the "Patient" entity can have multiple instances of the "Address" entity like "Home Address," "Work Location" and so on. You cannot create multiple linked entity instances for a parent entity instance for a given relationship name, hence a one to many relationship between two entities for a given relationship name is not supported. The "Patient" entity cannot have multiple home addresses.

An individual instance of information transfer can be called a transaction. Bill pay, wire transfer, and address change are transactions. Transactions in OAAM are used for fraud detection. They can be evaluated using a set of rules and predictive models. The

core elements of a transaction are entity data and transaction data. Entity data refers to the entities defined and associated as an instance of a transaction. Oracle Adaptive Access Manager can take inputs from a variety of sources and channels and quickly map application data using the OAAM Administration Console.

Data could be mapped to attributes of the entity. An entity data map is shown below.

Key: first name	**Value: Mark**
Key: last name	Value: Henry
Key: email	Value: x@y.com
Key: shipping.addr_line1	Value: #1, Lex residence
Key: shipping.addr_line2	Value: Redmond street
Key: shipping.zip	Value: 418001
Key: customer id	Value: 9876543210

An attribute of an entity can be an entity itself. Such an attribute is called a linked entity. For instance, "Shipping Address" is a linked entity of the entity, "Customer."

Customer: Customer ID (attribute)

first name (attribute)

last name (attribute)

email (attribute)

shipping address (linked entity) - type

address:address line1

address line2

Zip

Entities reduce configuration time since they are only set up once. This minimizes stored data. For example, a user's shipping address is saved in the database once and all transactions from the user refer to this instance. Entities increases processing speed because the data is saved as a hash and compared as such. At runtime the transaction will include this data and risk evaluations can be made against the data.

The key concepts of entities are the following:

- You create an entity by specifying the details about its attributes.
- You can create associations to reflect relationships between entities.
- You can define an entity to be used in a transaction.
- You can run risk evaluations against the entity data.
- You can search on entity data which includes attributes that are related to entities that are mapped to a particular transaction type to find potential fraud.
- You can add entity data to groups for use in rules evaluation. (For example, you can add credit cards and accounts to a blacklisted group, so any transaction from this account or credit cards can be blocked).
- You can create, update, or search entities in the context of a client application that provides the transaction.

Entity Definition
Configuration that defines a reusable data structure such as address.

Entity Instance
When an entity linked to another entity or used in a transaction definition an instance is created such as home address or work address

Entity Occurrence
When an entity instance is used in a runtime operation an individual occurrence is created such as the shipping address used in order number 356893

Data Type
Entity data may be configured as one of four types including string, numeric, date and Boolean. The string data type is used for the majority of use cases. The numeric data type should be used when arithmetic calculations will be performed on the data by the rules. The date data type is used for data specific data. Boolean data type is used for True/False data.

ID Labels
When runtime entity data is displayed in the OAAM Administration Console the labels shown will be those defined in the ID Scheme tab of the entity definition.

Link Name
When an entity is linked to another the linked entity is given a name which will be used to identify it in other Admin console screens including transaction definitions.

19.2 How to Create Entity Definitions

Security administrators utilize the OAAM Administration Console to configure entities such as an address or credit card. This section contains instructions for creating simple and complex entities. For instructions for defining the transaction, refer to Chapter 20, "Managing Transactions, refer to Chapter 20, "Managing Transactions.".

19.2.1 Entity Elements

An entity definition includes entity type, the data elements and their properties, the ID scheme, and linked entities if there are any.

Best Practices: The entity data type, length, and so on should not be altered after the entity has been defined and used in a transaction.

19.2.1.1 Data Elements

Data elements are used to describe the attributes that make up an entity. For example, the credit card entity has attributes such as address line 1, address line 2, city, zip, and state. Data elements, such as description, length, type, and so on, are used to describe each attribute.

19.2.1.2 Display Element

Display elements are the elements you want to present and the order in which you want to present the value of an entity in a user interface. For example, if you want to display an address, you would want to show address line 1 as the first item, address

line 2 as the second item, city as the third item, state as the fourth item, and zipcode as the fifth item.

19.2.1.3 ID Scheme

An ID scheme consists of the data elements that can uniquely identify an entity, in other words, you are defining the unique combination that identifies the entity. For example, the credit card entity has many attributes, but the way to uniquely identify a credit card is by using the 16-digit credit card number. In that case, the ID scheme is just the credit card number.

Another example, the address entity has address line 1, address line 2, city, state, and zipcode as attributes. Address line 1, address line 2, and zipcode, without the state and city attributes, can still be used to identify the address uniquely.

For session details to appear for transaction and entity data, transactions are sent with all the ID scheme attributes. ID scheme is similar to a composite key on the table. All attributes that had been defined in the ID scheme must be sent in order for the ID scheme to be able to uniquely identify and update the transaction. For example, if SSN is the only attributes present in ID Scheme, the incoming transaction is uniquely identified when SSN present. If an entity does not include SSN, it is considered a new entity when an entity is created. For example, the entity with firstname, lastname, SSN is a different entity than an entity with firstname, lastname, and telephone.

19.2.1.4 Linked Entities

Linked entities are used to configure relationships between entities. Linked entities are created and updated via either the Entity CRUD API or via the transaction CRUD API.

19.2.1.5 Entity Key

The entity Key is the unique identifier provided by the system integrator which is used when creating and updating entities via the API.

19.2.2 Overview of Creating a Simple Entity Definition

A simple entity is created without any previously linked entities or new linked entities. An overview for creating a simple entity is presented in this section. For detailed instructions on creating an entity definition, refer to Creating an Entity Definition.

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. Create an entity with an entity name, key and description.
   a. Click **New Entity** at the upper right corner to create a new entity.
   b. Enter entity name, definition key, and description, and click **Apply**.

      The definition key is the unique identifier for an entity definition. For example, you specify "address" as the key for an entity definition. You will not be able to create another entity definition with the same key value.
   c. Click **OK** when the confirmation dialog appears. The entity was created successfully.
3. Add attributes to the entity. For information, refer to Section 19.2.4.2, "Adding and Editing Data Elements."
   a. Click the Data tab and then the **Add** button in the toolbar to add a row for an attribute.

b. Define the attributes of the entity and click **Apply**.

4. Define the ID scheme. For information, refer to Section 19.2.4.3, "Selecting Elements for the ID Scheme."
   a. In ID Scheme tab, click Add to add data elements.
   b. Select the ID labels and click Add.
   c. When the confirmation dialog appears, click OK.

      The data elements added successfully

   d. Add another data element.
5. Specify display elements. For information, refer to Section 19.2.4.4, "Specifying Data for the Display Scheme."
   a. Click Display tab and then the Add button in the toolbar to choose the display elements of the entity.
   b. Select the display element and then click Add.
   c. Click OK to dismiss the confirmation dialog.
6. Activate the entity. For information, refer to Section 19.2.4.7, "Activating Entities."

   A simple entity is created without any previously linked entities or new linked entities.

19.2.3 Overview of Creating a Complex Entity Definition

An entity can be linked to multiple entities based on a relationship name. A complex entity has other entities linked to it by a relationship name. For instance, a Customer can be defined by following attributes:

Customer: first name (Simple attribute)

last name (Simple attribute)

email (Simple attribute)

shipping address (linked entity of type address)

address: addr line1

addr line2

zip

phone number

Shipping address is a relationship name which links customer to another entity of type address.

An overview for creating a complex entity is presented in this section. For detailed instructions on creating an entity definition, refer to Creating an Entity Definition.

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. Create an entity with an entity name, key and description.
   a. Click **New Entity** at the upper right corner to create a new entity.
   b. Enter entity name, key, and description.
   c. Click **OK** when the confirmation dialog appears. The entity was created successfully.

3. Add attributes to the entity. For information, refer to Section 19.2.4.2, "Adding and Editing Data Elements."
   a. Click the Data tab and then the **Add** button in the toolbar to add a row for an attribute.
   b. Define the attributes of the entity and click **Apply**.
4. Define the ID scheme. For information, refer to Section 19.2.4.3, "Selecting Elements for the ID Scheme."
   a. In ID Scheme tab, click Add to add data elements.
   b. Select the ID labels and click Add.
   c. When the confirmation dialog appears, click OK.

      The data elements added successfully
   d. Add another data element.
5. Specify display elements. For information, refer to Section 19.2.4.4, "Specifying Data for the Display Scheme."
   a. Click Display tab and then the Add button in the toolbar to choose the display elements of the entity.
   b. Select the display element and then click Add.
   c. Click OK to dismiss the confirmation dialog.
6. Link the entity to another entity. For information, refer to Section 19.2.4.5, "Creating Associations to Reflect Relationships between Entities."
7. Activate the entity. For information, refer to Section 19.2.4.7, "Activating Entities."

19.2.4 Creating an Entity Definition

Follow the steps in this section to create a new entity definition. You will have to provide the required information for all tabs of the Entities Details page before you can activate the entity.

Note: After creating an entity, you must activate it if you want to use it in a transaction. Only active entities can be used in a transaction. By default an entity is disabled when it is created. For information on activating an entity, refer to Section 19.2.4.7, "Activating Entities."

19.2.4.1 Initial Steps

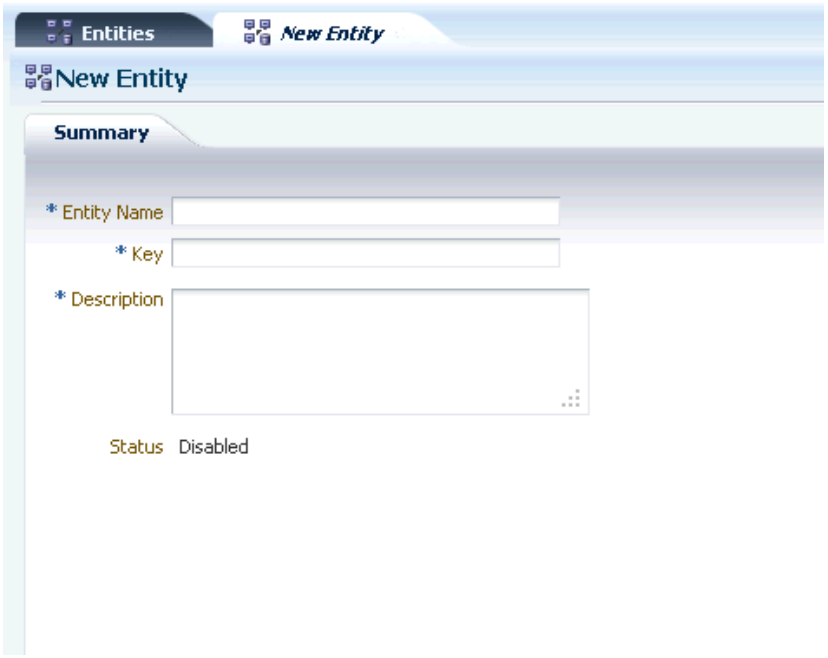
To create an entity, follow these steps.

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. In the **Entity Definition Search** page, click the **New Entity** button.

   Alternative methods to open create pages are listed in Section 3.10, "Search, Create, and Import."

   A **New Entity** page is shown in Figure 19–3.

Figure 19–3 New Entity Page



3. In the **New Entity** page, enter a unique entity name in the Entity Name field.

   For example, for the Address entity, enter Address in the Entity Name field.

4. Enter an entity key (string) in the Entity key field that will indicate the entity.

   The entity Key is the unique identifier provided by the system integrator which is used when creating and updating entities via the API. Enter the key provided by the integrators. When modifying transactions, do not change the key. The key may be referenced by other applications.

5. Enter a description about the data element in the Description field. For example, you can enter "Address of customer."

6. Click **Apply to apply your changes**.

   A confirmation dialog appears with a message that the entity was created successfully.

7. Click **OK** to close the dialog.

   The **Entity Details** page appears for the entity that you have just created.

   The page contains seven tabs:

   - **Summary** - General Details
   - **Data** - **Data Elements** (Used for adding and editing data elements of entity)
   - **ID Scheme** - Data Elements (Used for adding and editing data elements of an entity)
   - **Display** - Display Elements (Used for adding and editing display elements of the entity based on the Identification Scheme)
   - Linked Entity - Data Element (Used for linking entities)
   - Usage - Displays information on how the entity is being used
   - Purging - Enables set up of purging for entity data

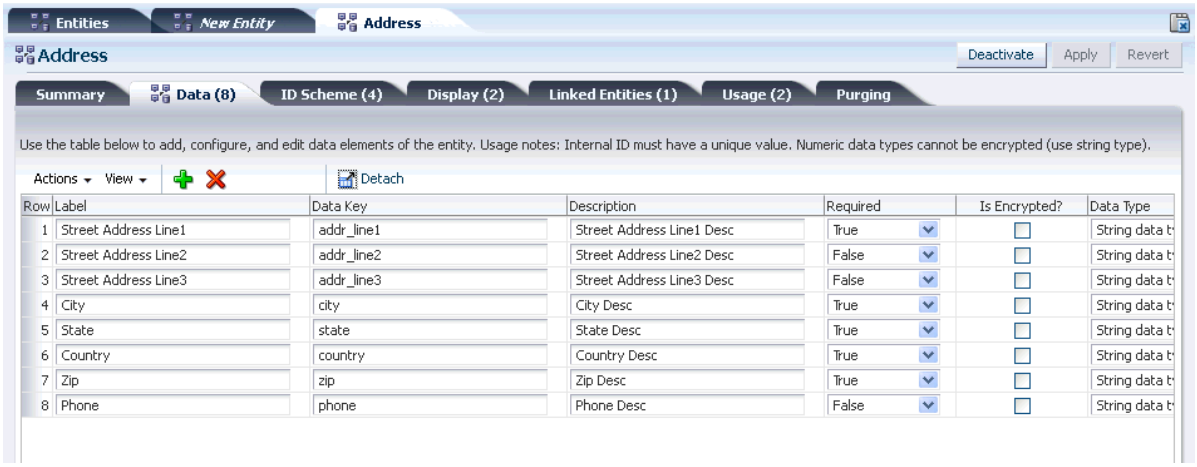
The tab titles for Data, ID Scheme, Linked Entities, and Display will show the number of data elements present, in parenthesis, when you have added your elements.

19.2.4.2 Adding and Editing Data Elements

Use the **Data** tab to specify or the data elements that are part of that entity.

For an entity like Address, the attributes could be Address Line1, Address Line2, Address Line3, City, State, Zipcode, and Country. Metadata elements, such as a label, description, data type, and so on, describe the properties of the attribute.

Figure 19–4 Entity Data



Define the elements for each attribute of an entity by following these instructions:

1. Enter a label for the attribute in the Label field.

   For example, Address Line1.

2. Specify the data key in the Entity Data key field.

   Ensure that the Entity Data Key used is the exact string coming from the protected application. The Entity data key is used to identify the data element. The data key is specified for internal use. It is typically used in rule conditions and other purposes.

3. Enter a description about the data property in the Description field.

   For example, the address of the customer logging in.

4. Specify whether the element is required in the Required field.

   Some data elements are not populated all the time because the entity can function without this data. Those elements are marked True or False for whether they are required For example "Address Line2" in an address is not required since many addresses do not have "Address Line2."

5. Specify whether the element should be encrypted in the Is Encrypted field.

   If **Is Encrypted?** is set to **True**, data is encrypted so that it can be stored securely in the database; thereby protecting sensitive data.

   Encryption is used for string data fields; other data fields are not required to be encrypted.

   Encrypted fields have the following constraints:

- These fields should not be used in rules. If they are used, you cannot specify regular values for comparing against these fields; the values will have to be encrypted values.
- These fields cannot be used in the search criteria while querying for transactions through the query screen.

  Numeric fields cannot be encrypted.

6. Specify the data element's data type in the Data type field and click **Apply**.

   A data type is an attribute that specifies the type of data that the attribute can take: Boolean data type, Date data type, Name value profile, Numeric data type, and String data type.

   Note: Encryption is not allowed for a numeric data type. When a numeric data type is selected, the "Is Encrypted" column becomes inactive.

7. When the confirmation dialog appears, click **OK**.
8. If you want to add another element, click the **Add** button on the toolbar and repeat Steps 1 through 7.

You can use the **Delete** button to delete the data elements within the entity.

Note: The **Row and Column** values are automatically assigned based on the data type and should not be changed unless you want to rearrange values in the database.

19.2.4.3 Selecting Elements for the ID Scheme

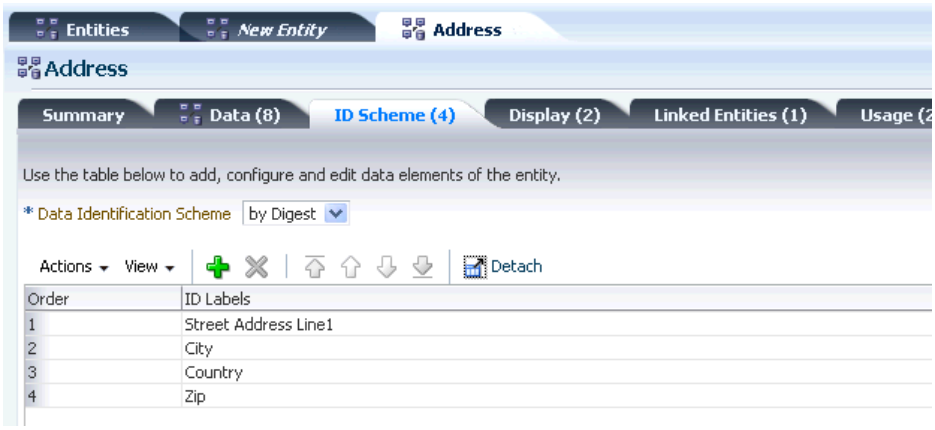
In the **ID Scheme** tab, select the elements that you want to use to uniquely identify the entity.

The Address entity has Address Line1, Address Line2, Address Line3, City, State, Zipcode, and Country as attributes. The Address Line1, City, Country, and Zipcode attributes can be used to identify the address uniquely. The Address Line2 attribute is not necessary.

Address Line1 alone would not uniquely identify an address. For example, 150 Main Street can exist in more than one location.

An example of a **ID Scheme** tab is shown in Figure 19–5.

Figure 19–5 Entity ID Scheme



1. Select the **Data Identification Scheme**.

   Identification Scheme determines how an entity is uniquely identified using the elements that are part of the entity. The elements that are selected should be stored as plain text (**key**) or encrypted (**digest**).

   - **By Key**: This scheme creates a unique identifier by simply concatenating the selected elements of the entity.

     Tip: When transactions are created, OAAM generates keys for the ID attributes of the transaction by concatenating the key-attributes of elements defined in the ID scheme of an entity. The character used to concatenate the entity key-attributes is specified through the property, `tracker.transaction.key.generation.scheme.concatenate.separator`. The default value for the character is "^". Since the character "^" is used by OAAM, ensure that the entity-key-data value you enter does not contain "^".

   - **By Digest**: This scheme creates a unique identifier by hashing the values of the selected elements of the entity. The resultant key is usually cryptic. Use this scheme when the data values are large or if they need to be secured.

2. Click the **Add** button on the toolbar to add a data element.

3. In the **Add Data Elements** screen, select the data elements to add to the ID Scheme and click **Add**.

   You can select one or several data elements to add to the identification scheme. After the data elements are added, they are not available in the list for further selection.

4. Select the order of the elements

   The order of the rows in the **ID scheme** tab determines how information is stored in the database and uniquely identified. The order determines how the data is concatenated while forming the data that identifies the entity. Order is not required and is automatically pre-filled if you do not fill in that information.

Since order is important, if changes are required later, you can reorder the columns by dragging and dropping the rows.

You can use the **Delete** button to delete the data elements within the entity.

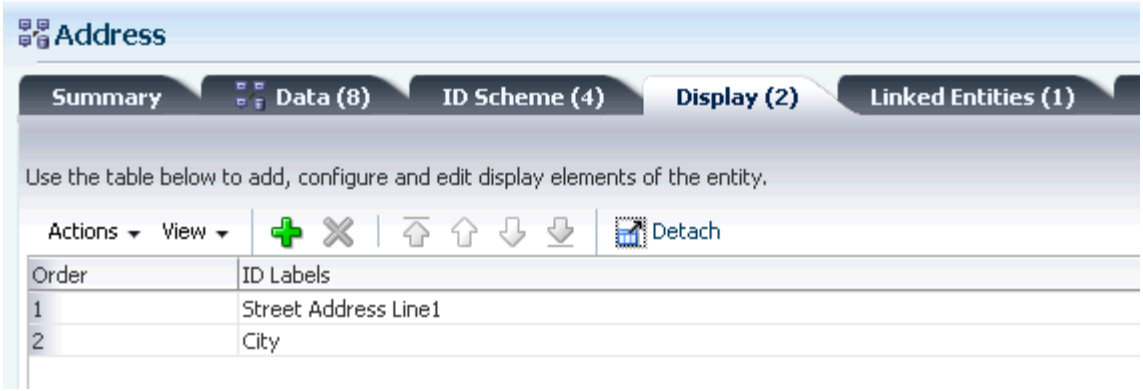
19.2.4.4 Specifying Data for the Display Scheme

In the **Display** tab, define the **display scheme**. The display scheme specifies the data elements to present and their order when you display the value of the entity in reports:

- The data elements form the entity data that can be displayed.
- The order determines how the data is concatenated while forming the data to be displayed for the entity

An example of a **Display** tab is shown in Figure 19–6.

Figure 19–6 Entity Display



The Data elements that you have selected to present are shown in the **Transaction Details** page.

To select the data elements, follow these steps.

1. Click the **Add** button to add a data element.
2. In the **Add Data Elements** screen, select the data elements to add for displaying and click **Add**.

   For example, for an address, you can choose to present Street Address Line1 and City.
3. Select the order of the elements

   The order determines what is shown first, second, third, and so on when the data is displayed for the entity. Order is not required and is automatically pre-filled if you do not fill in that information.

   For example, if you want to display an address, you would want to show Street Address Line1 as the first item and City as the second item.

   Since order is important, if changes are required later, you can reorder the columns by dragging and dropping the rows. For example, in the display, you might decide that you want "City, State, Zip code" for addresses in the UK and USA.

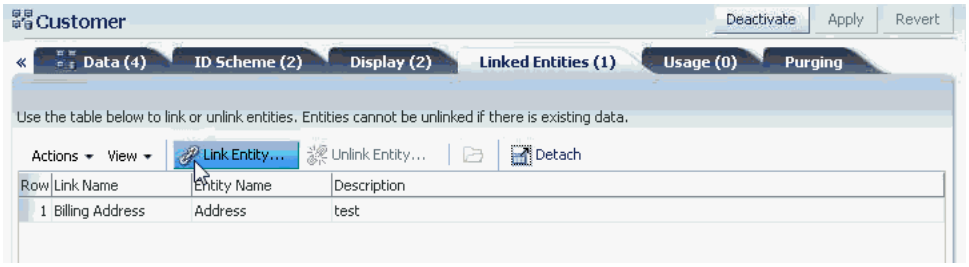
You can use the **Delete** button to delete the display elements.

19.2.4.5 Creating Associations to Reflect Relationships between Entities

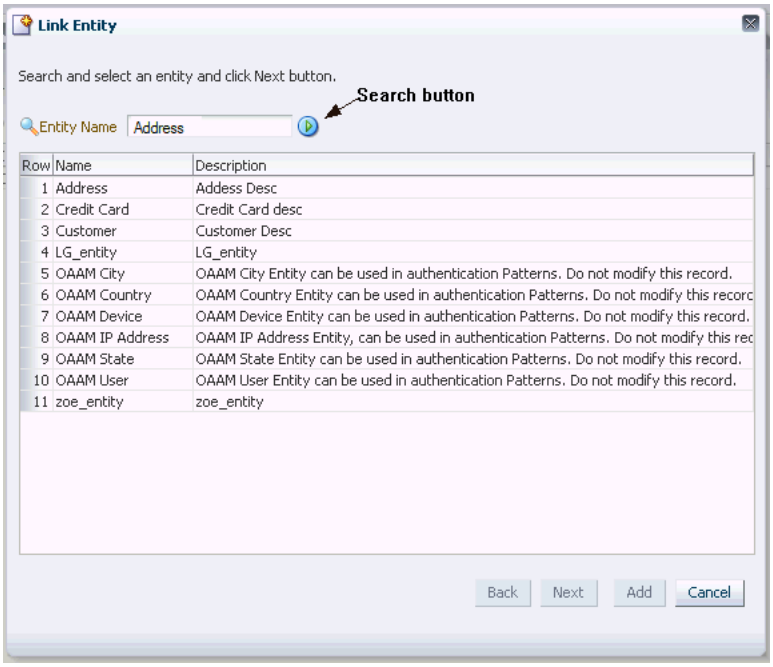
An entity can be linked to another entity. The Patient entity can be linked to another entity of type Address. The relationship between "Patient" and address entities can be said to be one-to-one (1:1) because they have a one to one direct mapping. The Address entity is not dependant on the Patient and can reside by itself. It can be linked to other entities like Customers and Providers.

To create associations between entities, perform the following steps:

1. From the entity's detail page, click the Linked Entity tab, and then the Link button in the toolbar to select the entity to link to this entity.



2. In the Entity Name field, enter the name for the entity you want to select to link to this entity and click the Search button next to the Entity Name field.



The entity appears in the results table with the name and description.

Note: An entity cannot be linked to itself. For example, a Patient cannot be linked to another patient.

---

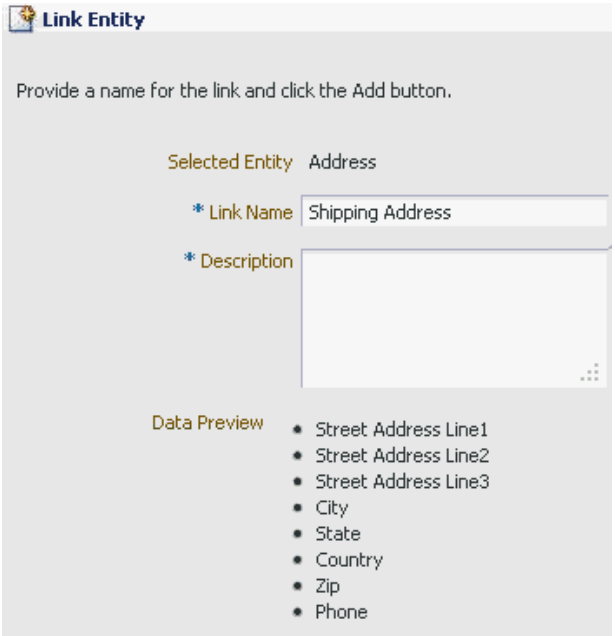
3. Select the entity from the list of entities to link to this entity and click **Next**.

   Only one entity can be selected at a time. The selected entity for linking is displayed with its attributes and links. For example, Street Address Line1, Street Address Line2, Street Address Line3, City, State, Country, Zip, and Phone are examples of attributes that could be listed for Address.

4. Enter a link name and description and click **Add** to link the entities. The linking name is the relation between the two entities.

   The Data Preview displays the data fields of the entity.

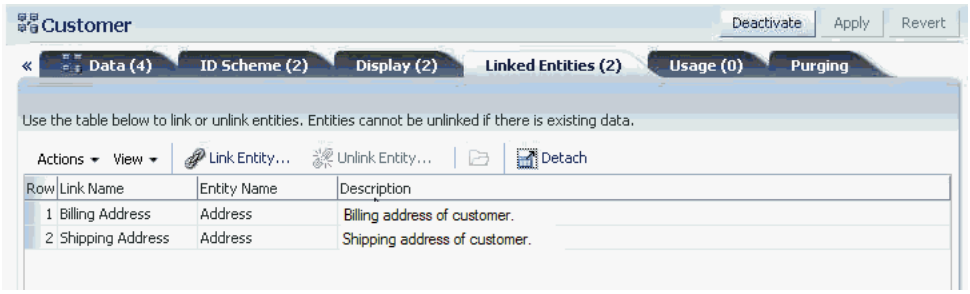
Figure 19–7 Link Entity Dialog



For example, the Customer entity is linked to another entity of the type Address, and Shipping Address is the relationship name.

Shipping Address is the entity instance of the entity selected. The relationship name must be unique within the entity. For example, a Patient and a Provider entity can have linked entities with the same name "Home Address", but a Patient entity cannot have two Home Addresses.

Figure 19–8 Linked Entities Tab



19.2.4.6 Setting Up Entity Purging During Entity Creation

To set up purging for entity data, refer to Section 19.4, "Setting Up Targeted Purging for Entity Data."

19.2.4.7 Activating Entities

After creating an entity, you must activate it if you want to use it in a transaction. Only active entities can be used in a transaction. By default an entity is disabled when it is created.

To activate entities:

1. In the Entity Definition Search page, select the row for each entity you want to activate.

2. Click the **Activate** button.

   When you click **Activate**, the entity is validated for errors (if data elements are present). If there are any errors, they must be fixed before the entity is activated.

   Only active entities can be used in a transaction. Make sure to activate an entity definition if you want to use it in a transaction.

19.2.5 What Happens When You Create an Entity Definition

When you create an entity definition, OAAM stores the information in its database schema:

- Entity header-data (name, key, and so on) in VT_ENTITY_DEF
- Entity data field definitions in VT_DATA_DEF_ELEM (with link through VT_DATA_DEF_MAP and VT_DATA_DEF).
- ID Scheme and Display Scheme data in VT_DATA_DEF_ELEM (with link through VT_DATA_DEF_MAP and VT_DATA_DEF)
- The relationship between entities (definitions) in VT_ENT_DEFS_MAP. The RELATION_TYPE column is used to specify the name of the relationship. For example an entity named "Patient" could have a relation to the "Address" entity with the RELATION_TYPE as "Home Address".

19.3 Managing Entities

This section contains procedures to manage entities.

19.3.1 Managing Entity Associations

Linking entities is extremely helpful in modularizing and reusing entity data. For instance you have an employee entity definition and a customer entity definition. Suppose you want to store address information for both the definitions. It is a better and more consistent approach to create an address entity definition and link it to employee and customer rather than adding address related attributes to the two entities individually.

Linked entity data can be used in transaction related rules for detecting and preventing fraud. Linked entities are stored in the VT_ENT_DEFS_MAP table

This section provides tasks related to linking entities.

19.3.2 Searching for Entity Definitions

To open the Entity Definition Search page, double-click **Entities** in the Navigation tree.

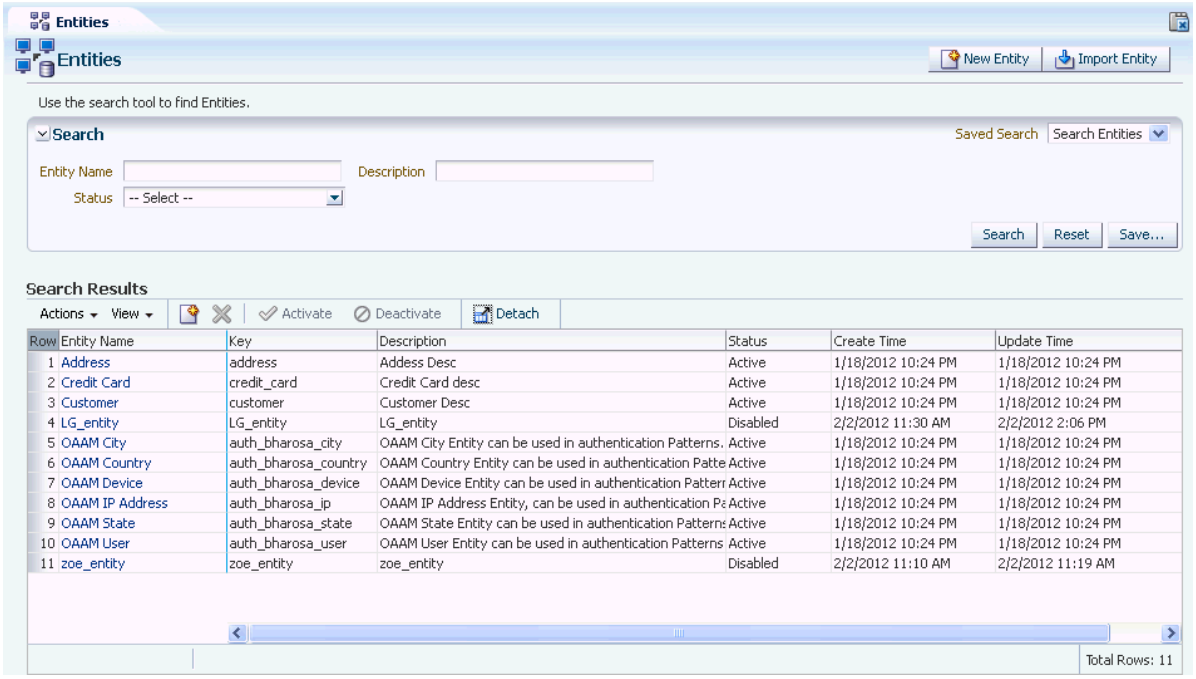
The Entity Definition Search page is the starting place for managing entities. From the Entity Definition Search page, you can:

- List entities
- Search for entities
- Create new entities
- Import/export entities
- Activate/deactivate entities
- Delete entities

- Open the Entity Details page

An example of an **Entity Definition Search** page is shown in Figure 19–9.

Figure 19–9 Entity Definition Search

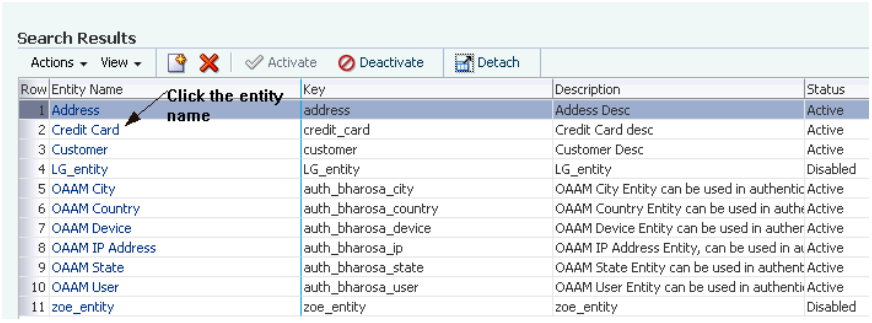


19.3.3 Viewing Details of a Specific Entity

To view the details of a specific entity:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. From the **Entity Definition Search** page, search for the entity you want.
3. In Search Results, click the entity name to open the Entity Details page.

Figure 19–10 Open Entity



19.3.4 Viewing Entity Usage

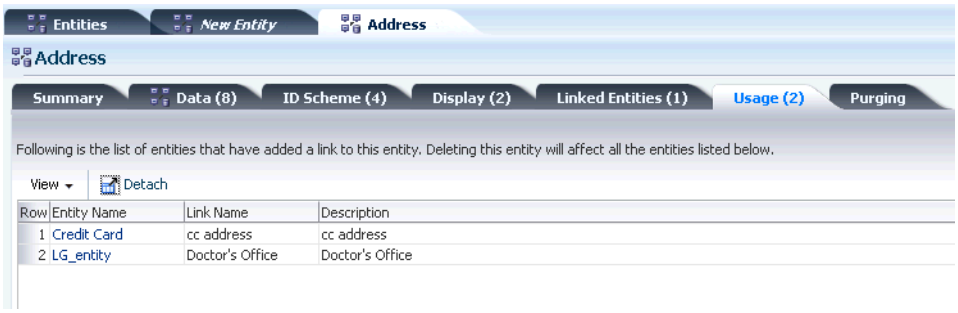
The Usage tab can be used to view the list of entities to which a particular entity is linked. You can also delete one more such links from this page.

To view how the entity is being used, follow these steps:

1. If you are not in the **Entity Details** page of the entity you want details about, follow the instructions in Section 19.3.3, "Viewing Details of a Specific Entity."
2. Click the Usage tab to view a list of entities that have added a link to this entity.

   The Usage tab indicates if the entity is being used by other entities and how edits to an entity impacts other entities.

Figure 19–11 Entity Usage



If this entity is linked multiple times by another entity, the entity name displays different entity instance names of the entities it is linked to.

19.3.5 Editing the Entity

To edit the details of a specific entity:

> **Note:** Be cautious when editing entities. If you edit an entity and it is in several transactions, then the edits are applied to all instances of the entity in the different transactions.

1. If you are not in the **Entity Details** page of the entity you want to edit, follow the instructions in Section 19.3.3, "Viewing Details of a Specific Entity."
2. From the **Summary** tab, you can modify the name and description of the entity; and activate or deactivate the entity.
3. From **Data** and **ID Schemes** tabs, you can modify the data elements of the entity.

   If you delete a data element from the scheme, it is added to the **Add** list and available the next time you select **Add Data Elements**.
4. From the **Display** tab, you can edit the way the entity is displayed.
5. Click **Apply**.

19.3.6 Removing or Unlinking Entities

Unlinking a relationship is the same as deleting the relationship. However, deleting the linked entity is not the same. For example, you have a link customer->address (shipping address). Unlinking or deleting the relationship would delete the shipping address entry from the database. However, the address entity definition would still persist. Only its link with customer (with name shipping address) will be deleted. It might be still linked to customer by any other name (for example, billing address) or any other entity definition, for example, employee.

You can remove the selected instance of the linked entity only if there are no references to this instance in a transaction.

To unlink entities from an entity:

1. If you are not in the **Entity Details** page of the entity you want to unlink entities from, follow the instructions in Section 19.3.3, "Viewing Details of a Specific Entity."
2. Click the **Link Entities** tab and select the entity to unlink.
3. Click the **Unlink Entity** button to unlink the selected entity.

19.3.7 Changing the Relationship Name

To change the relationship name, follow these steps:

1. If you are not in the **Entity Details** page of the entity you want to edit, follow the instructions in Section 19.3.3, "Viewing Details of a Specific Entity."
2. Click the Linked Entities tab.
3. Highlight the linked entity and from the Actions menu, select **Open Linked Entities**.
4. From the Edit Linked Entities dialog, you can edit the information in the Link Name and Description fields, and click **Save**.

The relationship name is used in passing entity data while creating entity instances. It is also used when entities are used in transactions. During the mapping phase while creating transaction definitions, you need to link source data to the linked entity data. There are no particular conventions for naming. Although, symbol dot (.) should not be used.

19.3.8 Importing and Exporting Entities

This section contains instructions to import and export entities.

19.3.8.1 Exporting Entities

To export entities:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. In the **Entity Definition Search** page, enter the search criteria you want and click **Search**.
3. Select the row for each entity you want to export.
4. Click the **Export** button or select **Export Selected** from the **Actions** menu.
5. In the **Export Entities** screen, click **Export**.
6. In the **Save** screen, click **OK**.

19.3.8.2 Importing Entities

To import entities:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. In the **Entity Definition Search** page, click **Import**.

3. In the **Entities Import** screen, click **Browse** and locate the entity file you want to import.
4. Click **OK**.

19.3.9 Deactivating and Deleting Entities

This section contains information on deactivating and deleting entities.

19.3.9.1 Deactivating Entities

To deactivate entities:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. In the **Entity Definition Search** page, enter the search criteria you want and click **Search**.
3. Select the row for each entity you want to deactivate.
4. Press the **Deactivate** button.

19.3.9.2 Deleting Entities

To delete entities:

1. Open the **Entity Definition Search** page, as described in Section 19.3.2, "Searching for Entity Definitions."
2. In the **Entity Definition Search** page, enter the search criteria you want and click **Search**.
3. Select the row for each entity you want to delete and select the **Delete** button from the toolbar.

   If the entities selected for deletion are not used or linked to a transaction, a warning message is shown asking for confirmation.

   If an entity is used, you will not be allowed to delete it.
4. Click **Delete** to delete the entities.
5. In the confirmation dialog, click **Yes**.

If you deactivate an entity, it will not be available for you to use in transactions. Entities that are referenced by transactions cannot be deleted or deactivated.

19.4 Setting Up Targeted Purging for Entity Data

Most entity related data are non-transactional and persistent in nature. To effectively manage the non-transactional and persistent entity data archival and purging, use targeted purging policies.

The targeted purging policy determines the inclusion and exclusion of entity definitions to purge from the database. You can decide not to purge the data at all or to purge at a different time sequence from other entities. To set up targeted purging for entity data, follow the instructions below:

1. Set up the archive tables and the flag to true, if you want the entity and transaction data to be archived.

   You cannot selectively choose to only archive the data since archiving is part of the purge process.

2. If you are not in the **Entity Details** page of the entity you want to view, follow the instructions in Section 19.3.3, "Viewing Details of a Specific Entity."
3. Click the Purge tab.
4. If you want to purge data, deselect the option, "Do not purge any entity data." If you do not want to purge data, select "Do not purge any entity data."

   Note: Entity definition and transaction definitions are retained even though the data is being purged.

   The purging mechanism is hierarchical. Data is purged from transaction down to entity and then related entities.
5. Set the database to delete data older than a specified number of days.

   The purge-unused-entity-data-older-than-days option determines what data, including related entities, should be purged.

   You must convert years and months into days for the unit to specify.

   Data that has not been updated in the last 180 days is purged by default.

   If the retention period is 0, then the data is never purged. The retention period cannot take alphabetic characters or negative numbers.

   The retention period cannot be null or empty if you chose the option to purge the data.

19.5 Best Practices

This section outlines some best practices for entity creation.

- Any data structure that will be reusable across transactions should be an entity.
- Any sensitive data, such as credit card and social security numbers, should be encrypted in the database.
- Ensure that the Data Key used is the exact string coming from the protected application.
- If you want to rearrange the fields in the database for performance purposes, you can modify the row and column values. Only the first 3 columns out of the ten are indexed by default. Rearranging the fields impacts performance.

20

Managing Transactions

This chapter focuses on the creation and usage of transaction definitions and the mapping of client specific data into the OAAM database. The mapping will be used by administrators to more easily examine transactional entities and define risk levels for transactions and by investigators to review transactional data to proactively prevent fraud. This chapter includes these sections:

20.1 Transaction Handling

Oracle Adaptive Access Manager can evaluate the risk associated with a transaction in real-time to prevent fraud and misuse. Any user activity that requires monitoring after successfully logging in can be termed as a transaction. A transaction consists of useful information that are being processed by OAAM for risk analysis and the related data can be grouped together to form entities for ease of operation. Using the Transactions feature requires native integration. Refer to Chapter 18, "Modeling the Transaction in OAAM" for details about the deployment. The flow of OAAM transaction handling is as follows:

1. An administrator using Oracle Adaptive Access Manager defines the entities and transaction data to use (transaction definition) to represent the client transactions.
2. The entities and transaction data elements are then mapped to the source data (client-specific data) so that the Oracle Adaptive Access Manager server can process the information from the client application. For example, in an online transaction, the data involved may be credit cards, e-checks, debit cards, dollar amounts, name, shipping and billing addresses, and so on.
3. The client's transaction page passes the required information to Oracle Adaptive Access Manager to monitor the activity.
4. Transaction data is saved into the Oracle Adaptive Access Manager Server using the APIs described in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

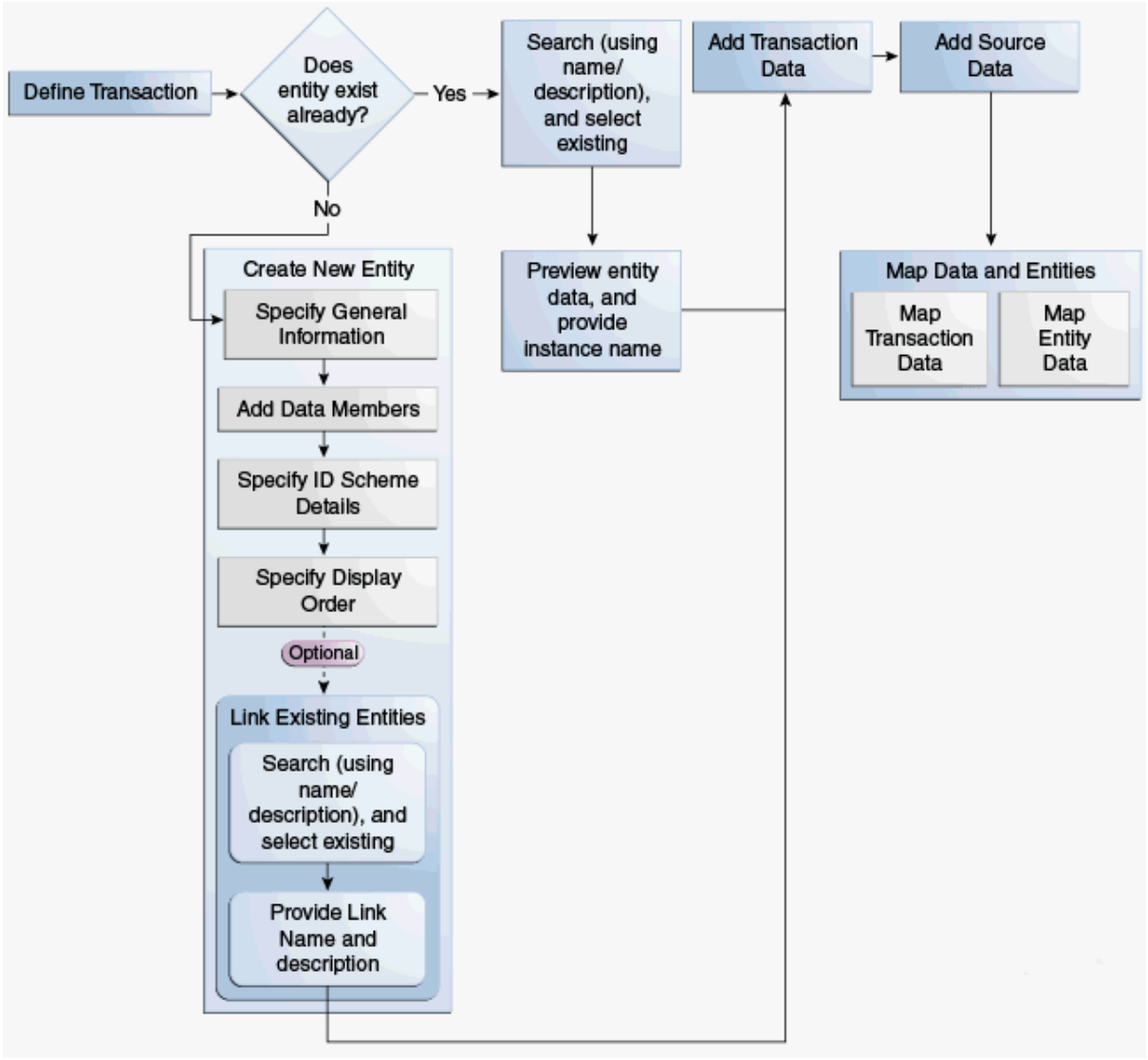
5. Oracle Adaptive Access Manager enforces authorization rules and fraud analysis on a client's transaction data based on transaction definitions.

20.2 Overview of Creating a Transaction Definition

The following tasks are required to create a transaction definition:

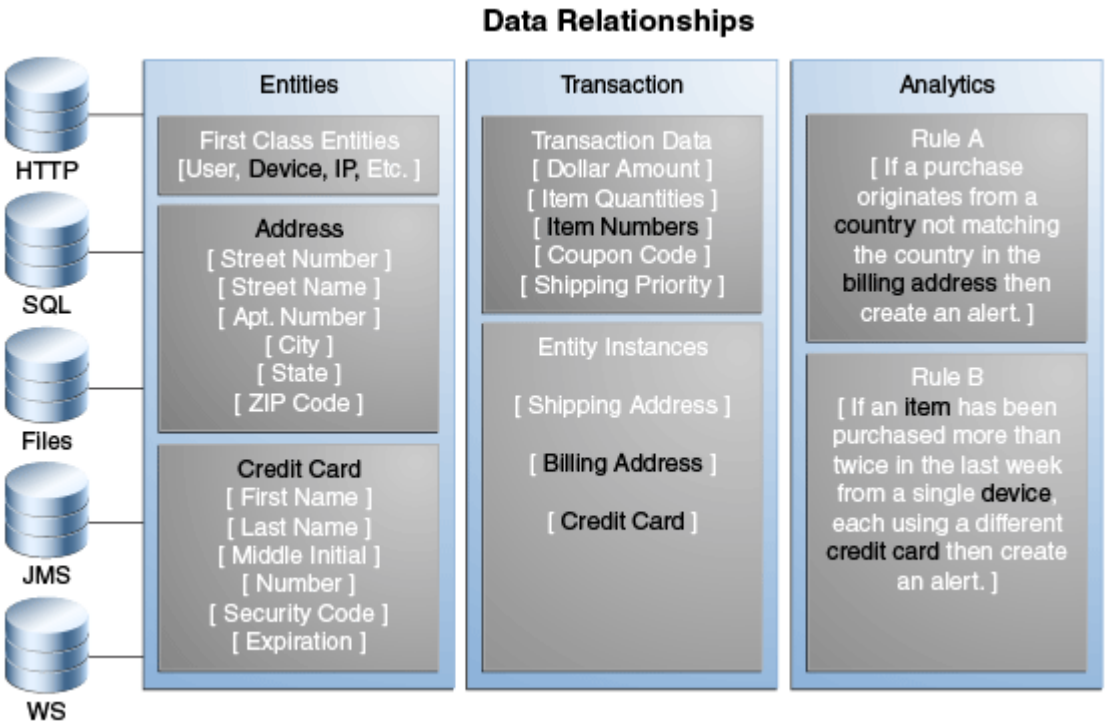
1. Create the transaction definition. Figure 20–1 shows the transaction definition creation process.

Figure 20–1 Create Transaction Definition Process



The transaction definition captures the transaction that directly maps with the customers transaction. The transaction data from the customer is processed by OAAM for risk analysis. Figure 20–2 shows the relationship between entities and transactions and how they are used in analytics.

Figure 20–2 Data Relationships



The high-level steps to creating and using transaction definitions are as follows:

a. Add entity instances to the transaction definition.

Refer to Section 20.4.3, "Add an Existing Entity to the Transaction" or Section 20.4.4, "Add a New Entity to the Transaction" for details.

b. Add transaction data elements for the transaction at the Oracle Adaptive Access Manager End.

For example, Transaction Amount and Transaction Date.

All data fields that do not fit into entities should be added as transaction data elements.

Refer to Section 20.4.5, "Define Transaction Data for OAAM" for details.

c. Add source data for the transaction from the client's end.

Source data elements are a list of parameters from the client's end. Details from the external application fill in these fields. Make sure the source data internal IDs match to the keys used by the external application while sending the transaction data.

Refer to Section 20.4.6, "Source Data for the Transaction from the Client's End" for details.

d. Map transaction to source data and map entity to source data.

Refer to Section 20.4.7.2, "Mapping Entities to the Source Data" for details.

Mapping connects the source data to our entities and transaction data.

e. Activate the transaction definition.

Refer to Section 20.5.7, "Activating a Transaction Definition" for details.

2. Create an alert. The alert is used to notify administrators about anomalies or send information about the system when rules are triggered.
3. Create a policy that uses transaction conditions.
4. Add a rule to the policy. The rule must contain a transaction condition.
5. When adding the rule to the policy, select your transaction definition for the **Select Transaction to check** field.
6. Link the alert to the policy.
7. Verify the policy by logging into the client application and performing transactions.

20.3 Pre-requisites for Performing Analysis on Transactions

In order for Oracle Adaptive Access Manager to perform analysis on transactions, you must determine how to represent the transactions in Oracle Adaptive Access Manager, how to process the data coming in, how to use the data, and how to display the data.

Look at the available business data by logging into the application.

1. Identify all the entities and transaction fields of interest for the third-party transaction.
2. On paper, determine the transaction definition and the mapping of the source data to transaction definition. Source data elements are the fields from the customer application. Make sure the source data keys match the keys used by the customer application.
3. Log in to Oracle Adaptive Access Manager.
4. On the **Sign In** page, enter your credentials and click **Sign In**.

   Upon a successful sign in, Oracle Adaptive Access Manager displays the OAAM Admin Console.
5. Create the necessary entities and activate them. In the example, customer, credit card, shipping address, and billing address are entities that you would create. For information, refer to Chapter 19, "Creating and Managing Entities."

Now, you are ready to create an OAAM transaction. The transaction definition captures the transaction that directly maps with the customers transaction. This definition will be used in policies for monitoring.

20.4 Creating and Using Transaction Definitions

OAAM uses a transaction definitions to specify the mapping between the customer data and the system database. These mappings are created for each transaction.

20.4.1 Open the Transactions Page

The Transactions page is the starting place for managing your transaction definitions. From the Transactions page, you can:

- Open transaction definitions and transaction search pages
- View transaction definitions
- Create new transaction definitions
- Activate transaction definitions

- Deactivate transaction definitions
- Import transaction definitions
- Export transaction definitions
- Search for transaction instances and logs
- Search for entity instances and logs

The bulk action cannot be selected for creating new, activating, and deactivating transaction definitions.

To open the Transactions page, double-click **Transactions** in the Navigation tree.

Alternatively, you can:

- Right-click **Transactions** in the Navigation tree and select **List Transactions** from the context menu.
- Select **Transactions** in the Navigation tree and then choose **List Transactions** from the **Actions** menu.
- Click the **List Transactions** button in the Navigation tree toolbar.

20.4.2 Create the Transaction Definition

To start the creation of the transaction definition, proceed as follows:

1. In the **Transactions Search** page, click the **New Transaction** button.

   Alternatively, you can:

   - Right-click **Transactions** in the Navigation tree and select **New Transaction** from the context menu.
   - Select **Transactions** in the Navigation tree and then choose **New Transaction** from the **Actions** menu.
   - Click the **Create new Transaction** button in the Navigation tree toolbar.
   - Select the **Create New Transaction** button from the **Search Results** toolbar.
   - Select **New Transaction** from the **Actions** menu in **Search Results**.

   A **New Transaction Definition** page appears.

2. In the **New Transaction Definition** page, enter the transaction definition name.

   Enter a valid name for the name. It must be unique. Transaction definition names are not case-sensitive.

3. Enter the description.

   Enter a description of the transaction definition to be used for informational purposes only.

4. Enter the definition key.

   This definition key value is used to map the client/external transaction data to transaction definitions in Oracle Adaptive Access Manager.

   This value is sent while making the API call for creating or updating the transaction data in OAAM Server.

5. After making the required entries, click the **Apply** button.

   A new transaction is created. You can now add a new entity or map an existing entity.

20.4.3 Add an Existing Entity to the Transaction

An entity is a data structure that can be reused in multiple transactions. For example, the Address entity could be used as a shipping address, billing address, home address, and so on. Most entities also combine multiple data points into the structure for data optimization. For example, the set of properties for an employee entity could include first name, last name, social security number, department, and salary entity properties. When associating the employee entity with a transaction you can create an instance for contractors, offshore employees, and so on.

You can add instances of entities to the transaction definition and later map the data fields to the customer source data.

In the **Entity Selection** page:

1. Click **Add Existing Entity**.

   The **Add Entity** screen appears.

2. Search for the entity and click the search button next to the Entity Name field.

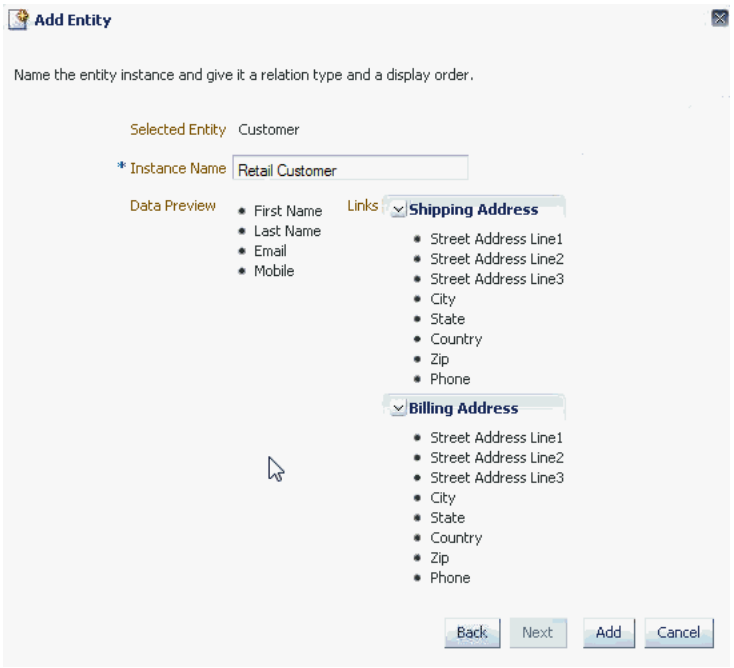
   Inactive entities are not available for adding to transactions.

   You can single-select an entity.

3. Click the **Next** button.

   The preview shows the data fields associated with the selected entity and the linked entities of the selected entity.

Figure 20–3 Adding an Existing Entity



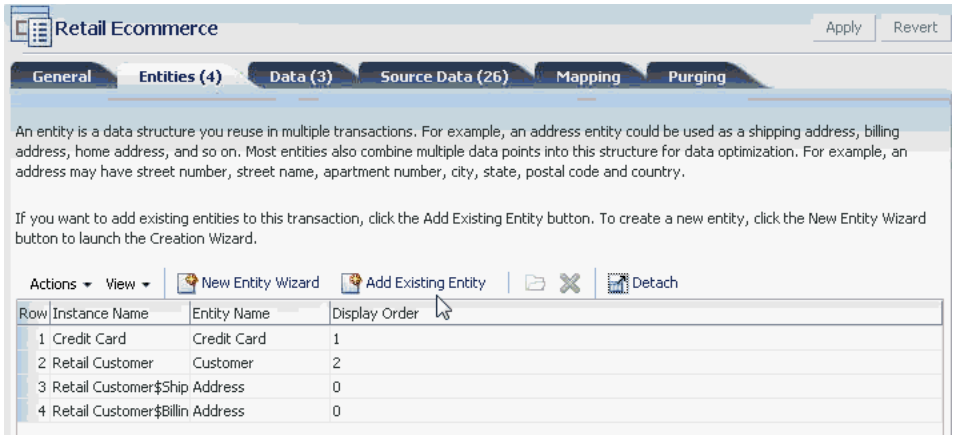
4. Enter the instance name.

   The instance name must be unique. You can edit the instance name at a later date if needed.

5. Click **Add** to add the selected entity.

The entity and the linked entities are shown in the Entities tab.

Figure 20–4 Linked Entities



The display order is auto-generated and takes the next available order. You can change the order if needed later on.

You can add multiple instances of the same entity.

20.4.4 Add a New Entity to the Transaction

In the **Entity Selection** page:

1. Click **Create New Entity**.
2. Enter **Entity Name** and **Description** and click **Next**.

   Refer to Section 19.2.4.1, "Initial Steps" in Chapter 19, "Creating and Managing Entities" for details.
3. In the **Entity Data** page, add data elements of the entity.

   Best Practice: The data type, length, and so on of the fields in the transaction definition should not be altered after the transaction has been defined and used in a transaction.

   Refer to Section 19.2.4.2, "Adding and Editing Data Elements" in Chapter 20, "Managing Transactions" for details.
4. In the **Entity ID Scheme** page, select the elements that you want to use to uniquely identify an entity.

   Refer to Section 19.2.4.3, "Selecting Elements for the ID Scheme" in Chapter 19, "Creating and Managing Entities" for details.
5. In the **Entity Display** page, specify the data elements to present and their order when you display the value of the entity and click **Finish**.

   You can cancel entity creation by using the **Cancel** button. The **Entity Selection** screen will appear when you press **Cancel**.

   Refer to Section 19.2.4.4, "Specifying Data for the Display Scheme" in Chapter 19, "Creating and Managing Entities" for details.
6. Perform Steps 1 through 5 to create new entities to add to the transaction definition.

20.4.5 Define Transaction Data for OAAM

Transaction data is unique or transient for each transaction occurrence and therefore not reusable across different transactions. For example, the total dollar amount of a transaction would not be reused in multiple transactions so it should be transaction data and not an entity.

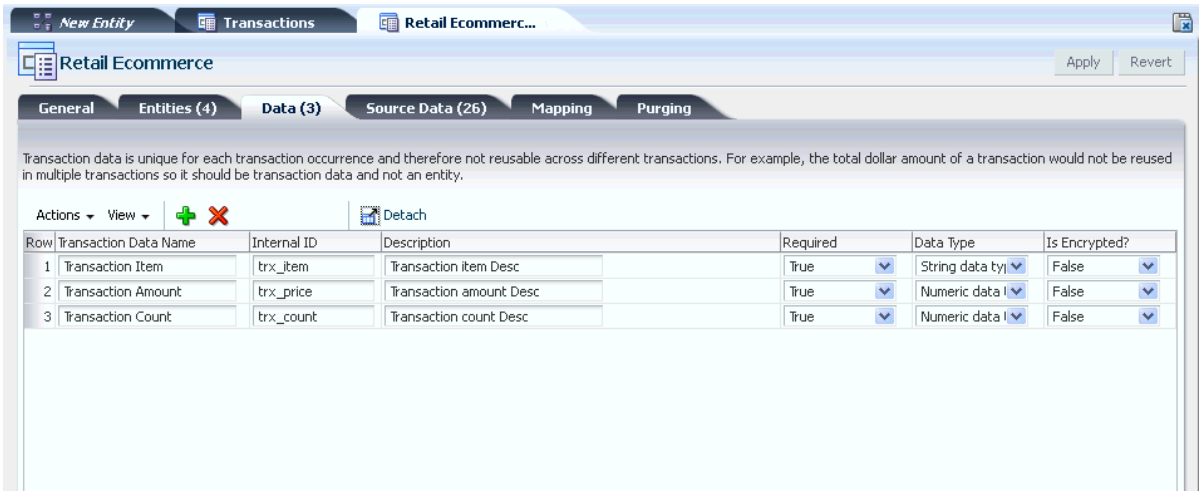
Examples of transaction data are as follows:

- Dollar amount
- Coupon code
- Item number

To add transaction data to the transaction definition, proceed as follows:

1. Click **Data** tab.

Figure 20–5 Retail Ecommerce Data



2. In the **Transaction Data** page, click **Add Row**.
3. Enter the data name.
4. Enter the data type.
5. Enter the internal ID.

   The internal ID is used to identify the data element. The internal ID specified in the transaction data will be for internal use. It is typically used in rule conditions and other purposes. Do not change this internal ID after it is defined.
6. Enter a description.
7. Specify whether the element should be encrypted.

   If encrypted is set to true, data is encrypted before it is stored in the database. This feature protects sensitive data.

   Encrypted fields have the following constraints:

   - These fields cannot be used in rules.
   - These fields cannot be used in the search criteria while querying for transactions through the query screen

Encrypted values from transaction data fields cannot be decrypted outside of the OAAM application. For example, encrypted data cannot be accessed from customized rule conditions. Another example, encrypted data elements cannot be viewed in BI Publisher reports.

8. Specify whether the element is required.

   Some data elements are not populated all the time as the data might not be available. Those elements are marked as "not required." For example "Address Line 2" in an address is not required since many addresses will not have "Address Line2."

9. Click **Add**.

10. Add other elements by following Steps 2 through 8.

    You must fill in the required fields for the previous row before you add new transaction data to the transaction definition.

11. Press the **Next** button to add source data.

Row and Column Values

Row and column values are automatically assigned by the Oracle Adaptive Access Manager Server. If there is a need to change the Row and Column values, follow these guidelines:

1. Set the column values for the most commonly used fields to 1-3 or 11-13 based on whether it is non-numeric or numeric.
2. For a given row there can be a total of 13 fields.
3. For Non-Numeric fields, Column value should be 1 to 10.
4. For Numeric fields, Column value should be 11 to 13.

Fields in the **Data** tab are mapped to DATAX (for non-numeric), NUM_DATAX (for numeric) columns in VT_TRX_DATA table in database.

Fields in **Entities** are mapped to DATAX (for non-numeric), NUM_DATAX (for numeric) columns in VT_ENTITY_ONE_PROFILE table in database.

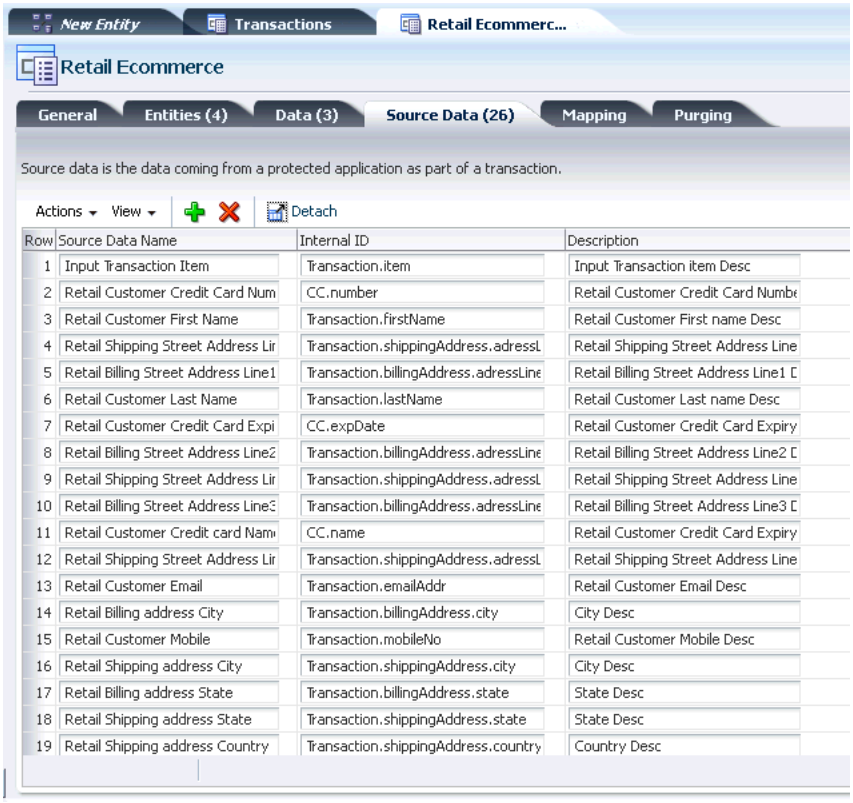
20.4.6 Source Data for the Transaction from the Client's End

Source data (client data) is the data coming from a protected application as part of a transaction.

The source data is defined by the client. To add source data elements to the transaction definition, proceed as follows:

1. Click the **Source Data** tab.

Figure 20–6 Retail Ecommerce Source Data



2. In the **Source Data** page, click **Add Row**.
3. Enter the data name.

   The data name provides a way to identify the element.

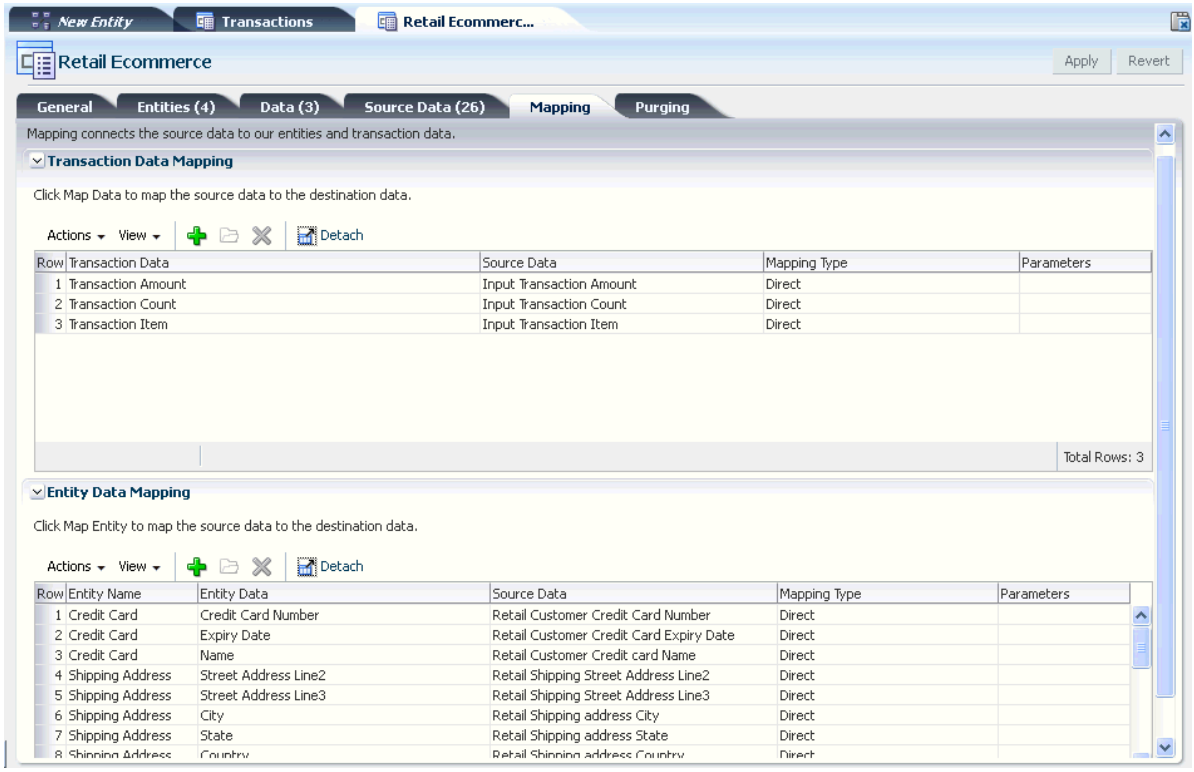
   The data name must be unique.
4. Enter the data type.
5. Enter the internal ID.

   The client supplies the internal ID.
6. Enter a description.
7. Specify whether the source data is needed.
8. Press **Add**.
9. Add other elements by following Steps 1 through 7.
10. After adding all the source data elements, click **Next**.

20.4.7 Map the Source Data

Mapping is a way to connect the source data to transaction data and to entities.

Figure 20–7 Retail Ecommerce Mapping



20.4.7.1 Mapping Transaction Data to the Source Data

To connect the transaction data to the source data, proceed as follows:

1. In the **Transaction Data Mapping** section of the **Mapping** page, click **Add Transaction Data Mapping**.
2. Select the transaction data.

   The data elements to choose from are the ones you defined in the "Define Transaction Data for OAAM" section.
3. Select the **Source Data**.

   The client data elements to choose from are the ones that you added in the "Source Data for the Transaction from the Client's End" section.
4. Select the mapping type.

   Select **Direct**, **Concatenate**, **Endstring**, and **Substring**.

   - Select **Direct** if you want a one-to-one mapping of the source data element to the destination data element.
   - Select **Concatenate** if you want to join two or more source data elements to form one data element.
   - Select **Endstring** if you want to have last "x" number of characters from source data as the data.
   - Select **Substring** if you want to have a part of the source data as the data.
5. If you selected **Concatenate** as the mapping type, you will have to enter separators.

6. If you selected **Endstring**, you will have to enter the last "x" number of characters.

   If you selected **Substring**, you will have to enter the **Start Index** and the **End Index** (CSV format). The string index begins with 0. For example if you want "acc" for "account," you would specify 0,2. By default, `oaam.transaction.mapping.startindex.min` is set to `0`.

   Translation Params are the parameters defined when selecting certain Mapping type such as end string, lowerstring, and substring.

7. Select **Map Data**.
8. Map other elements by following Steps 2 through 6.
9. Click **Finish** or perform mapping for entities.

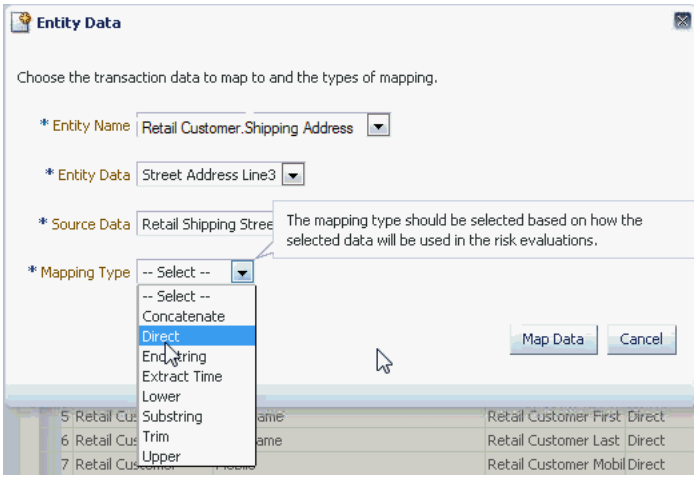
20.4.7.2 Mapping Entities to the Source Data

To add the mapping for the Entity elements, proceed as follows:

1. In the entities data mapping panel of the Mappings page, select the entity name.

   After you selected the entity name you are interested in mapping, the data elements of that corresponding entity will be listed in the Entity Data list.

Figure 20–8 Mapping Entity Data



2. Select the entity data.
3. Select **Source Data**.
4. Select the mapping type.

   Select **Direct**, **Concatenate**, **Endstring**, and **Substring**.

   - Select **Direct** if you want a one-to-one mapping of the source data element to the destination data element.
   - Select **Concatenate** if you want to join two or more source data elements to form one data element.
   - Select **Endstring** if you want to have last "x" number of characters from source data as the data.
   - Select **Substring** if you want to have a part of the source data as the data.

5. If you selected **Concatenate** as the mapping type, you will have to enter separators.
6. If you selected **Endstring**, you will have to enter the last "x" number of characters.

   If you selected **Substring**, you will have to enter the **Start Index** and the **End Index** (CSV format). The string index begins with 0. For example if you want "acc" for "account," you would specify 0,2. By default, `oaam.transaction.mapping.startindex.min` is set to `0`.

   Translation Params are the parameters defined when selecting certain Mapping type such as end string, lowerstring, and substring.
7. Click **Map Data**.
8. Click **Finish** or perform mapping for transaction data.

   When the transaction definition is created, the new **Transaction Details** page opens.

20.4.7.3 Editing Mapping

For transaction data, you can specify the transaction data, source data, and mapping type.

For entity mapping, you can specify the entity name, transaction data, source data, and mapping type.

20.4.8 Activate the Definition

By default, a transaction definition is disabled on create.

Activate the transaction definition using the **Activate** button in the **Transaction Details** page.

Some steps are required before a transaction definition can be activated; otherwise, an error message will appear.

The following are required before you can activate a transaction definition:

- Source/Input data elements
- Mapping for all required Transaction Data Elements
- Mapping for all required elements in the Transaction Entities

20.4.9 Model a Policy

Determine the OAAM checkpoint that can be used to trigger the fraud policies that can perform fraud checks on the transaction. If an existing checkpoint can be reused, there is no need to create a checkpoint. Otherwise, create an OAAM checkpoint for the transaction.

Now, look at the requirements for what kind of rules should go into the fraud policy for this transaction.

Look at the list of transaction rule conditions to see which rule condition is needed. Go through the "Example Usage" section of those rule conditions.

Create an OAAM policy and add the rule.

20.4.10 Configure Trigger Results

Once the rule condition is configured, specify what should be the **Results** if the rule condition is satisfied. You can configure **Alert** and **Action** groups that indicate that the user has reached his threshold and also a **score**. The client application can interpret the result and take appropriate action in terms of redirecting the user to the relevant pages that indicate that the user action is not allowed.

Now, you have the setup ready in OAAM so that the transaction can be created in OAAM and fraud policies and rules can be triggered.

20.4.11 Integrate the Client Application

Integrate the client application with OAAM using OAAM shared libraries. Refer to "Integrating Native Java Applications" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details of the integration. This is required since transactions functionality is available through native integration. As part of this integration, the client application does two things:

- Call the OAAM Data Collection API to pass the transaction data. OAAM Data Collection APIs persist the transaction data based on the transaction definition into the OAAM database. This results in the creation of OAAM entities and transaction data. The output of these APIs is a Transaction ID (The unique identifier created when the customer submitted the transaction).
- Call the OAAM Rules API to trigger the fraud policies/rules associated to the checkpoint. This step results in triggering the rules engine that would execute the policies and rules associated to this checkpoint and creating Alerts if the associated rules trigger. The output of these APIs is a set of actions and risk score as returned by the policies and rules.

Once the integration with client application is done, you can perform a sample transaction and verify the end-to-end flow.

20.5 Managing Transaction Definitions

Procedures to manage transaction definitions are provided in this section.

20.5.1 Searching for a Transaction Definition

In the Transactions Search page you can view a list of all transaction definitions and search for a transaction definition based on various criteria. The Transactions Search page provides access to the Transaction Details page for any transaction.

To search for a transaction definition, proceed as follows:

1. Open the **Transactions Search** page, as described in Section 20.5.1, "Searching for a Transaction Definition."
2. Specify criteria in the Search Filter to locate the transaction and click **Search**.

   The search filter criteria are described in Table 20–1, " Search Filter Criteria".

   If you want to reset the search parameters to the default setting, use the **Reset** button.

Table 20–1 Search Filter Criteria

Field	Description
Name	The name of the transaction
Key	This Key value that is used to map the client/external transaction data to transactions in the Oracle Adaptive Access Manager server.
Keyword	The keyword. The keyword filter may increase the likelihood of meaningful search results.
Status	The status of the transaction

The **Search Results** table displays a summary of the transactions that match these criteria specified.

By default, transactions are sorted on **Name**, but you can sort transactions on **Key**, and **Keyword**.

Each transaction has a name. If the description is too long to be fully shown, you can place the mouse over the text to see the entire description.

20.5.2 Viewing Transaction Definitions

The **Search Results** table displays a summary of the transactions that match the search criteria.

Click the row for the transaction you are interested in to view more details.

20.5.3 Editing a Transaction Definition

To edit the details of a specific transaction definition, proceed as follows:

When modifying transaction definitions, do not change the Definition ID. The Definition ID may be referenced by other applications.

1. If you are not in the **Transaction Definition Details** page of the transaction definition you want to edit, follow the instructions in Searching for a Transaction Definition.
2. In the **General** tab, to edit the transaction definition name and description.
3. In the **Entity** tab, select the entity you want, click **Edit Entity**, and edit the entity.
4. In the **Data** tab, edit the data elements.
5. In the **Source Data** tab, perform edits.
6. In the **Mapping** tab's **Data Mapping** section, click **Edit Mapping**, and edit the source data and mapping type and click **Map**.
7. In the **Mapping** tab's **Entity Mapping** section, click **Edit Mapping**, and edit the entity name, transaction data, source data, and mapping type fields.
8. Click **Apply** or **Revert**.

   If you click **Apply**, transaction definition updates are applied.

   If you click **Revert**, transaction definition updates are not applied

20.5.4 Deleting Transaction Definitions

To delete transaction definitions, proceed as follows:

1. Search for the transaction definition you are interested in, as described in Section 20.5.1, "Searching for a Transaction Definition."
2. Select the row corresponding to the policies you want to delete and press the **Delete** button or select **Delete Transaction Definition** from the **Actions** menu.

   A warning message reminds you that the changes will be permanent and asks if you want to continue.

   If the transaction definitions selected for deletion are not actively used or contain transaction data from the past, a confirmation message is shown asking for confirmation. If you answer "yes", those transaction definitions are deleted.

   When multiple transaction definitions are selected for deletion and if some of the transaction definitions are used or contain transaction data from the past, a warning message appears, stating: "The following instances are used and cannot be deleted. Do you want to delete the other transaction definitions?" If you answer "yes", the unused transaction definitions are deleted.

   Note: If you have a transaction definition and it has transaction data from the past or is being used, you are not allowed to delete the definition.

3. In the Information dialog, click **OK**.

   The transaction definition is deleted.

20.5.5 Exporting Transaction Definitions

To export transaction definitions, proceed as follows:

1. Open the **Transaction Definitions Search** page, as described in Section 20.4.1, "Open the Transactions Page."
2. In the **Transaction Definitions Search** page, enter the search criteria you want and click **Search**. Refer to Section 20.5.1, "Searching for a Transaction Definition."
3. Select all the rows corresponding to the transaction definitions you want to export.
4. Click the **Export** button or select **Export Transaction Definition** or **Generate Delete Script** from the **Actions** menu.
5. In the **Export Transaction Definition** screen, click **Export**.

   Generate Delete Script exports a delete script for the transaction definitions that you have selected. You can import this script later to delete the transaction definitions in the application if they are present.
6. Save the file to disk.

   The file is exported.
7. Click **OK**

If the transaction definition selected for export and deletion is not used or does not contain transaction data from the past, a confirmation dialog is shown asking for a confirmation. If you answer "yes", the transaction definition is deleted.

When multiple transaction definitions are selected for export and deletion and if some of the transaction definitions are used or contain transaction data from the past, a message appears, telling you which ones can be deleted and which ones cannot be deleted. Links to a usage tree are available for each of the used transaction definitions.

In the dialog, you are also given the option to delete the ones that are not in use or contain transaction data from the past.

20.5.6 Importing Transaction Definition

To import a transaction definition, proceed as follows:

1. Open the **Transaction Definitions Search** page, as described in Section 20.4.1, "Open the Transactions Page."
2. In the **Transaction Definitions Search** page, click **Import** or select **Import Transaction Definition** from the **Actions** menu.
3. In the **Transaction Definition Import** screen, click **Browse** and locate the transaction definitions you want to import.
4. Click **OK**.

20.5.7 Activating a Transaction Definition

To activate a transaction definition, proceed as follows:

1. Open the **Transaction Definitions Search** page, as described in Section 20.4.1, "Open the Transactions Page."
2. In the **Transaction Definitions Search** page, enter the search criteria you want and click **Search**. Refer to Section 20.5.1, "Searching for a Transaction Definition."
3. Select the row corresponding to the transaction definition you want to activate.
4. Press the **Activate** button or select **Activate** from the **Actions** menu.

The **Activate** button is disabled if multiple rows are selected.

All the required information must be entered (in all tabs), before you can activate the transaction. At least one source data element should be present.

20.5.8 Deactivating a Transaction Definition

To deactivate a transaction definition, proceed as follows:

1. Open the **Transaction Definitions Search** page, as described in Section 20.4.1, "Open the Transactions Page."
2. In the **Transaction Definitions Search** page, enter the search criteria you want and click **Search**. Refer to Section 20.5.1, "Searching for a Transaction Definition."
3. Select the row corresponding to the transaction definition you want to deactivate.
4. Press the **Deactivate** button or select **Deactivate** from the **Actions** menu.

The **Deactivate** button is disabled if multiple rows are selected.

20.6 Setting Targeted Purging for Transaction Data Per Transaction Definition

The volume of data growth varies between transaction. For better data growth management, you can specify targeted purging of transaction data.

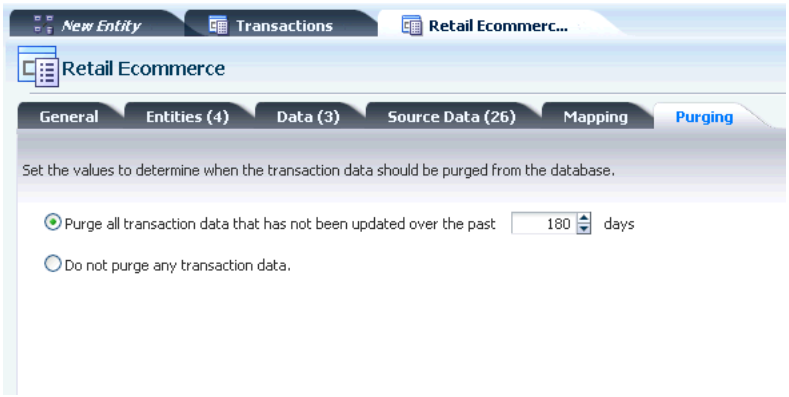
The targeted purging policy determines which portion of the data is purged from the database. You can decide not to purge the data at all or to purge at a different time sequence from other transactions. To set up targeted purging, proceed as follows:

1. Set up the archive tables and the flag to true, if you want the entity and transaction data to be archived.

   Note: You cannot selectively choose to only archive the data since archiving is part of the purge process.

2. In the **Transaction Definition Details** page, click the Purge tab to set the values to determine when the transaction data should be purged from the database.

Figure 20–9 Retail Ecommerce Purge



3. If you want to purge data, deselect the option, **Do not purge any transaction data**. If you do not want to purge data, select **Do not purge any transaction data**.

   Note: Entity definition and transaction definitions are retained even though the data is being purged.

   The purging mechanism is hierarchical. Data is purged from transaction down to entity and then related entities.

4. The **Purge all transaction data that has not been updated over the past** option determines what data will be deleted. Set the database to delete data older than a specified number of days.

   Note: If the data you want to purge is in years and months, you must convert years and months into days.

   Data that has not been updated in the last 180 days is purged by default.

   If the retention period is 0, then the data is never purged. The retention period cannot take alphabetic characters or negative numbers.

20.7 Transaction Searches

This section describes the transaction search features in Oracle Adaptive Access Manager. Subsequent sections provide the Transaction Search in greater detail.

The Transaction search enables you to search for different transactions created in the system. From the transaction, you can see what kind of information will be used in authorization and analysis. For example, you can search on "Internet Banking" with search filters for Transaction Amount, Transaction Account number, and so on.

An example of a Transaction search is provided below using "Internet Banking" and its transaction-related filters.

Internet Banking:

- Transaction Amount
- Transaction Account number
- Customer.firstname
- Customer.lastname

20.8 OAAM Transaction Use Cases

This section describes example use cases for using transaction definitions.

20.8.1 Implementing a Transaction Use Case

Joe is a retail banking customer. Retail banking customers can make money transfers totaling up to $500 per day.

Implementation Tasks:

1. Identify the source data fields that make up the **Money Transfer** transaction.
2. Give a unique identifier that identifies the transaction type of **Money Transfer**.
3. Determine how to model the **Money Transfer** transaction in OAAM in terms of OAAM entities and transactions.
4. Identify the mapping between the source data of **Money Transfer** and OAAM entities and transaction.
5. Use OAAM Admin to create and activate the entities and transaction definitions for **Money Transfer** based on the model you came up with.
6. Determine the OAAM checkpoint that can be used to trigger the fraud policies that can perform fraud checks on the **Money Transfer** transaction. If an existing checkpoint can be reused, there is no need to create a checkpoint. Otherwise, create an OAAM checkpoint for the **Money Transfer** transaction.
7. Now, look at the requirements for what kind of rules should go into the fraud policy for this transaction.
8. Based on the use case, you would want to enforce a threshold on the total in money transfer allowed per day.
9. Look at the list of transaction rule conditions in Section B.8, "Transactions Conditions." Go through the "Example Usage" section of those rule conditions.
10. For this use case, the rule condition "Transaction: Check Transaction Aggregrate and Count Using Filter Conditions" can be used to check to see whether the user has reached the threshold of $500 in money transfer per day.
11. Create an OAAM policy and add the rule using the "Transaction: Check Transaction Aggregrate and Count Using Filter Conditions" rule condition and specify the following in the rule condition:

Table 20–2 Transaction Rule Configuration

Parameters	Values
Transaction to check	Choose the transaction definition of Money Transfer
Aggregrate Function	Sum
Entity or Element to count	Select the data field that indicates the "money transfer amount"
Condition for Aggregrate	Select "Greater Than Equals"
Check value for Aggregrate	500
Condition for Count	Greater than Equals
Check Value for Count	1 (since you want at least 1 transaction to be there)
Duration	1 rolling day (if last 24 hours to be treated as a day) or 1 Calendar day (if the current calendar day i.e. 12am to 11.59 pm has to be considered)
Transaction Status	Select if only transactions in a particular status have to be considered
Ignore Current Transaction in Count	Select TRUE if current transaction should be excluded. If it is has to be included select FALSE and make sure the transaction data is created before running the rules.
For the same User?	Default is TRUE which makes sense since you want to consider only the transactions of current user
Apply filter checks on Current Transaction	Select TRUE if there are any conditions in Query Filter and you want to apply them to current transaction first
Query Filter	Select any filters so that you can fine tune what transactions have to be chosen to compute the aggregate before it checks if the threshold is reached.

12. Once the rule condition is configured, specify what should be the **Results** if the rule condition is satisfied. You can configure **Alert** and **Action** groups that indicate that the user has reached his threshold and also a **score**. The client application can interpret the result and take appropriate action in terms of redirecting the user to the relevant pages that indicate that the user action is not allowed.
13. Now, you have the setup ready in OAAM so that the transaction can be created in OAAM and fraud policies and rules can be triggered.
14. Integrate the client application with OAAM using OAAM shared libraries. Refer to "Integrating Native Java Applications" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details of the integration. This is required since transactions functionality is available through native integration. As part of this integration, the client application does two things:
    - Call the OAAM Data Collection API to pass the transaction data. OAAM Data Collection APIs persist the transaction data based on the transaction definition into the OAAM database. This results in the creation of OAAM entities and transaction data. The output of these APIs is a Transaction ID.
    - Call the OAAM Rules API to trigger the fraud policies/rules associated to the checkpoint. This step results in triggering the rules engine that would execute the policies and rules associated to this checkpoint and creating Alerts if the associated rules trigger. The output of these APIs is a set of actions and risk score as returned by the policies and rules.
15. Once the integration with client application is done, you can perform a sample money transfer transaction and verify the end-to-end flow.

20.8.2 Use Case: Transaction Frequency Checks

These kinds of checks can be implemented using the "Transaction: Check Transaction Count Using Filter Condition" rule condition. Table 20–3 shows the important parameters of the rule condition.

Table 20–3 Transaction Frequency Checks

Parameters	Values
Select Transaction to count	Select the transaction definition for which this check has to be applied
Specified Condition For Count	Select "Greater Than Equals"
Specified Check Value for Count	Enter the frequency value
Duration	Enter the duration

20.8.3 Use Case: Transaction Frequency and Amount Check against Suspicious Beneficiary Accounts

This kind of check can be implemented using the "Transaction: Check Transaction Aggregrate and Count Using Filter Conditions" rule condition. Table 20–4 shows the important parameters of this rule condition.

Table 20–4 Transaction Frequency and Amount Check against Suspicious Beneficiary Accounts

Parameters	Values
Select Transaction to check	Select the transaction definition for which this check has to be applied
Select Aggregrate Function	Sum
Select Entity or Element to count	Select the numeric data field that indicates the "amount"
Select Condition for Aggregrate	Select "Greater Than Equals"
Specified Check value for Aggregrate	Enter the value of amount to check
Specified Condition for Count	Greater than Equals
"Specified Check Value for Count	Enter frequency value
Duration	Enter the duration

20.8.4 Use Case: Transaction Check Against Blacklisted Deposit and Beneficiary Accounts

This kind of check can be implemented using the "Transaction: Check Current Transaction Using Filter Condition" rule condition.

Before configuring the rule, create the two groups of accounts, one that has the list of blacklisted deposit accounts and the other that has the list of blacklisted beneficiary accounts. Those groups should be populated with the lists of accounts that are blacklisted. These tasks can be done using OAAM Admin.

After that, create the rule using the "Transaction: Check Current Transaction Using Filter Condition" rule condition and configure it as follows:

Table 20–5 Transaction Check against Blacklisted Deposit and Beneficiary Accounts

Parameters	Values
Select Transaction to check	Select the transaction definition for which this check has to be applied
Filter condition	Select Deposit Account Data Field from the Transaction and specify the condition as "IN" and then select the group as the Blacklisted Deposit Accounts
Filter condition	Select Beneficiary Account Data Field from the Transaction and specify the condition as "IN" and then select the group as the Blacklisted Beneficiary Accounts

20.8.5 Use Case: Transaction Pattern

Example: Configure a rule to determine whether several small transactions (where amount < $10) has happened before a big transaction (amount > $500) is attempted in the last couple of hours. If yes, then the user should be challenged before this huge transaction.

To configure this kind of check the rule condition "Transaction: Check if consecutive Transactions in given duration satisfy the filter conditions" can be used.

The rule condition parameters have to be configured as follows:

Table 20–6 Transaction Pattern

Parameters	Values
Select Transaction to check	Select the transaction definition for which this check has to be applied
Duration	Enter the duration of transactions that has to be considered
Allow gaps in transactions during checks?	If gaps are allowed then select TRUE, otherwise select FALSE
No of transactions to check for 1st set of conditions	Enter number of transactions that should match the first set of conditions. For example, if you want to first check 2 small transactions then enter the value as "2".
Checks for 1st set of conditions	Enter the following conditions that should match the first set of transactions ■ Select Amount data element with condition as "Less Than" and value as 10.
No of transactions to check for 2nd set of conditions	Enter number of transactions that should match the first set of conditions. For example, if you want to check 1 big transaction after 2 small transactions then enter the value for "No of transactions to check for 2nd set of conditions" as "1".
Checks for 2nd set of conditions	Enter the following condition that should match the next set of transactions. ■ Select Amount data element with condition as "Greater Than" and value as 500

Part VII

OAAM Offline Environment

This part contains instructions on how to use an OAAM Offline environment.

21

OAAM Offline

OAAM supports two types of deployment:

- OAAM online can be used to perform real-time risk evaluations
- OAAM offline can be used to perform risk evaluations on historical or non-real time login/transactional data

This chapter provides information about setting up OAAM Offline for rule evaluation and fraud detection.

21.1 Concepts

This section provides a brief introduction to OAAM Offline and contains the following sections:

21.1.1 What is OAAM Offline?

OAAM Offline can be used for the following purposes:

- Standalone security tool

  OAAM Offline can be used to analyze transactions and logins. Users who do not have an OAAM production system could use an offline system as their primary risk analysis system.

- Research and development tool

  OAAM Offline can be used to create and verify new policies and rules using non real-time customer data without impacting customers in the real-time environment. Users are able to run complicated rules that would take too long to execute in a production system on a secondary system. They run simpler rules in OAAM and use OAAM Offline as the secondary system.

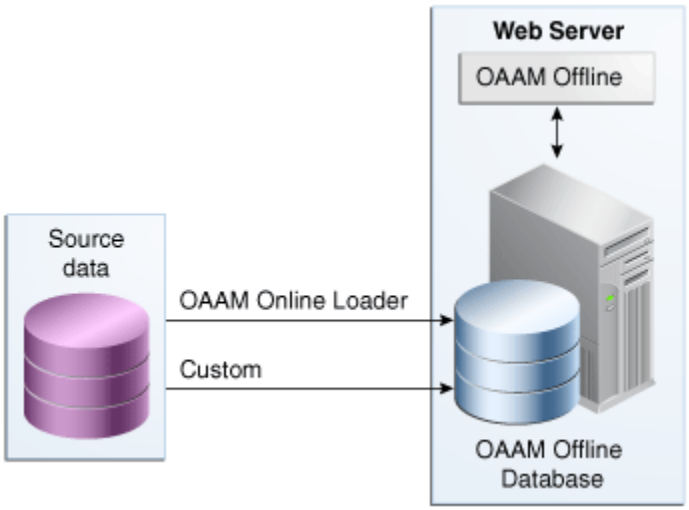
- Supplemental offline analysis tool

  OAAM Offline can be used in the tuning of rules and verification of rules behavior against customer and transaction data without impacting customers in real-time environment.

21.1.2 OAAM Offline Architecture

OAAM Offline is a standalone application.Unlike OAAM Online, OAAM Offline does not involve a client application. The relationship between the source data, the loaders, the Web server that hosts OAAM Offline, and the database that stores the customer login and transaction data is shown in Figure 21–1, "OAAM Offline Architecture".

Figure 21–1 OAAM Offline Architecture



OAAM Offline has its own database. This database has an identical schema to that of the OAAM Online version. It is used to load customer data to perform risk analysis and tune rules. OAAM Offline can support both login and transaction data. For information on the types of loaders that are used to load data, refer to Section 21.1.7, "Data Loaders."

If you want to load the customer data (source data) into the Offline database, you will need to create a Load Job, and a data loader is required to load the data into the database.

21.1.3 Jobs

A job is a collection of tasks that can be run by OAAM. You can perform a variety of jobs such as load data, run risk evaluation, roll up monitor data, and so on. Out of the box, OAAM supports the following jobs:

Table 21–1 Jobs

Jobs	Descriptions
Load	A Load Job reads records from a remote data source, converts the data into OAAM login sessions, and stores the login sessions in the OAAM offline datastore.

Table 21–1 (Cont.) Jobs

Jobs	Descriptions
Run	A Run Job performs risk analysis on a set of OAAM sessions. When a Run starts execution, it performs a clean up for the records in the Job's data filter. This clean up involves deleting rule logs, alerts, and actions and resetting risk scores and authentication statuses.
Load and Run	A Load and Run Job is a combination of a Load Job and a Run Job. After each record is processed by the Load Job, the result is fed directly into the Run Job.
Monitor Data Rollup	A Monitor Data Rollup Job consolidates monitor data utilized in the dashboard and some risk evaluations on a regular basis. This job consolidates data to optimize the database when processed.

Users can schedule jobs and run them offline. For information on jobs, refer to Chapter 22, "Scheduling and Processing Jobs in OAAM."

21.1.4 What is a Load Job and How Do You Set One Up

A Load Job reads records from a remote data source, converts the data into OAAM login sessions, and stores the login sessions in the OAAM offline datastore.

The process for creating a Load Job is as follows:

1. Specify the type of loader to use to load the data into the Offline database and the database connection details. If you are using the OAAM loader, the mapping details of the remote database to the OAAM schema is already provided, but you can edit these on the database-side if necessary.
2. Specify a data filter to define the set of records in the database to be loaded.
3. Set up the scheduling for when to run the Load Job.

A Load Job begins by connecting to the database defined in the Job's connection properties, and executes a SQL Query constructed from the Job's data mapping properties and filtered by the values in the Job's Data Filter. It then takes the results from that query and generates login records in the OAAM Offline database. As it generates the logins, it also runs the device identification checkpoint so that cookies are assigned. For information on creating a Load Job, refer to Section 22.4.1, "Creating Load Jobs," and for information on data loaders, refer to Section 21.1.7, "Data Loaders,"

21.1.5 What is a Run Job and How Do You Set One Up?

A Run Job performs risk analysis on a set of OAAM sessions.

The process for creating a Run Job is:

1. Define how and under what conditions the OAAM policies are applied to the sessions.
2. Set up the data filter to define the set of records in the database to be loaded or run.
3. Set up the scheduling for when to run the Run Job.

When a Run starts execution, it performs a clean up for the records in the Job's data filter. This clean up involves deleting rule logs, alerts, and actions and resetting risk scores and authentication statuses. The Run Job is executed based on the Run Type. For information on creating Run Jobs, refer to Section 22.4.2, "Creating Run Jobs,"

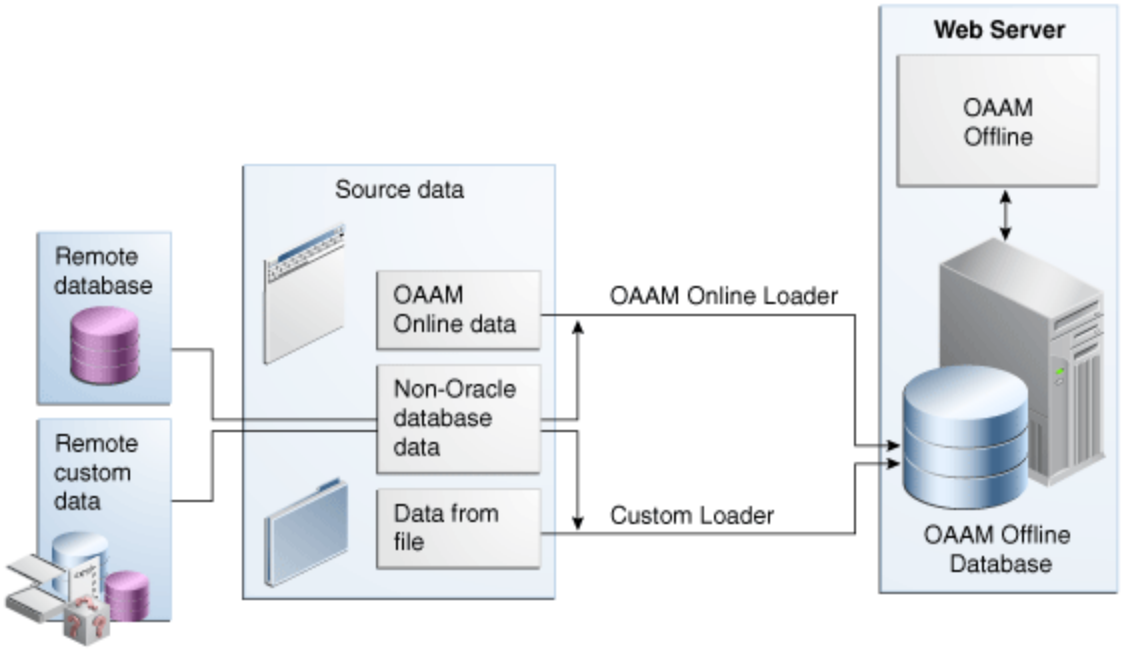
21.1.6 Load and Run Job

A Load and Run Job is a combination of a Load Job and a Run Job. After each record is processed by the Load Job, the result is fed directly into the Run Job.

21.1.7 Data Loaders

Loaders load the customer login or transaction data that will be processed for jobs.

Figure 21–2 Data Loaders



The standard OAAM Loader, which is shipped with OAAM, can be used to load login data from an OAAM schema database or a remote database that is mapped to the OAAM schema.

Custom data loaders are developed to accomplish complex and custom use cases specific to a deployment. Login and transaction data can be loaded from almost any source including files. OAAM supports custom loaders. For more information on developing a custom loader, refer to the "*Developing a Custom Loader for OAAM Offline*" chapter of the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

Table 21–2 summarizes the differences between the default and custom loaders.

Table 21–2 OAAM Loader vs. Custom Loader

Loaders	Shipped With OAAM	Loads any data	Loads from any source	Complex data mapping	Use case
OAAM Loader	Yes. Default loader	No Loads login data	No Loads from an OAAM schema database or a remote database that is mapped to the OAAM schema	No Data mapping must be simple and straight forward	Use Case: Configure a Solution to Run Risk Evaluations Offline
Custom Loader	No. Custom development For information, refer to Developing a Custom Loader in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.	Yes Loads login and transaction data	Yes Loads from remote, custom source including files	Yes Used if the data cannot be mapped easily and requires complex SQL queries or some manipulations	Use Case: Load Transactional Data and Run Risk Evaluations from Multiple Sources

21.1.8 Run Type

The Run type defines how and under what conditions the OAAM policies are applied to the sessions. A Run Job using the OAAM Run type reads the set of session records from the database. Pre-authentication checkpoints are run for all sessions in the set. Post-authentication checkpoints are run only for sessions where the user is successfully authenticated.

If you need to change the checkpoints to run, refer to Section 21.9, "Changing the Checkpoints to Run." A Custom Run Job may perform other tasks or run checkpoints differently than our standard checkpoints.

21.1.9 OAAM Offline User Interface

The user interfaces of OAAM Online and Offline are identical except for the dashboard and job creation and job monitoring pages.

21.1.9.1 Dashboard Differences

The OAAM Offline Dashboard is similar to the OAAM Online Dashboard except for the details listed:

Uses Non Real-time Customer Data

The OAAM Offline Dashboard uses non real-time customer data from OAAM Online or from a remote, custom source instead of real-time data.

Risk Analysis Dashboard

The OAAM Offline Dashboard provides access to the "Risk Analysis" dashboard, which shows the progress of the current load or run task.

21.1.9.2 Job Interface for Load, Run, and Load and Run

The Jobs search page enables you to search for jobs to display and view their details. The Job Creation wizard provides a step-by-step guide through the job definition and scheduling process for Load, Run, and Load and Run Jobs. These jobs are not available in OAAM Online.

21.1.9.3 Job Queue

The Job Queue page displays the job instance currently processing and progress in terms of estimated completion time and percentage complete progress. You can cancel or pause and resume a job instance processing from the queue interface. If a job is not set to process via scheduling it will not appear in the Job Queue.

21.2 Access Control

Access permissions for the offline environment is detailed in the following table.

Table 21–3 Offline Environment

Role	Access
CSR and CSR Managers	No access
Fraud investigators and Investigation Managers	Same access as online including security dashboard
System Administrators	Same access as online (Environment node) and full access to scheduler node
Security Administrator	Same access as online except the Environment node and full access to scheduler node

21.3 Installation and Configuration of OAAM Offline System

This section describes the steps to configure OAAM Offline.

21.3.1 Overview

Table 21–4 presents a summary of the tasks for configuring OAAM Offline. The table also provides information on where to get more details about each task.

Table 21–4 Tasks in OAAM Offline Setup

Task	Description	Documentation
Task 1 - Install OAAM offline	OAAM offline installation is similar to the OAAM online installation.	Refer to Section 21.3.2, "Install OAAM Offline."
Task 2 - Create the offline database schema	OAAM Offline has its own database. This offline database has an identical schema to that of the OAAM Online version.	Refer to Section 21.3.3, "Create the Offline Database Schema."

Table 21–4 (Cont.) Tasks in OAAM Offline Setup

Task	Description	Documentation
Task 3 - Configure database connectivity	When you configure OAAM Offline with the Oracle Fusion Middleware Configuration Wizard, you will be able to set values for the Schema Owner, Schema Password, Database and Service, Host Name, and Port	Refer to Section 21.3.4, "Configure Database Connectivity."
Task 4 - Log in to OAAM Offline	Log in to OAAM Offline.	Refer to Section 21.3.5, "Log In to OAAM Offline."
Task 5 - Set up the environment	After installing and configuring OAAM Offline, you must set up the base environment.	Refer to Section 21.3.6, "Environment Set Up."

21.3.2 Install OAAM Offline

Oracle Adaptive Access Manager (Offline) is included in the Oracle Identity and Access Management Suite. You can use the Oracle Identity and Access Management 11*g* Installer to install OAAM Offline.

21.3.3 Create the Offline Database Schema

You must create and load the OAAM offline schema before installing OAAM offline. For OAAM, Oracle recommends the Oracle Database Enterprise Edition for production deployments although the Standard Edition can be used as well. You create and load the schema using the Oracle Fusion Middleware Repository Creation Utility (RCU), which is available on the Oracle Technology Network (OTN) Website. You can access the OTN website at:

`http://www.oracle.com/technetwork/index.html`

Later, you will load customer login and/or transaction data into the OAAM Offline database, and OAAM Offline will use this database to perform risk analysis. The following sections provide best practices for the OAAM Offline database.

21.3.4 Configure Database Connectivity

When you configure OAAM Offline with the Oracle Fusion Middleware Configuration Wizard, you will be able to set values for Schema Owner, Schema Password, Database and Service, Host Name, and Port. You will also be able to test the connectivity.

21.3.5 Log In to OAAM Offline

To sign in to OAAM Offline, follow these steps:

1. In a browser window, enter the URL to the **Oracle Adaptive Access Manager Offline 11g Sign In** page.

   `http://`*`host`*`:`*`port`*`/oaam_offline/`

   where

   - *host* refers to the Oracle Adaptive Access Manager Offline managed server host
   - *port* refers to the OAAM Admin Offline managed server port
   - `/oaam_offline/` refers to the OAAM Offline Admin Sign In page

2. In the **Sign In** page, enter your credentials.
3. Click the **Sign In** button.

21.3.6 Environment Set Up

After installing and configuring OAAM Offline, you must complete the following tasks to set up the base environment:

- Import the Snapshot
- Set Up Encryption and Database Credentials for Oracle Adaptive Access Manager
- Enable Autolearning
- Enable Configurable Actions
- Import IP Location Data
- Configure How Checkpoint Data Is Handled in Load and Run Jobs

21.3.6.1 Import the Snapshot

Import the snapshot that is used by both OAAM Online and Offline. The use of snapshots online and offline are identical. The **Snapshot** is a zip file that contains the default policies, rules, groups, and any other information that is needed to configure OAAM Offline. The OAAM snapshot file is located in the *MW_HOME/IDM_ORACLE_HOME*`/oaam/init` directory. Refer to Chapter 2, "Setting Up the OAAM Environment" for information on loading the snapshot.

21.3.6.2 Set Up Encryption and Database Credentials for Oracle Adaptive Access Manager

Encryption is used to protect data within Oracle Adaptive Access Manager from unauthorized access. The process uses methods and a key or keys to encode plain text into a non-readable form. A key is required to decrypt the encrypted information and make it readable again. Authorized persons who own the key can decrypt information that is encrypted with the same key. For instructions to set up encryption and database credentials for OAAM Offline, refer to Section 2.4, "Setting Up Encryption and Database Credentials for Oracle Adaptive Access Manager,".

21.3.6.3 Enable Autolearning

To use Autolearning (pattern analysis):

1. Import default entities.
2. Import autolearning policies and rules if you are not using the default snapshot. These are required in order to perform the autolearning run on the data.
3. Enable Auto-learning properties

   ```
   vcrypt.tracker.autolearning.enabled=true
   vcrypt.tracker.autolearning.use.auth.status.for.analysis=true
   vcrypt.tracker.autolearning.use.tran.status.for.analysis=true
   ```

   For more information, refer to Section 15.3, "Before You Begin to Use Autolearning."
4. Define and enable patterns.
5. Perform load and the run at the same time.

Patterns are supported with Autolearning, but if you reload the same data, the evaluation does not occur and hence would not be useful in that case.

21.3.6.4 Enable Configurable Actions

If you want configurable actions enabled in your system, follow this process:

1. Enable the configurable action property.

   Set `dynamicactions.enabled` to `true`.

2. Make sure the configurable action definitions are configured in the Oracle Adaptive Access Manager database.

   A user can see the list of available configurable actions before adding a new one.

3. Determine what configurable actions have to be added to which checkpoint and the preconditions for executing those configurable actions.

4. If the existing Configuration Actions are not sufficient, develop and deploy custom ones. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details on developing a configurable action.

   Although some configurable actions are provided with the product, you may have to develop custom templates for your particular requirements.

   a. Define the custom action template

   b. Load the action template

5. Associate the configurable actions to the Checkpoint.

For information on enabling configurable actions, refer to Chapter 16, "Managing Configurable Actions."

21.3.6.5 Import IP Location Data

IP location data is used by the risk policies framework to determine the risk of fraud associated with a given IP address (location). To be able to determine location of the login or transaction, this data must be uploaded. For information, see Section 26.3, "Importing IP Location Data."

21.3.6.6 Configure How Checkpoint Data Is Handled in Load and Run Jobs

Performing a Load and Run job multiple times appends rule data to existing sessions, resulting in duplicate checkpoints for each time the job is performed. If you want old checkpoint data to be erased before checkpoint rules are run, ensure that `bharosa.ra.loadrun.resetbeforerun` has been set to `true`. If you do not want existing checkpoint data to be erased when performing Load and Run multiple times, set this property to `false`.

21.4 Scheduling Jobs

For information on scheduling jobs, refer to Chapter 22, "Scheduling and Processing Jobs in OAAM." The chapter describes how to define, schedule, and run Oracle Adaptive Access Manager batch jobs.

21.5 Testing Policies and Rules

OAAM policies/rules for a new deployment or an existing deployment can be tested using OAAM Offline.

21.5.1 New Deployment Using OAAM Offline

You can use a combination of OAAM Offline and BIP reports to test the effect of policies and rules on users. To do this:

1. Deploy an offline instance of OAAM to perform batch analysis
2. Configures the OAAM loader or develop your own to load a set of production data into the offline environment to use as the test set.
3. Run policies/rules against the test set of data multiple times to view the impact of policy changes.

For example, in a new deployment, you can load a month of your production data into OAAM and run the base policies to see how many alerts and actions would have been generated if OAAM had been used in production for one month. The BIP reports are useful to gather aggregate values for the rules and outcomes. In the results you will see that as OAAM learns the behaviors, users will generate fewer alerts and actions. If you add any new rules or edit any rule thresholds you can do another run and compare BIP report outcomes to those from the original run.

21.5.2 Existing Deployment Using OAAM Offline

If you have OAAM already in production, you can export a set of production data on which to test the effects of policy/rule changes.

1. Set up a scheduled data load to update the offline environment data every 24 hours
2. When the security team wants to add a new rule or edit a rule threshold they can first run 24 hours of data against the current policies in production and run BIP reports exported to XLS.
3. Then the team can make the edits and run a second time on the same data set and run the same BIP reports.
4. Comparing the reports from Run 1 and Run 2 will reflect how the user population was effected by the policy changes. In other words, if the first run generates 100 alerts and the second run generates 125 alerts, the effect of the edits is 25 additional alerts are generated.

You can also license third party tools for further testing options. For example, IntegratID (http://integratid.com/) has the ARM Automator tool which can be used to simulate very specific traffic scenarios on which to test.

For example, if you want to test if a velocity rule will trigger if a user logs in from Los Angeles at 10:24 am PST then logs in from New York City at 10:45 am PST using the same device.

21.6 What to Expect in OAAM Offline

Setting Up Patterns In Autolearning

In online systems, the administrator can set up patterns at any time and the pattern processing starts for the logins after that point. In offline systems, the administrator must set up the properties and the patterns prior to starting the Load Job, so that when the Load Job runs, the patterns processing occurs simultaneously. This is one of the key differences between online and offline systems.

Running Jobs in Autolearning

You cannot perform the load and then the run if you want Auto-learning. Only "Load and Run" is supported for pattern processing. Choose Load and Run as the job type when you are creating jobs. A Load and Run Job is a combination of a Load Job and a Run Job. After each record is processed by the Load Job, the result is fed directly into the Run Job. After the Load and Run Job is submitted, you will need to go to the Job Queue and search for the job in order to view its status and other details.

Timestamps and Autolearning

Offline data come with timestamps. In autolearning, when buckets are created they are created with the timestamp of the login that resulted in its creation. On each subsequent update to the bucket count, OAAM updates the time stamp with the timestamp of the login (request) that caused that update. Autolearning based rules use the timestamp of the bucket to help calculate sum and percentage. For example, a user logged into the system on 12th Monday and 22nd Sunday this month. The buckets are populated properly, but the rules evaluation cannot identify the "update" timestamp and hence does not work.

21.7 Monitoring OAAM Offline

This section describes how to monitor OAAM Offline using the Dashboard and Server Logs.

21.7.1 Using Dashboard to Monitor the Loader Process

The OAAM Offline Dashboard uses non-real time customer data from OAAM Online or from a remote, custom source instead of real-time data to provide:

- Views of the statistics on the rate of logins
- An overview of activity
- High-level personalized views of the status of user behavior and key transactions

The "Risk Analysis" dashboard shows the progress of the current load or run task. Risk Analysis statistics are provided for

- load data: the data loaded from OAAM Online or from a remote, custom source
- run data: the data that policies are run against. You can run the rules against the entire database or against a subset of the database

Information is shown for the percent complete, number of records processed, number of records remaining, and estimated complete time, and so on.

Use the following sections of the Dashboard to monitor the loader process:

1. The performance panel on the top gives the throughput in terms of logins per minute, transactions loaded per minute, and so on. A trending graph is shown of the different types of data based on performance so that loader trends can be monitored.
2. The dashboard on the bottom presents historical data. Select Performance from the Dashboard list. Performance can be monitored in terms of average response time of APIs, Rules, and so on. Trend graph are available for the selection.

Offline Job data is based on when records were processed, not timestamp.

21.7.2 Enable Rule Logging

For rules logs to be processed, the value of `vcrypt.tracker.rules.trace.policySet.min.ms` must be `-1`.

Rule logging for detailed information can be turned on by setting:

```
vcrypt.tracker.rules.trace.policySet=true
vcrypt.tracker.rules.trace.policySet.min.ms=-1
```

21.7.3 Database Query Logs for Performance Monitoring

Make sure you have the following properties set:

```
bharosa.db.query.performance.warning.print.stack=false
bharosa.db.query.performance.warning.threshold.ms=200
```

The server writes SQLs that took more than 200ms to execute to log file. Random SQLs in logs are fine, considering the load being handled. However, higher number of SQLs indicate possible improvements in database or network areas.

21.7.4 Oracle Adaptive Access Manager Server Logs

For every 1000 requests processed, the loader process prints the time taken to process those 1000 requests. These logs provide a good indication of throughput.

21.7.5 Database Tuning

You can monitor and tune the performance of the database using tools like Oracle Enterprise Manager Fusion Middleware Control.

21.7.6 Manageability

Offline uses Oracle Dynamic Monitoring Service (DMS) for performance monitoring. Information about monitoring performance is in Chapter 23, "Monitoring OAAM Administrative Functions and Performance."

21.8 Loading from Non-Oracle or Non-Microsoft Server SQL Server Database

The OAAM Loader type is configured to be able to load from an Oracle or Microsoft SQL Server database. If you are not using an Oracle or Microsoft Server SQL Server Database, perform the steps in Section 21.8.1, "Specifying Offline Loader Database Platforms for Non-Oracle or Non-Microsoft Server SQL Server Databases" and Section 21.8.2, "Creating a View of a Non-OAAM Database". If you are using a Microsoft Server SQL Server database, perform the steps in Section 21.8.2, "Creating a View of a Non-OAAM Database."

21.8.1 Specifying Offline Loader Database Platforms for Non-Oracle or Non-Microsoft Server SQL Server Databases

If you want to load from a different type of database, there are two steps that must be followed. You must deploy the jar file containing the JDBC driver for the database, and create properties of the following form using the Properties Editor and changing the bolded bracketed values:

```
oaam.offline.loader.databaseplatform.enum.[identifier]=[number > 10]
oaam.offline.loader.databaseplatform.enum.[identifier].name=[Human Readable Name]
oaam.offline.loader.databaseplatform.enum.[identifier].driver=[Driver Class Name]
```

Note: If you add multiple database types, that [number > 10] must be unique for each one.

For example, to set up for IBM DB2, you would set the following properties:

```
oaam.offline.loader.databaseplatform.enum.db2=11
oaam.offline.loader.databaseplatform.enum.db2.name=IBM DB2
oaam.offline.loader.databaseplatform.enum.db2.driver=COM.app.db2.jdbc.app.DB2Drive
r
```

21.8.2 Creating a View of a Non-OAAM Database

Users who want to load from a non-OAAM database will need to create a view in their remote data source. This section explains how to set up the required database view in the remote database.

21.8.2.1 The OAAM_LOAD_DATA_VIEW

The Out-of-the-Box Loader for OAAM Offline requires a table or view with a specific name and structure to exist in the remote data source. By default the view already exists in the OAAM schema, but if you want to load from a non-OAAM schema, then you are required to create a view in the remote data source that conforms to the specification of an OAAM load data view. The structure is given in the following table.

Table 21–5 OAAM_LOAD_DATA_VIEW

Field Name	Data Type	Description
LOGIN_TIMESTAMP	Date/Time	The login time.
SESSION_ID	Character	Uniquely identifies a login record.
USER_ID	Character	The user's User ID.
LOGIN_ID	Character	The user's Login ID. This may be the same as the USER_ID if the load data source does not distinguish between User ID and Login ID.
DEVICE_ID	Character	Identifies the user's device.
GROUP_ID	Character	The application ID.
IP_ADDRESS	Integer	The IP address, in the form of a long integer.
AUTH_STATUS	Integer	The auth status. If loading from a non-OAAM schema, this field should be a decode function that converts the remote data source's authentication status into an OAAM authentication status, defined by the user defined enum auth.status.enum. If the remote schema has no concept of auth status, then this value should be -1.
CLIENT_TYPE	Integer	The client type. When loading from a non-OAAM schema, this should be -1.
USER_AGENT	Character	The user agent string from the browser.
FLASH_FINGERPRINT	Character	This field represents the digital fingerprint. It may be null if not supported by the load data source.
DIGITAL_COOKIE	Character	This field represents the digital cookie set by OAAM. When loading from a non-OAAM schema, this should be null.

Table 21–5 (Cont.) OAAM_LOAD_DATA_VIEW

Field Name	Data Type	Description
EXP_DIGITAL_COOKIE	Character	This field represents the expected digital cookie set by OAAM. When loading from a non-OAAM schema, this should be null.
SECURE_COOKIE	Character	This field represents the secure cookie set by OAAM. When loading from a non-OAAM schema, this should be null.
EXP_SECURE_COOKIE	Character	This field represents the expected secure cookie set by OAAM. When loading from a non-OAAM schema, this should be null.

21.8.2.2 Schema Examples

The OAAM Schema and custom schema are shown below.

21.8.2.2.1 OAAM Schema The following example shows the SQL for the `OAAM_LOAD_DATA_VIEW` that ships with OAAM.

```
CREATE OR REPLACE FORCE VIEW OAAM_LOAD_DATA_VIEW (
LOGIN_TIMESTAMP, SESSION_ID, USER_ID, LOGIN_ID, DEVICE_ID, GROUP_ID,
      IP_ADDRESS, AUTH_STATUS, CLIENT_TYPE, USER_AGENT, FLASH_FINGERPRINT,
      DIGITAL_COOKIE, EXP_DIGITAL_COOKIE, SECURE_COOKIE, EXP_SECURE_COOKIE) AS
SELECT l.create_time LOGIN_TIMESTAMP, l.request_id SESSION_ID, l.user_id USER_ID,
   l.user_login_id LOGIN_ID, l.node_id DEVICE_ID, l.user_group_id GROUP_ID,
   l.remote_ip_addr IP_ADDRESS, l.auth_status AUTH_STATUS, l.auth_client_type_code
      CLIENT_TYPE,
   (SELECT t1.data_value FROM v_fprints t1 WHERE t1.fprint_id=l.fprint_id) USER_
AGENT,
   (SELECT t2.data_value FROM v_fprints t2 WHERE t2.fprint_id=l.digital_fp_id)
      FLASH_FINGERPRINT,
   l.sent_dig_sig_cookie DIGITAL_COOKIE, l.expected_dig_sig_cookie EXP_DIGITAL_
COOKIE,
   l.sent_secure_cookie SECURE_COOKIE, l.expected_secure_cookie EXP_SECURE_COOKIE
FROM vcrypt_tracker_usernode_logs l;
```

For discussion purposes, consider this statement in two parts.

The first part starts at the beginning and ends before the Select. This part is required and cannot be modified.

The second part starts with the Select and continues to the end of the statement. If loading from a non-OAAM schema, this part would be customized to select data from that schema.

21.8.2.2.2 Custom Schema Example In this example, you would want to load from a table that looks like the following. You would want to have "Banking" as your Application ID, and you would not want to load test data.

LOGINS

Table 21–6 LOGINS

Field Name	Data Type	Description
LOGIN_TIME	Date/Time	The login time.
LOGIN_ID	Integer	Primary Key
USER_NAME	Character	The user's Login ID.
DEVICE_ID	Character	Identifies the user's device.
IP_ADDRESS	Character	The IP address, in dot notation.

Table 21–6 (Cont.) LOGINS

Field Name	Data Type	Description
AUTH_STATUS	Character	'S' = Success, 'I' = Invalid User, 'F' = Wrong Password.
USER_AGENT	Character	The user agent string from the browser.
IS_TEST	Integer	0 = Real Data, 1 = Test data

In this case, a decode statement is needed to convert the custom authentication status to an OAAM authentication status, and the IP address needs to be parsed to convert it into a long integer. A view must be created that looks like the following.

```
CREATE OR REPLACE FORCE VIEW OAAM_LOAD_DATA_VIEW (
LOGIN_TIMESTAMP, SESSION_ID, USER_ID, LOGIN_ID, DEVICE_ID, GROUP_ID,
      IP_ADDRESS, AUTH_STATUS, CLIENT_TYPE, USER_AGENT, FLASH_FINGERPRINT,
      DIGITAL_COOKIE, EXP_DIGITAL_COOKIE, SECURE_COOKIE, EXP_SECURE_COOKIE) AS
SELECT l.login_time LOGIN_TIMESTAMP, cast(l.login_id AS varchar2(256)) SESSION_ID,
   l.user_name USER_ID, l.user_name, LOGIN_ID, l.device_id DEVICE_ID,
   'Banking' GROUP_ID,
   to_number(substr(l.ip_address, 1, instr(l.ip_address, '.')-1))*16777216
      to_number(substr(l.ip_address, instr(l.ip_address, '.', 1, 1)+1,
          instr(l.ip_address, '.', 1, 2)-instr(l.ip_address, '.', 1, 1)-1))*65536
      to_number(substr(l.ip_address, instr(l.ip_address, '.', 1, 2)+1,
          instr(l.ip_address, '.', 1, 3)-instr(l.ip_address, '.', 1, 2)-1))*256
      to_number(substr(l.ip_address, instr(l.ip_address, '.', 1, 3)+1)) IP_
ADDRESS,
   decode(l.auth_status, 'S', 0,
      'I', 1,
      'F', 2,
          -1) AUTH_STATUS,
   -1 CLIENT_TYPE, l.user_agent USER_AGENT, null FLASH_FINGERPRINT,
   null DIGITAL_COOKIE, null EXP_DIGITAL_COOKIE, null SECURE_COOKIE,
   null EXP_SECURE_COOKIE
FROM logins l
WHERE l.is_test = 0
```

Here, you map your `user_name` to `USER_ID` and `LOGIN_ID`, you map a literal string "Banking" to `GROUP_ID`, you parse your `ip_address` string and convert it to a long integer, you use a decode statement to convert your `auth_status`, you map `-1` to `CLIENT_TYPE`, and you map literal `null` to `FLASH_FINGERPRINT`, `DIGITAL_COOKIE`, `EXP_DIGITAL_COOKIE`, `SECURE_COOKIE`, and `EXP_SECURE_COOKIE`.

21.9 Changing the Checkpoints to Run

A Run Job using the OAAM Load type reads the session records from the database, applies policies for the Pre-Authentication and Post-Authentication checkpoints. Pre-authentication checkpoints are run for all sessions if the `PreAuth` property is set to true. By default it is set to true. Post-authentication checkpoints are run only for sessions where the user is successfully authenticated and the `PostAuth` property is set to true.

If you have customized checkpoints and policies in addition to or instead of our standard checkpoints and policies and you would like to change whether checkpoints run or not, you will have to create or edit the following properties using the Properties Editor:

```
profile.type.enum.[checkpoint-key].isPreAuth
or
```

```
profile.type.enum.[checkpoint-key].isPostAuth
```

Setting the `isPreAuth` or `isPostAuth` property to `true` or `false` for a given checkpoint changes which checkpoint to run. The Pre-Authentication checkpoints are run first and then Post-Authentication checkpoints are run second. The sequence of the checkpoints cannot be changed since checkpoints have a numerical order and they are run in that order.

21.10 Migration

Migration of custom loaders from 10*g* is not supported.

21.11 Use Cases

This section present common use cases for OAAM Offline and running jobs.

21.11.1 Use Case: Upgrading a Deployment with Multiple Scheduled Jobs

Chuck is an administrator who is expected to upgrade a 10*g* deployment with multiple scheduled jobs to 11.1.2 offline without any interruption in the schedule.

Requires: upgrade assistant

Solution: Chuck runs the upgrade assistant to upgrade the 10g offline to 11.1.2 and the scheduled jobs are migrated to the new environment.

21.11.2 Use Case: Configure a Solution to Run Risk Evaluations Offline

George is a security and compliance officer. He has been asked to configure a solution to run risk evaluations offline that are deemed too expensive to run in real-time. Part of the purpose of this process is to use configurable actions to provision users, devices, IPs, and other data such as locale into/out of groups to profile their behaviors.

Requires: Login Loader, Load/Run, Configuration Actions, and BIP

Solution: George exports the configured groups and imports them into the production database for use in real-time risk analysis. He uses the OAAM Loader that is already configured to pull data into the offline database and map it correctly. He also uses the out-of-the-box run task to perform the entire login chain of checkpoints on every session in the selection.

Procedure: In the OAAM Administration Console George defines the source of the data as the OAAM production database and how much data to load (1 month) and run by specifying a date range. He can choose to load a selection and run checkpoints on only a sub-selection of that data if he wants. Lastly he either configures a single date/time to load and run or a reoccurring load and run or simply clicks Start to start the load and run now. (He can configure a configurable action to add users who were blocked into the "blacklisted group")

After the load and run are complete, George generates a few BI Publisher aggregate reports showing metrics for the total numbers of each action, alert, risk scores by checkpoint and total members added/removed from each profiling group.

Outline of the general tasks and questions/issues a user faces in this flow

- Configure data source
- Map data into useful structure - login (OOTB)
- Selection of data to load - all or a specific selection

- Run checkpoints also?
- Load now or start at a set time?
- Scheduling when the load happens or recurring
- View the results in a useful format to understand the insights found by the risk evaluations and profiling performed.

21.11.3 Use Case: Run Login Analysis on the Same Data Multiple Times (Reset Data)

George is a security and compliance officer. He has been asked to configure a solution to test new/edited risk evaluations offline before they are deployed to run in production.

Requires: OAAM Loader, Universal Risk Snapshot, and Security Policies

Solution: He uses the OAAM Loader that is already configured to pull data into the offline database and map it correctly. He also uses the out-of-the-box run task to perform the entire login chain of checkpoints on every session in the selection.

Procedure: In the OAAM Administration Console George defines the source of the data as the OAAM production database and how much data to load and run by specifying a date range. He can choose to load a selection and run checkpoints on only a sub-selection of that data if he wants. He selects data for the last month. George then exports a snapshot from the production OAAM Admin and restores it into OAAM offline testing environment. He configures a load and run for all the data. He gives a base name for the run "Production state 08/11/2010." When the first instance of the run occurs it is automatically given a name using the base name appended with the start data/time "Production state 08/11/2010_18:01.80112010". Once the run is complete his team makes edits and additions to the security policies they had designed. George starts another run that is automatically named "Production state 08/11/2010_23:12.80112010" on all the data. This second run will ignore any data created in the first run so the results will not be skewed. Actions alerts and scores generated by the first run will not affect the results of the second run or any other run. Once the second run is complete he generates a report showing aggregate outcome values for the two runs so they can be compared side by side. George is satisfied with the results so he backs up a snapshot and restores it into the production environment.

General tasks and questions/issues a user faces in this flow

1. Configure data source.
2. Map data into useful structure - login (OOTB).
3. Selection of data to load - all or a specific selection?
4. Run checkpoints also?
5. Load now or start at a set time?
6. Scheduling when the load happens or reoccurring.
7. View the results in a useful format to understand the insights found by the risk evaluations and profiling performed.

21.11.4 Use Case: Monitor Data Rollup

Gram is an IT Administrator who must make sure the monitor data used in the dashboard is kept optimized. He must configure a consolidation of the data to automatically run three times a week from now on.

Solution: Gram will use the Monitor Data Rollup task that is already available to consolidate the Monitor data three times a week. He will configure the database connection properties to map to the OAAM Production database correctly.

Procedure: In the OAAM Administration Console (online) Gram defines the source of the data as the OAAM production database and how much data to consolidate by specifying a date range. He configures the monitor data rollup with the proper rollup unit and cutoff date. He then schedules to run the job for 3 times a week.

21.11.5 Use Case: Consolidation of the Dashboard Monitor Data

Gram is an IT Administrator who must make sure the monitor data used in the dashboard is kept optimized on a daily basis. He must configure a consolidation of the data to automatically run daily from now on.

Solution: Gram will use the Monitor Data Rollup task that is already available to consolidate the monitor data daily. He will configure the database connection properties to map to the OAAM Production database correctly.

Procedure: In the OAAM Administration Console (online) Gram defines the source of the data as the OAAM production database and how much data to consolidate by specifying a date range. He configures the monitor data rollup with the rollup unit as daily and cutoff time to 1. He then schedules to run the job for 3 times a week. When he views the historical dashboard, he realizes that some of the hourly granularity in the hourly trending view in the bottom part dashboard is lost which is expected.

21.11.6 Use Case: Load Transactional Data and Run Risk Evaluations from Multiple Sources

George is a security and compliance officer. He has been asked to configure a solution to monitor employee usage of their gas cards to identify any employees that may be abusing the resource.

Solution: George wants to run risk evaluations against the motor pool vehicle type data, employee details on type of vehicles used and gas card transaction records. This data comes from three different sources and is available in CSV format. George worked with his team and a contractor to develop a custom data loader that meets his requirements.

This loader maps the incoming data to the OAAM schema utilizing entities and transactions he previously defined in the OAAM Administration Console. His team also developed a custom run task to evaluate using two transaction checkpoints. They developed the run task so administrators can select which of the two checkpoints they want to run.

Procedure: In the OAAM Administration Console George defines how much data to load and run by specifying a date range. He can choose to load a selection and run rules on only a sub-selection of that data if he wants. Once George determines what data to run risk evaluations on he selects what checkpoints to run. He can select one or more to run at a time. Lastly he either configures a single date/time to load and run or a reoccurring load and run or simply clicks start to kick off the load and run now.

After the run and load and run is complete George's team runs both an aggregate and listing reports they developed. One displays total numbers of each alert per month but also trending of each alert by day of the month so they can see any spikes. The other shows the employees that triggered alerts, each with a list of the alerts they triggered and when.

Outline of General Tasks: Below is an outline of the general tasks and questions/issues a user faces in this flow.

- Configure data sources
- Map data into OAAM schema - Transaction (Custom)
- Selection of data to load - all or a specific selection?
- Run rules also?
- What checkpoints do I want to run?
- Load now or start at a set time?
- Scheduling when the load happens or reoccurring
- Reporting to view results in a useful form for the business users.

21.11.7 Use Case: Using OAAM Offline (Standard Loading)

The user flow for OAAM Offline usage is shown below.

1. Install the offline system.
2. Load data.
3. Run rules against the data.

   Checkpoint evaluation follows the same order as online.

   In post -authentication, for rules with challenge actions, the authentication status will be set to pending.

   Alerts will be generated for suspicious activities.
4. Examine dashboard and reports.
5. Discover hacking attempts.
6. Create new rules and policies to trap the attacks.
7. Run the old data through the new rules and policies.
8. Reexamine reports to see if the new rules helped.
9. Test the rules in pre-production.
10. Implement new rules and policies on Oracle Adaptive Access Manager production system.

21.12 Best Practices

This section outlines some best practices for administrators using OAAM Offline.

21.12.1 Configuring Worker/Writer Threads

While creating the loader configuration, start with 10 worker threads and watch the throughput (number of requests processed per minute) using the Dashboard.

If the throughput is not satisfactory, increase writer threads in increments of 5. Higher number of writer threads does not necessarily result in better throughput. Adjust the number of worker threads for max throughput for the given hardware.

21.12.2 Database Server with Good I/O Capability

Make sure the host that runs the database server has good I/O capability. Offline processing is I/O intensive.

21.12.3 Database Indexes

Make sure to obtain and apply the latest Oracle Adaptive Access Manager database patch to ensure that the proper indexes are present.

21.12.4 Setting Memory Buffer Size

Load/ Run pauses only after buffer is flushed. When there is need for pause/resume, keep the throttle size lower. The default is 100.

21.12.5 Quality of Input Data

If data is to be loaded into a database, make sure the data is valid as per mappings. Source data validation (basic sanity checks) is easier to perform before starting the load. It will save loading cycles and the incorrect processing of information.

Validations are:

- Check for null or empty required fields (like user name)
- Ensure that there are not too many log ins/transactions from the same user, and incorrect delimiter or escaping resulted in user id "0" being logged in more than 30% time. These kinds of errors will not necessarily result in an error, but they will slow loading process and process the data incorrectly.
- Check that the combination of fields expected to be unique and the data are unique.
- Make sure the source data does not have duplicate records/content. Duplicate records will skew the results and might raise false alerts.
- Make sure the field that identifies the request (Request Identifier) is unique.
- To avoid data truncation, make sure source data is not truncated while loading into database if the source data is loaded into database before it is fed to Oracle Adaptive Access Manager.

21.12.6 Configuring Device Data

If the source data does not have secure cookies and/or digital cookies, send constant secure cookies and/or digital cookies and turn off rotating cookies in Oracle Adaptive Access Manager.

21.12.7 Availability

Failover is not instantaneous. The system uses a leasing mechanism to tell whether the Job is still alive, and fails over when the lease expires, which may take as much as 10 minutes.

21.12.8 OAAM Loader vs. File-based and Custom Loaders

The OAAM Loader is preferred over the file-based and custom loaders since the OAAM Loader is optimized. It provides better control and is easier to use and faster:

- For pausing and resuming

- For working with partial data set

Instead of using a file-based/custom loader, you may want to consider loading file or storing data in a temporary database using standard tools and then using the temporary database to load data into the database.

21.12.9 Custom Loader Usage

Custom Loaders can be used for the following

- If the data cannot be mapped easily and requires complex SQL queries or some manipulations
- Requires custom Java code to map data
- Requires loading Transaction data
- Requires loading login and transaction data

For guidelines for developing a custom loader, refer to "Developing a Custom Loader" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

Part VIII

Scheduling Jobs

This part provides information about defining, scheduling, and running jobs for performing batch analysis.

22

Scheduling and Processing Jobs in OAAM

The chapter describes how to define, schedule, and run Oracle Adaptive Access Manager batch jobs. This chapter contains the following topics:

22.1 Access Control

Access permissions for the online scheduling system and offline environment are detailed in the following tables.

Table 22–1 Online Job Scheduling System

Role	Access
CSR and CSR Managers	No access
Fraud investigators and Investigation Managers	No access
System Administrators	Full access
Security Administrator	No access

Table 22–2 Offline Environment

Role	Access
CSR and CSR Managers	No access

Table 22–2 (Cont.) Offline Environment

Role	Access
Fraud investigators and Investigation Managers	Same access as online including security dashboard
System Administrators	Same access as online (Environment node) and full access to scheduler node
Security Administrator	Same access as online (everything except Environment Node) and full access to scheduler node

22.2 Introduction to OAAM Jobs

For security administration, it is often required to run evaluations to detect high risk situations. For system administration, running a job to consolidate data is key to maintaining optimal performance of a system. Oracle Adaptive Access Manager provides the ability to configure batch jobs and schedule them.

A job is a collection of tasks that can be run by OAAM. You can perform a variety of jobs such as load data, run risk evaluation, roll up monitor data, and other jobs.

Table 22–3 provides descriptions for these jobs.

Table 22–3 Jobs

Jobs	Applicable Deployment	Descriptions
Load	offline	A Load Job records from a remote data source, converts the data into OAAM login sessions, and stores the login sessions in the OAAM offline datastore.
Run	offline	A Run Job performs risk analysis on a set of OAAM sessions.
Load and Run	offline	A Load and Run Job is a combination of a Load Job and a Run Job. After each record is processed by the Load Job, the result is fed directly into the Run Job.
Monitor Data Rollup	online and offline	A Monitor Data Rollup Job consolidates monitor data utilized in the dashboard and some risk evaluations on a regular basis. This job consolidates data to optimize the database when processed.

22.2.1 Job Interface

The Jobs search page enables you to search for jobs to view details. Actions that you can perform on jobs are listed in this table.

Table 22–4 Job Actions

Action	Description
Search	Search for jobs.
Create	Create jobs.
Execute	Start running a job
View logs	View the log of a job
View execution queue	View the processing order of jobs

Table 22–4 (Cont.) Job Actions

Action	Description
View progress of jobs	View the percentage complete and estimated time for completion
Pause and resume	Stop a job and start it again
Cancel jobs	Stop a job

The Job Creation wizard is invoked by clicking the **New Job** icon and provides a step-by-step guide through the job definition and scheduling process. The wizard prompts you for information as you go. If you are using a standard loading process, you configure your database connection URL for the Data Loader to access the offline data in the remote database, the characteristics of the run session, a filter for the data to be loaded in the database, and schedule to run the job.

The Job Queue page displays the job currently processing and progress in terms of estimated completion time and percentage complete progress. You can cancel or pause and resume a job processing from the queue. If a job is not set to process via scheduling it will not appear in the Job Queue.

22.2.2 Job Queue

When a job is created and scheduled, a single instance of the job is added to the Job Queue. The Job Queue is the order of job execution. Processing order is based on scheduled start time, priority and date/time added to the queue. Jobs are displayed in the queue according to the order they will process.

For example, if Job A is configured with a High priority and set to process immediately, and then Job B is configured with a High priority and set to process immediately, an instance of A will appear in the queue above B. The jobs will process in that order.

22.2.3 Searching for Jobs

Using the Jobs search page, you can search for jobs and view their details.

1. In the Navigation tree, double-click **Jobs** to open the Jobs search page.
2. Specify criteria in the search filter to locate the job and click **Search**.

Table 22–5 Search Filters

Filter	Definition
Job Type	The specific task that a job performs.
Job Status	Enabled or Disabled. A disabled job will not run.
Job Priority	Priority for the job: High, Low, Medium
Created Date	Date job was created. By default, the Created Date is set to last 1 month.
Schedule Type	Once or Recurring.
Recurrence Interval	Hourly, Daily, Weekly, or Monthly
Last Start Date	The last start time of the job execution. When you set the "from" section of this field, the "to" section is automatically populated to the current time.
Last End Date	By default, the Last End Date is set to 24 hours after the Last Start Date.

Clicking a job name opens the corresponding Job Details page in a new tab.

Note: The standard jobs packaged with Oracle Adaptive Access Manager support a number of languages. However, the job name, Default Monitor Data Rollup Task, is displayed in English, even if you are viewing non-English content.

In the Jobs search page, you can perform the following tasks from the toolbar:

Table 22–6 Results Table Toolbar Actions

Action	Description
Open	Open the job to see details.
Delete	Delete the job.
Enable	Enable the job.
Disable	Disable the job.
Process Now	Process the job immediately.
Launch the Job Creation wizard	Launch the Job Creation wizard so that you can define and schedule a job.

22.3 Launching the Job Creation Wizard

Use the Job Creation wizard to create a new job. Jobs are created by the Security Administrator in Online application or by the Security Administrator or System Administrator in Offline application. The Monitor Data Rollup Job is created by the System Administrator.

To open the Job Creation wizard, perform the following steps:

1. In the Navigation tree, double-click **Jobs** to open the Jobs search page.
2. Click the **New Job** button in the upper right of the Console or the **New Job** button on the toolbar or select **New Job** from the Actions menu.

   The New Job dialog appears with the available job types to select from.

   Note: All jobs listed in the table are available in OAAM Offline. Only Monitor Data Rollup is available for OAAM Online.

Table 22–7 OAAM Job Types

Job Type	Definitions
Load	Read data to create OAAM sessions.
Load and Run	Create and read OAAM sessions in one step.
Monitor Data Rollup	Monitor data consolidation
Run	Perform bulk risk analysis on OAAM sessions

3. Select the job you want to create and click **Continue**.

   The General page opens by default as the first page of the Job Creation wizard.

The following sections describe the pages of the Job Creation wizard. In these pages, required settings are identified by the asterisk (*).

22.3.1 Create Job: General

The General page displays general information about the job such as job type, job name, and job status. Use this page to name and describe the job. The Job Name field can take alphanumeric characters. The job is enabled by default.

Note: The job type cannot be changed.

22.3.2 Create Job: Load Details (for Load and Load and Run Jobs)

The Load Details page enables you to control which records will be processed.

You can choose between the Custom Loader and the OAAM Loader.

Table 22–8 Custom and OAAM Loaders

Loaders	Description
Custom Loader	A Custom Loader is a user-defined loader that defines how to accomplish complex and custom scenarios. For the custom loader, you must provide the fully qualified class name for the custom loader class.
OAAM Loader	The OAAM Loader is the default loader that defines how the records are read from the remote data source and how they are converted into OAAM sessions. The OAAM Data Loader loads login data from a relational database.

By default, the OAAM Loader is selected. It requires information on the data source and miscellaneous properties.

Table 22–9 OAAM Loader Details

Panels	Description
Data Source	This panel contains the information about the data source and connection information.
Miscellaneous properties	This panel contains other information such as transaction size, memory buffer size, and write pool size and the values can be adjusted to improve performance.

22.3.3 Create Job: Run Details (for Run and Load and Run Jobs)

The Run Details page lets you choose the Custom Run Type or the OAAM Run Type. The Run type defines how and under what conditions the OAAM policies are applied to the sessions.

22.3.4 Create Job: Data Filters

The Data Filters page enables you to choose the filter that determine which set of data to load into the offline system or process. If the job type is Load and Run, then the same data filter applies for both load and run.

The Auto Increment filter defines the set of records as all records created after the date specified in the **From Date** field. The Date Range filter defines the set of records as all records that were created between the dates specified in the **From Date** and **To Date** fields.

22.3.5 Create Job: Schedule

The Schedule page enables you to specify the scheduling options for the job. You provide the following information:

Table 22–10 Schedule Page Options

Options	Description
Job Priority	The job priority determines the importance of the job and the job will be added to the job execution queue based on the priority. For additional information, refer to Section 22.3.5.1, "Job Priority."
Schedule Type	You can choose to run the job immediately or you can schedule the job to run in the future. For information, refer to Section 22.3.5.2, "Schedule Type."
Start Date and Start Time (Once)	The job runs at the Start Date and Time.
Recurrence Interval (Recurring)	Daily Hourly, Weekly, Monthly The job repeats execution based on your selection.
Execute Every (Recurring)	Recurrence frequency of the recurrence interval. For example if the Recurrence Interval is Weekly, you could enter 2 for Execute Every. The job will execute every 2 weeks
Start Time (Recurring)	The recurring job starts at the time you specified on the Start Date given in the Recurrence Range. You can pick the day of the week by selecting a begin time that is on the day of the week that you want.
Start Date and End Date for Recurrence Range (Recurring)	This is the date range for job execution. The job will continue execution between the Start date and End Date at intervals specified by you. For a recurring job, the Start Date is the date and time at which the job will first executes. The End Date is the date and time after which there will be no more recurrences. If left blank, the job will recur indefinitely until it is manually removed from the Job Queue. End Date is not applicable for a nonrecurring job.
Cancel execution if job runs longer than	The job cancels if it runs longer than a certain time. For example: 60 seconds. The job cancels execution if runtime exceeds 60 seconds. For information, refer to Section 22.3.5.3, "Cancel Time."

22.3.5.1 Job Priority

Job priority indicates the importance of the job. Job priority can be set to low, medium and high. If two jobs are in conflict the higher priority job will process first. If two jobs are in conflict and they have the same priority, OAAM will randomly select one of the jobs to process first.

Table 22–11 Job Priority Examples

Example	Set to Process	Priority	Result when administrator clicks Submit at exactly the same time
1	Job A: Immediately Job B: Immediately	Job A: High Job B: Medium	Instance of A will show up in the queue above Instance of B and will process in that order because Job A is higher priority
2	Exactly the same start time/date	Job A: Medium Job B: Low	Instance of A will show up in the queue above Instance of B and will process in that order because Job A is higher priority.
3	Exactly the same start time/date	Both are Medium	Job queue logic will select either A or B randomly to process first and instances will display in the Job Queue in the randomly determined order

22.3.5.2 Schedule Type

Schedule Type determines how often and when a particular job will be run. Schedule Type is either **Once** or **Recurring**.

Table 22–12 Scheduling Types

Type	Definition	Fields Required	Fields that Do Not Apply
Once	Run the job once and only once at the date and time specified in the future. If the schedule type is set to Once, the execution time (Start Date and Start Time) is set to the current date and time by default and the job processes at once ("now").	Start Date and Start Time	Recurrence/Interval Type, Recurrence Frequency, or End Time
Recurring	Run the job multiple times on a schedule	All Frequency is how often the execution recurs.	None

Examples of scheduling types are shown in the following table.

Table 22–13 Scheduling Type Examples

If I want	Values to set are	Notes
A group of related and dependent jobs to run every two weeks	■ Recurrence/Interval Type: Weekly ■ Recurrence Frequency: 2	
Job to run every two weeks on a Monday at 3:00PM, from August 30, 2010 until October 25, 2010	■ Schedule Type: Recurring ■ Begin Time: 08/30/2010 3:00 PM ■ End Time: 10/25/2010 3:00 PM ■ Interval: Weekly ■ Frequency: 2 ■ Time: 3:00 PM	The user does not specify the day of week directly. For weekly recurrence, the user indirectly picks the day of week by selecting a begin time that is on the day of week that she wants. This example the job will run on Mondays because 08/30/2010 is a Monday.

22.3.5.3 Cancel Time

As part of your job definition, you can specify an optional **Cancel Time**. The **Cancel Time** determines the maximum amount of time a job is allowed to run before the system automatically stops it. In this way, users can avoid the problem of having jobs run at times that may conflict with other activities. This option is not required, and if a job has no cancel time, it will run until it finishes or until a user manually stops it. If the job is currently executing, then changing the cancel time will only affect future recurrences. The currently executing job instance will use the original setting.

22.3.6 Create Job: Summary

The Summary page displays the choices made and information entered in the previous wizard pages.

22.4 Creating Jobs

Create new jobs by following the instructions in this section. Topics covered in this section are:

- Creating Load Jobs
- Creating Run Jobs
- Creating Load and Run Jobs
- Creating Monitor Data Rollup Jobs

22.4.1 Creating Load Jobs

A Load Job reads records from a remote data source, converts the data into OAAM login sessions, and stores the login sessions in the OAAM offline datastore.

> **Note:** If you are loading from a non-OAAM schema, you must set up a database view. For instructions, refer to Section 21.8.2, "Creating a View of a Non-OAAM Database."

The process for creating a Load Job is:

1. Select Job Type and provide job details. See Section 22.4.1.1, "Selecting Load Job Type and Providing Job Details."
2. Enter Load Details.

   The Loader type defines how the records are read from the remote data source and how they are converted into OAAM sessions.

   If you want to load data from a database, choose the OAAM Loader Type that is shipped with OAAM. See Section 22.4.1.3, "Providing Load Details for OAAM Data Loader."

   If you want to perform any other type of task, choose a Custom Loader Type. See Section 22.4.1.2, "Providing Load Details for Custom Loader."

   If using the OAAM Loader Type, the following steps are needed:
3. Set up the data filter.

   The data filter defines a criteria to define the set of records in the database to be loaded or run.

   If you want to define the set of records as all records created after a given date, choose **Auto Increment** as the data filter type. See Section 22.4.1.4, "Specifying to Load All Data Created After a Given Date."

   If you want to define the set of records as all records that were created between a From Date and a To Date, choose **Date Range**. See Section 22.4.1.5, "Specifying to Load Data Created within a Date Range."
4. Set up the scheduling.

   If you want to schedule a Load Job that runs once, choose **Once** as the schedule type. See Section 22.4.1.6, "Scheduling a Load Job that Runs Once."

   If you want to schedule a Load Job that runs on a regular basis, choose **Recurring** as the schedule type. See Section 22.4.1.7, "Scheduling a Load Job that Runs on a Regular Basis (Recurring)."
5. Confirm details. See Section 22.4.1.8, "Checking the Summary Details of Load Job."

22.4.1.1 Selecting Load Job Type and Providing Job Details

To create a Load Job:

1. In the Jobs search page, click the **New Job** button.

   The **Choose Job Type** dialog appears with the available job types to select from.
2. Select **Load** and click the **Continue** button

   The Create Job page opens to the General page where you can specify the name and description for the Load Job.

   By default the status is **Enabled** and the **Job Type** field displays **Load**.

   The **Job Type** field is not editable.
3. Decide on a name for the job you are defining and enter it in the **Job Name** field.

   The Job Name can only contain alphanumeric characters.
4. Enter a description for the Load Job.

   The **Next** button is enabled after the job name and description have been entered.
5. Click the **Next** button to create the Load Job.

The job is created and you are directed to the **Load Details** page.

22.4.1.2 Providing Load Details for Custom Loader

A Custom Loader is a user-defined loader that defines how to accomplish complex and custom scenarios. After creating the job, you are directed to the Load Details page where you can start defining the job.

If you want to use a custom loader to load the data source, follow these steps:

1. In the Load Details page, select **Custom Loader**.

   This is the custom loader you developed to accomplish complex and custom scenarios specific to your deployment. You will have written a custom class to define this loader.

2. To select a custom loader, click the **Update Class Path...** button.

   A dialog appears where you must enter the exact path of a Java class that implements the custom loader specification.

3. Enter the exact path of a Java class that implements the custom loader specification and press **OK**.

   If the system cannot find the class, or if the class is not a properly defined custom loader, an error occurs.

22.4.1.3 Providing Load Details for OAAM Data Loader

The loader type defines how the records are read from the remote data source and how they are converted into OAAM sessions. After creating the job, you are directed to the Load Details page where you can start defining the job.

The OAAM Data Loader loads login data from a relational database. If you want the OAAM Loader as the data loader type for your data source, follow these steps.

1. In the Load Details page, ensure that the **OAAM Loader** type is selected.
2. Under Data Source Details, enter the database connection parameters for the source database.

   The database connection parameters define how to connect to the remote database.

Table 22–14 Database Connection Parameters

Parameter	Description
Database Platform	The type of database from which you will be loading.
JDBC URL	The connection string for the database.
Database User Schema	The user name for the database.
Database Password	The password for the database.

3. Enter values for the miscellaneous properties.

   This panel contains information that can be adjusted to improve performance such as transaction size, memory buffer size, and write pool size.

Table 22–15 Characteristics of the Load Job

Property	Description
Write Pool Size	Defines the number of threads dedicated to processing the incoming records. The optimal value will depend on the users' systems, so users may have to experiment to find the value that gives them the best performance on their system.
Memory Buffer Size	Defines the size of the buffer that holds yet-to-be processed records in memory. When pausing or suspending a job that is meant to restart, all records in this buffer must be processed before the job can stop. The higher this value is, the longer the shutdown procedure will take.
Transaction Size	Defines how records are processed as a batch, and also controls the logging frequency.

4. Click the **Next** button.

   After providing the database connection details and adjusting various properties in the Load Details page, you are ready to apply data filters for the Load Job.

22.4.1.4 Specifying to Load All Data Created After a Given Date

After entering the required database connection parameters and miscellaneous properties in the Load Details page, you are directed to the Data Filters page where you can specify which set of data to load. Data filters determine which set of records should be loaded into the offline system.

If you want to define the set of records as all records created after a given, follow these steps.

1. Select **Auto Increment** as the filter type.
2. Enter a **From Date**.
3. Click the **Next** button.

   You are directed to the Schedule page where you can specify to run the job once or on a recurring basis.

   A recurring Load Job with an Auto Increment filter will suspend itself after it processes all records that meet its criteria, and the next recurrence will process any new records that have been added in the mean time. If you decide to apply the **Auto Increment** filter, then the best practice is to use a **Recurring** schedule for the Load Job.

22.4.1.5 Specifying to Load Data Created within a Date Range

After entering the required database connection parameters and miscellaneous properties in the Load Details page, you are directed to the Data Filters page where you can specify the data filter to use to define the set of records to be loaded. A Date Range filter defines the set of records as all records that were created between a **From Date** and a **To Date**.

If you want data within a date range to be loaded from the data source, follow these steps.

1. Select **Date Range** as the filter type.
2. Enter a **From Date** and **To Date**.

   Only data that falls within that specific date range is loaded. You will need to enter the **From** and **To Date** for data collection. All data processed within these dates are loaded into the offline system.

3. Click the **Next** button.

You are directed to the Schedule page where you can specify to run the job once or on a recurring basis.

22.4.1.6 Scheduling a Load Job that Runs Once

After specifying the data filter, you are directed to the Schedule page where you can define the priority and schedule type for your job.

If you want the job to run immediately, follow these steps:

1. In the Schedule page, select a job priority: **High**, **Medium** or **Low**.

   Job priority determines the importance of the job.

2. Select **Once** as the **Schedule Type**.

   The job runs at the start date and start time specified by you or the job can be run immediately. This job is run only once and there is no recurrence. If the schedule type is set to **Once**, the execution time (Start Date and Start Time) is set to the current date and time and the job at once ("now").

3. Enter the **Start Date** and **Start Time** under Schedule Details.

4. Choose the **Cancel execution if runs longer than** option.

   The job cancels if it runs longer than a certain time.

   For example: 60 seconds. The job cancels execution if runtime exceeds 60 seconds.

5. Click **Next**.

22.4.1.7 Scheduling a Load Job that Runs on a Regular Basis (Recurring)

After specifying the data filter, you are directed to the Schedule page where you can define the priority and schedule type for your job.

If you want the job to run on a regular basis, follow these steps:

1. In the Schedule page, select the job priority.

   Job priority determines the importance of the job.

2. Select **Recurring** as the schedule type.

   Although the schedule type can be set or modified later, you must specify a schedule type now; otherwise, you will not be able to execute the job.

   The job should run repeatedly based on the recurring interval specified.

   If a job is recurring, then only one job instance for a particular job may execute at once. If the previous recurrence is still running, paused, or waiting in the Job Queue to execute, then this job instance is skipped. The job instance is moved to the job log with a status of **Skipped**, and the next recurrence, if any, is placed into the Job Queue.

3. Set the schedule details to the desired values.

Table 22–16 Schedule Details

Parameters	Description
Recurrence Interval	Daily Hourly, Weekly, Monthly, The job repeats execution based on your selection.
Execute Every	Recurrence frequency of the recurrence interval. For example if the Recurrence Interval is Weekly, you could enter 2 for Execute Every. The job will execute every 2 weeks
Start Time	The recurring job starts at the time you specified on the Start Date given in the Recurrence Range.
Start Date and End Date for Recurrence Range	This is the date range for job execution. The job will continue execution between the Start date and End Date at intervals specified by you. For a recurring job, the Start Date is the date and time at which the job will first executes. The End Date is the date and time after which there will be no more recurrences. If left blank, the job will recur indefinitely until it is manually removed from the Job Queue. End Date is not applicable for a nonrecurring job.
Cancel execution if job runs longer than	The job cancels if it runs longer than a certain time. For example: 60 seconds. The job cancels execution if runtime exceeds 60 seconds.

4. Click **Next** if you want to see the Summary page or click **Finish** to process the job.

22.4.1.8 Checking the Summary Details of Load Job

If you clicked **Next** in the Schedule page, you are directed to the Summary page. This page displays the choices made and information entered in the previous wizard pages.

If you are not satisfied with the choices and entries shown in the Summary page, use the **Back** button to return to the wizard pages and make changes.

If you are satisfied with the choices and entries shown in the Summary page, create the job by clicking the **Finish** button. A success confirmation message is presented and the Job Edit page is launched. The Job Edit page enables you to modify and reschedule a job.

22.4.2 Creating Run Jobs

A Run Job performs risk analysis on a set of OAAM sessions. A Run Job using the OAAM Load type reads the session records from the database, applies policies for Pre-Authentication and Post-Authentication checkpoints where the user is successfully authenticated.

> **Note:** You can change which checkpoint is Pre-Authentication or Post-Authentication by creating or editing the following properties using the Properties Editor:
>
> `profile.type.enum.[checkpoint-key].isPreAuth`
>
> `profile.type.enum.[checkpoint-key].isPostAuth`
>
> A Custom Run Job may perform other tasks or resolve the checkpoints to be run in a different fashion.

The process for creating a Run Job is:

1. Select Job Type and provide job details. See Section 22.4.2.1, "Selecting Run Job Type and Providing Job Details."

2. Enter Run Details. See Section 22.4.2.2, "Choosing Default or Custom Run as Run Type."

   The Run Type defines how and under what conditions the OAAM policies are applied to the sessions.

   If using the OAAM Run Type, the following steps are needed:

3. Set up the data filter.

   The data filter defines a criteria to define the set of records in the database to be loaded or run.

   If you want to define the set of records as all records created after a given date, choose **Auto Increment** as the data filter type. See Section 22.4.2.3.2, "Specifying to Run Analysis on All Data Created After a Given Date."

   If you want to define the set of records as all records that were created between given dates, choose **Date Range**. See Section 22.4.2.3.1, "Specifying to Run Analysis on Data Created Within a Date Range."

4. Set up the scheduling.

   If you want to schedule analysis to run once, choose **Once** as the schedule type. See Section 22.4.2.4.1, "Scheduling Analysis to Run Once."

   If you want to schedule analysis to run on a regular basis, choose **Recurring** as the schedule type. See Section 22.4.2.4.2, "Scheduling Analysis to Run on a Regular Basis (Recurring)."

5. Confirm details. See Section 22.4.2.5, "Checking the Summary Details of the Run Job."

22.4.2.1 Selecting Run Job Type and Providing Job Details

To create a Run Job, follow these steps:

1. In the Jobs search page, click the **New Job** button.

   The **Choose Job Type** dialog appears with the available job types to select from.

2. Select **Run** and click the **Continue** button.

   The Create Job page is opened by default to the General page where you can specify the name and description for the Run Job.

3. Enter a name and description for the Run Job.

   The **Next** button is enabled only after the job name and description are entered.

4. Click the **Next** button.

   The Run Job is created and you are directed to the Run Details page.

22.4.2.2 Choosing Default or Custom Run as Run Type

After creating the job, you are directed to the Run Details page where you can select the Run type. The Run type defines how and under what conditions the OAAM policies are applied to the sessions.

1. In the Run details page, select the Run Type from the following two options:

Table 22–17 Run Type

Run Type	Description
Default	By default the OAAM Run type is selected. The Pre-Authentication and Post-Authentication checkpoints which are enabled by default are run. If you select the default run type, you will need to specify the Transaction Size and Memory Buffer Size.
Custom Run	To select a Custom Run type, click the **Update Class Path...** button, then enter the fully qualified class name for the custom run class. If it is valid, you will be able to proceed to the next page; otherwise, an error message is displayed. The custom run class path is usually different from the Custom Load Class path.

2. Click the **Next** button.

   You are directed to the Data Filters page.

22.4.2.3 Specifying Which Set of Records to Analyze

After selecting the Run type, you are directed to the Data Filters page where you can:

- Specify how much data to load and run by specifying a date range, or
- Choose to load a selection and run checkpoints on only a sub-selection of that data

22.4.2.3.1 Specifying to Run Analysis on Data Created Within a Date Range If you want to define the set of records as all records that were created between given dates, follow these steps:

1. Select **Date Range** as the filter type.
2. Enter the **From** and **To Date** for data processing.

   All data loaded within these dates will be processed.
3. Click **Next**.

   You are directed to the Schedule page.

22.4.2.3.2 Specifying to Run Analysis on All Data Created After a Given Date If you want to define the set of records as all records created after a given, follow these steps.

1. Select **Auto Increment** as the filter type.
2. Enter **From Date**.

   This is the date from when data should be run.

   All data from the given date will be processed with the current policies and rules.
3. Click **Next**.

   You are directed to the Schedule page.

22.4.2.4 Scheduling Analysis to Run

After specifying the data filter, you are directed to the Schedule page where you can define the priority and schedule type for your job.

You can choose to:

- Configure a single date/time to load and run
- Configure a recurring load and run
- Click Start to start the load and run now

22.4.2.4.1 Scheduling Analysis to Run Once To configure a single date/time to load and run:

1. In the Schedule page, select a job priority.

   Job priority determines the importance of the job.

2. Select **Once** as the **Schedule Type**.

   The job runs at the start date and start time specified by you or the job can be run immediately. This job is run only once and there is no recurrence. If the Schedule Type is set to **Once**, the execution time (Start Date and Start Time) is set to the current date and time and the job at once ("now").

3. Set the schedule details to the desired values.

Table 22–18 Schedule Details for a Run Job that Executes Once

Property	Description
Start Date and Start Time	The job will run at the Start Date and Time.
Cancel Execution if job runs longer than	The maximum amount of time a job is allowed to run before the system automatically stops it. This option is not required, and if a job has no cancel time, it will run until it finishes or until a user manually stops it.

4. Click **Next**.

22.4.2.4.2 Scheduling Analysis to Run on a Regular Basis (Recurring) To configure a recurring load and run:

1. In the Schedule page, select the job priority.
2. Select the **Schedule Type** as **Recurring**.

   The job should run repeatedly based on the recurring interval specified. If a job is recurring, then only one job instance for a particular job may execute at once. If the previous recurrence is still running, paused, or waiting in the Job Queue to execute, then this job instance is skipped. The job instance is moved to the job log with a status of **Skipped**, and the next recurrence, if any, is placed into the Job Queue.

3. Set the schedule details to the desired values.

   The Run Job will execute as per the Schedule Details.

Table 22–19 Schedule Details for Recurring Run Job

Properties	Description
Recurrence Interval	Hourly, Daily, Weekly or Monthly
Execute Every	Frequency in the recurrence pattern
Start Time	The recurring job starts at the time you specified on the Start Date given in the Recurrence Range.
Start Date and End Date	This is the date range for job execution. The job will continue execution between the Start date and End Date at intervals specified by you. For a recurring job, the Start Date is the date and time at which the job will first executes. The End Date is the date and time after which there will be no more recurrences. If left blank, the job will recur indefinitely until it is manually removed from the Job Queue. End Date is not applicable for a nonrecurring job.
Cancels execution if runtime exceeds	The maximum amount of time a job is allowed to run before the system automatically stops it. This option is not required, and if a job has no cancel time, it will run until it finishes or until a user manually stops it.

4. Click **Next** to proceed to the summary page or **Finish** to process the job.

22.4.2.5 Checking the Summary Details of the Run Job

If you clicked **Next** in the Schedule page, you are directed to the Summary page.

This page displays the choices made and information entered in the previous wizard pages. If you are not satisfied with the choices and entries shown in the Summary page, use the **Back** button to return to the wizard pages and make changes. If you are satisfied with the choices and entries shown in the Summary page, create the job by clicking the **Finish** button. A success confirmation message is presented and the Job Edit page is launched. The Job Edit page enables you to modify and reschedule a job.

Data Clean Up

When a Run begins executing, it performs a clean up for the records in the job's data filter. This clean up involves deleting rule logs, alerts, and actions and resetting risk scores and authentication statuses. This ensures that this data created from a run will not affect other runs on the same data. Pattern and group updates will not be reset between runs so these features are not intended for use cases where the same data is run multiple times.

For example, if you create a Run Job named "R&D Run" and you process it three times, the results (actions, alerts and score) from "R&D Run_090820100429" will not effect "R&D Run_090820100715" and "R&D Run_090920100807" will ignore outcomes of the previous two.

22.4.3 Creating Load and Run Jobs

A Load and Run Job is a combination of a Load Job and a Run Job. After each record is processed by the Load Job, the result is fed directly into the Run Job. In a Load and Run Job, patterns will be processed for successful logins after the Post-Authentication rules are processed.

Note: If you are loading from a non-OAAM schema, you must set up a database view. For instructions, refer toSection 21.8.2, "Creating a View of a Non-OAAM Database."

22.4.3.1 Selecting Load and Run Job Type and Providing Details

1. In the Jobs search page, click the **Create Job** button.

   The **Choose Job Type** dialog appears with the available job types to select from.

2. Select Load and Run and click the **Continue** button.

   The Create Job page is opened by default to the General page where you have to specify the name and description for the Load and Run Job.

   By default the **Status** should be **Enabled**.

3. Select **Load and Run** as the job type.

4. Enter a name and description for the Load and Run Job and select the status.

   The job type, name and description for the Load and Run Job and the status should be displayed in the General page. By default the status should be **Enabled**.

5. Click the **Next** button.

   The Load and Run Job is created and you are directed to the Load Details page.

22.4.3.2 Selecting Loader Type for Load and Run Job

After creating the job, you are directed to the Load Details page where you can start defining the job.

1. In the Load Details page, select the **Loader** type from the following two options: **OAAM** and **Custom Loader**.

   By default the **OAAM** Loader type is selected. You can select the custom loader if you choose to write a custom class.

2. Under Data Source Details, enter the database connection parameters for the source database. The following parameters have to be entered:

Table 22–20 Database Connection Parameters

Parameter	Description
Database Platform	The type of database from which you will be loading.
JDBC URL	The connection string for the database.
Database User Schema	The user name for the database.
Database Password	The password for the database.

3. Verify miscellaneous properties.

   This panel contains information that can be modified to improve performance such as transaction size, memory buffer size, and so on.

4. Click the **Next** button.

   You are directed to the Run Details page.

22.4.3.3 Specifying Data Filters for Load and Run Job

After entering the required database connection parameters and miscellaneous properties in the Load Details page, you are directed to the Data Filters page where you can specify the data filter to be used for the data to be loaded.

1. Select **Auto Increment** or **Date Range** as the filter type. If **Auto Increment** is selected, enter date from when data should be loaded and run.

   The data filter selected is applied for both the Load and Run Job. All data from the given date is loaded. All data from the given date is processed with the current policies and rules.

2. If **Date Range** Filter type is selected, enter the **From** and **To Date** for data processing.

   All data loaded within these dates will be processed.

22.4.3.4 Scheduling a Load and Run Job that Runs Once

After specifying the data filter, you are directed to the Schedule page where you can define the priority and schedule type for your job.

1. In the Schedule page, select a job priority.

   Job priority determines the importance of the job.

2. Select **Once** as the **Schedule Type**.

   The job runs at the start date and start time specified by you or the job can be run immediately. This job is run only once and there is no recurrence. If the schedule

type is set to **Once**, the execution time (Start Date and Start Time) is set to the current date and time and the job at once ("now").

3. Set the schedule details to the desired values.

Table 22–21 Schedule Details for a Run Job that Executes Once

Property	Description
Start Date and Start Time	The job will run at the Start Date and Time.
Cancel Execution if job runs longer than	The maximum amount of time a job is allowed to run before the system automatically stops it. This option is not required, and if a job has no cancel time, it will run until it finishes or until a user manually stops it.

4. Click **Next**.

22.4.3.5 Scheduling a Load and Run Job that Runs on a Regular Basis (Recurring)

After specifying the data filter, you are directed to the Schedule page where you can define the priority and schedule type for your job.

1. In the Schedule page, select the job priority and select schedule type as **Recurring**.

   The job should run repeatedly based on the recurring interval specified.

   If a job is recurring, then only one job instance for a particular job may execute at once. If the previous recurrence is still running, paused, or waiting in the Job Queue to execute, then this job instance is skipped. The job instance is moved to the job log with a status of **Skipped**, and the next recurrence, if any, is placed into the Job Queue.

2. Set the schedule details to the desired values.

   The Load and Run Job executes as per the Schedule Details. The Load Job runs first and then the Run Job as per the schedule details.

Table 22–22 Schedule Details

Parameters	Description
Recurrence Interval	Daily Hourly, Weekly, Monthly The job should repeat execution based on your selection.
Execute Every	Recurrence frequency of the recurrence interval. For example if the Recurrence Interval is Weekly, you could enter 2 for Execute Every. The job will execute every 2 weeks
Start Time	The recurring job starts at the time you specified on the Start Date given in the Recurrence Range.
Recurrence Range: Start Date and End Date	This is the date range for job execution. The job will continue execution between the Start date and End Date at intervals specified by you. For a recurring job, the Start Date is the date and time at which the job will first executes. The End Date is the date and time after which there will be no more recurrences. If left blank, the job will recur indefinitely until it is manually removed from the Job Queue. End Date is not applicable for a nonrecurring job.
Cancel execution if job runs longer than	The job cancels if it runs longer than a certain time. For example: 60 seconds. The job cancels execution if runtime exceeds 60 seconds.

3. Click **Next**.

   You are directed to a summary details page.

22.4.3.6 Checking the Summary Details of the Load and Run Job

If you clicked **Next** in the Schedule page, you are directed to the Summary page.

This page displays the choices made and information entered in the previous wizard pages. If you are not satisfied with the choices and entries shown in the Summary page, use the **Back** button to return to the wizard pages and make changes.

If you are satisfied with the choices and entries shown in the Summary page, create the job by clicking the **Finish** button. A success confirmation message is presented and the Job Edit page is launched. The Job Edit page enables you to modify and reschedule a job.

22.4.4 Creating Monitor Data Rollup Jobs

This section shows how Monitor Data Rollup Jobs can be created. The topics in this section are the following:

- About Monitor Data Rollup Jobs
- Selecting Monitor Data Rollup Type and Providing Details
- Specifying Rollup Unit and Cutoff Time
- Scheduling a Monitor Data Rollup Job that Runs Once
- Scheduling a Monitor Data Rollup that Runs on a Regular Basis (Recurring)
- Checking the Summary Details of the Monitor Data Rollup

22.4.4.1 About Monitor Data Rollup Jobs

The Monitor Data Rollup Job reclaims space in the database by merging redundant records in the V_MONITOR_DATA table. If Monitor Data records are of the same type, with the same data value and fingerprint, and fall within the same period on a trending graph for a particular scale, then those records are considered to be redundant for that scale.

A Monitor Data Rollup Job with a daily scale, for example, will merge all of the redundant records from each day into single records for each day.

Monitor Data records may be redundant on one scale, but not redundant on a more granular scale. For example, if there are two Monitor Data records of the same type and with the same data value and fingerprint, one created on a Monday and one created two days later, then those two records would be redundant on a weekly scale, but would not be redundant on a daily scale.

When Monitor Data records are merged, each set of redundant Monitor Data records is taken and a new record is created using the earliest begin date, the latest end date, the sum of the counts and running times, the smallest minimum running time, and the largest maximum running time of each set. Then the entire set of redundant Monitor Data records is deleted and the new merged Monitor Data record is inserted to take their place. Depending on the scale at which to roll up, there will be at most one Monitor Data record for each time period for each unique combination of Monitor Type, data value, and fingerprint.

22.4.4.2 Selecting Monitor Data Rollup Type and Providing Details

To create a Monitor Data Rollup Job, follow these steps:

1. In the Navigation tree, double-click **Jobs** to open the Jobs search page.
2. In the Jobs search page, click the **Create Job** button.

The **Choose Job Type** dialog appears with the available job types to select from.

3. Select **Monitor Data Rollup** and click the **Continue** button.

   The Create Job page is opened by default to the General page.

4. Select **Monitor Data Rollup** as the job type.
5. Enter a name and description for the Monitor Data Rollup Job.
6. Select the status.

   By default the status should be **Enabled**.

7. Click the **Next** button.

   The Monitor Data Rollup Job is created and you are directed to the Rollup Details page.

22.4.4.3 Specifying Rollup Unit and Cutoff Time

After creating the Monitor Data Rollup Job, you are directed to the Rollup Details page where you can specify Rollup options for this job. All records within the specified unit size will be rolled up (compacted) into a single record.

1. In the Rollup Details page, select the rollup unit.

   The rollup unit defines the scale at which the Monitor Data records will be rolled up.

   Choices are **Hourly**, **Days**, **Weekly**, and **Monthly**.

2. Select the Cutoff Time.

   This value determines which records should be compacted. For example, if the 6 Months is specified for the Cutoff Time, all records older than 6 months will be compacted to a single record. The Cutoff Time property tells the job which records to leave alone and not roll up.

   It is recommended that the Cutoff Time remains at the default value because if the Cutoff Time value is below the default value, the dashboard graphs may not be accurate.

Table 22–23 Default Value for Cutoff Time

Rollup	Cutoff Time
Hourly	1 hour
Days	2 days
Weekly	13 weeks
Monthly	6 months

3. Click **Next**.

22.4.4.4 Scheduling a Monitor Data Rollup Job that Runs Once

After specifying the Rollup options for the job, you are directed to the Schedule page where you can define the priority and schedule type for your job.

To specify for the Monitor Data Rollup Job to occur once, follow these steps:

1. In the Schedule page, select a job priority.

   Job priority determines the importance of the job.

2. Select **Once** as the schedule type.

   The job runs at the start date and start time specified by you or the job can be run immediately. This job is run only once and there is no recurrence. If the schedule type is set to **Once**, the execution time (Start Date and Start Time) is set to the current date and time and the job processes at once ("now") by default.

3. Set the schedule details to the desired values.

Table 22–24 Schedule Details for a Run Job that Executes Once

Property	Description
Start Date and Start Time	The job will run at the Start Date and Time.
Cancel Execution if job runs longer than	The maximum amount of time a job is allowed to run before the system automatically stops it. This option is not required, and if a job has no cancel time, it will run until it finishes or until a user manually stops it.

4. Click **Next**.

22.4.4.5 Scheduling a Monitor Data Rollup that Runs on a Regular Basis (Recurring)

After specifying the Rollup options for the job, you are directed to the Schedule page where you can define the priority and schedule type for your job.

To specify for the Monitor Data Rollup Job to be recurring, follow these steps:

1. In the Schedule page, select the job priority.

   The job priority for the rollup job is set which determines the order of execution when two jobs have same schedule date and time.

2. Select **Recurring** as the schedule type.

   The job should run repeatedly based on the recurring interval specified. If a job is recurring, then only one job instance for a particular job may execute at once. If the previous recurrence is still running, paused, or waiting in the Job Queue to execute, then this job instance is skipped. The job instance is moved to the job log with a status of **Skipped**, and the next recurrence, if any, is placed into the Job Queue.

3. Set the schedule details to the desired values.

Table 22–25 Schedule Details

Parameters	Description
Recurrence Interval	Daily Hourly, Weekly, Monthly, The job should repeat execution based on your selection.
Execute Every	Recurrence frequency of the recurrence interval. For example if the Recurrence Interval is Weekly, you could enter 2 for Execute Every. The job will execute every 2 weeks

Table 22–25 (Cont.) Schedule Details

Parameters	Description
Start Time	The recurring job starts at the time you specified on the Start Date given in the Recurrence Range.
Recurrence Range: Start Date and End Date	This is the date range for job execution. The job will continue execution between the Start date and End Date at intervals specified by you. For a recurring job, the Start Date is the date and time at which the job will first executes. The End Date is the date and time after which there will be no more recurrences. If left blank, the job will recur indefinitely until it is manually removed from the Job Queue. End Date is not applicable for a nonrecurring job.
Cancel execution if job runs longer than	The job cancels if it runs longer than a certain time. For example: 60 seconds. The job cancels execution if runtime exceeds 60 seconds.

The Monitor Data Rollup Job should execute as per the Schedule Details.

4. Click **Next**.

   You are directed to the Monitor Data Rollup Job Summary Details page

22.4.4.6 Checking the Summary Details of the Monitor Data Rollup

If you clicked **Next** in the Schedule page, you are directed to the Summary page. This page displays the choices made and information entered in the previous wizard pages.

If you are not satisfied with the choices and entries shown in the Summary page, use the **Back** button to return to the wizard pages and make changes.

If you are satisfied with the choices and entries shown in the Summary page, create the job by clicking the **Finish** button. A success confirmation message is presented and the Job Edit page is launched.

22.5 Managing Jobs

This section shows how jobs can be managed in OAAM. The topics in this section are the following:

- About Running Jobs
- Notes About Rescheduling Jobs
- Processing a Job Immediately
- Pausing a Job
- Resuming a Paused Job
- Canceling a Job
- Enabling Jobs
- Disabling Jobs
- Deleting Jobs
- Viewing Job Details
- Viewing Instances of a Job
- Viewing the Job Log
- Viewing and Sorting the Job Queue
- Editing Jobs

- Editing the Monitor Data Rollup

22.5.1 About Running Jobs

When the scheduled start time for a job instance arrives, the system checks to see if it is allowed to execute it. If a job is recurring, then only one job instance for a particular job may execute at once, so if the previous recurrence is still running, paused, or sitting in the Job Queue waiting to execute, then this job instance will be skipped. The job instance will be moved to the job log with a status of Skipped, and the next recurrence, if any, will be placed into the Job Queue.

If the server stops while a job instance is executing, that job instance will automatically restart at the point where it stopped when the server starts up. In a clustered environment, if the server where a job instance is running fails, another server in the cluster will automatically restart it.

If the job was scheduled with a **Cancel Time**, and the server starts some time later, the time during which the server was down will not count against the elapsed time for purposes of determining when the job should auto-suspend. For example, if a job is scheduled to start at 12:00 am and cancel after two hours, but the server stops at 1:30 am and is not restarted until 7:00 am, then the job will restart where it left off at 7:00 with 30 minutes remaining, and will auto cancel at 7:30.

22.5.1.1 Bulk Risk Analytics Job Execution

The Load, Run, and Load and Run Job types are all mutually exclusive with each other. No Load, Run, or Load and Run Job may execute at the same time as another Job of either Job Type.

22.5.1.2 Run Data Reset

Actions, alerts and rule log data will be deleted if the same selection of data has another run processed on it. This ensures that this data created from a run will not affect other runs on the same data. Pattern and group updates will not be reset between runs so these features are not intended for use cases where the same data is run multiple times.

For example, if an administration console user creates a Run Job named "R&D Run" and he processes it three times, the results (actions, alerts and score) from "R&D Run_090820100429" will not effect "R&D Run_090820100715" and "R&D Run_090920100807" will ignore outcomes of the previous two.

22.5.1.3 Group Populations

If a configurable action adds or removes members to or from a group as a result of a run these changes will be available for use by subsequent runs.

For information on groups, refer to Chapter 12, "Managing Groups."

22.5.1.4 Pattern Buckets and Memberships

Pattern buckets created and membership count updates that occur as a result of a run are available for use by subsequent runs.

For information on pattern buckets and membership, refer to Section 15.1.2, "Patterns."

22.5.1.5 Actions, Alerts, Scores

Rule outcomes from a run will be deleted before subsequent runs on the same data.

For information on actions, alerts, and scores as outcomes, refer to Section 10.2, "Basic Concepts."

22.5.2 Notes About Rescheduling Jobs

OAAM does not reschedule a job unless the start time is changed. When changing the recurrence pattern for a job (recurrence interval and/or recurrence frequency), the best practice is to also change the start date and time to be explicit about when you want the next recurrence to occur. Otherwise, the next scheduled recurrence, if any, will proceed as scheduled, and the next recurrence after that will be calculated from that point. If the job does not have any future recurrences scheduled, then modifying the recurrence pattern without changing the start time will have no effect -- after the change is saved, the job will still not have any future recurrences scheduled.

22.5.3 Processing a Job Immediately

To process a job immediately:

1. Search for the jobs that you want to enable by performing the procedure described in Section 22.2.3, "Searching for Jobs."
2. Select the job from the Search Results table and click **Process Now**.

   Alternatively, you can select **Process Now** from the Actions menu.

   If there are no other jobs that are currently running, the job is placed as a job instance in the queue. The job status is "Running" and the Start time is set to the current time.

   If another job is currently running that prevents the selected job from executing, a message informs you that the job could not be started and the queue will be unchanged.

22.5.4 Pausing a Job

To pause a job, if it is running, or prevent execution of a job, but leave it in the queue, follow these steps:

1. In the Job Queue page, select the job.
2. Press the **Pause** icon in the Results toolbar.

   The job instance is suspended. The next job in the queue is run. Pausing the job does not affect the order of the job instances in the execution queue.

   If a recurring job instance that has not yet started is paused, the job instance is suspended and remains paused in the queue until it is resumed or canceled.

   If a recurring job instance is paused and then resumed when another job is scheduled to run, the job that is resumed has higher priority.

22.5.5 Resuming a Paused Job

To resume a paused job, follow these steps:

1. In the Job Queue page, select the paused job.

   The Process button is enabled when a job instance is paused.
2. Press the **Process** icon in the Results toolbar.

The job instance resumes processing from where it was paused if no other job is currently running. The process start time shows the original process Start Time and not the Start Time when the job instance was resumed.

If a job is resumed when another job is scheduled to run, the job that is scheduled is skipped.

If another job is already running, resuming the paused job places the job in the Job Queue and it will be executed after the current job completes running.

22.5.6 Canceling a Job

To stop the job instance if it is running and remove the job instance from the Job Queue, perform the following steps:

1. In the Job Queue page, select the job.
2. Press the **Cancel** icon on the Results toolbar.

   The job instances that were selected are suspended and removed from the Job Queue.

   If the job is recurring, the next instance will be added to the Job Queue.

22.5.7 Enabling Jobs

In addition to creating and modifying jobs, you can enable jobs that are currently disabled. If the **Enable** button is enabled, it means that jobs are currently disabled and you can enable them by clicking **Enable**. If there are no disabled jobs listed in the search results table, then the **Enable** button is disabled.

To enable jobs:

1. Search for the jobs that you want to enable by performing the procedure described in Section 22.2.3, "Searching for Jobs."
2. In the search results table, select the jobs and click **Enable**.

   Alternatively, you can select **Enable** from the Actions menu.

   A message indicating that the jobs have been successfully enabled is displayed.
3. Click **OK** to close the dialog.

22.5.8 Disabling Jobs

You can disable jobs that are currently enabled. If the Disable button is enabled, it means that jobs are currently enabled and you can disable them by clicking Disable. If all the jobs in the search results table are disabled then the **Disable** button will not be enabled.

Only jobs that are processed can be disabled. The jobs that are running or scheduled to run in the future cannot be disabled.

To disable jobs:

1. Search for the jobs that you want to disable by performing the procedure described in Section 22.2.3, "Searching for Jobs."
2. In the search results table, select the jobs and click **Disable**.

   Alternatively, you can select **Disable** from the Actions menu.

   A message indicating that the jobs have been successfully disabled is displayed.

3. Click **OK** to close the dialog.

22.5.9 Deleting Jobs

To delete jobs, follow these steps:

1. Search for the jobs that you want to delete by performing the procedure described in Section 22.2.3, "Searching for Jobs."
2. Select the jobs from the Search Results table and click the **Delete** button.

   Alternatively, you can select **Delete** from the Actions menu.

   Only the jobs that are not processed can be deleted. The jobs that are processed (finished) contain logs and references to job instances and cannot be deleted. Error messages are displayed when you try to delete these jobs. Processed jobs can only be disabled. Jobs with the In Process status cannot be deleted. If multiple jobs are selected, and if any one of them cannot be deleted, none of the selected jobs will be deleted.

Table 22–26 Deleting Jobs

Status	Can Be Deleted
Not Processed	Yes
Processed	No. They can only be disabled.
In Process	No

22.5.10 Viewing Job Details

Clicking the job name in the Search Results table opens the corresponding Job Details page. The following information is displayed in the Job Details page:

- The General page displays general information about the job such as job type, job name, and job status.
- The Load Details page shows the loader that controls which records will be processed.
- The Rollup Details page shows the monitor rollup details.
- The Run Details page shows the run type details.
- The Data filters tab shows which set of data to load into the offline system or process.
- The Schedule page shows the scheduling options chosen for the job.

22.5.11 Viewing Instances of a Job

The Instances tab of the Job Details page shows all past and present job instances for a job. The panel at the top enables you to filter the job instances shown.

Table 22–27 Filter Job Instances

Filter	Description
State	Show only those job instances that are in a particular state, such as Running, Skipped, Completed, or Canceled

Table 22–27 (Cont.) Filter Job Instances

Filter	Description
Process Message	Show only those job instances that match on the process message.
Process Start Time	Show only job instances that started processing in the specified timestamp range
Process End Time	Show only job instances that stopped processing (whether successfully or unsuccessfully) in the specified timestamp range

The **Process Now** button enables you to start executing jobs that were skipped or not executed because of errors. If this job is already running and another job of the same job type is already running, you will be informed that this job cannot be started now.

22.5.12 Viewing the Job Log

To view the job log, open the Job Log page from the Job Queue page. This page shows past job instances. The top panel enables you to filter the results.

Table 22–28 Job Log Filters

Filters	Description
Job Instance Name	Show only job instances that match on job instance name.
Job Type	Show only job instances of the specified job type
State	Show only those job instances that are in a particular state, such as Running, Skipped, Completed, or Canceled.
Process Message	Show only those job instances that match on the process message.
Process Start Time	Show only job instances that started processing in the specified timestamp range
Process End Time	Show only job instances that stopped processing (whether successfully or unsuccessfully) in the specified timestamp range.

22.5.13 Viewing and Sorting the Job Queue

You can view and sort jobs.

22.5.13.1 Viewing the Job Queue

In the Navigation tree, double-click **Job Queue** to open the Job Queue page.

This page shows a listing of currently processing and future jobs. The job instances are displayed in the exact order of execution in the execution queue. There is only one job instance per job.

The recurring job instances have the job name followed by the date and time when the current instance started or the date and time when it will occur next.

The process start time is the exact time when the job started running for current jobs and an estimated start time for the future jobs. Process Duration is shown only for currently processing jobs.

You can filter based on job type, status, start/complete date, name and description. The queue displays which jobs are currently running and what their status is in terms of estimated completion time and percentage progress. Completed jobs will display as such.

The **Job Instance Name** in the table is a link to the Job Details page for the job.

22.5.13.2 Sorting the Job Queue

To sort the Job Queue:

1. In the Navigation tree, double-click **Job Queue** to open the Job Queue page.
2. In the Job Queue page, click the Sort Ascending icon in the Priority column or the Start Time column to sort the list.

   Sorting is not allowed on other data points since the job records are placed in the order of execution and this cannot be edited.

   If two jobs have the same start date and time, but different job priority, the higher job priority would be listed first in the Job Queue

22.6 Editing Jobs

This section contains instructions to edit jobs.

22.6.1 Editing Jobs

The Job Edit page enables you to modify and reschedule a job.

Table 22–29 summarizes the Job Edit tabs.

Table 22–29 Edit Job

Edit Job Tabs	Description
General	General information for the job: job type, name, and status. The Job Name field cannot be modified.
Job Type	The fields on this tab are specific to the job type.
Schedule	Similar to Schedule page of the Job Creation wizard.
Instances	This tab shows all past and present job instances for a job.

You can make the following changes:

1. Enable or disable a job from the General tab.
2. Change the Transaction and Memory Buffer Size from the Run Details tab.
3. Change the job schedule from the Schedule tab.

Only the job instance for next occurrence are affected by the edits. The ones that are currently processing are not affected.

22.6.2 Editing the Monitor Data Rollup

To edit a Monitor Data Rollup Job, follow these steps:

1. Make the following changes:
   a. Enable or disable a job from the General tab.
   b. Change the Transaction and Memory Buffer Size from the Run Details tab.
   c. Change the job schedule from the Schedule tab.
2. Click the **Process Now** button.

   The Monitor Data Rollup Job is processed on a one time basis. The regular schedule of this job is not affected by the one-time job execution. The job will be executed again at its regular scheduled date and time.

22.7 Migration

If you are loading from a non-OAAM schema, you must set up the required database view. Refer to Section 21.8.2, "Creating a View of a Non-OAAM Database."

22.8 Use Cases

Use cases are presented below.

22.8.1 Use Case: Load OAAM Login Data and Run Checkpoints on a Recurring Basis

1. Security Administrator activates the option to create a new job.
2. Security Administrator selects the **Load and Run Job** from a dialog.
3. Security Administrator fills in the general information and clicks **Next**.
4. Security Administrator is presented with the Load Details page. Security Administrator selects **OAAM Loader**, fills in the Database Connection information and, if desired, modifies the miscellaneous properties. Security Administrator then clicks **Next**.
5. Security Administrator is presented with the Run Details page. Security Administrator selects Default Run Type and, if desired, modifies the Run Properties. Security Administrator then clicks **Next**.
6. Security Administrator is presented with the Data Filters page. Security Administrator selects **Auto Increment** and selects the desired **From Date**.
7. Security Administrator is presented with the Schedule page of the wizard. The default Schedule Type should be **Once**, and the **Start Date** and **Start Time** should be set to the current date and time by default.
8. Security Administrator selects the **Recurring** Schedule Type and sets the schedule details to the desired values. Security Administrator may also change the job priority and set the **Cancel Time**, if desired.
9. Security Administrator clicks **Next**, confirms the information in the Summary, and clicks **Finish**.

Alternate Courses of Action 1: If the remote database is not an OAAM schema, the Security Administrator is required to create a view in the schema that conforms to the specification provided in Section 21.8.2, "Creating a View of a Non-OAAM Database.".

Alternate Courses of Action 2: If the data to be loaded is in a file rather than a database, then the Security Administrator may write a custom loader to load the data from the file, but a better practice would be to import the file data into a database table and follow Alternate Courses of Action 1.

Alternate Courses of Action 3: The job instance is placed into the Job Queue and is scheduled to start at the desired time. When complete, the next job instance is placed into the Job Queue. The loaded data will be available in the sessions list.

22.8.2 Use Case: Load Transaction Data and Run Checkpoints on a Recurring Basis

Pre-conditions: Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions. A custom loader has been written and the resulting classes have been specified in the OAAM Offline application's classpath. Any needed properties have been set in the OAAM Environment Manager.

1. Security Administrator activates the option to create a new job.

2. Security Administrator selects the **Load and Run Job** Type from a dialog.
3. Security Administrator fills in the general information and clicks **Next**.
4. Security Administrator is presented with the Load Details page. Security Administrator selects **Custom Loader** Type and clicks **Update Class Path**.
5. Security Administrator types in the fully qualified Java class name for the Custom Loader Type and clicks **OK**.
6. Security Administrator modifies the miscellaneous properties if desired and clicks **Next**.
7. Security Administrator is presented with the Run Details page. Security Administrator selects Default Run Type and, if desired, modifies the Run Properties. Security Administrator then clicks **Next**.
8. Security Administrator is presented with the Data Filters page. Security Administrator selects **Auto Increment** and selects the desired **From Date**.
9. Security Administrator is presented with the Schedule page of the wizard. The default Schedule Type should be **Once**, and the **Start Date** and **Start Time** should be set to the current date and time by default.
10. Security Administrator selects the **Recurring** Schedule Type and sets the schedule details to the desired values. Security Administrator may also change the **Job Priority** and set the **Cancel Time**, if desired.
11. Security Administrator clicks **Next**, confirms the information in the Summary, and clicks Finish.

    The job instance is placed into the Job Queue and is scheduled to start at the desired time. When complete, the next job instance is placed into the Job Queue. The loaded data will be available in the sessions list.

Alternate Courses of Action: An error will occur at step 5 if there is a problem instantiating the Custom Loader. One possible problem is that the system cannot find the class. Another possible problem is that the class exists, but an error occurred when instantiating the class. The final possible problem is that the system was able to instantiate the class, but it does not properly implement the custom loader specification. The user will receive a different error message depending on the problem.

22.8.3 Use Case: Create a Job for Immediate Execution

Preconditions: Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions.

Actors: Security Administrator

Steps:

1. The Security Administrator activates the option to create a new Job.
2. The Security Administrator selects the desired Job Type from a dialog.
3. The Security Administrator fills in the general information and clicks **Next**.
4. The Security Administrator fills in the Job Type specific information and clicks **Next** (this may be multiple screens, depending on the Job Type).
5. The Security Administrator is presented with the Schedule screen of the wizard. The default Schedule Type should be **Once**, and the Start Date and Start Time should be set to the current date and time by default.

6. The Security Administrator ensures that the Schedule Type is set to **Once** and that the Start Date and Start Time are set to the current date and time. The Security Administrator may also change the Job Priority and set the Suspend Time, if desired.
7. The Security Administrator clicks **Next**, confirms the information in the Summary, and clicks **Finish**.

Alternate Courses of Action:

Alternate Courses of Action 1: If the selected Job Type is mutually exclusive, and another Job of the same Job Type is currently executing, this new job will be placed into the Job Queue, but will not begin executing until the currently executing Job is completed.

Post-conditions: The Job begins executing, and the Job Instance is visible in the Job Queue.

22.8.4 Use Case: Create a Job for Future Execution

Preconditions: The Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions.

Actors: Security Administrator

Steps:

1. The Security Administrator activates the option to create a new Job.
2. The Security Administrator selects the desired Job Type from a dialog.
3. The Security Administrator fills in the general information and clicks **Next**.
4. The Security Administrator fills in the Job Type specific information and clicks **Next** (this may be multiple screens, depending on the Job Type).
5. The Security Administrator is presented with the Schedule screen of the wizard. The default Schedule Type should be **Once**, and the Start Date and Start Time should be set to the current date and time by default.
6. The Security Administrator ensures that the Schedule Type is set to **Once**. The Security Administrator sets the Start Date and Start Time to the desired date and time. The Security Administrator may also change the Job Priority and set the Suspend Time, if desired.
7. The Security Administrator clicks **Next**, confirms the information in the Summary, and clicks **Finish**.

Alternate Courses of Action: None.

Post-conditions: The Job Instance is placed into the Job Queue and is scheduled to start at the desired time.

22.8.5 Use Case: Create a Job With Recurring Execution

Preconditions: Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions.

Actors: Security Administrator

Steps:

1. The Security Administrator activates the option to create a new Job.

2. The Security Administrator selects the desired Job Type from a dialog.
3. The Security Administrator fills in the general information and clicks **Next**.
4. The Security Administrator fills in the Job Type specific information and clicks Next (this may be multiple screens, depending on the Job Type).
5. The Security Administrator is presented with the Schedule screen of the wizard.
6. The Security Administrator sets the Schedule Type to **Recurring** and sets the Start Date and Start Time to the desired date and time. The Security Administrator may also change the Job Priority and set the End Time and Suspend Time, if desired.
7. The Security Administrator clicks **Next**, confirms the information in the Summary, and clicks **Finish**.

Alternate Courses of Action: None.

Post-conditions: The Job Instance is placed into the Job Queue and is scheduled to start at the desired time. When complete, the next Job Instance is placed into the Job Queue.

22.8.6 Use Case: View the Job Queue

Preconditions: Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions.

Actors: Security Administrator

Security Administrator activates the option to display the Job Queue, and clicks the **Current Queue** tab, if necessary.

Alternate Courses of Action:

Alternate Courses of Action 1: If the Security Administrator wants to pause a Job Instance, then she will click the desired Job Instance (or multi-select the Job Instances) and click the **Pause** button. The Job Instance will remain in the Job Queue, but the State will be changed to **Paused**. If the Job Instance was executing, it will stop, and if another Job Instance was blocked on this one, it will begin executing.

Alternate Courses of Action 2: If the Security Administrator wants to resume a paused Job Instance, then she will click the desired Job Instance (or multi-select the Job Instances) and click the **Resume** button. If the scheduled start time for this Job Instance has passed and there are no other conflicting Jobs already running, this Job Instance will go into **Running** state and will begin executing. Otherwise this Job Instance will go into **Scheduled** state. If multiple Job Instances are resumed at the same time, then the one with the earliest scheduled start time will go first.

Alternate Courses of Action 3: If the Security Administrator wants to cancel a Job Instance, then she will click the desired Job Instance (or multi-select the Job Instances) and click the **Cancel** button. The selected Job Instance(s) will be removed from the Job Queue. If the Job is recurring, then the next Job Instance will be placed into the Job Queue.

Post-conditions: The system displays all currently executing and upcoming Job Instances. If a Job is recurring, only the next instance is displayed.

22.8.7 Use Case: View the Logs from a Job Execution

Preconditions: Security Administrator is logged in the OAAM Administration Console and has the appropriate permissions.

Actors: Security Administrator

To view the logs from a job execution:

1. Double click **Job Queue** in the Navigation tree.
2. Click the **Job Log** tab.

   This page tab past job instances. The top panel enables you to filter the results.
3. Search for the Job Instance.

This page shows past job instances. The top panel enables you to filter the results.

Table 22–30 Job Log Filters

Filters	Description
Job Instance Name	Show only job instances that match on job instance name.
Job Type	Show only job instances of the specified job type
Job State	Show only those job instances that are in a particular state, such as Running, Skipped, Completed, or Canceled.
Process Message	Show only those job instances that match on the process message.
Process Start Time	Show only job instances that started processing in the specified timestamp range
Process End Time	Show only job instances that stopped processing (whether successfully or unsuccessfully) in the specified timestamp range.
Completed %	The percentage of the job that completed.
Process Duration	The time in seconds for completion

Alternate Courses of Action: None.

Post-conditions: The system displays the filtered list of past Job Instances.

22.8.8 Use Case: Check If the Job Ran Successfully

To check if the job ran successfully:

1. Open the Job Details page of the newly created job.
2. Click the **Instances** tab to check for job completion.

   If the Run Job schedule time has elapsed, search for the job instance. Its State should be **Completed** with a Process Start Time and a Process End Time. The Process Message should show the number of records processed and the Completed % should show the percentage completed. The Process Duration should show the time in seconds for completion.
3. Verify job completion by opening to the Sessions page and searching by the same time period as the job.

   For a Run Job, the Count of Sessions should be the same as that of after the load completion. For a Load Job, the Count of Sessions should have increased by the number shown in the job instances page. For a Load and Run Job, the Count of Sessions should have increased by the number of records processed as shown in the job instance.
4. Open a Session Details page.

   For a Run Job and a Load and Run Job, the Sessions details page should show that policies and rules have been processed on the records. For a Load Job, you should

see that the record is loaded but no policies and rules have been processed on the session record.

22.8.9 Use Case: View the Order of Execution of Jobs

In the Navigation tree, double-click **Job Queue** to open the Job Queue page. This page shows a listing of currently processing and future jobs. The job instances are displayed in the exact order of execution in the execution queue. There is only one job instance per job.

The recurring job instances have the job name followed by the date and time when the current instance started or the date and time when it will occur next.

The process start time is the exact time when the job started running for current jobs and an estimated start time for the future jobs. Process Duration is shown only for currently processing jobs.

You can filter based on job type, status, start/complete date, name and description. The queue displays which jobs are currently running and what their status is in terms of estimated completion time and percentage progress. Completed jobs will display as such.

The **Job Instance Name** in the table is a link to the Job Details page for the job.

Part IX

Reporting and Auditing

This part contains information about reporting and auditing features in Oracle Adaptive Access Manager 11*g*.

It contains the following chapters:

23

Monitoring OAAM Administrative Functions and Performance

There are several methods to view performance metrics. This chapter provides the following topics, with emphasis on using Oracle Adaptive Access Manager dashboard:

- Monitoring Performance Data and Administrative Functions Using the Oracle Adaptive Access Manager Dashboard
- Monitoring Performance Using the Dynamic Monitoring System
- Monitoring Performance Data and Administrative Functions Using Fusion Middleware Control

23.1 Monitoring Performance Data and Administrative Functions Using the Oracle Adaptive Access Manager Dashboard

This section introduces you to the dashboard and how it is used.

23.1.1 What is a Dashboard?

The Oracle Adaptive Access Manager Dashboard is an application that provides a high-level view of real monitor data. Monitor data is a representative sample of data.

It presents a real-time view of activity via aggregates and trending.

The Dashboard is comprised of three sections that enable you to focus your review on relevant data, such as the following:

- Performance statistics
- Expanded summary data
- Statistics based on location, scoring, device, security, and performance

Dashboard reports that are presented help you visualize and track trends. With a dashboard report you could check the frauds/alerts in your system. The dashboard also helps you make decisions based on user/location/devices profile allowing easy identification of risks taking place in the system.

The level of access to the dashboard (user interface views and controls) is based according to roles and company requirements.

23.1.2 Common Terms and Definitions

This section contains common dashboard terms and definitions.

Table 23–1 Common Dashboard Terms and Definition

Term	Definition
Refresh	Rate to update Dashboard with new data. The choices are 30 seconds, 1 minute, and 10 minutes.
Performance Panel	Section 1 of the Dashboard shows real-time data.
Summary Panel	Section 2 of the Dashboard shows aggregate data.
Dashboard Panel	Section 3 of the Dashboard shows historical data.
Data type	Type of information in the Oracle Adaptive Access Manager system.
Range	Time frame. The choices are Today, Last 1 day, Last 7 days, Last 30 days, and Last 90 days.
Average Process Time	Average number of milliseconds for execution.
Blocked Transactions	Transactions that were blocked during the transaction checkpoint.
High Alert (Logins)	High level alerts triggered during the login checkpoint.
High Alert (Transactions)	High level alerts triggered during the transaction checkpoint.
KBA Challenges	Challenge question responses.
OTP Challenges	OTP challenge responses

23.1.3 Navigation

In the Navigation tree, double-click **Dashboard**. The Dashboard will appear in the OAAM Administration Console's right side.

The dashboard is divided into three sections:

- The performance panel (Section 1) presents real-time data. It shows the performance of the traffic that is entering the system. A trending graph is shown of the different types of data based on performance.
- The summary panel (Section 2) presents aggregate data based on time range and different data types.
- The dashboard panel (Section 3) presents historical data. The detailed dashboards are used for trending data over time ranges.

23.1.4 Using the Dashboard in Oracle Adaptive Access Manager

The Oracle Adaptive Access Manager Dashboard uses real-time data to provide a quick, overview of users and devices that have generated alerts and of all alerts by geographic location. It displays different levels of security to help you analyze online traffic, identify suspicious behavior, and design rules for fraud prevention. The dashboard also offers both total time views and trending views of performance levels.

23.1.4.1 Performance

This section provides information on viewing the total view and trending views.

23.1.4.1.1 Viewing Statistics in Total View and Trending View The Performance panel (Section 1) displays a total view on the left and a trending view on the right.

- The total view shows the statistics on the current volume or rate of logins at the present time versus the maximum.

  Max - the maximum number of logins per minute

Current - the current number of logins per minute

- The trending view provides statistics on the selected data (how the data progresses) during the past hour.

23.1.4.1.2 Viewing Performance Data

To view the performance data:

1. Select the data type you want from the **Data** list.

   The data types provided are:

Table 23–2 Performance Data Types

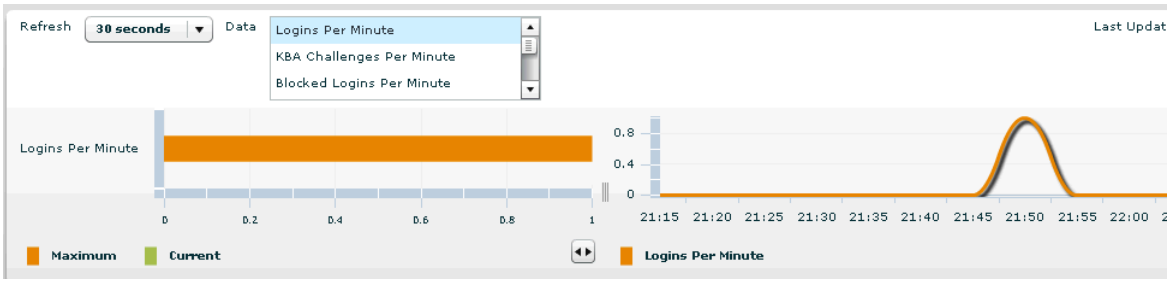
Data Type	Definition
Logins per minute	Number of successful login per minute
KBA challenges per minute	Number of challenge question responses per minute
OTP challenges per minute	Number of OTP challenge responses per minute
Blocked logins per minute	Number of blocked logins per minute
Blocked transactions per minute	Number of blocked transactions per minute
Transactions per minute	Number of successful transactions per minute
High Alerts (Logins) per minute	Number of high alerts triggered during the login checkpoint per minute
High Alert (Transactions) per minute	Number of high alerts triggered during the transaction checkpoint per minute

2. To select more than one data type, control-click the types you want.

   Note: The Performance panel is intended for viewing between 1 and 3 data points at a time.

3. To change the refresh rate, select the refresh rate from the **Refresh** list.

Figure 23–1 Performance Panel



Graphs are shown in different colors, which are generated on the fly, to distinguish the data schemes that are represented.

The performance panel also provides tooltips so that you can view more detailed information about the data points you are interested in. To view information using tooltips, move the mouse to the desired data point.

23.1.4.1.3 Difference Between Performance Panel and Performance Dashboard

The Performance panel (Section 1) displays real-time interpolations that are updated at the selected rate. The numbers displayed are not totals even though they may correspond numerically to totals in many instances.

The Performance dashboard is one of the five detailed dashboards in Section 3. Section 3 provides accurate totals and trends them over time.

A good analogy to the difference between these two views is a speedometer. Section 1 is like a speedometer. While driving, a speedometer may display 60 m.p.h. This does not mean that during the hour you have traveled 60 miles. In reality you, would have traveled 25 miles if the speed fluctuated or you stopped for gas. If Section 1 shows the rate at which you are traveling, Section 3 shows your actual distance traveled.

23.1.4.2 Summary

The Summary panel displays an overview or aggregate of the selected data type for the specified range or time fame.

Data Types

Table 23–3 presents the data types in the Summary panel.

Table 23–3 Summary Data Types

Data Type	Definition
Login Sessions	Login sessions
Success Logins	Successful logins
Temporary Allow Logins	Logins that occurred while a temporary allow was active
Blocked Logins	Logins that were blocked during the login checkpoint
High Alert (Logins)	High level alerts triggered during the login checkpoint
KBA Challenges	Challenge question responses
OTP Challenges	OTP challenge responses
Transaction Sessions	Transaction ID
Success Transactions	Successful transactions
Blocked Transactions	Transactions that were blocked during the transaction checkpoint.
High Alert (Transactions)	High level alerts triggered during the transaction checkpoint
Average Rule Process Time	Average number of milliseconds for rule execution
Average Policy Process Time	Average number of milliseconds for policy execution
Average Checkpoint Process Time	Average number of milliseconds for checkpoint execution

To select a data type, click the one you want from the **Data** list.

To select more than one data type, control-click the types you want.

Figure 23–2 Summary panel

Refresh

To change the refresh rate, click the **Refresh** list and then click the refresh rate you want.

Range

To change the range or timeframe, click the **Range** list and then click the range you want.

23.1.4.3 Dashboards

Section 3 provides access to five different dashboard types:

- Location

  For information about the Location dashboard, refer to Section 23.1.4.3.1, "Viewing Data Type by Location."

- Scoring

  For information about the Scoring dashboard, refer to Section 23.1.4.3.2, "Viewing a List of Scoring Breakdowns."

- Security

  For information about the Security dashboard, refer to Section 23.1.4.3.3, "Security Dashboard," and Section 23.1.4.3.4, "Viewing a List of Rules or Alerts by Security."

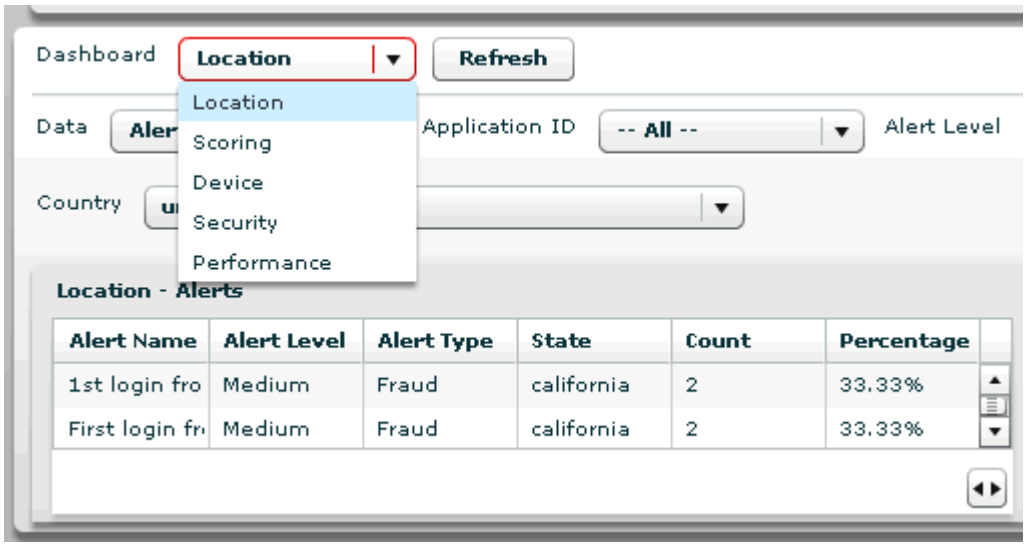
- Device

  For information about the Device dashboard, refer to Section 23.1.4.3.5, "Viewing Browser and Operating System Data by Device."

- Performance

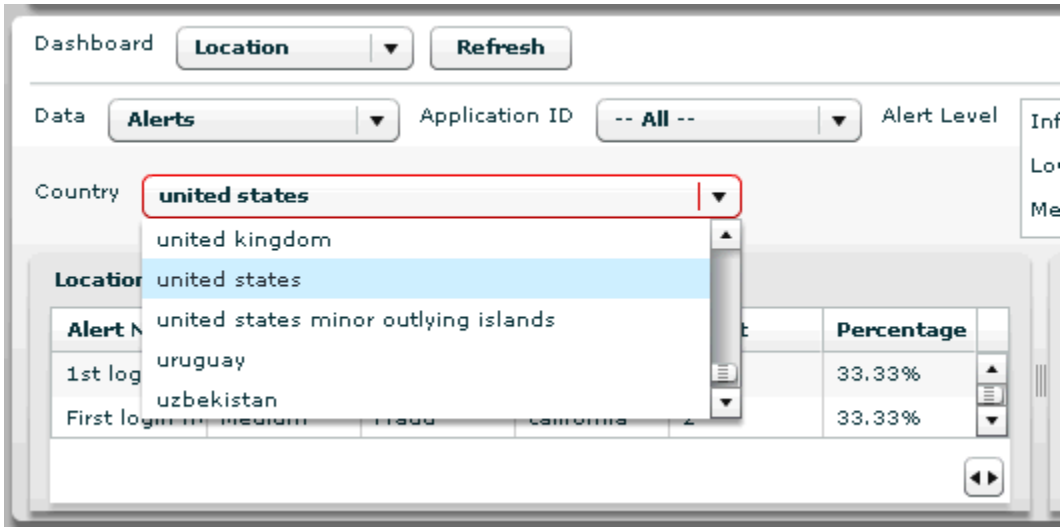
  For information about the Performance dashboard, refer to Section 23.1.4.3.6, "Viewing a Data Type by Performance."

Figure 23–3 Five Dashboards



For each dashboard type you can select the type of data you want to see from a menu of data types. For example, if you select the **Location** dashboard, a **Country** list appears that enables you to select the country you want.

Figure 23–4 Choices After Data Type Selection



23.1.4.3.1 Viewing Data Type by Location You can view data type by location.

1. In Section 3, in the **Dashboard** drop-down menu, select **Location**.

   The section becomes a Location dashboard.

2. In the **Data** drop-down menu, select the data type you want to view by location.

   The data types you can select to view by country are the following:

Table 23–4 Data Types by Location

Data Types by Location	Definition
Alerts	Alert that have been triggered by country
Actions	Actions that have been taken by country
KBA Challenges	KBA challenges that have been triggered by challenge result and country
OTP Challenges	OTP challenges that have been triggered by challenge result and country
Routing Type	Routing types by country
Sessions	Sessions by country
Temporary Allow	Temporary allows that have been made by country

3. To narrow the list to a specific **Organization ID**, select an application from the **Organization ID** drop-down menu
4. To narrow the list to a specific timeframe, select a ranges from the **Range** drop-down menu.
5. To narrow the list to a specific checkpoint, select a checkpoint from the **Checkpoint** drop-down menu.
6. To narrow the list to a specific country, select a country from the **Country** list, click the country you want.
7. If you selected the alerts data type, you can narrow the list further by selecting the alert level you want from the **Alert Level** box.
8. If you selected the alerts or temporary allow data type, you can narrow the list further by selecting the checkpoint you want from the **Checkpoint** list.

> **Note:** For KBA challenges from phone challenges, the country will be listed as "Data Not Available". For these records, the trending graph will not be displayed.

23.1.4.3.2 Viewing a List of Scoring Breakdowns To view a list of scoring breakdowns:

1. In the **Dashboard** list, click **Scoring**.

   The **Scoring** dashboard appears and defaults to risk score.
2. To narrow the list to a specific checkpoint, in the **Checkpoint** list, click the Checkpoint you want.
3. To narrow the list to a specific timeframe, in the **Ranges** list, click the range you want.
4. Click **Refresh**.

23.1.4.3.3 Security Dashboard Items in the Dashboard list are accessible based on your role. Only fraud investigators can access the Security dashboard.

23.1.4.3.4 Viewing a List of Rules or Alerts by Security To view a list of rules or alerts by security:

1. In the **Dashboard** list, click **Security**.

The **Security** dashboard appears and defaults to rules.

2. To specify a different data type, on the **Data** list, click the data type you want.

   The data types provided.

   - Rules
   - Alerts

3. To narrow the list to a specific **Organization ID**, on the **Organization ID** list, click the **Organization ID** you want.
4. To narrow the list to a specific checkpoint, in the **Checkpoint** list, click the range you want.
5. To narrow the list to a specific timeframe, in the **Ranges** list, click the range you want.
6. Click **Refresh**.

23.1.4.3.5 Viewing Browser and Operating System Data by Device To view browser and operating system data by device:

1. In the **Dashboard** list, click **Device**.

   The **Device** dashboard appears and defaults to browser/operating system.

2. To narrow the list to a specific **Organization ID**, in the **Organization ID** list, click the Organization ID you want.
3. To narrow the list to a specific timeframe, in the **Ranges** list, click the range you want.
4. Click **Refresh**.

23.1.4.3.6 Viewing a Data Type by Performance To view a data type by performance:

1. In the **Dashboard** list, click **Performance**.

   The **Performance** dashboard appears and defaults to rules.

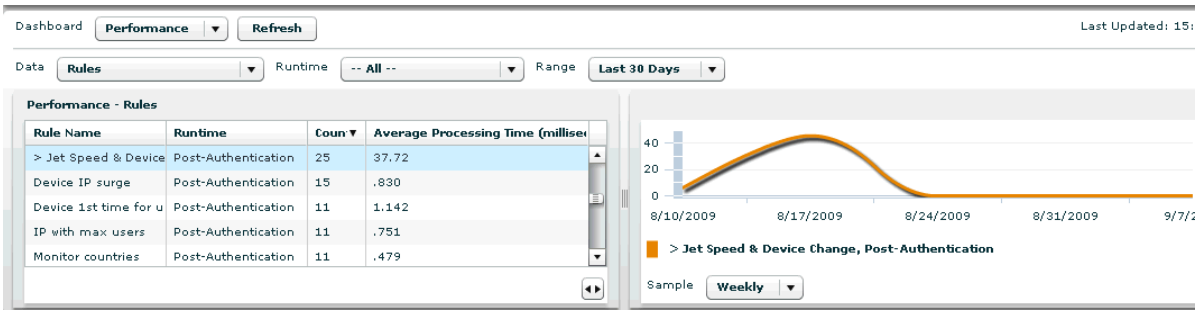
2. To specify a different data type, in the **Data** list, click the data type you want.

   The data types provided are:

Table 23–5 Data Type by Performance

Data Type by Performance	Definition
Rules	Rules currently in the system
Policies	Policies currently in the system
Checkpoints	Points in a session when rule is run
APIs	Calls into the system through the soap interface
Tracker APIs	Calls into the tracker subsystem
Authorization APIs	Calls into the authorization subsystem
Common APIs	Miscellaneous calls
CC APIs	Calls into the Cases subsystem
Rules APIs	Calls to the rules processor

Figure 23–5 Viewing Data Type by Performance



3. If you selected the rules or policies data type, you can narrow the list further by selecting the checkpoint you want from the **Checkpoint** list.
4. To view data trended over a specific timeframe, in the **Ranges** list, click the range you want.
5. To trend data for a specific data type item, select the row from the **Performance** table.
6. Click **Refresh**.

23.1.4.3.7 Using the Total and Trending Views The left side of the dashboard panel displays a total view and the right side displays a trending view of the selected data type.

The total and trending view sections are placed side by side, and you can toggle between the views to look at the details of one more clearly. For example, you can expand the trending view section to see the entire legend instead of a portion of it.

You must select a row from the table in the total view to see data in the trending view. After selecting a row or more, the trending view will show you the corresponding graph(s) of the data. Graphs are shown in different colors to distinguish the data schemes that are represented. The colors are generated on the fly; they are not predefined.

Figure 23–6 Total and trending views

23.1.4.3.8 Viewing the Trending View Graph The graph in the trending view adjusts accordingly based on the information being shown. The Y-coordinate will adjust depending on the highest data point. The sample will adjust based on the range. Also, whether you can choose to see data by hours, days, weeks, or months will depend on what is selected for the range.

23.1.4.3.9 View by Range To narrow the data gathered to a specific time frame, from the **Range** list, select Today, Last 1 day, Last 7 days, Last 30 days, or Last 90 days.

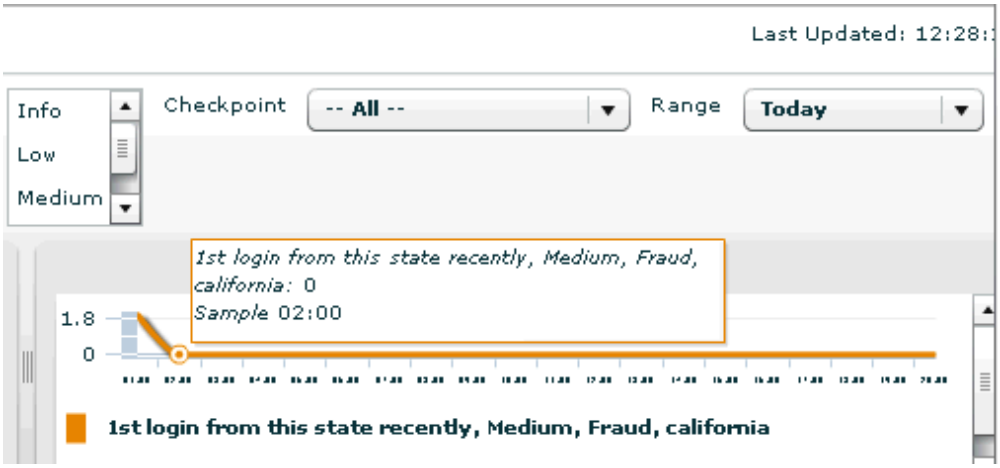
23.1.4.3.10 View by Sample To view data by a periodic interval, from the **Samples** list, select hourly, daily, weekly, or monthly. The choices available will depend on the range selected.

An example would be that if you have collected data over a period of six months, and you want to show how much data was collected every day using last month's data, you would choose to show daily samples trended over a month.

23.1.4.3.11 Last Updated The "Last Updated" field, which also appears in the performance panel (Section 1), is updated when you select a different data type.

23.1.4.3.12 Using Tooltips Tooltips are particularly useful if the data points are shown closely together (packed); you can use the tooltip to gather information. For example, you may want to view data for every 1-hour sample.

Figure 23–7 Tooltips



23.2 Monitoring Performance Using the Dynamic Monitoring System

Oracle Adaptive Access Manager uses the Oracle Dynamic Monitoring Systems (DMS) to measure application-specific performance information for logins and rule and API execution. DMS is notified when events occur, when important intervals begin and end, or when pre-computed values change their state. At run time, DMS stores metrics in memory and enables you to save or view the metrics in Fusion Middleware Control. DMS can display statistics of your system using the Oracle DMS Spy application to aid in troubleshooting and diagnostics.

The Oracle DMS Spy application is launched by entering http://machine_name:port/dms/ into your browser URL address field. The following metric tables are available:

The following metric tables are available:

23.2.1 Login Information (Counts Only)

Login Information (Counts only) that is sent are listed in Table 23–6.

Table 23–6 Login Information

Description	DMS Noun Path	DMS Noun Type/Group
Login Count - Total	/OAMS/OAAM/LoginCount_Total	OAMS.OAAM_Counters
Login Count - Success	/OAMS/OAAM/LoginCount_Success	OAMS.OAAM_Counters
Login Count - Failed	/OAMS/OAAM/LoginCount_Failed	OAMS.OAAM_Counters
Login Count - Blocked	/OAMS/OAAM/LoginCount_Blocked	OAMS.OAAM_Counters
Login Count - Challenged	/OAMS/OAAM/LoginCount_ Challenged	OAMS.OAAM_Counters

23.2.2 Rules Engine Execution Information (Count and Time Taken to Execute)

The rules engine execution information (count and time taken to execute) is shown in Table 23–7.

Table 23–7 Rules Engine Executions

Description	DMS Noun Path	DMS Noun Type/Group
Rules Execution	/OAMS/OAAM/Rules_Execution	OAMS.OAAM
Policies Execution	/OAMS/OAAM/Policies_ Execution	OAMS.OAAM
Checkpoints Execution	/OAMS/OAAM/Checkpoints_ Execution	OAMS.OAAM

23.2.3 APIs Execution Information (Count and Time Taken to Execute)

The APIs execution information (count and time taken to execute) is shown in Table 23–8

Table 23–8 API Execution

Description	DMS Noun Path	DMS Noun Type/Group
API Call updateLog	/OAMS/OAAM/API/Tracker/UpdateLog	OAMS.OAAM
API Call updateAuthStatus	/OAMS/OAAM/API/Tracker/UpdateAuthStatus	OAMS.OAAM
API Call processRules	/OAMS/OAAM/API/RulesEngine/ProcessRules	OAMS.OAAM

23.3 Monitoring Performance Data and Administrative Functions Using Fusion Middleware Control

Fusion Middleware Control organizes a wide variety of performance data and administrative functions into distinct, Web-based home pages. The Fusion Middleware Control home pages make it easy to locate the most important monitoring data functions from a Web browser.

23.3.1 Displaying the Fusion Middleware Control

To display Fusion Middleware Control:

1. Enter the Fusion Middleware Control URL, which includes the name of the host and the administration port number assigned during the installation. The following shows the format of the URL:

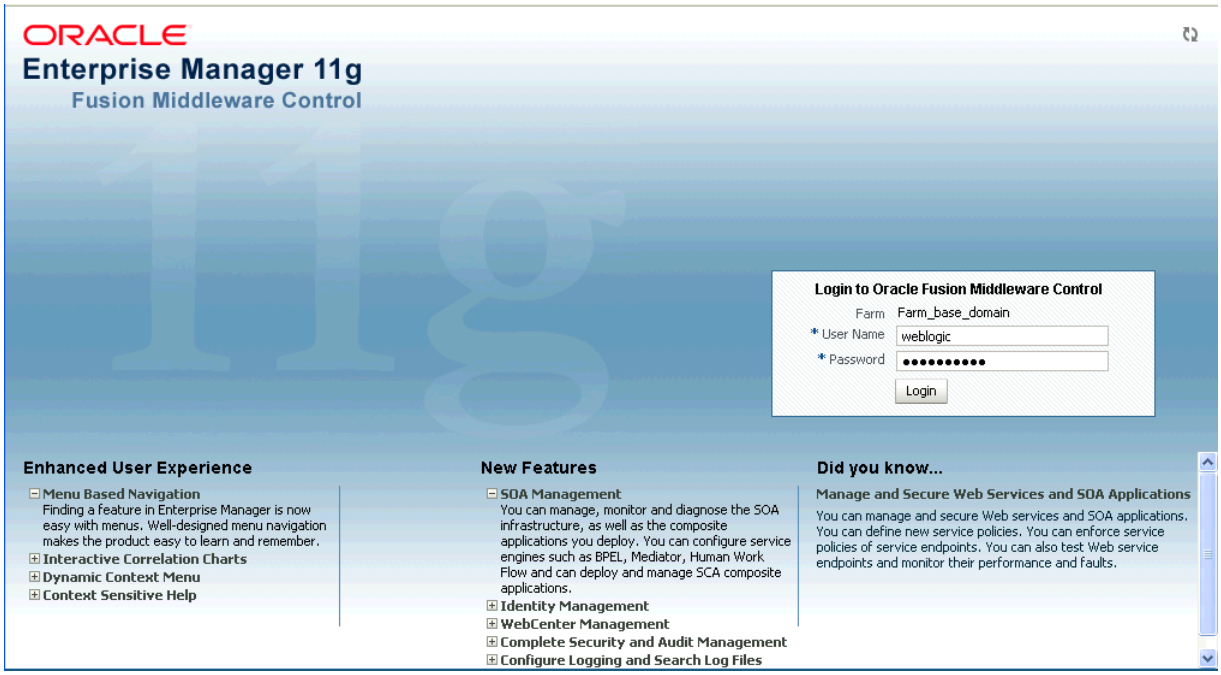
   `http://hostname.domain:port/em`

2. Enter the Oracle Fusion Middleware administrator user name and password and click **Login**.

   The default user name for the administrator user is `weblogic`. This is the account you can use to log in to Fusion Middleware Control for the first time. The password is the one you supplied during the installation of Oracle Fusion Middleware.

The Fusion Middleware Control Login is shown in Figure 23–8.

Figure 23–8 Fusion Middleware Control Login



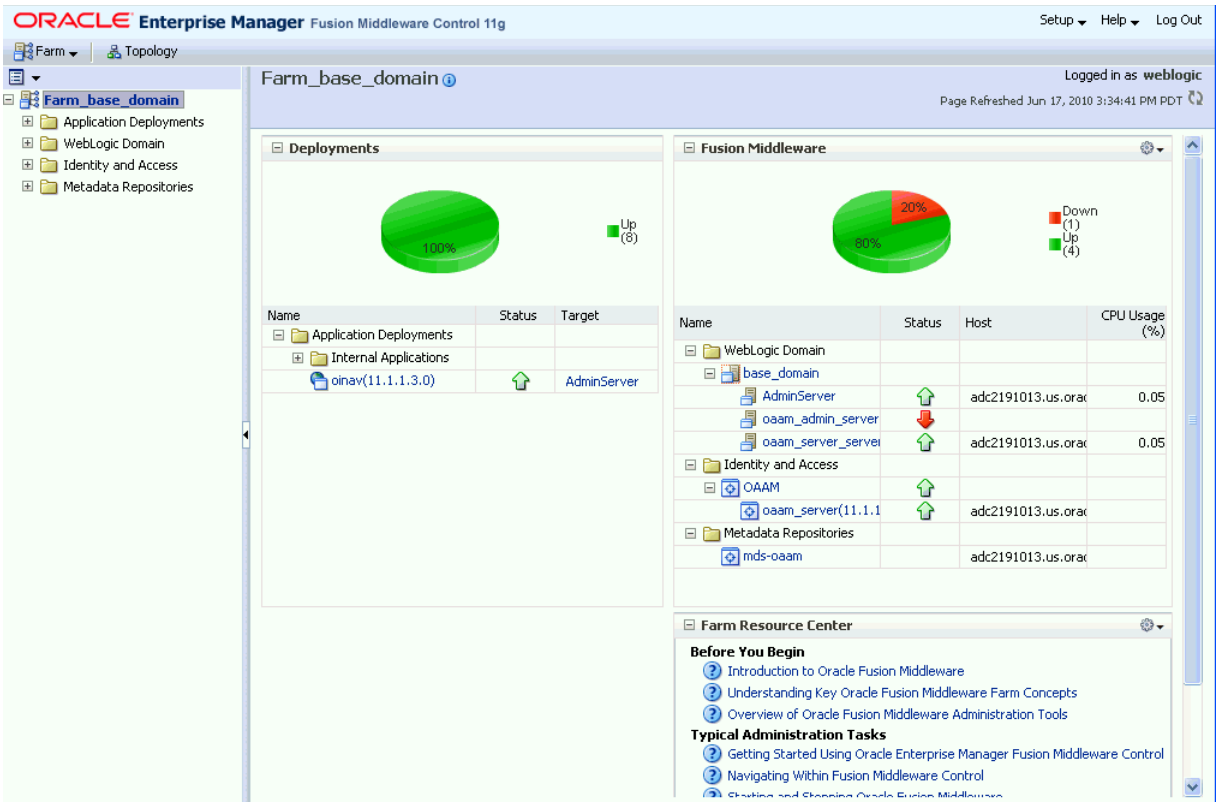
23.3.2 Displaying Base Domain 11*g* Farm Page

When you first log in to Fusion Middleware Control, the Base Domain home page is displayed.

Fusion Middleware Control displays the target navigation panel on the left and the content panel on the right.

The farm home page is shown in Figure 23–9

Figure 23–9 Oracle Adaptive Access Manager Farm Home Page



Content Panel

The content panel displays the overall status of the Oracle Fusion Middleware environment and links to reference information.

From here, you can view

- The status and target of the internal applications in the deployment.
- The status, host, and CPU usage of the repository and server instances.
- Resource information on concepts and tasks

Target Navigation Panel

The target navigation panel lists all of the targets in the farm in a navigation tree.

Oracle Adaptive Access Manager details in Fusion Middleware Control are divided into the following nodes within the navigation panel:

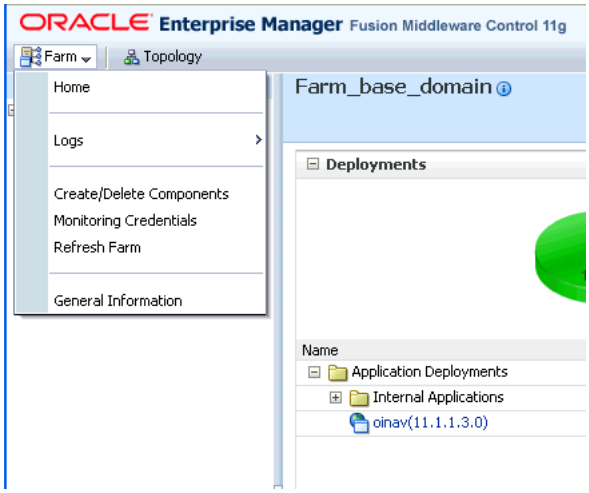
- Application Deployments
- WebLogic Domain
- Identity and Access
- Metadata Repositories

When you select a target, such as a Managed Server or a component, the target's home page is displayed in the content panel and that target's menu is displayed at the top of the page, in the context panel. For example, if you select a Managed Server, the WebLogic Server menu is displayed. You can also view the menu for a target by right-clicking the target in the navigation panel.

Farm Menu

Farm Menu in the upper left corner of the target navigation panel provides a list of operations that you can perform on the farm.

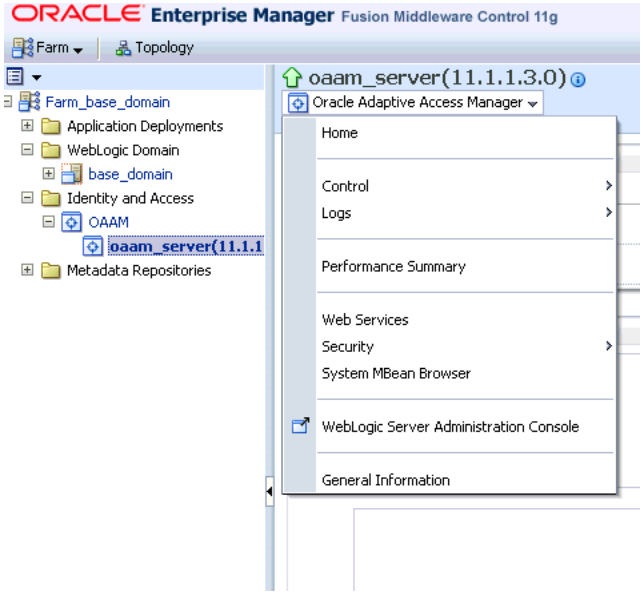
Figure 23–10 Farm Menu



Dynamic Menu

Dynamic Target Menu provides a list of operations that you can perform on the currently selected target. The menu that is displayed depends on the target you select. The menu for a specific target contains the same operations as those in the Right-Click Target Menu.

Figure 23–11 Dynamic Menu



23.3.3 Oracle Adaptive Access Manager Cluster Home Page

To access the Oracle Adaptive Access Manager Cluster Home page:

1. Log in to Fusion Middleware Control.
2. Expand the **Identity and Access** node.
3. Click the **OAAM** (cluster) node.

The Oracle Adaptive Access Manager Cluster Home page appears. Use this page to monitor the OAAM cluster.

In the Oracle Access Management Access Manager Cluster Home page, you can:

- Monitor the OAAM cluster
- View the status of the OAAM servers that are part of the OAAM cluster
- View details of the database used by Oracle Adaptive Access Manager
- Access general information about the OAAM cluster such as the name, version, Oracle Home, and domain home
- Access the performance summary of the server instances in the cluster

Monitor the Oracle Adaptive Access Manager cluster

The Performance Overview section of the Oracle Adaptive Access Manager Cluster Home page shows a graphical representation and a table view of the login statistics.

The data shown are for:

- Number of successful logins during the last 5 minute collection interval
- Number of logins failed during the last 5 minute collection interval

In the graphical representation, the x axis shows the time and the y axis shows the number of logins.

The performance overview is also available in tabular format when you click the **Table View** link at the bottom of the graph.

View the status of the servers that are part of the Oracle Adaptive Access Manager cluster

The Deployment section of the Oracle Adaptive Access Manager Cluster Home page provides information on the statuses of the OAAM server instances.

You can view the following information:

Fields	Description
Instance Name	The name of the OAAM server instance. For example: oaam_server.
Status	The status of the OAAM server instance: ■ Green Up Arrow indicates that the instance is running ■ Red Down Arrow indicates that the instance is not running ■ Clock indicates that the status information is currently unavailable.
Host	The name of the machine where the server is running.
Port	The address on that machine where the server is listening.
Server Name	The name of the container in which the applications are running

Fields	Description
Total Logins	The total number of logins attempted since startup.
Logins Successful	The total number of successful logins since startup
Logins Failed	The total number of failed logins since startup.

View details of the data repositories used by Oracle Adaptive Access Manager

To view hostname, port, and Service ID of the data repository, refer to the Data Store section. Oracle Adaptive Access Manager uses the RDBMS database as its data store.

Fields	Description
Hostname	The name of the server where the data store is located.
Port	The port on which the Listener is listening for Oracle connections
Service ID	The name of the database that Oracle Adaptive Access Manager is using

Access general information about the Oracle Adaptive Access Manager

In the Oracle Adaptive Access Manager Cluster Home page, you can access general information about the cluster and the datasource.

To view the target name, version, Oracle Home, and Domain home:

1. Click **Oracle Adaptive Access Manager Cluster** at the top of the home page to expand the dynamic menu.
2. Select **General Information**.

Access the Performance Summary for the Oracle Adaptive Access Manager Cluster

To see a performance summary for insight into the current performance of the Oracle Adaptive Access Manager cluster:

1. Click **Oracle Adaptive Access Manager Cluster** at the top of the home page to expand the dynamic menu.
2. Click **Performance Summary**.

23.3.4 Oracle Adaptive Access Manager Server Home Page

The Oracle Adaptive Access Manager Server Home page displays a performance overview of the instance.

To access an Oracle Adaptive Access Manager Server Home page:

1. Log in to Fusion Middleware Control.
2. Expand the **Identity and Access** node.
3. Expand the **OAAM** (cluster) node.
4. Click an OAAM server node.

The Oracle Adaptive Access Manager Server Home page appears. From this page, you can:

- View statistic summary for the OAAM server instance

- View performance overview (graphical representation and table)
- Access a List of Operations to perform

View statistic summary for the Oracle Adaptive Access Manager server instance

The OAAM Server Home Page displays a Performance Overview with key metrics.

From this page, you can view a statistic summary for the OAAM Server instance that was selected.

Metric	Description
Logins - Logins Successful	Total number of successful logins since startup.
Logins - Logins Failed	Total number of login attempts that failed since startup.
Checkpoint - Average Processing Time	Average time (in ms) for all the policies in a checkpoint to process since startup.
Checkpoint - Number of Checkpoints Processed	Total number of checkpoints processed since startup.
Policies - Average Policy Processing Time	Average time (in ms) to process a policy
Policies - Number of Polices Processed	Total number of policies processed since startup

View performance overview of the Oracle Adaptive Access Manager server instance

The Performance Overview section of the OAAM Server Home page provides a graphic representations of logins to the OAAM server instance. You can also open a table view of logins from this section.

- Graphical

  The x axis shows the time.

  The y axis shows the number of logins, checkpoints, or policies processed.

- Table

  Click **Table View** to show the Performance Overview in tabular format.

Access the list of operations to perform on the Oracle Adaptive Access Manager server instance

The Oracle Adaptive Access Manager menu, which is available when you click Oracle Adaptive Access Manager at the top of the page, provides a list of server instance-related operations. This menu contains the same operations as those in the context menu.

Menu Item	Operation
Home	Enables you to view the instance home page
Control	Enables you to start up and shut down the server instance From the menu, click **Control** and select **Startup** or **Shutdown**.
Logs	Enables you to view server logs and configure logging From the menu, click **Logs** and select **View Log Messages** or **Log Configurations**.

Menu Item	Operation
Performance Summary	Enables you to view a performance summary From the menu, click **Performance Summary**. The categories for the summary metrics are: ■ CheckPoint Execution Summary ■ Login Metrics Summary ■ Policy Execution Summary ■ Rule Execution Summary ■ Rule Processing Summary ■ Update Authorization Status Summary ■ Update Log Summary ■ Web Module Metrics
Web Services	Enables you to view web services From the menu, click **Web Services**.
Security	Enables you to view OAAM Server application policies and roles From the menu, click **Security** and select **Application Policies** or **Application Roles**.
System MBean Browser	Enables you to access the System MBean Browser From the menu, click **System MBean Browser**.
WebLogic Server Administration Console	Enables you to access the WebLogic Server Administration Console From the menu, click **WebLogic Server Administration Console**.
General Information	Enables you to view general information about the server instance From the menu, click **General Information**.

23.4 Use Cases

This section provides a scenario of how Oracle Adaptive Access Manager's dashboards are used.

23.4.1 Use Case: Trend Rules Performance on Dashboard

Through using the dashboard, Security Administrators--who plan, configure and deploy policies--can monitor the performance of rules and modify if necessary.

Rules and policies can potentially have a performance impact. For example, if the Security Administrator defines a new policy to check for a user, who is not using an email address that had been used before (ever). If the bank has more than 1 billion records in the database, performing that check against all the records for every transaction has great impact on performance.

To trend rule performance on the dashboard (find the average rule processing times for the past week with daily samples):

1. Log in to the OAAM Administration Console.
2. In the Navigation tree, select **Dashboard**. The dashboard is displayed.

   The dashboard is divided into three sections:

- The **performance panel** on the top presents real-time data. It shows the performance of the traffic that is entering the system. A trending graph is shown of the different types of data based on performance.
- The **summary panel** in the middle presents aggregate data based on time range and different data types.
- The **dashboard** at the bottom presents historical data. The detailed dashboards are used for trending data over time ranges.

3. In the performance dashboard in Section 3, select **Performance** from the Dashboard list.
4. Select **Rules** from the Data list.

   You have selected **Rules** to view rule performance.

   The rules appear in the **Performance - Rules** table.
5. Narrow the data to view by a specific time frame. To view average rule processing times for the past week, in the **Range** list, select **Last 7 Days**.

   The average processing time for each rule is shown in the **Average Processing Time** column of the **Performance-Rules** table.
6. Select the sample to use to trend the data. To specify that you want to use daily samples to trend the performance data, select **Daily** from the **Sample** list.
7. View the specific trend graph. Click a specific rule in the **Performance - Rules** table to see the performance trend graph.

23.4.2 Use Case: View Current Activity

Business Analyst, Security Administrators, and Fraud Investigators are interested in actions that affect the user.

The Dashboard panel (Section 3) displays a total view and a trending view of the selected data type.

To monitor actions:

1. View the number of blocks
2. View the number of KBA challenges
3. View the number of OTP challenges
4. Trend the information over time, taking note of spikes and number of customers affected.

23.4.3 Use Case: View Aggregate Data

Business Analyst, Security Administrators, and Fraud Investigators are interested in actions that affect the user.

To obtain up-to-date numbers for user access and actions, view the Summary panel (Section 2), which provide an aggregate of the data.

23.4.4 Use Cases: Additional Security Administrator and Fraud Investigator Use Cases

Security Administrators and Fraud Investigators are interested in viewing:

- Current activity and trended activity over time
- Average performance numbers and trended performance averages over time

- Distribution of events trended by geography
- Security events trended over time

Viewing Current Activity and Trended Over Time

Security Administrators and Fraud Investigators are interested in viewing current activity and trended over a short period of time.

1. Log in to the OAAM Administration Console.
2. Open the Dashboard.
3. In the Performance Panel (Section 1) select a data type from the **Data** list.
4. View statistics in total view and trending view.
   - Total view - current activity over short period of time
   - Trending view - current activity trended over a short period of time
5. In the Summary Panel (Section 2), view a summary of the current activity for a range.
   - Sessions
   - Actions
   - Alerts
   - and others

Average Performance Numbers and Trended Performance Averages Over Time

Security Administrators and Fraud Investigators are interested in viewing average performance numbers and trended performance averages over time

1. Log in to the OAAM Administration Console.
2. Open the **Dashboard**.
3. In the Performance dashboard (in Section 3), view the following by performance.
   - Rules
   - APIs
   - and others

Distribution of Events Trended by Geography

Security Administrators and Fraud Investigators are interested in viewing a distribution of events trended by geography.

1. Log in to the OAAM Administration Console.
2. Open the **Dashboard**.
3. In the Performance dashboard (in Section 3), view events by location.
   - Sessions
   - Actions
   - Alerts
   - and others

Security Events Trended Over Time

Security Administrators and Fraud Investigators are interested in viewing security events trended over time.

1. Log in to the OAAM Administration Console.
2. Open the **Dashboard**.
3. In the Performance dashboard (in Section 3), view security events.
   - Rules
   - Alerts
   - and others

23.4.5 Use Cases Additional Business Analyst Use Cases

Business Analyst are interested in viewing:

- Customer behavior trend
  - Operating system browser combinations
  - KBA challenges
  - Blocks
- Distribution of events trended by geography
  - sessions
  - actions
  - alerts
  - and so on

23.4.6 Use Case: Viewing OTP Performance Data

1. In the Navigation tree, double-click **Dashboard**.
2. Check Section I of the **Dashboard** for **OTP Challenges per minute**.

   The graph displays the **OTP Challenges per minute** statistics
3. Check Section II of the Dashboard

   The summary table of the Dashboard displays the **Count of OTP Challenges** for the specified time period.
4. Check Section III of the Dashboard under **Locations**.

   The **Location Dashboard** displays performance statistics, such as **count**, **percentage**, and others.

24

Reporting and Auditing

Oracle Adaptive Access Manager provides access to a rich set of forensic data to power investigations and auditing:

- OAAM reports enables you to use Oracle BI Publisher as the reporting solution for OAAM components.
- Oracle Adaptive Access Manager leverages the common audit framework from Oracle Platform Security Services to capture full audit trails for administration console users.

24.1 Configuring OAAM Reports

Oracle Adaptive Access Manager reports enable you to use Oracle BI Publisher as the reporting solution. Oracle Adaptive Access Manager reports use Oracle BI Publisher to query and report on information in the OAAM schema.

24.1.1 What is Oracle BI Publisher?

Oracle BI Publisher is an Oracle's enterprise reporting solution and provides a single reporting environment to author, manage, and deliver all of your reports and business documents. Utilizing a set of familiar desktop tools, such as Microsoft Word, Microsoft Excel, or Adobe Acrobat, you can create and maintain report layouts based on data from diverse sources

The *Oracle Business Intelligence Publisher Administrator's Guide* explains how to use Oracle BI Publisher to create reports. You can access the *Oracle Business Intelligence Publisher Administrator's Guide* by searching for it on the Oracle Technology Network web site.

The Oracle Business Intelligence Publisher Documentation Library is available on the Oracle Technology Network web site. You can access the Oracle Technology Network Website at:

`http://www.oracle.com/technology/index.html`

24.1.2 Setting Up Oracle BI Publisher for OAAM Reports and Fusion Middleware Audit

When your data resides in a database, you can run pre-defined Oracle Business Intelligence Publisher (Oracle BI Publisher) reports and create your own reports on the data. This section contains these topics about configuring Oracle BI Publisher for OAAM reports:

- Acquiring and Installing Oracle BI Publisher
- Copying OAAM Reports to the Reporting Database

- Set Up the Data Source for OAAM Reports

For performance reasons, it is recommended to replicate production data into a reporting database and to provide a dedicated reporting environment for Oracle BI Publisher.

For information on how to configure audit reporting and view audit reports, refer to "Using Audit Analysis and Reporting" in *Oracle Fusion Middleware Application Security Guide*.

24.1.2.1 Acquiring and Installing Oracle BI Publisher

OAAM uses Oracle BI Publisher to generate your OAAM reports.

Perform the following steps to acquire and install Oracle BI Publisher:

1. Go to Oracle Technology Network web site at `http://www.oracle.com/technetwork/index.html`
2. Locate the Oracle BI Publisher Download page by searching on the key words Oracle BI Publisher or Oracle BI Publisher Download.
3. Review the Oracle Technology Network License Agreement that appears on the Oracle BI Publisher Download page. You must accept the Oracle Technology Network License Agreement to download Oracle BI Publisher.
4. Download the version of Oracle BI Publisher that is appropriate for your operating system by clicking on the appropriate link.
5. Install Oracle BI Publisher by referring to the Oracle Business Intelligence Publisher Installation Guide. Refer to Oracle Business Intelligence Publisher Documentation for information about accessing the Oracle Business Intelligence Publisher Installation Guide.
6. Verify your Oracle BI Publisher is operational before installing and configuring the OAAM reports.

24.1.2.2 Copying OAAM Reports to the Reporting Database

This section explains how to install Oracle BI Publisher OAAM reports. You must install Oracle BI Publisher and verify it is operational before installing the OAAM reports. Refer to the *Oracle Fusion Middleware Business Intelligence Publisher Reports Administrator's Guide for Oracle Identity Management* for more information.

Perform the following steps to install the reports:

1. Stop the Oracle BI Publisher server. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.
2. On your OAAM host, locate the OAAM products reports package from the `/IAM_HOME/oaam/reports` directory and extract the contents to a location on your Oracle BI Publisher server. For example:

   /ORACLE_BI_PUBLISHER_HOME/xmlp/XMLP/reports
3. Copy the `properties.xml` file to any directory in Oracle BI Publisher server's file system.
4. Start the Oracle BI Publisher server. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.

24.1.2.3 Set Up the Data Source for OAAM Reports

Perform the following steps to configure the data source for the reports:

1. Configure the JDBC Data Source for the reports by performing the following steps:
   a. Log in to Oracle BI Publisher from a Web browser as an Administrator. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.
   b. Click the **Admin** tab, then click **JDBC** under Data Sources, and then click the **Add Data Source** button. The Add Data Source screen appears.
   c. Enter the following information in the fields on the Add Data Source screen. Replace the *variable values* in the following examples with the actual values for your Oracle Adaptive Access Manager database.

Field	Data to Enter
Data Source Name	`ARM` For the Oracle Adaptive Access Manager reports to work out-of-the-box, the JDBC data source must be named as "ARM". If you choose a different name, you must modify the data source property in all reports.
Connection String	`jdbc:oracle:thin:@`*`host:port:sid`*
User Name	User name for a database schema user that has access to Oracle Adaptive Access Manager.
Password	Password for user identified in the User Name field.
Database Driver Class	`oracle.jdbc.driver.OracleDriver`

   d. Click the Test Connection button to test the connection to the JDBC Data Source. You will receive the `Connection established successfully` message if your connection is successful.

      If you do not receive the `Connection established successfully` message, verify the data you entered is accurate and check if the OAAM database is running.
   e. Click the **Apply** button on the Add Data Source screen after you have received the Connection established successfully message.
2. Configure the AdminProperties Data Source. The AdminProperties contains configuration information that Oracle BI Publisher will need to read when generating the reports.
   a. Click the **Admin** tab, then click **File** under Data Sources, and then click the **Add Data Source** button. The Add Data Source screen appears.
   b. Enter the following information in the fields on the Add Data Source screen:

Field	Data to Enter
Data Source Name	`AdminProperties` You must name this Data Source `AdminProperties`.
Full Path of Top-level Directory	Path must be the directory where you copied `properties.xml`.

   The configuration for the data source is complete. Refer to the *Oracle Fusion Middleware Business Intelligence Publisher Reports Administrator's Guide for Oracle Identity Management* to generate reports for Oracle Adaptive Access Manager.
3. Click **Reports**, **Shared Folders**, and then **oaam**.

Reports are grouped under Common, KBA, OTP, Security, Users, Devices, Location, Performance, and Summary.

4. Choose any report from these groupings.
5. Choose any output type and click **View**.

24.1.3 Viewing/Running Reports

This section explains how to view/run reports.

Take these steps to view/run a report:

1. Log in to Oracle BI Publisher using a URL of the form:

   `http://host.domain.com:port/xmlpserver/`

2. Click **Shared Folders**, **OAAM**, and then **oradb**.
3. Click **View** for the report you want to generate.
4. Select an output format for the report and click **View**.

   The report is generated. See Oracle Business Intelligence Publisher Documentation to learn more about Oracle BI Publisher.

24.1.4 Setting Preferences

You can set the Report Locale, User Interface Language, Time Zone, and Accessibility Mode for Oracle BI Publisher.

- Report Locale- A locale is a language and territory combination (for example, English (United States) or French (Canada)). Oracle BI Publisher uses the report locale selection to determine the template translation to apply, the number formatting and date formatting to apply to the report data.
- User Interface Language- The User Interface language is the language that your user interface displays in. The language that you selected at login will be selected as the default. However, you can choose from the languages that are available for your installation through this option.
- Time Zone - Select the time zone to apply to your reports. Reports run by you (this user) will display the time according to the time zone preference selected here.
- Accessibility Mode- Setting this to "On" will display the report catalog in a tree structure that is accessible via keyboard strokes

For more information on setting preferences, refer to the "Setting My Account Preferences and Viewing My Groups" chapter of the *Oracle Fusion Middleware Report Designer's Guide for Oracle Business Intelligence Publisher*.

24.1.5 Adding Translations for the Oracle BI Publisher Catalog and Reports

In release 11g, Oracle BI Publisher supports two types of translation:

- Catalog Translation
- Template (or layout) Translation

Catalog translation enables the extraction of translatable strings from all objects contained in a selected catalog folder into a single translation file; this file can then be translated and uploaded back to Oracle BI Publisher and assigned the appropriate language code.

Catalog translation extracts not only translatable strings from the report layouts, but also the user interface strings that are displayed to users, such as catalog object descriptions, report parameter names, and data display names.

Users viewing the catalog will see the item translations appropriate for the user interface language they selected in their My Account preferences. Users will see report translations appropriate for the Report Locale they selected in their My Account preferences.

Template translation enables the extraction of the translatable strings from a single RTF-based template (including sub templates and style templates) or a single Oracle BI Publisher layout template (.xpt file). Use this option when you only need the final report documents translated. For example, your enterprise requires translated invoices to send to German and Japanese customers.

For information describing the process of downloading and uploading translation files, refer to the "Adding Translations for the BI Publisher Catalog and Reports" of the *Oracle Fusion Middleware Administrator's and Developer's Guide for Oracle Business Intelligence Publisher*.

24.1.6 Localizing Reports

If you want to localize reports perform the following steps:

1. Unzip `oaam_reports_translations.zip`. The `oaam_reports_translations.zip` is in the same directory as the reports you installed earlier. Refer to Section 24.1.2.2, "Copying OAAM Reports to the Reporting Database."
2. In the Oracle BI Publisher catalog, select the OAAM folder.
3. Click the option to Import XLIFF.
4. Upload the Catalog_*.xlf file for the languages you want to use.

24.1.7 Scheduling a Report

Oracle BI Publisher Enterprise enables you to schedule reports, and deliver the executed output to various destinations. Oracle BI Publisher Scheduler is configured as a part of Oracle BI Enterprise Edition installation process. Ensure that the scheduler is configured properly, before you start scheduling the reports.

For information on scheduling reports, refer to "Creating Report Jobs" in the *Oracle Fusion Middleware Report Designer's Guide for Oracle Business Intelligence Publisher*.

24.1.8 OAAM Reports

OAAM provides a range of out-of-the-box reports that are accessible through Oracle Business Intelligence Publisher.

24.1.8.1 Common Reports

These reports provide data based on device location or login information.

Report Name	Description
RecentLogins	Lists all logins in the specified time range.

24.1.8.2 Devices Reports

These reports provide data based on the device information.

Report Name	Description
DeviceIdScoring	Displays Device ID scoring summary for the designated date range.
MultipleFailures	Lists all devices with multiple login failures in the specified time range.
MultipleUsers	Lists all devices that have multiple users.

24.1.8.3 KBA Reports

These reports provide data based on the KBA information.

Report Name	Description
ChallengeStatistics	Lists challenge response statistics. For example, Users with Failure counter > 0 - failures more than none (have at least failed once) Users with multiple failures - failures more than one (have failed multiple times)
QuestionStatistics	Lists challenge question statistics.
Registration	Lists question registration statistics.

Note: Updated statistics are not available immediately after a user is challenged or answers a question. The Oracle BI Publisher reports are generated from the database and database updates do not occur in real-time for the statistics.

24.1.8.4 Location Reports

These reports provide data based on the location information.

Report Name	Description
CountryAggregates	Displays country aggregate summary for the designated date range.
MultipleUsers	Lists all locations that have multiple users.
StateAggregates	Displays state aggregate summary for the designated date range.

24.1.8.5 Performance Reports

These reports provide data based on the performance information.

Report Name	Description
RulesAPIPerformance	Displays the Average Processing time and counts for Rule API calls for the designated date range.
RulesPerformance	Displays the Average Processing time, runtime, and counts for the rules in the designated date range.
TrackerAPIPerformance	Displays the Average Processing time and counts for Tracker API calls for the designated date range.

24.1.8.6 Security Reports

These reports provide data based on the security information.

Report Name	Description
AlertsBreakdown	Displays alert breakdown summary for the designated date range.
PostAuthScoring	Displays post-authorization scoring summary for the designated date range.
PreAuthScoring	Displays pre-authorization scoring summary for the designated date range.
RulesBreakdown	Displays rules breakdown summary for the designated date range.
ScoringCombinations	Displays score combination summary for the designated date range.

24.1.8.7 Summary Reports

These reports provide summaries for date ranges.

Report Name	Description
AveragesSummary	Displays average summary for the designated date range.
LoginSummary	Displays login aggregate summary for the designated date range.

24.1.8.8 Users Reports

These reports provide data based on the user information.

Report Name	Description
MultipleDevices	Lists all users that use multiple devices.

24.1.9 Creating Custom OAAM Reports

If you have additional reporting requirements beyond the out of the box reports described in Section 24.1.8, "OAAM Reports", you can create custom reports. You may want to refer to the Oracle Adaptive Access Manager Database Schema chapter in the *Oracle Fusion Middleware Reference for Oracle Identity Management*. It describes the OAAM schema, which is useful when building custom reports. This section discusses advanced report creation.

To create a custom OAAM report, you must perform the following tasks:

- Creating a Data Model
- Mapping User Defined Enum Numeric Type Codes to Readable Names
- Adding Lists of Values
- Adding Geolocation Data
- Adding Sessions and Alerts

An example is provided for your reference.

In code listings OAAM table and field names are bold and italic.

24.1.9.1 Creating a Data Model

Refer to the instructions in *Creating a New Report in the Oracle Business Intelligence Publisher Report Designer's Guide*:

http://download.oracle.com/docs/cd/E12844_01/doc/bip.1013/e12187/T518230T518233.htm

24.1.9.2 Mapping User Defined Enum Numeric Type Codes to Readable Names

Several fields in many tables are numeric type codes, which correspond to OAAM User Defined Enums. Refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for more information on OAAM User Defined Enums. Information on how to map those type codes to readable names is presented in this section.

There are two methods for resolving these names, and the one to choose depends on whether you need to display in English only or in internationalized strings.

24.1.9.2.1 Results Display To display a readable string rather than a type code value in the report output, the report writer will need to add a join to the tables that hold the User Defined Enums, and then add the field to the select clause.

24.1.9.2.2 English Only User Defined Enum Result Display The following SQL code shows how to add the join criteria to the query:

```
SELECT …
FROM …
LEFT OUTER JOIN (
      SELECT enumElement.num_value, enumElement.label
      FROM v_b_enum enum
            INNER JOIN v_b_enum_elmnt enumElement ON on enum.enum_id = enum_
element.enum_id
      WHERE enum.prop_name = 'enum name') alias
      ON table.type_field = alias.num_value
…
```

In this code, table.type_field is the field containing a type code value that you want to replace with a string. Alias is the name you are giving the inner select clause. Finally, enum_name is the property name of the User Defined Enum.

To display in the report, you need to add *alias*.label to the select clause.

24.1.9.2.3 Internationalized User Defined Enum Result Display The following SQL code shows how to add the join criteria to the query:

```
SELECT …
FROM …
LEFT OUTER JOIN (
      SELECT t0.config_value, element.num_value
      FROM v_b_config_rb t0
      INNER JOIN (
            SELECT enum_element.num_value, enum_element.str_value, enum.prop_name
            FROM v_b_enum enum
                  INNER JOIN v_b_enum_elmnt enum_element ON enum.enum_id = enum_
element.enum_id
            WHERE enum.prop_name = 'enum name') element
            ON t0.config_name=element.prop_name || '.' || element.str_value ||
'.name'
      WHERE t0.locale_id = (
            SELECT locale_id FROM v_b_locale
            WHERE language = substr(:xdo_user_ui_locale, 1, 2)
                  AND country = substr(:xdo_user_ui_locale, 4, 2)
                  AND (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en', 'es',
'fr', 'it', 'ja', 'ko')
```

```
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND
substr(:xdo_user_ui_locale, 4, 2) = 'BR')
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND
substr(:xdo_user_ui_locale, 4, 2) IN ('CN', 'TW')))
            UNION SELECT locale_id FROM v_b_locale
            WHERE language = substr(:xdo_user_ui_locale, 1, 2)
                  AND NOT EXISTS(SELECT locale_id FROM v_b_locale
                  WHERE language = substr(:xdo_user_ui_locale, 1, 2)
                        AND country = substr(:xdo_user_ui_locale, 4, 2))
                        AND country IS NULL
                        AND (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en',
'es', 'fr', 'it', 'ja', 'ko')
                              OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND
substr(:xdo_user_ui_locale, 4, 2) = 'BR')
                              OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND
substr(:xdo_user_ui_locale, 4, 2) IN ('CN', 'TW')))
            UNION SELECT locale_id FROM v_b_locale
            WHERE language = 'en'
                  AND NOT (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en',
'es', 'fr', 'it', 'ja', 'ko')
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND
substr(:xdo_user_ui_locale, 4, 2) = 'BR')
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND
substr(:xdo_user_ui_locale, 4, 2) IN ('CN', 'TW'))))
      ORDER BY t0.config_name) alias
      ON table.type_field = alias.num_value
…
```

In this code, table.type_field is the field containing a type code value that you want to replace with a string. Alias is the name you want to give the inner select clause. Finally, enum_name is the property name of the User Defined Enum.

To display in the report, you need to add *alias*.config_value to the select clause.

24.1.9.3 Adding Lists of Values

Add parameters to your report definition to enable your users to interact with the report and specify the data of interest from the data set.

To allow a user to select from a list of readable strings representing type codes, the report writer will need to create a List of Values (LOV) from a query on the User Defined Enums tables, filtered by the enum name.

24.1.9.3.1 User Defined Enums as List of Values for Filtering, English Only The following listing shows how to write the query to populate the list of values.

```
SELECT enumElement.label, enumElement.num_value
FROM v_b_enum enum
      INNER JOIN v_b_enum_elmnt enumElement ON on enum.enum_id = enumElement.enum_
id
WHERE enum.prop_name = 'enum name'
ORDER BY enumElement.label
```

The following listing shows how to filter the report based on this LOV.

```
WHERE …
AND (:parameter IS NULL OR :parameter = table.type_field)
```

In these listings, enum_name is the property name of the User Defined Enum, table.type_field is the field containing a type code value that you want to replace with

a string, and parameter is the named parameter. Review the *Oracle BI Publisher User's Guide* for information about creating and setting up report parameters.

24.1.9.3.2 User Defined Enums as List of Values for Filtering, Internalized The following listing shows how to write the query to populate the list of values.

```
SELECT t0.config_value, element.num_value
FROM v_b_config_rb t0
INNER JOIN (
      SELECT enum_element.num_value, enum_element.str_value, enum.prop_name
      FROM v_b_enum enum
            INNER JOIN v_b_enum_elmnt enum_element ON enum.enum_id = enum_
element.enum_id
      WHERE enum.prop_name = 'enum name') element
      ON t0.config_name=element.prop_name || '.' || element.str_value || '.name'
WHERE t0.locale_id = (
      SELECT locale_id FROM v_b_locale
      WHERE language = substr(:xdo_user_ui_locale, 1, 2)
            AND country = substr(:xdo_user_ui_locale, 4, 2)
            AND (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en', 'es', 'fr',
'it', 'ja', 'ko')
                  OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND substr(:xdo_
user_ui_locale, 4, 2) = 'BR')
                  OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND substr(:xdo_
user_ui_locale, 4, 2) IN ('CN', 'TW')))
      UNION SELECT locale_id FROM v_b_locale
      WHERE language = substr(:xdo_user_ui_locale, 1, 2)
            AND NOT EXISTS(SELECT locale_id FROM v_b_locale
            WHERE language = substr(:xdo_user_ui_locale, 1, 2)
                  AND country = substr(:xdo_user_ui_locale, 4, 2))
                  AND country IS NULL
                  AND (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en', 'es',
'fr', 'it', 'ja', 'ko')
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND
substr(:xdo_user_ui_locale, 4, 2) = 'BR')
                        OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND
substr(:xdo_user_ui_locale, 4, 2) IN ('CN', 'TW')))
      UNION SELECT locale_id FROM v_b_locale
      WHERE language = 'en'
            AND NOT (substr(:xdo_user_ui_locale, 1, 2) in ('de', 'en', 'es',
'fr', 'it', 'ja', 'ko')
                  OR (substr(:xdo_user_ui_locale, 1, 2) = 'pt' AND substr(:xdo_
user_ui_locale, 4, 2) = 'BR')
                  OR (substr(:xdo_user_ui_locale, 1, 2) = 'zh' AND substr(:xdo_
user_ui_locale, 4, 2) IN ('CN', 'TW'))))
ORDER BY t0.config_name
```

The filtering is done in the same manner as the English Only version.

24.1.9.4 Adding Geolocation Data

The OAAM schema includes tables that map IP address ranges to location data including city, state, and country. The relevant tables are VCRYPT_IP_LOCATION_MAP, VCRYPT_CITY, VCRYPT_STATE, and VCRYPT_COUNTRY. Many tables contain IP addresses, and VCRYPT_IP_LOCATION_MAP contains foreign keys to each of VCRYPT_CITY, VCRYPT_STATE, and VCRYPT_COUNTRY.

In OAAM, IP addresses are stored as long numerals. The following listing shows how join a table containing an IP address to the VCRYPT_IP_LOCATION_MAP.

```
SELECT ...
```

```
FROM vcrypt_tracker_usernode_logs logs
      INNER JOIN vcrypt_ip_location_map loc ON (
            logs.remote_ip_addr >= loc.from_ip_addr AND logs.remote_ip_addr <=
loc.from_ip_addr
      )
```

For user input and display purposes, you will normally want to use the standard four-part IP address. The following listing shows how to display a numeric IP address as a standard IP, where *ipField* is the field or parameter containing the numeric IP address you want to display.

```
…
to_char(to_number(substr(to_char(ipField, 'XXXXXXXX'), 1, 3), 'XX')) || '.' ||
      to_char(to_number(substr(to_char(ipField, 'XXXXXXXX'), 4, 2), 'XX')) || '.'
||
      to_char(to_number(substr(to_char(ipField, 'XXXXXXXX'), 6, 2), 'XX')) || '.'
||
      to_char(to_number(substr(to_char(ipField, 'XXXXXXXX'), 8, 2), 'XX'))
...
```

The following listing shows how to convert a standard IP address to the long numeric format.

```
…
to_number(substr(ipField, 1, instr(ipField, '.')-1))*16777216 +
      to_number(substr(ipField, instr(ipField, '.', 1, 1)+1, instr(ipField, '.',
1, 2)-instr(ipField, '.', 1, 1)-1))*65536 +
      to_number(substr(ipField, instr(ipField, '.', 1, 2)+1, instr(ipField, '.',
1, 3)-instr(ipField, '.', 1, 2)-1))*256 +
      to_number(substr(ipField, instr(ipField, '.', 1, 3)+1))
```

24.1.9.5 Adding Sessions and Alerts

Sessions and alerts exist in the VCRYPT_TRACKER_USERNODE_LOGS and VCRYPT_ALERT tables, respectively. They join to each other via the REQUEST_ID field, and they each join to the geolocation data via the VCRYPT_IP_LOCATION_MAP table via the BASE_IP_ADDR field.

24.1.9.5.1 Type Code Lookups The session table and the alert table have several type code fields that may be translated into readable text by following the instructions to look up the user defined enums by name. The following tables will list the type code fields and the name of the user defined enum.

Table 24–1 VCRYPT_TRACKER_USERNODE_LOGS

Field Name	User Defined Enum Name
AUTH_STATUS	auth.status.enum
AUTH_CLIENT_TYPE_CODE	auth.client.type.enum

Table 24–2 VCRYPT_ALERT

Field Name	User Defined Enum Name
ALERT_LEVEL	alert.level.enum

Table 24–2 (Cont.) VCRYPT_ALERT

Field Name	User Defined Enum Name
ALERT_TYPE	alert.type.enum
ALERT_STATUS	alert.status.enum
RUNTIME_TYPE	profile.type.enum

24.1.9.6 Example

This report will show a list of sessions, with user id, login id, auth status, and location. To start with, you will need to create two date parameters, fromDate and toDate. The query will look like this:

```
SELECT s.request_id, s.user_id, s.user_login_id, auth.label, country.country_name,
state.state_name,
city.city_name
FROM vcrypt_tracker_usernode_logs s
      INNER JOIN vcrypt_ip_location_map loc ON s.base_ip_addr = loc.base_ip_addr
      INNER JOIN vcrypt_country country ON loc.country_id = country.country_id
      INNER JOIN vcrypt_state loc ON loc.state_id = country.state_id
      INNER JOIN vcrypt_city city ON loc.city_id = city.city_id
      LEFT OUTER JOIN (
             SELECT enumElement.num_value, enumElement.label
             FROM v_b_enum enum
                   INNER JOIN v_b_enum_elmnt enumElement ON on enum.enum_id =
enum_element.enum_id
             WHERE enum.prop_name = 'auth.status.enum') auth
             ON s.auth_status = auth.num_value
WHERE (:fromDate IS NULL OR s.create_time >= :fromDate)
      AND (:toDate IS NULL OR s.create_time <= :toDate)
ORDER BY s.create_time DESC
```

24.1.9.7 Adding Layouts to the Report Definition

Oracle BI Publisher offers several options for designing templates for your reports. Refer to the *Oracle Business Intelligence Publisher Report Designer's Guide* for instructions.

24.1.10 Building OAAM Transactions Reports

This section explains how you can build transaction reports. It contains the following topics:

- Getting Entities and Transactions Information
- Discovering Entity Data Mapping Information
- Discovering Transaction Data Mapping Information
- Building Transaction Reports

24.1.10.1 Getting Entities and Transactions Information

To obtain the Transaction Definition key and Entity Definition keys, follow these steps:

1. Log in to the OAAM Administration Console and go to Transactions menu and search for the transaction definitions you are interested in.
2. Go to the **General** tab and note down the **Definition Key** of the transaction. This is the "Transaction Definition Key" of the transaction.

3. Go to the **Entities** tab of the transaction and note down distinct list **Entity Name**.
4. Choose the **Entities** menu option to search for Entities and note the **Key** of each of those entities. That is the "Entity Definition Key" of the entities.

24.1.10.2 Discovering Entity Data Mapping Information

To discover entity data mapping information that you will need to create your report, follow the procedures in this section.

24.1.10.2.1 Information about Data Types For your reference, number data types are listed in the following table.

Table 24–3 Information about Data Types

Data Type	Description
1	Represents String data
2	Represents Numeric data. Data stored is equal to (Original value * 1000).
3	Date type data. Store the data in "'YYYY-MM-DD HH24:MI:SS TZH:TZM" format and also retrieve it using same format.
4	Boolean data. Stored as strings. "True" represents TRUE and "False" represents FALSE

24.1.10.2.2 Discover Entity Data Details Like Data Type, Row and Column Mappings To get the entity data details that you will need to construct your report, follow these steps:

1. Get the Entity Definition Key by looking at the entity definition using the OAAM Administration Console.
2. Get details of how entity data is mapped using the SQL Query:

```
SELECT label,
  data_row,
  data_col,
  data_type
FROM vt_data_def_elem
WHERE status =1
AND data_def_id =
  (SELECT data_def_id
  FROM vt_data_def_map
  WHERE relation_type   ='data'
  AND parent_obj_type   =3
  AND parent_object_id IN
    (SELECT entity_def_id
    FROM vt_entity_def
    WHERE entity_def_key=<Entity Definition Key>
    AND status =1
    )
  )
ORDER BY data_row ASC,
  data_col ASC;
```

24.1.10.2.3 Build Entity Data SQL Queries and Views The above SQL query gives a list of data fields of the entity with data type and row, column position. Using that information, build a SQL query based on the following information that represents data of the given entity. It is also recommended to create/build a view based on this SQL query that represents data of the given entity.

Note: EntityRowN represents an entity data row. If your entity has 3 distinct data_row values from the above query then you would have 3 EntityRows, name the aliases as EntityRow1, EntityRow2, and so on, and similarly take care of the corresponding joins as shown below.

```
SELECT ent.ENTITY_ID,
    ent.EXT_ENTITY_ID,
    ent.ENTITYNAME,
    ent.ENTITY_KEY,
    ent.ENTITY_TYPE,
    EntityRowN<row>.DATA<col> <column_name>,
    (EntityRowN<row>.NUM_DATA<col>/ 1000.0) <numeric_column_name>,
    to_timestamp_tz(EntityRowN<row>.DATA<col>, 'YYYY-MM-DD HH24:MI:SS TZH:TZM')
<date_column_name>,
    ent.CREATE_TIME,
    ent.UPDATE_TIME,
    ent.EXPIRY_TIME,
    ent.RENEW_TIME
  FROM
    VT_ENTITY_DEF entDef,
    VT_ENTITY_ONE ent
    LEFT OUTER JOIN VT_ENTITY_ONE_PROFILE EntityRowN
  ON (EntityRowN.ENTITY_ID    = ent.ENTITY_ID
  AND EntityRowN.ROW_ORDER    = <row>
  AND EntityRowN.EXPIRE_TIME IS NULL)
    LEFT OUTER JOIN VT_ENTITY_ONE_PROFILE EntityRowN+1
  ON (EntityRowN+1.ENTITY_ID    = ent.ENTITY_ID
  AND EntityRowN+1.ROW_ORDER    = <row+1>
AND row1.EXPIRE_TIME IS NULL)
  WHERE
ent.ENTITY_DEF_ID      = entDef.ENTITY_DEF_ID and
entDef.ENTITY_DEF_KEY=<Entity Definition Key>
```

24.1.10.3 Discovering Transaction Data Mapping Information

To discover transaction data mapping information that you will need to create your report, follow the procedures in this section.

24.1.10.3.1 Discover Transaction data details like Data Type, Row and Column mappings To get entity data details you will need to construct your report, follow these steps:

1. Get list of transaction to entity definition mapping Ids using the following SQL:

```
SELECT map_id
FROM
vt_trx_ent_defs_map,
  vt_trx_def
WHERE
vt_trx_ent_defs_map.trx_def_id = vt_trx_def.trx_def_id
AND vt_trx_def.trx_def_key  =<Transaction Definition Key>
```

2. Use the following SQL query to get details of all transaction data fields, their data type and their row, column mapping:

```
SELECT label,
  data_row,
  data_col,
  data_type
FROM vt_data_def_elem
```

```
    WHERE status    =1
    AND data_def_id =
      (SELECT data_def_id
      FROM vt_data_def_map
      WHERE relation_type   ='data'
      AND parent_obj_type   =1
      AND parent_object_id IN
        (SELECT trx_def_id
        FROM vt_trx_def
        WHERE trx_def_key='mayo_pat_rec_acc'
        AND status       =1
        )
      )
    ORDER BY data_row ASC,
      data_col ASC;
```

24.1.10.3.2 Build Transaction Data SQL Queries and Views Use the information from the previous section and build a SQL query that represents transaction data based on the following:

Note: It is recommended to build a view based on this query so that it is easier to build reports

```
SELECT trx.LOG_ID,
    trx.USER_ID,
    trx.REQUEST_ID,
    trx.EXT_TRX_ID,
    trx.TRX_TYPE,
    trx.STATUS,
    trx.SCORE,
    trx.RULE_ACTION,
    trx.TRX_FLAG,
    trx.POST_PROCESS_STATUS,
    trx.POST_PROCESS_RESULT,
    TxnDataRowN<row>.DATA<col> <data_column_name>,
   (TxnDataRowN<row>.NUM_DATA<col>/ 1000.0) <numeric_column_name>,
    to_timestamp_tz(TxnDataRowN<row>.DATA<col>, 'YYYY-MM-DD HH24:MI:SS TZH:TZM')
<date_column_name>,
    (SELECT entTrxMap.MAP_OBJ_ID
    FROM VT_ENT_TRX_MAP entTrxMap
    WHERE entTrxMap.DEF_MAP_ID = <Transaction to Entity Mapping Id of Entity1_
Name>
    AND entTrxMap.TRX_ID       = trx.LOG_ID
    ) <EntityN_Name>,
    (SELECT entTrxMap.MAP_OBJ_ID
    FROM VT_ENT_TRX_MAP entTrxMap
    WHERE entTrxMap.DEF_MAP_ID = <Transaction to Entity Mapping Id of Entity2_
Name>
    AND entTrxMap.TRX_ID       = trx.LOG_ID
    ) <EntityN+1_Name>,
    trx.CREATE_TIME,
    trx.UPDATE_TIME,
    TRUNC(trx.create_time, 'HH24') created_hour,
    TRUNC(trx.create_time, 'DDD') created_day,
    TRUNC(trx.create_time, 'DAY') created_week,
    TRUNC(trx.create_time, 'MM') created_month,
    TRUNC(trx.create_time, 'YYYY') created_year
  FROM VT_TRX_DEF trxDef,
    VT_TRX_LOGS trx
  LEFT OUTER JOIN VT_TRX_DATA TransactionDataRowN
```

```
  ON (TransactionDataRowN.TRX_ID         = trx.LOG_ID
  AND TransactionDataRowN.ROW_ORDER      = <rowN>)
LEFT OUTER JOIN VT_TRX_DATA TransactionDataRowN+1
  ON (TransactionDataRowN+1.TRX_ID         = trx.LOG_ID
  AND TransactionDataRowN+1.ROW_ORDER      = <rowN+1>)
  WHERE trx.TRX_DEF_ID      = trxDef.TRX_DEF_ID  and
trxDef.TRX_DEF_KEY=<Transaction Definition Key>
```

24.1.10.4 Building Transaction Reports

Follow the instructions in this section to build reports for entities and transactions.

24.1.10.4.1 Building Entity Data Reports Use the SQL Queries or Views built using the information mentioned in Section 24.1.10.2.3, "Build Entity Data SQL Queries and Views."

24.1.10.4.2 Building Transaction Data Reports Use the SQL Queries or Views built using the information mentioned in Section 24.1.10.3.2, "Build Transaction Data SQL Queries and Views."

24.1.10.4.3 Joining Entity Data Tables and Transaction data tables You can join the transaction data views you built with entity data view using VT_ENT_TRX_ MAP.MAP_OBJ_ID which is indicated using the pseudo column <EntityN_Name>.

24.2 Auditing OAAM Events

The Fusion Middleware Audit Framework leverages Oracle BI Publisher to audit data recorded to an audit database. By using Oracle BI Publisher, you can take advantage of powerful reporting features such as flexible report display, filtering, scheduling, and custom reporting.

24.2.1 Introduction to Auditing

Oracle Adaptive Access Manager uses the Oracle Fusion Middleware Common Audit Framework to support auditing for a number of events. The Oracle Fusion Middleware Common Audit Framework provides uniform logging.

While auditing can be enabled or disabled, it is normally enabled in production environments. Auditing has minimal performance impact, and the information captured by auditing can be useful (even mission-critical).

Audit data can be written to either a single, centralized Oracle Database instance or to flat files known as bug-stops. Regardless of where the audit record is stored, it contains a sequence of items that can be configured to meet particular requirements. The audit log file helps the audit administrator track errors and diagnose problems if the audit framework is not working properly.

24.2.2 About Audit Record Storage

Database Logging: Implements the Common Auditing Framework across a range of Oracle Fusion Middleware products. The benefit is audit-function commonality at the platform level.

Database Audit Store: In production environments, Oracle recommends using a database audit store to provide scalability and high-availability for the Common Audit Framework. Audit data is cumulative and grows over time. Ideally this is a database for only audit data; not used by other applications.

The Oracle Fusion Middleware Audit Framework schema for audit log tables is provided by the Oracle Fusion Middleware Repository Creation Utility (RCU), which must be run before you can log information to the database.

24.2.3 Oracle Adaptive Access Manager Events You Can Audit

OAAM events are those generated when the Oracle Adaptive Access Manager Console is used.

The OAAM events that can be audited and the details captured in them are listed in this section. These event definitions and configurations are implemented as part of the audit service in Oracle Platform Security Services.

24.2.3.1 Customer Care Events

Customer Care events are shown in Table 24–4.

Table 24–4 Customer Care Events

Event	Event Data
Create CSR Case	CaseId, UserGroupName, UserId, CaseSeverity, Description
Update Cases	CaseId, CaseSeverity, CaseStatus, CaseDisposition, CaseExpirationDurationInHrs, ActionNotes, CaseActionResult
Change Status	CaseId, CaseStatus, CaseDisposition, ActionNotes, CaseActionResult
Perform Case Action	CaseId, CaseActionEnum, CaseSubActionEnum, ActionNotes, CaseActionResult
Get Challenge Question	CaseId, ActionNotes, CaseChallengeQuestion
Check Challenge Question Response	CaseId, ActionNotes, CaseChallengeQuestion, CaseChallengeQuestionResult

24.2.3.2 KBA Questions Events

KBA Questions events are listed in Table 24–5.

Table 24–5 KBA Questions Events

Event	Event Data
Create KBA Category	KBACategoryId, KBACategoryName, KBACategoryDetails
Update KBA Category	KBACategoryId, KBACategoryName, KBACategoryDetails
Delete KBA Categories	KBACategoryIds
Create KBA Question	KBAQuestionId, KBAQuestion, KBAQuestionDetails
Update KBA Question	KBAQuestionId, KBAQuestion, KBAQuestionDetails
Delete KBA Questions	KBAQuestionIds
Create KBA Validation	KBAValidationId, KBAValidationName, KBAValidationDetails
Update KBA Validation	KBAValidationId, KBAValidationName, KBAValidationDetails
Delete KBA Validation	KBAValidationIds
Add KBA Validation to Global	KBAValidationId
Delete KBA Validation from Global	KBAValidationId
Update KBA Answer Logic	KBAAnswerLogicDetails
Update KBA Registration Logic	KBARegistrationLogicDetails

24.2.3.3 Policy Management Events

Policy Management events are listed in Table 24–6.

Table 24–6 Policy Management Events

Event	Event Data
Create Policy	PolicyId, PolicyName, PolicyDetails
Copy Policy	SourcePolicyId, PolicyName, PolicyDetails
Update Policy	PolicyId, PolicyName, PolicyDetails
Delete Policy	PolicyIds
Add Override	PolicyId, PolicyOverrideRowId, PolicyOverrideDetails
Update Overrides	PolicyId, PolicyOverrideIds, PolicyOverrideDetails
Delete Overrides	PolicyId, PolicyOverrideIds
Link Policy To Group	PolicyId, GroupId, ActionNotes
Unlink Policy from Groups	PolicyId, GroupIds
Create Rule	PolicyId, RuleId, RuleName, RuleDetails
Add Conditions to Rule	PolicyRuleMapId, RuleConditionIds
Update Rule in Policy	PolicyId, RuleId, RuleName, RuleDetails
Copy Rule to Policy	PolicyId, PolicyRuleMapDetails
Delete Rules from Policy	PolicyRuleMapIds
Update Rules Order in Policy	PolicyRuleMapId, RuleConditionMapIds
Update Rule Parameter values	PolicyRuleMapId, RuleConditionMapId, RuleParamValueDetails

24.2.3.4 Policy Set Management Events

Policy set management events are listed in Table 24–7.

Table 24–7 Policy Set Management Events

Event	Event Data
Policy Set Update	UpdatePolicySet
Policy Set Save Score	SaveScoreActions
Policy Set Save Action	SaveActionOverrides
Policy Set Delete Score	DeleteScoreActions
Policy Set Delete Action	Delete Action Overrides

24.2.3.5 Group/List Management Events

Group/List Management events are listed in Table 24–8.

Table 24–8 Group Management Events

Event	Event Data
Add Group	GroupId, GroupName, GroupDetails
Update Group	GroupId, GroupName, GroupDetails
Delete Groups	GroupIds
Add Group Elements	GroupId, GroupElementsDetails

Table 24–8 (Cont.) Group Management Events

Event	Event Data
Update Group Element	GroupId, GroupElementId, GroupElementValue
Delete Group Elements	GroupId, GroupElementIds
Delete all Group Elements	GroupId

24.2.3.6 Pattern Management Events

Pattern management events are listed in Table 24–9.

Table 24–9 Pattern Management Events

Event	Event Data
Pattern Update Status	UpdatePattern
Pattern Create	CreatePattern
Pattern Update	UpdatePatternStatus
Pattern Delete	DeletePattern
Pattern Add Parameter	AddParam
Pattern Update Parameter	UpdateParam
Pattern Delete Parameter	DeleteParams
Pattern Update Parameter Order	UpdateParamsOrder

24.2.3.7 Dynamic Action Management Events

Dynamic action management events are listed in Table 24–10.

Table 24–10 Dynamic Action Management Events

Event	Event Data
Dynamic Action Create	CreateDynamicAction
Dynamic Action Update	UpdateDynamicAction
Dynamic Action Delete	DeleteDynamicActions
Dynamic Action Create Instance	CreateDynamicActionInstance
Dynamic Action Update Instance	UpdateDynamicActionInstance
Dynamic Action Update Status	UpdateDynamicActionInstanceStatus
Dynamic Action Delete Instance	DeleteDynamicActionInstances

24.2.3.8 Entity Management Events

Entity Management events are listed in Table 24–11.

Table 24–11 Entity Management Events

Event	Event Data
Entity Create	CreateEntityDef
Entity Update	
Entity Update Status	UpdateEntityDefStatus
Entity Delete	DeleteEntityDefs

Table 24–11 (Cont.) Entity Management Events

Event	Event Data
Entity Save Data	SaveDataElements
Entity Delete Data	DeleteDataElements
Entity Add ID	AddIDSchemeElements
Entity Update ID	UpdateIDSchemeElements
Entity Delete ID	DeleteIDSchemeElements
Entity Add Display	AddDisplayElements
Entity Update Display	UpdateDisplayElements
Entity Delete Display	DeleteDisplayElements
Entity Create Reference	CreateEntityDefsRelation
Entity Update Reference	UpdateEntityDef
Entity Delete Reference	DeleteEntityDefsRelations

When an update to attributes/properties of an entity definition is performed, the following audit events are triggered:

- Update Entity Def
- Update ID Scheme Elements
- Save Data Elements

24.2.3.9 Transaction Management Events

Transaction management events are listed in Table 24–12.

Table 24–12 Transaction Management Events

Event	Event Data
Transaction Create	CreateTransactionDef
Transaction Update	UpdateTransactionDef
Transaction Update Status	UpdateTransactionDefStatus
Transaction Delete	DeleteTransactionDef
Transaction Add Entity	AddTransactionEntityDefMap
Transaction Update Entity	UpdateTransactionEntityDefMap
Transaction Delete Entity	DeleteTransactionEntityDefMaps
Transaction Save Data	SaveTransactionDataElemDefs
Transaction Delete Data	DeleteTransactionDataElemDefs
Transaction Save Source	SaveTransactionSourceDataElemDefs
Transaction Delete Transaction Source Data Element Definitions	DeleteTransactionSourceDataElemDefs
Transaction Set Data Map	SetTransactionDataMapping
Transaction Delete Data Map	DeleteTransactionDataMappings
Transaction Set Entity Map	SetTransactionEntityDataMapping
Transaction Delete Entity Map	DeleteTransactionEntityDataMappings

When an update to attributes/properties of a transaction definition occurs, an audit event is triggered as well as audit events of related APIs. For example, when the transaction "save source" is performed the following audit events are also triggered:

- Save transaction data-element defs
- Update a transaction definition

24.2.3.10 Snapshot Management Events

Snapshot management events are listed in Table 24–13.

Table 24–13 Snapshot Management Events

Event	Event Data
Snapshot Create	CreateSnapshotInDB
Snapshot Store	StoreSnapshot
Snapshot Commit Diff	CommitDiff
Snapshot Delete	DeleteSnapshots

24.2.3.11 OAAM Server Administration Events

OAAM Server Administration events are listed in Table 24–14

Table 24–14 OAAM Server Administration Utility Events

Event	Event Data
Property Create	Create Property
Property Delete	UpdateProperty
Property Update	DeleteProperties

24.2.3.12 User Detail Events

User events are listed in Table 24–15.

Table 24–15 User Events

Event	Event Data
Get Login	GetUserRecentLogins
Get Session Data	GetSessionData
Get User Transaction	GetUserTransaction
Get Transaction Details	GetUserTransactionDetails
Get Checkpoint	GetUserCheckpointDetails

24.2.3.13 Import Events

Import events are listed in Table 24–16.

Table 24–16 Import Events

Event	Event Data
Import Policy	ImportPolicies
Import KBA	ImportKBAQuestions
Import Dynamic Action	ImportDynamicActions

Table 24–16 (Cont.) Import Events

Event	Event Data
Import Transaction	ImportTransactions
Import Pattern	ImportPatterns
Import Entity	ImportEntities
Import Condition	ImportConditions
Import Group	ImportGroups
Import Property	ImportProperties
Import Validation	ImportValidations

24.2.4 Setting Up Auditing for Oracle Adaptive Access Manager

Oracle Adaptive Access Manager can be configured to write audit records to a central database. In production environments, Oracle recommends using a database audit store to provide scalability and high-availability for the Common Audit Framework. Audit data is cumulative and grows over time. Ideally this is a database for only audit data; not used by other applications.

Configuring auditing for Oracle Adaptive Access Manager as follows:

1. Run the Oracle Fusion Middleware Repository Creation Utility (RCU) against the database, as described in "Create the Audit Schema using RCU" in the Oracle Fusion Middleware Repository Creation Utility User's Guide.
2. Set up audit data sources for the audit loader and configure it for the OAAM Server as described in "Set Up Audit Data Sources" in the *Oracle Fusion Middleware Application Security Guide*.
3. Enable the audit Policy and Audit Store by using Fusion Middleware Control.
4. Set up Oracle Business Intelligence Publisher audit reports.
5. Restart the WebLogic Server.

For information on deploying auditing, refer to "Configuring and Managing Auditing" in the *Oracle Fusion Middleware Application Security Guide*.

24.2.4.1 Create the Audit Schema using Repository Creation Utility

To switch to a database as the permanent store for your audit records, you first use the Oracle Fusion Middleware Repository Creation Utility (RCU) to create a database store for audit data.

Before you begin, make sure to collect the details on which database to use, along with the DBA credentials to use. Create the audit schema using RCU by selecting **Audit Services** when running RCU. When running RCU, and selecting the OAAM component, it does not select Audit by default. Hence, by default, the audit data is on a file system (IAMDomain/servers/AdminServer/logs/auditlogs/JPS/audit.log) rather than a database. If you want to use audit in production, it is advised to configure the audit schema when running RCU.

24.2.4.2 Configure a Data Source for the Audit Database

After you create a database schema to store audit records in a database, you must set up an Oracle WebLogic Server audit data source that points to that schema.

Define a JDBC data source for the audit database by using the WebLogic Administration Console so that the WebLogic server can access the database. You must configure the data source on the administration server and on all WebLogic managed server instances running Oracle Adaptive Access Manager server. Refer to the *Oracle Fusion Middleware Application Security Guide* for specific steps to follow to configure the data source.

24.2.4.3 Enable Auditing

Enable Audit Policy and Audit Store by using Fusion Middleware Control.

An audit policy is a declaration of the type of events to be captured by the audit framework for a particular component.

1. Change auditing store from file to database: navigate to the WebLogic Domain, then IAM_Domain, then Security, then Audit Store. Specify the JNDI name of the data source for the audit database.
2. Enable audit policies: navigate to the WebLogic Domain, then IAM_Domain, then Security, then Audit Policy.

24.2.4.4 Set Up Oracle Business Intelligence Publisher Audit Reports

You must install Oracle BI Publisher and verify it is operational before installing the Fusion Middleware Audit reports. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.

Perform the following steps to set up standard Oracle BI Publisher audit reports in their default formats out-of-the-box.

1. Stop the Oracle BI Publisher server. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.
2. Unjar the AuditReportTemplates.jar to a location on your Oracle BI Publisher server. For example:

   /ORACLE_BI_PUBLISHER_HOME/xmlp/XMLP/reports

   You can find AuditReportTemplates.jar at $MW_ORA_HOME/oracle_common/modules/oracle.iau_<version>/reports/AuditReportTemplates.jar.
3. Start the Oracle BI Publisher server. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.
4. Configure the JDBC Data Source for the reports by performing the following steps:
   a. Log in to Oracle BI Publisher from a Web browser as an Administrator. Refer to Oracle Business Intelligence Publisher Documentation if you need more information.
   b. Click the **Admin** tab, then click **JDBC** under Data Sources, and then click the **Add Data Source** button. The Add Data Source screen appears.
   c. Enter the following information in the fields on the Add Data Source screen. Replace the *variable values* in the following examples with the actual values for your audit schema.

Field	Data to Enter
Data Source Name	`Audit` Provide a name for the data source.
Connection String	`jdbc:oracle:thin:@host:port:sid`

Field	Data to Enter
User Name	User name for a audit schema user.
Password	Password for user identified in the User Name field.
Database Driver Class	`oracle.jdbc.driver.OracleDriver`

5. Test for a successful connection. If the connection is not successful, check the values you entered.
6. Click **Apply**.

24.2.4.5 Restart the WebLogic Server

Restart WebLogic Server instances: You must restart all the WebLogic Server instances (the admin server and all the managed server instances in the domain). During the restart, the audit loader rereads the audit store configuration and starts using the database for auditing.

24.2.5 Generate Fusion Middleware Audit Framework Reports

To generate Fusion Middleware Audit Framework reports in Oracle BI Publisher, perform the following steps:

1. Log in to Oracle BI Publisher.
2. Select the Reports tab.
3. Click More to expose the list of standard reports, including audit reports.
4. Click Oracle_Fusion_Middleware_Audit, then navigate to the report you want to run.
5. Use filter options in the top part of the report page to filter reported data in various ways. Report data appears on the bottom part of the report page.

For information, refer to "Using Audit Analysis and Reporting" in *Oracle Fusion Middleware Application Security Guide*.

24.2.6 Run the Fusion Middleware Common User Activities Reports

Perform the following steps to run the Fusion Middleware common user activities reports in Oracle BI Publisher:

1. Log in to Oracle BI Publisher.
2. Select the Reports tab.
3. Click More to expose the list of standard reports, including audit reports.
4. Click Oracle_Fusion_Middleware_Audit, then navigate to the report you want to run.
5. Select All Events.

24.2.7 Set Up Audit Report Filters

You can use the standard audit reports in their default formats out-of-the-box. However, if you want to customize the scope of data and other related aspects of the reports, you do so by setting up audit report filters.

For information, refer to "Using Audit Analysis and Reporting" in *Oracle Fusion Middleware Application Security Guide*.

24.2.8 Configure Scheduler in Oracle Business Intelligence Publisher

Clicking on the report's **Schedule** button brings up a page which you can use to schedule and administer the report.

For information on customizing audit reports, refer to "Using Audit Analysis and Reporting" in *Oracle Fusion Middleware Application Security Guide*.

24.2.9 Design and Create Custom Reports

The data in the database audit store is exposed through OAAM reports. OAAM audit reports are not available with Oracle Adaptive Access Manager out of the box. Oracle Fusion Middleware Audit Framework ships with a set of pre-defined reports that are designed to work, out-of-the-box, with Oracle Fusion Middleware components, but you can design and create custom reports with Oracle Business Intelligence Publisher's complete set of capabilities for designing and creating custom reports.

For information, refer to "Using Audit Analysis and Reporting" in *Oracle Fusion Middleware Application Security Guide*.

24.3 Use Cases

The following section provides a scenario of how Oracle Adaptive Access Manager's reports are used.

24.3.1 Use Case: BIP Reports

You are Marty, a business analyst for Acme Corp. You have been asked to gather some aggregate data on the impact to customers by the Oracle Adaptive Access Manager security system.

Directions: Run the KBA challenge statistics report and rules aggregate breakdown report. Also run the recent logins report, filtering for sessions that resulted in a block. Run all the reports with XLS output so you can share the results with your business unit.

24.3.1.1 Description

This use case demonstrates how to use Oracle BI Publisher.

24.3.1.2 Steps

This use case demonstrates how to use Oracle BI Publisher reports.

1. Log in to Oracle BI Publisher as an Analyst.
2. Select OAAM under Shared Folders.
3. Under oaam folder, select oradb.
4. Locate the report to run.
   a. Under the Common folder, click **RecentLogins** to view the RecentLogins report.
   b. Under the KBA folder, click **ChallengeStatistics** to view the Challenge Statistics report.

c. Under the KBA folder, click **QuestionStatistics** to view the QuestionStatistics report

d. Under the Security folder, click **RulesBreakdown** to view the RulesBreakdown report.

5. For the RecentLogins report, select **Blocked** in Auth Status as a search criteria.
6. Repeat the following steps for each report.
   a. Click **View**.
   b. In Template menu, select **Excel2000** and click **Export**.

24.3.2 Use Case: LoginSummary Report

The LoginSummary displays login aggregate summary for the designated date range.

1. Log in to Oracle BI Publisher using a URL of the form:

   `http://host.domain.com:port/xmlpserver/`

2. In the main page, click **OAAM** under Shared Folders and then **oradb**.
3. Under the Security folder, click LoginSummary to view the **LoginSummary** report.

   The Login Summary Report opens with the default time range of one month.

   The summary graph shows the following:

   - The count of sessions
   - The count of users
   - The count of registrations
   - The count of blocks

4. Save or export the report as desired.

Part X

Deployment Management

This part of the book contains information about managing deployment in Oracle Adaptive Access Manager.

25

Using the Properties Editor

Oracle Adaptive Access Manager provides properties out-of-the-box and a Properties Editor that enables you to create new database properties according to your requirement, modify existing database and file properties, and create and edit enumerations.

Note: not all roles have permissions to access the Properties Editor.

This chapter focuses on properties management using the OAAM Administration Console. It includes the following topics:

25.1 Navigating to the Properties Search Page

The Properties Search page is the starting place for managing your property definitions.

To open the Properties Search page:

1. In the Navigation tree, double-click **Properties** under **Environment**.

   Alternatively, you can:

   - Right-click **Properties** in the Navigation tree and select **List Properties** from the context menu.
   - Select **Properties** in the Navigation tree and then choose **List Properties** from the **Actions** menu.
   - Click the **List Properties** button in the Navigation tree toolbar.

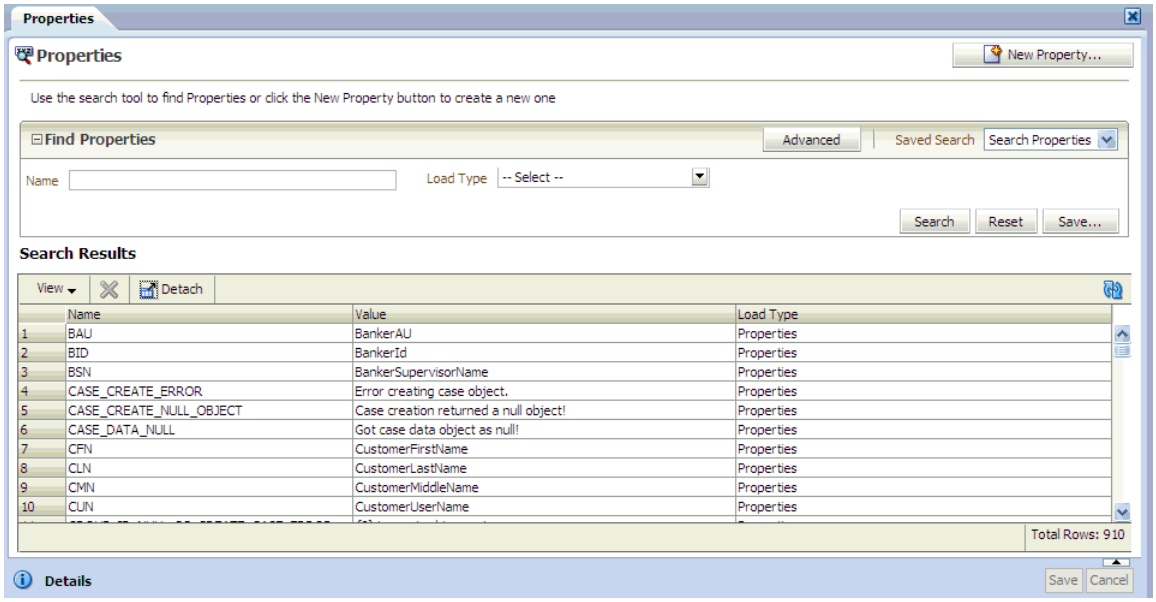
   The Properties Search page is displayed.

2. Click **Search** to view a list of properties in the system.

25.2 Searching for a Property

In the Properties Search page you can view a list of all properties in the system and search for a property based on the name, load type, and value.

Figure 25–1 Properties Page



To view a list of the properties present in the system, click **Search**. All available properties are displayed in the Results table.

To search for a property:

1. Specify the criteria in the search fields in the Properties Search page to locate the property.

   The search filter criteria are described in Table 25–1, " Search Filter Criteria".

Table 25–1 Search Filter Criteria

Field	Description
Name	The property name.
Load Type	The property's load type. If the property is available in the database, its load type is database; if the property is in a property file, its load type is properties, and if the property is a system property, its load type is systems. By default the load type is set to "all."
Value	The value for the property.

2. Click **Search**.

   If you want to reset the search parameters to the default setting, use the **Reset** button.

The Results Table displays a summary of the properties that match the criteria specified.

By default, properties are sorted on Property Name, but you can sort properties on the Load Type.

25.3 Viewing the Value of a Property

To view the value of a property, select the property in the Results table. The name, load type, and value for the property is displayed in the bottom panel.

25.4 Viewing Enumerations

Enumerations can be viewed and edited using the Properties Editor.

For the enumerations to be listed in the Properties Editor, you must set the following property to false:

```
bharosa.config.ui.list.filter.enum=false
```

25.5 Creating a New Database Type Property

To create a new database type property:

1. From the Properties Search page, click the **New Property** button or **Create new Property** icon.

   A New Property dialog is displayed.

2. In the New Property dialog, type in the property name and value.

   An error message appears for the following:

   - Duplicate name
   - Special characters
   - Blank value

   The property name cannot be edited after the property has been created.

3. Click **Save**.

All properties created using the properties editor can be of the "Database" type only. They are created in the server database.

A system and file type properties cannot be created from the user interface.

If you do not want to create the new property, click **Cancel** instead of **Save**.

25.6 Editing the Values for Database and File Type Properties

You can easily edit the values for database and file type properties and save them.

System properties are read only and cannot be edited.

To edit a database or file type property, follow these steps:

1. In the Results table, select the property.

   The name, load type, and value is shown in the details panel.

   If multiple properties are selected, details for the last selected property are shown in the details panel.

2. In the details panel, edit the value of the property.

Name and Type are read-only in the details panel.

3. Click **Save**.

   The modified property detail are saved successfully.

   When a file load type property is edited, it changes to a database type property. The existing file type property will no longer be shown in the Results table.

   If you do not want to save the modified property, click **Cancel** instead of **Save** to revert the changes to the original value.

25.7 Deleting Database Type Properties

System and file properties are not allowed to be deleted.

To delete a database type property or properties:

1. In the Results table, select the properties.

   A confirmation dialog appears.

2. Click the **Delete** button. The selected properties are deleted successfully.

If you delete a database type property that had been changed from a file type property, the selected property is deleted and the old file type property is restored.

25.8 Exporting Database and File Type Properties

To export file properties, follow these steps:

> **Note:** System properties will not be exported. Only file and database type properties will be exported.

1. In the Navigation tree, open **Properties** under Environment.

   The Properties Search page is displayed.

2. Click **Search** to view a list of properties in the system.
3. Select the properties you want to export.
4. Select **Export Selected** from the Actions menu.

   An Export Properties dialog appears with options to select the export type and provide a name.

5. Enter a name for your ZIP file.
6. Choose Java Properties or XML Properties as the Export Type.
7. Click **Export**.

   If you do not want to export the files, click **Cancel** instead of **Save**.

8. Click **Save** and then **OK**.

   A ZIP file for the selected properties in XML or Java format is exported.

25.9 Importing Database Type Properties

To import database type properties, follow these steps:

1. In the Navigation tree, open **Properties** under Environment.

   The Properties Search page is displayed.

2. Click the **Import Properties** button.

   An Import Properties dialog appears.

3. In the Import Groups dialog box, type the path and name of the file; or use the **Browse** (...) button to locate the ZIP file that contains the properties, and then select the file.

4. Click **Open** and then click **OK**.

   Updates are saved to the database. Updates occur only if the value of the property changed.

5. Click **OK**.

   If you try to import properties in an invalid format, an error will be displayed.

25.10 Editing Enums in the Property Editor

User-defined enums are a collection of properties that represent a list of items. Each element in the list may contain several different attributes. The definition of a user-defined enum begins with a property ending in the keyword ".enum" and has a value describing the use of the user-defined enum. Each element definition then starts with the same property name as the enum, and adds on an element name and has a value of a unique integer as an ID. The attributes of the element follow the same pattern, beginning with the property name of the element, followed by the attribute name, with the appropriate value for that attribute.

The following is an example of an enum defining credentials displayed on the login screen of an OAAM Server implementation:

```
bharosa.uio.default.credentials.enum = Enum for Login Credentials
bharosa.uio.default.credentials.enum.companyid=0
bharosa.uio.default.credentials.enum.companyid.name=CompanyID
bharosa.uio.default.credentials.enum.companyid.description=Company ID
bharosa.uio.default.credentials.enum.companyid.inputname=comapanyid
bharosa.uio.default.credentials.enum.companyid.maxlength=24
bharosa.uio.default.credentials.enum.companyid.order=0
bharosa.uio.default.credentials.enum.username=1
bharosa.uio.default.credentials.enum.username.name=Username
bharosa.uio.default.credentials.enum.username.description=Username
bharosa.uio.default.credentials.enum.username.inputname=userid
bharosa.uio.default.credentials.enum.username.maxlength=18
bharosa.uio.default.credentials.enum.username.order=1
```

In case of enums, to override non translatable core properties set it in oaam_custom.properties and the locale specific properties should be set in client_resource_<locale>.properties. To disable any already defined element in a user-defined enum, simply add an "enabled" attribute with a value of "false".

Part XI

Command-Line Interface

This part describes how to set up and use Oracle Adaptive Access Manager's command-line interface.

26

Oracle Adaptive Access Manager Command-Line Interface Scripts

This chapter provides information on the Command-Line Interface (CLI).

It contains the following sections:

26.1 CLI Overview

The Oracle Adaptive Access Manager Command-Line Interface (CLI) scripts enable users to perform various tasks instead of using the OAAM Administration Console.

You can use Oracle Adaptive Access Manager CLI scripts for the following:

- Import or export objects like policies, groups, conditions, and other modules without using the graphical user interface.
- Load location data into the Oracle Adaptive Access Manager database

26.2 Using CLI

The Oracle Adaptive Access Manager CLI is a tool in which you can perform various tasks using the keyboard rather than the OAAM Administration Console.

You can use Oracle Adaptive Access Manager CLI in the following ways:

- import or export objects like policies, groups, conditions, and other modules without using the graphical user interface
- perform import and export between different environments (for example, QA and staging) using a program.
- load location data

Set up the Oracle Adaptive Access Manager CLI environment before you run any of the scripts. For details refer to Section 2.3, "Setting Up the CLI Environment."

26.2.1 Obtaining Usage Information for Import or Export

To obtain usage information on Oracle Adaptive Access Manager CLI for import or export:

1. At the command line, change to the Oracle Adaptive Access Manager CLI work folder.
2. Run the `runImportExport.sh` script without any arguments.

```
$ sh runImportExport.sh
```

26.2.2 Command-Line Options

This subsection provides details about the command-line options.

To perform an import or export, you enter commands coupled with:

- information for actions like import or export
- information for module like policies, groups, validations, or others
- arguments for whether to export or import different modules
- additional parameters for the import and export features.

26.2.2.1 What is the Syntax for Commands?

Use this syntax for the command-line interface (typed in a single line with no line breaks or carriage returns):

sh runImportExport.sh

|-- action < import | export >

| +-- <export>

| + |-- entitycmd < add | delete >

| + |-- exportmode < zip | file >

| + |-- includeelements < true | false >

| + |-- listelemcmd < add | delete | replace >

| + -- outdir < path_to_dest_dir >

| +-- <import>

| -- batchmode < true | false >

-- module < rules | groups | policy (models) | questions | validations | answerHint | properties | conditions | questionsForTranslation | patterns | entities | transactions | dynamicActions | taskGroups | snapshot>

+-- <groups>"

-- submodule < all | users | alerts | ... >

+-- <properties>"

-- name < propertyId >

-- loadType < database | properties | system >

+-- <conditions>"

-- forceUpdate < true | false >

-- adminUser < user name >

-- adminPassword < password >

26.2.2.2 CLI Parameters

The options are described in Section 26.2, "Using CLI.".

Table 26–1 CLI Parameters

Parameters	Description
entitycmd	Indicates whether the entities for the module being exported would be added to the database or deleted from the database on importing the file. Default is add
exportmode	Indicates whether the result of export will be a ZIP file or XML file. Default is ZIP.
includeelements	Indicates whether the group elements need to be included in export. Default is true. This is applicable only for export of groups.
listelemcmd	Indicates whether the group elements will be added, deleted for replaced in the database when this file is imported. Default is add. This is applicable only for groups export.
outdir	The output folder where the resulting files from export will be saved. Default value is current folder.
batchmode	Controls the database commits when list items are imported in a batch. When the batch reaches its limit, the objects are inserted into the database. If `batchmode` is equal to true, the database update is also committed. By default, `batchmode` is set to `false`.
submodule	Used to specify the type of groups that should be included in export. Default value is all. This is applicable for groups export.
loadType	Used to specify the type of properties that need to be exported. If not specified then all type of properties are included. This is applicable for properties export.

26.2.2.3 Supported Modules for Import and Export

The list of supported modules for Oracle Adaptive Access Manager 11*g* is shown in Table 26–2.

Table 26–2 Support Modules

Module	Entity Name
groups	groups
policies	models
questions	questions
validations	validations
answer hint	answerHint
properties	properties
conditions	conditions
questions for translation	questionsForTranslation
patterns	patterns
entities	entities
transactions	transactions
configurable actions	dynamicActions
scheduler task groups	taskGroups
snapshot	snapshot

The 10*g* policy set and policy modules are not longer valid in 11*g*.

The difference between CLI import/export in 10*g* and 11*g* is that the module `models` and `policies` means the same: `-module policy` is same as `-module models`.

26.2.2.4 Import of Files

Examples of import options are as follows:

Import from a File

To import from a file, issue the following command:

```
$ sh runImportExport -action import -module properties
exportData\properties\<properties_zip_file>
```

Import Contents of ZIP file

To import the contents of a ZIP file, issue the following command:

```
$ sh runImportExport.sh -action import -module <supported_module>
<filename>
```

Here are examples:

To upload challenge questions, issue the following command:

```
$ sh runImportExport.sh -action import -module questions <filename>
```

To import conditions, issue the following command:

```
$ sh runImportExport.sh -action import -module conditions <filename>
```

To import policies, run the following command

```
$ sh runImportExport.sh -action import -module models <filename>
```

To import groups, run the following command

```
$ sh runImportExport.sh -action import -module groups <filename>
```

Import Snapshot

Note: Snapshot import will alter the current configurations in the system. Ensure that you back up the data before performing the import.

Options for backup are:

- Back up the configuration data in the database or file. For file, perform an export using CLI or the Universal Risk Snapshot feature. For information on using the Universal Risk Snapshot feature, refer to Chapter 14, "Managing System Snapshots."
- Export snapshot using CLI before doing an import

`runImportExport.sh -action import -module snapshot` *path to a valid snapshot zip file*

`runImportExport.sh -action import -module snapshot` *IDM_ORACLE_HOME*`/oaam/init/oaam_base_snapshot.zip`

Import a Groups of Users in an XML File

To import a group of users in an XML file, issue the following command:

```
$ sh runImportExport.sh -action import -module groups <abc.xml>
```

Import Multiple Policies from Multiple ZIP Files

To import multiple policies in multiple XML file, issue the following command:

```
$ sh runImportExport.sh -action import
-module models <ManyModels.zip> <OneModel.zip>
```

Import Multiple Questions from Multiple ZIP Files

To import multiple questions from multiple ZIP files, issue the command:

```
$ sh runImportExport.sh -action import
-module questions <ManyQuestions.zip> <OneQuestions.zip>
```

Import Multiple Validations from Multiple ZIP Files

To import multiple validations from multiple ZIP files, issue the command:

```
$ sh runImportExport.sh -action import
-module validations <ManyValidations.zip> <OneValidations.zip>
```

> **Note:** You may note that inapplicable options will be silently ignored (for example, the `outdir` option used for import) and options with lower precedence will be overridden (for example, `listelemcmd` is irrelevant when `includeelements` is equal to `false`).

26.2.2.5 Export of Files

Here are examples of export options:

Export Properties

To export all the properties irrespective of `loadtype`, issue the following command:

```
$ sh runImportExport.sh -action export -module properties
```

To export all the properties of any particular `loadtype`, issue the following command:

```
$ sh runImportExport.sh -action export -module properties -loadtype <
database | properties | system>
```

For example, to export all the properties of database `loadtype`, issue the following command:

```
$ sh runImportExport.sh -action export -module properties -loadtype
database
```

To export any single property, issue the following command:

```
$ sh runImportExport.sh -action export -module properties -name
<propertyname>
```

Export All

When performing an export, if no entity names are specified, all the entities of that particular module (and submodule) are exported. Thus, specifying names is not necessary for export.

To export all entities of a particular module, issue the following command:

```
$ sh runImportExport.sh -action export -module <module entity_name>
```

Export a Snapshot

Examples of exporting a snapshot are shown below:

```
runImportExport.sh -action export -module snapshot -snapshotname "name of
snapshot" -description "snapshot description"
```

```
runImportExport.sh -action export -module snapshot -snapshotname "OAAM
Snapshot" -description "OAAM snapshot description"
```

`-snapshotname`, `-description` are optional. If `snapshotname` is specified then the exported zip file name will be *value passed for -snapshotname.*`zip`, if `snapshotname` is not specified, the CLI will create a unique filename with name such as `snapshot_`*unique_value*.

The exported zip file would also contain one `snapshot.properties` file that has the following content.

Property	Description
serverIP	IP of server from where CLI is run
user	Operating system user name
name	Name of snapshot, if specified by `-snapshotname`, if not specified will be system generated unique name
description	Description of snapshot, if specified by `-description`, if not specified will be system generated unique name
serverName	Hostname from where CLI was run

Export all Policies

To export all policies, issue the following command:

```
$ sh runImportExport.sh -action export -module models
```

Export all User Groups

To export groups, issue the following command:

```
$ sh runImportExport.sh -action export -module groups -submodule users
```

Export All Questions

To export questions, issue the following command:

```
$ sh runImportExport.sh -action export -module questions
```

CLI exports all the related categories, validations, and locale information to make these questions complete.

Export All Validations:

To export all validations, issue the following command:

```
$ sh runImportExport.sh -action export -module validations
```

Export Conditions

To export conditions, issue the following command:

```
$ sh runImportExport -action export -module conditions
```

Export Condition with Delete Script

To export conditions with a delete script, issue the following command:

```
$ sh runImportExport -action export -module conditions -entitycmd delete
```

Export Specific Groups, Grp1 and Grp2, without Elements for Delete

To export specific groups without elements, issue the following command:

```
$ sh runImportExport.sh -action export
-module groups -includeelements false -entitycmd delete Grp1 Grp2
```

`entitycmd` indicates whether the entities for the module being exported would be added to the database or deleted from the database on importing the file.

In this example, Groups `Grp1` and `Grp2` are deleted from the database when the resulting file from this export command is imported back.

Export Groups with List Command Replace

To export groups with list command replace, issue the following command:

```
$ sh runImportExport.sh -action export -module groups -listelemcmd replace
G1 G2
```

The group elements for groups `G1` and `G2` will be replaced by the elements in the ZIP file during the import of the file resulting from this export command. For example, if group `G1` has elements `e1` and `e2` in the database, and the ZIP file has elements `e2` and `e3`, after the execution of the import, group `G1` will have elements `e2` and `e3`. However, if the value of `listelemcmd` had been "`add`," then after the import, `G1` would have elements `e1`, `e2` and `e3`. If the value specified was "`delete`," then after import, group `G1` would have element `e1` only as `e2` would have been deleted.

Export Policies to DESTDIR, But Do Not Create a ZIP File

To export policies to DESTDIR, but not create a ZIP file, issue the following command:

```
$ sh runImportExport.sh -action export -outdir DESTDIR -exportmode file
-module groups Group1 Group2
```

If `exportmode` is "`file`," then the data is exported as one or more XML files.

> **Note:** The command does not work for modules like policies and questions which have dependent data. A error will occur with the message that a ZIP stream is expected.

26.2.2.6 Import Options

The `batchmode` option controls the database commits when list items are imported in a batch. When the batch reaches its limit, the objects are inserted into the database. If `batchmode` is equal to `true`, the database update is also committed. By default, `batchmode` is set to `false`.

```
batchmode {true | false}
```

> **Note:** `batchmode` is not to be used in conjunction with importing other modules. It should be used with Lists only.

Here is an example of `batchmode` usage:

Import Groups in Batch Mode

To import groups in batch mode, issue the following command:

```
$ sh runImportExport.sh -action import -module groups -batchmode true
```

26.2.2.7 Importing Multiple Types of Entities in One Transaction

The examples preceding cover only those scenarios where the entities to be processed are of the same type. To be able to process different types of modules together, the command line has been altered to support multiple modules. All entities specified in a command are processed in a single transaction, which enables a related set of entities to be used together to ensure the "all or nothing" approach.

Here are examples of importing modules together:

Import Various Modules Together

To import various modules together, issue the following command:

```
$ sh runImportExport.sh -action import
-module groups 5grps.zip
-module models model1.zip
```

> **Note:** The action parameter is not to be repeated, but only the command from the `-module` parameter is repeated as per the different items to be imported. The order of the items supplied in the command line is retained for both, the type of entities, and the files for each entity.

26.2.2.8 Multiple Modules and Extra Options (Common vs. Specific)

Support for multiple modules raises many questions:

- What about the extra options?
- How to specify options common to all modules?
- How to specify options specific to a certain module, even though it has been defined as a common option?

The following things can be kept in mind:

- When writing an import or export command, keep in mind that `-module` is considered as the beginning of a new set of options. Everything that follows `-module` forms one set of options.
- Everything that is specified before the first `-module` option is taken as a set of common options, which are applied to each `-module`.
- If a certain option is specified as a common option and is also specified as a module specific option, the specific value will take precedence.

Examples are:

Export Everything to "all" Directory, but Policies to "policies" directory

To export everything to "`all`" directory, but policies to "`policies`" directory, issue the following command:

```
$ sh runImportExport.sh -action export -outdir all

-module models -outdir models

-module groups
```

Export Groups G1 and G2 for Delete Items, and G3 and G4 for Replace Items

To export groups `G1` and `G2` for delete items and `G3` and `G4` for replace items, issue the following command:

```
$ sh runImportExport.sh -action export

-module groups -listelemcmd delete G1 G2

-module groups -listelemcmd replace G3 G4
```

26.2.2.9 Transaction Handling

Transaction handling is different from imports and exports.

Import operates strictly in one transaction, except when using batch mode for importing lists. If there is any error in importing any entity for any module, the entire process is rolled back. Thus, no database updates will be committed. You may also note that though import strictly follows one transaction, it does not break down if it encounters invalid items in a list (for example, importing a city with an incorrect state or a country, and so on.) A warning message is logged and the import process continues, ignoring such items.

Export operates on a "best effort" basis. If an export for any entity fails, it continues with the next entity. The reason is that export does not perform any database updates. It only selects information from the database and places it into files.

26.2.2.10 Upload Location Database

To use the IP location loader utility, follow the setup instructions in Section 26.3, "Importing IP Location Data."

26.2.3 Globalization

For this release, CLI is not globalized.

26.3 Importing IP Location Data

Geolocation is a technology that uses data to ascertain the location of a network-connection enabled device. OAAM uses IP geolocation data to access the risk associated with a given IP address and for behavioral profiling. This IP location data along with the updates are acquired from third party providers. To enable these features, the data must be loaded into an OAAM database. The out of the box OAAM geolocation data loader supports data from both Quova and MaxMind.

Data from other providers may require a custom data loader. IP location data needs to be periodically updated according to the data provider's guidelines. Generally, data is updated at least once a month. The recommendation is to implement an automated job to periodically download new data from the third party service provider and load it into OAAM.

This section describes how to import IP location data into the Oracle Adaptive Access Manager database.

Note: the location data loading process is an offline process. It is required to run when there is a location data update, which is typically once or twice a month depending on the provider. Real time processing is not directly impacted by the location data loading process, because the database is the only shared component between real time and offline processes.

This section contains the following subsections:

- Loading the Location Data to the Oracle Adaptive Access Manager Database
- System Behavior
- Quova/Neustar File Layout
- Oracle Adaptive Access Manager Tables
- Verifying When the Loading was a Success

26.3.1 Loading the Location Data to the Oracle Adaptive Access Manager Database

Set up the Oracle Adaptive Access Manager CLI environment before you run any of the scripts. For details refer to Section 2.3, "Setting Up the CLI Environment."

26.3.1.1 Setting Up for SQL Server Database

To load data to Microsoft SQL Server database, `sqljdbc.jar` should be copied to a third party directory. This file can be downloaded for free from Microsoft at `http://www.microsoft.com/downloads/details.aspx?FamilyID=6d483869-816a-44cb-9787-a866235efc7c&DisplayLang=en`

26.3.1.2 Setting Up IP Location Loader Properties

1. Change to the `<ORACLE_MW_HOME>/<IAM_HOME>/oaam/cli` directory and make a copy of the sample `bharosa_location.properties` file.

   ```
   cp sample.bharosa_location.properties bharosa_location.properties
   ```

2. Update `bharosa_location.properties` with the location data details as in the following example. The location data should be obtained from a supported third party service provider, such as MaxMind, Quova/Neustar, and others.

Note that the properties marked as "Advanced" are not to be changed in general.

Table 26–3 IP Loader Properties

IP Loader Properties	Description
location.data.provider	quova or maxmind
location.data.file	/tmp/quova/EDITION_Gold_2008-07-22_v374.dat.gz
location.data.ref.file	/tmp/quova/EDITION_Gold_2008-07-22_v374.ref.gz
location.data.anonymizer.file	/tmp/quova/anonymizers_2008-07-09.dat.gz
location.data.location.file	only if maxmind location data is to be loaded; else leave this property unset/blank
location.data.blocks.file	only if maxmind location data is to be loaded; else leave this property unset/blank
location.data.country.code.file	only if maxmind location data is to be loaded; else leave this property unset/blank
location.data.sub.country.code.file	only if maxmind location data is to be loaded; else leave this property unset/blank

Table 26–3 (Cont.) IP Loader Properties

IP Loader Properties	Description
location.loader.database.pool.size	number of threads to use to update the database
location.loader.dbqueue.maxsize	Advanced: maximum number of location records to be kept in queue for database threads
location.loader.cache.location.maxcount	Advanced: maximum number of location records to be kept in cache, while updating existing location data
location.loader.cache.split.maxcount	Advanced: maximum number of location split records to be kept in cache, while updating existing location data
location.loader.cache.anonymizer.maxcount	Advanced: maximum number of anonymizer records to be kept in cache, while updating existing location data
location.loader.database.commit.batch.size	Maximum number of location records to batch before issuing a database commit
location.loader.database.commit.batch.seconds	Maximum time to hold an uncommitted batch
location.loader.cache.isp.maxcount	Maximum number of ISP records to be kept in cache

26.3.1.3 Setting Up for Loading MaxMind IP data

Before running the IP location loader, `Blocks.csv` file from MaxMind must be preprocessed with the following commands:

```
$ mv Blocks.csv Blocks-original.csv
$ sed -e 's/\"//g' Blocks-original.csv | sort -n -t, -k1,1 -o Blocks.csv
```

26.3.1.4 Setting Up Encryption

Refer to Chapter 2, "Setting Up the OAAM Environment" for information on setting up encryption.

26.3.1.5 Loading Location Data

After completing the setup detailed preceding, run the following command to load the location data into the Oracle Adaptive Access Manager database.

1. Set the `JAVA_HOME` environment variable to point to the location of the JDK.

   Make sure the `JAVA_HOME` environment variable is set to the JDK certified for the Identity Management Suite for *11g*.

2. Run the `loadIPLocationData` script.

   From bash shell, execute `loadIPLocationData.sh`

   From Windows command prompt, execute `loadIPLocationData.cmd`

   The command returns 0 when the data load is successful; on failure it returns 1.

IP Geolocation data needs to be periodically updated according to the data provider's guidelines. This is generally at least once a month. The recommendation is to have IT staff implement an automated job to periodically download fresh data from provider and load into OAAM

26.3.2 System Behavior

The IP location loader utility reads the information from the IP location data files (from Quova/Neustar or MaxMind) to populate the IP location tables in the Oracle Adaptive Access Manager system.

The IP location loader utility reads the information from the IP location data files (from Quova/Neustar or MaxMind) to populate the IP location tables in the Oracle Adaptive Access Manager system. The first time the utility is run against a new database, it inserts one or more rows into the vcrypt_ip_location_map for each record in the data file. It also creates a new record in vcrypt_country for each unique country name in the data file, a new record in vcrypt_state for each unique combination of country name and state name in the data file, and a new record in vcrypt_city for each unique combination of country name, state name, and city name in the data file.

When the IP location loader is run with a new data file against an already populated database, it skips records in the datafile that have matching, identical records in the vcrypt_ip_location_map table. It creates a new row in the vcrypt_ip_location_map for each record in the data file whose FROM_IP_ADDR does not already appear in the database. It updates the rows in the vcrypt_ip_location_map whose FROM_IP_ADDR matches the record in the data file, but has different data in other columns. The loader also creates new countries, states, and cities that do not already exist in the database.

Note: Neustar/Quova and MaxMind data can be loaded without the OAAM loader (out of the box).

26.3.3 Quova/Neustar File Layout

The Quova/Neustar data file is a pipe-delimited ('|') file, with 29 fields on each line, and one record per line. The information in these tables comes from Quova/Neustar's GeoPoint Data Glossary. In the following table, IP represents the vcrypt_ip_location_map table, CO represents the vcrypt_country table, ST represents the vcrypt_state table, and CI represents the vcrypt_city table.

The file layout is as follows:

Table 26–4 Quova/Neustar File Layout

Quova/Neustar Field	Oracle Adaptive Access Manager Field	Description
Start IP	IP.from_ip_addr	The beginning of the IP range, also used as an alternate primary key on the vcrypt_ip_location_map table.
End IP	IP.to_ip_addr	The end of the IP range.
CIDR	(not used)	
Continent	(not used)	
Country	CO.country_name	The country name.
Country ISO2	(not used)	
Region	(not used)	
State	ST.state_name	The state name.
City	CI.city_name	The city name.
Postal code	(not used)	
Time zone	(not used)	
Latitude	CI.latitude	The latitude of the IP address. Positive numbers represent North, and negative numbers represent South.

Table 26–4 (Cont.) Quova/Neustar File Layout

Quova/Neustar Field	Oracle Adaptive Access Manager Field	Description
Longitude	CI.longitude	The latitude of the IP address. Positive numbers represent East, and negative numbers represent West.
Phone number prefix	(not used)	
AOL Flag	mapped to IP.isp_id	Tells whether the IP address is an AOL IP address.
DMA	(not used)	
MSA	(not used)	
PMSA	(not used)	
Country CF	IP.country_cf	The confidence factor (1-99) that the correct country has been identified.
State CF	IP.state_cf	The confidence factor (1-99) that the correct state has been identified.
City CF	IP.city_cf	The confidence factor (1-99) that the correct city has been identified.
Connection type	mapped to IP.connection_type	Describes the data connection between the device or LAN and the internet. See the Connection Type mapping.
IP routing type	mapped to IP.routing_type	Tells how the user is routed to the internet. See the IP Routing Type mapping.
Line speed	mapped to IP.connection_speed	Describes the connection speed. This depends on connection type. See the Connection Speed mapping.
ASN	IP.asn	Globally unique number assigned to a network or group of networks that is managed by a single entity.
Carrier	IP.carrier	The name of the entity that manages the ASN entry.
Second-level Domain	mapped to IP.sec_level_domain	The second level domain of the URL. For example, Name in www.example.com. This is mapped through the Quova/Neustar reference file.
Top-level Domain	mapped to IP.top_level_domain	The top level domain of the URL. For example,. com in www.example.com. This is mapped through the Quova/Neustar reference file.
Registering Organization	(not used)	

26.3.3.1 Routing Types Mapping

A table for routing types mapping is shown in Table 26–5.

Table 26–5 Routing Types Mappings

Routing Type	Oracle Adaptive Access Manager ID	Description
fixed	1	User IP is at the same location as the user.
anonymizer	2	User IP is located within a network block that has tested positive for anonymizer activity.
aol	3	User is a member of the AOL service; The user country can be identified in most cases; any regional info more granular than country is not possible.
aol pop	4	User is a member of the AOL service; The user country can be identified in most cases; any regional info more granular than country is not possible.
aol dialup	5	User is a member of the AOL service; The user country can be identified in most cases; any regional info more granular than country is not possible.
aol proxy	6	User is a member of the AOL service; The user country can be identified in most cases; any regional info more granular than country is not possible.
pop	7	User is dialing into a regional ISP and is likely to be near the IP location; the user could be dialing across geographical boundaries
superpop	8	User is dialing into a multistate or multinational ISP and is not likely to be near the IP location; the user could be dialing across geographical boundaries.
satellite	9	A user connecting to the Internet through a consumer satellite or a user connecting to the Internet with a backbone satellite provider where no information about the terrestrial connection is available.
cache proxy	10	User is proxied through either an internet accelerator or content distribution service.
international proxy	11	A proxy that contains traffic from multiple countries.
regional proxy	12	A proxy (not anonymizer) that contains traffic from multiple states within a single country.
mobile gateway	13	A gateway to connect mobile devices to the public internet. For example, WAP is a gateway used by mobile phone providers.
none	14	Routing method is not known or is not identifiable in the preceding descriptions.
unknown	99	Routing method is not known or is not identifiable in the preceding descriptions.

26.3.3.2 Connection Types Mapping

Table 26–6 shows connection types mappings.

Table 26–6 Connection Types Mappings

Connection Type	Oracle Adaptive Access Manager ID	Description
ocx	1	This represents OC-3 circuits, OC-48 circuits, and so on, which are used primarily by large backbone carriers.
tx	2	This includes T-3 circuits and T-1 circuits still used by many small and medium companies.
satellite	3	This represents high-speed or broadband links between a consumer and a geosynchronous or lowearth orbiting satellite.
framerelay	4	Frame relay circuits may range from low to highspeed and are used as a backup or alternative to T-1. Most often they are high-speed links, so GeoPoint classifieds them as such.
dsl	5	Digital Subscriber Line broadband circuits, which include aDSL, iDSL, sDSL, and so on. In general ranges in speed from 256k to 20MB per second.
cable	6	Cable Modem broadband circuits, offered by cable TV companies. Speeds range from 128k to 36MB per second, and vary with the load placed on a given cable modem switch.
isdn	7	Integrated Services Digital Network high-speed copper-wire technology, support 128K per second speed, with ISDN modems and switches offering 1MB per second and greater speed. Offered by some major telcos.
dialup	8	This category represents the consumer dialup modem space, which operates at 56k per second. Providers include Earthlink, AOL and Netzero.
fixed wireless	9	Represents fixed wireless connections where the location of the receiver is fixed. Category includes WDSL providers such as Sprint Broadband Direct, as well as emerging WiMax providers.
mobile wireless	10	Represents cellular network providers such as Cingular, Sprint and Verizon Wireless who employ CDMA, EDGE, EV-DO technologies. Speeds vary from 19.2k per second to 3MB per second.
consumer satellite	11	
unknown high	12	GeoPoint was unable to obtain any connection type or the connection type is not identifiable in the preceding descriptions.
unknown medium	13	GeoPoint was unable to obtain any connection type or the connection type is not identifiable in the preceding descriptions.
unknown low	14	GeoPoint was unable to obtain any connection type or the connection type is not identifiable in the preceding descriptions.
unknown	99	GeoPoint was unable to obtain any connection type or the connection type is not identifiable in the preceding descriptions.

26.3.3.3 Connection Speed Mapping

Table 26–7 shows connection speed mappings.

Table 26–7 Connection Speed Mappings

Connection Speed	Oracle Adaptive Access Manager ID	Description
high	1	OCX, TX, and Framerelay.
medium	2	Satellite, DSL, Cable, Fixed Wireless, and ISDN.
low	3	Dialup and Mobile Wireless.
unknown	99	Quova/Neustar was unable to obtain any line speed information.

26.3.4 Oracle Adaptive Access Manager Tables

This section contains the tables used by the ETL process

26.3.4.1 Anonymizer

The following tables and sequences are used for uploading the Anonymizer data. Make sure the ETL process has sufficient privileges to read and update these tables.

Table 26–8 Anonymizer Data

Name	Table/Sequence
V_LONG_VALUE_ELEM_SEQ	Sequence
VCRYPT_LONG_VALUE_ELEMENT	Table
VCRYPT_VALUE_LIST	Table
V_VALUE_LIST_SEQ	Sequence
VCRYPT_CACHE_STATUS	Table
VCRYPT_CACHE_STATUS_SEQ	Sequence

26.3.4.2 Tables in Location Loading

The IP location loader requires read/write access to the following tables:

- VCRYPT_IP_LOCATION_MAP
- V_IP_LOCATION_MAP_SEQ
- V_IP_LOC_MAP_HIST
- V_IP_LOC_MAP_HIST_SEQ
- V_IP_LOC_MAP_SPLIT
- V_IP_LOC_MAP_SPLIT_SEQ
- V_IP_LOC_MAP_SPLIT_HIST
- V_IP_LOC_MAP_SPLIT_HIST_SEQ
- VCRYPT_COUNTRY
- V_COUNTRY_SEQ
- V_COUNTRY_HIST
- V_COUNTRY_HIST_SEQ
- VCRYPT_STATE

- V_STATE_SEQ
- V_STATE_HIST
- V_STATE_HIST_SEQ
- VCRYPT_CITY
- V_CITY_SEQ
- V_CITY_HIST
- V_CITY_HIST_SEQ
- VCRYPT_ISP
- VCRYPT_ISP_SEQ
- V_ISP_HIST
- V_ISP_HIST_SEQ
- V_LOC_LOOKUP
- V_LOC_LOOKUP_SEQ
- V_LOC_UPD_SESS
- V_LOC_UPD_SESS_SEQ
- V_UPD_LOGS
- V_UPD_LOGS_SEQ
- VCRYPT_LONG_VALUE_ELEMENT
- V_LONG_VALUE_ELEM_SEQ
- VCRYPT_VALUE_LIST
- V_VALUE_LIST_SEQ
- VCRYPT_VALUE_LIST_HIST
- V_VALUE_LIST_HIST_SEQ
- VCRYPT_CACHE_STATUS
- VCRYPT_CACHE_STATUS_SEQ
- VCRYPT_TRACKER_USERNODE_LOGS
- VCRYPT_ALERT
- VR_MAX_BLOCKS_LOGS

26.3.5 Verifying When the Loading was a Success

The loader script returns 0 when the data load is successful; on failure it returns 1.

Part XII

Multitenancy

This part of the book provides concepts on multitenancy in Oracle Adaptive Access Manager

It contains the following chapter:

- Chapter 27, "Multitenancy Access Control for CSR and Agent Operation"

27

Multitenancy Access Control for CSR and Agent Operation

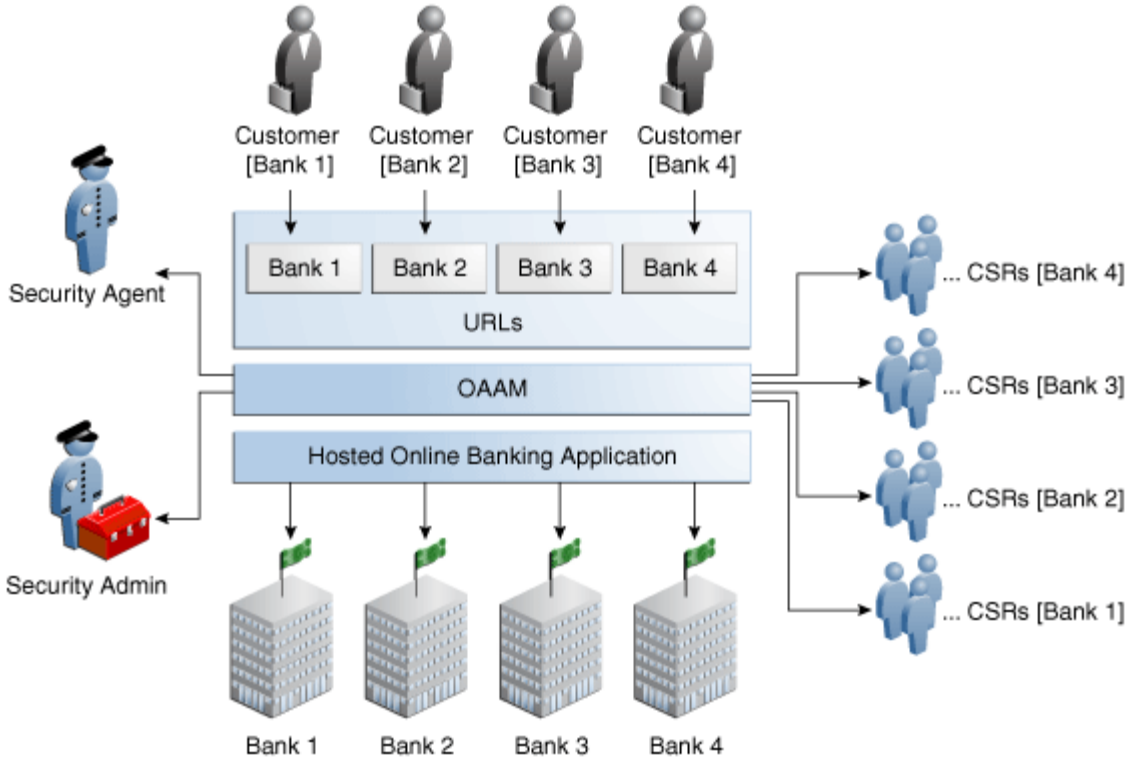
This chapter details the multitenancy access control feature of Oracle Adaptive Access Manager. Multitenancy access control handles access to the OAAM Administration Console for each organization so that it results in a different experience for administrative users of multiple tenants.

27.1 Multitenancy Access Control

Multitenancy refers to a principle in software architecture where a single instance of the software runs on a server, serving multiple client organizations. With a multitenant architecture, each client organization feels as if they are working with a separate customized application instance.

Figure 27–1 shows a multitenancy access control scenario.

Figure 27–1 Multitenant Access Control Scenario



Application ID

This is the application request coming from the client (browser). Generally the URL is mapped to an Application ID which is mapped to an Organization ID.

Organization ID

Each user belongs to only one Organization ID. It identifies what tenant applications a user utilizes and scopes which OAAM policies will run for them.

Shared Infrastructure/Shared Application

In the example shown in Figure 27–1, the online banking application (same instance of the same server) has its data partition in such a way that the application appears different for each client.

Awareness of the Applications

The online banking application can be customized by organizations as though each organization had a separate application. Each "application" corresponds to an Application ID: Bank1, Bank2, Bank3, and Bank4.

27.2 Mapping of Application ID (Client-Side) to Organization ID (Administration Side)

To ensure that a customer's data is unique from that of other customers, the Application ID is mapped to an Organization ID for use in OAAM Admin.

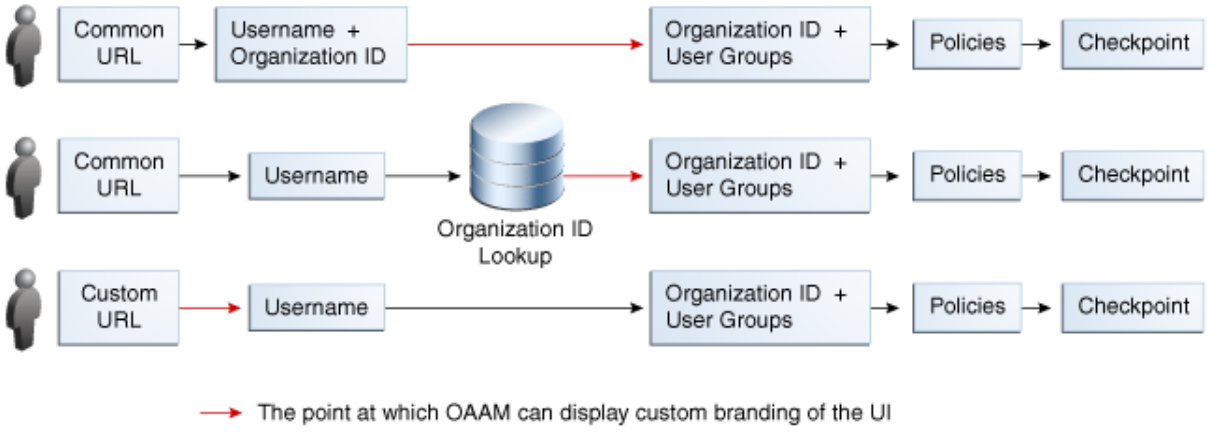
The Application ID of the client application is mapped to an Organization ID. Users are autoprovisioned to an Organization ID when they access an application for the first

time. For information on mapping applications to Organization IDs, refer to the "*Determining Application ID and User Group*" section of the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

The Application ID is used by OAAM Server to personalize and brand customer pages. They are used by OAAM Admin to determine which set of configuration properties to use to customize the customer applications. For information on customizing user interface branding, refer to the "*Customizing User Interface Branding*" section of the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

From the user's perspective, there is no indication that the (online banking) application is being shared among multiple tenants. When the users access that application, they may go through a specific URL for the bank application or communicate the Organization ID in one of two other ways. OAAM Server can use the URL to display the appropriate pages. Then, the user enters his User ID, which is mapped to an Organization ID.

Figure 27–2 Mapping of Application ID to Organization ID



But if banks share a common URL, OAAM Server does not know where users are logging in from; therefore it displays a generic bank screen. OAAM Server can be configured for one of the following scenarios: In example 1, the user enters a User ID and the Organization ID and that combination tells OAAM Server which pages to display. In example 2, the user enters a User ID and through an Organization ID look up OAAM Server is able to determine the correct pages to display. In example 3, the user is directed to the correct screen as soon as he accesses the URL.

27.3 Set Up Access Control for Multitenancy

To set up access control for multitenancy, perform the procedures in this session.

27.3.1 Set Access Control for Multitenancy

To set up access control for multitenancy, perform the following steps:

1. In the Properties Search page, specify bharosa.multitenant.boolean as the name to search for.
2. Click **Search**.

3. Change the value of the bharosa.multitenant.boolean property to true. If you cannot find the property, create it and set it to true.

27.3.2 Providing CSR Access to Particular Organizations

To provide access to a particular organization to the CSR administrative user, the CSR administrative user needs to belong to that organization.

At any point, a CSR or CSR Manager can be servicing more than one organization. He will be able to see all the cases of the organizations he is assigned to.

When CSRs are changed or added to an organization, the setting takes effect at the next login and not for the current login.

If you are migrating from a previous release, you can continue to operate as you have been without any change because out of the box, multitenancy access control is off. If you want multitenancy access control, you must set it up. Once you have set up multitenancy, access control is applied. For example, if a CSR belonged to Organization 1 in a previous release, he will still have access to all the cases in Organization 1 after access control is applied. If there is no access control previously, the CSR will have access to all cases. Now if multitenancy access control is set up, he can only see cases from Organization 1. If the CSR was working on five different cases from five different organizations before the upgrade to 11*g*, now he will not have access to them.

27.3.2.1 Using WebLogic

To achieve this, an organization with the exact same name as the Organization ID must exist and then that organization should be assigned to the CSR administrative user:

1. Log in to the WebLogic Administration Console as a WebLogic user:

   http://*hostname*:*port*/console

   Where hostname is the hostname of the Administration Server and port is the address of the port on which the Administration Server is listening for requests (7001 by default).

2. Create a group/organization using WebLogic Security Realms that exactly match the name of the Organization ID. For example, Bank1.

   Refer to the "Create groups" section of the Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help 11g.

3. Assign, as necessary/applicable, this group/organization to the CSR and CSR Manager, as necessary.

   Refer to the "Add users to groups" section in the Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help 11g.

To move a user from working on one organization to another:

1. Log in to the WebLogic Administration Console as a WebLogic user:

   http://*hostname*:*port*/console

   Where hostname is the hostname of the Administration Server and port is the address of the port on which the Administration Server is listening for requests (7001 by default).

2. In the Settings for Realm Name page, go to Users and Groups > Users in Security Realms.

3. Change the user membership of the group/organization, by removing the group/organization from the CSR and CSR Manager, and adding the new group/organization to the CSR and CSR Manager.

   The changes are effective from the next login for the CSR and CSR Managers.

   Refer to the "Modify users" section in the Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help 11g.

27.3.2.2 Adding Users and Groups to Oracle Internet Directory

If you want to add users and groups through OID, refer to the "Adding Users and Groups to Oracle Internet Directory" in the *Oracle Fusion Middleware Tutorial for Oracle Identity Management*.

27.3.2.3 Adding Users and Groups in the LDAP Store

If you want to take care of user and group creation in the external LDAP store, see "Creating Users and Groups for Oracle Adaptive Access Manager" in the *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*.

27.4 What to Expect

This section provides summaries and examples of the multitenant access control experience in OAAM. Multitenancy access control is only applicable for case management data access and filtering on Organization ID and filtering on Session search results. Oracle Adaptive Access Manager cannot control the data administration and security personnel view in the OAAM Administration Console.

Table 27–1 Multitenant Experiences for CSR and Agents

Task	CSR Experience	Agent Experience
Create CSR Case	CSRs can select one Organization ID to create a case.	N/A
Create Agent Case	N/A	Agents can select one Organization ID to create a case.
Search Cases	CSRs can see Organization IDs for which they have access, and from which they can select one (or more) Organization IDs.	Agents can see Organization IDs for which they have access, and from which they can select one (or more) Organization IDs.
View Cases	CSRs are able to see the cases from only those organization's users to which they have access.	Agents are able to see the cases from only those organization's users to which they have access. Escalated cases associated with the Organization ID to which agent has access are also included in the search result if it fits the query criterion.
Case Details	CSR can see the case detail for cases that belong to any user belonging to an organization he has access to. If the user does not belong to the organization he has access to, the CSR will not see that case in the search results.	Agents can see the case detail for cases that belong to any user belonging to an organization they have access to or cases that are associated with their Organization ID.
Case Actions	CSRs can perform case actions on cases they can see.	Agent can perform case actions on a cases they can see.

Table 27–1 (Cont.) Multitenant Experiences for CSR and Agents

Task	CSR Experience	Agent Experience
Sessions Search and Details Pages	CSRs do not have access to sessions search and details pages.	Agent cannot navigate to any of the details pages from sessions page or sessions search if multitenant access control is enabled. If multitenant access control is disabled, Agent is able to access details pages from any sessions search if the link is available.
Search Sessions	N/A	Agents can search sessions belonging to the users that belong to the organizations that they have access to and those organizations to which they have access.
Search Cases (with changed Organization ID Assignment)	CSR was assigned to "org1." He has created cases created for users in "org1." He serviced users for that organization for some time. He is then removed from "org1" service and has started servicing "org2." When he logs in again after this, he can no longer see the cases for "org1" (whether he created them or not). He can only see and work on the cases that belong to "org2."	Same experience as the CSR.
Link Sessions	N/A	Agents can link sessions to the cases belonging to organizations that they have access to. Also in search sessions for linking, Agents are able to see the sessions of only those organizations to which they have access.

27.5 Multitenancy Access Control Use Case

The following sections describe examples of common multitenant access control use cases.

27.5.1 CSR and CSR Manager Access Controls

Second Bank has deployed OAAM to secure both the consumer banking application and the business banking application. Their CSRs are broken up into two separate organizations. One organization assists only consumer banking customers and the other assists only business banking customers. They need to have strict control over the customer data visible to each of these CSR organizations. Also, there is a organization of senior CSR managers that need to have access to data for all customers. When the consumer banking CSR searches, views, creates, edits cases they only see data related to consumer banking customers. Likewise the business banking CSRs only see data for business banking customers. Neither is even aware that OAAM is doing this pre-filtering of data. The CSR managers can see data related to both consumer and business banking customer activity and they can perform all case flow operations.

Actors: CSR and CSR Manager

Setup: To set up the scenario:

1. Enable multitenancy access control.
2. Create consumer and business organizations to assist the customers with the exact names as the Organization IDs.

   One organization assists only consumer banking customers and the other assists only business banking customers. They need to have strict control over the customer data visible to each of these CSR organizations.
3. Create CSR1, CSR2, and CSRSenior as administrators.
4. Assign CSR1 to the consumer organization, CSR2 to the business organization, and CSRSenior to both consumer and business organizations.

   To provide access to a particular organization to the CSR administrative user, the CSR administrative user needs to belong to that organization.

   When the consumer banking CSRs (CSR1) search, view, create, and edit cases they only see data related to consumer banking customers. Likewise the business banking CSRs (CSR2) only see data for business banking customers. Neither is even aware that OAAM is doing this pre-filtering of data. The CSR managers (CSRSenior) can see data related to both consumer and business banking customer activity and they can perform all case flow operations.

Flow:

1. CSR opens the OAAM Administration Console.
2. CSR sees only the appropriate user interface views and controls afforded his role
3. CSR sees only the appropriate data afforded by his role (Organization ID). He cannot see data for users/sessions related to Organization IDs he does not have permission to view.
4. CSR Manager sees only the appropriate data afforded by his role (Organization ID). He cannot see data for users/sessions related to Organization IDs he does not have permission to view.

27.5.2 Agent Access Controls

Second Bank has deployed OAAM to secure both the consumer banking application and the business banking application. Their security analysts are broken up into two separate groups. One group investigates only consumer banking issues and the other investigates only business banking issues. They need to have strict control over all session, policy, and so on, and data visible to each of these security analysts organizations. Also, there is a organization of senior security analysts managers that need to have access to all data. When the consumer banking security analysts searches, views, creates, edits cases they only see data related to consumer banking. Likewise the business banking security analysts only see data for business banking. Neither is even aware that OAAM is doing this pre-filtering of data. The security analysts managers can see data related to both consumer and business banking activity/polices/and so on and they can perform all case flow operations. As well, managers have a filter so they can choose to only view business banking cases/data or only consumer banking cases/data.

Actors: Security Analyst and CSR

Flow:

1. CSR/Analyst opens the OAAM Administration Console.
2. CSR/Analyst sees only the appropriate user interface views and controls afforded his role.
3. CSR/Analyst sees only the appropriate data afforded by his role (Organization ID). He cannot see data for users/sessions related to Organization IDs he does not have permission to view.
4. CSR/Analyst Manager sees only the appropriate data afforded by his role (Organization ID). He ca not see data for users/sessions related to Organization IDs he does not have permission to view.
5. CSR Manager can filter what data he sees based on Organization ID.

27.5.3 CSR Case API Data Access Controls

Second Bank decides to integrate OAAM with their existing customer ticketing application. They will use the APIs to get customer data and take customer service actions on behalf of customers. Their CSRs are broken up into two separate organizations. One organization assists only consumer banking customers and the other assists only business banking customers. They need to have strict control over the customer data visible to each of these CSR organizations. Also, there is an organization of senior CSR managers that need to have access to data for all customers. The API will allow them to configure the integration to control access to the customer data based on Organization ID to these different groups of employees.

Actor: CSR

Flow:

1. CSR opens his custom console.
2. CSR sees only the appropriate data afforded by his role (organization ID)

27.6 Troubleshooting/FAQ

This section provides information on how to troubleshoot problems that you might encounter when setting up multitenancy access control.

27.6.1 I thought I had set up multitenancy access control but CSRs and Investigators still have access to all cases

Verify that you have bharosa.multitenant.boolean set to true. If set to false, multitenancy access control is disabled. By default, multitenancy access control is disabled.

When multitenancy access control is disabled:

- CSRs and Investigators can view and select from all the Organization IDs during case creation.
- In the Cases Home page all Organization IDs are listed for CSRs and Investigators.

27.6.2 I have set up multitenancy access control and I have verified that the property is set to true but the CSRs and Investigators are able to access to all cases

You must log out and log back in for access control to be applied. Changing the property takes effect at the next login and not for the current login.

27.6.3 Are Security and System Administrators affected when I set up multitenancy access control?

Enabling and disabling multitenancy access control has no effect on users with the security and system administrator roles. Multitenancy access control is only applicable to case management. Their user experience will not be affected.

27.6.4 Can CSRs and Investigators have access to multiple organizations?

Yes. They can be assigned to multiple organizations.

27.6.5 Can I limit access of a CSR or Investigator to certain organizations even though he had access before?

Yes. Once access control is set up appropriately, the CSR or Investigator will not have access to that Organization ID anymore. He will be limited from accessing the cases of that organization. Changing the property takes effect at the next login and not for the current login.

27.6.6 My CSRs and Investigators have no access to cases. What is wrong?

Make sure the CSRs and Investigators are assigned to proper roles and organizations so they can access the cases.

Part XIII

Troubleshooting

This part provides information for troubleshooting symptoms and gives solutions to the difficulties you may experience.

28

Performance Considerations and Best Practices

Checking for performance problems requires observation of the effects that lead to the decision that a performance issue exists and access to configuration and performance information.

This chapter covers performance troubleshooting for OAAM.

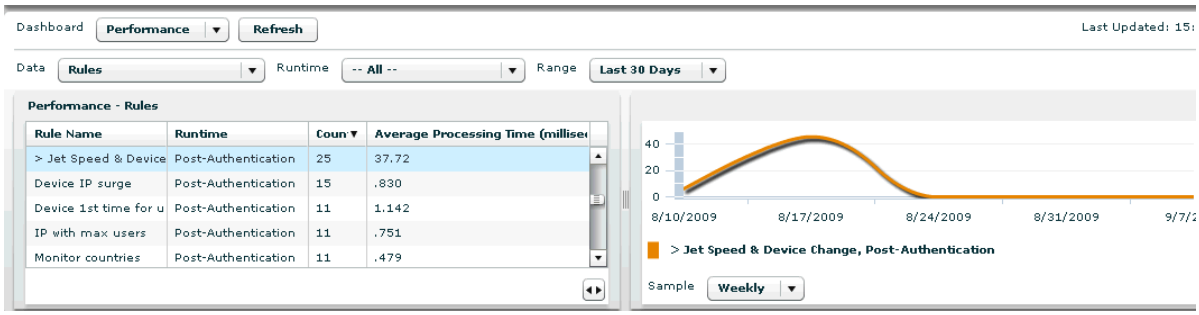
28.1 General Performance Tuning and Troubleshooting

Troubleshooting Process

The troubleshooting process starts with the top-level troubleshooting flow:

1. Check rules and policy performance using the OAAM dashboard's performance section.
   a. In the **Dashboard** list, click **Performance**.
   b. In the **Data** list, click the Rules or Policies data type.

Figure 28–1 Viewing Data Type by Performance



2. To check database performance, use Fusion Middleware Control to check the SQL query performance.
3. Examine diagnostics log, memory configuration check, network bottlenecks, CPU monitoring.

   Review all the performance areas and concerns to isolate where the bottlenecks are occurring to ensure you are getting the best performance possible. Gathering data and investigating the I/O bottlenecks provides options for the DBA or the designer on how to fix the problem. If the system does not perform as expected, you can experience increased response times and frequent time-outs.

You can also monitor key metrics in Fusion Middleware Control.

4. Check connectivity between application server and database, jStack stack trace, or thread dump.
5. Check the following OAAM properties:

```
bharosa.db.query.performance.warning.print.stack=false
bharosa.db.query.performance.warning.threshold.ms=500 (print WARN for every
call that takes more than 0.5 secs, this can be adjusted for optimal value
other than this).
bharosa.db.query.performance.warning.print.stack=true
```

Performance Troubleshooting

If the calls to the OAAM APIs begin to degrade over time, there are a few possible causes to check:

- The database is becoming too large. Regular archiving and purging of old data from the database should prevent problems.
- The hard drive on the serving machine may be too full. This could cause a variety of problems that would ultimately manifest as slow down or possibly a stopping of the application.
- The binaries responsible for the proper working of the application server have become corrupt. Check for recent or unusual modification times within the application directory of the Web container.
- The number of users or transactions per second has exceeded what the system was designed to handle*. Overcoming this will likely require additional hardware and/or more intelligent handling of incoming connections.

  * Metrics obtained by conducting pre-deployment performance testing on your reference staging hardware/software environment should enable you to pinpoint the maximum concurrent sessions and sessions per second that should not be exceeded.

28.2 Performance Monitoring and Troubleshooting Tools

In order to monitor and improve performance for your environment you need to know what tools are available and how to use each of these tools.

This section covers the following tools to give you an introduction as to what they are used for an how you can use them to collect performance related data.

Dashboard

Use the dashboard for a better insight into the performance of your system. Through statistics, you can view how long rules, policies, checkpoints, and APIs are taking to process. What are the average processing times for rules, policy and checkpoint executions? You can identify the items that consume the most resources (For example, which rules are the most and least expensive?). You can view the data for today, the last 1 day, last 7 days, last 30 days, or last 90 days. You can view the number of logins, KBA or OTP challenges, and Transactions per minute.

The dashboard provides data about the system health. Use it to determine if there are any bottlenecks. The Session Details page is also a useful tool that provides an overview of what rules and policies were run as well as collected details such as execution time, the time stamp, run time, the number of rules that were run, as well additional data.

To launch the Dashboard, in the Navigation tree of OAAM, double-click **Dashboard**. The Dashboard will appear in the OAAM Administration Console's right side.

Rule Logs

Create BI Publisher reports for rule logs to quickly obtain summary information and useful information that can assist you in determining where your performance bottlenecks may be.

Through reports, you can view detailed information about rules. Then, view the Session Details page for the execution time for rules. If the rule requires an unusual amount of time, perform further analysis. Also, check the execution of each runtime. How many seconds out of the box do we print queries? If query takes more than that threshold, print it.

Java Profiling

If the CPU of the application seems high and database is not up to speed, you can use the JAVA profiling tools. These provide data on the methods, code, and classes that require a lot of time. Using these tools may answer questions about how many executions occur, and the total time taken for the executions.

Oracle Fusion Middleware Control

You can use Fusion Middleware Control to monitor Oracle Adaptive Access Manager performance and activity.

1. Select OAAM under **Identity and Access** to go to the home page.

   In the home page, you can view a performance overview for Oracle Adaptive Access Manager.

2. Select **Performance Summary** from the Oracle Adaptive Access Manager menu in the upper left hand side of the home page to view performance metrics.

For information on monitoring status and performance with Fusion Middleware Control, see "Monitoring Oracle Fusion Middleware" in the *Oracle Fusion Middleware Administrator's Guide*.

Other Environment Dependant Tools

Use other environment dependant tools.

28.3 Policy and Rules - Performance Consideration

In most cases, creating of rules and policies should not be the focus when dealing with performance. However, as in any technology, there are tips and tricks that can be used to maximize performance when needed. Most of the considerations in this section are focused on the configuration.

Order Rules with Simple Conditions in the Beginning

Reordering rule conditions can improve the performance of rule evaluation in time, memory use, or both. Configure rules that are less complex, such as ones checking for a property or small variables, to run first in the order of evaluation. Configure the rules containing complex conditions like autolearning (a dynamic condition) to run after the simpler rules. The evaluation stops when a rule is evaluated to `true`. For example, if the first rule returns `true`, OAAM does not attempt to evaluate the second rule.

Consider Policy Structure and Behavior

Isolate the rules that require a great deal of time to process, then look at the policy to determine where performance issues might exists. For example, if it requires a great deal of time to execute all the rules associated to a policy, too many rules may be associated to a policy or more expensive rules are used. If there are too many rules, consider splitting them into different policies. If there are expensive rules consider optimizing the underlying SQL queries or optimizing/tuning database.

Running Conditions Multiple Times is Not Efficient/Can We Nest Them?

There policies where the outcome is to perform an action or give a score for a particular user or for when a feature is enabled. If a number of conditions are repeated that look for the particular user or an enabled feature in many rules, make the condition a decision point in one of your policies instead and continue from this point to a different flow. For example, if the condition is to check for a particular type of user, evaluating the same conditions many times evaluates the same users. If the condition is to check if a user is a mobile phone user and if he is, perform this action and give this score; and check if a user is a mobile phone user and if he is, perform that action and give another score, and so on. Instead of evaluating the condition in such a manner, considering nesting policies. Set up the evaluation to check if users are mobile phone customers and if they are, execute these different policies. In this way, you do not execute the conditions many times.

Order Rules So Not All Overrides are Evaluated

Are there overrides? Overrides (trigger combinations) are used to override the outcome of rules. In the Trigger Combination tab, each row in any trigger combination represents a rule that is presenting a policy. If there is a set of trigger combinations for a policy, each row corresponds to a rule. Each vertical column represents a combination of rules that are triggering or not. The trigger combinations evaluate sequentially, moving from column 1 to columns 2, 3, 4 and so on, and stop as soon as a rule return combination is matched.

Identify the rules that are more complex and arrange them in such a way that they are evaluated first. If the first column is true, the second column will not be looked at. Arrange rules so OAAM does not need to evaluate all the overrides.

Keep Only Required Rules, Patterns, and Logs

- Keep only required rules. If you are not using a rule, you may want to disable or remove it. A rule adds queries for every session that runs. You do not want additional queries to run on the database if it is not necessary. Out of the box, device rules are shipped. If you are not planning to use devices in evaluations, you can disable all the rules for devices.
- Keep only required patterns. If you are not using patterns in rules, disable or remove them. Each time you perform an operation and a session runs, autolearning can potentially run five to ten queries. If queries are run on the database, performance is affected.
- Keep only required updates (rule logs for example). The OAAM database has rule logs as a feature. Rule logs will update tables in the database. If you do not want every session available for analysis for investigation, you may want to completely turn detailed rule logs off or you can enable them only for the time you need them (for example, for 5 seconds).

Determine the Resource Bundles Needed for the Deployment

Resource bundle are properties files that contains locale-specific data used in internationalizing the application.

Consider if you need all the resource bundles and whether or not you can remove some. If your deployment is not multilingual, or if do not need all the resources and locales, consider not using some of the resource bundles.

Use Lightweight Applications and Policies/Rule Configuration

Use lightweight applications and policies/rules. In custom development, consider the resources required when adding a policy, rule, and action.

28.4 Logging - Performance Considerations

Rule Logging

Rule logging includes a large amount of data. Users who experience large numbers of logins per day will have many rows of data written in the logs.

You can configure rule logging such that detailed rule logs are created only if the execution time is more than a threshold. Then, the details are logged against the rules (runtime) with long execution time and hence the overhead of detailed logging is fair. If you want to set the minimum time required before detailed logging occurs, you need to set the following properties.

vcrypt.tracker.rulelog.detailed.minMillis=<time>

Logging

Oracle Adaptive Access Manager 11*g* components use the package java.util.logging as part of its logging infrastructure. This package is available in all Java environments. The OAAM loggers generate logging messages to report on errors and provide additional information about OAAM.

How much logging you need? The log level is used to define which messages should be written to the log. Reducing the amount of log output improves performance.

To access logging configuration:

1. Log in to Fusion Middleware Control as an administrator.
2. Under WebLogic Domain, click oaam_server_server1.
3. Expand the WebLogic Server tab, Logs, and select Log Configuration.
4. Click Log level and expand Root Logger > oracle > oracle.oaam.
5. Set log level to the level you need.

28.5 Database - Performance Considerations

Amount of Database Activity

The amount of database activity depends on several factors:

- Whether the user, device, or browser is new or existing
- If autolearning is used then the number of patterns
- Number of policies and rules defined and the number of checkpoints

OAAM prints out every SQL if the property `bharosa.db.query.performance.warning.threshold.ms` is set to zero.

Set this property and try a typical login and then grep for the log messages with the string "ms execution for" or "SQLCall".

That will give you an estimate about the typical database activity of login.

Database Queries to Determine the Space Used

The following query can be used to determine the average size of row in tables:

```
.
select table_name,
          avg_row_len
   from   user_tables
.
```

The following query can be used to determine the size of indexes of the tables:

```
.
   select inds.table_name,
          inds.index_name,
          sum( inds.sizes ) as index_bytes_per_row
   from   (
           select i.index_name,
                  i.table_name,
                  i.column_name,
                  decode(data_type, 'DATE'    , 7,
                                    'CHAR'    , data_length,
                                    'VARCHAR2', decode(
sign(data_length)-250, -1, .7*data_length+3, .7*data_length+1),
                                    'NUMBER'  ,
floor(nvl(data_precision,38)/2)+2 ) as sizes
           from   user_ind_columns i,
                  user_tab_columns t
           where  t.TABLE_NAME = i.table_name AND
                  t.COLUMN_NAME = i.COLUMN_NAME
           order by i.table_name, i.column_name
          ) inds
   group by inds.table_name, inds.index_name;
```

Database Tuning Practices

OAAM has indexes created out-of-the-box based on performance testing.

- The out-of-the-box indexes should be sufficient for most deployments but database administrators may choose to add additional indexes if they feel they are required after performance testing. This is rare however unless transactional use cases are involved.
- The database administrator may choose to adjust the database server parameters to tune I/O so that insets and updates are efficient
- The database administrator should monitor the production environment until the database server is stable

Oracle Partitioning Option

Partitioning is an option that extends Oracle Database 11g Enterprise Edition out-of-the-box capabilities.

- Deployments with more than 100K logins/transactions per day are recommended to utilize partitioning. When running the Oracle Fusion Middleware Repository Creation Utility (RCU) the partitioned scheme is used.
- Databases 500 GB and over should use partitioning.

OAAM Database Indexes Contention - Oracle Real Application Cluster (RAC) Specific

If high index contention occurs, you may want to partition the following indexes:

- PK_VT_TRX_LOGS
- PK_VT_ENT_TRX_MAP
- VT_TRX_LOGS_IDX3
- VT_WF_MONTHS_IDX1
- PK_VT_TRX_DATA
- VT_WF_YEARS_IDX0
- VT_WF_MONTHS_IDX0
- VT_TRX_LOGS_IDX6

Also partition the VT_USER_PROFILE table.

Database I/O (input/output)

Database I/O (input/output) performance problems may result if queries take a long time to run.

Audit and Query

Query and audit activities tend to perform many sequential reads and table scans on the production index/tablespaces. To lessen the performance impact, you might consider maintaining a logical standby database using DataGuard where you can have an option to query, audit, and perform reporting using the logical standby database. The logical standby database would have all the data as production, except for the last one hour. The production database instance can just be used to perform its inserts, updates, and so on, and also for active monitoring and alerts.

28.6 Memory - Performance Considerations

Memory Execution

Configure the application or content such that most of the executions are processing in memory.

Caching

The cache works by storing query results and making them available for later use. Use caching to return results in queries instead of pulling the information from the database each time. It is desirable that the information already exists in the cache. For example, cache user registration.

High Memory Usage Related to Caching

There are properties that you can use to control the maximum cache size. These properties are listed below:

Table 28–1 Cache Size Properties

Property Name	Object Cached	Default Value
vcrypt.fingerprint.cache.maxsize	Fingerprints	10000
bharosa.tracker.location.location.cache.maxsize	IP Locations	1000
bharosa.tracker.location.city.cache.maxsize	Cities	1000
bharosa.tracker.location.state.cache.maxsize	States	1000
bharosa.tracker.location.country.cache.maxsize	Countries	1000

A server restart is required after making changes.

When the appropriate property is set the cache will fill up to the size set and then the least recently used entries will be removed when a new entry is inserted.

Reduce Disk I/O

- Logging levels: Makes sure no unnecessary loggers are turned on.
- Check that the JVM Settings are correct for specialized applications: Did you configure the right settings? Out of the box, most of these settings are optimal.
- A slow database might add to disk I/O; thereby causing the application to run slowly.

28.7 Network - Performance Considerations

Network Calls

If the database is remote, queries to the database may require multiple hops. The more hops, the longer it takes for data to go from source to destination. Also, input can be affected if you are using Web services/SOAP and many sessions are being created.

SOAP Calls

Check if there are network issues.

Look for time-outs. Check that the network is set up correctly.

.Net/SOAP Web Service Integrated OAAM Deployment Seems Slow

Make sure the network communication between the .Net/SOAP application and OAAM Server is optimized. There should not be any extra hops which will add unwanted latency.

28.8 Hardware - Performance Considerations

Infrastructure

- Is there enough processing power? Check the processor and available memory. Are the disks fast enough?
- Number of servers
- Disk performance. Small system lose space because they are running a large number of log files so consider the number of processors configured for the database.

CPU Cycles

Insufficient CPU resources to satisfy demand may cause performance problems. For example, if there is not enough cache or the system is not up to requirements. Check the load and consumption on the CPU.

29

FAQ/Troubleshooting

This appendix describes common problems that you might encounter when using Oracle Adaptive Access Manager and explains how to solve them.

29.1 Techniques for Solving Complex Problems

This section describe a process to enable you to more easily solve a complex problem. It contains the following topics:

- Simple Techniques
- Divide and Conquer
- Rigorous Analysis
- Process Flow of Analysis
- Failures

29.1.1 Simple Techniques

You can work your way through some simple troubleshooting techniques to try to solve a problem.

Steps	Description
Experience	You have seen this problem before or it is simply issue you know the answer to.
Post to the Forum	This is not the first step. Only valid once basics have been applied and a second opinion is needed. Appropriate during rigorous analysis, but not before.
Intuitive leap (or guess)	The problem just inspires a guess at a cause. You have a feel for the problem or rather its cause. This can be very effective and result in a quick resolution, but without proper confirmation, it often leads to the symptom being fixed and not the real cause being resolved.
Review basic diagnostics	Check the logs for errors and the flow. Check flow (HTTP headers, network packet trace, SQL trace, strace). Run through and document the flow. Cross check with configuration details to ensure flow is expected.
Read the error message	Reading the error and the flow information will give a big clue. Taken together with some knowledge of the way the component works, this can give a lot of insight. Always check knowledge (Oracle and search engine) for matches. Perform any diagnostics needed to establish if the error is key. With multiple errors, look to see which is likely the cause and which are just consequences.
Compare	Compare the logs and flows with a working system. Perform a test case. If it happens only at a certain site, then compare the differences.

Steps	Description
Divide	Break the problem down

29.1.2 Divide and Conquer

Steps to reduce the problem to a manageable issue are listed in this section.

Process	Description
Simplify the problem	Make a problem as simple as possible.
Remove components that are not needed	Most problems involve complex components and connections between them. Most involve third party components. So where ever possible, eliminate third party components first and then as many components and custom components as possible (for example, command line not application, SQLPLUS is not an application.)?
Reduce complexity	Test to see if a simpler version of the problem exists with the same symptoms. (for example, remove components of a complex Select, or a search filter, check if a single request or few requests will suffice)?.
Like fixing an underground pipe with a leak	Imagine a complex configuration as being a underground hose pipe with a leak. You know there is a problem, there is a leak someplace, but not where it is.
List the components	Draw a box for each components and a line where it is connected to the next. Note the protocols used to join them.
Check both ends	What goes in should come out the same. If you see data in and out results in a problem then it is one of the ends that is wrong. If the flow is not as expected the problem is in between.
Lazy Y	Test points in the configuration to find where the deviation occurs. Once established (beyond doubt) that a piece of the configuration behaves as expected it can be ignored.
Repeat	Repeat this loop to close in on the problem
Help	When 3rd party components are involved in the issue, get help from the others and work on the issue together.

29.1.3 Rigorous Analysis

All or part of the process should be applied if:

- a problem is complex
- a problem is highly escalated
- a problem was not solved with the first attempts
- a problem is getting out of control
- a problem has potential for getting out of control

29.1.4 Process Flow of Analysis

The process flow of analysis is presented below:

1. State the problem.
2. Specify the problem.

   Develop possible causes from:

   a. Knowledge and experience

   b. Distinctions and changes

3. Test possible causes against the specification.
4. Determine most probable cause.
5. Verify the solution.

29.1.4.1 State the Problem

Stating the problem is the most important step to solving the issue.

Step	Description
Ensure a clear and concise problem statement	Stating the problem is the most important step. It is the most commonly ignored or at least the problem statement is assumed. It is pointless trying to solve a problem until the problem statement is stated. Otherwise what are you actually trying to fix? If you do not know what it is you are fixing how can you fix it?
Consider if the problem stated can be explained	If so, then it is not the problem statement --If the problem statement can be explained then back up and try and get a more correct problem statement. This is a case to start communicating if you are helping someone solve his problem. Either ask some direct questions to narrow down the issue or just pick up the telephone and talk to the person to clarify the real issue. If there are lots of issues then start noting them down as separate issues.
Do not settle for a vague statement	Vague problem statements, like "bad performance", "something crashes" are of no use and commonly are the cause for issues to be long running and out of control.
Never combine problems in a single statement	Ensure there is only one problem being dealt with. Do not accept combined problems. The combined problem is either multiple distinct problems or some of the problems are actually symptoms.

29.1.4.2 Specify the Problem

Describe problems in detail and ask focused questions to gather pertinent information.

Step	Description
Specify the problem	These are symptoms of the problem.
Start by asking questions	Ask questions such as What, Where, When, and to what Extent?
What?	**What** tends to be the obvious question and is mostly a list of facts and symptoms; what deviated from the expectation?
Where?	**Where** may or may not be relevant, but is worth asking as it is often significant and often overlooked.
When	**When** is very important as time lines helps identify patterns and establish what change triggered the problem.
Extent	**Extent** or **how many** is particularly useful in establishing probable causes. If it is all the systems for example then check if it affects all systems or try a testcase. How often is also important. Once a week is quite different from many times every second and tells us much about the type of issue to look for.
List the symptoms and facts	List the symptoms and facts and how they are significant
What changed?	Something changed that is certain unless the problem has always been there. This is a special case.

Step	Description
Assumptions	Verify the data provided and check for conflicts and contradictions. Always check for any assumptions. Be careful to identify any information that is not verified and thus is only assumed. In fact this is particularly a mistake made by analysts that have more technical experience. Though also occurs a lot when inexperienced analysts are given details from people they perceive as having more knowledge. However trivial an assumption seems, always look for proof and confirmation.

29.1.4.3 What It Never Worked

If the component did not work before, performing these steps:

Considerations	Description
Consider behavior and expectation if performance issue	For cases when the issue is about something that never worked correctly the first issue is to establish what correct behavior really is and if it is reasonable? This also enables proper expectations from the outset. This is especially true for performance issues.
Confirm that there is no misunderstanding	Establish that the requirement is reasonable.
Do not compare Apples with Oranges	Agree on a specific goal. Focus on that issue only.
Consider all components involved	Consider all components involved: ■ Not just the software ■ Hardware is fast enough?
Consider if the solutions is just to change perception	What can you see that causes you to think there's a problem? ■ Human factors ■ Perception

29.1.4.4 IS and IS NOT but COULD BE

Consider what the problem is, what it isn't, and what it could be.

Step	Description
IS and IS NOT but COULD BE	For every fact or symptom ask this question: IS and IS NOT but COULD BE
Provide comparison	A test case often is the key to establishing something to compare the problem with. If it reproduces the issue then it does not help the problem analysis as such, but it is extremely useful when passing the problem to the next team to work on the fix. It also enables quicker testing of potential fixes and solutions (workarounds).
If there is no comparison, create a test case	If it does not reproduce then it provides something to compare the problem system with and perhaps even a possible work around.

29.1.4.5 Develop Possible Causes

Problem solving involves developing possible causes.

Development	Description
Knowledge and experience	You can use your knowledge and experience to recognize possible causes ■ Seen before ■ Seen it in the documentation ■ Support note or through search engine
Distinctions and changes	You can make a list of distinctions and changes to narrow down causes: ■ Only at this site or on one platform ■ Just after upgrade ■ When load increased ■ Only on Thursdays
Examine each of the symptoms and comparisons	Consider each of the facts and ensure that they are relevant and that they are not conflicting

29.1.4.6 Test Each Candidate Cause Against the Specification

Test each candidate cause against the specification:

- Each possible cause must fit all the items in the specification
- If you end up with no causes then go back and refine the process
- Causes must explain both the IS and the IS not but COULD be
- Determine the most probable cause
- Do not discount any causes that fit

29.1.4.7 Confirm the Cause

Confirm the cause so that you can devise an action plan.

You can:

- Devise ways to test the possible causes
- Observe
- Test assumptions
- Experiment
- Test solution and monitor

The main point here is to devise action plans to prove or disprove the theories. It is important to communicate the reason for each action plan. Especially when asking for a negative test, i.e. a test that is to prove something is not true. People might assume all action plans are attempts to solve the problem and resist any thing they think is not directed in the direction.

29.1.4.8 Failures

When one solution fails, just start back at the beginning and apply the approach once again, updated with the new results. Really complex problems will often take several iterations.

The process is not infallible.

Main causes of failure are:

- Poor or incorrect problem statement
- Inaccurate or vague information
- Missing the key distinctions in IS vs. IS NOT
- Allowing assumptions to distort judgment
- Not involving a broader set of skills

29.2 Troubleshooting Tools

This section contains information about tools and processes you can use to investigate and troubleshoot issues with your system.

Table 29–1 lists the general and OAAM-specific tools you can use for troubleshooting problems.

Table 29–1 Troubleshooting Tools

Category	Description
General Tools	■ Oracle Enterprise Manager Fusion Middleware Control ■ Database Enterprise Manager ■ Monitor Data in DMS ■ Audit Data ■ Ping/Network Check Tools
OAAM Specific Tools	■ Dashboard ■ Monitor Data ■ Log files

Table 29–2 provides items to check for when troubleshooting the system.

Table 29–2 Troubleshooting Tips

Tips	Reason
Check the operating system	Some issues may be platform specific. For example, Java keystores created on non-IBM platforms will not work on IBM platforms
Check WebLogic Server version	Make sure OAAM is installed on a WebLogic server certified for 11g
Check the JDK	Make sure the JDK is certified for the Identity Management 11g Suite
Change logging configuration through Oracle Enterprise Manager Fusion Middleware Control	Make sure the log level is changed appropriately before tracing and debugging
Search for log messages through Oracle Enterprise Manager Fusion Middleware Control	Log messages record information you deem useful or important to know about how a script executes.
Use the Execution Context ID to search for log messages	The ECID is a unique identifier that can be used to correlate individual events as being part of the same request execution flow.
Use the WebLogic Console to monitor database connection pool	Check the health of the connection pool through the WebLogic Console.

Table 29–3 summarizes problems and the checks you can perform to troubleshoot and solve the problem.

Table 29–3 Problems and Tips

Problem	Checks You Can Perform
Common Troubleshooting Use Cases	■ Most of the operations are slow ■ Server is throwing out of memory exceptions ■ Server is throwing encryption related exceptions ■ Connection pool related errors occur when starting the server ■ Errors while starting managed servers after upgrade from 11.1.1.4 to 11.1.2 ■ OAAM CLI script issues ■ SOAP call issues ■ Native integration issues
Most of the Operations are Slow	■ Check performance of OAAM policies – Use the dashboard to see the performance of the rules – Tune rules or their parameters if necessary ■ Check the database using Oracle Enterprise Manager Fusion Middleware Control and see if there are any queries that are slow. Follow Oracle Enterprise Manager Fusion Middleware Control recommendation to add suggested indexes ■ Check if the application server CPU is high Take a thread dump if possible ■ Check the connectivity and network speed between application server and database ■ Use the IP of the database machine in data source settings
Server is Throwing Out of Memory Exceptions	■ Check the configuration of the OAAM WebLogic Domain ■ See if all the OAAM web applications are deployed on the same managed servers ■ Increase the heap size of the managed server
Connection Pool Errors	■ Make sure the database listener is running ■ Use IP address rather than name in JDBC URL ■ Make sure the database service name is correct ■ Make sure the connection pool is not too "large" Check if there are too many managed servers accessing the same database
Errors While Starting the Managed Server After Upgrade	■ Make sure encryption keys are properly copied ■ Make sure all manual steps are followed that are in the upgrade documentation ■ Check the WebLogic Console and make sure all web applications are targeted properly to their managed servers

Table 29–3 (Cont.) Problems and Tips

Problem	Checks You Can Perform
OAAM CLI Script Issues	■ Make sure the JAVA_HOME environment variable is set to the JDK certified for the Identity Management Suite for 11g ■ Make sure CLI related properties are set in the `oaam_cli.properties` file.
SOAP Call Issues	■ Known issues exist with time-outs in SOAPGenericImpl ■ OWSM is enabled by default, so you need to set OWSM policy before using SOAP ■ Make sure the SOAP server URL including the port number is valid
Native Integration Issues	■ Make sure the appropriate version of the OAAM Extensions Shared Library is used (the WAR should use the war version and EAR should use the ear version ■ Make sure the OAAM data source is created and the JNDI name is correct (it should match the JNDI name of the OAAM Server) ■ Make sure the native application is using the same keys that are used by the OAAM Admin and OAAM server ■ Issues with the encryption keys – Make sure all the managed servers are on the same WebLogic domain or copy the keys across the domains – If using non-11g servers, use the Java keystores ■ Shared library usage by many applications on the same server Currently the OAAM Extensions Shared Library cannot be used by more than one application on the same managed server

29.3 Policies, Rules, and Conditions

No results were found after policy execution

Question/Problem: I imported the policy and expected to see the results from the execution, but no results were found. How can I determine what happened?

Answer/Solution: To debug the problem:

1. Check the Session details page to verify if that policy executed in that session.

   Make sure that "vcrypt.tracker.rules.trace.policySet.XXXXXX" is set to true for that checkpoint. (XXXX corresponds to that checkpoint)

2. Verify the configuration of the policy.

   a. Is the policy active?

   b. Is the policy linked to that user group to which this user belongs?

      For a policy to execute in a session, it should either be linked to "All Users" or to one of groups the user is member of. Verify whether the policy is linked appropriately.

3. Verify that enough time was given for the cache to refresh.

   If group linking is changed recently, make sure to wait more than 30 seconds for the cache to refresh.

Alerts and/or action did not generate for a rule

Question/Problem: The policy executed but alerts and actions were not generated.

Answer/Solution: When a rule triggers, the alerts set up in the rule will trigger. However, the action configured in a rule can be overridden in different levels, like trigger combination, policy set override. Look at these for possible override of the action triggered by the rule.

Verify the configuration of actions and alerts.

1. Verify that the alerts and actions have been set up in the rule. Then verify that the rule was indeed triggered in the session.

   When a rule triggers, the alerts set up in the rule will trigger. However, the action configured in a rule can be overridden in different levels, like trigger combination, policy set override. Look at these for possible override of the action triggered by the rule.

2. Verify if there are other trigger combinations in the policy that match this specific set of conditions.

   Trigger combinations are evaluated in a sequential order, as shown in the user interface, until all conditions match for a combination. After finding a matching combination, the rest of the combinations are not evaluated. It is possible that multiple combinations match for a specific set of conditions; however only the first one to match will trigger. Verify if there are other trigger combinations in the policy that match this specific set of conditions.

Alert Trigger Sources Are Not Being Displayed in Session Details Page

Question/Problem: In the Sessions Details page for sessions which contain alerts, the **Trigger Source** column is empty.

Answer/Solution: By default, the Session Details page does not display the trigger sources if the execution time for alerts is less than 2000 millisecond (2000 ms) since detailed logging is dependent on the execution time.

The property that controls this threshold and logging is

```
# Int property determining minimum time required for detailed logging
vcrypt.tracker.rulelog.detailed.minMillis=2000
```

After changing the property, print
`vcrypt.tracker.rulelog.detailed.minMillis=<value>`.

Note: Changing the property influences only new sessions.

Every login generates an alert

A rule is configured too strictly. Determine which rule is causing the alerts and relax the restrictions somewhat

29.4 Groups

Action element or action member does not appear in the action group in rules

Question/Problem: An action element was added or an action member, but it does not appear in the action group in rules.

Answer/Solution: For the action to appear, you must restart the server because action members are enumerations.

Unable to delete all the groups

Question/Problem: The user is not able to delete all the groups that were selected for deletion.

Answer/Solution: If a group is used in other instances within the application, the user will not be able to delete the groups

Delete all the members in a group

Question/Problem: What happens if I delete all the members in a group?

Answer/Solution: If the group is linked to any rules or patterns, the rules or patterns will not function as expected.

Difference between a User ID and a User Name group

Question/Problem: What is the difference between a User ID and a User Name group?

Answer/Solution: The user name is set up by the user. For example: "Bob" is the login and the user is "xyz123". The User ID is the scheme a customer uses to uniquely identify users.

Groups Usage

Question/Problem: What are groups used for?

Answer/Solution: To simplify the configuration for rule conditions and rule results, groups are created.

For example, to create a rule "Restricted IPs," you must add a condition to determine if the logged in user IP is in the list of restricted IPs configured. The restricted IPs are grouped together as RestrictedIPSGroup of type IP and the rule condition will use this group.

Add/remove group members based on a rule triggering

Question/Problem: Can I automatically add/remove members to a group based on a rule triggering? How?

Answer/Solution: To add members to a group or remove members from a group, create a new trigger action enumeration named "add member to group" or "remove member from group" and an action group for it. In the group add an action. Configure a configurable action to trigger on "add member to group" or "remove member from group" which will add or remove the member.

Exclude users

Question/Problem: How can I exclude some users from being affected by a rule?

Answer/Solution: Create a group which contains the users. Then specify in the Rule's Pre-Condition tab to exclude the group.

What is a Cache Policy?

Question/Problem: What does Cache Policy do?

Answer/Solution: The Cache Policy determines if the application uses data stored in the cache or re-fetches original data from the server.

How does Cache Policy affect performance

Question/Problem: How does Cache Policy affect performance?

Answer/Solution: Performance is impacted if the application has to consult the server every time the information must be accessed. With cached data, the information is already stored for rapid access. Performance is impacted if you cache data and large changes are made since caching uses server space.

Not caching a group

Question/Problem: In what situations should I not cache a group?

Answer/Solution: You should not cache a group if you have a long list of elements since groups are re-cached if there are any changes to the group.

Group inside a group

Question/Problem: Can I have a group inside another group?

Answer/Solution: No, the only exception is when a city group could be in a state group which could be in a country group.

View group linking

Question/Problem: How can I see if a group is linked to something else?

Answer/Solution: The Policy Tree shows the linking of User ID groups to policies.

29.5 Autolearning

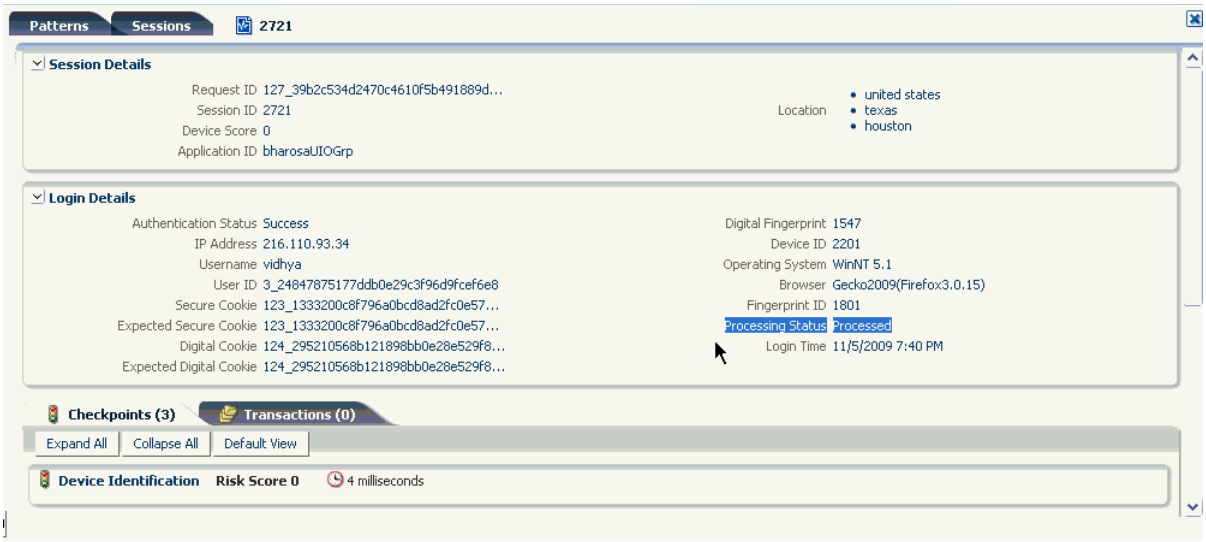
Verify that autolearning is functional

Question/Problem: I enabled autolearning and configured the policies. How do I verify that autolearning is running?

Answer/Solution: To verify if autolearning is turned on and working:

1. Log in to the system.
2. Run a few logins.
3. To determine whether autolearning data of a session has been processed, go to the Session Details page of that session and view the Processing Status field in the Login Details section.

Figure 29–1 Autolearning processing



If autolearning has not been set up correctly, data will not have been processed.

29.6 Configurable Actions

Custom action not available

Question/Problem: A custom action was created, but it is not available in the user interface.

Answer/Solution: Ensure that the Java class is in the right directory and that it is in the right package.

Multiple cases were generated because of configurable action

Question/Problem: Multiple cases are generated when create cases was defined as a configurable action.

Answer/Solution: If the pre-condition is an action that can occur frequently, every time, the action occurs, a case is created. For example, actions such as "challenge" can occur more than once in a session (OTP challenge, KBA challenge, and so on).

Synchronous Actions

Question/Problem: Synchronous actions are executed in the order of their priority in the ascending order. For example, if you want to create a CSR case and then send an email with the Case ID, you would choose synchronous actions. Synchronous actions will trigger/execute immediately.

What happens if the first action fails. Will the email be sent still?

Answer/Solution: The execution of configurable action is not dependent on the execution of other configurable actions. However, custom code can check data in the context that is shared across actions and perform logic based on the context data.

Asynchronous Actions

Question/Problem: Asynchronous actions are queued for execution and will be executed based on their priority but not in any particular sequence. For example, if you want to send an email or perform some action and do not care about executing it

immediately and are not interested in any order of execution, you would choose asynchronous actions.

Are asynchronous actions guaranteed to execute? What happens if the server stops running?

Answer/Solution: If the server stops running, then any pending configurable actions will not be executed.

Trigger Criteria

Question/Problem: Trigger criteria enables you to choose when you want to trigger the action in the session.

The action could be either a score or an action or both. These are compared against the values from the Rule Engine for the selected checkpoint while defining the configurable action.

What happens if both action and score are specified and only one is matched? What is the priority?

Answer/Solution: When both action and score are specified, the configurable action is executed only if both of criteria match with the outcome from the Rules Engine.

Action Priority in Asynchronous Actions

Question/Problem: How is action priority used in asynchronous actions?

Answer/Solution: Actions are aligned in different queues based on the action priority. When it is time to execute the next action from the queue, the highest-priority action is executed first.

29.7 Entities and Transactions

Entity not available

Question/Problem: A user creates an entity, but it is not available in the Transactions Page Entities list.

Answer/Solution: The user has forgotten to activate his entity.

Refer to Section 19.2.4.7, "Activating Entities."

Data element not available for evaluation

Question/Problem: The Data element is not available for evaluation in the condition

Answer/Solution: The Data element may be encrypted.

Add multiple entity instances

Question/Problem: Can a user add multiple instances of the entity to a Transaction?

Answer/Solution: Yes

Entity change affects instances of the entity

Question/Problem: If a user changed the entity definition, are all the instances of the entity affected?

Answer/Solution: Yes, the definition is a template

Refer to Section 19.3.5, "Editing the Entity."

Not able to delete an entity

Question/Problem: The user is not able to delete an entity. The user has removed that instance from the Transaction already.

Answer/Solution: The entity is also used in other transactions, patterns, and so on.

Refer to Section 19.3.9.2, "Deleting Entities."

Not able to delete the entity even when transactions are not using them

Question/Problem: The user does not have any Transaction that uses the entity, but is still not able to delete the entity.

Answer/Solution: There might be historical Transaction data using the entity

Group of floating point numbers

Question/Problem: I want to see if the transaction amount is one of a specific value - like $999.99. Is there a way to model this? "Generic Integer" and "Generic Long" are available, but they do not take floating point numbers.

Answer/Solution: Where decimals are needed, model by changing the unit. For example, instead of 99.99, use 9999. Care should be taken to use the unit (for example cents instead of dollars) consistently in all the rules and groups.

Exclude certain entities

Question/Problem: How do you exclude certain entities - like merchants or accounts? For example, merchants and accounts are modeled as entities and Oracle Adaptive Access Manager does not have a "group of entities" option.

Answer/Solution: Group the entities using their "primary key" (like a generic strings group.

Transaction Based Rules Trigger Even When Transaction is Disabled

Question/Problem: Why do my transaction based rules trigger even when the transaction is disabled?

Answer/Solution: If a transaction is disabled, OAAM will still allow the transaction data to be used as input for evaluation if the rules that are set up to act upon the transaction are active. When the rule is triggered, the transaction data is displayed in Session Details and alerts and actions are triggered.

Disabling the transaction does not make the transaction invalid. It only stops the transaction from being displayed in transaction condition mapping.

Disable the transaction if you want fewer records shown in the rules that fired report, but to disable any processing of the transaction, you will have to deactivate the rules.

29.8 KBA

I want to configure the system so users will register 7 questions and will be challenged with 3 questions instead of the usual one question in the flow

Question/Problem: Can a customer change the number of questions to show during the challenge flow?

Answer/Solution: The OAAM "one question at a time" flow is by design. It is better security practice to present one question and only show the next question once the user has successfully answered the challenge. This protects the questions from being harvested for use in a phishing exercise. As well, OAAM allows users to have multiple

attempts at a question which entails keeping track of how many wrong answers they have entered. If there were more than one question displayed at a time this would be difficult to maintain and possibly confusing to end users. If a customer wants to challenge a user with more than one question they should do so by presenting them in separate sequential screens. As well this is their only option since OAAM does not support authentication of more than one question at a time.

Track the failures and update the failure counter for IVR, online (KBA and OTP), CSR, and other custom mechanisms

Question/Problem: I want to support IVR, online (KBA and OTP), CSR, and so on. Should I write custom code to track the failures and update the failure counter?

Answer/Solution: Customers can support any type of challenge mechanism in their deployment. Examples include KBA, OTP, IVR, or other custom mechanisms. The OAAM Admin Console supports failure counters, registration information, and so on in both user and case detail screens. If a customer adds a new/custom challenge processor then the counters are displayed in the user and CSR details pages. For example, if a company developed a dynamic KBA solution and integrated it into OAAM via a challenge processor then the CSR case screen would show a Dynamic KBA challenge failure counter and would lock out based on the policy they set.

Note: A custom processor example that illustrates task processor integration is available for your reference through My Oracle Support article ID 1501759.1 titled *OAAM 11gR2 (11.1.2.0) Sample Application Download for Task Processor Integration*.

You can access My Oracle Support at https://support.oracle.com.

OTP failure counters consolidate failures from different channels. For example, if multiple channels are used, the OTP status displays Locked if the combined OTP counters are above the threshold. So, if user failed SMS twice and Email once and threshold is 3, the user is locked.

The Reset Action resets all challenge failure counters:

- Reset KBA: Re-register KBA; KBA and OTP counters are reset to zero
- CSR KBA reset: Re-register KBA; KBA and OTP counters are reset to zero
- Reset OTP: Re-register OTP; KBA and OTP counters are reset to zero

The Unlock action unlocks the user account for both KBA and OTP:

- Unlock KBA: KBA and OTP counters are reset to zero
- Unlock OTP: KBA and OTP counters are reset to zero.

Why was I challenged with a question I did not register for

Question/Problem: A user states that he was challenged with a question he did not register for. How can this happen?

Answer/Solution: There are a few possible reasons:

- The user may have forgotten the challenge questions since registration. Often this is because the user has not been challenged for an extended period.
- The challenge questions may have been reset by another party in a joint account (husband, wife, significant other).

The user's questions should be reset, allowing him to register new challenge questions.

Should I increase the number of questions for user registration?

Question/Problem: How do I decide if I should increase the number of questions for registration?

Answer/Solution: Whether to increase the number of questions depends on the business use case.

If the number of questions is increased to five and the user has three questions registered:

- If the system is using all five questions, you do not need to ask the user to re-register questions. No change is required in this case. Existing users continue to use their questions until the questions are reset.
- If all five questions are required, you can have your users register:
  - An additional two questions, which means you must make changes in the policy and add a new rule
  - All five questions, which means you must use a batch job

Why is the Question Statistics in the Details Page not displaying the Percentage of Challenges for a Question.

Question/Problem: Why are the statistics not updated for "Percentage of Challenges for a Question" immediately after the user answers a question?

Answer/Solution: The thread which updates the question statistics runs every hour. Updated statistics are not available after a user answers a question. However, the statistics are updated after one hour.

Level of Answer Logic

Question/Problem: What is the difference between **Off**, **Low**, **Medium**, **High**?

Answer/Solution: Answer Logic is a set of advanced matching algorithms used by the system to determine whether the answers provided by the user in the challenge response process match closely to the ones provided during registration. The algorithms and the level of Answer Logic are factors in evaluating answers.

The levels of Answer Logic, the intensity or strength of algorithms, used to evaluate answers are:

- **Off** – No Answer Logic is used; answers must exactly match those previously registered by the user.
- **Low** – Less Answer Logic; answers provided by the user must be a match or near-match to the answers that were provided at the time of registration
- **Medium** – More Answer Logic; the user is given some leeway for the answers that are provided. For example, St. might be accepted for Street.
- **High** – Highest level of Answer Logic. The constraints are not strict for matching.

Refer to Section 7.10.3, "Level of Answer Logic."

Decryption of user's registered questions and answers

Question/Problem: Can a customer decrypt a user's registered questions and answers if needed?

Answer/Solution: Decryption of registered questions and answers is not supported for a number reasons. Primarily this is a security concern. If it were supported, it would be possible for an insider to discover the questions and answers for all users. Challenge questions are used to protect applications in times of high risk. These

questions in the wrong hands can be used to perpetrate fraud. As well, some KBA answers could contain personally identifiable information which requires a very high level of protection. In addition to security concerns there are privacy concerns as well.

Are KBA answers case-sensitive?

Question/Problem: Are KBA answers case-sensitive?

Answer/Solution: KBA answers are not case-sensitive for usability concerns. Since a user will only be challenged with a challenge question when there is a medium level of threat, most users will not be challenged on a regular basis since most users follow regular patterns while conducting their business. If users are not challenged regularly, they may remember the answers to their challenge questions when and if they receive a challenge but may not remember the exact spelling or capitalization. Because of this, KBA includes the use of fuzzy logic to interpret use answers. Common misspellings and abbreviations, for example, can be accepted if the basic information of the answer is correct. This greatly increases the effectiveness as a solution overall since a challenge question is not useful if a user fails to answer correctly because he forgot to capitalize the name of the street he grew up on.

29.9 Case Management

Notes in Case Management log appear in English

Question/Problem: The notes in the **Logs** tab appear in English.

Answer/Solution: The values for the **Notes** column in the **Logs** tab for notes that are not added by the user will appear in English by default.

The notes are taken from the action enums "note" field (property).

The value of that property is saved into database (as notes). After being saved, users cannot change that data.

Implementations can customize the "note" in the enum property to the localized value.

"Access case" is inside the `oaam_resources.properties` file:

```
customercare.case.actiontype.enum.accesscase.description=Access case
```

Case creation / access logic will use that string for the creating records after that point.

29.10 Jobs

Question/Problem: After I execute the task and view the historical data in the dashboard, will there be any difference in the user interface. Will monitor data rollup have an impact on the dashboard?

Answer/Solution: There should be no impact on dashboard. There should not be any impact with default settings for cutoff time. If you the set cutoff time to smaller than default, then you may see impact on dashboard. Example: if you perform a daily rollup and change the cutoff time from 3 to 1, then you will lose some of the hourly granularity in the hourly trending view in the bottom part of the dashboard.

29.11 Dashboard

KBA Challenge and Challenge Statistics Do Not Match in Sessions for Time Range

Question/Problem: The Summary Dashboard statistics for KBA challenges does not match the Challenge statistics in the Sessions Search page for the same time range.

Answer/Solution: The counts are two different metrics. The Challenge statistics are a count of the number of sessions that were challenged. The KBA Challenge statistics are a count of the number of times a user answered a challenge question.

For example, if a user logs in and is challenged and answers the question incorrectly once, and then answers the question correctly. There will be one session in the Sessions Search page related to this login, but the KBA Challenges on the dashboard will increase by 2.

The Count of Unsuccessful Challenges is Incorrect in the Summary Logins Report

Question/Problem: A high-risk user logs in to OAAM Server and he is challenged. He enters incorrect answers for the challenge questions. The CSR checks the Oracle Adaptive Access Manager Login Summary Report and looks at the unsuccessful challenges. The count is more than the actual.

Answer/Solution: The totals shown in Successful Challenges and Unsuccessful Challenges are the number of times a challenge question was answered successfully or unsuccessfully.

Average Processing Time for Rules and Policies Does Not Match with Reports

Question/Problem: The CSR captures the rules processing times from session details for a user and runs a SQL query to gather the statistics from the database. The report and SQL query numbers are different than those displayed by the dashboard.

- The average processing times in sessions details and the database are different from the numbers displayed in the performance dashboard. They do not match exactly.
- Execution counts shown in the Dashboard vary from the Security RulesBreakdown report. Additional rules are displayed in the dashboard. (Session details and the Security RulesBreakdown report show fewer rules.)

Answer/Solution: The reasons for the mismatch are listed as follows:

1. The execution count shown in the Dashboard and in the Security RulesBreakdown report vary because the dashboard displays the number of times the rule was processed, whether or not they triggered, but the Security RulesBreakdown report displays the number of times the rule returned true. The values in the dashboard and the values returned by that SQL query are different measurements, so the values should not be expected to match.
2. The average processing times in sessions details and the database are different from the numbers displayed in the performance dashboard. They do not match exactly. The monitor data calculates the processing time differently from the report and query. The report and query includes setup code and other processing times not included in the monitor data number. The monitor data contains the rules processing time and the time spent for fact assertions into the working memory.

29.12 Command-Line Interface

Command-Line Errors

Question/Problem: How do I troubleshoot command-line errors?

Answer/Solution: Here are the steps to troubleshoot command-line errors:

1. Check Java Version. Make sure it is the same as recommended version. For example, like JDK 1.6.
2. Make sure the jars are in class path (jps*.jars).
3. Define credentials in the Credential Store. The Credential Store is similar to sessions.xml, but the definition is in Enterprise Management for OAAM domain instead of a file.
4. Make sure the SID is correct.

Schedule exports

Question/Problem: Can I write a CRON job to schedule policy, group, and rule exports?

Answer/Solution: Yes.

Steps to create a scheduled job are:

1. Create a script using CLI to export the required data. Test for accuracy of data.

   Refer to Chapter 26, "Oracle Adaptive Access Manager Command-Line Interface Scripts" for information on exporting policies and groups

2. Create a cron job to periodically run the script.

   For information on creating a cron job, refer to

   `http://en.wikipedia.org/wiki/Cron`

3. Ensure that you:

   a. Encrypt the database password. Refer to Chapter 26, "Oracle Adaptive Access Manager Command-Line Interface Scripts."

   b. Do not overwrite files - Devise a unique naming convention.

   c. Monitor the backup process - Setup email and notification

   d. Monitor disk space /performance - Include only required data in backup, and look for groups with many elements, and so on.

29.13 Import/Export

Importing large policy ZIP files

Question/Problem: I tried to import a large policy ZIP file that contains many policies (the file size is larger than 1MB), but the import failed. The log file does not shows any errors. How can I import this file?

Answer/Solution: If OAAM Admin is installed on the Windows platform, you must create a `\tmp` folder in the drive where you have installed WebLogic.

For example, if the WebLogic domain is on the C drive, you must create a `c:\tmp` folder.

This folder will be used as a temporary folder for uploading large files into OAAM Admin.

OAAM Admin failed to import policy, rule condition, and challenge questions ZIP files.

Question/Problem: OAAM Admin failed to import policy, rule condition, and challenge questions ZIP files.

Answer/Solution: This is an issue with Mozilla Firefox MIME type mapping. If the environment does not have any application mapped to the ZIP extension, Mozilla maps the incorrect content type. One workaround is to add a file type mapping in Firefox Preferences.

Browser does not recognize the files which are being uploaded

Question/Problem: When I try to import my Oracle Adaptive Access Manager files, my browser does not recognize them.

Answer/Solution: When the MIME entry for Foxfire is not present in the operating system on which it is installed, the browser fails to recognize correct file types.

A MIME entry must be added for all the types of files, viz, doc, txt, zip, and others under the `/etc/mime.types` file of any operating system to enable browsers to recognize the files which are being uploaded. Once this entry is there, the browser recognize the files successfully.

There is no issue if the MIME entry is already present in operating system.

29.14 Location Loader

Characters added during transfer of files

Question/Problem: During the transfer/ftp of files, characters such as carriage return "\r" are added.

Answer/Solution: To resolve the issue, run dos2unix against the files. When you are running the .sh file, use either dos2unix <filename> or dos2unix . *.* .

TNS:no appropriate service handler found" error

Question/Problem: The following error when I load data

```
TNS:no appropriate service handler found
```

Answer/Solution: It may be that the number of processes in your database is set to a minimal value.

Use the following commands to check the number of process set in the database

```
SQL> show parameter process
SQL> alter system set processes=100 scope=spfile;
```

29.15 Device Registration

Device Registration

Question/Problem: The user has an option in the challenge questions registration page to register a device:

"Check to register the device that you are currently using as a safe device"

If he skipped during the registration flow, he does not seem to have an option later on from the user preferences page. Is there a way to turn it on?

Answer/Solution: Device registration is set up to ask the user to register the device during registration and when being challenged.

You can turn it on in the register questions page of user preferences by setting:

`bharosa.uio.default.userpreferences.questions.registerdevice.enabled=true`

Currently the central user preferences page only enables for unregistering devices.

The user can register the device during registration, but he is also given the option to register the device when being challenged.

Question/Problem: The registration of devices does not appear in the registration flow. Device ID policies have been imported into OAAM Admin.

Answer/Solution: Device registration is not enabled by default. To enable device registration, `bharosa.uio.default.registerdevice.enabled` should be set to `true`.

29.16 Time Zones

Time zone management

Question/Problem: Do rules that evaluate time use one time zone for all sessions or does it use the time zone from the customer browser/OS? For example, if I set up a rule to KBA challenge if a user logs in outside of office hours (not 8:00 am - 6:00 pm) is this evaluated based on the time zone from the customer browser/OS?

```
Nameuser.timezoneTypeSystemValuePST8PDT
user.timezone = PST8PDT
oaam.adf.timezone = user.timezone
```

The Date and Time used for rule execution (pattern or non-pattern) comes in from "request_time." This is the same date / time that any request based rules will use.

- For on-line it is the OAAM Admin server time.
- For off-line: it is the time specified in the off line data for that request.

29.17 Encryption

How many keystores are there?

Question/Problem: How many keystores are there? And which one is used for what?

Answer/Solution: There are 3 keystores:

- System Keystore: Used for encrypting properties and other non database-related data
- Database: Columns in the database. Mostly password, PIN, Transaction data (like credit card #, and so on).
- SOAP/WebServices: On the client side to authenticate Web Services request

What tables and columns are encrypted

Question/Problem: If the database is encrypted with these keystores which database tables, or columns, or both are encrypted?

Answer/Solution: VCryptPassword and Transaction tables.

Decrypt data

Question/Problem: Do you need to decrypt the data? When do you need to do this?

Answer/Solution: Data is decrypted by the application as and when required. There are not external tools available to decrypt this data.

Omit encryption

Question/Problem: Can you omit the encryption?

Answer/Solution: SOAP is optional. Database and System are mandatory

29.18 Localization

Turn on/off localization

Question/Problem: How do I turn off localization?

Answer/Solution: There is no flag to turn-off localization, but there is a user-defined enum that captures the locales supported by the deployment. The enum can be used to enable only one locale.

You would change the `locale.enum.XXX.adminSupported` and `locale.enum.XXX.enabled` properties to `false` for each unwanted locale.

Characterset in database for Oracle Adaptive Access Manager

Question/Problem: A client already has a database with no UTF8 support, and he wants to keep it that way as it is a shared database and ignore browser locale preferences.

Answer/Solution: Since Browser preferences cannot be controlled, the server should ignore Locale preference or always use English.

Language setting on a per user basis?

Question/Problem: Does Oracle Adaptive Access Manager support language setting on a per user basis?

Answer/Solution: Usually, Web applications take the language setting of the browser.

For example, a user registers his virtual authentication device and KBA questions using a Spanish browser. If he logs in using an English browser, his phrase will be in Spanish and answers to any KBA questions presented will be expected in Spanish. The KBA question presented to him however will be in English as is expected with most Web application content.

In Oracle Adaptive Access Manager 10.1.4.5 the end-user facing Web application used in proxy type deployments has globalization support. The end user's browser language/locale setting tells the application what language to display the screens in, including KBA questions and the personalization of the virtual authentication devices (phrase). The APIs for KBA and the virtual devices accept locale as a parameter.

However, if the deployment is using native application integration, the functionality would need to be developed in the custom end user facing Web application being built. This application would probably use resource bundles. It would also need to call the KBA and the virtual authentication device APIs while passing a supported locale as a parameter.

29.19 Using Different Encryption Algorithms and Plugging in New Encryption

Out of the box supported encryption algorithms

- AES
- DES
- DESede (Default)

  Also called Triple DES

To switch to different encryption

Set the property bharosa.cipher.encryption.algorithm.system.default to one of the following:

- DES
- AES

To use a new encryption algorithm follow these steps:

1. Write java a class that implements the interface `com.bharosa.common.util.Password`.
2. Implement the methods `encrypt()` and `decrypt()`.
3. Add an element to the `bharosa.cipher.encryption.algorithm.enum` enum with the following attributes to oaam_custom.properties file:
   - name: Name of the algorithm
   - description: Description of the algorithm
   - classname: Fully qualified Class name of the java class developed in Step 1
   - keyRetrieval.className: Set it to `com.bharosa.common.util.cipher.CSFKeyRetrieval`
   - prefix.system: Prefix that will be used while encrypting (Optional)
   - alias: Alias of the encryption algorithm
4. Set the property `bharosa.cipher.encryption.algorithm.system.default` to the newly added element name.
5. Compile and build the jar and related property files
6. Package them as OAAM extensions war
7. Deploy the OAAM extensions war and target it to both oaam_admin and oaam_server

   Refer to the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for details on OAAM Extensions.

29.20 Virtual Authentication Devices

Developing Custom Background Images

To develop custom background images for the virtual authentication devices the following must performed:

1. Process images to correct resolution for each pad being used.

2. Next you must add the images to correct directories for each virtual authentication device. TextPad images should be in the TextPad directory, and so on. The directory will be in the form `bharosa.image.dirlist={oracle.oaam.home}/oaam_images`. This will resolve to `"/scratch/user/Oracle/Middleware/Oracle_IDM1/oaam/oaam_images"`. In this directory there are three sub-directories named keypad, questionpad and textpad.

Disabling Date And Time Stamp Displayed In The Authentipad Image In .Net

1. To disable date and time stamp, comment out:

   CreateAuthentiPad API

   AuthPad.TimeStampText = DateTime.Now.ToString();

   CreateQuestionPad API

   TimeStampText = DateTime.Now.ToString();

2. To display Timestamp

   Example 1 (displays user defined string):

   ret.AuthPad.TimeStampText = "monster";

   ret.TimeStampText = "puppet";

   Example 2 (displays current time):

   AuthPad.TimeStampText = DateTime.Now.ToString();

   TimeStampText = DateTime.Now.ToString();

KeyPad does not display

- Check the property bharosa.authentipad.image.url
- Make certain that the client application is pointing to the correct server application

No image displayed in Keypad background

- User may have images disabled
- Users image may have been deleted from the backgrounds directory
- Check the properties file to make sure that the backgrounds directory setting is correct

29.20.1 Timeout Session Option in WebLogic

The WebLogic Console provides an option to specify the `session timeout` for an application but changing this value does not work for OAAM Admin. The `session timeout` value should be configurable when OAAM is deployed.

The workaround to configure the `session timeout` value is to configure the `web.xml session timeout` in the WebLogic application server using the deployment plan feature. The steps are as follows:

1. Generate deployment plan from the existing non-plan based deployment.

   The URL for a WebLogic deployment plan example is:

   http://www.slideshare.net/jambay/weblogic-deployment-plan-example

2. Edit the plan.xml.

   a. Add a variable definition for the custom `session timeout` in minutes.

```
...
<variable-definition>
  <variable>
    <name>mySessionTimeOut</name>
    <value>60</value>
  </variable>
</variable-definition>
...
```

b. Override the desired web application `oaam_admin.war`'s `web.xml` as follows:

```
<module-override>
   <module-name>oaam_admin.war</module-name>
   ...
   <module-descriptor external="false">
     <root-element>web-app</root-element>
     <uri>WEB-INF/web.xml</uri>
    <variable-assignment>
       <name>mySessionTimeOut</name>
       <xpath>/web-app/session-config/session-timeout</xpath>
     </variable-assignment>
   </module-descriptor>
   ...
```

3. Then, select the application `oaam_admin.ear` and click the **Update** button in the deployment list
4. Select the plan path and redeploy the application.

   Ignore any shared library warnings.
5. Make sure your `config-root` is the application `ear` directory.
6. Restart all the servers.

29.21 OAAM Sessions are Not Recorded When IP Address from Header is an Invalid IP Address

OAAM sessions are not recorded for header-based IP addresses by default because header based IP addresses are not accepted by default. To enabled the reading of IP addresses from the header, set `vcrypt.tracker.ip.detectProxiedIP` to `true`. It enables the use of the "X-Forwarded-For" IP. When header IP addresses are enabled, only valid IP addresses are used. If the header contains an invalid IP address, the actual request IP address is used.

When using OAAM with LBR and SNAT enabled, the client IP address needs to be preserved. This is critical since OAAM relies on the client IP Address when evaluating policies.

Make sure the following OAAM properties are set as follows:

```
vcrypt.tracker.ip.detectProxiedIP=true
bharosa.ip.header.name=X-Forwarded-For
```

For information on load balancers preserving the Client IP Addresses, see *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*.

Part XIV

Appendixes

This section contains the following reference appendixes:

- Appendix A, "Using OAAM"
- Appendix B, "Conditions Reference"
- Appendix C, "OAAM Properties"
- Appendix D, "Setting Up Archive and Purge Procedures"
- Appendix E, "Device Fingerprinting"
- Appendix F, "Globalization Support"
- Appendix G, "OAAM Access Roles"
- Appendix H, "Pattern Processing"
- Appendix I, "Configuring SOAP Web Services Access"
- Appendix J, "Configuring Logging"
- Appendix K, "Rule and Fingerprint Logging"
- Appendix L, "VCryptUser Table"
- "Glossary"

A

Using OAAM

Oracle Adaptive Access Manager can be used to protect businesses and their customers through multifactor authentication, proactive, real-time fraud prevention, risk evaluation at transaction runtime, and tools for fraud analyst to investigate a possible fraud.

The following are scenarios for developers who integrate OAAM with OAM in security solutions, fraud analysts who investigate fraud, and database administrators who archive and purges records to free space in the system.

A.1 Investigation - Alert Centric Flow

A fraud analyst on the BigMart team reviews suspect transactions to identify fraud. The alert severity level and specific dollar totals have been found to indicate fraud. The deployment primarily utilizes a manual case creation and investigation flow. Analysts start each investigation by searching for transactions with high severity alerts. When fraud is identified analysts record findings, black list entities of various sorts and close out cases with a disposition.

1. Search for Retail Ecommerce transactions with high severity alerts.
    a. Log in to the OAAM Administration Console as an investigator.
    b. Click the Search Transactions tab.
    c. Filter the transactions by Transaction Type as equal to "Retail Ecommerce," Alert level as equal to "High," and your criteria for Transaction Date likely to pick up the transactions; and then, click Search.
    d. The results table contains a Transaction Data column that can be sorted in ascending or descending order by clicking the Transaction Date column header. The up/down arrow next to it indicates the current order of the data. Click the Transaction Date column header to filter results by ascending time stamp.
    e. Select the orange square next to the alerts you are interested in for the total count of alerts and detailed messages about potentially fraudulent activity, which will be displayed in the popup.
    f. Go back to the search filters and select Transaction Type as Retail Ecommerce.
    g. Use the Add Fields drop-down box and from the list of fields provided, select Retail.ecommerce.total.dollar.amount as a filter on which you want to search.
    h. For the Retail.Ecommerce.total.dollar.amount, select Greater than as the operator, and type in "500"; then, click Search.
    i. Click Transaction Date result header to filter results by ascending time stamp.

2. To view the details on the oldest transaction, click the Retail Ecommerce link in the Transaction Type column to open the Transaction Details page.
   a. View the transaction and entity data for details.

      Locate important details of the transaction that took place including the amount of the item, addresses, card numbers, customer identity, device, and IP address location for the transaction.

   b. To filter the transactions for the device used in the transaction, drag the device ID in the Summary panel into the Filtered Items panel on the right side of the page.
3. To find matching transactions in the first seven days, in the Filtered Items panel, select 7 Days for Time Range, click Find Matching Items, and then click the number of transactions.

   A Filtered Transactions page appears with a list of transactions which the device was used.
4. View list of transactions returned.
   a. Select the orange square next to the alerts you are interested in so that information about the total count and alert messages will be displayed in the popup.
   b. To select all transactions to compare at once, click the Row column header.
5. Click the Compare button on the search results toolbar to compare parameters of the transactions and customer details.
   a. Click the Detach button on the search results toolbar to detach the Compare Transactions page for a larger view.
   b. Link selection of transactions/sessions to a new Agent case. Click Link to Case in the upper right corner to open a case to link sessions. Either search and select an existing case or create a new case, and then link the sessions. Click the Create New Case button in the Link to Case dialog.
6. From the Compare Transaction page, delete the Device ID as a filter in the Filtered Items panel and drag user names involved in suspect transactions one by one to the Filtered Items panel to see if they had other activity which needs evaluation.
7. Once you have selected the transactions, add the device ID utilized in the fraudulent orders to the OAAM Restricted Devices blacklist group. This will black list future activity originating from this device.
   a. Select transactions, and click the Add to Group button in the toolbar. In the Add to Group dialog, select Device as the data type to add and click Next.
   b. Select the Search from existing groups radio button and search for the OAAM Restricted Devices group and click Next.
8. Add the credit cards used to a Stolen Cards group to prevent future credit card fraud.
   a. Select transactions, and click the Add to Group button. In the Add to Group dialog, select Credit Card as the data type to add and click Next.
   b. Select the Search from existing groups radio button and search for the Stolen Cards watch group and click Next.
9. Create the new group as part of the flow.

a. Select transactions, and click the Add to Group button. In the Add to Group dialog, select Credit Card as the data type to add and click Next.

b. Select the Create New Group radio button and provide the group name, cache policy, and description, and click Next.

10. Close the Agent case with a confirmed fraud disposition.

A.2 Investigation - Session Centric Flow

A security analyst working for BigUniversity reviews suspect access attempts to identify attempted fraud. The deployment primarily utilizes a manual case creation and investigation flow. The analyst starts each investigation by searching for sessions which were blocked. When attempted fraud is identified analysts record findings, black list entities of various sorts and close out cases with a disposition.

1. Search for sessions with a blocked authentication status.

   a. Log in to the OAAM Administration Console as an investigator.

   b. Click the Sessions tab.

   c. In the Sessions search page, filter the sessions by **Blocked** for Authentication Status and then, click **Search**.

   d. The results table contains a Session Date column that can be sorted in ascending or descending order by clicking the Session Date column header. The up/down arrow next to it indicates the current order of the data. Click the Session Date column header to filter results by ascending time stamp.

   e. In the results table, select the orange square next to the alerts for the total count of alerts and detailed messages about potentially fraudulent activity, which will be displayed in the popup.

      View the full set of alerts triggered in the session. The alert messages provide insight into what occurred in the situation. Click the alert message link to go to an Alert Details page where information can be viewed about the generation of the alert, the message, alert level, message type, and the alert's relationship to other data types such as user, device, location, sessions, browser, operating system, locales, and others.

   f. To filter the sessions for the device used in the session, drag the device ID in the results table into the Filtered Items area of the Utility Panel on the right side of the page.

2. To find matching sessions in the last 24 hours, in the Filtered Items panel, select **24 Hours** for the Time Range, click the **Find** button, and then click the number of sessions link under **Matching Items Found**.

   A Filtered Sessions page appears with a list of sessions in which the device was used.

   The results table shows Session ID, Alerts, Transactions, Organization ID, User Name, Device ID, IP Address, Location, Authentication Status, Session Date, Pre-authentication action, Pre-authentication score, Post-authentication score, Post-authentication action, client type, User ID, and Internal Session ID.

3. View list of sessions returned.

   a. View the alerts: In the results table of the Filtered Sessions page, select the orange square next to the alerts for information on the total count of alerts and

detailed messages about potentially fraudulent activity, which will be displayed in the popup.

b. Link sessions to a case: Select the sessions and click **Link to Case** in toolbar to link the sessions to a new Agent case or an existing one.

A dialog appears with the instructions, "Open a case to link sessions. Either search and select an existing case or create a new case, and then link the sessions." Three buttons are shown: Create New Case, Open existing case, and Cancel.

Click **Create New Case**. A Link to Case dialog appears with instructions to enter details. The case type is Agent and cannot be changed. Enter details for the following fields:

Organization ID

Severity Level: Choices are Low, Medium, High

Canned Descriptions: Choices are Cannot Login, Forget Question Answers, Possible Fraud, and OTP Override.

Description

Click **Next**. Another Link to Case dialog appears with the message, "The following sessions have been selected to link to the case 1. Enter a note for this action." As part of the linking the investigator enters notes describing why the sessions were linked. Enter Canned Notes: Choices are "These sessions contain suspected fraud" and "These sessions contain corporate misuse." Click **Link Sessions**. A dialog appears with a message, "The selected sessions were linked to Case_<number> successfully." Click **OK** to dismiss the dialog.

The case log records the notes as well as the user who performed the link action. These sessions stay linked to the case unless they are unlinked by an investigator or manager.

4. Drag IP addresses involved in suspect sessions one by one to Filtered Items panel to see if they had other activity which needs evaluation.
   - **a.** Delete Device ID as one of the filters if it does not seem to be relevant to the case.
   - **b.** Drag IP address into the Filtered Items panel.
   - **c.** Click the Find button.
   - **d.** Click the number of Sessions to see the Filtered Sessions page.
   - **e.** View the alerts.
   - **f.** Click the Session ID to view the Session Details page. Then close the page, and go back to Filter Sessions page.
5. Add the IPs utilized in the fraudulent access requests to the OAAM Restricted IPs group. This will blacklist future activity originating from these IPs.
   - **a.** In the Results table of the Filtered Sessions page, click the IP address link.
   - **b.** In the IP Address details page, click Add IP Address to Group
6. Close the Agent case with a confirmed fraud disposition.

   An investigator closes the case, by providing notes and a disposition. A disposition contains information about why and how the investigator came to a conclusion.

a. Go back to the Case Details page and click Change Status.

b. Enter **Closed** for Status.

c. Enter **Confirmed Fraud** for Disposition.

d. Enter canned notes.

e. Enter additional notes.

f. Click **Submit**.

A.3 Investigation - Auto-generated Agent Case Flow

Jeff is a fraud analyst on the BigMart team. The deployment primarily utilizes automated case creation and investigation flow. Analysts start each investigation by searching for new cases. They drill in on the sessions for which the case was generated. When fraud is identified analysts record findings, black list entities of various sorts and close out cases with a disposition.

An auto-generated case is created when a security administrator configures an action to create an Agent case when specific rules trigger. In other words, the new Agent case is dynamically created as a result of a particular event. This Agent case contains the session data for which it was created.

1. Search for Agent cases with current status ""New".

   a. Log in to the OAAM Administration Console as an investigator.

   b. Filter the cases by Case Type as "Agent," Case Status as "New," and Expired as "Hide Expired"; and then, click Search.

   c. Filter results by ascending time stamp.

      The results table contains a Last Action Date column that can be sorted in ascending or descending order by clicking the Last Action Date column header. The up/down arrow next to it indicates the current order of the data. Click the Last Action Date column header to filter the view by cases with the least time to overdue at the top.

2. Open top case to start working it.

   When a case with a status of New is accessed for the first time the status automatically changes to Pending. Other investigators can now see that the case is actively being worked on since the case has an owner and the status is not New.

3. View the session that contains the alerts generated.

   a. View alert messages in popup.

      In the table of Case Details page of Linked Sessions tab, select the orange square next to the alerts you are interested in for the alert total count and alert message, which will be displayed in the popup. If you want, you could click the Alert link and look through the Alert detail page. Go back to the Case Details page, and click the Session ID of the session you are interested in.

   b. In the Session Details page, view list of transactions from the Session Transactions panel. Go to Transaction search, and search for transactions.

4. Compare the transactions.

   a. Select transactions from the Transaction search results and click Compare.

   b. Drag the credit cards used into the Filtered Items panel one by one to find related sessions and transactions in the last 7 days.

A list of filtered transactions are shown in the Filtered Transactions page.

5. Link transactions found to the Agent case.
   a. Select the transactions and click the Link to Case button in the search results toolbar.

      A dialog appears with the instructions to open a case to link sessions. Either search and select an existing case or create a new case, and then link the sessions.

   b. Click the Open existing case button to open an existing case.
   c. In the Link to Case dialog, enter criteria and click Search.
   d. Click Next.

      Another Link to Case dialog appears listing sessions that have been selected to link to the case. Instructions are given to enter a note for this action.

   e. Select the list item that best describes the situation. Enter any additional comments.
   f. Click Link Sessions.
   g. Click OK in the Link to Case confirmation dialog to confirm.
6. Enter case notes in the notes panel.
7. Add the IPs utilized in the fraudulent transactions to the OAAM Restricted IPs group.
8. Close the Agent case with a confirmed fraud disposition.

A.4 Escalated Agent Case

This morning John Smith called customer service claiming to have lost money out of his account. John claims that there was a wire transfer for $129 out of his account last week that he did not initiate. The CSR opens case 321 for John via his username jsmith and enters notes based on the information he provided. The case displays John's username in the title so any CSR viewing the case can always see what user this case is for. The CSR escalates the case and tells jsmith he will be contacted within 24 hours by an investigator. Mike works on the BigBank Security team. He is responsible for investigating customer service related security issues. He searches for cases with an escalated status and filters by date. Mike opens the newly escalated case from the CSR. Mike can view customer/user specific data and the notes from the CSR as a starting point. He searches for wire transfer transactions John Smith has performed for values between $100 and $200. Mike compares the transactions returned to determine if this looks like fraud.

1. CSR opens a new case for the customer.
   a. Log in to the OAAM Administration Console as a CSR.
   b. In the **Cases Search** page, click the **New Case** button.

      The **Create Case** screen is displayed.

   c. Enter the John Smith's user name, xxxx, in the **User ID** field and select the **Organization ID** (group John Smith belongs to).
   d. For severity level, select **High** from the **Severity Level** list.
   e. In Canned field, selects **Possible Fraud**.

2. Enters into note box, "Customer claims that there was a wire transfer for $129 out of his account last week that he did not initiate." Then clicks **Create**.
3. On the toolbar of Case Details page, clicks **More Actions** and then selects **Escalation**.

   The **Escalation** screen is displayed.
4. In the **Type** list, selects the Agent as type of case and escalates the case to investigation team.
5. Investigator searches for cases.
   a. Filter by escalated status.
   b. Filter results by ascending time stamp.
6. Searches for transactions.
   1. Wire transfer transactions.
   2. Between $100 and $200.
7. Compares transactions.

A.5 Search Transactions: Add Filter 1

Jeff is a security analyst at Acme Corp. Acme has online purchase and user profile change transactions defined in the deployment. Jeff is searching for transactions that involved addresses in the 95060 zipcode. He selects all transaction types and adds a filter for address.zipcode. When he runs the query the zipcode column appears in the results. When the zipcode column is added the rest of the columns resize horizontally to optimize the screen real estate available.

1. In Agent page, click the Transactions tab.
2. In the Transaction Name field, select Retail Ecommerce and other items.
3. Click the Add Fields down arrow button.
4. From the list, choose address.zipcode as the additional filter.
5. Use the search operator, Equals, to refine your query in the text field.
6. In the search field, enter 95060.

   The transactions that match the search criteria, 95060, appear in the Search Results table. You can view a transaction in detail by clicking the transaction name link.

A.6 Search Transactions: Add Filter 2

Jeff is a security analyst at Acme Corp. Acme has online purchase and user profile change transactions defined in the deployment. Jeff is searching for ecommerce transactions that involved dollar totals greater than $500. He selects the ecommerce transaction type and adds a filter for total dollar amount. The add fields menu contains all the specific entities, entity data and linked entity data. When he runs the query the dollar total column appears in the results. When the new column is added the rest of the columns resize horizontally to optimize the screen real estate available.

1. In Agent page, click the Transactions tab.
2. In the Transaction Name field, select ecommerce.
3. Click the Add Fields down arrow button.

4. From the list, choose Transaction Amount as one of the additional filters.
5. Use the search operator, Greater Than, for the Transaction Amount.
6. In the search field, enter 500, to search for Transaction Amounts greater.

   The transactions that are greater than $500 appear in the Search Results table. You can view a transaction in detail by clicking the transaction name link.

A.7 Wire Transfer Dollar Amount Pattern

Mike is a security administrator who needs to profile user's behavior based on the online banking wire transfers they complete. In this case Mike wants to track the ranges of dollar amounts each user normally transfers. He creates a user multi-bucket pattern to create dollar ranges of $100. Mike then implements a rule to challenge if the current dollar range bucket transfer has fallen into is one the user has hit less than 5% of the time in the last three months.

Prerequisites: Default snapshot is loaded. A transaction that represents a banking wire transfer, such as the "Internet Banking" transaction is configured for the application.

Create the Pattern

Create a multi-bucket pattern on the Internet Banking transaction with User as the Member Type and add Transaction Amount as a range attribute with a $100 increment.

1. Open the OAAM Administration Console.
2. In the Navigation tree, double-click **Patterns**. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.
4. Create a new multi-bucket pattern on the Internet Banking transaction to create dollar ranges of $100.
   a. In the "New Pattern" dialog, select Transaction Type as "Internet Banking," Creation Method as "Multi-Bucket," Member Types as "User," and Evaluation Priority as "High".
   b. In the Attributes tab, add a new attribute, selecting "Transaction Amount" from the list. For the Attribute Details, select Compare Operator as "Range," Start Value as " 0", End Value as blank, and Increment Step as "100."

      The transaction amount is collected in ranges of 100.

Create the Rule

Create a rule to challenge if the current dollar range bucket transfer has fallen into is one the user has hit less than 5% of the time in the last three months.

1. Create a new policy to run in the Transaction Update checkpoint.
2. Create the transaction definitions in OAAM.
3. Create an alert group with an alert for unusual wire transfer amounts.
4. Add a rule to the Transaction Update policy.
5. Add the "Transaction: Check Current Transaction using the filter conditions" to check if the current transaction type is Internet Banking.
6. Add the "Transaction: Check Transaction Count using filter conditions" to check if this user has had at least five successful Internet Banking transactions over the last 3 months.

7. Add the "Pattern (Transaction): Entity is member of pattern less than some percent times" to check if this user has been a member of this pattern less than 5% of the time over the last 3 months.

   Values to enter are: Pattern Hit Percent less than as "5," Pattern name for membership as the name of the pattern created, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3", and Member type for pattern membership as "User."

8. Set the rule results to trigger the alert and challenge the user.

   Set the rule result Action Group to "OAAM Challenge."

   Set the rule result Alert Group to the alert for unusual wire transfer amounts.

Test

1. Perform 5 Internet Banking transactions for the same user, all with a dollar amount between 1 and 99.
2. Perform an Internet Banking transaction for the same user, with a dollar amount of 250. You should be presented with a challenge question, because this transaction amount is outside the user's normal range. If you answer the question correctly, you should see a "success" message.

A.8 Shipping Address Country Pattern and Billing Mismatch

Mike is a security administrator who needs to profile ecommerce transactions based on the country the goods are shipping to and if the billing and shipping addresses are from different countries. He creates a pattern to create a bucket for each country and count the transactions shipped to each. He then implements a rule to alert if a transaction is shipping to a country that less then 5% of all other orders have shipped to in the last 3 months and if the shipping address country and billing address country are not the same.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction, such as the "Retail Ecommerce" transaction. The transaction has entities or attributes that indicates the country in the shipping address and the country in the billing address.

Create the Pattern

1. Open the OAAM Administration Console.
2. In the Navigation tree, double-click **Patterns**. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.
4. Create a new multi-bucket pattern on the ecommerce transaction to create a bucket for each country and count the transactions shipped to each.
   a. In the "New Pattern" Dialog, select Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "Shipping Address," and Evaluation Priority as "High."
   b. In the Attributes tab, add a new attribute, selecting "Country" from the list and selecting "for Each" as the Compare Operator.

Create the Rule

Create a rule to generate an alert if a transaction is shipping to a country that less than 5% of all other orders have shipped to in the last 3 months and if the shipping address country and billing address country are not the same.

1. Create a new policy to run in the Transaction Update checkpoint.
2. Create the transaction definitions in the OAAM Administration Console.
3. Create an alert group with an alert for if the billing and shipping addresses are from different countries.
4. Add a rule to the Transaction Update policy.
5. Add the "Transaction: Check Current Transaction using the filter conditions" to check if the current transaction type is Retail Ecommerce.
6. Add the "Transaction: Check Transaction Count using filter conditions" to check if this user has had at least five successful Retail Ecommerce transactions over the last 3 months.
7. Add the "Session: Compare two parameter values" condition to the rule, with Parameter key 1 as "Transaction.billingAddress.country," Operation as "Not Equal To," Parameter key 2 as "Transaction.shippingAddress.country," Ignore case as "True," and if no data, return as "False".
8. Add the "Pattern (Transaction): Entity is member of pattern less than some percent times" condition to the rule, with Pattern Hit Percent less than as "5," Pattern name for membership: pattern created in step 4, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "Shipping Address."
9. Set the rule result to generate an alert.

Post conditions: If a user ships to a country different from his billing address, and the shipping country is one that is used less than 5% of the time, then an alert is generated.

A.9 Browser Locale Pattern

Mike is a security administrator who needs to profile users based on the browser locales they utilize when accessing. He creates a multi-bucket pattern for users by locale. This will create a bucket for each locale. He then develops a rule to challenge if the locale being used is one this user has never used previously.

Prerequisites: Default snapshot is loaded.

Create the Pattern

1. Open the OAAM Administration Console.
2. In the Navigation tree, double-click **Patterns**. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.
4. Create a new multi-bucket pattern on the authentication transaction to track each browser locale.
   a. In the "New Pattern" Dialog, select Transaction Type as "Internet Banking," Creation Method as "Multi-Bucket," Member Types as "User," and Evaluation Priority as "High."

b. In the Attributes tab, add a new attribute, selecting "Locale" from the list and select Compare Operator as "for Each".

Create the Rule

Create a rule to challenge if the locale being used is one this user has never used previously.

1. Create a new policy to run in the Transaction Update checkpoint.
2. Create the transaction definitions using the OAAM Administration Console.
3. Create an alert group with an alert for locale being used is one this user has never used previously.
4. Add a rule to the Transaction Update policy.
5. Add the "Transaction: Check Current Transaction using the filter conditions" to check if the current transaction type is Internet Banking.
6. Add the "Pattern (Transaction): Entity is member of pattern for first time in certain time period" condition to the rule, with Is condition True as "True," Time period type for bucket membership as "Years," Time period for bucket membership as "999," Member type for pattern-bucket membership as "User," and First Time count as "1."
7. Set the rule result Action Group to "OAAM Challenge."

A.10 Credit Card by Shipping Address Country Pattern

Mike is a security administrator who needs to profile ecommerce transactions based on the credit card and country the goods are shipping to. He creates a pattern to create a bucket for each credit card and shipping address country and count the transactions. He then implements a rule to alert if a transaction uses a credit card that has been used more then 5 items and has shipped to the current country less then 5% of the time in the last 3 months.

Prerequisites: Default snapshot is loaded. System has a defined transaction that represents the ecommerce transaction. The transaction has entities that represent the credit card and the shipping address.

Create the Pattern

Create a multi-bucket pattern on the Retail Ecommerce transaction with User as the Member Type. Add Shipping Address.Country as a For Each attribute.

1. Open the OAAM Administration Console.
2. In the Navigation tree, double-click **Patterns**. The **Patterns Search** page is displayed.
3. Click the **New Pattern** button.
4. Create a new multi-bucket pattern on the ecommerce transaction for each credit card and shipping address country and count the transactions.
   a. In the "New Pattern" Dialog, select Transaction Type as "Retail Ecommerce," Creation Method as "Multi-Bucket," Member Types as "User," and Evaluation Priority as "High."
   b. In the Attributes tab, add a new attribute, selecting "Shipping Address.Country" for the shipping address from the list and select "for Each" as the Compare Operator.

Create the Rule

Create a rule to alert if a transaction uses a credit card that has been used more than five items and has shipped to the current country less than 5% of the time in the last 3 months.

1. Create a new policy to run in the Transaction Update checkpoint.
2. Create the transaction definitions using the OAAM Administration Console.
3. Create an alert group with an alert for unusual shipping address country.
4. Add a rule to the Transaction Update policy.
5. Add the "TRANSACTION: Check Current Transaction using the filter conditions" to check if the current transaction type is Internet Banking.
6. Add the "TRANSACTION: Check Transaction Count using filter conditions" to check if this user has had at least five successful Internet Banking transactions over the last 3 months.

   Values: Select Transaction to check as "Retail Ecommerce," Select Entity or Element to count as "User," Specified Condition for Count as "Greater Than," Specified Check value for Count as 5, Duration as "3 Rolling months," Ignore Current Transaction in count? as "True," for the same user? as "False," and apply the filter checks on Current Transaction as "False."
7. Use the "PATTERN (TRANSACTION): Entity is member of pattern less than some percent times" to check if this user has been a member of this pattern less than 5% of the time over the last 3 months.

   Values: Pattern Hit Percent less than as "5," Pattern name for membership: pattern created, Is Membership Count Less than patternHitPercent as "True," Time period type for pattern membership as "Months," Time period for pattern membership as "3," and Member type for pattern membership as "User."
8. Set the rule results to trigger the alert and challenge the user.

Test

1. Perform 5 Internet Banking transactions for the same user, all with a dollar amount between 1 and 99.
2. Perform an Internet Banking transaction for the same user, with a dollar amount of 250. You should be presented with a challenge question, because this transaction amount is outside the user's normal range.

A.11 Linked Entities

Adam is an security administrator at Acme Corporation. He has defined a Customer entity that will be used in an ecommerce transaction. As part of the customer entity definition Adam links the Address entity twice. He links Address as a Shipping Address and as a Billing Address. The ecommerce transaction has been defined to include both the Customer entity and the linked Address entities. At runtime the transaction will include all this data and risk evaluations can be made against the data.

1. Figure out what fields are needed for the Customer entity in Retail Ecommerce transactions.

   The Retail Ecommerce transaction fields for Customer are First Name, Last Name, Is Shipping Address Same, Credit Card, CC Expiration Date, CC Issuing Country, Item, Count, Price, Address Line1 (for Shipping Address), Address Line2 (for Shipping Address), Address Line3 (for Shipping Address), City (for Shipping

Address), State (for Shipping Address), Country (for Shipping Address), Pin Code (for Shipping Address), Address Line1 (for Billing Address), Address Line2 (for Billing Address), Address Line3 (for Billing Address), City (for Billing Address), State (for Billing Address), Country (for Billing Address), and Pin Code (for Billing Address).

2. Figure out the transaction definition and the mapping of the source data to transaction definition. Source data elements are the fields from the customer application. Make sure the source data keys match the keys used by the customer application.

   An example is provided below for a transaction with Transaction Name Retail Ecommerce and Transaction Key trx_re.

Table A–1 Data Fields and Source Keys

Data Name	Internal ID
Item	itemId
Price	itemPrice
Count	itemCount
First Name	customer.firstName
Last Name	customer.lastName
Credit Card	creditCard.number
CC Expiration Date	creditCard.expDate
CC Issuing Country	creditCard.issuingCountry
Is Shipping Address Same?	shippingAddress.addressSame
Address Line1	shippingAddress.addressLine1
Address Line2	shippingAddress.addressLine2
Address Line3	shippingAddress.addressLine3
City	shippingAddress.city
State	shippingAddress.state
Country	shippingAddress.country
Pin Code	shippingAddress.pinCode
Address Line1	billingAddress.addressLine1
Address Line2	billingAddress.addressLine2
Address Line1	billingAddress.addressLine3
City	billingAddress.city
State	billingAddress.state
Country	billingAddress.country
Pin Code	billingAddress.pinCode

3. Log in to the OAAM Administration Console and double-click **Entities** in the Navigation tree to create entities for item, Customer, and Address.

   An entity is a data structure you reuse in multiple transactions. For example, an address entity could be used as a shipping address, billing address, home address, and so on. Most entities also combine multiple datapoints into this structure for

data optimization. For example, an address may have street number, street name, apartment number, city, state, postal code and country.

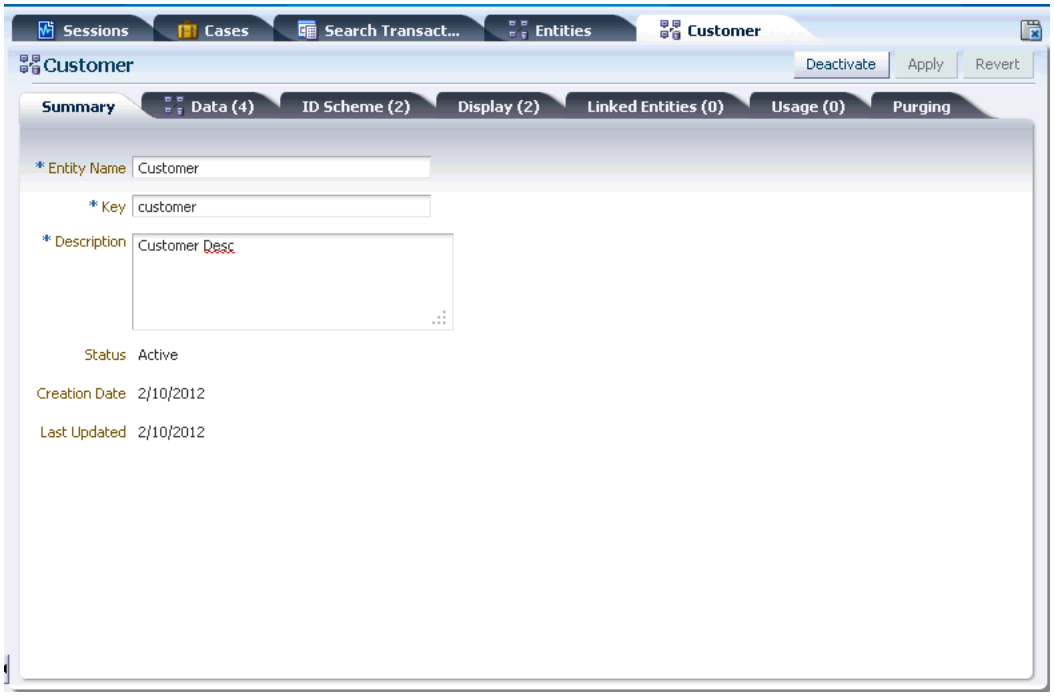
4. Create the Address entity by clicking the **New Entity** button in the Entities search page.
5. In the Summary tab, specify the following values:

   Entity Name: Address

   key: <key>

   Description: <description>

Figure A–1 Entity Summary



6. In Data tab, click the Add button to add a data element. Numeric data types cannot be encrypted (use string type).

   Note: Internal ID must have a unique value

   Label: Text used to identify component data in a web page.

   Description: Description about the data element.

   Data Key: The Data Key is used to identify a data element in the Entity. The data keys specified in the Data tab are for internal use. They are typically used in rule conditions. Do not change this key after it is defined.

   Required: True/False. Some data elements are not populated all the time as the data might not be available. For example "Address Line 2" in an address is not required since many addresses will not have "Address Line2."

   Is Encrypted?: If encrypted is set to true, data is encrypted before it is stored in the database. This feature protects sensitive data. These fields should not be used in

rules. If they are used, you cannot specify regular values for comparing against these fields; the values will have to be encrypted values. These fields cannot be used in the search criteria while querying for transactions through the query screen. Numeric fields cannot be encrypted.

Data Type: A data type is an attribute that specifies the type of data that the attribute can take: Boolean data type, Date data type, Name value profile, Numeric data type, and String data type.

7. In ID Scheme tab, use the table to add, configure and edit data elements of the entity. Also choose Data Identification Scheme: By Key or By Digest.

   Identification Scheme determines how an entity is uniquely identified using the elements that are part of the entity. The elements that are selected should be stored as plain text (**key**) or encrypted (**digest**).

   By Key: This scheme creates a unique identifier by simply concatenating the selected elements of the entity.

   By Digest: This scheme creates a unique identifier by hashing the values of the selected elements of the entity. The resultant key is usually cryptic. Use this scheme when the data values are large or if they need to be secured.

8. In Display tab, use the table to add, configure and edit display elements of the entity.

   The Address entity has Street Address Line1, Street Address Line2, City, State, Country, Zip, and Phone as attributes. The Street Address Line1, City, Country, and Zip attributes can be used to identify the address uniquely. The Street Address Line2 and Phone attributes are not necessary.

   Street Address Line1 alone would not uniquely identify an address. For example, 150 Main Street can exist in more than one location.

9. In Purging tab, set the values to determine when the entity data should be purged from the database.

   Purge all entity data that has not been updated over the past [number] days

   Do not purge any entity data

10. Click Activate.

11. Create the Customer entity by clicking the **New Entity** button in the Entities search page.

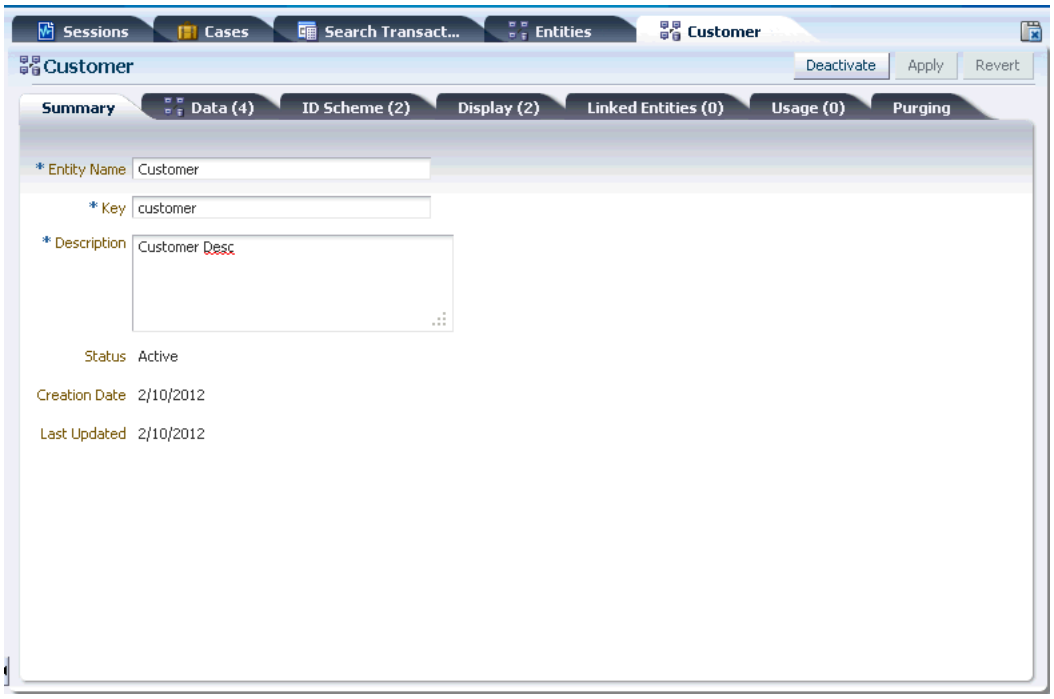
12. In the Summary tab, specify the following values:

    Entity Name: Customer

    key:

    Description: <description>

Figure A–2 Entity Summary



13. In Data tab, click the Add button to add a data element. Numeric data types cannot be encrypted (use string type).

    Note: Internal ID must have a unique value

14. In ID Scheme tab, use the table to add, configure and edit data elements of the entity. Also choose Data Identification Scheme: By Key or By Digest.
15. In Display tab, use the table to add, configure and edit display elements of the entity.
16. In Purging tab, set the values to determine when the entity data should be purged from the database.

    Purge all entity data that has not been updated over the past [number] days

    Do not purge any entity data
17. Click Activate.
18. In the Linked Entity tab, link entity. Click Link Entity button in toolbar.
19. In Link Entity dialog, search for Address entity to link to Customer entity.
20. Select entity and click Next.
21. Provide a name for the link to Customer entity and click the Add button. The data Preview shows:

    Address Line1

    Address Line2

    Address Line3

City

State

Country

Zip

Pin Code

22. In the Linked Entity tab, link entity. Click Link Entity button in toolbar.
23. In Link Entity dialog, search for Address entity to link to Customer entity.
24. Select entity and click Next.
25. Provide a name for the link to Customer entity and click the Add button.
26. Click Activate.
27. Create the Item entity.
28. Double-click Transactions.
29. Enter the following information to start the creation of a transaction definition.
    - Transaction Type
    - Description
    - Definition Key
30. Add existing or new entities to this transaction.
31. Add transaction data. This data is unique for each transaction occurrence and therefore not reusable across different transactions. For example, the total dollar amount of a transaction would not be reused in multiple transactions so it should be transaction data and not an entity.
32. In Data Source, provide:
    - Source Data Name
    - Internal ID
    - Description
33. Connect the source data to OAAM entities and transaction data using mapping.
34. In Purging, Set the values to determine when the transaction data should be purged from the database.
35. Link Shipping Address to Customer.
36. Log in to the application and create/generate some test transactions.
37. Log in to the OAAM Administration Console and check the transaction data to make sure the transactions are created.
38. Determine which transaction rule conditions can be used to model the rules you want.
39. Create a policy of transaction rules by creating a new policy first.
40. Use your application to create transactions that trigger the rules.
41. Use the OAAM Administration Console to verify whether the rules you configured are triggering.

B

Conditions Reference

Conditions are configurable evaluation statements that are the basic building blocks of decision making in the OAAM rule evaluation process and flow. They use datapoints from historical and runtime data to evaluate risk or business logic. Conditions are grouped based on the type of data used in the condition. For example, user, device, and location. Conditions are pre-packaged in the system and cannot be created by a user. Conditions may take user inputs when adding them to a rule.

This appendix contains the following sections:

B.1 Available Conditions

The following table lists the available standard conditions.

Table B–1 Rule Conditions

Condition	Description
Always On - User	This rule always gets processed
Device: Browser header substring	Checks whether the supplied string exists as a substring in the browsers header information
Device: Check if device is of given type	Checks whether the current device is of selected device type.
Device: Check if device is using Mobile Browser	Checks whether the current device is using mobile browser to access the site based on the user agent string
Device: Device first time for user	Checks whether this device is used for the first time by this user
Device: Device in group	Checks if this device is in group
Device: Excessive use	Checks whether device is excessively used but not used before
Device: Is registered	Checks if the user has registered this device

Table B–1 (Cont.) Rule Conditions

Condition	Description
Device: Timed not status	Checks the maximum login attempts for all but the given status within the given time period
Device: User count	Checks the unique user count using this device in past "x" seconds
Device: Used count for User	Checks the device used count. This condition ignores the current request for calculating the device count.
Device: User status count	Checks the user count with the given status from this device in specified duration
Device: Velocity from last login	Triggers when miles per hour is more than specified value and the IP does not belong to ignore IP group
Location: ASN in group	Checks whether the ASN for the current IP address is (or is not) in the ASN group
Location: Carrier in group	Checks if the IP is in the given carrier group
Location: City in group	Checks if the IP is in the given city group
Location: Domain in group	Checks if the Second Level Domain is in the group
Location: In Country group	Checks if the IP is in the given country group
Location: IP Connection speed in group	Checks if the IP Connection Speed is in the group
Location: IP Connection type	Checks the connection type for the IP. The connection type could be DSL, Cable, ISDN, Dialup, Fixed Wireless, Mobile Wireless, Satellite, Frame Relay, T1/T3, OCx, and others
Location: IP Connection type in group	Checks if the IP connection type is in the group
Location: IP Excessive use	Checks if IP is excessively used but not used before
Location: IP in group	Checks if the IP is in the IP group
Location: IP in Range group	Checks if the IP is in the IP range specified in an IP Range group. Condition will check if IP of activity belongs to one of the IP ranges specified in the list of ranges.
Location: IP is AOL	Checks if the IP is from an AOL proxy
Location: IP line speed type	Checks the connection line speed type for the IP. This is categorized into High, Medium, Low or Unknown
Location: IP Maximum logins	Checks the maximum number of logins using the current IP address within the given time duration. This condition ignores the current request during evaluation of maximum logins count.
Location: IP Maximum Users	Checks the maximum number of users using the current IP address within the given time duration
Location: IP Multiple Devices	Checks the maximum number of devices from IP address within the given time duration
Location: IP routing type	Checks the routing type for the IP. It could be fixed/static, anonymizer, AOL, POP, Super POP, Satellite, Cache Proxy, International Proxy, Regional Proxy, Mobile Gateway or Unknown
Location: IP Routing Type in group	Checks if the IP Routing Type is in the group
Location: IP type	Checks if IP is valid, unknown or private
Location: Is IP from AOL	Checks if the IP is from AOL proxy
Location: ISP in group	Checks if the ISP for the current IP address is (or is not) in the ISP group
Location: State in group	Checks if the IP is in the given State group

Table B–1 (Cont.) Rule Conditions

Condition	Description
Location: Timed not status	Checks the maximum login attempts for all but the given status within the given time period
Location: Top Level Domain in group	Checks if the Top Level Domain is in the group
Location: User status count	Check the user count with the given status from this location in specified duration
Pattern (Authentication): Entity is a member of the pattern less than some percent of time	Evaluates if the entity of the type specified (user, device, location, and so on) involved in the current access request has been a member of the pattern specified less/more than the defined percentage within the time range configured.
Pattern (Authentication): Entity is a member of pattern bucket for the first time in a certain time period	Checks if this Entity is member of pattern bucket for first time in certain time period
Pattern (Authentication): Entity is a member of the pattern bucket less than some percent with all entities in the picture	Checks if this entity has been member of this pattern bucket based on percent basis, taking into account all other entities
Pattern (Authentication): Entity is a member of the pattern N times	Checks to determine whether the entity is a member of the pattern more than "n" number of times. This condition is intended to be used only with single bucket type patterns since it evaluates pattern membership as opposed to individual bucket membership.
Pattern (Authentication): Entity is a member of the pattern N times in a given time period	Checks if this entity has been member of this bucket. You can compare if this entity has been belonging to this bucket before.
Pattern (Transaction): Entity is a member of the pattern bucket for the first time in a certain time period	Checks if this entity is member of pattern bucket for first time in certain time period
Pattern (Transaction): Entity is a member of the pattern bucket less than some percent with all entities in the picture	Checks if this entity has been member of this pattern bucket based on percent basis, taking into account all other entities
Pattern (Transaction): Entity is a member of the pattern less than some percent of time	Evaluates if the entity of the type specified (user, device, location, and so on) involved in the current access request has been a member of the pattern specified less/more than the defined percentage within the time range configured.
Pattern (Transaction): Entity is a member of the pattern N times	Checks to determine whether this entity is a member of the pattern more than "n" number of times. This condition is intended to be used only with single bucket type patterns since it evaluates pattern membership as opposed to individual bucket membership.
Pattern (Transaction): Entity is a member of the pattern N times in a given time period	Checks to determine whether this entity has been a member of the current pattern bucket more than "n" number of times within the given time range. This condition is intended to be used only with both single bucket and multi-bucket type patterns. It evaluates individual bucket membership.
Pattern (Transaction): Entity is member of pattern X% more frequently all entities' average over last N time periods	Checks if this entity has been member of this pattern condition more (or less) frequently than is typical for all entities.
Pattern (Transaction): Entity is member of pattern X% more frequently than entity's average over last N time periods	Checks if this entity has been member of this pattern condition more (or less) frequently than is typical for this entity.
Transaction: Check Count of any entity or element of a Transaction using filter conditions	Checks count of any entity or element of a Transaction using filter conditions
Transaction: Check Current Transaction using the filter conditions	Checks current transaction using filter conditions

Table B–1 (Cont.) Rule Conditions

Condition	Description
Transaction: Check if consecutive Transactions in given duration satisfy the filter conditions	Check if consecutive transactions in given duration satisfy the filter conditions
Transaction: Check number of times entity used in transaction.	Compares the number of times an entity used has been used with the specified count.
Transaction: Check Transaction Aggregrate and Count using filter conditions	Checks the transaction aggregrate and count using filter conditions
Transaction: Check Transaction Count using filter conditions	Checks the transaction count using filter conditions
Transaction: Check Unique Transaction Entity Count with the specified count	Checks the unique transaction entity count with the specified count
Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) across two different durations	Compares the transaction aggregrates (Sum/Avg/Min/Max) across two different durations
Transaction: Compare Transaction Counts across two different durations	Compares the transaction counts across two different durations
Transaction: Compare Transaction Entity or Element Counts across two different durations	Compares the transaction entity or element counts across two different durations
Session: Check parameter value	Checks if specified parameter value is more than specified value
Session: Check parameter value for regular expression	Checks if specified parameter value matches regular expression
Session: Check parameter value in group	Checks if specified parameter value is in group
Session: Check Risk Score Classification	Checks the risk score classification based on the risk score from previous checkpoint execution
Session: Check string parameter value	Checks to compare string value
Session: Check two string parameter value	Checks to compare two parameters string value
Session: Check value in comma separated values	Checks if specified value is present in comma separated value list.
Session: Compare two parameter values	Compares two parameter values
Session: Check Current Session using the filter conditions	Check Current Session using (up to 5) filter conditions
Session: Compare with current date time	Compares specified parameter value with current time
Session: Cookie Mismatch	Checks to see if there is mismatch of supplied cookie with the expected cookie
Session: IP Changed	Checks if IP Address is changed since transaction is started
Session: Mismatch in Browser Fingerprint	Checks to see if there is mismatch in browser fingerprint with the fingerprint supplied during authentication. Fingerprint is constructed using the context values passed to Rules Engine
Session: Time Unit	Checks if the current time unit matches the specified time unit criteria.
System - Check Boolean Property	Checks the system property

Table B–1 (Cont.) Rule Conditions

Condition	Description
System: Check if enough data is available for any pattern	Checks if a defined minimum amount of pattern data has been captured in the OAAM database. Generally the threshold should be set to between 1-3 months for best results. The standard policies use this rule to determine if there is enough pattern data captured to start running pattern based risk analysis.
System: Check if enough pattern data is available	Checks if enough pattern data is available. This condition will check if pattern data is available in the system for last several days for a given pattern.
System - Check Integer Property	Checks system property
System - Check Policy max score	Checks Policy maximum score
System - Check Policy min Score	Checks Policy minimum score
System - Check Request Date	Checks request date
System - Check String Property	Checks system property
System - Evaluate Policy	Processes the policy as rule and evaluate results
User: Account Status	Checks account status of the user
User: Action Count	Checks action counter for the given action. This condition has dependency on action configuration
User: Action Count Timed	Checks if the given action count is more than specified count. If checkpoint is not specified, action is checked in all checkpoints
User: Action Timed	Checks maximum number of actions in the past "x" seconds
User: ASN for first time	Checks if user using this ASN for the first time
User: Authentication Image Assigned	Checks if authentication image is assigned to user
User: Authentication Mode	Check user authentication mode
User: Challenge Channel Failure	Checks if a user has a failure counter value over a specified value from specific channel
User: Challenge Failure Is Last Challenge Before	Checks if it is the last challenge before number of hours, since number of days have passed.
User: Challenge Failure - Minimum Failures	Checks if a user has a failure counter value over a specified value.
User: Challenge Maximum Failures	Checks if user failed to answer challenge question for specified number of times
User: Challenge Questions Failure	Checks how many questions have failures
User: Challenge timed	Checks if user answered challenge question successfully in last n days
User: Check Anomalous User Request	Checks if the current User Request is Anomalous
USER: Check Devices of Certain Type are Used	Checks if devices of certain type are used for successful sessions within "n" seconds
User: Check Devices Used	Checks the number of devices tried in given time
User: Check first login time	Checks if user first logged in within range. First login is the first successful login
User: Check Fraudulent User Request	Checks if the current User Request is fraudulent
User: Check Information	Checks to see if user information is set. Information data to check is sent as key value pair.
User: Check Last Session Action	Checks if the given action is in last session. If checkpoint is not specified, action is checked in all checkpoints of that session

Table B–1 (Cont.) Rule Conditions

Condition	Description
User: Check login count	Checks user login count within specified duration
User: Check Login Time	Checks if user login time is within the specified time
User: Check OTP Failures	Checks if user's OTP failure counter value over a specified value
User: Check User Data	Checks User Data for the given key
User: Checkpoint score	Checks if the score is within limits
User: City first time for user	Checks whether the user is using this city for the first time
User: Client And Status	Checks account status of the user
User: Country failure count for user	Checks failure count for the user from the given country
User: Country first time for user	Checks if the user is using this Country for the first time
User: Country first time from group	Checks if this country is used for the first time by this user from the given country group
User: Distance from last successful login	Checks the distance from last successful login within specified time
User: Distance from last successful login within limits	Checks if distance from last successful login within specified time is within limits
User: Image Status	Checks the image status of the user
User: In Group	Checks if the user is in the given group
User: IP carrier for first time	Checks if the user is using this IP carrier for the first time
User: Is last IP match with current IP	Checks if user login IP address matches with that of previous login
User: Is User Agent Match	Checks if user agent matches with that of previous login from same device
User: Last Login Status	Checks to see if user login status is in specified list
User: Last login within specified time	Checks the last login within specified time
User: Location Used Timed	Checks if user used this location within the given time period
User: Login for first time	Checks if user is logging in for the first time
User: Login in group	Checks if the user login is in the given group
User: Login time between specified times	Checks the login time between specified time
User: Maximum Cities	Checks the number of cities within the given time period
User: Maximum Countries	Checks the number of countries within the given time period
User: Maximum IPs Timed	Checks the maximum number of IP within the given time period
User: Maximum Locations Timed	Checks the maximum number of locations within the given time period
User: Maximum States	Checks the number of states within the given time period
User: Multiple failures	Checks if user failed multiple times
User: Check Number of Registered Devices Of Given Type	Number of registered devices of given type.
User: Phrase Status	Checks phrase status of the user
User: Preferences Configured	Checks if the user preferences are set
User: Question Status	Checks Question status of the user

Table B–1 (Cont.) Rule Conditions

Condition	Description
User: Stale session	Checks if a newer session was established after this session is created
User: State first time for user	Checks if the user is using this state for the first time
User: Status Count Timed	Checks if user attempted multiple logins in specified time
User: User Agent Percentage Match	Checks if user agent percentage match is above specified percentage. Compares with browser user agent string (UAS) of previous login from same device
User: User Carrier for first time	Checks to see if the user has used this Carrier successfully previously
User: User City for first time	Checks to see if the user has used this City successfully previously
User: User Country for first time	Checks to see if the user has used this Country successfully previously
User: User Group in Group	Checks if the user group is in the given group
User: User IP for first time	Checks if the user has used this IP successfully previously
User: User ISP for first time	Checks if the user has used this ISP successfully previously
User: User is member of pattern N times	Checks if this user has been member of this pattern Condition
User: User state for first time	Checks if the user has used this state successfully previously
User: Velocity from last successful login	Checks the velocity from last successful login
User: Velocity from last successful login within limits	Triggers when velocity from last successful login is within specified limits

The following table lists the device fingerprinting conditions.

Table B–2 Device ID Conditions

Condition	Description
Device ID: Cookies match	Checks if tracker node matches for both cookies
Device ID: Cookie state	Checks the cookie state for the given device and user
Device ID: Header data match	Checks if header data match
Device ID: Header data match percentage	Checks if header data match percentage is within specified range
Device ID: Header data present	Checks if header data is present
Device ID: HTTP header data browser match	Checks if browser is matched based on HTTP header data
Device ID: HTTP header data browser upgrade	Checks if browser is upgraded based on HTTP header data
Device ID: HTTP header data OS match	Checks if OS match based on HTTP header data
Device ID: HTTP header data OS upgrade	Checks if OS is upgraded based on HTTP header data. Check is based on versions
Device ID: Is cookie disabled	Checks if cookie is disabled for the user based on history
Device ID: Is cookie empty	Checks if cookie value is empty or not empty. Validation check is not included
Device ID: Is Cookie from same device	Checks if the HTTP and flash cookies are from same device. Automatically checks old nodes, if current node is not found
Device ID: Is Cookie Old	Checks if the cookie sent is from old cookie
Device ID: Is cookie valid	Checks if there is a valid node for given cookie value

Table B–2 (Cont.) Device ID Conditions

Condition	Description
Device ID: known header data match percentage	Checks if known header data match percentage is within specified range
Device ID: User ASN for first time	Checks if the user has used this ASN successfully previously
Device ID: User used this fingerprint	Checks if the user has used this fingerprint previously

B.2 Descriptions

This appendix focuses on device, autolearning, location, transaction, session, system, and user conditions.

B.3 Autolearning Conditions

The section provides information on the autolearning conditions.

B.3.1 Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period

Table B–3 provides general information about the `Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period` condition is provided in the following table.

Table B–3 Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period

Condition	Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period
Description	The "Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period" condition determines whether the entity is a member of the "First Time" pattern bucket in a certain time period. "First time" can be considered as a relative function. If you want to truly track "first time" membership, use "Years" as the time period type and a long value such as 5 years around 5 years in the rule / policy configuration.
Prerequisites	An authentication type pattern must be created with a first class entity member type defined. This pattern operates on first class entities such as user, device, IP, city, state, country.
Assumptions	Autolearning is enabled.
Available since version	10.1.4.5
Checkpoints	All checkpoints. See the First Time count parameter for details on configuring the checkpoint.

Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period Condition Parameters

Table B–4 describes the parameters in the `Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period` condition.

Table B–4 Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period Condition Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern name for bucket First Time	Name of the pattern for which the "first time" pattern bucket is checked.	The following patterns are available out-of-the box: ■ User: Device profiling pattern ■ User: ISP profiling pattern ■ User: Country profiling pattern ■ User: Connection type profiling pattern ■ User: ASN profiling pattern ■ User: State profiling pattern ■ User: Locale profiling pattern ■ User: Day of the week profiling pattern ■ User: Routing type profiling pattern ■ User: Time range profiling pattern You may use other patterns you created. **Note**: Only active patterns appear in the drop-down list.	No
Is condition True	The `Is condition True` parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the user falls in the "First Time" bucket and the value of this parameter is `True`, the condition evaluates to `True`. If the user does not fall into the "First Time" bucket and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	`True` or `False`	No
Time period type for bucket membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ `Hours` (for "First Time" in the last "n" hours) ■ `Days` (for "First Time" in the last "n" days) ■ `Months` (for "First Time" in the last "n" months) ■ `Years` (for "First Time" in the last "n" years)	No

Table B–4 (Cont.) Pattern (Authentication): Entity is Member of Pattern Bucket for First Time in Certain Time Period Condition Parameters

Parameter	Description	Possible Values	Can be Null?
Time period for bucket membership	The time period over which the bucket membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern bucket membership	The type of member about which the pattern collects data.	Type of members that is applicable for the transaction. For authentication, select `User`, `Device`, `IP`, `City`, `State`, and/or `Country`.	No
First Time count	The count of occurrences (value) against which the pattern bucket count is compared.	The default value is 1. If the rule is used in a policy that is run in the Preauthentication checkpoint, select 0 as the value since autolearning takes place after the authentication is successful. In the Preauthentication checkpoint, autolearning would not have taken place for the current login. For all other checkpoints (post-authentication and any checkpoints after post-authentication), select 1 as the value.	No

Example Usage

A pattern and rule could be configured to detect if the current access request is the first time the user has accessed from the state they are in now in the given time frame. For example, is this the first time in the last six months that John has logged in from California?

B.3.2 Pattern (Authentication): Entity is a Member of the Pattern Less Than Some Percent of Time

Table B–5 provides general information about the `Pattern (Authentication): Entity is a member of the pattern less than some percent of time` condition.

Table B–5 Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent of Time

Condition	Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent of Time
Description	Checks if this entity has been a member of this pattern condition based on a percent basis
Prerequisites	An authentication transaction type pattern has been created with a first class entity member type defined.
Assumptions	Autolearning is enabled.
Available since version	10.1.4.5
Checkpoints	All checkpoints. This condition can be used in any checkpoint, but if the data is not processed by then, the data used will be stale by a session. This condition is for the authentication type only.

Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent of Time Parameters

Table B–6 describes the `Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent of Time` condition parameters.

Table B–6 Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent Time Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern hit percent	Percent hit count of the pattern used for comparison. If the current entity behavior has occurred less than the specified percentage and `Is Membership Count Less than patternHitPercent` parameter is `True`, the condition triggers. For example, if the rule is to trigger the condition if the user is coming from this pattern less than 10%. The pattern hit percent value is 10. If you create the city pattern and configure the rule to trigger if the user is coming in from a given city less than 10% of the time, the rule triggers when the user comes in from the city until 10% is reached. Pattern Hit Percent is the threshold in which the condition stops triggering.	Use only integer values.	No
Pattern name for membership	Name of the pattern that is used to check the membership count.	The following patterns are available out-of-the box: ■ User: Device profiling pattern ■ User: ISP profiling pattern ■ User: Country profiling pattern ■ User: Connection type profiling pattern ■ User: ASN profiling pattern ■ User: State profiling pattern ■ User: Locale profiling pattern ■ User: Day of the week profiling pattern ■ User: Routing type profiling pattern ■ User: Time range profiling pattern You may use other patterns that you created. **Note**: Only active patterns appear in the drop-down list.	No

Table B–6 (Cont.) Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent Time

Parameter	Description	Possible Values	Can be Null?
Is Membership Count Less than patternHitPercent	This setting controls if the evaluation triggers when it is above or below the specified percentage. You can use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit percentage is less than the specified percentage is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit percentage is less than the specified percentage is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	`True` or `False`	No
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, or `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member type (`user`, `device`, `IP`, `city`, `country`)	Type of members applicable for that pattern type. Choices for the authentication type are **User**, **Device**, **IP**, **City**, **State**, and/or **Country**.	No

Example Usage

Trigger if this user accessed from the current state they are in less than 3% of the time in the last two months. For example, has John logged in from California less than 5% of the time in the last two months?

B.3.3 Pattern (Authentication): Entity is a Member of the Pattern Bucket Less Than Some Percent with All Entities in the Picture

Table B–7 provides general information about the `Pattern (Authentication): Entity is a Member of the Pattern Bucket Less Than Some Percent with All Entities in the Picture` condition.

Table B–7 Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent with All Entities in Picture

Condition	Pattern (Authentication): Entity is a Member of the Pattern Bucket Less Than Some Percent with All Entities in the Picture
Description	Checks if this entity has been a member of this pattern bucket based on percent basis taking all other entities into account.
Prerequisites	Entities and patterns must be defined before adding the condition to the rule/policy.
Assumptions	Autolearning is enabled.
Available since version	10.1.4.5
Checkpoints	This condition can be used in any checkpoint, but if data is not processed by then the data used will be stale by a session.

Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent with All Entities in Picture Parameters

Table B–8 describes the parameters in the `Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent with All Entities in Picture` condition.

Table B–8 Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent with All Entities in Picture Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern bucket hit percent less than	Percent hit count of the pattern that is used for comparison If the current entity behavior has occurred less than the specified percentage, the condition triggers. If Jim logs in 30 times from the city and all users, including Jim, logged in 300 times, Jim's percentage is 10.	Integers. Decimals are not recommended.	No
Pattern name for membership	Name of the pattern for which the membership count is checked.	The following patterns are available out-of-the box: ■ User: Device profiling pattern ■ User: ISP profiling pattern ■ User: Country profiling pattern ■ User: Connection type profiling pattern ■ User: ASN profiling pattern ■ User: State profiling pattern ■ User: Locale profiling pattern ■ User: Day of the week profiling pattern ■ User: Routing type profiling pattern ■ User: Time range profiling pattern You may use other patterns you created. **Note**: Only active patterns appear in the drop-down list.	No
Is Membership Count Less than patternHitPercent	This setting controls if the evaluation triggers when it is above or below the specified percentage. You can use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit percentage is less than the specified percentage is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit percentage is less than the specified percentage is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	True or False	No

Table B–8 (Cont.) Pattern (Authentication): Entity is Member of Pattern Less Than Some Percent with All Entities in Picture Parameters

Parameter	Description	Possible Values	Can be Null?
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member type (user, device, location, city, country)	Type of members applicable for that transaction. For authentication type it can be user, device, IP, city, state, or country.	No

Example Usage

Trigger if the current state a user is accessing from is one that other users have used a very low percentage of the time within the specified time range. For example, have all users logged in from California less than 5% of the time in the last year?

B.3.4 Pattern (Authentication): Entity is Member of Pattern N Times

Table B–9 provides general information about the `Pattern (Authentication): Entity is Member of Pattern N Times` condition.

Table B–9 Pattern (Authentication): Entity is Member of Pattern N Times

Condition	Pattern (Authentication): Entity is Member of Pattern N Times
Description	Checks if this entity has been member of this pattern condition. This condition is intended to be used only with single bucket type patterns. It evaluates individual bucket membership.
Prerequisites	You should have entities and patterns defined before you try to add this to rule / policy.
Assumptions	Autolearning is enabled.
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Pattern (Authentication): Entity is Member of Pattern N Times Parameters

The following table summarizes the parameters in the `Pattern (Authentication): Entity is Member of Pattern N Times` condition.

Table B–10 Pattern (Authentication): Entity is Member of Pattern N Times Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern hit count more than	If the current entity behavior has occurred more than the specified count, the condition triggers.	For Pre-Authentication execution, set the count one less than what you want the rule to trigger on.	No
Pattern name for membership	Name of the pattern this rule condition will evaluate against.	The following patterns are available out-of-the box: ■ User: Device profiling pattern ■ User: ISP profiling pattern ■ User: Country profiling pattern ■ User: Connection type profiling pattern ■ User: ASN profiling pattern ■ User: State profiling pattern ■ User: Locale profiling pattern ■ User: Day of the week profiling pattern ■ User: Routing type profiling pattern ■ User: Time range profiling pattern You may have other patterns you created to choose from. **Note**: Only active patterns appear in the drop-down list.	No
Is Membership Count More than patternHitCountFor User	Boolean value that is used to return `True` or `False` from the condition. Use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit count is more than the specified hit count for the user is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit count is more than the specified hit count for the user is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	`True` or `False`	No

Table B–10 (Cont.) Pattern (Authentication): Entity is Member of Pattern N Times Parameters

Parameter	Description	Possible Values	Can be Null?
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ `Hours` ■ `Days` ■ `Months` ■ `Years`	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Positive integers	No
Member type for pattern membership	The member type (`user`, `device`, `IP`, `city`, `country`)	Type of members applicable for that transaction. For authentication type, the type can be `user`, `device`, `IP`, `city`, `state`, and `country`.	No

Example Usage

A single bucket pattern for China is created. Trigger if the current user is coming from China and has accessed from China more than a set number of times within a time range. For example, has John logged in from China more than 4 times in the last six months?

B.3.5 Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period

General information about the `Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period` condition is provided in the following table.

Table B–11 Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period

Condition	Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period
Description	Checks it the entity has been a member of the current pattern bucket more than "n" number of times within the given time range. This condition is intended to be used only with single bucket type patterns.
Prerequisites	Ensure that the following prerequisites are met: ■ 10.1.4.5.2 or later must be installed. ■ Entities and patterns must be defined before adding this condition to rules/ policies.
Assumptions	Autolearning is enabled.
Available since version	10.1.4.5.2
Checkpoints	All checkpoints

Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

The following table summarizes the parameters in the `Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period` condition.

Table B–12 Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern name for membership	Name of the pattern this rule condition will evaluate against.	The following patterns are available out-of-the box: ■ User: Device profiling pattern ■ User: ISP profiling pattern ■ User: Country profiling pattern ■ User: Connection type profiling pattern ■ User: ASN profiling pattern ■ User: State profiling pattern ■ User: Locale profiling pattern ■ User: Day of the week profiling pattern ■ User: Routing type profiling pattern ■ User: Time range profiling pattern You may have other patterns you created to choose from. **Note**: Only active patterns appear in the drop-down list.	No
Time period for bucket membership	The time period over which the bucket membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Time period type for bucket membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Member type for pattern membership	The member type (user, device, location [city, state, country], IP)	It is one of the type of members applicable for that transaction. For authentication type it is one of user, device, IP, city, state, country.	No

Table B–12 (Cont.) Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Bucket hit count	The number of request for the application which will be compared against. Hit count for the bucket and the compare operator used in Pattern (Authentication): Entity is a Member of the Pattern N Times in a Given Time Period evaluate the outcome of the condition together.	The default value is 3. For preauthentication execution, set the count to be one less than what you want the rule to trigger on.	No
Compare operator for the count	Comparison operator to be used for comparing the count in the system with bucketHitCountForEntity. For example if you specified the compare operator as `Less than` and bucket hit count as 3, the condition evaluates to `true` as long as the hit count for that bucket is less than 3 for that authentication.	Possible values are defined in the `bharosa.numeric.eval.operator.enum` property: ■ Equal to ■ Less than ■ Less than equal to ■ More than ■ More than equal to ■ Not equal to	No
Return value if condition is true	Value to return if the condition evaluates to `True`. If the condition does not evaluate to `True` then the opposite of the success value is returned. For example, if you specify `False` as the value to return if the condition evaluates to True, `False` is returned if the condition evaluates to `True`.	True / False	No
Return value if condition encounters an error	Value returned if the condition execution encounters an issue. Possible errors are that the pattern was not active, incorrect parameters were passed (configured), or values for the parameters were not in the expected range.	True / False	No

Example Usage

Trigger if the current user has accessed from the current location less than a set number of times within a time range. For example, out of all the states John has logged in from, has he come from California less than 4 times in the last month?

Common use cases for this condition involve whitelists and blacklists. For example, "how many times has the user come in from this IP address?" You can create a single bucket type pattern with Remote IP as an attribute, `Like` as the compare operator, and provide a comma-separated list of IP addresses for the compare value. This condition

increments the user's profile when the user comes in from a remote IP from the remote IP address list. You can use this remote IP list to check if the user came in from a certain remote IP address the last 10 times in the last 3 months. You are essentially evaluating the user's behavior against the list of remote IP addresses. For this example, you would not want to create a multi-bucket pattern because this condition would not take advantage of multiple buckets. The condition does not consider how many times the end user individually came from a certain remote IP.

B.3.6 Pattern (Transaction): Entity is Member of Pattern N Times

General information about the `Pattern (Transaction): Entity is Member of Pattern N Times` condition is provided in the following table.

Table B–13 Pattern (Transaction): Entity is Member of Pattern N Times

Condition	Pattern (Transaction): Entity is Member of Pattern N Times
Description	Checks if this entity has been member of this pattern condition.
Prerequisites	Entities and patterns must be defined before you try to add this to rule / policy. The patterns must be active and ones that make use of the transactions in the server.
Assumptions	Auto Learning is enabled.
Available since version	11.1.2.0
Checkpoints	All Checkpoints. Refer to the note for transaction create.

Pattern (Transaction): Entity is Member of Pattern N Times Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is Member of Pattern N Times` condition.

Table B–14 Pattern (Transaction): Entity is Member of Pattern N Times Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Hit Count More than	If the current entity behavior has occurred more than the specified value, the condition should trigger.	For transaction create execution set the count one less than what you want the rule to trigger on.	No
Pattern Name for membership	Name of the pattern this rule condition will evaluate against.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is Membership Count More than patternHitCountFor User	Boolean value that is used to return `True` or `False` from the condition. Use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit count is more than the specified value for the user is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit count is more than the specified value for the user is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	True or False	No

Table B–14 (Cont.) Pattern (Transaction): Entity is Member of Pattern N Times Parameters

Parameter	Description	Possible Values	Can be Null?
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use `1` through `23` for hours, `1` through `30` for days, `1` through `12` for months, and `1` through `8` for years. If you enter values that are greater than the maximum values for the time period type, OAAM Server uses the maximum possible values.	No
Member type for pattern membership	The member type (user, device, IP, city, country)	Type of members applicable for that transaction. For authentication type, choices are User, Device, IP, City, State, Country.	No

Example Usage

Trigger if the current destination account has had more than 5 transfers to it between $100 - $500 within the last 8 hours.

B.3.7 Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period

General information about the `Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period` condition is provided in the following table.

Table B–15 Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period

Condition	Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period
Description	This condition checks if the entity has been a member of the current pattern bucket more than "n" number of times within the given time range. This condition is intended to be used only with single bucket type patterns. It evaluates individual bucket membership.
Prerequisites	Entities and patterns must be defined before you try to add this to rule / policy. The patterns must be active and ones that make use of the transactions in the server.
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	All checkpoints. See possible values for the bucket hit count in the table following.

Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period` condition.

Table B–16 Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Name for membership	Name of the pattern for which bucket membership is checked. When adding or editing conditions in a rule, select the pattern name from a drop down list of active patterns that are presented.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Time period for bucket membership	The time period over which the bucket membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Time period type for bucket membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Member type for pattern-bucket membership	The member type: user, device, location, and IP	It is one of the type of members applicable for that transaction. For authentication type, it is one of user, device, IP, city, state, country.	No
Bucket Hit Count	The hit count that will be compared against. Hit count for the bucket and the compare operator evaluate the outcome of the condition together.	For Transaction Create execution set the count one less than what you want the rule to trigger on.	No

Table B–16 (Cont.) Pattern (Transaction): Entity is a Member of the Pattern N Times in a Given Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Compare Operator for the count	Comparison operator to use for comparing the count in the system with Bucket Hit Count. For example if you specify the Compare Operator as `Less than` and Bucket Hit Count as `3`, then if in the system, the condition evaluates to `True` as long as hit count for that bucket is less than `3` for that authentication.	Possible values are defined in the `bharosa.numeric.eval.operator.enum` property: ■ Equal to ■ Less than ■ Less than equal to ■ More than ■ More than equal to ■ Not equal to	No
Return value if condition is True	Value to return if the condition evaluates to `True`. If the condition does not evaluate to `True`, then the opposite of the success value is returned.	True/False.	No
Return value if condition encounters an error	Value returned if the condition execution encounters an issue. Possible errors are that the pattern was not active, incorrect parameters were passed (configured), or values for the parameters were not in the expected range.	True/False.	No

Example Usage

Trigger if the current originating account has transferred to the current destination account less than a set number of times within a time range. For example, has Account 123456 transferred funds to Account 789012 less than 2 times in the last two months?

B.3.8 Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period

General information about the `Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period` condition is provided in the following table.

Table B–17 Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period

Condition	Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period
Description	Checks if the entity is a member of a pattern bucket for the first time in a certain time period. First time is a relative function. To track first time, in the rule / policy, configure user years as the time period type and use a long value like 5 years.
Prerequisites	Entities and patterns must be defined before you try to add this to rule / policy. The patterns must be active and ones that make use of the transactions in the server.
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	All checkpoints. Read the details on the `First time count` parameter for configuring the checkpoint.

Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period` condition.

Table B–18 Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Name for bucket first time	Name of the pattern for which bucket first time is to be checked.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is Condition True	Evaluate this condition to `True` if this parameter is `True` and first time bucket is `True`. The `Is condition True` parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the user falls in the "First Time" bucket and the value of this parameter is `True`, the condition evaluates to `True`. If the user does not fall into the "First Time" bucket and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	True or False	No
Time period type for bucket membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No

Table B–18 (Cont.) Pattern (Transaction): Entity is a Member of the Pattern Bucket for the First Time in a Certain Time Period Parameters

Parameter	Description	Possible Values	Can be Null?
Time period for bucket membership	The time period over which the bucket membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern-bucket membership	The member type (user, device, location, city, country)	Type of members applicable for that transaction. For authentication type it is one of user, device, IP, city, state, country.	No
First time count	The count of occurrences (value) against which the pattern bucket count is compared.	The default value is 1. If the rule is used in a policy that is run in the Preauthentication checkpoint, select 0 as the value since autolearning takes place after the authentication is successful. In the Preauthentication checkpoint, autolearning would not have taken place for the current login. For all other checkpoints (post-authentication and any checkpoints after post-authentication), select 1 as the value.	No

Example Usage

Trigger if this is the first time the current originating account has transferred to the current destination account within a time range. For example, is this the first time account 123456 has transferred funds to account 789012 in the last 2 years?

B.3.9 Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time

General information about the `Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time` condition is provided in the following table.

Table B–19 Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time

Condition	Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time
Description	Condition to check if this entity is member of the pattern bucket for less than a certain percent in a certain time period. This condition checks the pattern membership percent against the pattern usage of the same entity. OAAM is counting the entity's membership count for percentage and not the number of entities that belong to that pattern.
Prerequisites	Entities and patterns must be defined before you try to add this to rule / policy. The patterns must be active and ones that make use of the transactions in the server.

Table B–19 (Cont.) Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of

Condition	Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	All Checkpoints

Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time` condition.

Table B–20 Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Hit Percent less than	Percent hit count of the pattern that will be used for comparison.	Integers The rule will calculate the percentage membership of an entity belonging to a pattern.	No
Pattern Name for membership	Name of the pattern that is used to check the membership percentage.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is Membership Count Less than patternHitPercent	This setting controls if the evaluation triggers when it is above or below the specified percentage. Use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit percent is less than the specified value is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit percent is more than the specified value is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	True or False	No

Table B–20 (Cont.) Pattern (Transaction): Entity is a Member of the Pattern Less Than Some Percent of Time Parameters

Parameter	Description	Possible Values	Can be Null?
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member type (user, device, location, city, country)	One of the types of members applicable for that transaction. For the authentication type, it is one of user, device, IP, city, state, country.	No

Example Usage

Trigger if the current originating account has transferred to the current destination account less than the specified percent of the time within a time range. For example, has account 123456 transferred funds to account 789012 less than 10% of the time in the last two months?

B.3.10 Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture

General information about the `Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture` condition is provided in the following table.

Table B–21 Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture

Condition	Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture
Description	Checks if this entity has been member of this pattern bucket based on percent basis, taking into account all other entities
Prerequisites	Entities and patterns should be defined before adding this to a rule / policy.
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	Transaction checkpoints

Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture` condition.

Table B–22 Pattern (Transaction): Entity is a Member of the Pattern Bucket Less than Some Percent with All Entities in the Picture Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Bucket Hit Percent less than	If the current entity behavior has occurred less than the specified percentage the condition should trigger.	Positive integer	No
Pattern Name for membership	Name of the pattern for which bucket percentage is checked.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is Membership Count Less than patternHitPercent	Use this parameter to negate the outcome of the condition. Evaluate this condition to `True` if this parameter is `True` and the percentage is less than the specified percentage. Evaluate this condition to `True` if this parameter is `False` and the percentage is not less than the specified percentage. The condition evaluates to `False` in all other cases.	True or False	No
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member type (user, device, location, city, country)	It is one of the type of members applicable for that transaction. For authentication type it is one of user, device, IP, city, state, country.	No

Example Usage

Trigger if less than the specified percent of all users have transferred within the same dollar range the current dollar amount this user is transferring within a time range. For example, John is trying to transfer $625. Have less than 5% of all users performed a funds transfer in the $500-$700 range in the last two months?

B.3.11 Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods

General information about the `Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods` condition is provided in the following table.

Table B–23 Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods

Condition	Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods
Description	Checks if this entity has been a member of this pattern condition more (or less) frequently than is typical for all entities.
Prerequisites	Entities and patterns must be defined before adding this condition to the rule/policy.
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	Transaction checkpoints

Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods` condition.

Table B–24 Pattern (Transaction): Entity is Member of Pattern X% More Frequently All Entities' Average Over Last N Time Periods Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Bucket Hit Percent More than	Percent hit count of the pattern that will be used for comparison.	0 - 100	No
Pattern Name for membership	Name of the pattern for which the bucket membership is to be checked.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is current frequency more than average frequency	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the current frequency is more than the average frequency and the value of this parameter is `True`, the condition evaluates to `True`. If the current frequency is less than the average frequency and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	True/false	No
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the bucket membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member type (user, device, location [city, state, country], IP)	Member type applicable for the transaction. For authentication type, it is one of user, device, IP, city, state, country.	No

Example Usage

Mike is a security administrator who needs to profile and evaluate a user's behavior based on the frequency and volume of access requests he makes to an HR application for employee records compared to the access requests of others. Mike wants to track the number of records per 8-hour time period normally accessed by any HR representative. He creates a multi-bucket pattern to capture the count of requests over

each 8-hour period for a day. Mike then implements a rule to alert him if the current access falls into an 8-hour range that exceeds the average for all users over the last month by 30%.

1. Define a pattern with user as the member type. Add Time as a `Range` attribute with `start`, `end`, and `step` as `0`, `23`, and `8`, respectively.
2. Create a rule and add this condition to that rule.
3. Create a policy (Transaction Create Runtime) and add the rule to the policy. While doing this, add the pattern condition when creating the rule and provide the values of `30` and `Days` for `time period` and `time period type` respectively. Choose the value of `30` for the pattern hit percent. Leave other values as default.
4. Configure the alert in the rule if it evaluates to `true`.
5. Over the course of several days, log in as several users and perform an average of 10 employee record lookup transactions in each eight-hour period. Then, log in and perform 14 employee record lookup transactions in an eight-hour period. Since the current frequency (14) is more than 30% higher than the average frequency for all users (10), the rule triggers and an alert is generated.

B.3.12 Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods

General information about the `Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods` condition is provided in the following table.

Table B–25 Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods

Condition	Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods
Description	Checks if this entity has been member of this pattern condition more (or less) frequently than is typical for this entity.
Prerequisites	Entities and patterns must be defined before adding this condition to the rule/policy.
Assumptions	Autolearning is enabled.
Available since version	11.1.2.0
Checkpoints	All Checkpoints, see the note for transaction create.

Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods Parameters

The following table summarizes the parameters in the `Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods` condition.

Table B–26 Pattern (Transaction): Entity is Member of Pattern X% More Frequently Than Entity's Average Over Last N Time Periods Parameters

Parameter	Description	Possible Values	Can be Null?
Pattern Bucket Hit Percent More than	Percent hit count of the pattern that will be used for comparison.	0 - 100	No
Pattern Name for membership	Name of the pattern for which the pattern membership is checked. When adding or editing a condition in a rule, select the pattern name from a drop down of active patterns that will be presented.	Choices are only available if there are active patterns that make use of the transactions in the server.	No
Is current frequency more than average frequency	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the current frequency is more than the average frequency and the value of this parameter is `True`, the condition evaluates to `True`. If the current frequency is less than the average frequency and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	True/false	No
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ Hours ■ Days ■ Months ■ Years	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	No
Member type for pattern membership	The member Type (user, device, location [city, state, country], IP)	It is one of the type of members applicable for that transaction. For authentication type it is one of user, device, IP, city, state, country.	No

Example Usage

Mike is a security administrator who needs to profile and evaluate user's behavior based on the frequency and volume of access requests they make to an HR application for employee records. Mike wants to track the number of records per 8-hour time period normally accessed by each HR representative. He creates a multi-bucket pattern to capture the count of requests over each 8-hour period for a day. Mike then implements a rule to alert if the current access falls into an 8-hour range that exceeds the user's average over the last month by 40%.

1. Define a pattern with `user` as the member type. Add Time as a `Range` attribute with start, end, and step as `0`, `23`, and `8`, respectively.
2. Create a rule and add this condition to that rule.
3. Create a policy (Transaction Create runtime) and add the above rule to this policy. While doing this choose the pattern you defined from a drop down list available in the Pattern Name list. Choose the values of `30` and `Days` for time period and time period type respectively. Choose the value of `40` for the pattern hit percent. Leave other values as default.
4. Configure the alert in the rule if it evaluates to `true`.
5. Over the course of several days, log in as the same user perform an average of 10 employee record lookup transactions in each eight-hour period. Then log in as this user and perform 15 employee record lookup transactions in an eight-hour period. Since the current frequency (15) is more than 40% higher than the average frequency (10), the rule will trigger.

B.4 Device Conditions

These section provides information on the device conditions.

B.4.1 Device: Browser Header Substring

General information about the `Device: Browser Header Substring` condition is provided in the following table.

Table B–27 Device: Browser Header Substring

Condition	Device: Browser Header Substring
Description	Checks whether the supplied string exists as a substring in the browser's header information. The string comparison is performed by ignoring the case (uppercase or lowercase) of the strings.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	The rule is configured through a policy.
Available since version	Pre-10.1.4.5
Checkpoints	All checkpoints.

Device: Browser Header Substring Parameters

The following table summarizes the parameters in the `Device: Browser Header Substring` condition.

Table B–28 Device: Browser Header Substring Parameters

Parameter	Description	Possible Values	Can be Null?
Substring to check for	Substring to be checked with the string present in the browser.		Yes

B.4.2 Device: Check if Device is of Given Type

General information about the `Device: Check if Device is of Given Type` condition is provided in the following table.

Table B–29 Device: Check if Device is of Given Type

Condition	Device: Check if Device is of Given Type
Description	Checks whether the current device is of selected device type. It is very helpful to detect mobile or generic devices.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	11.1.2.0.0
Checkpoints	All checkpoints.

Device: Check if Device is of Given Type Parameters

The following table summarizes the parameters in the `Device: Check if Device is of Given Type` condition.

Table B–30 Device: Check if Device is of Given Type Parameters

Parameter	Description	Possible Values	Can be Null?
Device Type	Select Device type to compare with that of current device	Enumeration The default is `Mobile Device`. Other possible value is Desktop Device	No
Return value when device is of selected type	Specify the value to be returned if device is of selected type.	Boolean. True or False The default is `True`.	No

Example Usage

Used to check if the device being used is of given type.

To achieve this, you must use this condition in a rule.

1. Configure the `Devices Type` of this condition as `Mobile Device` and configure the `Return value when device is of selected type` of this condition as `true`.
2. Run authentications from a mobile device, and this rule will trigger.

B.4.3 Device: Device First Time for User

General information about the `Device: Device First Time for User` condition is provided in the following table.

Table B–31 Device: Device First Time for User

Condition	Device: Device First Time for User
Description	Checks to see if the user is using this device for the first time. Note that "device" is the combination of the physical device and the browser in most of the test scenarios. Check the page of the recent login to determine the Device ID associated with the login sessions to verify the rule. The user's current (session) device is also counted if is found to be used for the first time.
Prerequisites	The rule should be configured through a policy.
Assumptions	None
Available since version	Pre-10.1.4.5
Checkpoints	All checkpoints.

Device: Device First Time for User Parameters

The following table summarizes the parameters in the `Device: Device First Time for User` condition.

Table B–32 Device: Device First Time for User Parameter

Parameter	Description	Possible Values	Can be Null?
Is	Checks if the condition should return `True` or `False` if the user is using this device for the first time	True (default) or False	No

Example Usage

This condition is used to determine if the user is logging in using this device for the first time irrespective of the status.

This condition could potentially be used to determine if the user is logging in from a different device or different devices and to challenge him when it is the case.

B.4.4 Device: Excessive Use

General information about the `Device: Excessive Use` condition is provided in the following table.

Table B–33 Device: Excessive Use

Condition	Device: Excessive Use
Description	Checks to see if this device is used excessively. Basically, checks to see if a device was not active for several days and suddenly a large number of users are logging in from the same device in a short period (in a few hours). This condition can be potentially used to track the compromised device of automated programs that obtained access to the code and then tries to log in several users.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: Excessive Use Parameters

The following table summarizes the parameters in the `Device: Excessive Use` condition.

Table B–34 Device: Excessive Use Parameters

Parameter	Description	Possible Values	Can be Null?
Number of users	Number of users logging in from a single device in a short period.	positive integers	No
Within (hours)	This parameter defines the short period in which OAAM must find excessive use.	positive integer	No
and not used in (days)	This parameter describes the number of days the device was not in use.	positive integer	No

Example Usage

This condition can be potentially used to determine if the device used in the current activity is compromised. For example, you might have certain devices that are deemed as compromised and you may want to block users logging in from them. For example, an individual could be "hacking" into a bank computer and then trying to perform various activities. Typically, activity logging should be set up for that computer for several days.

B.4.5 Device: In Group

General information about the `Device: In Group` condition is provided in the following table.

Table B–35 Device: In Group

Condition	Device: In Group
Description	Checks to see if the device is in the specified list.
Prerequisites	A list defined already which has devices (IDs) as members. You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: In Group Parameters

The following table summarizes the parameters in the `Device: In Group` condition.

Table B–36 Device: In Group Parameters

Parameter	Description	Possible Values	Can be Null?
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the device is in the group and the value of this parameter is `True`, the condition evaluates to `True`. If the device is not in the group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	True / [False]	Yes.
Device in group	This is the list of IDs of a list of devices. The OAAM Administration Console will display a menu with the possible lists of device lists. Use the Group editor in the OAAM Administration Console to edit the device list.		Yes

Example Usage

This condition can be potentially used to determine if the device of the current activity belongs to a particular list of devices.

For example,

- You may want to block users logging in from the device that is considered "compromised."
- You may not want users to perform certain activities if they are logging in from a device that is a kiosk.

For more information on group creation, see Chapter 12, "Managing Groups."

B.4.6 Device: Is Registered

General information about the `Device: Is Registered` condition is provided in the following table.

Table B–37 Device: Is Registered

Condition	Device: Is Registered
Description	Condition checks to see if the device where that the user is logging in is registered for the user.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: Is Registered Parameters

The following table summarizes the parameters in the `Device: Is Registered` condition.

Table B–38 Device: Is Registered Parameters

Parameter	Description	Possible Values	Can be Null?
If registered, return	Boolean parameter to decide if the default return value should be `true` or `false` if the device is registered.	[`True`] / `False`	Yes

Example Usage

Use this condition to identify if the user is logging in from a device that he has not registered before. This can basically prevent a fraud where the user's login information is stolen and the thief tries to log in using the user's login information from another otherwise safe location.

B.4.7 Device: Timed Not Status

General information about the `Device: Timed Not Status` condition is provided in the following table.

Table B–39 Device: Timed Not Status

Condition	Device: Timed Not Status
Description	This condition counts the attempts by users from the same device (the device used in the attempt) in the last few seconds where the authentication status is not the one given in the condition. If this count exceeds the count configured in the condition, then this condition evaluates to true.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: Timed Not Status Parameters

The following table summarizes the parameters in the `Device: Timed Not Status` condition.

Table B–40 Device: Timed Not Status Parameters

Parameter	Description	Possible Values	Can be Null?
status	Count the attempts that are not equal to this specified status. Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	`auth.status.enum` (auth.status.enum.success is the default)	No
within seconds	This parameter defines the short period in which the number of login attempts that use that device are counted.	positive integer	No
attempts	Maximum number of attempts to watch for. If the attempt count in Oracle Adaptive Access Manager exceeds this number, then the condition will evaluate to true.	positive integer	No

Example Usage

This condition can be potentially used to determine if the device used in the current activity is compromised. A possible fraud scenario can be detected where:

- An individual (or a automated program) uses the same device to make login attempts and the attempts are either failing or passing based on the data that was stolen.
- A program is used to break the password in an automated manner.

In these cases, there are repeated failed login attempts from the same device in a short amount of time.

B.4.8 Device: Used Count for User

General information about the `Device: Used Count for User` condition is provided in the following table.

Table B–41 Device: Used Count for User

Condition	Device: Used Count for User
Description	This condition counts the attempts by users from the same device (the device used in the attempt) in the last few seconds with an authentication status that is not the one that is specified in the condition. If this count exceeds the count configured in the condition, then this condition evaluates to true.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: Used Count for User Parameters

The following table summarizes the parameters in the `Device: Used Count for User` condition.

Table B–42 Device: Used Count for User Parameters

Parameter	Description	Possible Values	Can be Null?
Authentication Status	Count the attempts with the status that are not equal to this status.	`auth.status.enum` (`auth.status.enum.success` is the default)	No
more than	Maximum number of attempts to watch for. If the attempt count exceeds this number then the condition will evaluate to true.	positive integer	No
Is	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the count exceeds the count specified in the condition and the authentication is not equal to the status specified in the condition, the condition evaluates to `True`. If the count does not exceed the count specified in the condition and the authentication is equal to the status specified in the condition, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	`True` or `False`	No

Example Usage

This condition can be potentially used to determine if the device used in the current activity is compromised.

Possible fraud scenarios that can be detected are:

- An individual (or an automated program) is using same device to make login attempts and the attempts are either failing or passing based on the data that was stolen
- A program is trying to break the password for user in automated fashion

In these cases, repeated failed login attempts are made from the same device in a short period.

B.4.9 Device: User Count

General information about the `Device: User Count` condition is provided in the following table.

Table B–43 Device: User Count

Condition	Device: User Count
Description	Check to see if this device is used by several unique users in the last few seconds. This can potentially be fraud since if this condition is true then it will be potentially a compromised device or compromised login information for a number of users.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: User Count Parameters

The following table summarizes the parameters in the `Device: User Count` condition.

Table B–44 Device: User Count Parameters

Parameter	Description	Possible Values	Can be Null?
Seconds elapsed	This parameter defines the short period in which the number of users try to log in to the system using that device.	positive integer	No
The maximum number of users allowed	Number of users logging in from the same device in a short period.	positive integers	No

Example Usage

This condition can be potentially used to determine if the device used in the current activity is compromised. It could be possible that a fraudster had stolen the login information for several users and tried to ruin their accounts. The result is that many users are logging in from the same device in intervals that are a few seconds each.

B.4.10 Device: User Status Count

General information about the `Device: User Status Count` condition is provided in the following table.

Table B–45 Device: User Status Count

Condition	Device: User Status Count
Description	Checks user count with the given status from this device in specified duration
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

Device: User Status Count Parameters

The following table summarizes the parameters in the `Device: User Status Count` condition.

Table B–46 Device: User Status Count Parameters

Parameter	Description	Possible Values	Can be Null?
Within	Number of time units to look back in history	Positive Integer. The default is `3`.	No
Time Unit	Time units to be associated with the "Within" parameter	Select a time unit configured from the `time.unit.enum` property: Milliseconds, Seconds, Minutes, Hours, Days, Weeks, Months, Years	No
Maximum number of users allowed	Maximum number of users allowed for this condition to start triggering	Positive Integer The default is `3`.	No
With Status	Name of the group that is of type auth status.	Long. ID of the group	Yes

Example Usage

Determine if too many users have logins from the logins that failed from the device in the last three hours.

1. Create a Group of Authentication statuses and add "wrong_password" status to this group.
2. Configure the **Within** parameter to `5`.
3. Configure the **Time Unit** to `Minutes`.
4. Configure the **Maximum number of users allowed** to `3`.
5. Configure the **With Status** to the group name that your created above.

Perform logins from this device with the wrong password for four users. The rule triggers for the fifth login. Wait for longer than 5 minutes, and perform the login again; rule will not trigger.

B.4.11 Device: Velocity from Last Login and Ignore IP Group

General information about the `Device: Velocity from Last Login and Ignore IP Group` condition is provided in the following table.

Table B–47 Device: Velocity from Last Successful Login

Condition	Device: Velocity from Last Login and Ignore IP Group
Description	Condition evaluates if the user's velocity in miles per hour is more than the specified value. The location database is used to determine the location of the user for this login and previous login. It takes into account the current session as well. Note that the velocity calculation is dependent on the accuracy of the location data.
Prerequisites	This rule is configured through a policy. Location database should be loaded for the rule.
Assumptions	Location database is loaded.
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Device: Velocity from Last Login and Ignore IP Group Parameters

The following table summarizes the parameters in the `Device: Velocity from Last Login and Ignore IP Group` condition.

Table B–48 Device: Velocity from Last Login and Ignore IP Group Parameters

Parameter	Description	Possible Values	Can be Null?
Miles per Hour is more than	Positive number that indicates the user's speed in miles per hour. If the condition determines that the user has traveled faster than this value, then condition will evaluate to `true`. Miles per hour is the ratio of the distance traveled (in miles) to the time spent traveling (in hours).	positive integer The default is `60`.	No
Last login within (Seconds)	Positive integer that specifies the time difference between this login and last successful login to calculate user's velocity.	positive integer The default is `172800` which is 48 hours.	No
Ignore IP Group	This parameter allows you to specify a list of IPs to ignore. If a user's IP is from that list, then this condition always evaluates to false. If the user's IP is not in that list or if the list is null or empty, then the condition evaluates the velocity of the user or the device from the last login and evaluates to true if the velocity exceeds the configured value.		

Example Usage

Use this condition to determine the users' location and the risk it poses because of changes in the user's login location between the time of the current login and the last successful login.

Examples are shown below:

- For a case with a user traveling by ground transportation, you can configure this rule so that 60 is the value for miles per hour and the time is in seconds for the last successful login (use default values).
- For users traveling on air transport, you can use different values (for example, 500 miles an hour) to ensure that login locations and speed are within reason.

> **Note:** Be aware that the velocity calculation depends highly on location databases.

B.4.12 Device: Check if Device is Using Mobile Browser

General information about the `Device: Check if Device is Using Mobile Browser` condition is provided in the following table.

Table B–49 Device: Check if Device is Using Mobile Browser

Condition	Device: Check if Device is Using Mobile Browser
Description	Checks whether the current device is using a mobile browser to access the site based on the user agent string. A mobile browser is a web browser designed for use on a mobile device such as a mobile phone or PDA.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	Groups have been configured with names of mobile browsers.
Available since version	11.1.2
Checkpoints	All checkpoints.

Device: Check if Device is Using Mobile Browser Parameters

The following table summarizes the parameters in the `Device: Check if Device is Using Mobile Browser` condition.

Table B–50 Device: Check if Device is Using Mobile Browser Parameters

Parameter	Description	Possible Values	Can be Null?
Mobile Browsers Group	Select the group that has a list of mobile browsers	OAAM Mobile Browser Group	No
Default value to return in case of errors	Specify the value to be returned in case of errors.	Boolean. The default is `False`. `True` or `False`	No

Example Usage

This condition is used in the `Is Mobile Device` rule in the `OAAM Base Device ID Policy`. It is used to check if the device is using a mobile browser.

To achieve this, you need to use this condition in a rule.

1. In the `Device: Check if device is using Mobile Browser` condition, configure the `Mobile Browsers Group` parameter as `OAAM Mobile Browser Group` and configure the `Default value to return in case of errors` parameter as `False`. The Mobile Browser Group contains names of mobile browsers.
2. Add the `Device: Browser header substring` condition to the rule with the `Substring to check for` parameter as `OIC`.
3. Run authentications from a mobile device using one of the browsers in the Mobile Browser group with browser header substring of `OIC`, and the `Is Mobile Device` rule will trigger. Since the `OAAM Base Device Policy` trigger combination is configured so that if `Is Mobile Device` returns true, the `OAAM Mobile Device ID Policy` is run.

For more information on the OAAM Base Device ID policy, see Section 10.7.1, "OAAM Base Device ID Policy."

B.5 Location Conditions

These section provides information on the location conditions.

B.5.1 Location: ASN in Group

General information about the `Location: ASN in Group` condition is provided in the following table.

Table B–51 Location: ASN in Group

Condition	Location: ASN in Group
Description	Checks to see if the ASN for this IP location is in the group of ASNs that might be of interest. ASN is autonomous system number.
Prerequisites	There should be a list of ASNs already defined. You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: ASN in Group Parameters

The following table summarizes the parameters in the `Location: ASN in Group` condition.

Table B–52 Location: ASN in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the ASN is in the group and the value of this parameter is `True`, the condition evaluates to `True`. If the ASN is not in the group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
ASN in ASN group	This is a list of ASN groups. The Rule's Conditions tab will display a menu of possible ASNs groups to for this parameter. Use the Group editor in the OAAM Administration Console to edit the ASN group.	

Example Usage

This condition can be potentially used to determine if the ASN of the current activity (IP) belongs to a particular group of ASNs. For example you might have certain ASNs those can be deemed as dangerous and you may want to block users logging in from from these. Or you might not want users to perform a certain activity if they are logging in from an ASN that is from a particular country or region.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.2 Location: in City Group

General information about the `Location: in City Group` condition is provided in the following table.

Table B–53 Location: City in Group

Condition	Location: in City Group
Description	Checks whether the current activity belongs to a given city group.
Prerequisites	There should be a group defined already which has cities as members. You should have this rule configured using a policy. IP location data is useful for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: in City Group Parameters

The following table summarizes the parameters in the `Location: in City Group` condition.

Table B–54 Location: City in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the city is in the city group and the value of this parameter is `True`, the condition evaluates to `True`. If the city is not in the city group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[`True`] / `False`
City in city group	This is a list of city groups. The Rule's Conditions tab displays a drop-down list of possible groups of cities. Use the Group editor in the OAAM Administration Console to edit this group list.	(java Long values)

Example Usage

Use this condition to determine if the current activity seems to originate from one of several cities of interest. For example you might have a list of cities and if the current IP of the activity occurs in one of those cities, you can configure the system to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.3 Location: In Carrier Group

General information about the `Location: In Carrier Group` condition is provided in the following table.

Table B–55 Location: In Carrier Group

Condition	Location: Carrier in Group
Description	Checks to see if the IP is in the given carrier group
Prerequisites	There should be a list of carriers already defined. You should have this rule configured using a policy. Location data is helpful for the condition.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: In Carrier Group Parameters

The following table summarizes the parameters in the `Location: In Carrier Group` condition.

Table B–56 Location: In Carrier Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the carrier is in the carrier group and the value of this parameter is `True`, the condition evaluates to `True`. If the carrier is not in the carrier group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
IP in carrier group	This is a list of the groups of carriers. The Rule's Condition tab displays drop-down list of possible lists of carriers groups to configure for this parameter. Use the Group editor in the OAAM Administration Console to edit carrier group.	

Example Usage

This condition can be potentially used to check to see if the carrier of the current activity (IP) belongs to a particular list of carriers. For example you might have certain carriers that can be deemed as "dangerous" (hackers stole all of a carrier's phone numbers recently) and you may want to block users logging in from a carrier, or you might not want users to perform a certain activity if they are logging in from a carrier that is from a particular country or region.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.4 Location: In Country Group

General information about the `Location: In Country Group` condition is provided in the following table.

Table B–57 Location: In Country Group

Condition	Location: In Country Group
Description	Checks whether the IP belongs to a given country group.
Prerequisites	There should be a group defined already which has countries as members. You should have this rule configured using a policy. IP location data is required for this condition. (Most production environments will have application database populated.)
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: In Country Group Parameters

The following table summarizes the parameters in the `Location: In Country Group` condition.

Table B–58 Location: In Country Group Parameters

Parameters	Description	Possible Value
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP is in the country group and the value of this parameter is `True`, the condition evaluates to `True`. If the IP is not in the country group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Country in country group	This is a list of group of countries. The Rule's Condition tab will display a drop-down list of possible groups. Use the Group editor in the OAAM Administration Console to edit the group.	(java Long values)

Example Usage

This condition can be potentially used to determine if the current activity seems to originate from one of several countries of interest. For example you might have a list of countries and if the current IP used for the activity belongs to one of those countries, then you can configure the policy to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.5 Location: IP Connection Type in Group

General information about the `Location: IP Connection Type in Group` condition is provided in the following table.

Table B–59 Location: IP Connection Type in Group

Condition	Location: IP Connection Type in Group
Description	Determine whether the connection type of this IP location is in the group of connection types that might be of interest.
Prerequisites	There should be a list of connection types already defined. You should have this rule configured using policies.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Connection Type in Group Parameters

The following table summarizes the parameters in the `Location: IP Connection Type in Group` condition.

Table B–60 Location: IP Connection Type in Group

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP's connection type is in the connection type group and the value of this parameter is `True`, the condition evaluates to `True`. If the IP's connection type is not in the connection type group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Connection type in group	This list of connection type groups. The Rule's Condition tab will display a drop-down list of possible lists of connection types. Use the Group editor in administration user interface to edit this group list.	

Example Usage

Use the `Location: IP Connection Type in Group` condition to determine whether the IP of the current activity comes from a connection type that can be of particular interest to determine fraud. For example, you might have connection type of "satellite link."

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.6 Location: IP in Range Group

General information about the `Location: IP in Range Group` condition is provided in the following table.

Table B–61 Location: IP in Range Group

Condition	Location: IP in Range Group
Description	Checks whether the IP of the current activity belongs to a list of IP-ranges specified.
Prerequisites	There should be a group defined already which has IP-ranges as members. You should have this rule configured through a policy.
Assumptions	
Available since version	10.1.4.5.1
Checkpoints	All checkpoints except Device ID.

Location: IP in Range Group Parameters

The following table summarizes the parameters in the `Location: IP in Range Group` condition.

Table B–62 Location: IP in Range Group Parameters

Parameter	Description	Possible Values
Is IP in IP-range group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP belongs to one of the IP ranges and the value of this parameter is `True`, the condition evaluates to `True`. If the IP does not belong to one of the IP ranges and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
IP range group	Specify the group that contains the IP ranges. Condition checks if the IP belongs to one of the ranges from this group.	

Example Usage

The `Location: IP in Range Group` condition can be potentially used to determine if the IP of the current activity belongs to one of several ranges of IPs that may be of interest. For example you might have ranges of IPs from a particular subnet and you might want to take action if that is the case.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.7 Location: IP Line Speed Type

General information about the `Location: IP Line Speed Type` condition is provided in the following table.

Table B–63 Location: IP Line Speed Type

Condition	Location: IP Line Speed Type
Description	Checks whether the current IP has connection line speed as one of the specified connection speed. This (connection speed) is categorized into High, Medium, Low or Unknown.
Prerequisites	You should have this rule configured using a policy. IP location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Line Speed Type Parameters

The following table summarizes the parameters in the `Location: IP Line Speed Type` condition.

Table B–64 Location: IP Line Speed Type Parameters

Parameter	Description	Possible Values
is	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the current IP has a connection line speed as one of the specified connection line speeds and the value of this parameter is `True`, the condition evaluates to `True`. If the current IP does not have a connection line speed as one of the connection line speeds and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
speed type	This is the enumeration value that indicates connection speed type. This (connection speed) is categorized into High, Medium, Low or Unknown The enum that is used for this parameter is location.linespeed.enum	(Integer) Default value is location.linespeed.enum.low

Example Usage

The `Location: IP Line Speed Type` condition can be used potentially to determine whether the current activity seems to originate from an IP that has a particular speed type. For example, you may want an alert generated if the speed type is high for the user who usually logs in from a dial-up network.

B.5.8 Location: IP Maximum Users

General information about the `Location: IP Maximum Users` condition is provided in the following table.

Table B–65 Location: IP Maximum Users

Condition	Location: IP Maximum Users
Description	Condition checks to see if the maximum number of distinct users using the current IP address within the given time duration exceeds the configured condition attribute value. Notice that the current request is also counted in finding the number of unique users from the IP.
Prerequisites	You should have this rule configured using a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Maximum Users Parameters

The following table summarizes the parameters in the `Location: IP Maximum Users` condition.

Table B–66 Location: IP Maximum Users Parameters

Parameter	Description	Possible Values
Seconds elapsed	This is the time period in which the number of users from this IP is to be counted.	integer The default is `300`.
The maximum number of users	Maximum number of users allowed.	integer The default is `5`.

Example Usage

Use this condition to determine if a particular IP is used by fraudsters to perform logins / transactions by using different login IDs they have stolen. In such cases you see a number of different logins from the same IP during a relatively short period.

B.5.9 Location: IP Routing Type in Group

General information about the `Location: IP Routing Type in Group` condition is provided in the following table.

Table B–67 Location: IP Routing Type in Group

Condition	Location: IP Routing Type in Group
Description	Checks to see if the IP Routing Type is in the group.
Prerequisites	There should be a group defined already which has routing types as members. You should have this rule configured using a policy. IP location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Routing Type in Group Parameters

The following table summarizes the `Location: IP Routing Type in Group` parameters in the condition.

Table B–68 Location: IP Routing Type in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP routing type is in the group and the value of this parameter is `True`, the condition evaluates to `True`. If the IP routing type is not in the group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Routing type in group	This is a list of groups of IP routing types. A drop-down list of possible lists of IP routing type groups. Use the Group editor in the OAAM Administration Console to edit this group list.	(java Long values)

Example Usage

The `Location: IP Routing Type in Group` condition can be potentially used to determine whether the current activity is from an IP that belongs to a particular routing type. For example, you might have a list of routing types that can potentially lead to fraud and if the current IP of the activity has one of those routing types, you can configure to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.10 Location: Is IP from AOL

General information about the `Location: Is IP from AOL` condition is provided in the following table.

Table B–69 Location: Is IP from AOL

Condition	Location: Is IP from AOL
Description	Determine whether the IP is from AOL proxy
Prerequisites	You should have this rule configured using a policy to test it.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: Is IP from AOL Parameters

The following table summarizes the parameters in the `Location: Is IP from AOL` condition.

Table B–70 Location: Is IP from AOL Parameters

Parameter	Description	Possible Values	Can be Null?
Is AOL	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP is from AOL and the value of this parameter is `True`, the condition evaluates to `True`. If the IP is not from AOL and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	Boolean [True] / False	No

Example Usage

Use the `Location: Is IP from AOL` condition to determine if the IP is from an AOL proxy. Customers may want to set up the system to take certain actions for users logging in from AOL.

B.5.11 Location: In State Group

General information about the `Location: In State Group` condition is provided in the following table.

Table B–71 Location: In State Group

Condition	Location: In State Group
Description	Checks whether the country/state of this session belongs to a given country/states group. For example, California belongs to a given states group.
Prerequisites	There should be a group defined already which has states as members. You should have this rule configured in a policy. IP location data is required. Most production environments will have application database populated.
Checkpoints	All checkpoints other than Device ID.

Location: In State Group Parameters

The following table summarizes the `Location: In State Group` parameters in the condition.

Table B–72 Location: In State Group Parameters

Parameters	Description	Possible Value
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the country/state is in the country/state group and the value of this parameter is `True`, the condition evaluates to `True`. If the country/state is not in the country/state group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False If state is in group is true, trigger this rule. Is state is in group is false, do not trigger.
State in state group	This is a list of group of states. The Rule's Condition tab will display a drop-down list of possible groups. Use the Group editor in the OAAM Administration Console to edit the group.	java Long values

Example Usage

The `Location: In State Group` condition can be potentially used to determine if the current activity seems to originate from one of several states in the group. If this user comes in from this state, and the state is part of the state group you created, then this condition will be triggered. For example, there are states that do not charge sales tax on purchases, so if you are an online merchant, and if the user comes in from one of these states, then you can bypass your tax calculation rules.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.12 Location: IP Connection Type

General information about the `Location: IP Connection Type` condition is provided in the following table.

Table B–73 Location: IP Connection Type

Condition	Location: IP Connection Type
Description	Check connection type for the IP address. Refer to the `location.connection.type.enum` for connection types. For example: ■ Cable ■ Consumer Satellite ■ Dialup ■ DSL ■ Fixed Wireless ■ Frame Relay ■ ISDN ■ Mobile Wireless ■ Optical Circuit ■ Satellite ■ T1/T3 Connection type is from the geolocation provider. OAAM is prepopulated with connection type enums for the common connection types that the geolocation provides. If the geolocation data provides new connection types, you must configure enums for them.
Prerequisites	There should be a list of connection types already defined. You should have this rule configured using policies.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Connection Type Parameters

The following table summarizes the parameters in the `Location: IP Connection Type` condition.

Table B–74 Location: IP Connection Type Parameters

Parameter	Description	Possible Values
Is	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the connection type is the one specified and the value of this parameter is `True`, the condition evaluates to `True`. If the connection type is not the one specified and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[`True`]/ `False` Checks if the connection type is the specified one and if true, then trigger the condition.
Connection type	This lists connection types to choose from.	

Example Usage

Use the `Location: IP Connection Type` condition to determine whether the IP of the current activity is from a connection type that can be of particular interest to determine fraud. For example, you might have connection type of "satellite link."

B.5.13 Location: IP Maximum Logins

General information about the `Location: IP Maximum Logins` condition is provided in the following table.

Table B–75 Location: IP Maximum Logins

Condition	Location: IP Maximum Logins
Description	Maximum number of logins using the current IP address within the given time duration. This condition ignores the current request during evaluation of maximum logins count.
Prerequisites	You should have this rule configured using a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Maximum Logins Parameters

The following table summarizes the parameters in the `Location: IP Maximum Logins` condition.

Table B–76 Location: IP Maximum Logins Parameters

Parameter	Description	Possible Values
Authentication status is	Authentication status.	Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin
Seconds elapsed	This is the time period in which the number of logins from this IP is to be counted.	integer The default is `300`.
The maximum number of logins	Maximum number of logins for this condition to start triggering	Positive integer. The default is `3`.

Example Usage

Use this condition to determine if a particular IP is used by fraudsters to perform logins by using the same login ID. In such cases you see a number of logins from the same IP during a relatively short period. Maximum number of users allowed to log in from a particular IP address is 3 within 300 seconds.

Configure the rule such that if there are more than "x" logins within "y" seconds using the current IP an action may be taken and an alert generated.

B.5.14 Location: IP Excessive Use

General information about the `Location: IP Excessive Use` condition is provided in the following table.

Table B–77 Location: IP Excessive Use

Condition	Location: IP Excessive Use
Description	Checks to see if this IP is used excessively. Basically, checks to see if a large number of users are using this IP excessively prior than before within a short period (in a few hours) when the IP hadn't been used for "n" number of days.
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Excessive Use Parameters

The following table summarizes the parameters in the `Location: IP Excessive Use` condition.

Table B–78 Location: IP Excessive Use Parameters

Parameter	Description	Possible Values
Number of users	Number of users logging in from a single IP in a short period.	Positive integers The default is `5` users.
Within (hours)	This parameter defines the short period in which OAAM must find excessive use.	Positive integer The default is `24` hours.
and not used in (days)	This parameter describes the number of days the IP was not in use.	Positive integer The default is `not used in 30 days`.

Example Usage

Use this condition to monitor IP addresses and check for IP surges within a particular duration when the IP address had not been used in d days. For example, configure a policy and rule to track the number of logins from the same IP address and if there are more than "n" logins in "x" hour from an IP address and the IP address had not been used in "d" days, a high alert should be triggered.

B.5.15 Location: Timed Not Status

General information about the `Location: Timed Not Status` condition is provided in the following table.

Table B–79 Location: Timed Not Status

Condition	Location: Timed Not Status
Description	Checks the maximum login attempts for all but the given status within the given time period. For example there are n number of attempts from this location, and the authentication is not success in y seconds. You are trying to figure out if there are more than n number of failures in the last five minutes in geolocation (IP).
Prerequisites	You should have this rule configured through a policy.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: Timed Not Status Parameters

The following table summarizes the parameters in the `Location: Timed Not Status` condition.

Table B–80 Location: Timed Not Status Parameters

Parameter	Description	Possible Values
Authentication status is not	Authentication status is configured through `auth.status.enum`. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	
within duration (seconds)	This parameter defines the short period in which the number of login attempts that use that location are counted.	Positive integer The default is `300`.
for more than	Maximum number of attempts to watch for. If the attempt count exceeds this number, then the condition will evaluate to true.	Positive integer The default is `3`.

Example Usage

If there are a number of login attempts from that particular location and the authentication status is not `Success`, then trigger this rule. This is based on the number of users and not location.

The `Location: Timed Not Status` condition is generalized for all locations if the defined number of users coming in is more than the number set and the status is the

value that has been set, then trigger the rule. For example, if the user is not authenticated and he tries to log in to a particular Web site and the number of user is more than 4 in the duration, then trigger the rule.

Another example: you can use this condition to find out if there were more than 10 attempts from this location where the status is not `Success` during this time period. A fraudster may have tried to access the system, but he was not successful 10 times. This may be an "alarm" that the location is not good.

This condition can be potentially used to determine if the IP address used in the current activity is compromised. A possible fraud scenario can be detected where a program is used to break the password in an automated manner.

B.5.16 Location: IP in Group

General information about the `Location: IP in Group` condition is provided in the following table.

Table B–81 Location: IP in Group

Condition	Location: IP in Group
Description	Checks to see if the IP address is in a group of IP addresses.
Prerequisites	There should be a group defined already which has IP addresses as members. You should have this rule configured using a policy. IP location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP in Group Parameters

The following table summarizes the parameters in the `Location: IP in Group` condition.

Table B–82 Location: IP in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP address is in the group of IP addresses and the value of this parameter is `True`, the condition evaluates to `True`. If the IP address is not in the group of IP addresses and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	True/ [False]
IP group	This is a list of IP address groups. Use the Group editor in the OAAM Administration Console to edit this group list.	

Example Usage

This condition can be potentially used to determine whether the current activity is from a certain IP address. For example, you might have a list of addresses that can monitored and if the current IP of the activity is one of the IP addresses listed in the group, you can configure to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.17 Location: Domain in Group

General information about the `Location: Domain in Group` condition is provided in the following table.

Table B–83 Location: Domain in Group

Condition	Location: Domain in Group
Description	Checks if the second-level domain is in the group of domains. In the Domain Name System (DNS) hierarchy, a second-level domain (SLD) is a domain that is directly below a top-level domain (TLD). Second-level domains commonly refer to the organization that registered the domain name.
Prerequisites	A group must be defined already which has second-level domains as members. You should have this rule configured using a policy. Internet Protocol address (IP address) location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: Domain in Group Parameters

The following table summarizes the parameters in the `Location: Domain in Group` condition.

Table B–84 Location: Domain in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the second-level domain is in the group of second-level domains and the value of this parameter is `True`, the condition evaluates to `True`. If the second-level domain is not in the group of second-level domains and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Second level Domain in group	This is a list of groups that contain second-level domain names. The Conditions tab of the rule displays a drop-down list of groups that contains second-level domain names. Use second-level domain names to pass and block entire sites such as *.example.org or entire intranet levels such as *.sales.* or *.admin.* Use the Group editor in the OAAM Administration Console to edit this group list.	(java Long values)

Example Usage

Use this condition to determine if the current activity seems to originate from one of the second-level domains of interest. For example you might have a list of second-level domain groups and if the current IP used for the activity belongs to one of those second-level domains, you can configure the system to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.18 Location: IP Connection Speed in Group

General information about the Location: IP Connection Speed in Group condition is provided in the following table.

Table B–85 Location: IP Connection Speed in Group

Condition	Location: IP Connection Speed in Group
Description	Checks if the IP connection speed is in the group. Internet connection speed is categorized into High, Medium, Low or Unknown. ■ high: A user connecting to the Internet through OCX, TX, and Framerelay ■ medium: A user connecting to the Internet through Satellite, DSL, Cable, Fixed Wireless, and ISDN ■ low: A user connecting to the Internet through Dialup and Mobile Wireless ■ unknown: Quova/Neustar was unable to obtain any line speed information
Prerequisites	There should be a group defined already which has IP connection speeds as members. You should have this rule configured using a policy. IP location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Connection Speed in Group Parameters

The following table summarizes the parameters in the `Location: IP Connection Speed in Group` condition.

Table B–86 Location: IP Connection Speed in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the IP connection speed is in the IP connection speed group and the value of this parameter is `True`, the condition evaluates to `True`. If the IP connection speed is not in the IP connection speed group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Connection speed in group	This is a list of connection speeds. The Rule's Conditions tab displays a drop-down list of possible groups of connection speeds. Use the Group editor in the OAAM Administration Console to edit this group list.	(java Long values)

Example Usage

This condition can be used potentially to determine whether the current activity seems to originate from an IP that has a particular speed. For example, you may want an alert generated if the speed is high for the user who usually logs in from a dial-up network.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.19 Location: ISP in Group

General information about the condition is provided in the following table.

Table B–87 Location: ISP in Group

Condition	Location: ISP in Group
Description	Checks if the ISP for the current IP address is (or is not) in the ISP group. This group contains Internet Service Providers. Examples of ISPs are Comcast, Verizon, AOL, and so on.
Prerequisites	There should be a list of ISP groups already defined. You should have this rule configured using policies.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: ISP in Group Parameters

The following table summarizes the parameters in the `Location: ISP in Group` condition.

Table B–88 Location: ISP in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the ISP is in the ISP group and the value of this parameter is `True`, the condition evaluates to `True`. If the ISP is not in the ISP group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
ISP in ISP group	This list of ISP groups. The Rule's Condition tab will display a drop-down list of possible lists of ISP groups. Use the Group editor in administration user interface to edit this group list.	

Example Usage

Use this condition to determine whether the ISP of the current activity comes from an ISP that can be of particular interest to determine fraud. For example, in the Pre-authentication Policy rule, Blacklist ISPs, the ISP group is OAAM Restricted ISPs. The action is to OAAM Block and the Alert is OAAM Restricted ISP.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.20 Location: Top-Level Domain in Group

General information about the condition is provided in the following table.

Table B–89 Location: Top Level Domain in Group

Condition	Location: Top Level Domain in Group
Description	Checks if the Top Level Domain is in the group. This group contains top-level domain names (the last part of an Internet domain name, that is, the letters that follow the final dot of any domain name). Use top-level domain names to pass and block whole countries, for example,.uk, .ru, or .ca, and entire communities, for example, .mil, .info, .gov, or edu.
Prerequisites	A group must be defined already which has top-level domains as members. You should have this rule configured using a policy. Internet Protocol address (IP address) location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: Top Level Domain in Group Parameters

The following table summarizes the parameters in the `Location: Top Level Domain in Group` condition.

Table B–90 Location: Top Level Domain in Group Parameters

Parameter	Description	Possible Values
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the top-level domain is in the group of top-level domain names and the value of this parameter is `True`, the condition evaluates to `True`. If the top-level domain is not in the group of top-level domain names and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True] / False
Top level Domain in group	This is a list of groups that contain top-level domain names. The Conditions tab of the rule displays a drop-down list of groups that contains top-level domain names. Use top-level domain names to pass and block entire sites such as *.example.org or entire intranet levels such as *.sales.* or *.admin.* Use the Group editor in the OAAM Administration Console to edit this group list.	(java Long values)

For more information on group creation, see Chapter 12, "Managing Groups." You must enter values when creating the domain groups.

Example Usage

Use this condition to determine if the current activity seems to originate from one of the top-level domains of interest. For example you might have a list of top-level domain groups and if the current IP used for the activity belongs to one of those top-level domains, you can configure the system to take an action or generate an alert.

For more information on group creation, see Chapter 12, "Managing Groups."

B.5.21 Location: IP Multiple Devices

General information about the condition is provided in the following table.

Table B–91 Location: IP Multiple Devices

Condition	Location: IP Multiple Devices
Description	Checks for the maximum number of devices from the IP address within the given time duration
Prerequisites	You should have this rule configured using a policy. IP location data is required for this condition. Most production environments will have an IP location database populated.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Multiple Devices Parameters

The following table summarizes the parameters in the `Location: IP Multiple Devices` condition.

Table B–92 Location: IP Multiple Devices Parameters

Parameter	Description	Possible Values
Authentication status is	Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	
Duration	This is the time period in which the number of devices from this IP is to be counted.	The default is 300.
Time	The time value.	
for more than	Maximum number of devices to watch for. If the device count exceeds this number, then the condition will evaluate to true.	The default is 3.

B.5.22 Location: IP Routing Type

General information about the `Location: IP Routing Type` condition is provided in the following table.

Table B–93 Location: IP Routing Type

Condition	Location: IP Routing Type
Description	Check routing type for the IP. It could be fixed/static, anonymizer, AOL, POP, Super POP, Satellite, Cache Proxy, International Proxy, Regional Proxy, Mobile Gateway or Unknown
Prerequisites	You should have this rule configured using policies.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID

Location: IP Routing Type Parameters

The following table summarizes the parameters in the `Location: IP Routing Type` condition.

Table B–94 Location: IP Routing Type Parameters

Parameter	Description	Possible Values	Can be Null?
Is	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the routing type is the one specified and the value of this parameter is `True`, the condition evaluates to `True`. If the routing type is not the one specified and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	[True]/ False	No
Routing type	This lists routing types to choose from.		No

Example Usage

Use this condition to determine whether the IP of the current activity uses a routing type that can be of particular interest to determine fraud.

Sometimes you might not want to perform a task if the IP is unknown or private.

B.5.23 Location: IP Type

General information about the `Location: IP Type` condition is provided in the following table.

Table B–95 Location: IP Type

Condition	Location: IP Type
Description	Checks to see if IP type is one of the following values: valid, unknown, or private.
Prerequisites	IP location data is required for this condition. Most production environments will have an IP location database populated.

Table B–95 (Cont.) Location: IP Type

Condition	Location: IP Type
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: IP Type Parameters

The following table summarizes the parameters in the `Location: IP Type` condition.

Table B–96 Location: IP Type Parameters

Parameter	Description	Possible Values
IP type	This is a single IP location type value. If you need to check for multiple IP location types, you will need multiple conditions. The IP location type is a single valid from the enum, location.ip.type.enum.	
Is	This is a boolean parameter that defines a default return value if the IP is valid, unknown, or private.	True/ [False]

Example Usage

If you want to check for an IP type, valid, private, or unknown, then use this condition.

B.5.24 Location: User Status Count

General information about the `Location: User Status Count` condition is provided in the following table.

Table B–97 Location: User Status Count

Condition	Location: User Status Count
Description	Check the number of times users are allowed with this status during the specified duration
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints except Device ID.

Location: User Status Count Parameters

The following table summarizes the parameters in the Location: User Status Count condition.

Table B–98 Location: User Status Count Parameters

Parameter	Description	Possible Values
Within	Number of time units to look back in history	Positive Integer. The default is `3`.
Time unit	Time unit to be associated with the "Within" parameter	Select a time unit configured from the `time.unit.enum` property: Milliseconds, Seconds, Minutes, Hours, Days, Weeks, Months, Years
Maximum number of users allowed	Maximum number of users allowed for this condition to start triggering	Positive Integer The default is `3`.
With Status	Name of the group that is of type auth status.	Long. ID of the group

Example Usage

Determine if too many users have logins from the logins that failed from the IP in the last n hours.

B.6 Session Conditions

The Session conditions are documented in this section.

B.6.1 Session: Check Parameter Value

General information about the `Session: Check Parameter Value` condition is provided in the following table.

Table B–99 Session: Check Parameter Value

Condition	Session: Check Parameter Value
Description	Check to see whether the specified parameter value is above the given threshold. Use this condition to determine whether the value of a particular parameter in the transaction is above a known threshold and then actions can be taken accordingly. Basically provided a mathematical function for integrators. This will be very useful in native integration.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

B.6.1.1 Session: Check Parameter Value Parameters

The following table summarizes the parameters in the `Session: Check Parameter Value` condition.

Table B–100 Session: Check Parameter Value Parameters

Parameter	Description	Possible Values	Can be Null?
Is	If the "Is" is true and the value is above the threshold provided then condition evaluates to true. If the "Is" is false and the value is below the threshold provided then condition evaluates to true.	[True] / False	No
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "creditcard" and whose value at Checkpoint is to be populated by users credit card, then key is "creditcard" in this case. If key is null then defaultError return value is the result of the condition.		Yes
Value above	This is basically the threshold value. Use this parameter to see if the time is greater than the time parameter present in the transaction. It accepts string representations of long values. Note: If you want to create a rule that uses a decimal value, use the condition Session: Check string parameter value.	Long values	Yes

B.6.1.2 Example Usage

Use this condition when you want to determine whether the value of a particular attribute of the transaction exceeds a threshold.

For example, you configured a transaction called purchase want to trigger a rule whenever the customer purchase exceeds $1000 Mark.

For accomplish this, you must use this rule with this condition.

1. Configure the `Parameter Key` of your transaction to `purchase.orderTotal` assuming that you have such an attribute in your transaction.
2. Configure `Value above` to `1000`. Configure an alert that says `Too Big Purchase`.
3. Process a transaction by providing a few total value numbers above 1000 and a few below 1000.
4. Verify that for the ones above 1000 the rule is triggered.

B.6.2 Session: Check Parameter Value in Group

General information about the `Session: Check Parameter Value in Group` condition is provided in the following table.

Table B–101 Session: Check Parameter Value in Group

Condition	Session: Check Parameter Value in Group
Description	Checks to see if specified parameter value matches the regular expression and the group identified by the expression matcher is in the list of strings. Regular expression matching is not sensitive to case (uppercase and lowercase letters are treated same)
Prerequisites	None for the condition as such, but you must have a rule configured with this condition for it to work.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Session: Check Parameter Value in Group Parameters

The following table summarizes the parameters in the `Session: Check Parameter Value in Group` condition.

Table B–102 Session: Check Parameter Value in Group Parameters

Parameter	Description	Possible Value	Can be Null
Is	If the "Is" is true and the key's value matches the regular expression and the first group string found by the regex matcher is in the string group, then the condition evaluates to "true."	[True] / False	Yes
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example, if the transaction is "internet banking" and the name of the attribute is "bankName" and its value at checkpoint is to be populated by users, then key is "Transaction.bankName" in this case. You should be able to find this key in the Internal ID column in the Transaction Source Data tab in transaction details. If the key is null, then defaultReturnValue is the result of the condition.		Yes
Regular Expression	The character pattern with which you want to match the "value" which has its look up name given by "Parameter Key". In same banking example, if you want to determine whether the bankName equals "SomeBank," you should define this pattern in the policy/rule as "(SomeBank)" without the quotation marks. If the regular expression is null, then defaultReturnValue is the result of the condition.		Yes
In list	The condition checks to see if the character group obtained by the regular expression matcher belongs to this string group. If the list name is null or if the list specified by the name is empty, then defaultReturnValue is the result of the condition.		Yes
Default Return value	If there is any error or if the condition cannot be evaluated because of insufficient data, then return (evaluate to) this value. If this value is not specified (null) then "False" is assumed.	[False] / True	Yes

Example Usage

Use this condition when you want to determine whether a part of the value of a particular attribute of the transaction matches a character pattern, and to see if this part of the value is present in the pre-determined group of strings.

For example, you have configured a transaction called internet banking and you want to trigger a rule if the bank name is "bank1" or "bank2."

To achieve this, you must use this rule with this condition:

1. Configure the "Parameter Key" of your transaction to "Transaction.bankName" (assuming that you have such an attribute in your transaction).
2. Configure "Regular Expression" to "(bank.)". Configure an alert that says "Some specified bank transaction".
3. Create a group of generic strings called "interesting banks" and add "bank1" and "bank2" to it.
4. Configure the group name as "In List" parameter for this condition.

5. Configure "Is" to true and default return value to false.
6. Process a few transaction by providing bank names, "bank1" and "bank2","bank3", and so on. Verify that the alert is generated for "bank1" and "bank2" only.
7. Verify that alerts are generated for "BANK1". This shows that the regular expression matching is not case-sensitive.

For more information on group creation, see Chapter 12, "Managing Groups."

B.6.3 Session: Check Parameter Value for Regular Expression

General information about the `Session: Check Parameter Value for Regular Expression` condition is provided in the following table.

Table B–103 Session: Check Parameter Value for Regular Expression

Condition	Session: Check Parameter Value for Regular Expression
Description	Determine whether the specified parameter value matches regular expression. Use this condition to determine whether a string value of a particular parameter in the transaction matches a known pattern and then action can be taken accordingly. This provided a mathematical function for integrators and is useful in native integration.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

B.6.3.1 Session: Check Parameter Value for Regular Expression Parameters

The following table summarizes the parameters in the `Session: Check Parameter Value for Regular Expression` condition.

Table B–104 Session: Check Parameter Value for Regular Expression Parameters

Parameter	Description	Possible Values	Can be Null?
Is	If the "Is" is true and regular expression matches to the provided criteria then condition evaluates to true. If the "Is" is false and regular expression does not match to the provided criteria then condition evaluates to true.	[True] / False	No

Table B–104 (Cont.) Session: Check Parameter Value for Regular Expression Parameters

Parameter	Description	Possible Values	Can be Null?
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "creditcard" and whose value at Checkpoint is to be populated by users credit card, then key is "creditcard" in this case. If key is null then defaultError return value is the result of the condition. You should be able to find this key in the Internal ID column in Transaction Source Data tab in transaction details.		Yes
Regular Expression	The character pattern with which you want to match the "value" whose look up name is given by "Parameter Key". In same credit card example. Check to see whether the user entered all correct in credit card so you might look for pattern "[0-9]".		Yes
Error Return value	If there is any error then return (evaluate to) this value. If this value is not specified (null) then "False" is assumed.	[False] / True	Yes

B.6.3.2 Example Usage

Use this condition to determine whether the value of a particular attribute of the transaction matches a character pattern.

For example, you configured a transaction called "purchase" and want to trigger a rule whenever the customer e-mail field ends with ".gov" or ".mil" so you can track government and military business for your firm.

For accomplish this, you must use this rule with this condition.

1. Configure the "Parameter Key" of your transaction to "customer.e-mail" assuming that you have such an attribute in your transaction.
2. Configure "Regular Expression" to "*[.gov][.mil]".
3. Configure an alert that says "Government/Military business."
4. Process a few transaction by providing e-mail addresses ending with ".gov" or ".mil".
5. Verify that the alert is generated.
6. Process a few transactions by giving another e-mail address ending with ".com" or any ending other than ".gov" or ".mil".

   Notice that alert is not generated.

B.6.4 Session: Check Two String Parameter Values

General information about the `Session: Check Two String Parameter Values` condition is provided in the following table.

Table B–105 Session: Check Two String Parameter Values

Condition	Session: Check Two String Parameter Value
Description	Check to see whether the specified parameter value is equal to a given character string. Use this condition to determine whether the value of a particular parameter in the transaction matches an expected string so that action can be taken accordingly. Basically the condition provided a string equality function for integrators. This is useful in native integration. Note that the comparison is case-sensitive. That is "Good" is not equal to "GOOD".
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

Session: Check Two String Parameter Values Parameters

The following table summarizes the parameters in the `Session: Check Two String Parameter Values` condition.

Table B–106 Session: Check Two String Parameter Values Parameters

Parameter	Description	Possible Values	Can be Null?
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "creditCardType" and whose value at Checkpoint is to be populated by users credit card type, then key is "creditCardType" in this case.		Yes
Value	This is basically the value to compare with.		Yes

Example Usage

Use this condition when you want to determine whether the value of a particular attribute of the transaction equals a given string.

For example, you have configured a transaction called purchase and you want to trigger a rule whenever the customer credit card is American Express.

To accomplish this, you must use this rule with this condition:

1. Configure the "Parameter Key" of your transaction to "purchase.creditCardType" assuming that you have such an attribute in your transaction.
2. Configure "Value" to "A_CARD". Configure an alert that says "A_CARD Used"
3. Process a few transactions by providing the card type as A_CARD and a few with another card type.
4. Verify that when A_CARD is used, the rule is triggered.

B.6.5 Session: Check String Value

General information about the `Session: Check String Value` condition is provided in the following table.

Table B–107 Session: Check String Value

Condition	Session: Check String Value
Description	Check to see whether the specified parameter value is equal to a given character string. Use this condition to determine whether the value of a particular parameter in the transaction matches an expected string so that action can be taken accordingly. Basically the condition provided a string equality function for integrators. This is useful in native integration. Note that the comparison is case-sensitive. That is "Good" is not equal to "GOOD".
Prerequisites	None for the condition as such, but you must configure a rule with this condition for the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

B.6.5.1 Session: Check String Value Parameters

The following table summarizes the parameters in the `Session: Check String Value` condition.

Table B–108 Session: Check String Value Parameters

Parameter	Description	Possible Value	Can be Null?
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "creditCardType" and whose value at Checkpoint is to be populated by users credit card type, then key is "creditCardType" in this case.		Yes
StringValue	This is basically the value to compare with.		Yes

B.6.5.2 Example Usage

Use this condition when you want to determine whether the value of a particular attribute of the transaction equals a given string.

For example, you have configured a transaction called purchase and you want to trigger a rule whenever the customer credit card is American Express.

To accomplish this, you must use this rule with this condition:

1. Configure the "Parameter Key" of your transaction to "purchase.creditCardType" assuming that you have such an attribute in your transaction.
2. Configure "Value" to "A_CARD". Configure an alert that says "A_CARD Card Used"
3. Process a few transactions by providing the card type as A_CARD and a few with another card type.
4. Verify that when A_CARD is used, the rule is triggered.

B.6.6 Session: Time Unit Condition

General information about the `Session: Time Unit` condition is provided in the following table.

Table B–109 Day of Week

Condition	Day of Week
Description	Checks to see if time unit in current date matches certain criteria. The condition determines if a particular time unit (that is part of the current time) belongs to a particular position in the time unit. This condition uses the request date if available to evaluate the date function requested with the help of parameters. If the request date is not available, then current server date time will be used.
Example	This condition can determine if the day of the week is equal to (or not equal to or …) Monday or Tuesday and so on. It can also determine if the day of the month matches certain criteria of the day of the month. It can also try to match the same criteria if month of the year is X or not X or in or not in X.

Session: Time Unit Parameters

The following table summarizes the parameters in the `Session: Time Unit` condition.

Table B–110 Day of Week Parameters

Parameters	Description	Possible Values
Time Unit	Enum What is the time unit you are looking for? The default value is Day Of The Week	Possible values are: ■ Day Of the Week ■ Day Of the Month ■ Day of the year ■ Month of the Year ■ Hour of the day ■ Week Of the Month ■ Week Of The year ■ Year
Comparison operator	Enum What comparison you want to make with the time unit. The default value is Equal To	Possible values are: ■ Equal to ■ Not equal to ■ Less than ■ More than ■ Less than equal to ■ more than equal to ■ In ■ Not in

Table B–110 (Cont.) Day of Week Parameters

Parameters	Description	Possible Values
Comparison value	String The default value is "" (empty string), that represents integer or string that represents comma separated integers. Example: "1" or "1,2,3,4". The user can use comma-delimited values when using IN or NOT in operator. If comma-delimited values are used for any other operators, it will be determined as an error and value of the number 5 parameter (shown in Error Return) will be returned. If the string does not represent number (or a list of comma separated numbers) then it is determined as error and value of parameter number 5 will be returned.	Correct values of this parameter for different time units. ■ Day Of The week: 1 through 7 (1 is Sunday). ■ Day Of the month: 1 through 31 ■ Day of the year: 1 through 366 ■ Month of the year: 0 through 11 (0 is January) ■ Hour of the day: 0 through 23 ■ Week of the Month: 0 through 6 ■ Week of the Year 1 through 53 ■ Year: Positive integer
Is Condition True	Boolean True or False Default value is True. The "Is Condition True" parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the comparison is True and the value of this parameter is True, the condition evaluates to True. If the comparison is False and the value of this parameter is False, the condition evaluates to True. In all other cases, the condition evaluates to False.	
Error Return value	Boolean Default value is false If the user has configured the value of Comparison Value (#3) incorrectly, or if there is any other error determining date then this value will be returned. The days of the weeks are: ■ 1 = Sunday ■ 2 = Monday ■ 3 = Tuesday ■ 4 = Wednesday ■ 5 = Thursday ■ 6 = Friday ■ 7 = Saturday The week day is 2,3,4,5,6 Time Unit is Day of the Week Comparison Operator is "IN" Comparison Value is "1,2,3,4,5" Is Condition True is True Error Return value is "false"	

B.6.7 Session: Compare Two Parameter Values

General information about the `Session: Compare Two Parameter Values` condition is provided in the following table.

Table B–111 Session: Compare Two Parameter Values

Condition	Session: Compare Two Parameter Values
Description	Compares the specified parameter values based on the compare operator, and if based on flag if case (upper / lower) should be used for string type parameters. Use this condition to check if the value of a particular parameter in the transaction is above / below / equal to another parameter. Basically provided a mathematical function for integrators. Before doing the compare the values of the actual items in the transaction are converted to string (characters) for comparison.
Prerequisites	None for the condition as such, but you must have the rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All runtimes

Session: Compare Two Parameter Values Parameters

The following table summarizes the parameters in the `Session: Compare Two Parameter Values` condition.

Table B–112 Session: Compare Two Parameter Values Parameters

Parameter	Description	Possible Values	Can be Null?
Parameter Key1	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "shippingaddresszip" and whose value at runtime is to be populated by users shipping address zip code, then key is "shippingaddresszip" in this case. If key is null then defRetValue return value is the result of the condition.	String	No
Parameter Key2	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "billingaddresszip" and whose value at runtime is to be populated by users billing address zip code, then key is "billingaddresszip" in this case. If key is null then defRetValue return value is the result of the condition.	String	No

Table B–112 (Cont.) Session: Compare Two Parameter Values Parameters

Parameter	Description	Possible Values	Can be Null?
Operation	This is the compare operation to be used on the values associated with two keys above. This operator is used as result = (value1) [This compare operation] (value2) For example if value1 = numeric amount1 (say = 100.00 Dollars) and value2 = numeric amount2 (say = 53.23 dollars) and this operator is say "more than" then the condition evaluates to 100.00 [More than] 53.23 === False.	=, <, >, <=, >=, <>, contains, starts with, ends with	Yes
IgnoreCase	Whether case (upper case / lower case) should be ignored for string representations of the parameters.	[True] / False	No
Default Return Value	Default value of the condition if there is any error in obtaining the parameters or if one of both of the parameters cannot be found, or are empty or null.	[False] / True	No

Example Usage

Use this condition whenever you want to compare the values of two attributes of the transaction. For example, you have configured a transaction called purchase and you want to trigger a rule whenever the customer's billing zip code and shipping zip code are not same. For achieving this, you must use this rule with this condition.

1. Configure the **Parameter Key1** of your transaction as **purchase.billingZipCode**. This assumes that you have such an attribute in your transaction.
2. Configure the **Parameter Key2** of your transaction as **purchase.shippingZipCode**. This assumes that you have such an attribute in your transaction.
3. Configure **Compare Operator** as **not equals**. Configure an alert that says "Billing and Shipping Code no match."
4. Process a transaction by providing different billing and shipping zip codes.
5. Verify that the rule is triggers. Also verify that if the transaction has the same billing and shipping zip code, the rule does not trigger.

B.6.8 Session: Check Current Session Using the Filter Conditions

General information about the `Session: Check Current Session Using the Filter Conditions` condition is provided in the following table.

Table B–113 Session: Check Current Session Using the Filter Conditions

Condition	Session: Check Current Session Using the Filter Conditions
Description	Compares the attributes of the session with the specified value of the current value. This condition can use up to six filter condition which are logical "AND"ed to obtain the final result of the condition. This condition lets you build a expression. You can build expression that have the attributes of session also available. Expression building can be viewed as Expr1 = right side variable <Operator> left side variable or Value AND Expr2 = right side variable <Operator> left aide variable or Value .... and so on. You can add up to 6 expressions to build your logic. The variables available are the attributes of the session that are available in the environment when this condition is evaluated.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	11.1.2.0.0
Checkpoints	All Checkpoints except Device ID.

Session: Check Current Session Using the Filter Conditions Parameters

The following table summarizes the parameters in the `Session: Check Current Session Using the Filter Conditions` condition.

Table B–114 Session: Check Current Session Using the Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
Check If (or the right side of the expression)	The attribute of the session to be compared. This should be selected from pre-determined list of attributes that are available. It is required to have at least one attribute (row) in the condition.	Drop_Down	No
Operator	Select the appropriate operator from the list of available operators.	Drop Down, select one of <, >, <=, >=, =, Not Equal to, Equals Ignore case, is null, is not null, in, not in, like, not like	No

Table B–114 (Cont.) Session: Check Current Session Using the Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
Value / Current	Choose the value if you want to specify absolute value or current if you want to compare with the the current other attribute of the session.	Value / Current	No
Right side of value	If you selected the value in the value/current, you will be provided with the text box to enter the absolute value to be used as right side of expression. If you chose Current in the previous box, then you will obtain a drop down of the available attributes to compare.	String Value	Yes
and	You can repeat the rows of left side: operator: right side to build your expression.		

Example Usage

This condition can be used whenever you want to compare the values of the session and build a chain of expressions and build your own logic

For example, if you want to see if the IP Address of the session is not localhost and users are logging in from Mozilla type browsers. For achieving this, you must use this condition in a rule.

1. Configure on the first expression, "Check If" "IP Address" "Not Equals" "Value" and type in "127.0.0.1" in the box
2. On the second line of expression configure, "AND" "Session.Browser.UserAgent" "Like" "Value" and then type in "Mozilla".
3. Perform logins from an IP address other than 127.0.0.1 with the Mozilla web browser, and the rule triggers.
4. Perform logins from the same IP address with the other web browser, such as Internet Explorer of Safari, and the rule does not trigger.

B.6.9 Session: Check Risk Score Classification

General information about the `Session: Check Risk Score Classification` condition is provided in the following table.

Table B–115 Session: Check Risk Score Classification

Condition	Session: Check Risk Score Classification
Description	Checks the risk score classification based on the risk score from previous checkpoint execution
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	11.1.2.0.0
Checkpoints	All Runtimes.

Session: Check Risk Score Classification Parameters

The following table summarizes the parameters in the `Session: Check Risk Score Classification` condition.

Table B–116 Session: Check Risk Score Classification Parameters

Parameter	Description	Possible Values	Can be Null?
Classification Type	Type or Range of risk score. Out of box risk score classified in three types or ranges. (low is 0 to 0, medium is 1 to 500, high is 501 to 1000). Note: you can change the default values or add more classifications using the following enum: oracle.oaam.common.rules.riskscore.classification.enum	(Integer = 0,1,2) Select from Drop down [0=low], 1=medium, 2=high	No
Default Return Value	Default value of the condition if there is any error.	[False] / True	No

Example Usage

This condition can be used whenever you want to see if the risk score was in pre-determined range in the previous checkpoints for the same session.

For example, if you want to see if the risk score was in high range in any previous checkpoint in this session. The assumption here is you have only 2 checkpoints here namely pre-authentication and post authentication that have policies in them.

For achieving this, you must use this rule with this condition.

1. Configure the "risk score type" of your condition as "high."
2. Configure "default return value" as "false".
3. Configure this rule in the post authentication checkpoint.
4. In Pre-authentication checkpoint configure a rule that emits a high score. (It can be done by creating the rule in that checkpoint by adding the "always on" condition to it.)
5. Verify that the rule is triggers.

B.6.10 Session: Cookie Mismatch

General information about the `Session: Cookie Mismatch` condition is provided in the following table.

Table B–117 Session: Cookie Mismatch

Condition	Session: Cookie Mismatch
Description	Checks to see if there is mismatch of supplied cookie with the expected cookie.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Runtimes except Device ID.

Session: Cookie Mismatch Parameters

The following table summarizes the parameters in the `Session: Cookie Mismatch` condition.

Table B–118 Session: Cookie Mismatch Parameters

Parameter	Description	Possible Values	Can be Null?
Fingerprint Type	Fingerprint type enum for the cookie. Valid values will be browser or flash.	[Browser] or Flash	No
CookieKey	Context data key for the cookie value.	String [browser_securecookie] or any String	No
Trigger If Match	If set to true, the condition will evaluate to true if the cookies match.	[True] / False	Yes

Example Usage

This condition can be used whenever you want to check if the expected cookie and the actual cookie coming in from this device matches or not.

To use this condition, add it to a rule and use it in say post authentication checkpoint.

You will need to use a simulator or browser modifier extensions to send another cookie instead of the expected one.

1. Add this condition with default values to the rule.
2. Perform logins to make sure that your logins are from the same device--view the Device ID field in the session data.
3. Now use the browser modifier extension or simulator to send a different cookie than expected one.

This rule should trigger.

B.6.11 Session: Mismatch in Browser Fingerprint

General information about the `Session: Mismatch in Browser Fingerprint` condition is provided in the following table.

Table B–119 Session: Mismatch in Browser Fingerprint

Condition	Session: Mismatch in Browser Fingerprint
Description	Checks to see if there is mismatch in browser fingerprint with the fingerprint supplied during authentication. Fingerprint is constructed using the context values passed to Rules Engine.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Runtimes except Device ID.

Session: Mismatch in Browser Fingerprint Parameters

The following table summarizes the parameters in the `Session: Mismatch in Browser Fingerprint` condition.

Table B–120 Session: Mismatch in Browser Fingerprint Parameters

Parameter	Description	Possible Values	Can be Null?
User Agent Key	Context data key for browser user agent value.	String [browser_uas] or any String	No
Local Language Key	Key to Local Lang value	String[browser_localLang] or any String	Yes
Local Country Key	Key to Local Country value	String[browser_localCountry] or any String	Yes
localVariantKey	Key to Local Country value	String[browser_localVariant] or any String	Yes
Trigger If Match	If Set (to true), condition is triggered when fingerprints match	[True] / False	Yes

Example Usage

This condition can be used whenever you want to check if the browser fingerprint matches the actual one logging in from the browser for this session.

To use this condition, add it to a rule and use it in the post authentication checkpoint.

You will need to use a simulator or browser modifier extensions to send the desired user agent strings.

1. Add this condition with default values to the rule.
2. Perform logins to make sure that your logins are coming in from the same device. View the Device ID field in the session data.
3. Use the browser modifier extension or simulator to send a different fingerprint than the expected one.

The rule should trigger.

B.6.12 Session: Compare with Current Date Time

General information about the `Session: Compare with Current Date Time` condition is provided in the following table.

Table B–121 Session: Compare with Current Date Time

Condition	Session: Compare with current date time
Description	Compare specified parameter value with current time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Runtimes.

Session: Compare with Current Date Time Parameters

The following table summarizes the parameters in the `Session: Compare with Current Date Time` condition.

Table B–122 Session: Compare with Current Date Time Parameters

Parameter	Description	Possible Values	Can be Null?
Parameter Key	The "key" or the look up name of the parameter in the transaction. For example if the transaction is purchase and the name of the attribute is "po_time" and whose value at runtime is to be populated by date-time type data., then key is "po_time" in this case. If key is null then condition evaluates to false. If key returns a null date object then "IfNull" return value is the result of the condition.	String	Yes
Is after current date?	This is the boolean parameter to configure if the date field should be checked for condition after the current date or before (or equal to) the current date.	Boolean [True]/ False	Yes
If given date key returns empty date (ifNull)	This boolean parameter specifies what to do if the Parameter Key did not return a valid date object from transaction data.	Boolean [True]/ False	Yes

Example Usage

This condition can be used whenever you want to compare the value of the date attribute in a transaction with the transaction date itself.

For example, if you have configured a transaction called "Purchase" and you want to trigger a rule whenever the purchase order date is after the current time.

To achieve this, you must:

1. Use this rule with this condition.
2. Configure the `Parameter Key` of your transaction to `purchase.po_date` assuming that you have such an attribute in your transaction.
3. Configure the `Is after current date` of your transaction to `true`.
4. Configure `If given date key returns empty` to `false`
5. Process a few transaction by providing different `po_date` values.
6. Verify that the rule is triggers when `po_date` is after the current date.

B.6.13 Session: IP Changed

General information about the `Session: IP Changed` condition is provided in the following table.

Table B–123 Session: IP Changed

Condition	Session: IP Changed
Description	IP Address is changed since transaction is started
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Runtimes

Session: IP Changed Parameters

The following table summarizes the parameters in the `Session: IP Changed` condition.

Table B–124 Session: IP Changed Parameters

Parameter	Description	Possible Values	Can be Null?
IP Key	The "key" or the look up the IP value in the transaction data.	String	Yes

Example Usage

This condition can be used mostly in transaction related scenarios to compare the value of the IP attribute in a transaction with the current IP address of the session.

For example, if you have configured a transaction called purchase and you want to trigger a rule whenever the IP address coming in the transaction does not match the one that the session is coming from.

To achieve this, you must use this rule with this condition.

Configure the "IP Key" of your transaction as "purchase.ip_addr" assuming that you have such an attribute in your transaction.

Process a few transaction by providing different ip_addr values.

Verify that the rule is triggers when ip_addr is not the same as the session's IP address.

B.6.14 Session: Check Value in Comma Separated Values

General information about the `Session: Check Value in Comma Separated Values` condition is provided in the following table.

Table B–125 Session: Check Value in Comma Separated Values

Condition	Session: Check Value in Comma Separated Values
Description	Checks if specified value is present in comma separated value list. Here the comma separated values is the set of values in the transaction data associated with the specified key.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Runtimes

Session: Check Value in Comma Separated Values Parameters

The following table summarizes the parameters in the `Session: Check Value in Comma Separated Values` condition.

Table B–126 Session: Check Value in Comma Separated Values Parameters

Parameter	Description	Possible Values	Can be Null?
Parameter Key	The "key" or the look up the value in the transaction data. The value associated with this key may be comma separated.	String	Yes
Value to Check	Value check against	String	Yes
Is True	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the value of the key is in the list and the value of this parameter is `True`, the condition evaluates to `True`. If the value of the key is not in the list and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	Boolean	True

Example Usage

This condition can be used mostly in transaction related scenarios to compare if one of the data values associated with specified key is the one we are interested in.

For example, you want to identify if the merchant is interested in knowing if the user has stayed in a specified country as part of evaluating the credit card application that is coming in. The countries information comes in as a comma-delimited list of strings with country codes. For example: US, UK, and so on.

You configure your transaction as credit_card_application which has a data field that says counties_resided_last_3_years.

Add this condition to the rule that will be executed.

Configure the "Parameter Key" of your transaction as "countries_resided_last_3_years"

Configure Value to Check as "US."

Configure isTrue as "true"

Process / perform a few transactions with various combinations of countries resided.

When your comma-delimited list of countries resided contains "US" the rule will trigger.

B.7 System Conditions

The system conditions are documented in this section.

B.7.1 System - Check Boolean Property

General information about the `System - Check Boolean Property` condition is provided in the following table.

Table B–127 System - Check Boolean Property

Condition	System - Check Boolean Property
Description	Verify if specified property equals true of false.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All checkpoints.

B.7.1.1 System - Check Boolean Property Parameters

The following table summarizes the parameters in the `System - Check Boolean Property` condition.

Table B–128 System - Check Boolean Property Parameters

Parameter	Description	Possible Value	Can be Null?
Property	The complete name of the property that must be checked.		Yes
PropertyValue	The expected value of the property. If the property has this value then the condition will evaluate to true.	[True] / false	Yes
Defaultvalue	The value of the property to be used if the property is not found in the system.	[True] / false	Yes

B.7.1.2 Example Usage

Use this condition when you want to determine whether the value of a particular property is true or false.

For example, you have a property "trigger.sample.rule" and its value is true.

You want to trigger a rule based on this property.

For accomplish this, you must use this rule with this condition.

1. Configure the "Property" of this condition to "trigger.sample.rule".
2. Configure the PropertyValue to "true".
3. Configure DefaultValue to "false"
4. Run authentication of users to see if the rule triggers.
5. Use the property editor to change the value of the property "trigger.sample.rule" to false.
6. Run authentication of users again and notice that the rule does not trigger.

B.7.2 System - Check Enough Pattern Data

General information about the `System - Check Enough Pattern Data` condition is provided in the following table.

Table B–129 System - Check enough pattern data

Details	System - Check Enough Pattern Data
Condition	System - Check enough pattern data
Description	Checks if enough profiling data is available for a given pattern. This condition checks if pattern data is available in the system for the last several days. It checks only for a particular pattern. So if data is available that is collected by the given pattern for more than the specified number of days, this condition evaluates to true.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Available since version	11.1.2.0
RunTimes	All Runtimes.

System - Check Enough Pattern Data Parameters

The following table summarizes the parameters in the `System - Check Enough Pattern Data` condition.

Table B–130 System - Check enough pattern data parameters

Parameter	Description	Possible Values	Can be null?
Pattern name to check for data	Name of the pattern for which the data availability is to be checked.	Pattern names from drop down list	No
Number of days of data	How many days should the condition "look back" from the current login's request time. Typical value is 90 (days). The condition checks these many number of days of data. If pattern profiling data is available for at least these number of days, the condition evaluates to true	Positive integer	No
Is pattern data available	Condition evaluates to true if this value is true and there is enough autolearning data OR if this value is false and there is not enough autolearning data. In all other cases, the condition evaluates to false. Use this parameter to decide the outcome of the condition.	[True] / False	Yes
Return value if condition encounters an error	Value to return if the condition runs into an error.	[False] / True	Yes

Example Usage

Use this condition to check if enough autolearning data exists in the system that had been collected by a given pattern.

"Enough data" can be termed as data gathered over the last several days, depending on the customer scenarios.

For example, this condition can determine if the given autolearning pattern has gathered the data for the last 90 days and based on that, the autolearning rules are used.

The condition provides time for autolearning data to reach statistical stability. If autolearning rules work on a very small set of data, the results may be skewed, depending on how small data sample is.

For example, on a system that just had the pattern enabled today, a customer may want the OAAM Server to gather pattern data for three months before starting testing.

In that case, this condition is useful because it will evaluate to true only after three months (90 days). Then, autolearning rules can trigger and evaluate the risk.

B.7.3 System - Check If Enough Data is Available for Any Pattern

General information about the `System - Check If Enough Data is Available for Any Pattern` condition is provided in the following table.

Table B–131 System - Check If Enough Data is Available for Any Pattern

Details	System - Check If Enough Data is Available for Any Pattern
Condition	Checks if enough profiling data is available for any pattern. This condition will check if pattern data is available in the system for last several days.
Description	This condition will check if a defined minimum amount of pattern data has been captured in the OAAM database. Generally the threshold should be set to between 1-3 months for best results. The standard policies use this rule to determine if there is enough pattern data captured to start running pattern based risk analysis.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	Autolearning is enabled. Without active patterns collecting profiling data, this conditions will not be meaningful.
Available since version	11.1.1.5.0
RunTimes	All Runtimes.

System - Check If Enough Data is Available for Any Pattern Parameters

The following table summarizes the parameters in the `System - Check If Enough Data is Available for Any Pattern` condition.

Table B–132 System - Check If Enough Data is Available for Any Pattern Parameters

Parameter	Description	Possible Value	Can be Null?
Number of days of data	How many days should condition "look back" from the current login's request time. Typical value is 90 (days). Condition checks these many number of days of data. If pattern profiling data is available for at least these number of days, the condition will evaluate to true.	Positive integer	No
Is pattern data available	Condition evaluates to true if this value is true and there is enough autolearning data OR if this value is false and there is not enough autolearning data. In all other cases, the condition evaluates to false. Use this parameter to decide the outcome of the condition.	[True] / False	Yes
Return value if condition encounters an error	Value to return if the condition runs into an error.	[False] / True	Yes

Possible Scenarios

Use this condition to check if enough autolearning data exists in the system.

"Enough data" can be termed as data gathered over the last several days depending on the customer scenarios.

This condition can determine if any of the autolearning pattern have gathered data for the last 90 days, and based on that, auto learning rules can be used.

This provides time for autolearning data to reach statistical stability. Otherwise, if autolearning rules work on a very small set of data, the results may be skewed depending on how small the data sample is.

For example: on a system that has patterns enabled today, customers may want OAAM Server to gather pattern data for three months before starting to use autolearning rules. In that case, this condition is useful. It evaluates to true only after three months (90 days) and then autolearning rules can trigger and evaluate the risk.

B.7.4 System - Check Integer Property

General information about the `System - Check Integer Property` condition is provided in the following table.

Table B–133 System - Check Integer Property

Condition	System - Check Integer Property
Description	Verify if specified property equals expected integer value
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All checkpoints.

System - Check Integer Property Parameters

The following table summarizes the parameters in the `System - Check Integer Property` condition.

Table B–134 System - Check Integer Property Parameters

Parameter	Description	Possible Value	Can be Null?
Property	The complete name of the property that must be checked.		Yes
Value	The expected value of the property. If the property has this value then the condition will evaluate to true.	Integer	Yes
default value (if null)	The value of the property to be used if the property is not found in the system.	Integer	Yes

Possible Scenarios

Use this condition when you want to determine whether the value of a particular property equals the expected integer value.

For example, you might have a property `trigger.sample.rule.test.integer` and its value to `25`.

You want to trigger a rule based on this property.

For accomplish this, you must use this rule with this condition.

1. Configure the `Property` of this condition to `trigger.sample.rule.test.integer`. Configure the `Value` to `25`.
2. Configure `default value (if null)` to `30`.
3. Run authentication users to see the rule trigger.
4. Use the Property editor to change the value of the property `trigger.sample.rule.test.integer` to `88`.
5. Run authentication users again.

   Notice that the rule does not trigger.

B.7.5 System - Check Request Date

General information about the `System - Check Request Date` condition is provided in the following table.

Table B–135 System - Check Request Date

Condition	System - Check Request Date
Description	Verify if the request date of the transaction or authentication is after a specific date. Notice that only the year, month and day part of the date is used. So basically the "time" portion of the date is ignored when comparing dates.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

System - Check Request Date Parameters

The following table summarizes the parameters in the `System - Check Request Date` condition.

Table B–136 System - Check Request Date Parameters

Parameter	Description	Possible Value	Can be Null?
Date (MM/dd/yyyy)	The date string which the user wants to check the request date against.		No
Is After Request Date	To check to see whether the specified date is after the request date or not after request date **Example**: If we suppose that request data is today: Case A Set parameter to false if date entered is < today, the rule is triggered if date entered is > today, the rule is not triggered Case B Set parameter to true if date entered is < today, the rule is not triggered if date entered is > today, the rule is triggered	[True] / False	Yes

Example Usage

Use this condition when you want to determine whether the transaction or authentication occurred after a certain date.

For example, if you want to direct users to a certain other policy after a given date, you might use this rule.

To do this, you must use this rule with this condition.

1. Configure the "Date" of this condition to "12/22/2009" if you want to trigger a rule starting the 23rd December of 2009.
2. Configure the "Is After" to "true".
3. Run authentication on users.

   If the date is after 12/22/2009, the rule triggers.
4. Using the Policy editor, change the date in this condition to a future date.

5. Run authentication on the users again.

   Notice that the rule does not trigger.

B.7.6 System - Check String Property

General information about the `System - Check String Property` condition is provided in the following table.

Table B–137 System - Check String Property

Condition	System - Check String Property
Description	Verify if specified property equals expected string value
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

System - Check String Property Parameters

The following table summarizes the parameters in the `System - Check String Property` condition.

Table B–138 System - Check String Property Parameters

Parameter	Description	Possible Value	Can be Null?
Property	The complete name of the property that must be checked.		Yes
Value	The expected value of the property. If the property has this value then the condition will evaluate to true.	String	Yes
default value (if null)	The value of the property to be used if the property is not found in the system.	String	Yes

Example Usage

Use this condition when you want to determine whether the value of a particular property equals the expected the string value.

For example, you have a property `trigger.sample.rule.test.string` and its value is `test_string`. You want to trigger a rule based on this property.

For achieving this, you must use this rule with this condition.

1. Configure `Property` to `trigger.sample.rule.test.string`.
2. Configure `Value` to `test_string` and configure `default value (if null)` to `some_other_string`.
3. Run authentication on users to trigger the rule.
4. Use the Property editor to change the value of the property `trigger.sample.rule.test.instringteger` to a completely different string value.
5. Run authentication on users again.

   The rule does not trigger.

B.8 Transactions Conditions

These section provides information on the following transaction conditions:

- Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions
- Transaction: Check Current Transaction Using Filter Condition
- Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions
- Transaction: Check Number of Times Entity Used in Transaction
- Transaction: Check Transaction Aggregrate and Count Using Filter Conditions
- Transaction: Check Transaction Count Using Filter Condition
- Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations
- Transaction: Compare Transaction Counts Across Two Different Durations
- Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations
- Transaction: Check Unique Transaction Entity Count with the Specified Count

Note: The filter operators "like" and "not like" work only on transaction data and entity data where the data type is string.

B.8.1 About Duration Types

You may need to specify a duration type in some of the Transaction conditions. This section describes the "rolling" and "calendar" duration types.

Duration Types: Rolling

In Transaction conditions, if you specify the duration type as `rolling`, the following property controls how the date/time for the start point is calculated:

`tracker.transaction.condition.computeDuration.useSystemTime`

If you set the property to true

If the property is set to `true`, OAAM takes the current system time as the end point to count backward to the start point. This property is set to `true` by default and calculates system time. When the duration is described as "last" x seconds/minutes/hours/days, use the rolling type duration. For example, if you specify 1 day using the rolling duration type, the rolling day starts 24 hours (exactly 1 day) from the current system time.

For example, if it is 11:33 am, and you specify 1 day, the "rolling" day will start from 11:33 am of the previous day and end at the current time today. If you specify 1 hour using `rolling` duration type, it simply subtracts 60 minutes from the current time to compute the start time of the duration window.

Examples of the `rolling` duration type are as follows:

A "rolling" week starts 7 days from the current day.

A "rolling" month starts from the same day of the previous month.

A "rolling" year starts from the same day of the previous year.

When you specify the `rolling` duration type, the end date/time is the current time. The duration type affects how the start time of the duration is computed.

If you set the property to false

If the property is set to `false`, OAAM takes the last transaction time as the end point to count backward to the start point. For example, if you specify 1 day using the rolling duration type, the rolling day starts 24 hours (exactly 1 day) from the last transaction time.

The `tracker.transaction.condition.computeDuration.useSystemTime` property fixes Bug 12960845 for online (real-time) transaction processing. For offline execution, it is mandatory to set this property to false so that OAAM will use the last transaction time instead of current system time.

Before/Skip Option

If `tracker.transaction.condition.computeDuration.useSystemTime` is set to `True`.

The `Before/Skip` configuration is useful for rule requirement like the following:

Rule should check for the transactions with "is the transactionType been used by this user in the last 6 months excluding the last 7 days?" If yes, then allow the user to perform the transaction. If no, then challenge the user. If the rule execution was on 12/Dec/2014 at 11:00:00 am for the online scenario, the rule should check for the duration from 05/Jun/2014 11:00:00 am to 05/Dec/2014 11:00:00 am.

If `tracker.transaction.condition.computeDuration.useSystemTime` is set to `False`.

Consider the same rule requirement for offline scenario where rule is executed for the transaction/session of 12/Dec/2014 11:00:00am at some time later than the transaction/session time. Offline can be loading/running rules for the session/transaction at 20/Dec/2014 05:00:00am. In this scenario, OAAM Offline should consider the transaction/session time as 12/Dec/2014 11:00:00am and not the 20/Dec/2014 05:00:00am.

Duration Types: Calendar

There will be occasions where you want to specify the duration window to start at 0.00. For those occasions, use the duration type as "calendar".

Therefore, if you specify 1 day using "calendar" as the duration type, the "calendar" day starts at 0.00 (12:00 am) of that day and ends at the current time.

For example, suppose the current time is 3.35pm and you want to count behavior that occurred between 3pm and 3.35 pm then you can specify it has 1 hour with duration type as 'calendar'.

Examples of the calendar duration type are as follows:

- A "calendar" week starts from Sunday regardless of the current day.
- A "calendar" month starts from the 1st of the current month.
- A "calendar" year starts from January 1st of the current year.

When you specify the "calendar" duration type, the end date/time is the current time. The duration type affects how the start time of the duration is computed.

The "Before" option is used when you want to skip over an interval of time before you begin counting backward to the start point. For example, if you want to calculate 7 days worth of data, but you do not want the data from the last 7 days, you would specify the interval of time you want to skip. For example, if today is February 6, and

you want to look at data from January 17 to the 23rd, you would specify "Before" 15 days.

B.8.2 Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions

General information about the Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions condition is provided in the following table.

Table B–139 Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions

Condition	Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions
Condition	Transaction: Check Count of any entity or element of a Transaction using filter conditions
Description	Check to see whether the count of a transaction entity or entity/data element with a given count where transactions matches ALL the conditions specified. Up to 6 conditions can be specified.
Prerequisites	Ensure that you are using 10.1.4.5.2 or later. Transactions should be defined; Transaction type of the current transaction should be same as the transaction type specified in the rule condition
Assumptions	
Available since version	10.1.4.5.2
Checkpoints	All checkpoints.

Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions Parameters

The following table summarizes the parameters in the Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions condition.

Table B–140 Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Select Entity or Element to count	Transaction Entity/Element that must be counted for checking		No
Specified Condition For Count	Condition for the count check. Select only valid operators that are relevant to numeric values		No
Specified Check Value for Count	Count value to check. Specify only valid positive integers.		No
Duration	Duration Descriptor		No
Ignore Current Transaction in count?	Flag to indicate if the current transaction must be ignored in the count		
for the same user?	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes

Table B–140 (Cont.) Transaction: Check Count of Any Entity or Element of a Transaction Using Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
Apply the filter checks on Current Transaction?	Flag to indicate if the filter conditions have to validated on current transaction before doing the count		No
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on the count of an entity or entity/data element of the transaction.

For example, you configured a transaction called "purchase" and want to trigger a rule if the same user is trying to use more than 5 different credit cards in the last 2 hours and the amount of purchase is more than $100.

To achieve this:

1. Select the "Credit Card" entity name as the one to be counted, so that the rule counts the distinct number of credit cards used.
2. Then, select "For the same current user" flag as true.
3. Then, select the duration as 2 rolling hours and the filter condition as "Amount" greater than 100.

There is provision to specify up to six (6) conditions for filtering the transactions that need to be considered for counting.

B.8.3 Transaction: Check Current Transaction Using Filter Condition

General information about the Transaction: Check Current Transaction Using Filter condition is provided in the following table.

Table B–141 Transaction: Check Current Transaction Using Filter

Condition	Transaction: Check Current Transaction Using Filter
Description	Check to see whether the current transaction matches ALL the conditions specified. Up to 6 conditions can be specified.
Prerequisites	1. Transactions should be defined. 2. Transaction type of the current transaction should be the same as the transaction type specified in the rule condition
Assumptions	If there are multiple transactions in the current session, then this condition is applied on the last transaction
Available since version	10.1.4.5.1
Checkpoints	All checkpoints.

Transaction: Check Current Transaction Using Filter Parameters

The following table summarizes the parameters in the Transaction: Check Current Transaction Using Filter condition.

Table B–142 Transaction: Check Current Transaction Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction type of the transaction to be counted. It represents the Transaction Definition fully qualified key. This is specified using the list box that has the list of transaction definitions		No
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. The left hand side represents the fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. The operator and the right hand side represent the fully qualified key of the filter condition. The right hand side is the value, which could be a simple value, the value of the current transaction, or a group. ■ Value: A simple value that is entered into a field ■ Current: A value from the current transaction. A value is selected from a list of values based on the current entities. ■ Group: Group is automatically selected if you chose the condition as IN or NOT IN. After Group is selected, you will have to select a type of group. Then, based on type, a list box appears with other values to select from, and so on.		Wherever the filterKey is specified, an appropriate condition must be specified

Example Usage

This condition can be used whenever you want to trigger a rule based on checks on the current transaction.

For example, you have configured a transaction called purchase and you want to trigger a rule whenever the amount field of the purchase transaction is greater than $1000 and country is in the list of High Risk countries (that you have configured).

Dollar amounts must be integer values.

For achieving this, you must use this rule with two filter conditions: one for checking if the amount field is greater than 1000 and the second filter condition for checking if the country of the current session is in the list of High Risk countries.

You can use this condition to specify up to six (6) filter conditions on the current transaction.

B.8.4 Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions

General information about the Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions condition is provided in the following table.

Table B–143 Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions

Condition	Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions
Description	Check to see whether consecutive transactions in a given duration satisfy the specified filter conditions
Prerequisites	■ Transactions should be defined ■ Transaction type of the current transaction should be same as the transaction type specified in the rule condition ■ Ensure that you are using 10.1.4.5.2 or later.
Assumptions	
Available since version	10.1.4.5.2
Checkpoints	All checkpoints.

Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions Parameters

The following table summarizes the parameters in the Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions condition.

Table B–144 Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Duration	Duration Descriptor		No
Select transaction Status Group	Group of Transaction Statuses that should be considered. If no group is specified then Transaction Status is ignored in the query.		Yes
Ignore Current Transaction in count?	Flag to indicate if the current transaction must be ignored		
for the same user?	Flag to indicate if only transactions belonging to the current user to be counted. If this flag is false then transactions irrespective of users will be considered.		No
Allow gaps in transactions during checks?	Flag to indicate if gaps are allowed while checking for conditions. If this value is TRUE then gaps would be allowed while checking for conditions.		No
No of transactions to check for 1st set of conditions	Number of transactions that should satisfy the 1st check. Specify positive integers.		No
Filter Key 101 Filter Key 102 Filter Key 103 Filter Key 104 Filter Key 105 Filter Key 106	Filter Keys for 1st check. These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		Yes
Filter Condition 101 Filter Condition 102 Filter Condition 103 Filter Condition 104 Filter Condition 105 Filter Condition 106	Filter Conditions for 1st check. These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Table B–144 (Cont.) Transaction: Check if Consecutive Transactions in Given Duration Satisfy the Filter Conditions Parameters

Parameter	Description	Possible Values	Can be Null?
No of transactions to check for 2nd set of conditions	Number of transactions that should satisfy the 2nd check. Specify positive integers.		No
Filter Key 201 Filter Key 202 Filter Key 203 Filter Key 204 Filter Key 205 Filter Key 206	Filter Keys for 2nd check. These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		
Filter Condition 201 Filter Condition 202 Filter Condition 203 Filter Condition 204 Filter Condition 205 Filter Condition 206	Filter Conditions for 2nd check. These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on checks that are satisfied on consecutive transactions in a given duration.

For example, you configured a transaction called purchase and want to trigger a rule if the current/last transaction amount is greater than $1000 and there were at least 3 transactions before that where the amount was less than $10.

So, the rule is looking at the last 4 transactions and checking for a fraud pattern of small transactions first and then a big transaction.

Configure a rule with this rule condition and select the appropriate transaction type.

1. Select the number of transactions for the first check as `1` and select the condition to check as "Amount" "Greater Than" 1000, since you want to check only one transaction for the large amount.
2. Select the number of transactions for the second check as "3" and select the condition to check as "Amount" "Less Than" 10, since you want to check 3 transactions for smaller amounts.
3. If you want to allow other transactions in between the checks for the first check and the second check, select "Allow Gaps in Transactions during checks?" as TRUE otherwise select FALSE.

B.8.5 Transaction: Check Number of Times Entity Used in Transaction

General information about the Transaction: Check Number of Times Entity Used in Transaction condition is provided in the following table.

Table B–145 Transaction: Check Number of Times Entity Used in Transaction

Condition	Transaction: Check Number of Times Entity Used in Transaction
Description	Compares the number of times an entity used has been used with the specified count.
Prerequisites	▪ Transactions should be defined ▪ Transaction type of the current transaction should be same as the transaction type specified in the rule condition
Assumptions	
Available since version	11.1.2.0
Checkpoints	All Checkpoints.

Transaction: Check Number of Times Entity Used in Transaction Parameters

The following table summarizes the parameters in the Transaction: Check Number of Times Entity Used in Transaction condition.

Table B–146 Transaction: Check Number of Times Entity Used in Transaction Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Select Transaction Entity to count	Select the entity/element to be counted. Only distinct values will be counted		No
Specified Condition	Specified Condition		No
Specified Count	Count value to check. Specify only valid positive integers.		No
Duration	Specify the duration during which the transactions must be counted. Duration descriptor widget renders the user interface for specifying the duration.		No
Transaction Status	Specify the transaction status that must be considered for counting. If you want to consider all transactions regardless of their status then don't specify any status		Yes
Ignore Current Transaction in count?	Flag to indicate if the current transaction must be ignored		Yes

Example Usage

This condition can be used whenever you want to trigger a rule based on the number of times the same entity has been used over a specified time period.

For example, you have configured a transaction called purchase and you want to trigger if a credit card is used more than 10 times in one day.

To achieve this, select `Credit card` as the element to be counted and select 1st duration as `1 calendar day`.

Then select comparison condition as `Greater than` and the specified count as `10`.

B.8.6 Transaction: Check Transaction Aggregrate and Count Using Filter Conditions

General information about the `Transaction: Check Transaction Aggregrate and Count Using Filter Conditions` condition is provided in the following table.

Table B–147 Transaction: Check Number of Times Entity Used in Transaction

Condition	Transaction: Check Transaction Aggregrate and Count Using Filter
Description	Check the aggregrate of a numeric field and transaction count. You can specify the criteria for transaction to be counted using the filter conditions (up to 6 conditions) and you can also specify the other parameters like duration to be considered and the transaction status to consider and so on.
Prerequisites	Transactions should be defined. Transaction type of the current transaction should be same as the transaction type specified in the rule condition
Assumptions	Aggregrate can be applied only on numeric fields. So the transaction definition should have at least one numeric field.
Available since version	10.1.4.5.1
Checkpoints	All checkpoints.

Transaction: Check Transaction Aggregrate and Count Using Filter Conditions Parameters

The following table summarizes the parameters in the `Transaction: Check Transaction Aggregrate and Count Using Filter Conditions` condition.

Table B–148 Transaction: Check Transaction Aggregrate and Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Select the aggregate function	Aggregrate function to check. Available functions are sum, min, max, avg		
Select Entity or Element to count	Numeric element on which aggregrate check must be performed. It represents fully qualified key of the numeric field. This is specified using list box that has list of all numeric data fields.		No
Specified Condition for Aggregate	Operator to be applied for the aggregrate condition. Specify greater than, greater than or equals, less than, less than or equals		No
Specified Check Value for Aggregate	Aggregrate numeric value to check		No
Specified Condition For Count	Operator to be applied for the count condition. Specify greater than, greater than or equals, less than, less than or equals		Yes
Specified Check Value for Count	Transaction count numeric value to check		Yes

Table B–148 (Cont.) Transaction: Check Transaction Aggregrate and Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Duration	Specify the duration during which the transactions must be counted. The duration descriptor enables you to specify the duration.		No
Transaction Status	Specify the transaction status that must be considered for counting. If you want to consider all transactions regardless of their status, do not specify any status		Yes
Ignore Current Transaction in count?	Specify if you want to ignore current transaction (if any) in the count. If there are multiple transactions and if this is specified as true, only the last transaction is ignored.		Yes
for the same user?	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes

Table B–148 (Cont.) Transaction: Check Transaction Aggregrate and Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Apply the filter checks on Current Transaction	Specify if you want to check the filter conditions on the current transaction before performing the count. If the filter conditions fail on the current transaction then the rule condition is evaluated to false without performing the count.		
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. The left hand side represents the fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute.		
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. The operator and the right hand side represent the fully qualified key of the filter condition. The right hand side is the value, which could be a simple value, the value of the current transaction, or a group. ■ Value: A simple value that is entered into a field ■ Current: A value from the current transaction. A value is selected from a list of values based on the current entities. ■ Group: Group is automatically selected if you chose the condition as IN or NOT IN. After Group is selected, you will have to select a type of group. Then, based on type, a list box appears with other values to select from, and so on.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on an aggregrate of a transaction numeric value and transaction count.

This is designed to reduce the number of conditions since you can specify checks for both aggregrate and count in a single condition

For example, suppose you have configured a transaction called purchase and you want to challenge if a user is performing a lot of purchases (for example, more than 2 per hour with average amount that is greater than 500) from a high-risk country.

For achieving this, you must use this rule with the following:

1. Specify Aggregrate condition as `Average`.
2. Specify Aggregrate value to check as `500`.

3. Specify Count condition as `Greater Than Equals`.
4. Specify Count to check as `2`.
5. Specify the duration with duration type as rolling and duration as 1 hour.
6. Specify false for `Ignore Current Transaction in count?` since you want to consider current transaction in the count.
7. Specify `true` for `Apply the filter checks on Current Transaction`.
8. One filter condition: for checking if the country of the current session is in the list of High Risk countries.

You can use this condition to specify up to six (6) filter conditions that are applied on transactions that are considered for counting

B.8.7 Transaction: Check Transaction Count Using Filter Condition

General information about the `Transaction: Check Transaction Count Using Filter` condition is provided in the following table.

Table B–149 System - Check String Property Parameters

Condition	Transaction: Check Transaction Count Using Filter
Description	Check the transaction count with a specified value. You can specify the criteria for the transaction to be counted using the filter conditions (up to 6 conditions) and you can also specify the other parameters like the duration to be considered and the transaction status to consider and so on.
Prerequisites	▪ Transactions should be defined. ▪ Transaction type of the current transaction should be same as the transaction type specified in the rule condition
Assumptions	If there are multiple transactions in the current session, then this condition is applied on the last transaction
Available since version	10.1.4.5.1
Checkpoints	All checkpoints.

Transaction: Check Transaction Count Using Filter Parameters

The following table summarizes the parameters in the `Transaction: Check Transaction Count Using Filter` condition.

Table B–150 Transaction: Check Transaction Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to count	Transaction type of the transaction to be counted. It represents the Transaction Definition fully qualified key. This is specified using the list box that has the list of transaction definitions		No
Specified Condition For Count	Operator to be applied for the count condition. Specify greater than, greater than or equals, less than, less than or equals		No
Specified Check Value for Count	Transaction count numeric value to check		No

Table B–150 (Cont.) Transaction: Check Transaction Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Duration	Specify the duration during which the transactions must be counted. The duration descriptor enables you to specify the duration.		No
Transaction Status	Specify the transaction status that must be considered for counting. Do not specify any status if you want to consider all transactions regardless of their status.		Yes
Ignore Current Transaction in count?	Specify if you want to ignore the current transaction (if any) in the count. If there are multiple transactions and if this is specified as true, only the last transaction is ignored.		Yes
for the same user?	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes

Table B–150 (Cont.) Transaction: Check Transaction Count Using Filter Parameters

Parameter	Description	Possible Values	Can be Null?
Apply the filter checks on Current Transaction?	Specify if you want to check the filter conditions on the current transaction before performing the count. If the filter conditions fail on the current transaction, then the rule condition is evaluated to false without performing the count.		
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. The left hand side represents the fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. The operator and the right hand side represent the fully qualified key of the filter condition. The right hand side is the value, which could be a simple value, the value of the current transaction, or a group. ■ Value: A simple value that is entered into a field ■ Current: A value from the current transaction. A value is selected from a list of values based on the current entities. ■ Group: Group is automatically selected if you chose the condition as IN or NOT IN. After Group is selected, you will have to select a type of group. Then, based on type, a list box appears with other values to select from, and so on.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on transaction count condition.

For example, suppose you have configured a transaction called `Purchase` and you want to challenge the user if the user is performing a large number of purchases (for example more than 2 per hour with amount greater than 1000 for each purchase) from a high risk country, you may want to use this condition.

For achieving this, you must use this rule with the following:

1. Specify `Specified Condition For Count` as `Greater Than Equals`.
2. Specify Count to check as 2.

3. Specify the `Duration` with duration type as rolling and duration as 1 hour.
4. Specify `false` for `Ignore Current Transaction in count?` since you want to consider the current transaction in count.
5. Specify `true` for `Apply the filter checks on Current Transaction?`.
6. Configure two filter conditions:
   - One for checking if the amount field is greater than 1000.
   - Another for checking if the country of the current session is in the list of High Risk countries.

You can use this condition to specify up to six (6) filter conditions that are applied on transactions that are considered for counting.

B.8.8 Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations

General information about the `Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations` condition is provided in the following table.

Table B–151 Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations

Condition	Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations
Description	Compare transactions aggregrates across two different durations
Prerequisites	■ Transactions should be defined ■ Transaction entity/data field that must be aggregrated should be of type numeric ■ Transaction type of the current transaction should be same as the transaction type specified in the rule condition ■ Ensure that you are using 10.1.4.5.2 or later.
Assumptions	
Available since version	10.1.4.5.2
Checkpoints	All checkpoints.

Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations Parameters

The following table summarizes the parameters in the `Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations` condition.

Table B–152 Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Select the aggregate function	Aggregrate function that must be used		No
Select Entity or Element to count	Transaction Entity/Data Element that must be aggregrated		No

Table B–152 (Cont.) Transaction: Compare Transaction Aggregrates (Sum/Avg/Min/Max) Across Two Different Durations Parameters

Parameter	Description	Possible Values	Can be Null?
Specify Duration for the 1st Aggregate	Select duration for the first aggregrate		No
Specify Duration for the 2nd Aggregate	Select duration for the second aggregrate		No
Select Comparison Condition to compare 1st aggregate with 2nd aggregate	Comparison condition		No
Multiplier for 2nd Aggregate	Multiplier value for the second aggregrate. Only nonzero and null values will be considered		Yes
Ignore Current Transaction in Aggregate?	Flag to indicate if the current transaction must be ignored		No
for the same user?	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes
Specify condition for count	Condition for the count check. Select only valid operators that are relevant to numeric values		No
Specified value for count	Count value to check. Specify only valid positive integers.		No
Apply the filter checks on Current Transaction?	Flag to indicate if the filter conditions have to validated on current transaction before doing the count		No
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on the comparison of aggregrates of a transaction entity/data element across two different durations.

For example, you configured a transaction called `Purchase` and want to trigger if the sum of the transaction amount for the current day is 20% more than the sum of all transactions amount of the previous day for that user.

To achieve this:

1. Select the `Amount` as the element to be aggregrated and `Sum` as the aggregrate function.
2. Then, select first duration as `1 calendar day` and the second duration as `1 calendar day before 1 day`.
3. Then select the comparison condition as `Greater than` and multiplier value as `1.2` (100%+20%).

B.8.9 Transaction: Compare Transaction Counts Across Two Different Durations

General information about the `Transaction: Compare Transaction Counts Across Two Different Durations` condition is provided in the following table.

Table B–153 Transaction: Compare Transaction Counts Across Two Different Durations

Condition	Transaction: Compare Transaction Counts Across Two Different Durations
Description	Compare transactions counts across two different durations
Prerequisites	▪ Transactions should be defined ▪ Transaction type of the current transaction should be same as the transaction type specified in the rule condition ▪ Ensure that you are using 10.1.4.5.2 or later.
Assumptions	
Available since version	10.1.4.5.2
Checkpoints	All checkpoints.

Transaction: Compare Transaction Counts Across Two Different Durations Parameters

The following table summarizes the parameters in the `Transaction: Compare Transaction Counts Across Two Different Durations` condition.

Table B–154 Transaction: Compare Transaction Counts Across Two Different Durations Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction to check	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions		No
Specify Duration for the 1st count	Select duration for the first count		No
Specify Duration for the 2nd count	Select duration for the second count		No
Select Comparison Condition to compare 1st count with 2nd count	Comparison condition		No
Multiplier for 2nd count	Multiplier value for the second aggregrate. Only nonzero and null values will be considered		Yes
Ignore Current Transaction in count?	Flag to indicate if the current transaction must be ignored		No

Table B–154 (Cont.) Transaction: Compare Transaction Counts Across Two Different Durations

Parameter	Description	Possible Values	Can be Null?
for the same user?	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes
Specify condition for count	Condition for the count check. Select only valid operators that are relevant to numeric values		No
Specify value for count	Count value to check. Specify only valid positive integers.		No
Apply the filter checks on Current Transaction?	Flag to indicate if the filter conditions have to validated on current transaction before doing the count		No
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on the comparison of transaction counts across two different durations.

For example, you configured a transaction called `Purchase` and want to trigger the rule if the number of transactions for the current day is 20% more than the number of all transactions of the previous day for that user.

To achieve this:

1. Select the first duration as `1 calendar day` and the second duration as `1 calendar day before 1 day`.
2. Then, select the comparison condition as `Greater than` and multiplier value as `1.2 (100%+20%)`.

B.8.10 Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations

General information about the `Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations` condition is provided in the following table.

Table B–155 Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations

Condition	Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations
Description	Compare transaction entity/element counts across two different durations
Prerequisites	■ Transactions should be defined ■ Transaction type of the current transaction should be same as the transaction type specified in the rule condition ■ Ensure that you are using 10.1.4.5.2 or later.
Assumptions	
Available since version	10.1.4.5.2
Checkpoints	All checkpoints.

Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations Parameters

The following table summarizes the parameters in the `Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations` condition.

Table B–156 Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations Parameters

Parameter	Description	Possible Values	Can be Null?
durationDescriptorFor1stDuration	Select duration for the first count		No
durationDescriptorFor2ndDuration	Select duration for the second count		No
comparisonConditionEnum	Comparison condition		No
multiplierFor2ndDurationValue	Multiplier value for the second aggregrate. Only nonzero and null values will be considered		Yes
forTheSameCurrentUserId	Boolean flag to indicate whether only transactions belonging to the current user to be counted or not		Yes
ignoreCurrentTransactionInCount	Flag to indicate if the current transaction must be ignored		No
specifiedConditionEnumForCount	Condition for the count check. Select only valid operators that are relevant to numeric values		No
specifiedValueForCount	Count value to check. Specify only valid positive integers.		No

Table B–156 (Cont.) Transaction: Compare Transaction Entity/Element Counts Across Two Different Durations Parameters

Parameter	Description	Possible Values	Can be Null?
applyFilterOnCurrentTransaction	Flag to indicate if the filter conditions have to validated on current transaction before doing the count		No
Filter Key 1 Filter Key 2 Filter Key 3 Filter Key 4 Filter Key 5 Filter Key 6	These parameters specify the left hand side of the filter conditions. It represents fully qualified key of the transaction field. This field could be an entity field or data field or transaction attribute or request attribute. Note: There is a widget for this that renders list box with all the data fields.		Yes
Filter Condition 1 Filter Condition 2 Filter Condition 3 Filter Condition 4 Filter Condition 5 Filter Condition 6	These parameters represent the operator and right hand side of the filter condition. It represents fully qualified key of the filter condition. Note: There is a widget for this that renders the list box of operators and a way to specify simple value or group name (in case of IN or NOT IN operator) or select another field in the transaction.		Wherever the filterKey is specified, appropriate condition must be specified

Example Usage

Use this condition when you want to trigger a rule based on the comparison of any transaction entity/element counts across two different durations.

For example, you configured a transaction called `Purchase` and want to trigger if the number of distinct credit cards used in the current day is 20% more than the number of distinct credit cards used on the previous day for that user.

To accomplish this:

1. Select `Credit card` as the element to be counted and select the first duration as `1 calendar day` and the second duration as `1 calendar day before 1 day`.
2. Then, select the comparison condition as `Greater than` and the multiplier value as `1.2 (100%+20%)`.

B.8.11 Transaction: Check Unique Transaction Entity Count with the Specified Count

General information about the `Transaction: Check Unique Transaction Entity Count with the Specified Count` condition is provided in the following table.

Table B–157 Transaction: Check Unique Transaction Entity Count with the Specified Count

Condition	Transaction: Check Unique Transaction Entity Count with the specified count
Description	Check Unique Transaction Entity Count with the specified count
Prerequisites	▪ Transactions should be defined ▪ Transaction type of the current transaction should be same as the transaction type specified in the rule condition
Assumptions	
Available since version	10.1.4.5
Checkpoints	All checkpoints.

Transaction: Check Unique Transaction Entity Count with the Specified Count Parameters

The following table summarizes the parameters in the `Transaction: Check Unique Transaction Entity Count with the Specified Count` condition.

Table B–158 Transaction: Check Unique Transaction Entity Count with the Specified Count Parameters

Parameter	Description	Possible Values	Can be Null?
Select Transaction	Transaction Definition fully qualified key. This is specified using list box that has list of transaction definitions	Select one from list presented on the screen	No
Select Transaction Entity to count	Select the entity/element to be counted. Only distinct values will be counted		No
Specified Condition	Specified condition	Select from drop down list.	No
Duration	Specify the duration during which the transactions must be counted. The duration descriptor field shows types of durations you can choose from in the user interface.	Select from list.	No
Transaction Status	This parameter specifies the transaction status to consider for counting. To consider all transactions regardless of their status, do not specify any status	Enumeration from list Enumeration element of tracker.transaction.status.enum	Yes
For the same user?	This parameter specifies whether to evaluate the condition for the current users	Boolean. True or False	No
Ignore Current Transaction in count?	Flag to indicate if the current transaction must be ignored		Yes

Example Usage

This condition can be used whenever you want to trigger a rule based on the number of times the same entity has been used over a specified time period.

For example, you have configured a transaction called `Purchase` and you want to trigger if a credit card is used more than 10 times in one day by the same user. To achieve this, proceed as follows:

1. Select `Credit card` as the element to be counted and select 1st duration as `1 calendar day`. Note: You must have the Credit card entity configured.
2. Select `For the same user` as `true`.
3. Then select the comparison condition as `Greater than` and the specified count as `10`.
4. Set `Transaction Status` to `Success`.
5. Select `Ignore Current Transaction in count?` to `true`, so that your current transaction will not be counted.

B.9 User Conditions

The user conditions are documented in this section.

B.9.1 User: Stale Session

General information about the User: Stale Session condition is provided in the following table.

Table B–159 User: Stale Session

Condition	User: Stale Session
Description	Verify if a newer session is established after this session is created
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoint	All checkpoints.

Example Usage

This condition can be used whenever you want to determine whether the user has established a successful login from another channel while this authentication is in progress (concurrency check). The OAAM Session ID is checked. For example, you can configure your rules so that an action occurs when a user logs in and gets a Session ID and a fraudster logs in with the same ID and gets a new Session ID (the user is on the old session and the fraudster creates a new session).

B.9.2 User: Devices Used

General information about the `User: Devices Used` condition is provided in the following table.

Table B–160 User: Check User Data

Condition	User: Devices Used
Description	Number of devices tried in a given time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

User: Devices Used Parameters

The following table summarizes the parameters in the `User: Devices Used` condition.

Table B–161 User: Check User Data Parameters

Parameter	Description	Possible Value	Can be Null?
Number of devices	Provide the number of devices to be compared with the devices to be found for the user.	[Integer] The default is `0`. Provide a positive integer number. (>=0)	No
Within Duration (seconds)	Users session history look-back period in seconds.	[Integer] The default is `3600`. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No

Example Usage

This condition can be used whenever you want to check if the user is using too many devices in certain time period immediately preceding this request.

For example, you want to restrict users to use only N number of devices in last 24 hours.

To achieve this, you must use this condition in a rule.

1. Configure `Number of devices` to be "N-1".
2. Configure `Within Duration (seconds)` to be `86400`.
3. Run authentications with the registered users and you can see the rule triggering when they have used "N" devices within last 24 hours.

B.9.3 User: Check If Devices Of Certain Type Are Used

General information about the `User: Check If Devices Of Certain Type Are Used` condition is provided in the following table.

Table B–162 User: Check If Devices Of Certain Type Are Used

Condition	User: Check If Devices of a Certain Type are Used
Description	Number of devices of given type used in given time.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	11.1.2.0.0
Checkpoints	All Checkpoints.

User: Check If Devices Of Certain Type Are Used Parameters

The following table summarizes the parameters in the `User: Check If Devices Of Certain Type Are Used` condition.

Table B–163 User: Check If Devices Of Certain Type Are Used Parameters

Parameter	Description	Possible Value	Can be Null?
Number of devices	Compare operator for number of actual devices found of given type and the number configured in this condition.	[enumeration] The default is `More Than`. Possible values are More than equal to, Less than, Less than Equal to, Equal to, Not equal to	No
Number of devices to compare	Provide the number of devices to be compared with the devices to be found for the user.	[Integer] The default is `0`. Provide a positive integer number. (Greater than or equal to 0)	No
Device of type	Select Device type to look for.	[Enumeration] The default is `Mobile Device`. Other possible value is Desktop Device	No
Within Duration (seconds)	Time period in seconds to look back into users session history.	[Integer] The default is 3600. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No

Example Usage

This condition can be used whenever you want to check if the user is using too many devices of certain type in certain time period immediately preceding this request. For example, lets say you want to restrict users to use only N number of mobile devices in last 24 hours.

To achieve this, you must use this condition in a rule.

1. Configure `Number of devices to compare` as `Greater Than`. Configure the `Number of Devices` as *N-1*.
2. Configure `Devices of type` as `Mobile Device` and configure `Within Duration (seconds)` as `86400`.
3. Run authentications with the registered users and you can see the rule triggering when they have used "N" devices within last 24 hours.

B.9.4 User: Check Number of Registered Devices Of Given Type

General information about the `User: Check Number of Registered Devices Of Given Type` condition is provided in the following table.

Table B–164 User: Check Number of Registered Devices Of Given Type

Condition	User: Check Number of Registered Devices Of Given Type
Description	Number of registered devices of given type.
Prerequisites	None for the condition as such, but you must have the rule configured with this condition to experience the behavior.
Assumptions	
Available since version	11.1.2.0.0
Checkpoints	All Runtimes.

User: Check Number of Registered Devices Of Given Type Parameters

The following table summarizes the parameters in the `User: Check Number of Registered Devices Of Given Type` condition.

Table B–165 User: Check Number of Registered Devices of Given Type Parameters

Parameter	Description	Possible Values	Can be Null?
Compare Number Of Devices	Compare operator for number of actual registered devices found of given type and the number configured in this condition	[enumeration] The default is More Than. More Than Equal To, Less Than, Less That Equal To, Equal To, Not Equal To	No
Number of (registered) devices to compare	Number of devices to compare.	[Integer] The default is 4. Provide a positive number. I this number is less than zero the condition will always evaluate to false.	No
Device of Type	Select Device type to look for.	[Enumeration] The default is `Mobile Device`. Other possible value is Desktop Device	No

Example Usage

This condition can be used whenever you want to check if the user has too many devices registered.

For example, you want to restrict users to use only N number of registered mobile devices.

To achieve this, you must use this condition in a rule.

1. Configure the `Compare Number of Devices` operator of this condition as `Greater Than`. Configure `Number of (registered) devices to compare` as 4.
2. Configure `Devices of type` as `Mobile Device`.
3. Run a few authentications with the registered users from a new device every time (clear cookies) you register those devices for the user.

When the user has 5 devices registered and comes in from either a new or an existing device, the rule will be triggered.

B.9.5 User: Velocity from Last Success

General information about the `User: Velocity from Last Success` condition is provided in the following table.

Table B–166 User: Velocity from Last Success

Condition	User: Velocity from Last Success
Description	Condition evaluates to check to see if ■ The user's login was successful earlier, and ■ The velocity in miles per hour is more than the specified value, and ■ The user belongs to the same Device ID
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

B.9.6 User: Velocity from Last Successful Login

General information about the `User: Velocity from Last Successful Login` condition is provided in the following table.

Table B–167 User: Velocity from Last Success

Condition	User: Velocity from Last Success
Description	Condition evaluates to check to see if ■ The user's login was successful earlier, and ■ The velocity in miles per hour is more than the specified value, and ■ The user belongs to the same IP group
Prerequisites	You must have a rule configured with this condition to experience the behavior. There should be a list of IP groups already. A geolocation database is needed if you want this condition to return more accurate outcomes; otherwise all IPs are shown as Private and the condition will be a default value such as False. The condition will work without geolocation, but it would not be useful. Outcome is more accurate if there is geolocation data.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

User: Velocity from Last Successful Login Parameters

The following table summarizes the parameters in the `User: Velocity from Last Successful Login` condition.

Table B–168 User: Velocity from Last Success Parameters

Parameter	Description	Possible Values	Can be Null?
Miles per Hour is more than	Maximum number to watch for in the ratio of the distance traveled (in miles) to the time spent traveling (in hours)	Positive integer with a default of 60	No
Ignore if last login device is same	Ignore the condition if the login is from the same device.	Default is true True will return null during condition evaluation if more than one successful login of the same user from the same Device ID. If the same user has a different Device ID associated with the login, then this will not return null and an alert/action occurs. False ignores the parameter and condition evaluates only based on miles per hour.	No
Ignore IP Group	IP group to be ignored for this condition This is a list of groups that contain IP groups. The Conditions tab of the rule displays a drop-down list of IP address groups. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.	IP group created through Group editor. Examples are OAAM Restricted IPs and OAAM Risky IPs.	Yes

The condition evaluates if the user's login was successful earlier and the velocity in miles per hour is more than specified value and the user has the same Device ID. If there are multiple logins of the same user from the same device then parameter "ignore if last login device is same" is used. In order to return null from this condition, there must be multiple logins that are successful from the same user who has the same Device ID. Location database is used to determine the location of the user for this login and previous login.

True for "Ignore if last login device is same" will return null during condition evaluation if more than one successful login of the same user from the same Device ID. If the same user has a different Device ID associated with the login, then this will not return null and an alert/action occurs. False ignores the parameter and condition evaluates only based on miles per hour.

This Ignore IP Group parameter allows you to specify a list of IPs to ignore. If the user's IP belongs to the list of IPs (the IP group), then this condition always evaluates to false and no action and/or alert is triggered. If the user's IP is not in that list or if the list is null or empty, then the condition evaluates the velocity of the user from the last login. If the velocity of the user from the last login is more than the configured value in the rule, the condition evaluates to true and the condition is triggered.

Use this condition if you have a requirement that an evaluation be performed based on the physical distance between the location a user is logging in from now versus the last location he logged in from and the velocity/speed required to travel between the locations given the time if the device used is different.

1. Create a policy and add a User Velocity rule with the condition, User: Velocity from last successful login.

2. Enter a number for **Miles per Hour is more than**. For example, 500.
3. Select **True** for **Ignore if last login device is same**.
4. Add a KBA challenge as a result of the User Velocity rule.

For more information on group creation, see Chapter 12, "Managing Groups."

B.9.7 User: Velocity from Last Successful Login within Limits

General information about the `User: Velocity from Last Successful Login within Limits` condition is provided in the following table.

Table B–169 User: Velocity from Last Successful Login within Limits

Condition	User: Velocity from Last Successful Login within Limits
Description	This condition triggers when velocity from last successful login is within specified limits
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Velocity from Last Successful Login within Limits Parameters

The following table summarizes the parameters in the `User: Velocity from Last Successful Login within Limits` condition.

Table B–170 User: Velocity from Last Successful Login within Limits Parameters

Parameter	Description	Possible Values	Can be Null?
Velocity above or equal	Lower bound of the distance traveled.	Default is 100	No
And below or equal	Upper bound of the distance traveled.	Default is 300	No
Then, trigger	If `then trigger` is True, the rule triggers if the condition is met. If `then trigger` is `False`, the rule condition will trigger only if the condition is not met.	Default is True	No
Ignore if last login device is same	If last login device is the same, do not perform any action	Default is True	No

It is possible for a user to log in to their application, then board a Jet and fly to another city and once again log in to the same application.

1. The Rule first picks up the last successful login in last N seconds. (If there are multiples then the last one (with the highest timestamp) will be picked.
2. The Rule looks at cityLastLogin and currentCurrentLogin and finds the distance between them which is equal to the distance.
3. Then calculates thisDistance divided by the difference in login times. That becomes the velocityCalculated.

4. If velocityCalculated is more than velocityConfigured in the rule (from the UI) then the rule will trigger.

B.9.8 User: Distance from Last Successful Login

General information about the `User: Distance from Last Successful Login` condition is provided in the following table.

Table B–171 User: Distance from Last Successful Login

Condition	User: Distance from Last Successful Login
Description	Distance from last successful login within specified time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Distance from Last Successful Login Parameters

The following table summarizes the parameters in the `User: Distance from Last Successful Login` condition.

Table B–172 User: Distance from Last Successful Login Parameters

Parameter	Description	Possible Values	Can be Null?
Miles more than	Maximum number of miles to watch for. If the number of miles exceeds this number, then the condition will evaluate to true.	Default is 300	No
Within Duration (seconds)	Time period in seconds to look back into users session history. Seconds elapsed	[Integer] The default is 3600. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No

B.9.9 User: Distance from Last Successful Login within Limits

General information about the `User: Distance from Last Successful Login within Limits` condition is provided in the following table.

Table B–173 User: Distance from Last Successful Login within Limits

Condition	User: Distance from Last Successful Login within Limits
Description	Checks if distance from last successful login within specified time is within limits
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Distance from Last Successful Login within Limits Parameters

The following table summarizes the parameters in the `User: Distance from Last Successful Login within Limits` condition.

Table B–174 Distance from Last Successful Login within Limits Parameters

Parameter	Description	Possible Values	Can be Null?
in past (seconds)	Seconds elapsed	Default is 3600	No
Distance above or equal	Lower limit of distance value	Default is 100	No
And below or equal	Upper limit of distance value	Default is 300	No
Then, trigger	If `then trigger` is true, the rule triggers if the condition is met. If `then trigger` is `False`, the rule condition will trigger only if the condition is not met.	Default is True	No

B.9.10 User: Authentication Image Assigned

General information about the `User: Authentication Image Assigned` condition is provided in the following table.

Table B–175 User: Authentication Image Assigned

Condition	User: Authentication Image Assigned
Description	Checks if authentication image is assigned to the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Authentication Image Assigned Parameters

The following table summarizes the parameters in the `User: Authentication Image Assigned` condition.

Table B–176 User: Authentication Image Assigned

Parameter	Description	Possible Values	Can be Null?
Is assigned	Checks if the condition should return true or false if the authentication image is assigned to the user.	**True**/false	No

If you want the user to register an image, use this condition to check if the user has already registered an image. If an image has not been registered, an action may be taken such as forcing the user to register an image. If an image is registered, an action might be taken such that the authentication image is displayed in an assisted page.

As standard, the default OAAM rules are in place so that if the user registered an image, the virtual authenticator with authentication image is displayed in an OAAM Server page.

B.9.11 User: Authentication Mode

General information about the `User: Authentication Mode` condition is provided in the following table.

Table B–177 User: Authentication Mode

Condition	User: Authentication Mode
Description	Check user authentication mode
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Authentication Mode Parameters

The following table summarizes the parameters in the `User: Authentication Mode` condition.

Table B–178 User: Authentication Mode Parameters

Parameter	Description	Possible Values	Can be Null?
Authentication mode is	Authentication mode of the user. For example, the condition checks if the authentication mode of the user is "Full KeyPad"	The authentication values are from the auth.client.type.enum property. For example, possible values can be: ■ Full KeyPad ■ TextPad	No

The condition checks the authentication mode of the user, for example, Textpad or Full Keypad. If you have an option to upgrade from Textpad to Keypad, this is the condition used to check the state.

B.9.12 User: Status Count Timed

General information about the `User: Status Count Timed` condition is provided in the following table.

Table B–179 User: Status Count Timed

Condition	User: Status Count Timed
Description	User attempted multiple logins in specified time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Status Count Timed Parameters

The following table summarizes the parameters in the `User: Status Count Timed` condition.

Table B–180 User: Status Count Timed Parameter

Parameter	Description	Possible Values	Can be Null?
Authentication status is	Authentication status.	Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	No
Within Minutes	This parameter defines the period in which the login attempts that the user made are counted.	Default is 30	No
for more than	Maximum number of logins to watch for. If the login count exceeds this number within minutes with a certain authentication status, then the condition will evaluate to true.	Default is 3	No

B.9.13 User: Challenge Timed

General information about the `User: Challenge Timed` condition is provided in the following table.

Table B–181 User: Challenge Timed

Condition	User: Challenge Timed
Description	Checks if user answered challenge question successfully in last n minutes
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Timed Parameters

The following table summarizes the parameters in the `User: Challenge Timed` condition.

Table B–182 User: Challenge Timed

Parameter	Description	Possible Values	Can be Null?
Is	This is a boolean parameter that defines a default return value if user answered challenge question successfully in last n minutes.	Default is True	No
Within Minutes	This parameter defines the period in which the challenge questions that were answered correctly are counted.	Default is 30	No

B.9.14 User: Challenge Channel Failure

General information about the `User: Challenge Channel Failure` condition is provided in the following table.

Table B–183 User: Challenge Channel Failure

Condition	User: Challenge Channel Failure
Description	If a user has a failure counter value over a specified value from specific channel. The total number of challenge failures a user is allowed before an action occurs that is configured in this rule condition.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Channel Failure Parameters

The following table summarizes the parameters in the `User: Challenge Channel Failure` condition.

Table B–184 User: Challenge Channel Failure

Parameter	Description	Possible Values	Can be Null?
Challenge Channel	The challenge rule action for challenging the user; whether or not customer care asks the challenge question or it is a challenge by online method Value is from tracker.challenge.channel.enum.	Possible values are Online (Online challenge channel) and Cases (Customer care challenge channel)	No
Current Question Count only?	Count failures for current KBA challenge questions only or for all KBA challenge questions.	Default is False For example, does the user make 3 or 4 attempts for the current question or does the user can make 3 or 4 attempts counting the current question along with the previous questions?	No
Failures greater than or equal to	Number of failures	Default is 3	No

This condition is used to check if the user has been asked the question a certain number of times for a challenge channel, and if the failure counter value is over a specified value, the rule triggers to take an action, such as proceeding to the next question.

An example scenario could be the following:

For the Online Counter: If the user is answering challenge questions online, and if the user is given a maximum of three attempts to provide a correct answer, one attempt per question, each failure to answer a question increments the Online Counter. An action could be for the user to be locked out of the session after three failures.

For the Phone Counter: If the CSR is asking the user challenge questions by phone, and if the user is given a maximum of three attempts per question, a total of nine attempts is allowed. The user is advanced to the next question after three attempts in answering the current question. Each failure to answer the question increments the Phone Counter. An action could be for the user to be locked out of the session after three failures (nine attempts).

B.9.15 User: Challenge Questions Failure

General information about the `User: Challenge Questions Failure` condition is provided in the following table.

Table B–185 User: Challenge Questions Failure

Condition	User: Challenge Questions Failure
Description	Checks how many questions have failures. This condition checks for the total number of failures without the options to count the failure for the current question only or specify the challenge channel used.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Questions Failure Parameters

The following table summarizes the parameters in the `User: Challenge Questions Failure` condition.

Table B–186 User: Challenge Questions Failure

Parameter	Description	Possible Values	Can be Null?
Failures more than or equal to	Maximum number of failures to watch for. If the failure count exceeds this number, then the condition will evaluate to `true`.	Default is 1	No

Use this condition if you are using KBA questions, and you want to check the number of failures the user has, triggering the rule if the user has failed to answer multiple challenge questions.

If the user answers the KBA question incorrectly, he is allowed other attempts until he either answers correctly or the maximum number of failures is reached and the rule triggers. An action that results when the rule triggers could be that he is locked out of his account. In the OAAM-server based policies, the user is allowed three attempts total to provide the correct answer. If there are more than three failed attempts, the rule triggers.

B.9.16 User: Challenge Failure - Minimum Failures

General information about the `User: Challenge Failure - Minimum Failures` condition is provided in the following table.

Table B–187 User: Challenge Failure - Minimum Failures

Condition	User: Challenge Failure - Minimum Failures
Description	If a user has a failure counter value over a specified value.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Failure - Minimum Failures Parameters

The following table summarizes the parameters in the `User: Challenge Failure - Minimum Failures` condition.

Table B–188 User: Challenge Failure - Minimum Failures Parameters

Parameter	Description	Possible Values	Can be Null?
Failures greater than	Maximum number of failures to watch for. If the failure count exceeds this number, then the condition will evaluate to true.	Default is 0	No

B.9.17 User: Challenge Maximum Failures

General information about the `User: Challenge Maximum Failures` condition is provided in the following table.

Table B–189 User: Challenge Maximum Failures

Condition	User: Challenge Maximum Failures
Description	Checks if user failed to answer challenge question for specified number of times. You can choose to count the failure for the current question only.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Maximum Failures Parameters

The following table summarizes the parameters in the `User: Challenge Maximum Failures` condition.

Table B–190 User: Challenge Maximum Failures

Parameter	Description	Possible Values	Can be Null?
Number of Failures More than or equal to	Maximum number of failures to watch for. If the failure count exceeds this number, then the condition will evaluate to true.	Default is 3	No
Current Question Count only?	Increment question counter per question?	Default is False	Yes
If above or equal, return	The value to return if above or equal to the number of failed attempts allowed.	Default is True	Yes

Use this condition when you want to trigger a rule based on the number of times per question or number of times in a row the user can fail to answer a question correctly.

B.9.18 User: Challenge Failure Is Last Challenge Before

General information about the `User: Challenge Failure Is Last Challenge Before` condition is provided in the following table.

Table B–191 User: Challenge Failure Is Last Challenge Before

Condition	User: Challenge Failure Is Last Challenge Before
Description	If it is a last challenge before number of hours, since number of days have passed.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Challenge Failure Is Last Challenge Before Parameters

The following table summarizes the parameters in the `User: Challenge Failure Is Last Challenge Before` condition.

Table B–192 User: Challenge Failure Is Last Challenge Before Parameters

Parameter	Description	Possible Values	Can be Null?
Client Type	Client used	Possible values are ■ Alpha Keypad ■ Applet Tracker ■ Challenge Response ■ Default ■ Email ■ Eye Scan ■ Flash Tracker ■ Full KeyPad ■ Hand Fingerprint ■ Image Tracker ■ Login Page ■ Native Mobile Client ■ Normal ■ OCS Question ■ OTP ■ Partial Password ■ PinPad ■ Question and Answer ■ SMS ■ Slider ■ TextPad ■ Token ■ Transaction Signing ■ Unknown ■ Wheel	No
Minimum days since last Challenge	Minimum amount of time elapsed since the last challenge	Default is 1	No
Maximum days to look back	Maximum amount of time elapsed to consider	Default is 30	No

B.9.19 User: Check OTP Failures

General information about the `User: Check OTP Failures` condition is provided in the following table.

Table B–193 User: Check OTP Failures

Condition	User: Check OTP Failures
Description	Checks if user's OTP failure counter value is over a specified value.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.

Table B–193 (Cont.) User: Check OTP Failures

Condition	User: Check OTP Failures
Assumptions	None
Available since version	11.1.1.5
Checkpoints	All checkpoints

User: Check OTP Failures Parameters

The following table summarizes the parameters in the `User: Check OTP Failures` condition.

Table B–194 User: Check OTP Failures Parameters

Parameter	Description	Possible Values	Can be Null?
Failures more than or equal to	When the number of failures is more than this number, the condition triggers.	Default is `0`	No
If above or equal, return	The value to return if above or equal to the number of failed attempts in which this condition will trigger. For example, if the number is 5, and the OTP failures are more than 5, the condition will trigger. 0 returns `True` or `False` if above or equal.	Default is `True`	No
OTP Challenge Type	Challenge Type is the configuration of a type of challenge (ChallengeEmail, ChallengeSMS, ChallengeQuestion)	Default is ChallengeSMS Possible challenge type values are: ■ ChallengeEmail: OTP challenge via e-mail ■ ChallengeSMS: OTP challenge via Short Message Service (SMS) ■ ChallengeIM: OTP challenge via instant messaging Values are from the challenge.type.enum property. Through this enum, you can add challenge types.	No

This condition is used in a rule that OTP-challenges users for specific scenarios. If the user answers OTP incorrectly, he is allowed other attempts until he either answers correctly or is locked out of his account after a certain number of failures. When a user fails the OTP challenge, a counter is updated to indicate that user has had a failure. In the OAAM-server based policies, the user is allowed three attempts to provide the correct answer. If there are more than three failed OTP attempts, the rule triggers. The failure counter is set by default in the OAAM Challenge Policy, but you can customize it.

B.9.20 User: Multiple Failures

General information about the `User: Multiple Failures` condition is provided in the following table.

Table B–195 User: Multiple Failures

Condition	User: Multiple Failures
Description	User failed multiple times
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Multiple Failures Parameters

The following table summarizes the parameters in the `User: Multiple Failures` condition.

Table B–196 User: Multiple Failures Parameters

Parameter	Description	Possible Values	Can be Null?
Authentication status is not	User account status	Possible values are: ■ Blocked ■ Database Error ■ Invalid User ■ Locked ■ Password Expired ■ Pending ■ Pending Activation ■ Session Expired ■ Session Reused ■ Success ■ System Error ■ User Disabled ■ Wrong Answer ■ Wrong PIN ■ Wrong Password	No
for more than	Maximum number of failures to watch for. If the failure count exceeds this number, then the condition will evaluate to true.	Default is 3	No

This checks if the user has failed multiple times with a user account status that is not the one specified.

B.9.21 User: In Group

General information about the `User: In Group` condition is provided in the following table.

Table B–197 User: In Group

Condition	User: In Group
Description	Checks if user is in the group specified
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: In Group Parameters

The following table summarizes the parameters in the `User: In Group` condition.

Table B–198 User: In Group Parameters

Parameter	Description	Possible Values	Can be Null?
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the user is in the user group and the value of this parameter is `True`, the condition evaluates to `True`. If the user is not in the user group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	Default is True	No
User Group	This is a list of groups that contain users. The Conditions tab of the rule displays a drop-down list of user groups. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.	Default or OAAM Restricted Users	No

Use this condition to determine if an action needs to be performed on a user of the current activity. For example, a group of users could be considered high risk, so you can configure a policy to always challenge the users in the High Risk user group.

For more information on group creation, see Chapter 12, "Managing Groups."

B.9.22 User: Login in Group

General information about the `User: Login in Group` condition is provided in the following table.

Table B–199 User: Login in Group

Condition	User: Login in Group
Description	If the user login is in the given group
Prerequisites	You must have a rule configured with this condition to experience the behavior. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Login in Group Parameters

The following table summarizes the parameters in the `User: Login in Group` condition.

Table B–200 User: Login in Group Parameters

Parameter	Description	Possible Values	Can be Null?
Is in group	The parameter controls the outcome of the condition. You can negate the outcome of the condition with this parameter. If the user login is in the group and the value of this parameter is `True`, the condition evaluates to `True`. If the user login is not in the group and the value of this parameter is `False`, the condition evaluates to `True`. In all other cases, the condition evaluates to `False`.	Default is `False`	No
User Group	This is a list of groups that contain users. The Conditions tab of the rule displays a drop-down list of user groups. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.	User group from a list of user groups	No

For more information on group creation, see Chapter 12, "Managing Groups."

B.9.23 User: User Group in Group

General information about the `User: User Group in Group` condition is provided in the following table.

Table B–201 User: User Group in Group

Condition	User: User Group in Group
Description	If the user group is in the given group
Prerequisites	You must have a rule configured with this condition to experience the behavior. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User Group in Group Parameters

The following table summarizes the parameters in the `User: User Group in Group` condition.

Table B–202 User: User Group in Group Parameters

Parameter	Description	Possible Values	Can be Null?
Is in group	This is a boolean parameter that defines a default return value if the user group is in the group.	Default is True	No
Group List	This is a list of groups that contain users. The Conditions tab of the rule displays a drop-down list of user groups. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.	User group from a list of user groups	No

This condition checks if the user belongs or does not belong to a certain user group.

For more information on group creation, see Chapter 12, "Managing Groups."

B.9.24 User: Action Count

General information about the `User: Action Count` condition is provided in the following table.

Table B–203 User: Action Count

Condition	User: Action Count
Description	Checks action counter for the given action. This condition has dependency on action configuration
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Action Count Parameters

The following table summarizes the parameters in the `User: Action Count` condition.

Table B–204 User: Action Count Parameters

Parameter	Description	Possible Values	Can be Null?
Action	Contains action	Default is Password Values are specified in the `rule.action.enum` property.	No
Count Above or Equal to	Maximum number of actions to watch for. If the action count for this action exceeds this number, then the condition will evaluate to true.	Default is `3`	No

This condition checks if the maximum count of an action has been met.

B.9.25 User: Action Count Timed

Checks if the given action count is more than specified count. If checkpoint is not specified, action is checked in all checkpoints

General information about the `User: Action Count Timed` condition is provided in the following table.

Table B–205 User: Action Count Timed

Condition	User: Action Count Timed
Description	Checks if the given action count is more than specified count. If checkpoint is not specified, action is checked in all checkpoints
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	Action is check against a specific checkpoint or against all checkpoints.

User: Action Count Timed Parameters

The following table summarizes the parameters in the `User: Action Count Timed` condition.

Table B–206 User: Action Count Timed Parameters

Parameter	Description	Possible Values	Can be Null?
Checkpoint (Optional)	A specific checkpoint is provided or if it is not, the action is checked against all checkpoints.	Possible values configured through the `profile.type.enum` property.	Yes
Action	Action to be checked. This condition is cumulative for all actions counted that occurred across sessions.	Possible values configured through the `rule.action.enum` property. An example of an action is `Challenge`.	No

Table B–206 (Cont.) User: Action Count Timed Parameters

Parameter	Description	Possible Values	Can be Null?
in seconds	Seconds elapsed in which to check action count.	Default is `300`	No
Count Action only once per session?	Specify if you want the action only counted once per session. An action can occur a number of times within a session. For example, a user can be challenged more than once in a given session. If you specify **Count Action only once per session?** as `false`, if the end user is challenged 3 times in the one session, OAAM counts all of the Challenge actions that occurred in the last 300 seconds. If the end user is challenged 10 times in 5 sessions, OAAM counts the Challenge action as 10. If you specify **Count Action only once per session?** as `True`, if the end user is challenged 3 times in one session, OAAM counts the Challenge actions that occurred in the last 300 seconds as 1. If the end user is challenged 3 times each session in 5 sessions, OAAM counts the Challenge actions as 5.	Default is `True`	No
More than	Maximum action count across sessions in specified n seconds.	Default is `3`	No

Use this condition if you want to check if the action count across sessions in the last n seconds is more than the number specified. The condition has a parameter to specify if you want to count the action as one time per session or a number of separate times in a session. For example, you might want to count the actual number of Challenges irrespective to the number of sessions if you are running a transaction scenario and want to send an OTP challenge a number of times in the last n seconds. You might want to challenge the user only 2 or 3 times and not challenge him again or you might want to keep challenging him even if the user has been challenged a number of times in a session. For example, if in the last 5 minutes, irregardless of the number of sessions, you do not want the end user to be challenged a third time. On the other hand, you might only want the user to be challenged once per session or transfer.

B.9.26 User: Check Last Session Action

General information about the `User: Check Last Session Action` condition is provided in the following table.

Table B–207 User: Check Last Session Action

Condition	User: Check Last Session Action
Description	Checks if the given action is in last session. If checkpoint is not specified, action is checked in all checkpoints of that session
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Check Last Session Action Parameters

The following table summarizes the parameters in the `User: Check Last Session Action` condition.

Table B–208 User: Check Last Session Action

Parameter	Description	Possible Values	Can be Null?
Checkpoint (Optional)	Checkpoints to choose from	Possible values configured through the `profile.type.enum` property.	No
Action	Contains action	Default is `Password`	No
in seconds	Seconds elapsed	Default is `300`	No

B.9.27 User: Account Status

General information about the `User: Account Status` condition is provided in the following table.

Table B–209 User: Account Status

Condition	User: Account Status
Description	Checks the account status of the user.
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Account Status Parameters

The following table summarizes the parameters in the `User: Account Status` condition.

Table B–210 User: Account Status Parameter

Parameter	Description	Possible Values	Can be Null?
User Account Status	Account status of the user	Account status is configured through the vcrypt.user.account.status.enum property. Values are. ■ Active The user is active and available in the system. He has completed registration and can perform all operations. ■ Deleted The user is not available in the system. ■ Disabled The user is available in the system, but not active. He maybe disabled because of fraud or other reasons and cannot perform any operations. ■ Invalid The user name is not valid. ■ Pending Activation The user started registration, but has not completed it. He has entered his user name and password and his information has been stored in the database, but he will not be activated until he has completed registration. The user is available in the system, but he is not yet active and cannot perform any operations.	No
Is	Boolean parameter to decide if the default return value should be `true` or `false` if the account status is the one specified.	`True` or `False`	No

Use this condition if you want to check the account status of the user. For example, if the user status is `Disabled` or `Invalid`, you may have configured an action to block the user because you do not want the user to proceed with the steps to access the resource.

B.9.28 User: Client And Status

General information about the `User: Client And Status` condition is provided in the following table.

Table B–211 User: Client And Status

Condition	User: Client And Status
Description	Account status of the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Client And Status Parameters

The following table summarizes the parameters in the `User: Client And Status` condition.

Table B–212 User: Client And Status Parameters

Parameter	Description	Possible Values	Can be Null?
Used client	Client type	Possible values are ■ Alpha Keypad ■ Applet Tracker ■ Challenge Response ■ Default ■ Email ■ Eye Scan ■ Flash Tracker ■ Full KeyPad ■ Hand Fingerprint ■ Image Tracker ■ Login Page ■ Native Mobile Client ■ Normal ■ OCS Question ■ OTP ■ Partial Password ■ PinPad ■ Question and Answer ■ SMS ■ Slider ■ TextPad ■ Token ■ Transaction Signing ■ Unknown ■ Wheel	No
Within duration (minutes)	The period to count the number of times the user logged in from the client type successfully.	Default is `1440`	No
More than	Number of times the user logged in from the client type successfully.	Default is `3`	No

Use this condition to check if the user logged in successfully from the client type within the specified minutes. This condition checks for the status of `Success`.

B.9.29 User: Question Status

General information about the `User: Question Status` condition is provided in the following table.

Table B–213 User: Question Status

Condition	User: Question Status
Description	Question status of the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Question Status Parameters

The following table summarizes the parameters in the `User: Question Status` condition.

Table B–214 User: Question Status Parameters

Parameter	Description	Possible Values	Can be Null?
User Question Status	User question registration status Status value is from `vcrypt.user.question.status.enum`.	Set or Not Set	No
is	Checks if the condition should return `Yes` or `No` if the question status is the one specified.	Default is `Yes`	No

Use this condition to check if the challenge questions are set for the user. If the challenge questions are not set for the user (unregistered users), an action may be taken such as forcing the user to register questions. If the questions are set, an action might be taken such that the challenge questions are used for risky situations.

B.9.30 User: Image Status

General information about the `User: Image Status` condition is provided in the following table.

Table B–215 User: Image Status

Condition	User: Image Status
Description	Image status of the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Image Status Parameters

The following table summarizes the parameters in the `User: Image Status` condition.

Table B–216 User: Image Status

Parameter	Description	Possible Values	Can be Null?
User Image Status	User account status	Set or Not set	No
Is	Checks if account status is set	Default is `True`	No

B.9.31 User: Phrase Status

General information about the `User: Phrase Status` condition is provided in the following table.

Table B–217 User: Phrase Status

Condition	User: Phrase Status
Description	Phrase status of the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Phrase Status Parameters

The following table summarizes the parameters in the `User: Phrase Status` condition.

Table B–218 User: Phrase Status parameters

Parameter	Description	Possible Values	Can be Null?
User Phrase Status	User account status	Set or Not set	No
Is	Checks if the condition should return true or false if the user has his phrase registered or not.	Default is `True`	No

Use this condition to check if the user has or has not registered his security phrase.

B.9.32 User: Preferences Configured

General information about the `User: Preferences Configured` condition is provided in the following table.

Table B–219 User: Preferences Configured Parameters

Condition	User: Preferences Configured
Description	Checks if the user preferences are set
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Preferences Configured Parameters

The following table summarizes the parameters in the `User: Preferences Configured` condition.

Table B–220 User: Preferences Configured

Parameter	Description	Possible Values	Can be Null?
Is configured	Boolean parameter to decide if the default return value should be true or false if the user preferences are set.	Default is True	No

Use this condition to check if the user has or has not set user preferences.

B.9.33 User: Check Information

General information about the `User: Check Information` condition is provided in the following table.

Table B–221 User: Check Information

Condition	User: Check Information
Description	Checks to see if user information is set. Information data to check is sent as a key-value pair.
Prerequisites	To make use of this condition, a rule must be configured with this condition.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Check Information Parameters

The following table summarizes the parameters in the `User: Check Information` condition.

Table B–222 User: Check Information Parameters

Parameter	Description	Possible Values	Can be Null?
Key to comma separated values to check	Key to context map with comma separated values to check	Default is key You must enter this value. The condition checks for a non-null parameter key.	No
If information is set, return	Value to return `true` or `false` if the information is set.	Default is True	No

Use this condition to check if the value specified in the key is set or if the value specified by the key is empty ('') or null for the user. If the value is empty, OAAM sets it as null. A value that is made of spaces (" ") is set. A value made up of equal signs (=) is not set. You can specify `true` or `false` to check if the value of the key is set or if the value of the key is empty or null. This condition is mainly used to check the input fields for OTP. For a comma-separated list of keys, if all the keys have their values set, then it will return true if you specified to return true if the value is set, or false if you specify to return false if the value is set. In a comma-separated list, if any of the keys do not have their value set, the negative of the return value for if the information is set is returned.

Example Usage

This condition can be used whenever you want to check to see whether the user has associated data for the key. For example, you may want to determine whether the user has an e-mail defined in his OTP configuration, so you want to trigger a rule based on whether this email field is defined (non-empty) for the user. If the email field is set, the condition evaluates to true.

1. Configure the User Data Key of this condition with `user_otpContactInfo_email` (for mobile phone, use key to `user_otpContactInfo_mobile`).
2. Use the new standard base policies that are shipped with 11*g*. The user will register for OTP on the first or second login.
3. Run authentications with the registered users.

   You can see the rule triggers when they are registered for the OTP email (or mobile if you have used that as key).
4. Then go to policy editor and change the value of the key.
5. Run authentications for the users again and notice that the rule does not trigger.

   Notice that the rule does not trigger. (The assumption is that no such key data exists for this usual key)

B.9.34 User: Check User Data

General Information about the User: Check User Data Condition

General information about the `User: Check User Data` condition is provided in the following table.

Table B–223 User: Check User Data

Condition	User: Check User Data
Description	Verify if specified key has any related data for the user
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	
Available since version	10.1.4.5
Checkpoints	All Checkpoints.

User: Check User Data Parameters

The following table summarizes the `User: Check User Data` condition parameters.

Table B–224 User: Check User Data

Parameter	Description	Possible Value	Can be Null?
User Data Key	The complete name of the key which may have associated data for that user. Consider this a property or a configuration property for only that user.	[Strings] You must know the key to check. Note: You can only check one key.	No

Use the `User: Check User Data` condition to validate if the key is set or not. The condition always returns `true` if there is a value.

Note: Use the `User: Check Information` condition instead of this condition. The `User: Check Information` condition allows you to specify if you want `true` or `false` returned when checking whether the key is set or not.

B.9.35 User: User Agent Percentage Match

General Information about the User: User Agent Percentage Match Condition

General information about the `User: User Agent Percentage Match` condition is provided in the following table.

Table B–225 User: User Agent Percentage Match

Condition	User: User Agent Percentage Match
Description	Checks if user agent percentage match is above specified percentage. Compares with browser user agent string (UAS) of previous login from same device
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User Agent Percentage Match Parameters

The following table summarizes the parameters in the `User: User Agent Percentage` Match condition.

Table B–226 User: User Agent Percentage Match Parameters

Parameter	Description	Possible Values	Can be Null?
Is	Boolean parameter to decide if the default return value should be `true` or `false` if the agent percentage match is above the specified percentage.	Default is `False`	No
percentage match above	Agent percentage match is above specified percentage	Default is `60`	No
From Same Device?	Boolean parameter to decide if the default return value should be `true` or `false` if the device is the same device.	Default is `True`	No

This condition assumes that you know the keys that you are expecting in a user agent string. The condition checks how many of those values match (how similar is the user agent string to the previous user agent string). This condition is used for the Device ID rules.

B.9.36 User: Is User Agent Match

General information about the `User: Is User Agent Match condition` is provided in the following table.

Table B–227 User: Is User Agent Match

Condition	User: Is User Agent Match
Description	Checks if user agent matches with that of previous login from the same device
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Is User Agent Match Parameters

The following table summarizes the parameters in the `User: Is User Agent Match` condition.

Table B–228 User: Is User Agent Match

Parameter	Description	Possible Values	Can be Null?
Is	This is a boolean parameter that defines a default return value if the user agent matches that of the previous login from the same device.	Default is False	No
From Same Device?	Device is the same device	Default is True	No

Use this condition to check if the user agent string matches that of the previous login's user agent string from the same device.

B.9.37 User: Check Fraudulent User Request

General information about the `User: Check Fraudulent User Request` condition is provided in the following table.

Table B–229 User: Check Fraudulent User Request

Condition	User: Check Fraudulent User Request
Description	Check if the current User Request is fraudulent
Prerequisites	Prerequisites are as follows: ■ A rule must be configured with this condition to experience the behavior. ■ ODM Database User has been created. ■ Feedback is essential to keep up with newly classified data. ■ Feedback is also required to keep up with trends in recent data. ■ Rebuild models with recent data is the feedback mechanism so that models are up-to-date. ■ The date range for the data to be considered can be configured using the property oracle.oaam.predictive_analysis.request.period.
Assumptions	None
Available since version	11*g*
Checkpoints	Post Authentication checkpoint

User: Check Fraudulent User Request Parameters

The following table summarizes the parameters in the `User: Check Fraudulent User Request` condition.

Table B–230 User: Check Fraudulent User Request Parameter

Parameter	Description	Possible Values	Can be Null?
Select the Classification Model to use for evaluation	Choose the classification model you want to use to evaluate the current request.	OAAM Anomalous Request Model or OAAM Fraud Request Model The classification type is from an enum.	No
Select the required classification type	This should be the same as the value of the target column of your ODM model.	Fraud or Not Fraud	No
Enter the minimum value of probability required to predict the given classification type	Threshold probability value for fraudulent requests	Default is 0.80 Probability value should be between 0 (lowest probability) and 1 (highest probability). You can also specify decimal values like 0.85 Based on the data and requirements, range of probability can be adjusted.	No
Enter the maximum value of probability required to predict the given classification type	Minimum probability value for fraudulent requests	Default is 1.00 Probability value should be between 0 (lowest probability) and 1 (highest probability). You can also specify decimal values like 0.85 Based on the data and requirements, range of probability can be adjusted.	No
Default value to return in case of errors	The value to return in case of errors	Default is False	No

This condition is based on ODM data. The underlying triggers in ODM returns a value, that value is compared to the OAAM value, and an action can be triggered because of that. Predictive Analysis rules check if the outcome from ODM is in the specified range of probability.

Use this condition to check if the request looks similar to any of the known fraud requests.

B.9.38 User: Check Anomalous User Request

General information about the `User: Check Anomalous User Request` condition is provided in the following table.

Table B–231 User: Check Anomalous User Request

Condition	User: Check Anomalous User Request
Description	Check if the current User Request is Anomalous
Prerequisites	Prerequisites are as follows: ■ A rule must be configured with this condition to experience the behavior. ■ ODM Database User has been created. ■ Feedback is essential to keep up with newly classified data. ■ Feedback is also required to keep up with trends in recent data. ■ Rebuild models with recent data is the feedback mechanism so that models are up-to-date. ■ The date range for the data to be considered can be configured using the property oracle.oaam.predictive_analysis.request.period.
Assumptions	None
Available since version	11*g*
Checkpoints	Post Authentication checkpoint

User: Check Anomalous User Request Parameters

The following table summarizes the parameters in the `User: Check Anomalous User Request` condition.

Table B–232 User: Check Anomalous User Request

Parameter	Description	Possible Values	Can be Null?
Select Anomaly Model to use for evaluation	Choose the anomaly model you want to use to evaluate the current request.	OAAM Anomalous Request Model or OAAM Fraud Request Model	No
Enter the minimum value of probability required to classify the user request as anomalous	Probability value should be between 0 and 1. You can specify decimal values like 0.85	Default is 0.80 Based on the data and requirements, range of probability can be adjusted.	No
Enter the maximum value of probability required to classify the user request as anomalous	Probability value should be between 0 and 1. You can specify decimal values like 0.85	Default is 1.00 Based on the data and requirements, range of probability can be adjusted.	No
Default value to return in case of errors	Specify the value to be returned in case of errors.	Default is False	Yes

OAAM submits the request to ODM to see how problematic the request looks based on the configured percentage, a number between 0 and 1. It depends on the model that exists in ODM. Predictive Analysis rules check if the outcome from ODM is in the specified range of probability.

Use this condition to check if the request is anomalous compared to the existing set of requests.

B.9.39 User: User is Member of Pattern N Times

General information about the `User: User is Member of Pattern N Times` condition is provided in the following table.

Table B–233 User: User is Member of Pattern N Times

Condition	User: User is Member of Pattern N Times
Description	Checks if this user has been member of this pattern condition
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User is Member of Pattern N Times Parameters

The following table summarizes the parameters in the `User: User is Member of Pattern N Times` condition.

Table B–234 User: User is Member of Pattern N Times

Parameter	Description	Possible Values	Can be Null?
Pattern Hit Count More than	If the current entity behavior has occurred more than the specified count, the condition should trigger.	Default is 0	No
Pattern Name for membership	Pattern for which membership count will be checked.	Out-of-the-box patterns are listed as follows, although you can use your own patterns: User: Device profiling pattern User: ISP profiling pattern User: Country profiling pattern User: Connection type profiling pattern User: ASN profiling pattern User: State profiling pattern User: Locale profiling pattern User: Day of Week profiling pattern User: Routing type profiling pattern User: Time range profiling pattern	No

Table B–234 (Cont.) User: User is Member of Pattern N Times

Parameter	Description	Possible Values	Can be Null?
Is Membership Count More than patternHitCountFor User	Boolean value that is used to return true or false from the condition. Use this parameter to negate the outcome of the condition. If this parameter is `True` and the pattern hit count is more than the specified amount for the user is `True`, then the condition evaluates to `True`. If this parameter is `False` and the pattern hit count is more than the specified amount for the user is `False`, then the condition evaluates to `True`. The condition evaluates to `False` in all other cases.	Default is `True`	No
Time period type for pattern membership	The time period type (`hours`, `days`, `months`, and `years`)	The time period type is defined in the `work.type.enum` property. The time period types are `hour`, `day`, `month`, and `year`. Time period type to select from the drop-down list are: ■ `Hours` ■ `Days` ■ `Months` ■ `Years`	No
Time period for pattern membership	The time period over which the pattern membership is evaluated.	Use 1 through 23 for hours. 1 through 30 for days. 1 through 12 for months and 1 through 8 for years. The OAAM Server will use the maximum values if you enter values more than the above specified.	

B.9.40 User: User Country for First Time

General information about the `User: User Country for First Time` condition is provided in the following table.

Table B–235 User: User Country for First Time

Condition	User: User Country for First Time
Description	This checks to see if the user has logged in from this country successfully before
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User Country for First Time Parameters

The following table summarizes the parameters in the `User: User Country for First Time` condition.

Table B–236 User: User Country for First Time parameters

Parameter	Description	Possible Values	Can be Null?
First Time	Checks if the condition should return `true` or `false` if the country has been used successfully before.	Default is `True`	No

Use this condition to check whether the user has logged in successfully from this country before. The status must be "Success".

B.9.41 User: Country First Time for User

General information about the `User: Country First Time for User` condition is provided in the following table.

Table B–237 User: Country First Time for User

Condition	User: Country First Time for User
Description	Is the user using this country for the first time?
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Country First Time for User Parameters

The following table summarizes the parameters in the `User: Country First Time for User` condition.

Table B–238 User: Country First Time for User

Parameter	Description	Possible Values	Can be Null?
Is First Time?	Checks if the condition should return `true` or `false` if the user is using the country for the first time.	Default is `True`	No

This condition is used to determine if the user is logging in from this country for the first time irrespective of the status. This condition is different from the `User: User Country for First Time` condition because it is irrespective of the status, whereas the `User: User Country for First Time` condition must have the status of "Success."

This condition could potentially be used to determine if the user is logging in from a different country or different countries and to challenge him when it is the case.

B.9.42 User: Country First Time from Group

General information about the `User: Country First Time from Group` condition is provided in the following table.

Table B–239 User: Country First Time from Group

Condition	User: Country First Time from Group
Description	If this country is used for the first time by this user from the given country group
Prerequisites	You must have a rule configured with this condition to experience the behavior. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Country First Time from Group Parameters

The following table summarizes the parameters in the `User: Country First Time from Group` condition.

Table B–240 User: Country First Time from Group Parameters

Parameter	Description	Possible Values	Can be Null?
From group	Is in group	Default is True	No
Country in country group	This is a list of groups that contain countries. The Conditions tab of the rule displays a drop-down list of country groups. Use the Group editor in the OAAM Administration Console to create a group or edit this group list.	OAAM Monitoring Countries or OAAM Restricted Countries	No

This condition could potentially be used to determine if the user is logging in from a country in a group of countries and to challenge him when it is the case.

For more information on group creation, see Chapter 12, "Managing Groups."

B.9.43 User: User State for First Time

General information about the `User: User State for First Time` condition is provided in the following table.

Table B–241 User: User State for First Time

Condition	User: User State for First Time
Description	This checks if the user has used this state successfully previously
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User State for First Time Parameters

The following table summarizes the parameters in the `User: User State for First Time` condition.

Table B–242 User: User State for First Time Parameters

Parameter	Description	Possible Values	Can be Null?
First Time	Checks if the condition should return true or false if the city has been used before.	Default is `True`	No

Use this condition to check whether the user has logged in successfully from this state before. The status must be "Success".

B.9.44 User: State First Time for User

General information about the `User: State First Time for User` condition is provided in the following table.

Table B–243 User: State First Time for User

Condition	User: State First Time for User
Description	Is the user using this state for the first time?
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: State First Time for User Parameters

The following table summarizes the parameters in the `User: State First Time for User` condition.

Table B–244 User: State First Time for User Parameters

Parameter	Description	Possible Values	Can be Null?
Is	This is a boolean parameter that defines a default return value if the user is using the state for the first time.	Default is True	No

This condition is used to determine if the user is logging in using this state for the first time irrespective of the status.

This condition could potentially be used to determine if the user is logging in from a different state or different states and to challenge him when it is the case.

B.9.45 User: User City for First Time

General information about the `User: User City for First Time` condition is provided in the following table.

Table B–245 User: User City for First Time

Condition	User: User City for First Time
Description	This checks to see if the user has used this city successfully previously
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.

Table B–245 (Cont.) User: User City for First Time

Condition	User: User City for First Time
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User City for First Time Parameters

The following table summarizes the parameters in the `User: User City for First Time` condition.

Table B–246 User: User City for First Time Parameters

Parameter	Description	Possible Values	Can be Null?
First Time	Checks if the condition should return true or false if the city has been used successfully before.	Default is True	No

Use this condition to check whether the user has logged in successfully from this city before. The status must be "Success".

B.9.46 User: City First Time for User

General information about the `User: City First Time for User` condition is provided in the following table.

Table B–247 User: City First Time for User

Condition	User: City First Time for User
Description	Is the user using this city for the first time?
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: City First Time for User Parameters

The following table summarizes the parameters in the `User: City First Time for User` condition.

Table B–248 User: City First Time for User Parameters

Parameter	Description	Possible Values	Can be Null?
Is	Checks if the condition should return `true` or `false` if the user had logged in from this city before.	Default is `True`	No

This condition checks if the user has logged in from this city before.

B.9.47 User: Login for First Time

General information about the `User: Login for First Time` condition is provided in the following table.

Table B–249 User: Login for First Time

Condition	User: Login for First Time
Description	Checks if user is logging in for the first time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

B.9.48 User: IP Carrier for First Time

General information about the `User: IP Carrier for First Time` condition is provided in the following table.

Table B–250 User: IP Carrier for First Time

Condition	User: IP Carrier for First Time
Description	Is the user using this IP carrier for the first time?
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: IP Carrier for First Time Parameters

The following table summarizes the parameters in the `User: IP Carrier for First Time` condition.

Table B–251 User: IP Carrier for First Time parameters

Parameter	Description	Possible Values	Can be Null?
Is	Checks if the condition should return `true` or `false` if the IP Carrier is the one specified.	Default is `True`	No

Use this condition to check whether the user has logged in successfully using this IP carrier before. The status must be "Success".

B.9.49 User: User IP for First Time

General information about the `User: User IP for First Time` condition is provided in the following table.

Table B–252 User: User IP for First Time

Condition	User: User IP for First Time
Description	This checks if the user has used this IP successfully previously
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User IP for First Time Parameters

The following table summarizes the parameters in the `User: User IP for First Time` condition.

Table B–253 User: User IP for First Time Parameters

Parameter	Description	Possible Values	Can be Null?
Is First Time	Checks if IP has been used before.	Default is `True`	No

Use this condition to check whether the user has logged in successfully from this IP address before. The status must be "Success".

B.9.50 User: User ISP for First Time

General information about the `User: User ISP for First Time` condition is provided in the following table.

Table B–254 User: User ISP for First Time

Condition	User: User ISP for First Time
Description	This checks if the user has used this ISP successfully previously
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User ISP for First Time Parameters

The following table summarizes the parameters in the `User: User ISP for First Time` condition.

Table B–255 User: User ISP for First Time

Parameter	Description	Possible Values	Can be Null?
First Time	Checks if the condition should return true or false if the ISP has been used successfully before.	Default is True	No

Use this condition to check whether the user has logged in successfully using this internet service provider before. The status must be "Success".

If the user has never logged in using this internet service provider, trigger the rule.

B.9.51 User: Check First Login Time

General information about the `User: Check First Login Time` condition is provided in the following table.

Table B–256 User: Check First Login Time

Condition	User: Check First Login Time
Description	Checks if user first logged in within range. First login is the first successful login
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Check First Login Time Parameters

The following table summarizes the parameters in the `User: Check First Login Time` condition.

Table B–257 User: Check First Login Time parameters

Parameter	Description	Possible Values	Can be Null?
First time login within	Value to watch for in first login	Default is 3	No
Time Unit	Time units to be associated with the `First time login within` parameter	Select time unit configured from the `time.unit.enum` property. `Milliseconds`, `Seconds`, `Minutes`, `Hours`, `Days`, `Weeks`, `Months`, `Years`	No
Before	Checks if first login is before the specified duration	`False` or `True`	No

B.9.52 User: ASN for First Time

General information about the `User: ASN for First Time` condition is provided in the following table.

Table B–258 User: ASN for First Time

Condition	User: ASN for First Time
Description	Is the user using this ASN for the first time?
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: ASN for First Time Parameters

The following table summarizes the parameters in the `User: ASN for First Time` condition.

Table B–259 User: ASN for First Time

Parameter	Description	Possible Values	Can be Null?
Is	This is a boolean parameter that defines a default return value if the user is using this ASN for the first time.	Default is True	No

Use this condition to check whether the user has logged in successfully using this ASN before. The status must be "Success".

B.9.53 User: User Carrier for First Time

General information about the `User: User Carrier for First Time` condition is provided in the following table.

Table B–260 User: User Carrier for First Time

Condition	User: User Carrier for First Time
Description	This checks to see if the user has used this carrier successfully previously
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: User Carrier for First Time Parameters

The following table summarizes the parameters in the `User: User Carrier for First Time` condition.

Table B–261 User: User Carrier for First Time

Parameter	Description	Possible Values	Can be Null?
First Time	Checks if the condition should return true or false if the carrier has been used successfully before.	True	No

Use this condition to check whether the user has logged in successfully using this carrier before. The status must be "Success".

B.9.54 User: Maximum Countries

General information about the `User: Maximum Countries` condition is provided in the following table.

Table B–262 User: User Carrier for First Time

Condition	User: Maximum Countries
Description	Number of countries within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Maximum Countries Parameters

The following table summarizes the parameters in the `User: Maximum Countries` condition.

Table B–263 User: Maximum Countries Parameters

Parameter	Description	Possible Values	Can be Null?
More than	Maximum number of countries to watch for. If the country count exceeds this number within the duration with a certain status, then the condition will evaluate to `true`.	Default is `3`	No
Within Duration (seconds)	Time period in seconds to look back into users session history.	[Integer] The default is `3600`. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No
Authentication status	Authentication status	Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	No

B.9.55 User: Maximum States

General information about the `User: Maximum States` condition is provided in the following table.

Table B–264 User: Maximum States

Condition	User: Maximum States
Description	Number of states within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Maximum States Parameters

The following table summarizes the parameters in the `User: Maximum States` condition.

Table B–265 User: Maximum States Parameters

Parameter	Description	Possible Values	Can be Null?
More than	Maximum number of states to watch for. If the state count exceeds this number within a duration, then the condition will evaluate to true.	Default is `3`	No
Within Duration (seconds)	Time period in seconds to look back into users session history.	[Integer] The default is `3600`. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No
Authentication status	Authentication status	Authentication status is configured through auth.status.enum. For example: ■ Blocked ■ Locked ■ Database Error ■ Password Expired ■ Invalid User ■ Pending ■ Pending activation ■ Session expired ■ Session reused ■ Success ■ System Error ■ User is disabled ■ Wrong answer ■ Wrong password ■ Wrong pin	No

B.9.56 User: Maximum Cities

General information about the `User: Maximum Cities` condition is provided in the following table.

Table B–266 User: Maximum Cities

Condition	User: Maximum Cities
Description	Checks the number of cities within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.

Table B–266 (Cont.) User: Maximum Cities

Condition	User: Maximum Cities
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Maximum Cities Parameters

The following table summarizes the parameters in the `User: Maximum Cities` condition.

Table B–267 User: Maximum Cities Parameters

Parameter	Description	Possible Values	Can be Null?
More than	Maximum number of cities to watch for. If the number of cities exceeds the number within the duration with a certain authentication status, the condition triggers.	Default is `3`	No
Within duration (seconds)	Time period in seconds to look back into users session history.	Default is `3600`	No
Authentication status	Authentication status for which to check.	Authentication status is configured through the `auth.status.enum` property.	No

The condition is used to check the number of cities the user logged in from within the duration with a certain authentication status.

B.9.57 User: Maximum Locations Timed

General information about the `User: Maximum Locations Timed` condition is provided in the following table.

Table B–268 User: Maximum Locations Timed

Condition	User: Maximum Locations Timed
Description	Maximum number of locations within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Maximum Locations Timed Parameters

The following table summarizes the parameters in the `User: Maximum Locations Timed` condition.

Table B–269 User: Maximum Locations Timed

Parameter	Description	Possible Values	Can be Null?
Location Attribute	Location characteristic	Used location attributes can be, for example: ■ ASN ■ Carrier ■ Connection Type ■ ISP ■ Second level domain ■ Top level domain	No
More than	Maximum number of locations to watch for. If the location count exceeds this number with the location attribute within a certain duration, then the condition will evaluate to true.	Default is `3`	No
Within duration (seconds)	Time period in seconds to look back into users session history.	[Integer] The default is `3600`. Positive integer indicates that condition looks for finite time before this request. 0 value will mean that condition will look for all available history of sessions. If negative value is provided for this parameter then condition will always evaluate to false.	No

B.9.58 User: Maximum IPs Timed

General information about the `User: Maximum IPs Timed` condition is provided in the following table.

Table B–270 User: Maximum IPs Timed

Condition	User: Maximum IPs Timed
Description	Maximum number of IP within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Maximum IPs Timed Parameters

The following table summarizes the parameters in the `User: Maximum IPs Timed` condition.

Table B–271 User: Maximum IPs Timed Parameters

Parameter	Description	Possible Values	Can be Null?
More than	Maximum number of IP addresses to watch for. If the IP address count exceeds this number within a period of time, then the condition will evaluate to `true`.	Default is `3`	No
Within	Within the time period	Default is `3600`	No
Time	Time units to be associated with the `Within` parameter	Select a time unit configured in the enum `time.unit.enum`. Choices are: `Milliseconds`, `Seconds`, `Minutes`, `Hours`, `Days`, `Weeks`, `Months`, `Years`	No

B.9.59 User: Country Failure Count for User

General information about the `User: Country Failure Count for User` condition is provided in the following table.

Table B–272 User: Country Failure Count for User

Condition	User: Country Failure Count for User
Description	Check failure count for the user from the given country
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Country Failure Count for User Parameters

The following table summarizes the parameters in the `User: Country Failure Count for User` condition.

Table B–273 User: Country Failure Count for User Parameters

Parameter	Description	Possible Values	Can be Null?
Is Country First time?	Checks if the condition should return `true` or `false` if the country has not been used before.	Default is `True`	No
Failure count more than	Maximum number of failures to watch for in seconds. If the failure count exceeds this number in seconds, then the condition will evaluate to `true`.	Default is `2`	No
in seconds	Seconds elapsed.	Default is `3600`	No
If error, return	Value to return if there are any errors.	Default is `False`	Yes

Use this condition to check the number of times the user is failing login (incorrect password) from the same country.

B.9.60 User: Check Login Count

General information about the `User: Check Login Count` condition is provided in the following table.

Table B–274 User: Check Login Count

Condition	User: Check Login Count
Description	Check user login count within specified duration
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Check Login Count Parameters

The following table summarizes the parameters in the `User: Check Login Count` condition.

Table B–275 User: Check Login Count Parameters

Parameter	Description	Possible Values	Can be Null?
Check only current user	Condition to check for the current users	Default is `True`	No
Authentication status	Account status	Possible values are: ■ Blocked ■ Database Error ■ Invalid User ■ Locked ■ Password Expired ■ Pending ■ Pending Activation ■ Session Expired ■ Session Reused ■ Success ■ System Error ■ User Disabled ■ Wrong Answer ■ Wrong PIN ■ Wrong Password	No
in seconds	Seconds elapsed	Default is `3600`	No
with login more than	Maximum number of logins to watch for. If the login count exceeds this number, then the condition will evaluate to `true`.	Default is `5`	No
If error, return	Value to return if error occurs.	Default is `False`	Yes
Consider current request or not	Consider the current request or not	Default is `False`	Yes

Use this condition if you want to check the user login count within specified duration.

B.9.61 User: Last Login Status

General information about the `User: Last Login Status` condition is provided in the following table.

Table B–276 User: Last Login Status

Condition	User: Last Login Status
Description	Checks to see if user login status is in specified list
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Last Login Status Parameters

The following table summarizes the parameters in the `User: Last Login Status` condition.

Table B–277 User: Last Login Status Parameters

Parameter	Description	Possible Values	Can be Null?
Check last login Within	Duration from login time	Default is 4	No
Time	Time unit to be associated with the `Check last login within` parameter	The time unit is from the enum `time.unit.enum`. Select from: `Milliseconds`, `Seconds`, `Minutes`, `Hours`, `Days`, `Weeks`, `Months`, `Years`	No
Ignore logins with status in	Ignore logins with Authentication Status in this group	Authentication status group	
Trigger if last login status in	List of Authentication Status to Check	Authentication status	

B.9.62 User: Last Login within Specified Time

General information about the `User: Last Login within Specified Time` condition is provided in the following table.

Table B–278 User: Last Login within Specified Time

Condition	User: Last Login within Specified Time
Description	Checks last login within specified time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Last Login within Specified Time Parameters

The following table summarizes the parameters in the `User: Last Login within Specified Time` condition.

Table B–279 User: Last Login within Specified Time Parameters

Parameter	Description	Possible Values	Can be Null?
Within duration (seconds)	This parameter defines the period in which the last login attempts was made.	Default is `30`	No
Is from different IP	Boolean parameter to decide if the default return value should be `true` or `false` if the login is from a different IP.	Default is `False`	No

B.9.63 User: Check Login Time

General information about the `User: Check Login Time` condition is provided in the following table.

Table B–280 User: Check Login Time

Condition	User: Check Login Time
Description	Checks if user login time is within the specified time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Check Login Time Parameters

The following table summarizes the parameters in the `User: Check Login Time` condition.

Table B–281 User: Check Login Time Condition Parameters

Parameter	Description	Possible Values	Can be Null?
Trigger	If the `Trigger` parameter is set to `True`, the rule condition triggers if the condition is met. If the `Trigger` parameter is set to `False`, the rule condition will only trigger if the condition is not met.	Default is `True`	No
Above or Equal To Hour (0-23)	Lower bound of hour of the day, values between 0 and 23	Default is `9`	No
Below Hour (0-23)	Upper bound of hour of the day, values between zero and 23	Default is `18`	No

B.9.64 User: Login Time Between Specified Times

General information about the `User: Login Time Between Specified Times` condition is provided in the following table.

Table B–282 User: Login Time Between Specified Times

Condition	User: Login Time Between Specified Times
Description	Login time between specified time
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Login Time Between Specified Times Parameters

The following table summarizes the parameters in the `User: Login Time Between Specified Times` condition.

Table B–283 User: Login Time Between Specified Times

Parameter	Description	Possible Values	Can be Null?
From time	Beginning of time range	Default is `2:00`	No
To time	End of time range	Default is `4:00`	No
Try Location Based Time Zone	Timezone	Default is `False`	No

This condition checks if the user logged in during a specified time range.

If the `useTimeZone` parameter is set to `true` then OAAM uses the time based on desktop time, as provided by the IP Location data.

For example, this condition checks if the time is between 1 PM and 2 PM.

If you set the `useTimeZone` parameter to `true`, then OAAM will try to see if it is between 1 PM and 2PM in the user's geographical location, based on IP location data.

This is the only condition that has timezone setting for the time based calculations

B.9.65 User: Is Last IP Match with Current IP

General information about the `User: Is Last IP Match with Current IP` condition is provided in the following table.

Table B–284 User: Is Last IP Match with Current IP

Condition	User: Is Last IP Match with Current IP
Description	Checks if user login IP address matches with that of previous login
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Is Last IP Match with Current IP Parameters

The following table summarizes the parameters in the `User: Is Last IP Match with Current IP` condition.

Table B–285 User: Is Last IP Match with Current IP Parameters

Parameter	Description	Possible Values	Can be Null?
is	Boolean parameter to decide if the default return value should be `true` or `false` if the IP address matches.	Default is `False`	No
Class C Match (False, if full IP match)	Class C IP address. Each Class C network address has a 24-bit network prefix, with the three highest order bits set to 1-1-0 and a 21-bit network number, followed by an 8-bit host number.	Default is `True`	No
Within duration (seconds)	Time period in seconds to look back into users session history.	[Integer] The default is `3600`. Positive integer indicates that condition looks for finite time before this request. `0` value will mean that condition will look for all available history of sessions. If a negative value is provided for this parameter then condition will always evaluate to `false`.	No
Default Return Value	Default return value, in case the login is not found in specified time period or in case of error.	[`False`] / `True`	No

B.9.66 User: Location Used Timed

General information about the `User: Location Used Timed` condition is provided in the following table.

Table B–286 User: Location Used Timed

Condition	User: Location Used Timed
Description	If user used this location within the given time period
Prerequisites	None for the condition as such, but you must have a rule configured with this condition to experience the behavior.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Location Used Timed Parameters

The following table summarizes the `User: Location Used Timed` condition parameters.

Table B–287 User: Location Used Timed Condition Parameters

Parameter	Description	Possible Values	Can be Null?
Is	Checks if the condition should return `true` or `false` if the user used this location within a given time period.	Default is `True`	No
Used Location (Attribute)	The location attribute	Use condition attributes are as follows: ■ ASN ■ Carrier ■ Connection type ■ ISP ■ Metro ■ Second level domain ■ Top level domain ■ City ■ Country ■ IP routing type ■ State	No
Within	This parameter defines the short period in which the location is used.	Default is 3600	No
Time	Time unit to be associated with the `Within` parameter.	The time unit is from the enum `time.unit.enum`. Select from: `Milliseconds`, `Seconds`, `Minutes`, `Hours`, `Days`, `Weeks`, `Months`, `Years`	No
Minimum Records Needed for the Check	Checks if number of records are met	Default is `1`	No

B.9.67 User: Checkpoint Score

Table B–288 provides general information about the `User: Checkpoint Score` condition.

Table B–288 User: Checkpoint Score

Condition	User: Checkpoint Score
Description	Checks if the score is within limits
Prerequisites	None for the condition as such, but you must have a rule configured with this condition.
Assumptions	None
Available since version	10.1.4.5
Checkpoints	All checkpoints

User: Checkpoint Score Condition Parameters

Table B–289 describes the parameters in the `User: Checkpoint Score` condition.

Table B–289 User: Checkpoint Score Condition Parameters

Parameter	Description	Possible Values	Can be Null?
Checkpoint (optional)	Checkpoints from a list of checkpoints	Possible values are configured through the `profile.type.enum` property.	Yes
Score Above or equal to	Minimum score	Default is `500`	No
And below or equal to	Maximum score	Default is `1000`	No
Trigger	If the `Trigger` parameter is set to `True`, the rule condition triggers if the condition is met. If the `Trigger` parameter is set to `False`, the rule condition will only trigger if the condition is not met.	Default is `True`	No
If multiple executions, pick	Choose a score if there are multiple executions	Select from the following: ■ Any score ■ Last ■ Max score ■ Min score	No

C

OAAM Properties

This appendix provides essential OAAM properties and enums.

C.1 OAAM Properties

OAAM properties are summarized in the following sections.

C.1.1 Access Manager and Oracle Adaptive Access Manager Integration

These properties and default values are used to create the Oracle Access Manager Client Object Pool. These parameters can be configured to higher values if the login volume is high.

Table C–1 Pool Configuration Properties

Properties	Description
oaam.oam.oamclient.minConInPool	Defines the minimum number of OAP connections that OAAM will maintain in its pool. It is recommended to keep this value the same as Max Connections as oaam.uio.oam.num_of_connections.
oaam.oam.oamclient.initDelayForWatcher	Defines the initial delay (in milliseconds) before the OAAM Pool Watcher thread starts to check connections.
oaam.oam.oamclient.periodForWatcher	Defines the rest period (in milliseconds) for the OAAM Pool Watcher thread, a thread which periodically checks the health of connections in the pool. Keep this a low value, if connections can go bad frequently.
oaam.oam.oamclient.timeout	Period (in milliseconds) that a request will wait for an available OAP connection before timing out if no connections are available in the pool. Keep this value to a low number.
oaam.uio.oam.num_of_connections	Primary OAM Server Setting Defines the target (maximum) number of OAP connections to the primary OAM server that OAAM will maintain in its pool. Change default to sufficiently high number.
oaam.uio.oam.secondary.host.num_of_ connections	Secondary OAM Server Setting (if used) Defines the target (maximum) number of OAP connections to the secondary OAM server that OAAM will maintain in its pool. Change default to sufficiently high number.

C.1.2 Policies, Rules, and Conditions Properties

Table C–2 Policies, Rules, and Condition Properties

Properties	Description
vcrypt.tracker.rules.trace.policySet.XXXXXX	Specifies the checkpoint in which to log the rules. Make sure that "vcrypt.tracker.rules.trace.policySet.XXXXXX" is set to `True` for that checkpoint. (XXXX corresponds to that checkpoint)
vcrypt.tracker.rulelog.detailed.minMillis	Controls threshold and logging for rules. By default, the Session Details page does not display the trigger sources if the execution time for alerts is less than 2000 millisecond (2000 ms) since detailed logging is dependent on the execution time. Set this property to 2000
vcrypt.tracker.rules.allowControlledActions	Enables/disables the Action Override feature. This feature is turned off by default.

C.1.3 Autolearning Properties

Table C–3 Autolearning Properties

Properties	Description
vcrypt.tracker.autolearning.enabled	Enables/disables the autolearning feature. This property must always be set to `true` for autolearning to work.
vcrypt.tracker.autolearning.use.auth.status.for.analysis	Enables/disables the authentication patterns. Authentication patterns are the patterns that analyze the data related to authentication (login) related information only. You can set it to True or False.
vcrypt.tracker.autolearning.use.tran.status.for.analysis	Enables the transaction-related patterns. Set to true for the transaction-related patterns to work. Transaction related patterns analyze the transaction related data for autolearning. An example is a pattern that profiles users who are performing wire transfer operations.
oracle.oaam.transactions.analyzepatterns	Enables the collection of pattern data for transactions. Set to true for pattern data to be collected for transactions.
vcrypt.bharosa.autolearning.numPriorities	Creates the number of threadpools as the number of priorities. These threadpools are used for post processing the autolearning data. This number should be more than 1.
vcrypt.bharosa.autolearning.threadMultiplier	Create the number of threads for post processing. These threads are part of the threadpool that is used for post processing autolearning data. Keep this number to at least 5.
vcrypt.tracker.autolearnin.enabled	Controls the status for the product level. Setting the value to false disables some of the post processing for autolearning. Rules continue to run but may be using stale data.

Table C–3 (Cont.) Autolearning Properties

Properties	Description
vcrypt.tracker.autolearning.use.auth.status.for.analysis	Enables/disables autolearning post processing if you do not want to change the client code. Setting this property to true results in autolearning processing for the authentication type of updateAuthStatus requests if the status is SUCCESS for that authentication request. However if the status is not SUCCESS, autolearning does not occur. Running autolearning rules with this property set to false runs the rules on the data that is stale. If this property is set to false and autolearning rules are running, and if the log level is set to "debug" for "com.bharosa.vcrypt.tracker.rules.impl.VCryptTrackerAutoLearningImpl" class; then a message is written to the log saying that this property is disabled and rules are still being run. Use this property when the client code does not explicitly call the autolearning API.
oracle.oaam.transactions.analyzepatterns	Enables/disables the collection of pattern data for transactions. Set to true for pattern data to be collected for transactions.
vcrypt.tracker.autolearning.use.tran.status.for.analysis	Enable this property if you want autolearning (post processing) to occur but do not want to change the client code. Setting this property to true results in autolearning processing for updateTransactionStatus requests if the status is SUCCESS for that transaction request. However if the status is not SUCCESS, autolearning does not occur. Running autolearning rules with this property set to false runs the rules on the data that is stale. If this property is set to false and you have autolearning rules running, and if the log level is set to "debug" for the "com.bharosa.vcrypt.tracker.rules.impl.VCryptTrackerAutoLearningImpl" class; a message is written to the log saying that this property is disabled and rules are still running.
vcrypt.tracker.autolearning.use.synchronous.execution.for.pattern.analysis	Controls whether the pattern analysis occurs in synchronous mode. If set to true, pattern analysis is performed synchronously. The updateAuthStatus or updateTransactionStatus call may take longer to complete since all the pattern data update occurs as part of the same updateStatus call.
vcrypt.tracker.autolearning.update.entity.profile.for.auth.patterns	Enables/disables update of profiles for entities as part of pattern analysis.
bharosa.menu.queries.entities	Determines whether the menu item to view historical data should be shown in the OAAM Administration Console.
bharosa.arm.pagetitle.queries.entities.patternworkflow	Default location of the menu for the pattern historical data. Use this historical data page to check to see whether pattern data collection is functioning properly.

C.1.4 Cookie Properties

Table C–4 Cookie Properties

Properties	Description
oaam.cookies.secure	Sets the Secure Only flag on any cookies set by OAAM applications directly (does not apply to JSESSIONID). It will mainly apply to the VSC cookie `ora_oaam_vsc`. Other cookies may include `ora_oaam_clientoffset`. Default value is `false`. If set to `true`, the cookie(s) are only sent over HTTPS.

C.1.5 Entities and Transactions Properties

Table C–5 Entity and Transaction Properties

Properties	Description
bharosa.trackeradmin.show.transaction.detail=true	Enables you to view transactions in the Session Details page if set to true. Turns off the display for transactions is set to false.
oaam.admin.detail.ip.enabled oaam.admin.detail.user.enabled oaam.admin.detail.device.enabled oaam.admin.detail.fingerprint.enabled oaam.admin.detail.alert.enabled oaam.admin.detail.challengecount.enabled	Enables you to be able to use the details pages.
oaam.transaction.mapping.startindex.min	Starts the substring operation from the first character of the string if you set this property to `0`.

C.1.6 Encrypted Data Masking Properties

Table C–6 Encrypted Data Masking Properties

Properties	Description
oaam.transaction.encrypted.data.mask.suffix.length	Shows the number of characters unmasked. The default length is 3.
oaam.transaction.encrypted.data.mask.char	Shows mask characters to represent encrypted transaction data. For example, set the property to ********
oaam.transaction.encrypted.data.mask	Set to true to enables masking of encrypted transaction data globally.

C.1.7 KBA Properties

Table C–7 KBA Properties

Properties	Description
bharosa.kba.active	Enables KBA if set to true.
bharosa.config.type.kba_ config.enum.regQuestionsCount.validation.minValue	Specifies the maximum and minimum limits for questions the user will register.
bharosa.config.type.kba_ config.enum.regQuestionsCount.validation.maxValue	bharosa.config.type.kba_ config.enum.regQuestionsCount.validation.minValue=3
	bharosa.config.type.kba_ config.enum.regQuestionsCount.validation.maxValue=7
	The setting should be between 3 and 7 to offer security but not over burden a user's memory. The basic industry standard for KBA is 3 registered questions.
challenge.question.registration.groups.minimum.questions.per.category.count	Controls the listing of questions in the OAAM server.
challenge.question.registration.groups.categories.count	challenge.question.registration.groups.minimum.questions.per.category.count =1
challenge.question.registration.groups.questions.count	challenge.question.registration.groups.categories.count=5
challenge.question.registration.groups.count	challenge.question.registration.groups.questions.count=5
challenge.question.registration.groups.maxlimit	challenge.question.registration.groups.count=3
	challenge.question.registration.groups.maxlimit =5

C.1.8 OTP Properties

Table C–8 OTP Properties

Properties	Description
bharosa.uio.default.ums.integration.webservice	http://<UMS Server URL>:<UMS Port>/ucs/messaging/webservice
	UMS Server Web service URL
bharosa.uio.default.ums.integration.parlayx.endpoint	http://<UMS Server URL>:<UMS Port>/sdpmessaging/parlayx/SendMessage Service
	UMS Server ParlayX Endpoint URL
bharosa.uio.default.ums.integration.useParlayX	False
	Configures the use of web service or parlayx API. The value is false by default (Web services recommended).
bharosa.uio.default.ums.integration.userName	User name for UMS server
bharosa.uio.default.ums.integration.password	Password for UMS server
bharosa.uio.default.ums.integtaion.policies	UMS authentication policies
bharosa.uio.default.ums.integration.fromAddress	jane@mycompany.example.com
	OAAM from address for OTP messages.

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.ums.integration.message.status.poll.attempts	3 Number of times to attempt status poll each time the wait page is displayed.
bharosa.uio.default.ums.integration.message.status.poll.delay	1000 Delay between status polls while the wait page is being displayed
bharosa.uio.default.ums.integration.sleepInterval	10000
bharosa.uio.default.ums.integration.deliveryPage.delay	3000
bharosa.uio.default.challenge.type.enum.ChallengeSMS	2 SMS Challenge enum value
bharosa.uio.default.challenge.type.enum.ChallengeSMS.name	SMS Challenge Name of SMS challenge type
bharosa.uio.default.challenge.type.enum.ChallengeSMS.description	SMS Challenge Description of SMS challenge type
bharosa.uio.default.challenge.type.enum.ChallengeSMS.processor	com.bharosa.uio.processor.challenge.ChallengeSMSProcessor Processor class for SMS challenge type Specifies the java class for handling challenges of this type. The challenge mechanism is customizable through Java classes. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for information.
bharosa.uio.default.challenge.type.enum.ChallengeSMS.requiredInfo	mobile Required fields to challenge user with SMS challenge type A comma separated list of inputs from registration input enum
bharosa.uio.default.challenge.type.enum.ChallengeSMS.available	Makes available the SMS challenge type Specifies if the challenge type is available for use (service ready and configured). To enable/disable an OTP challenge type, the available flag should be set.
bharosa.uio.default.challenge.type.enum.ChallengeSMS.otp	true OTP property for SMS challenge type
bharosa.uio.default.challenge.type.enum.ChallengeEmail	1 Email Challenge enum value
bharosa.uio.default.challenge.type.enum.ChallengeEmail.name	Email Challenge Name of email challenge type
bharosa.uio.default.challenge.type.enum.ChallengeEmail.description	Email Challenge Description of email challenge type

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.challenge.type.enum.ChallengeEmail.processor	com.bharosa.uio.processor.challenge.ChallengeEmailProcessor Processor class for email challenge type Specifies the java class for handling challenges of this type. The challenge mechanism is customizable through Java classes. See the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for information.
bharosa.uio.default.challenge.type.enum.ChallengeEmail.requiredInfo	email Required fields to challenge user with email challenge type A comma separated list of inputs from registration input enum
bharosa.uio.default.challenge.type.enum.ChallengeEmail.available	false Makes available the email challenge type Specifies if the challenge type is available for use (service ready and configured). To enable/disable an OTP challenge type, the available flag should be set.
bharosa.uio.default.challenge.type.enum.ChallengeEmail.otp	true OTP property for email challenge type
bharosa.uio.default.register.userinfo.enabled	Enables/disables the profile registration pages if the OTP channel is enabled and requires registration.
bharosa.uio.default.userpreferences.userinfo.enabled	Enables/disables the ability to set preferences if the OTP channel is enabled and allows preference setting. User Preferences is a page that allows the user to change their image/phrase, challenge questions, un-register devices, and update their OTP profile.
bharosa.uio.default.challenge.type.enum.ChallengeSMS.available	Enables the SMS Challenge Type. This makes it possible for the policies to challenge using OTP via SMS.
bharosa.uio.default.messages.enum.terms.name	Terms and Conditions
bharosa.uio.default.messages.enum.terms.description	PLACEHOLDER TEXT FOR TERMS AND CONDITIONS
bharosa.uio.default.messages.enum.privacy.name	Privacy Policy
bharosa.uio.default.messages.enum.privacy.description	PLACEHOLDER TEXT FOR PRIVACY POLICY
bharosa.uio.default.userinfo.inputs.enum.terms	4 Terms and Conditions enum value
bharosa.uio.default.userinfo.inputs.enum.terms.name	Terms and Conditions Name for Terms and Conditions checkbox

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.userinfo.inputs.enum.terms.description	Terms and Conditions Description for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.inputname	terms HTML input name for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.inputtype	checkbox HTML input type for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.values	true Required values for Term and Conditions checkbox during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.terms.maxlength	40 HTML input max length for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.required	true Required flag for Term and Conditions checkbox during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.terms.order	5 Order on the page for Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.enabled	true Enabled flag for Terms and Conditions enum item
bharosa.uio.default.userinfo.inputs.enum.terms.regex	.+ Regular expression for validation of Terms and Conditions checkbox
bharosa.uio.default.userinfo.inputs.enum.terms.errorCode	otp.invalid.terms Error code to get error message from if validation of Terms and Conditions fails
bharosa.uio.default.userinfo.inputs.enum.terms.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager Java class to use to save / retrieve Terms and Conditions from data storage
bharosa.uio.default.userinfo.inputs.enum.mobile	0 Mobile phone enum value
bharosa.uio.default.userinfo.inputs.enum.mobile.name	Mobile Phone Name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.description	Mobile Phone Description for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.inputname	cell number HTML input name for mobile phone field

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.userinfo.inputs.enum.mobile.inputtype	text HTML input type for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.maxlength	15 HTML input max length for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.required	true Required flag for mobile phone field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.mobile.order	1 Order on the page for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.enabled	true Enabled flag for mobile phone enum item
bharosa.uio.default.userinfo.inputs.enum.mobile.regex	\\D?(\\d{3})\\D?\\D?(\\d{3})\\D?(\\d{4}) Regular expression for validation of mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile.errorCode	otp.invalid.mobile Error code to get error message from if validation of mobile phone entry fails
bharosa.uio.default.userinfo.inputs.enum.mobile.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager Java class to use to save / retrieve mobile phone from data storage
bharosa.uio.default.userinfo.inputs.enum.mobile2	2 Mobile phone enum value
bharosa.uio.default.userinfo.inputs.enum.mobile2.name	Mobile Phone 2 Name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.description	Mobile Phone 2 Description for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.inputname	cell number 2 HTML input name for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.inputtype	text HTML input type for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.maxlength	15 HTML input max length for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.required	true Required flag for mobile phone field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.mobile2.order	2 Order on the page for mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.enabled	true Enabled flag for mobile phone enum item

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.userinfo.inputs.enum.mobile2.regex	\\D?(\\d{3})\\D?\\D?(\\d{3})\\D?(\\d{4}) Regular expression for validation of mobile phone field
bharosa.uio.default.userinfo.inputs.enum.mobile2.errorCode	otp.invalid.mobile Error code to get error message from if validation of mobile phone entry fails
bharosa.uio.default.userinfo.inputs.enum.mobile2.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager Java class to use to save / retrieve mobile phone from data storage
bharosa.uio.default.userinfo.inputs.enum.email	1 Email address enum value
bharosa.uio.default.userinfo.inputs.enum.email.name	Email Address Name for email address field
bharosa.uio.default.userinfo.inputs.enum.email.description	Email Address Description for email address field
bharosa.uio.default.userinfo.inputs.enum.email.inputname	email HTML input name for email address field
bharosa.uio.default.userinfo.inputs.enum.email.inputtype	text HTML input type for email address field
bharosa.uio.default.userinfo.inputs.enum.email.maxlength	40 HTML input max length for email address field
bharosa.uio.default.userinfo.inputs.enum.email.required	true Required flag for email address field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.email.order	2 Order on the page for email address field
bharosa.uio.default.userinfo.inputs.enum.email.enabled	false Enabled flag for email address enum item
bharosa.uio.default.userinfo.inputs.enum.email.regex	.+@[a-zA-Z_]+?\\.[a-zA-Z]{2,3} Regular expression for validation of email address field
bharosa.uio.default.userinfo.inputs.enum.email.errorCode	otp.invalid.email Error code to get error message from if validation of email address entry fails
bharosa.uio.default.userinfo.inputs.enum.email.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager Java class to use to save / retrieve email address from data storage
bharosa.uio.default.userinfo.inputs.enum.email2	2 Email address enum value

Table C–8 (Cont.) OTP Properties

Properties	Description
bharosa.uio.default.userinfo.inputs.enum.email2.name	Email Address 2 Name for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.description	Email Address 2 Description for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.inputname	email2 HTML input name for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.inputtype	text HTML input type for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.maxlength	40 HTML input max length for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.required	true Required flag for email address field during registration and user preferences
bharosa.uio.default.userinfo.inputs.enum.email2.order	2 Order on the page for email address field
bharosa.uio.default.userinfo.inputs.enum.email2.enabled	false Enabled flag for email address enum item
bharosa.uio.default.userinfo.inputs.enum.email2.regex	.+@[a-zA-Z_]+?\\.[a-zA-Z]{2,3} Regular expression for validation of email address field
bharosa.uio.default.userinfo.inputs.enum.email2.errorCode	otp.invalid.email Error code to get error message from if validation of email address entry fails
bharosa.uio.default.userinfo.inputs.enum.email2.managerClass	com.bharosa.uio.manager.user.DefaultContactInfoManager Java class to use to save / retrieve email address from data storage
bharosa.uio.default.userinfo.inputs.enum.mobile.name	Mobile Phone Name for mobile phone field

C.1.9 Investigation Properties

Table C–9 Investigation Properties

Properties	Description
bharosa.trackeradmin.show.transaction.detail	Set to true to be able to view transactions in the Session Details page. Setting the property to false turns off the display for transactions.
oaam.customercare.agent.case.allow.userinfo	Turns on/off user information display for Agent case (which is not in escalated status
oaam.admin.investigator.default.landing.page=customercare oaam.admin.investigator.landing.page2=sessions oaam.admin.investigator.landing.page3=transactionlogs	Changes the landing page to either Cases, Sessions or Search Transactions with the use of property
incrementCacheCounter	Set to true in the rule.action.enum so that different actions performed by the user along with the aggregate count for each one of them is available in the user details: profile data.

C.1.10 Offline Scheduler Properties

Table C–10 Offline Scheduler Properties

Properties	Description
vcrypt.reports.scheduler.activate	Enables/disables scheduler so that jobs are run. By default, the property is set to false. Jobs can be created, but they will not run until the property is changed to true.

C.1.11 Virtual Authentication Devices Properties

Table C–11 Virtual Authentication Device Properties

Properties	Description

bharosa.user.noun.list
bharosa.user.adj.list
	Customize the phrase in the virtual authentication device by setting the following two parameters.
	The authenticator phrase is created by these two properties.
	Both are comma-separated lists of words.
	Examples:
	`actors,age,air,aircraft`
	`abundant,accessible,accommodating`

vcrypt.user.image.dirlist.property.name=bharosa.image.dirlist bharosa.image.dirlist=<imagePath>	Set the properties for images to be displayed. bharosa.image.dirlist sets is the location of the image files that the application will use when creating authentication images. The directory contains 1000 images. bharosa.image.dirlist=/bharosa_images/allpads/textpad/ vcrypt.user.image.dirlist.property.name=bharosa.image.dirlist
bharosa.authentipad.questionpad.datafield.input.type	The property in `client_resource_<locale>.properties` determines whether the QuestionPad is set for visible text input or password (non-visible) input. Valid values are text and password.
bharosa.authentipad.image.url	bharosa.authentipad.image.url=kbimage.jspaction=kbimage& Specifies the URL file and query parameters to use when displaying an image for challenge.
vcrypt.caption.assignDefault	Instructs the server not to assign a caption to the user's registration image if set to false.
desertref.authentipad.isADACompliant	Enables accessible versions of the virtual authentication devices in native integration if this ADA compliant property is set to true. The accessible versions of the pads contain tabbing, directions and ALT text necessary for navigation via screen reader and other assistive technologies.
bharosa.uio.default.authentipad.is_ada_compliant	Enables accessible versions of the virtual authentication devices in UIO if this ADA compliant property is set to true. The accessible versions of the pads contain tabbing, directions and ALT text necessary for navigation via screen reader and other assistive technologies.

C.1.12 Configurable Action Properties

Table C–12 Configuration Action Properties

Properties	Description
dynamicactions.enabled	Enables the configurable actions feature if set to true.

C.1.13 Proxy Properties

Table C–13 Proxy Properties

Properties	Description
vcrypt.tracker.ip.detectProxiedIP bharosa.ip.header.name	Enables use of the "X-Forwarded-For" IP, set this property to true. OAAM does not use the header IP by default. When using OAAM with LBR and SNAT enabled, the client IP address needs to be preserved. This is critical since OAAM relies on the client IP Address when evaluating policies. Make sure the following OAAM properties are set as follows: vcrypt.tracker.ip.detectProxiedIP=true bharosa.ip.header.name=X-Forwarded-For For information on load balancers preserving the Client IP Addresses, see the "Preparing the Network for an Enterprise Deployment" chapter in *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management*.
bharosa.uio.proxy.mode.flag	Indicates that the application is not protected by the OAAM proxy solution and that OAAM server should not proxy requests for UIO to the OAAM admin system. Set it to true for proxy mode. OAAM Server is configured to be in non-proxy mode with the flag set to false by default.

C.1.14 Device Registration Properties

Table C–14 Device Registration Properties

Properties	Description
bharosa.uio.default.registerdevice.enabled bharosa.uio.default.userpreferences.unregister.this.enabled bharosa.uio.default.userpreferences.unregister.all.enabled	Adds text and a checkbox to the bottom of the challenge page if the property is set to true. When a user is challenged, the checkbox and text would allow him to register the current device (if it is not already registered). If the device is already registered for that user, the option will not appear unless the user unregisters the device in user preferences.
bharosa.tracker.send.devideId	Enables device registration in native integration if property is set to true so that data can be captured.

C.1.15 Properties Editor Properties

Table C–15 Properties Editor Properties

Properties	Description
bharosa.config.ui.list.filter.enum	Enables the enumerations to be listed in the Properties Editor if set to false.

C.1.16 User Interface Properties

Table C–16 User Interface Properties

Properties	Description

bharosa.uio.default.username.case.sensitive	Specifies the user name to be in lowercase if set to false
	By default this property is set to true.
	When it is set to true, the user name is always in lower case. If it is set to false, the user name is taken as is.
	For example:
	`myusername`
	`MyUserName`
	`myUserName`
	If property is true (default), all of these are the same user and will appear in the OAAM Administration Console as "myusername".
	If property is false, all of these are different users and will appear in the OAAM Administration Console as entered.

oaam.export.max.rows.allowed	Limits the maximum row selection for exporting a report of the results to EXCEL. Reports are the results from the Search pages for policies, questions, validations, snapshots, properties, entities, transactions, conditions, groups, patterns, and so on.
fa.default.daterange.in.hours	Search screen default time range.
oaam.session.filter.timerange.enum.oneday.typevalue	Session screen default time range.

C.1.17 Time Zone Properties

Table C–17 Timezones

Properties	Description

oaam.adf.timezone	To set the time zone that will be used for all timestamps in the user interface, use the Property Editor to set `oaam.adf.timezone` to the desired time zone.
	For example,
	`oaam.adf.timezone = Atlantic/Reykjavik`
	`oaam.adf.timezone = Pacific/Midway`
	`oaam.adf.timezone = America/Anchorage`
	
	The time zones are as follows:
	Pacific/Midway (GMT-11:00) Midway - Samoa Time (ST)
	Pacific/Pago_Pago (GMT-11:00) Pago Pago - Samoa Time (ST)
	Pacific/Honolulu (GMT-10:00) Honolulu - Hawaii Time (HT)
	Pacific/Fiji (GMT+12:00) Fiji - Fiji Time (FJT)

oaam.adf.timezone	America/Anchorage (GMT-09:00) Alaska Time (AKT) America/Tijuana (GMT-08:00) Tijuana - Pacific Time (PT) America/Vancouver (GMT-08:00) Vancouver - Pacific Time (Canada) (PT) America/Los_Angeles (GMT-08:00) Los Angeles - Pacific Time (PT) America/Chihuahua (GMT-07:00) Chihuahua - Mexico Time 2 (MT) America/Denver (GMT-07:00) Denver - Mountain Time (MT) America/Edmonton (GMT-07:00) Mountain Time Canada (MT) America/Panama (GMT-05:00) Panama - Eastern Time (ET) America/Montreal (GMT-05:00) Montreal - Eastern Time (Canada) (ET) America/New_York (GMT-05:00) New York - Eastern Time (ET) America/Puerto_Rico (GMT-04:00) Puerto Rico - Atlantic Time (AT) America/Halifax (GMT-04:00) Canada Atlantic Time (AT) America/Santiago (GMT-04:00) Santiago - Chile Time (CLT) America/Caracas (GMT-04:00) Caracas - Venezuela Time (VET) America/Godthab (GMT-03:00) Godthab - Western Greenland Time (WGT) America/Argentina/Buenos_Aires (GMT-03:00) Buenos Aires - Argentine Time (ART) America/Sao_Paulo (GMT-03:00) Sao Paulo - Brasilia Time (BRT) America/St_Johns (GMT-03:30) St Johns - Newfoundland Time (NT) America/Noronha (GMT-02:00) Noronha - Fernando de Noronha Time (FNT) Atlantic/Azores (GMT-01:00) Azores - Azores Time (AZOT) Atlantic/Cape_Verde (GMT-01:00) Cape Verde - Cape Verde Time (CVT)

Table C–17 (Cont.) Timezones

Properties	Description
oaam.adf.timezone	Europe/Dublin (GMT+00:00) Dublin - Greenwich Mean Time (GMT)
	Europe/London (GMT+00:00) London - Greenwich Mean Time (GMT)
	Etc/UTC (GMT+00:00) Coordinated Universal Time (UTC)
	Africa/Casablanca (GMT+00:00) Casablanca - Western European Time (WET)
	Europe/Lisbon (GMT+00:00) Lisbon - Western European Time (WET)
	Africa/Nouakchott (GMT+00:00) Nouakchott - Greenwich Mean Time (GMT)
	Atlantic/Reykjavik (GMT+00:00) Reykjavik - Greenwich Mean Time (GMT)
	Europe/Prague (GMT+01:00) Prague - Central European Time (CET)
	Europe/Budapest (GMT+01:00) Budapest - Central European Time (CET)
	Europe/Madrid (GMT+01:00) Madrid - Central European Time (CET)
	Europe/Vienna (GMT+01:00) Vienna - Central European Time (CET)
	Africa/Algiers (GMT+01:00) Algiers - Central European Time (CET)
	Africa/Lagos (GMT+01:00) Lagos - Western African Time (WAT)
	Europe/Belgrade (GMT+01:00) Belgrade - Central European Time (CET)
	Europe/Oslo (GMT+01:00) Oslo - Central European Time (CET)
	Europe/Rome (GMT+01:00) Rome - Central European Time (CET)
	Africa/Tunis (GMT+01:00) Tunis - Central European Time (CET)
	Europe/Stockholm (GMT+01:00) Stockholm - Central European Time (CET)
	Europe/Copenhagen (GMT+01:00) Copenhagen - Central European Time (CET)
	Europe/Tirane (GMT+01:00) Tirane - Central European Time (CET)
	Europe/Zurich (GMT+01:00) Zurich - Central European Time (CET)
	Europe/Paris (GMT+01:00) Paris - Central European Time (CET)
	Europe/Berlin (GMT+01:00) Berlin - Central European Time (CET)
	Europe/Warsaw (GMT+01:00) Warsaw - Central European Time (CET)
	Europe/Amsterdam (GMT+01:00) Amsterdam - Central European Time (CET)
	Europe/Brussels (GMT+01:00) Brussels - Central European Time (CET)
	Europe/Luxembourg (GMT+01:00) Luxembourg - Central European Time (CET)
	Europe/Bucharest (GMT+02:00) Bucharest - Eastern European Time (EET)

Table C–17 (Cont.) Timezones

Properties	Description
oaam.adf.timezone	Asia/Nicosia (GMT+02:00) Nicosia - Eastern European Time (EET)
	Europe/Kiev (GMT+02:00) Kiev - Eastern European Time (EET)
	Europe/Sofia (GMT+02:00) Sofia - Eastern European Time (EET)
	Europe/Riga (GMT+02:00) Riga - Eastern European Time (EET)
	Africa/Johannesburg (GMT+02:00) Johannesburg - South Africa Time (SAT)
	Europe/Athens (GMT+02:00) Athens - Eastern European Time (EET)
	Africa/Tripoli (GMT+02:00) Tripoli - Eastern European Time (EET)
	Africa/Cairo (GMT+02:00) Cairo - Egypt Time (ET)
	Asia/Beirut (GMT+02:00) Beirut - Eastern European Time (EET)
	Europe/Tallinn (GMT+02:00) Tallinn - Eastern European Time (EET)
	Europe/Vilnius (GMT+02:00) Vilnius - Eastern European Time (EET)
	Europe/Helsinki (GMT+02:00) Helsinki - Eastern European Time (EET)
	Asia/Amman (GMT+02:00) Amman - Eastern European Time (EET)
	Asia/Damascus (GMT+02:00) Damascus - Eastern European Time (EET)
	Africa/Harare (GMT+02:00) Harare - Central African Time (CAT)
	Asia/Jerusalem (GMT+02:00) Jerusalem - Israel Time (IT)
	Europe/Istanbul (GMT+02:00) Istanbul - Eastern European Time (EET)
	Africa/Khartoum (GMT+03:00) Khartoum - Eastern African Time (EAT)
	Asia/Aden (GMT+03:00) Aden - Arabia Time (AT)
	Africa/Mogadishu (GMT+03:00) Mogadishu - Eastern African Time (EAT)
	Asia/Baghdad (GMT+03:00) Baghdad - Arabia Time (AT)
	Asia/Bahrain (GMT+03:00) Bahrain - Arabia Time (AT)
	Africa/Djibouti (GMT+03:00) Djibouti - Eastern African Time (EAT)
	Africa/Nairobi (GMT+03:00) Nairobi - Eastern African Time (EAT)
	Europe/Moscow (GMT+03:00) Moscow - Moscow Time (MSK)

Table C–17 (Cont.) Timezones

Properties	Description
oaam.adf.timezone	Europe/Moscow (GMT+03:00) Moscow - Moscow Time (MSK)
	Asia/Qatar (GMT+03:00) Qatar - Arabia Time (AT)
	Asia/Kuwait (GMT+03:00) Kuwait - Arabia Time (AT)
	Asia/Riyadh (GMT+03:00) Riyadh - Arabia Time (AT)
	Asia/Tehran (GMT+03:30) Tehran - Iran Time (IRT)
	Asia/Dubai (GMT+04:00) Dubai - Gulf Time (GT)
	Asia/Baku (GMT+04:00) Baku - Azerbaijan Time (AZT)
	Asia/Muscat (GMT+04:00) Muscat - Gulf Time (GT)
	Asia/Kabul (GMT+04:30) Kabul - Afghanistan Time (AFT)
	Asia/Yekaterinburg (GMT+05:00) Yekaterinburg - Yekaterinburg Time (YEKT)
	Asia/Karachi (GMT+05:00) Karachi - Pakistan Time (PKT)
	Asia/Tashkent (GMT+05:00) Tashkent - Uzbekistan Time (UZT)
	Asia/Kolkata (GMT+05:30) Kolkata - India Time (IT)
	Asia/Colombo (GMT+05:30) Colombo - Sri Lanka Time (LKT)
	Asia/Katmandu (GMT+05:45) Katmandu - Nepal Time (NPT)
	Asia/Dhaka (GMT+06:00) Dhaka - Bangladesh Time (BDT)
	Asia/Almaty (GMT+06:00) Almaty - Alma-Ata Time (ALMT)
	Asia/Novosibirsk (GMT+06:00) Novosibirsk - Novosibirsk Time (NOVT)
	Asia/Rangoon (GMT+06:30) Rangoon - Myanmar Time (MMT)
	Asia/Krasnoyarsk (GMT+07:00) Krasnoyarsk - Krasnoyarsk Time (KRAT)
	Asia/Ho_Chi_Minh (GMT+07:00) Ho Chi Minh - Indochina Time (ICT)
	Asia/Jakarta (GMT+07:00) Jakarta - West Indonesia Time (WIT)
	Asia/Bangkok (GMT+07:00) Bangkok - Indochina Time (ICT)
	Asia/Kuala_Lumpur (GMT+08:00) Kuala Lumpur - Malaysia Time (MYT)

Table C–17 (Cont.) Timezones

Properties	Description
oaam.adf.timezone	Asia/Kuala_Lumpur (GMT+08:00) Kuala Lumpur - Malaysia Time (MYT)
	Asia/Shanghai (GMT+08:00) Shanghai - China Time (CT)
	Asia/Taipei (GMT+08:00) Taipei - China Time (CT)
	Asia/Irkutsk (GMT+08:00) Irkutsk - Irkutsk Time (IRKT)
	Asia/Singapore (GMT+08:00) Singapore - Singapore Time (SGT)
	Asia/Hong_Kong (GMT+08:00) Hong Kong - Hong Kong Time (HKT)
	Asia/Manila (GMT+08:00) Manila - Philippines Time (PHT)
	Australia/Perth (GMT+08:00) Perth - Western Time (Australia) (WT)
	Asia/Yakutsk (GMT+09:00) Yakutsk - Yakutsk Time (YAKT)
	Asia/Tokyo (GMT+09:00) Tokyo - Japan Time (JT)
	Asia/Seoul (GMT+09:00) Seoul - Korea Time (KT)
	Australia/Adelaide (GMT+09:30) Adelaide - Central Time (South Australia) (CT)
	Australia/Darwin (GMT+09:30) Darwin - Central Time (Northern Territory) (CT)
	Asia/Vladivostok (GMT+10:00) Vladivostok - Vladivostok Time (VLAT)
	Pacific/Guam (GMT+10:00) Guam - Chamorro Time (ChT)
	Australia/Hobart (GMT+10:00) Hobart - Eastern Time (Tasmania) (ET)
	Australia/Sydney (GMT+10:00) Sydney - Eastern Time (New South Wales) (ET)
	Australia/Brisbane (GMT+10:00) Brisbane - Eastern Time (Queensland) (ET)
	Asia/Magadan (GMT+11:00) Magadan - Magadan Time (MAGT)
	Pacific/Auckland (GMT+12:00) Auckland - New Zealand Time (NZT)
	Pacific/Fiji (GMT+12:00) Fiji - Fiji Time (FJT)
	Asia/Kamchatka (GMT+12:00) Kamchatka - Petropavlovsk-Kamchatski Time (PETT)
	Etc/GMT-12 (GMT+12:00) Dateline Standard Time (UTC+12:00)
	Pacific/Tongatapu (GMT+13:00) Tongatapu - Tonga Time (TOT)

C.1.18 Customer Care Properties

Table C–18 Customer Care Properties

Properties	Description
customercare.case.expirybehavior.enum.csrcase.behavior = expiry customercare.case.expirybehavior.enum.csrcase.label = Expired customercare.case.expirybehavior.enum.csrcase.durationInHrs = 24 customercare.case.expirybehavior.enum.csrcase.resetonaccess = false	Sets expiry behavior for CSR cases
customercare.case.expirybehavior.enum.csrcase.behavior = none	Disables the expiry behavior for CSR cases
oaam.permission.creatagentcase=oaam.perm.create.case.type.csr	Allows investigator access to create Agent cases
oaam.permission.creatagentcase=oaam.perm.create.case.type.csr	Allows CSR access to Agent cases

Table C–18 (Cont.) Customer Care Properties

Properties	Description
customercare.case.actiontype.enum.accesscase.description	The values for the **Notes** column in the **Logs** tab for notes that are not added by the user will appear in English by default. The notes are taken from the action enums "note" field (property). The value of that property is saved into database (as notes). After being saved, users cannot change that data. Implementations can customize the "note" in the enum property to the localized value. "Access case" is inside the `oaam_resources.properties` file: `customercare.case.actiontype.enum.accesscase.description=Access case` Case creation / access logic will use that string for the creating records after that point.
customercare.case.expirybehavior.enum.agentcase.behavior customercare.case.expirybehavior.enum.agentcase.label customercare.case.expirybehavior.enum.agentcase.durationInHrs customercare.case.expirybehavior.enum.agentcase.resetonaccess	Sets "expiry/overdue" behavior for Agent cases customercare.case.expirybehavior.enum.agentcase.behavior = overdue customercare.case.expirybehavior.enum.agentcase.label = Overdue customercare.case.expirybehavior.enum.agentcase.durationInHrs = 24 customercare.case.expirybehavior.enum.agentcase.resetonaccess = true
customercare.case.expirybehavior.enum.agentcase.behavior	customercare.case.expirybehavior.enum.agentcase.behavior = none Disables the "overdue/expiry" behavior for Agent cases
customercare.case.autostatuschange.enum.flowone.enabled	Enables Auto Change of Case Status if set to true.
customercare.case.autostatuschange.enum.flowone.enabled	Disables Auto Change of Case Status if set to false.

Table C–18 (Cont.) Customer Care Properties

Properties	Description
customercare.case.autostatuschange.enum.flowone customercare.case.autostatuschange.enum.flowone.name onecustomercare.case.autostatuschange.enum.flowone.description onecustomercare.case.autostatuschange.enum.flowone.enabled customercare.case.autostatuschange.enum.flowone.from customercare.case.autostatuschange.enum.flowone.to	customercare.case.autostatuschange.enum.flowone=1 customercare.case.autostatuschange.enum.flowone.name=Flow onecustomercare.case.autostatuschange.enum.flowone.description=Status flow onecustomercare.case.autostatuschange.enum.flowone.enabled=true customercare.case.autostatuschange.enum.flowone.from=new customercare.case.autostatuschange.enum.flowone.to=pending Configurable actions create cases with a status of "New". When the case is opened, the status is changed to "Pending." For these cases to change from "New" to "Pending" automatically on access, the properties are configured by default to the values.
customercare.case.autostatuschange.enum.flowtwo customercare.case.autostatuschange.enum.flowtwo.name customercare.case.autostatuschange.enum.flowtwo.description customercare.case.autostatuschange.enum.flowtwo.enabled customercare.case.autostatuschange.enum.flowtwo.from customercare.case.autostatuschange.enum.flowtwo.to customercare.case.autostatuschange.enum.flowtwo.casetype	customercare.case.autostatuschange.enum.flowtwo=2 customercare.case.autostatuschange.enum.flowtwo.name=Flow Two customercare.case.autostatuschange.enum.flowtwo.description=Status flow two customercare.case.autostatuschange.enum.flowtwo.enabled=true customercare.case.autostatuschange.enum.flowtwo.from=escalated customercare.case.autostatuschange.enum.flowtwo.to=pending customercare.case.autostatuschange.enum.flowtwo.casetype=agent Escalated cases have a Case Status of Escalated. When the case is opened, the status is changed to "Pending". For cases to change from Escalated to Pending automatically on access, the properties are configured by default.
oaam.comparetrx.max.rows.allowed	oaam.comparetrx.max.rows.allowed=10 Limits the number of transaction rows selected for Compare Transaction.
oaam.generic.idmshellrhs.tab.width	oaam.generic.idmshellrhs.tab.width=400 IDM shell right hand side width
oaam.customercare.linksessions.max.rows.allowed	oaam.customercare.linksessions.max.rows.allowed=25 Limits the number of session rows to be linked to agent case.

Table C–18 (Cont.) Customer Care Properties

Properties	Description
oaam.admin.investigator.default.landing.page oaam.admin.investigator.landing.page2 oaam.admin.investigator.landing.page3 oaam.admin.investigator.landing.showhometab	oaam.admin.investigator.default.landing.page=customercare oaam.admin.investigator.landing.page2=sessions oaam.admin.investigator.landing.page3=transactionlogs oaam.admin.investigator.landing.showhometab=false Default landing page for the investigator
oaam.admin.csr.default.landing.page	oaam.admin.csr.default.landing.page=customercare Default landing page for the CSR;points to the taskflowId(oaam.menu.enum)
oaam.utility.max.filter.items.allowed	oaam.utility.max.filter.items.allowed=15 Maximum filter items under tagged panel
oaam.utility.filter.isconjuctionall	oaam.utility.filter.isconjuctionall=true Utility filter items conjunction type (all or any)
oaam.utility.filter.timerange.default	oaam.utility.filter.timerange.default=oneday Utility filter default time-range: oaam.session.filter.timerange.enum
oaam.customercare.agent.case.allow.userinfo	oaam.customercare.agent.case.allow.userinfo=false Turns on/off userinfo for Agent case(which is not in escalated status)
customercare.case.agent.landingtf.access customercare.case.csr.landingtf.access	customercare.case.agent.landingtf.access=oaam.perm.do.case.agent.landingtf customercare.case.csr.landingtf.access=oaam.perm.do.case.csr.landingtf High-level permissions for landing pages for CSR and Investigator
bharosa.multitenant.boolean	Turns on the access control in the OAAM Administration Console for multitenant deployments, you must set the bharosa.multitenant.boolean property to true. By default, the value is set to false.

C.1.19 Step-up Authentication Properties

Table C–19 Step-Up Authentication Properties

Properties	Description
oaam.uio.oam.integration.stepup.enabled	Disables the Step-up use case in Access Manager-OAAM TAP integration, you need to set the following property to false.

C.1.20 Mobile Properties

Table C–20 Mobile Properties

Properties	Description
oaam.admin.detail.mobile.enabled	Turns off the mobile fields. Setting it to false hides these fields in the user interface. You want to enable this property if the deployment supports mobile access. If not, set it to false.

C.1.21 Agent Cases Properties

Table C–21 Agent Case Properties

Properties	Description
oaam.customercare.agent.case.allow.userinfo	Turns on/off user information for Agent case, which are not in the Escalated status.
oaam.admin.investigator.default.landing.page oaam.admin.investigator.landing.page2 oaam.admin.investigator.landing.page3	oaam.admin.investigator.default.landing.page=customercare oaam.admin.investigator.landing.page2=sessions oaam.admin.investigator.landing.page3=transactionlogs Changes the landing page to either Cases, Sessions or Search Transactions, use the following the properties:

C.1.22 Digital Fingerprint Properties

Table C–22 Digital Fingerprint Properties

Properties	Description
bharosa.uio.default.device.identification.scheme	Enables use of custom digital fingerprints if you set this property to the type of digital fingerprint you want to capture. For Instance, bharosa.uio.default.device.identification.scheme=applet Note: Flash is set to be the default digital fingerprint in OAAM.

C.1.23 Encryption

Table C–23 Encryption Properties

Property	Description
bharosa.cipher.encryption.algorithm.system.default	Switches to different encryption types
keystorepasswd	Password for opening the keystore.
keystorealiaspasswd	Password reading alias (key) in the keystore
keyFile	keyFile=soap_key.file File containing from key. Please note, keys in AES could be binary. Also note algorithms like 3DES require minimum 24 characters in the key

Table C–23 (Cont.) Encryption Properties

Property	Description
keystorefilename	keystorefilename=system_soap.keystore Keystore file name.
keystorealias	keystorealias=vcrypt.soap.call.passwd This is the keystore alias.
vcrypt.soap.auth.keystorePassword=<base64 encoded keystore password> vcrypt.soap.auth.aliasPassword=<based64 encoded password to the alias> vcrypt.soap.auth.username=<user configured for accessing the soap services> vcrypt.soap.auth.keystoreFile=system_ soap.keystore	Properties with the encoded passwords and the authentication user name to add to `oaam_custom.properties`.

C.1.24 Database Activity

Table C–24 Database Activity

Property	Description
bharosa.db.query.performance.warning.threshold.ms	Prints out every SQL if the property is set to zero.

C.1.25 SOAP Configuration Properties

Table C–25 SOAP Web Service Access Properties

Property	Description
vcrypt.soap.auth	Disables or enables HTTP authentication for Authenticator. set the following property to true (enabled) or false (disabled).
vcrypt.tracker.soap.url	SOAP Server Side URL. This setting is the location of the web services with which the application will communicate.
vcrypt.common.util.vcryptsoap.impl.classname	Specifies for the application which libraries to use when creating SOAP messages to exchange with the OAAM services. The available option is com.bharosa.vcrypt.common.impl.VCryptSOAPGenericImpl
vcrypt.soap.call.timeout	SOAP call timeout in milliseconds
keystorepasswd	Password for opening the keystore.
keystorealiaspasswd	Password reading alias (key) in the keystore
keyFile=	File containing from key. Please note, keys in AES could be binary. Also note algorithms like 3DES require minimum 24 characters in the key. For example, keyFile=soap_key.file.

Table C–25 (Cont.) SOAP Web Service Access Properties

Property	Description
keystorefilename	keystorefilename=system_soap.keystore Keystore file name.
keystorealias	keystorealias=vcrypt.soap.call.passwd Keystore alias.
vcrypt.soap.auth.keystorePassword=<base64 encoded keystore password> vcrypt.soap.auth.aliasPassword=<based64 encoded password to the alias> vcrypt.soap.auth.username=<user configured for accessing the soap services> vcrypt.soap.auth.keystoreFile=system_ soap.keystore	Properties with the encoded passwords and the authentication user name to add to `oaam_custom.properties`.

C.1.26 Fuzzy Logic

Table C–26 Fuzzy Logic Properties

Property	Description
bharosa.authenticator.EnableMatchScore	Selectively enables/disables the Fuzzy logic functionality in Knowledge Based Authentication

C.2 Enumerations

This section contains the following topics:

- Adding a New Case Status
- Adding New Alert Levels
- Adding Canned Notes to Case Status
- Adding New Case Severity
- Configuring Auto Change for Case Status
- Configuring Expiry Behavior for CSR Cases
- Configuring Expiry Behavior for Agent Cases

C.2.1 Adding a New Case Status

In this example, "myStatus" is the status that is being created. Other than the first line which specifies customercare.case.status.enum. myStatus is 100, all others are properties of this enum element.

Table C–27 New Status Enumeration

Properties	Description and Values
customercare.case.status.enum. myStatus	100 Specify a number that is not used by an existing case status enum
customercare.case.status.enum. myStatus.name	myStatus The status name
customercare.case.status.enum. myStatus.description	myStatus A description of the status
customercare.case.status.enum. myStatus.availableactions	1,2,3,4,5,8,9,10,11,102,103 Enum numbers for case.action.enum that tells the system which actions can be performed on the case in this state
customercare.case.status.enum. myStatus.access	oaam.perm.view.case.status.new Enum for the access permission for this case status (who can access the case in this state)
customercare.case.status.enum. myStatus.order	12 Specify an order number that will be used in the display when the case status is displayed in various drop down menus
customercare.case.status.enum. myStatus.display	true Specify whether the status is displayed in the interface. If you do not want this status to be displayed in the user interface, then set this to false
customercare.case.status.enum. myStatus.messagelist	customercare.case.statuschange.message.enum List of messages that you can see on screen when the status changes
customercare.case.status.enum. myStatus.notelist	customercare.case.statuschange.new.notes.enum List of canned notes that you can see for this status. If you are defining a new status, define your new notes enum. For instructions, refer to the "Adding Canned Notes to Case Status" section.

C.2.2 Adding New Alert Levels

To add new alert levels add the enum element for the alert level. An example for an "ultralow" alert level is shown below.

Table C–28 New Alert Level Enumeration

Property	Description and Value
alert.level.enum.ultralow	20000 Specify a number not used by alerts
alert.level.enum.ultralow.name	ALERT_ULTRA_LOW Name of the alert level
alert.level.enum.ultralow.label	Ultra Low Label that will be used in user interface

Table C–28 (Cont.) New Alert Level Enumeration

Property	Description and Value
alert.level.enum.ultralow.description	Ultra Low alert Description of the alert level
alert.level.enum.ultralow.color	Magenta Color to display on session
alert.level.enum.ultralow.viewColor	Cyan Color to display on alert screen
alert.level.enum.ultralow.order	23 Order to display in the drop down menu

C.2.3 Adding Canned Notes to Case Status

When you add a new status to case status, you should define the New Notes enum as defined on this first line below and then add note options to that enum. Those options will appear as canned notes. Note that you must configure the enum name as a note enum in the new status enum element that you defined.

Table C–29 Adding Canned Notes Enumeration

Property	Description and Value
customercare.case.statuschange.myStatus.notes.enum	My Status Canned Notes
customercare.case.statuschange.myStatus.notes.enum.review	1
customercare.case.statuschange.myStatus.notes.enum.review.name	My Review
customercare.case.statuschange.myStatus.notes.enum.review.description	My review needed
customercare.case.statuschange.myStatus.notes.enum.review.order	1
customercare.case.statuschange.myStatus.notes.enum.other	2
customercare.case.statuschange.myStatus.notes.enum.other.name	Other
customercare.case.statuschange.myStatus.notes.enum.other.description	Other
customercare.case.statuschange.myStatus.notes.enum.other.order	2

C.2.4 Adding New Case Severity

When you add a case severity enum you will need to define the corresponding properties for it. A sample of a "superhigh" severity enum is shown below.

```
customercare.case.severity.enum.superhigh=4 // Number that is not used by existing
severity enum element.
customercare.case.severity.enum. superhigh.name=Super High //Name
customercare.case.severity.enum. superhigh.description=Super High Severity level
// some description
customercare.case.severity.enum. superhigh.image=flag_lg_h.gif // Image file for
the icon that displays the severity
customercare.case.severity.enum.
superhigh.access=oaam.perm.view.case.severity.high // Access permission to view
the cases of high severity // define new if you do not want to resuse the enum
customercare.case.severity.enum. superhigh.order=3 // Order in the drop down menu
displays
customercare.case.severity.enum. superhigh.display=true // Whether to display on
```

```
user interface or not
customercare.case.severity.enum.
superhigh.messagelist=customercare.case.severitychange.message.enum // Message to
be given when severity change is done
customercare.case.severity.enum.
superhigh.notelist=customercare.case.severitychange.high.notes.enum // Canned
notes when severity change to this severity happens. You may want to define new
here.
```

C.2.5 Configuring Auto Change for Case Status

By default the Auto Change of Case Status is enabled. The property is as follows:

```
customercare.case.autostatuschange.enum.flowone.enabled=true
```

To disable Auto Change of Case Status set the following parameter:

```
customercare.case.autostatuschange.enum.flowone.enabled=false
```

Configurable actions create cases with a status of **New**. When the case is opened, the status is changed to **Pending**.

These cases change from **New** to **Pending** automatically on access. The default setting are as follows:

```
customercare.case.autostatuschange.enum.flowone=1
customercare.case.autostatuschange.enum.flowone.name=Flow
onecustomercare.case.autostatuschange.enum.flowone.description=Status flow
onecustomercare.case.autostatuschange.enum.flowone.enabled=true
customercare.case.autostatuschange.enum.flowone.from=new
customercare.case.autostatuschange.enum.flowone.to=pending
```

Escalated cases have a Case Status of **Escalated**. When the case is opened, the status is changed to **Pending**.

These cases change from **Escalated** to **Pending** automatically on access. The default settings are as follows:

```
customercare.case.autostatuschange.enum.flowtwo=2
customercare.case.autostatuschange.enum.flowtwo.name=Flow Two
customercare.case.autostatuschange.enum.flowtwo.description=Status flow two
customercare.case.autostatuschange.enum.flowtwo.enabled=true
customercare.case.autostatuschange.enum.flowtwo.from=escalated
customercare.case.autostatuschange.enum.flowtwo.to=pending
customercare.case.autostatuschange.enum.flowtwo.casetype=agent
```

C.2.6 Configuring Expiry Behavior for CSR Cases

The default setting is for CSR cases to expire after 24 hours. After a CSR case expires, a CSR cannot access them. CSR Managers have to extend the expiration time so that the CSR can access them.

The properties for setting and disabling expiry behavior are provided below.

C.2.6.1 Disable Expiry Behavior for CSR Cases

To disable the expiry behavior for CSR cases, modify the following property:

```
customercare.case.expirybehavior.enum.csrcase.behavior = none
```

C.2.6.2 Set Expiry Behavior of CSR Cases

Note: You do not need to change the other parameters.

To set expiry behavior for CSR cases (default setting), modify the following properties:

```
customercare.case.expirybehavior.enum.csrcase.behavior = expiry
customercare.case.expirybehavior.enum.csrcase.label = Expired
customercare.case.expirybehavior.enum.csrcase.durationInHrs = 24
customercare.case.expirybehavior.enum.csrcase.resetonaccess = false
```

C.2.7 Configuring Expiry Behavior for Agent Cases

Agent Cases have a default expiration date of 24 hours from the date of creation.

Information to change the default behavior is provided below.

C.2.7.1 Disable Expiry Behavior for Agent Cases

To disable the expiry behavior for Agent cases, modify the following property as shown below.

```
customercare.case.expirybehavior.enum.agentcase.behavior = none
```

C.2.7.2 Set Expiry Behavior for Agent Cases

To set expiry behavior for Agent cases, modify the following properties as shown below.

Note: You will not need to change the other parameters.

```
customercare.case.expirybehavior.enum.agentcase.behavior = expiry
customercare.case.expirybehavior.enum.agentcase.label = Expired
customercare.case.expirybehavior.enum.agentcase.durationInHrs = 24
customercare.case.expirybehavior.enum.agentcase.resetonaccess = false
```

C.2.8 Configuring Agent Case Access

By default only Investigators and Investigation Managers have access to create Agent cases. The property for investigator access is
`oaam.permission.creatagentcase=oaam.perm.create.case.type.agent`

To give a CSR access to Agent cases, configure the property as follows:
`oaam.permission.creatagentcase=oaam.perm.create.case.type.csr`

After setting the property, the CSR has full access to create agent cases.

D

Setting Up Archive and Purge Procedures

This chapter describes how to archive and purge data from the OAAM database using SQL scripts.

This chapter includes the following sections:

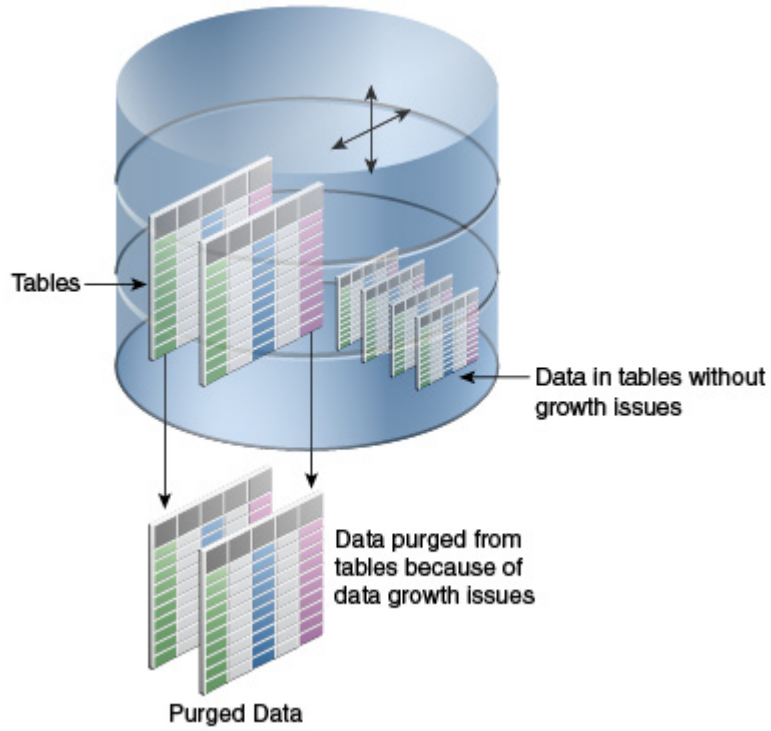
D.1 Overview

The archive and purge process allows the releasing of data that is not required anymore for rules evaluation or fraud investigation.

- Archiving is the process of moving data from main transactional tables to the archive tables.
- Purging is the process of deleting obsolete data that is not required by the system from tables because of data growth issues.

  Not all the tables are purged since many of them do not have data growth issues.

Figure D–1 Tables Without Data Growth Issues Not Purged



"Purging data" is different from "backing up data". A data backup is for the recovery of data if loss occurs; purges are for keeping the runtime tables free of old data. Regardless, to protect your data, database backups should be performed on a regular basis with the help of a database administrator.

The following data can be archived or purged using the scripts provided in the archive `IDM_ORACLE_HOME/oaam/oaam_db_scripts/oaam_db_purging_scripts.zip`:

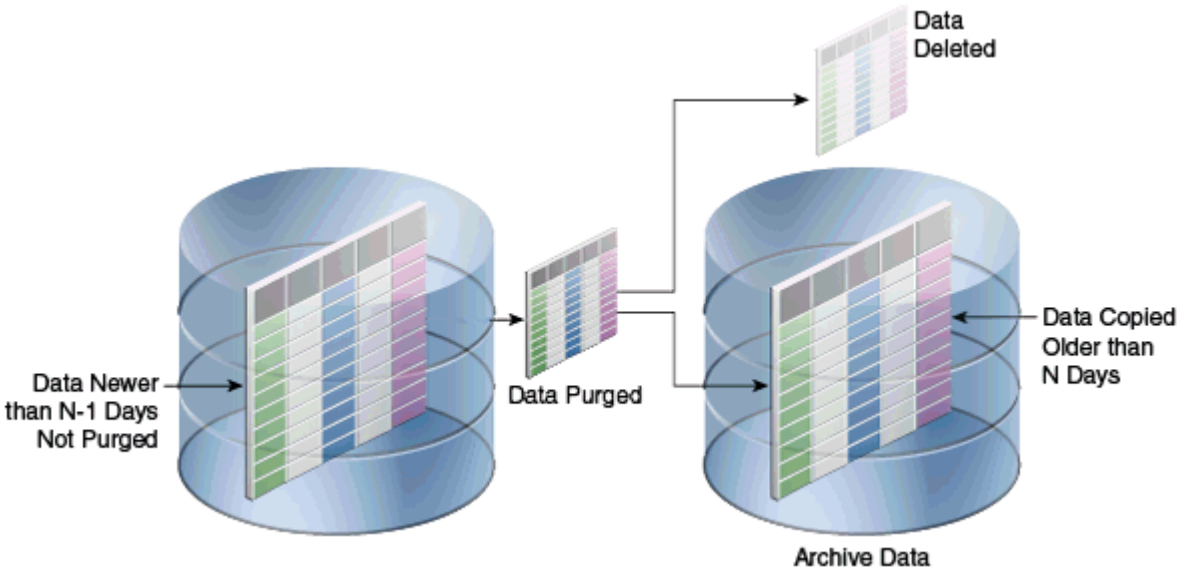
- Login and devices data
- Rule Logs data
- Auto Learning data
- Transactions and Entities data
- Profile data

Archive and purge criteria is based on the create/update timestamp of the records. This is specified using the retention period described using number of days.

The following is the overview of the archive and purge process:

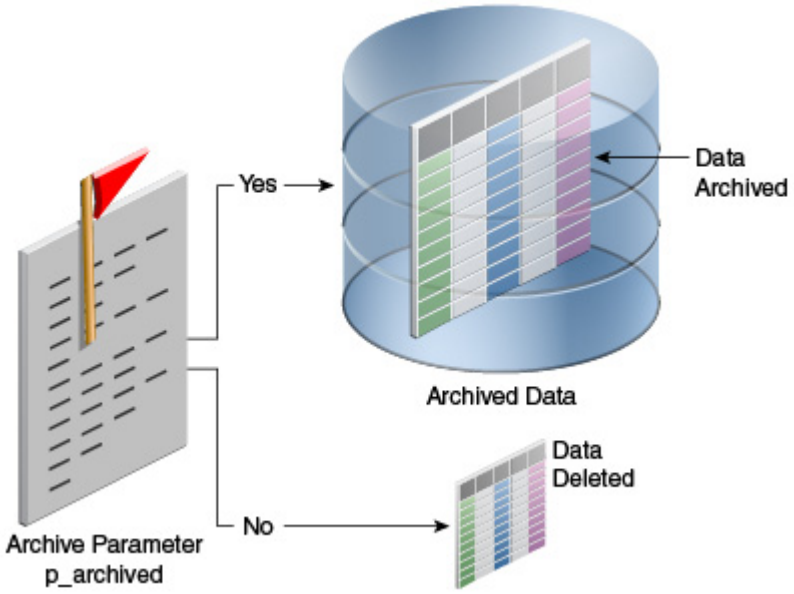
1. Determine the retention period (usually 180 days; that is 6 months)

Figure D–2 Retention



2. If the transactions feature is used and you want to specify different retention period based on the transaction type or entity, refer to Section 20.6, "Setting Targeted Purging for Transaction Data Per Transaction Definition," and Section 19.4, "Setting Up Targeted Purging for Entity Data."
3. Determine whether to purge or archive.

Figure D–3 Determining to purge or archive



4. Deploy the purge related stored procedures into the OAAM database. This is a one-time job.
5. Determine what types of data have to be archived and purged.

6. Schedule the related scripts to run on regular intervals or manually run the scripts when required.
7. Check for entries where the `LOG_TYPE` is `99` in the database table `V_SYS_LOGS`.

> **Note:** Rules may behave differently if the data that they look for is purged. For example, a rule is looking for 6 month data and you are purging data that is 9 days or older.

The next sections describe the above in detail.

D.2 Setting Up the Scripts in Database

To archive and purge OAAM data, you must set up the one-time scripts.

D.2.1 Non-EBR Schema

Follow these steps to set up the scripts if you have installed OAAM database in a non-EBR (edition-based redefinition) schema:

1. Create a scripts directory `oaam_purge_script`.
2. Unzip the scripts archive `IDM_ORACLE_HOME/oaam/oaam_db_scripts/oaam_db_purging_scripts.zip` to the scripts directory.
3. Log in to the database using the `sys` or `sysdba` account.
4. Grant the following privileges to the OAAM schema so that stored procedures can be created and executed:

```
GRANT create any procedure TO <schema_name>;

GRANT create any table TO <schema_name>;

GRANT create any index TO <schema name>;

GRANT create procedure TO <schema_name>;

GRANT execute any procedure TO <schema_name>;
```

5. Now connect to the OAAM schema using the OAAM user name and password. For example:

```
sqlplus <oaam_db_user_name>/<oaam_db_password>
```

6. Run the `create_purge_proc.sql` script

```
SQL> @oracle_db/create_purge_proc.sql
```

7. Validate the stored procedures to make sure they are valid and without errors.

D.2.2 EBR Schema

Edition-based redefinition (EBR) enables you to upgrade the database component of OAAM while it is in use, thereby minimizing or eliminating down time.

To set up the archive and purge process that supports EBR, proceed as follows:

1. Log in to database using the `sys` or `sysdba` account.
2. Grant the following privileges to the OAAM schema:

```
GRANT create any procedure TO <SCHEMA_NAME>
```

```
GRANT create any table TO <SCHEMA_NAME>
GRANT create any index TO <SCHEMA_NAME>
GRANT create procedure TO <SCHEMA_NAME>
GRANT create view TO <SCHEMA_NAME>
GRANT execute any procedure TO <SCHEMA_NAME>
ALTER user <SCHEMA_NAME> enable editions
GRANT use on EDITION ORA$BASE to <SCHEMA_NAME>
Exit
```

3. Log in to the OAAM Schema using the OAAM database user name and password.

   For example, `sqlplus <oaam_db_user_name>/<oaam_db_password>`

4. Log in as the `<schema_name>` user and run the `create_purge_proc.sql` script.

   `@ oracle_db/oracle_ebr/create_purge_proc.sql <EDITION_VERSION>`

   For example, `@ /oracle_db/oracle_ebr/create_purge_proc.sql ORA$BASE`

5. Validate the stored procedures to make sure they are valid and without errors.

D.3 Running the Archive and Purge Scripts

To run the archive and purge scripts, proceed as follows:

1. Set the `p_days1` and `p_archived` parameters using a text editor when you run the scripts. All the scripts have these two parameters that you can set. Table D–1 describes these parameters.

Table D–1 Archive and Purge Routine Parameters

Variable Name	Default Value	Description
p_days1	180	Retention period in days. Data older than this many number of days will be archived or purged.
p_archived	Y	Y or N for Yes and No respectively. If "Y" then data will be archived (in archive tables), otherwise data will be purged based on the retention period.

2. Select the scripts to run based on the data that has to be archived or purged. Table D–2 lists the types of data and corresponding script name.

Table D–2 Archive and Purge Scripts Based on Types of Data

Type of Data	Corresponding Script
Login, Device Data	exec_sp_purge_tracker_data.sql
Rules, Policy Log Data	exec_sp_purge_rule_log.sql
Transactions, Entities Data	exec_sp_purge_txn_log.sql
Autolearning Data	exec_sp_purge_workflow_data.sql
Profile Data	exec_sp_purge_profile_data.sql
Cases related Data	exec_sp_purge_case_data.sql
Monitor Data	exec_v_monitor_purge_proc.sql

3. Log in to the OAAM database using OAAM database user name and password and execute the selected scripts.
4. Check the corresponding log file and see if there are any errors or warnings.
5. If archiving is selected, then make sure to take a backup of the archive tables so that data can be restored if needed.

Archive and purge criteria is presented in the following table.

Table D–3 Archive and Purge Criteria

Type of Data	Purge Criteria
Device Fingerprinting Data	The purge process archives and purges device fingerprinting data based on the following criteria: ■ Device fingerprinting logs that are older than a specified period first. ■ User device maps that are not used after the data from the device fingerprinting logs ■ Device history that is not used after the data from the device fingerprinting logs ■ Device data that is not used after the data from the device fingerprinting logs **Note**: The `VT_SESSION_ACTION_MAP` table is not purged using the partition drop maintenance script. This table stores the device fingerprinting session information; therefore the purging of this table is performed using the manual purge stored procedure (`SP_SESS_ACT_MAP_PROC`) which is called by the `exec_sp_purge_tracker_data.sql` script.
Transaction In-Session Based Data	The purge process archives and purges in-session transaction data based on the following criteria: ■ In-session transactional-based data that is older than a specified period first ■ Transaction data that is not used in the transaction data after the transactions logs are purged for a specific time period ■ Entity, entity profile, user entity map and entity transaction map after the transactions logs are purged for a specific time period

Autolearning Profile Data	Archive and purge the following tables based on a specific time period.
	■ HOURS based tables will retain 3 days worth of data.
	■ DAYS based tables will retain 32 days worth of data.
	■ MONTHS based tables will retain 1 years worth of data.
	■ YEARS based tables will retain 5 years worth of data.
	Archive and purge fingerprint data for AUTH and TRANSACTION fingerprint types. Fingerprint data to be purged in this way is in fingerprint table and fp_map table. HOURS, DAYS, MONTHS, and YEARS tables described above also have references to fingerprint. Before purging fingerprint data, make sure that archiving and purging of HOURS, DAYS, MONTHS, and YEARS tables is performed.
	`vcrypt.fingerprint.type.enum.autolearning.auth=11`
	`vcrypt.fingerprint.type.enum.autolearning.transaction=12`
	`11` is the enumeration value for the autolearning `AUTH` type. Change these values in the script if another value was used during integration.
	`12` is enumeration value for the autolearning `TRANSACTION` type. Change these values in the script if another value was used during integration.

Table D–3 (Cont.) Archive and Purge Criteria

Type of Data	Purge Criteria
Rule Log Data	The rule log transaction data that is 30 days old is archived and purged.
Targeted Purging of Entity and Transaction Data	The entity and transaction data is archived and purged based on the following criteria: ■ Number of days of retention. Purges data older than the number of days of retention based on the update time. If not configured in the entity or transaction definition, then the data will not be purged or archived Default value: 180 ■ Purge data If you want to purge entity data, deselect the option, "Do not purge any entity data." If you do not want to purge entity data, select "Do not purge any entity data." If you want to purge transaction data, deselect the option, "Do not purge any transaction data." If you do not want to purge transaction data, select "Do not purge any transaction data." You cannot selectively choose to only archive the data since archiving is part of the purge process. Note: Entity definition and transaction definitions are retained even though the data is being purged. The purging mechanism is hierarchical. Data is purged from transaction down to entity and then related entities. Group members are purged if the member "entity" in the group is being purged.
Question/Problem: Does running the purge process remove registration of "safe" device? **Answer/Solution**: There is no special treatment for safe device. Active devices will not be purged.	6 Months device purge policy ■ Device is safe not used in last 6 months - candidate for purge ■ Device is not safe and not used in last 6 months - candidate for purge ■ Device is safe and used within last 6 months - not candidate for purge. It will not be purged even if device is created more than 6 months back. ■ Device is not safe and used within last 6 months - not candidate for purge. It will not be purged even if device is created more than 6 months back.
Registration of Safe Devices	The OAAM purge/archive process does not remove registration of "safe" devices and cause users to have to re-register safe devices unless the device has not been used for six months. Purge scripts unregister the devices when the devices are purged (as part of tracker_purge_job.sql). As part of tracker_purge_job.sql, all the unused devices (that are not referred by any record in VCRYPT_TRACKER_USERNODE_LOGS) are purged and also the related records in VT_USER_DEVICE_MAP are purged.

D.4 Running Partition Maintenance Scripts

In case the partitioned version of OAAM database is used, there are related scripts to drop the partitions.

D.4.1 Dropping Weekly Partitions

To drop weekly partitions, proceed as follows:

1. Run this script at the end of every two weeks starting from your database creation date.
2. To change the default retention period, open the script `Drop_Weekly_Partition_tables.sql` and set the retention period in days. Default is set to `15` days (two weeks).
3. Log in to the OAAM database using the OAAM database user name and password.
4. Execute the script `Drop_Weekly_Partition_tables.sql`.

D.4.2 Dropping Monthly Partitions

To drop monthly partitions, proceed as follows:

1. Run this script at the end of each month to drop partitions that are older than the sixth month.
2. To change the default retention period, open the script `Drop_Monthly_Partition_tables.sql` and set the retention period in days. Default is set to `180` days (6 months).
3. Log in to the OAAM database using the OAAM database user name and password.
4. Execute the script `Drop_Monthly_Partition_tables.sql`.

D.5 Minimum Data Retention Policy for OLTP (Online Transaction Processing) Tables

Based on the Oracle Adaptive Access Manager system requirement, the minimum data retention policy for various OLTP (online transaction processing) tables are shown below, but users should determine the data retention period based on their business requirements.

Table D–4 Minimum Data Retention Policies

Data	Retention Policy
Device Fingerprinting Data	Minimum of 6 months or 180 days
In-Session Transactional Tables	Minimum of 6 months or 180 days
Transaction and Entity Data	Data that has not been updated in the last 180 days is purged by default.
Auto-learning and Workflow Tables	Retention for hours, days, months, and years is listed below. ■ HOURS based Workflow tables will retain 3 days worth of data. ■ DAYS based Workflow tables will retain 32 days worth of data. ■ MONTHS based Workflow tables will retain 1 years worth of data. ■ YEARS based Workflow tables will retain 5 years worth of data.
Rule Log Data	The archive and purge script will archive and purge all rule log data that is 30 days older (This value should be set based on the customer care requirement. If the reporting database is used, then, rule logging data retention should be less than 30 days.

D.6 Best Practices/Guidelines for Running Purge Scripts

Best/practices guidelines for running purge scripts are as follows:

- Determine the retention period based on the business requirements and rules and policies used
- Perform regular purge/archive
- Make sure replication is not enabled during the window when these scripts are run
- Run these during off peak load hours which Oracle recommends you do. Archive and purge could be resource (like CPU) intensive.
- If archiving is required, make sure there is enough disk space available on the database server since the data would be moved to archive tables instead of simply purging. Archival space should be equal to or greater than the current table's storage.
- Plan your purging strategy since purging requires a significant amount of time if there are millions of rows that need to be deleted or copied from the database.
- In a multi-data center, it is recommended that you run purges at low data flow since the data in tables is replicated. You should consult your database administrator if you have multidimensional clustering (MDC) set up and require purging.
- Oracle recommends that custom purging scripts only include the tables utilized by the out of the box purging scripts provided. The alterations to the provided purge scripts can include parameterization for user ID. Such alterations should be thoroughly tested before being used in production to ensure they function as expected.

D.7 Details of Data that is Archived and Purged

Details of data that is purged and the corresponding archived tables are presented in the following sections.

D.7.1 Login and Device Data

Table D–5 Login and Device

Login and Device Tables	Corresponding Archived Tables
VCRYPT_TRACKER_NODE	VCRYPT_TRACKER_NODE_PURGE
VCRYPT_TRACKER_NODE_HISTORY	VCRYPT_TRACKER_NODE_HISTORY_PURGE
VCRYPT_TRACKER_USERNODE_LOGS	VCRYPT_TRACKER_USERNODE_LOGS_PURGE
VT_DYN_ACT_EXEC_LOG	VT_DYN_ACT_EXEC_LOG_PURGE
VT_SESSION_ACTION_MAP	VT_SESSION_ACTION_MAP_PURGE
VT_USER_DEVICE_MAP	VT_USER_DEVICE_MAP_PURGE
VCRYPT_ALERT	VCRYPT_ALERT_PURGE
VCRYPT_USERS_HIST	VCRYPT_USERS_HIST_PURGE
V_USER_QA_HIST	V_USER_QA_HIST_PURGE

D.7.2 Rules and Policy Log Data

Table D–6 Rules and Policy Log Data Tables

Rules, Policy Log Tables	Corresponding Archived Tables
VR_POLICYSET_LOGS	VR_POLICYSET_LOGS_PURGE
VR_RULE_LOGS	VR_RULE_LOGS_PURGE
VR_MODEL_LOGS	VR_MODEL_LOGS_PURGE
VR_POLICY_LOGS	VR_POLICY_LOGS_PURGE

D.7.3 Transactions and Entities Data

Table D–7 Transactions and Entity Data Tables

Transaction Tables	Corresponding Archived Tables
VT_ENTITY_ONE	VT_ENTITY_ONE_PURGE
VT_ENTITY_ONE_PROFILE	VT_ENTITY_ONE_PROFILE_PURGE
VT_USER_ENTITY1_MAP	VT_USER_ENTITY1_MAP_PURGE
VT_ENT_TRX_MAP	VT_ENT_TRX_MAP_PURGE
VT_TRX_DATA	VT_TRX_DATA_PURGE
VT_TRX_LOGS	VT_TRX_LOGS_PURGE

D.7.4 Autolearning Data

Table D–8 Autolearning Data Tables

Autolearning Transactional Tables	Corresponding Archived Tables
VT_WF_DAYS	VT_WF_DAYS_PURGE
VT_WF_HOURS	VT_WF_HOURS_PURGE
VT_WF_MONTHS	VT_WF_MONTHS_PURGE
VT_WF_YEARS	VT_WF_YEARS_PURGE
V_FPRINTS	V_FPRINTS_PURGE
V_FP_MAP	V_FP_MAP_PURGE

D.7.5 Profile Data

Table D–9 Profile Data Tables

Transactional Tables	Corresponding Archived Tables
VT_USER_PROFILE	VT_USER_PROFILE_PURGE
VT_DEVICE_PROFILE	VT_DEVICE_PROFILE_PURGE
VT_BASE_IP_PROFILE	VT_BASE_IP_PROFILE_PURGE
VT_IP_PROFILE	VT_IP_PROFILE_PURGE
VT_STATE_PROFILE	VT_STATE_PROFILE_PURGE
VT_CITY_PROFILE	VT_CITY_PROFILE_PURGE
VT_COUNTRY_PROFILE	VT_COUNTRY_PROFILE_PURGE

D.7.6 Cases-Related Data

Table D–10 Case-Related Data Tables

Transaction Tables	Corresponding Archived Tables
V_CASE	V_CASE_PURGE
V_CASE_HIST	V_CASE_HIST _PURGE
V_ACTION_LOG_SESS_MAP	V_ACTION_LOG_SESS_MAP_PURGE
V_ACTION_LOG_SESS	V_ACTION_LOG_SESS
V_CASE_MAP	V_CASE_MAP_PURGE
V_CASE_MAP_HIST	V_CASE_MAP_HIST_PURGE

D.7.7 Monitor Data

Table D–11 Monitor Data Tables

Transaction Table	Corresponding Archived Table
V_MONITOR_DATA	V_MONITOR_DATA_PURGE

D.8 List of Related Stored Procedures

The `create_purge_proc.sql` script creates the tables and the following stored procedures to archive and purge data from the transaction tables:

- SP_RULE_ PROC
- SP_MODEL_ PROC
- SP_POLICYSET_ PROC
- SP_POLICY_ PROC
- SP_NODE_HISTORY_ PROC
- SP_NODE_PROC
- SP_USER_NODE_PROC
- SP_USER_DVC_PROC
- SP_SESS_ACT_MAP_PROC
- SP_WF_YEARS_PROC
- SP_WF_MONTHS_PROC
- SP_WF_DAYS_PROC
- SP_WF_HOURS_PROC
- SP_V_FPRINTS_PROC
- SP_V_FP_MAP_PROC
- SP_VT_DY_ACT_EX_LOG_PRO
- SP_VT_TRX_LOGS_PROC
- SP_VT_TRX_DATA_PROC
- SP_VT_ENT_TRX_MAP_PROC

- SP_VT_ENT_ONE_PRF_PROC
- SP_VT_ENT_ONE_PROC
- SP_VT_ENT_ONE_MAP_PROC
- SP_VT_USER_PRF_PROC
- SP_VT_DEVICE_PRF_PROC
- SP_VT_IP_PRF_PROC
- SP_VT_BASE_IP_PRF_PROC
- SP_VT_CITY_PRF_PROC
- SP_VT_COUNTRY_PRF_PROC
- SP_VT_STATE_PRF_PROC
- SP_ARCHIVE_PURGE_VCRYPT_ALERT
- SP_ARCHPURGE_VCRYPTUSERSHIST
- SP_ARCH_PURGE_V_USER_QA_HIST

The `create_case_purge_proc.sql` script creates the following stored procedures to archive and purge data from the transaction tables:

- SP_V_CASE_PROC
- SP_V_CASE_HIST_PROC
- SP_V_CASE_MAP_PROC
- SP_V_CASE_MAP_HIST_PROC
- SP_V_ACTION_LOG_SESS_MAP_PROC
- SP_V_ACTION_LOG_SESS_PROC

The `create_v_monitor_purge_proc.sql` script creates SP_V_MON_DATA_PURGE_PROC to archive and purge data from the transaction table.

E

Device Fingerprinting

This chapter provides an in-depth understanding of Oracle Adaptive Access Manager device fingerprinting and identification technology. Depending on the specific situation Oracle Adaptive Access Manager can utilize combinations of the device attributes to fingerprint and identify a device being used in an access request or transaction. Device fingerprinting data may be gathered from multiple sources including secure cookie, flash shared object, user agent string, custom agent, mobile application, browser header data. The intelligent identification does not rely on any single attribute type so it can function on user devices not following strict specifications and in both web and non-web channels. This is especially important in large consumer facing deployments.

A device is identified using proprietary logic and a set of specialized policies to process available data and arrive at identification. This chapter covers the important fingerprinting and identification concepts, technology and use cases customers need to understand when deploying OAAM.

Out of the box, OAAM supports browser, mobile application and digital fingerprints. Digital can be either flash or one of the custom types defined by the user. OAAM provides the framework so users can use other fingerprints if needed.

E.1 Device Fingerprinting

Device fingerprinting and identification is one of the many attributes OAAM utilizes to assess the risk of an access request or transaction. Positive device identification is not and should not be considered an authentication method, nor the sole determining factor of an allow or block decision. OAAM provides a full, layered security solution. Device fingerprinting and identification represents only one of the layers.

This section provides information about Device Fingerprinting concepts that are related to device identification.

E.1.1 What is Device Fingerprinting?

Oracle Adaptive Access Manager device fingerprinting is a capability used to recognize the devices a user utilizes to login and conduct transactions, whether it is a desktop computer, laptop computer, mobile device or other web enabled device. Oracle Adaptive Access Manager can use any combination of standard attributes, including browser user agent string data, proprietary OTS (One Time Secure) cookies, Flash shared objects, mobile application data, custom client data and advanced "Auto-Learning" device identification logic, to identify a device. The Oracle Adaptive Access Managers patent-pending fingerprinting process is not vulnerable to "replay attacks" and does not place any logic on the client side where it may be vulnerable to exploit. The device identification is not merely a static list of attributes but is instead

dynamic capture, evaluation and profiling of the specific combinations of attributes available in each access request or transaction.

E.1.2 Browser Access

When an end user is accessing a protected application via a web browser OAAM performs browser based fingerprinting. In the majority of deployments this is the predominant use case. Browser based fingerprinting and identification utilizes browser user agent string data as well as secure cookie and Flash shared object data if available. The fingerprinting functions the same for desktop/laptop PCs as well as mobile devices and smart phones that run full function browsers. By design each browser will be given its own unique device identifier. The identification logic and policies are designed to deal with scenarios where only a subset of the data is available. For example, if only the browser user agent string is available the OAAM logic will look at context data such as the composition of devices the user has utilized previously and locations the user has accessed from in the past.

E.1.3 Browser Access and Custom Client

OAAM device fingerprinting can be extended to allow development of custom clients if desired. The digital fingerprint that accepts Flash shared object data in the standard browser access use case can instead accept data from a custom client. For example, a signed Java applet could be developed to gather the MAC Address of a device and use the Java/.Net/SOAP API to set the data into the digital fingerprint for use in the fingerprinting and identification logic.

E.1.4 Native Mobile Applications

Oracle Adaptive Access Manager is capable of fingerprinting, identifying and tracking mobile devices even when access is not via a browser. Mobile application developers may integrate OAAM device fingerprinting into their applications via the Access Management SDK and REST (Representational State Transfer) services layer. Mobile specific data such as application ID, GPS/triangulation location and IMEI (International Mobile Equipment Identity)/MAC address (Media Access Control address) can be collected and communicated to OAAM along with other device data. OAAM has unique handling for mobile devices allowing for a strong binding between user and device. Mobile cookies are listed in the following table.

Table E–1 Mobile Cookie

Attributes	Description
IMEI Id	IMEI (International Mobile Equipment Identity) ID is the mobile device's unique ID
MAC Address	Network MAC address (Media Access Control address) for the device
OS Type	Operating system of the device

E.1.5 What is the Device Identification Process?

The process of identifying the device and assigning a "Device ID" to involves three stages:

- Data Gathering
- Data Processing
- Data Storage

E.1.5.1 Data Gathering

Oracle Adaptive Access Manager captures information about the devices that a user utilizes when accessing protected applications. This information consists of many different data points gathered through a variety of means. The data collected is encoded into a unique fingerprint for the device.

E.1.5.2 Data Processing

Once this data is gathered, the OAAM Server must process the device fingerprint data and determine if this device has ever been seen before. Device fingerprinting uses data from and about the device and browser sessions to assess the risk of doing business with the person utilizing that device. The more data collected, the better OAAM can assess the risk.

E.1.5.3 Data Storage

Once a device has been given an ID, new rotating cookie values are generated and set. If the device identification scheme chosen is flash, the secure cookie is set as an HTTP cookie, and the digital cookie is set as a Flash Local Shared Objects (LSO) by the flash movie. These two values are the only values stored on a user's computer during the device identification process.

E.1.6 When is a Device Fingerprinted?

A device is generally fingerprinted as soon as it logs in to a protected application, prior to any authentication attempt. This way the device fingerprinting information is available for risk evaluation at any checkpoint. Some common checkpoints are pre-authentication, post-authentication and in-session/transaction. As well, a device may be re-fingerprinted at any time during a session to help detect some forms of man in the middle attack.

Generally the login page is embedded with a few lines of static HTML code. The html example code includes a flash shared object and image tags to collect additional device characteristics. The flash code internally makes a call to the application server thereby uploading the device characteristics.

Oracle Adaptive Access Manager generates a unique Secure Cookie for each identification and looks for the same cookie the next time any user logs in from the device. The cookie is only valid for that session on that particular device.

In cases where images are blocked, the cookies might be extracted from the login request itself. Oracle Adaptive Access Manager uses these different modes of collecting the cookies to overcome some technical difficulties imposed by browser or the security settings on the device.

There are two categories of data: secure and digital. Each of these categories have within them a fingerprint and a cookie. Oracle Adaptive Access Manager uses two types of cookies to perform device identification. One is the secure cookie (also known as browser cookie) and the other is the digital cookie (also known as the flash cookie).

- Secure data is gathered from the user's browser. This data includes the user-agent string, and an HTTP cookie value. The User-Agent is used as the secure fingerprint. The HTTP cookie value is a unique one-time use cookie that is set every time a user logs in. This cookie value is retrieved from the user's browser upon login.
- Digital fingerprint can be based on other custom fingerprints such as Java Applet, Quick time, or others. This data includes an array of Flash system capability data, and a Flash Locally Stored Object (LSO). The Flash capability data is used as the

digital fingerprint representing the Flash system capabilities. The LSO contains a unique one-time use value that is set every time a user logs in. This value is retrieved using a flash movie that runs upon login.

E.1.7 How is a Device Fingerprinted?

Secure Cookie and Browser Characteristics

Secure browser cookies are one of the attributes used to identify the device. The secure cookie is only good for one use and is replaced every time the device is fingerprinted. The Secure Cookie are extracted from the HTTP request. Along with the secure cookie, Oracle Adaptive Access Manager also extracts browser characteristics

For additional characteristics that are used to create a unique fingerprint for the device, refer to the table below.

OS/Browser	Characteristics
Operating System	
	■ Operating System ■ Version ■ Patch level
Browser	
	■ Browser ■ Version ■ Patch level
Locale	
	■ Country ■ Language ■ Variant

Flash Shared Object and Device Characteristics

Similar to Secure Cookie, Oracle Adaptive Access Manager can utilize a Flash Shared Object to store a one-time use token and replace it each time the device is fingerprinted.

The Flash shared object is sent to the server using an HTTP request. The Flash shared object captures and communicates additional device characteristics; such as system information and configuration settings, this adds additional granularity to the device ID. For a full list of the characteristics, refer to the table below.

Hardware/Software	Characteristics
System	■ Operation system ■ Flash version ■ Player type ■ Debug version ■ Screen DPI ■ Screen resolution ■ Color screen ■ Screen aspect ratio ■ Video embedded ■ Video encoder ■ Streaming video ■ Supports Video ■ Screen broadcast apps ■ Playback screen broadcast apps ■ Audio card ■ Microphone ■ Audio encoder ■ Streaming audio ■ MP3 ■ Native SSL support ■ Printer support ■ Input Method Editor (IME) ■ Manufacturer
Settings	■ Audio/Video enabled ■ Accessibility enabled ■ Audio enabled ■ Local file read disabled ■ Language

IP Intelligence and Historical Context

The combinations of users, devices, locations and other context captured by Oracle Adaptive Access Manager are used to evaluate the probability a device is one identified previously. This evaluation is especially useful when the total amount of device attributes is limited. For example, if user accesses via a browser without a secure cookie of Flash shared object.

Some of the attributes utilized for the analysis are listed below:

Table E–2 IP Details

IP Details	Description
IP Address	Address mapped to location
City Name	Geographic name of the city.
State Name	Geographic name of the state.
Country Name	Geographic name of the country.
Connection Speed	Internet connection speeds or bandwidths (high, medium, low).
Connection Type	Describes the data connection between the device or LAN and the internet. See the Connection Type mapping.
IP Routing Type	Tells how the user is routed to the internet.
Carrier Name	The name of the entity that manages the ASN entry.
ASN	Globally unique number assigned to a network or group of networks that is managed by a single entity.
Top-level Domain	The top-level domain of the URL. For example, .com in www.example.com. This is mapped through the Quova reference file.
Second-level Domain	The second-level domain of the URL

Native Mobile Application

OAAM device fingerprinting is integrated into mobile applications via the Access Management SDK and REST services layer. Developers embed the SDK in their application to collect application ID, OS, OS version, IP Address, one-time fingerprinting value, GPS/triangulation location, IMEI/MAC. These data elements are used by OAAM to fingerprint and identify the device as well as run risk evaluations.

E.1.8 Device Identification Policies

Oracle Adaptive Access Manager utilizes the policy engine for many purposes including business logic to drive user experience, risk analysis and device identification. The device identification policies are designed to function out of the box for all customer deployments. Given this Oracle does not recommend or support alterations to the device identification policies.

The following list of policies are utilized for device identification and should therefore never be deleted or altered in any way.

- OAAM Device ID Policy
- OAAM System Deep Analysis Flash Policy
- OAAM System Deep Analysis No Flash Policy
- OAAM Mobile Device Identification Policy (mainly used for Oracle Access Management Mobile and Social integrations)

Some sample scenarios to illustrate expected device identification behavior.

E.1.9 How are Secure Cookies Used?

The secure cookie stored by the OAAM in the client's browser is merely a tracking cookie:

- It does not store any information about the user.

- It is only used to track if the user had logged in from this browser before to identify a device.
- It is valid for a single user only.

If OAAM is able to find this cookie in the browser, it compares this cookie with an expected value. If the two values match, it means that the request has come from a previously used device, hence the device ID is reused. If it does not match, it may be a stale or a modified cookie, so is ignored. If the cookie is not present in the browser, it is a new request. In any case this cookie is discarded and a new cookie is generated.

From the OAAM server logs it should be apparent that the application is generating the secure cookie value successfully. This can also be verified by HTTP headers. Note that the OAAM cookie is necessary for OAAM to track the devices. If the OAAM cookies are not set on the browser, a new device ID will be generated until OAAM determines by other means that the device is the same.

E.1.10 Use Cases

No Cookie, No Flash Shared Object, Browser Fingerprint, User ID and IP Match

This scenario shows a what happens if a user deletes both their secure cookie and Flash shared object after every session but the other data stays consistent across sessions. The OAAM device identification logic and policies determine the after three successful fingerprints the device can be recognized as a consistent device ID.

Ses	User	IP	User Agent	Secure Cookie	Digital Cookie	Digital Cookie Data	Action
1	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	No expected, No cookie, Cookies enabled, Set	No DC expected, No FSO, Installed and set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	New device 1234
2	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	Cookie expected, No cookie, Cookies enabled, Set	DC expected, No FSO, Installed, Set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	New device 1235
3	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	Cookie expected, No cookie, Cookies enabled, Set	DC expected, No FSO, Installed, Set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	New device 1236
4	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	Cookie expected, No cookie, Cookies enabled, Set	DC expected, No FSO, Installed, Set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	New device 1237
5	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	Cookie expected, No cookie, Cookies enabled, Set	DC expected, No FSO, Installed, Set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	Device by browser data 1234

Ses	User	IP	User Agent	Secure Cookie	Digital Cookie	Digital Cookie Data	Action
6	jsmith	1.1.1.1	Mozilla/5.0 (Windows; U; Windows NT 6.1; en-US; rv:1.9.2.28) Gecko/20120306 Firefox/3.6.28	Cookie expected, No cookie, Cookies enabled, Set	DC expected, No FSO, Installed, Set	Type=Flash, Screen Aspect=1.0, A/V Disabled=F, Video Encoder=T …	Device by browser data 1234

New Device

Use Case	Description
Both secure and flash cookies are enabled.	Both secure and flash cookies are missing. Flash request came through successfully.
Both secure and flash cookies are disabled.	User has not used device from this location before
Secure cookies is enabled and flash is disabled	Both secure and flash cookies are missing. Also, the flash request didn't come through successfully.
Secure cookie is disabled and flash is enabled	Both secure and flash cookies are missing. But flash request came through successfully.

Device Recognized

Use Case	Description
Both secure and flash cookies are enabled.	Both secure and flash cookie came.
Both secure and flash cookies are disabled.	Both secure and flash cookies are missing. Also, the flash request didn't come through successfully.
Secure cookie is enabled and flash is disabled	Only secure cookie came through successfully.
Secure cookie is disabled and flash is enabled	Only flash cookie came through successfully.

Valid Exceptions

Use Case	Description
Browser upgrade.	Browser character mismatched
Device upgrade.	Flash data mismatched
Browser and Device upgrade.	Both browser and flash data mismatch
Used different browser. Secure cookie is missing.	Secure cookie is missing. Browser characteristics are mismatch. Flash cookie is matching. Flash data is a match (except browser).
User different browser. Both cookie and browser characteristics mismatch.	Secure cookie is mismatch. Browser characteristics are mismatch. Flash cookie is matching. Flash data is a match (except browser).
Secure cookie out of sync and flash is in sync.	Secure cookie is mismatch, but belonged to the same device.
Flash cookie out of sync and secure cookie is sync.	Flash cookie is a mismatch, but belonged to the same device.
Both secure cookie and flash are out of sync.	Both the cookies are mismatch, but they belonged to the same device

Device Risk Gradient

These use cases help to define Oracle Adaptive Access Manager's device risk gradient. The device risk gradient specifies the certainty of the device being identified. This is a standard pre-condition in all device type rules. For example, a device risk gradient of 0 is an exact match whereas a device gradient of 500 is a device with some unexpected by plausible variations from previous sessions, and a score of 1000 a device that has only minimal matching data to make an identification.

E.2 Out-of-the-Box Fingerprint Type

Out of the box fingerprint type properties are presented below. You can use these properties as examples for creating custom fingerprint types.

```
#Reference to the "vcrypt.fingerprint.type.enum" elementId for Digital Device
Fingerprinting
bharosa.uio.default.device.identification.scheme=flash

#Enum for fingerprint type

vcrypt.fingerprint.type.enum=Enum for finger print type

vcrypt.fingerprint.type.enum.browser=1
vcrypt.fingerprint.type.enum.browser.name=Browser
vcrypt.fingerprint.type.enum.browser.description=Browser
vcrypt.fingerprint.type.enum.browser.userAgent=userAgent
vcrypt.fingerprint.type.enum.browser.locallang=localLang
vcrypt.fingerprint.type.enum.browser.localcountry=localCountry
vcrypt.fingerprint.type.enum.browser.localvariant=localVariant
vcrypt.fingerprint.type.enum.browser.header_
list=locallang,localcountry,localvariant,userAgent
vcrypt.fingerprint.type.enum.browser.search_list=locallang,userAgent
vcrypt.fingerprint.type.enum.browser.result_list=locallang,userAgent
vcrypt.fingerprint.type.enum.browser.header_value_
nv=t,true,f,false,en,English,es,Spanish,de,German,it,Italian,ja,Japanese,fr,French
,ko,Korean,zh,Chinese,ar,Arabic,cs,Czech,da,Danish,nl,Dutch,fi,Finnish,el,Greek,iw
,Hebrew,hu,Hungarian,no,Norwegian,pl,Polish,pt,Portuguese,ro,Romanian,ru,Russian,s
k,Slovak,sv,Swedish,th,Thai,tr,Turkish,BR,Brazil

vcrypt.fingerprint.type.enum.flash=2
vcrypt.fingerprint.type.enum.flash.name=Flash
vcrypt.fingerprint.type.enum.flash.description=Flash
vcrypt.fingerprint.type.enum.flash.processor=com.bharosa.uio.processor.device.Flas
hDeviceIdentificationProcessor
vcrypt.fingerprint.type.enum.flash.header_
list=avd,acc,a,ae,ev,ime,mp3,pr,sb,sp,sa,sv,tls,ve,deb,l,lfd,m,os,ar,pt,col,dp,r,v
vcrypt.fingerprint.type.enum.flash.search_list=deb,l,os,v
vcrypt.fingerprint.type.enum.flash.result_list=deb,l,os,v
vcrypt.fingerprint.type.enum.flash.header_name_nv=avd,Audio/Video disabled by
user,acc,Has accessibility,a,Has audio,ae,Had audio encoder,ev,Embedded video,
ime, Has input method editor (IME) installed,mp3, Has MP3, pr, Supports printer,
sb, Supports screen broadcast applications, sp, Supports playback on screen
broadcast applications, sa, Supports streaming audio, sv, Supports streaming
video, tls, Supports native SSL, ve, Contains video encoder, deb, Debug version,
l, Language, lfd, Is local file read disabled, m, Manufacturer, os, Operating
System, ar, Aspect ratio of screen, pt, Player type, col, Is screen color, dp,
Dots-per-inch (DPI), r, Screen resolution, v, Flash version
#vcrypt.fingerprint.type.enum.flash.header_value_nv=t,true,f,false
vcrypt.fingerprint.type.enum.flash.header_value_
nv=t,true,f,false,en,English,es,Spanish,de,German,it,Italian,ja,Japanese,fr,French
```

```
,ko,Korean,zh,Chinese,ar,Arabic,cs,Czech,da,Danish,nl,Dutch,fi,Finnish,el,Greek,iw
,Hebrew,hu,Hungarian,no,Norwegian,pl,Polish,pt,Portuguese,ro,Romanian,ru,Russian,s
k,Slovak,sv,Swedish,th,Thai,tr,Turkish,BR,Brazil

vcrypt.fingerprint.type.enum.flash.avd=Audio/Video disabled by user
vcrypt.fingerprint.type.enum.flash.acc=Has accessibility
vcrypt.fingerprint.type.enum.flash.a=Has audio
vcrypt.fingerprint.type.enum.flash.ae=Had audio encoder
vcrypt.fingerprint.type.enum.flash.ev=Embedded video
vcrypt.fingerprint.type.enum.flash.ime= Has input method editor (IME) installed
vcrypt.fingerprint.type.enum.flash.mp3= Has MP3
vcrypt.fingerprint.type.enum.flash.pr= Supports printer
vcrypt.fingerprint.type.enum.flash.sb= Supports screen broadcast applications
vcrypt.fingerprint.type.enum.flash.sp= Supports playback on screen broadcast
applications
vcrypt.fingerprint.type.enum.flash.sa= Supports streaming audio
vcrypt.fingerprint.type.enum.flash.sv= Supports streaming video
vcrypt.fingerprint.type.enum.flash.tls= Supports native SSL
vcrypt.fingerprint.type.enum.flash.ve= Contains video encoder
vcrypt.fingerprint.type.enum.flash.deb= Debug version
vcrypt.fingerprint.type.enum.flash.l= Language
vcrypt.fingerprint.type.enum.flash.lfd= Is local file read disabled
vcrypt.fingerprint.type.enum.flash.m= Manufacturer
vcrypt.fingerprint.type.enum.flash.os= Operating System
vcrypt.fingerprint.type.enum.flash.ar= Aspect ratio of screen
vcrypt.fingerprint.type.enum.flash.pt= Player type
vcrypt.fingerprint.type.enum.flash.col= Is screen color
vcrypt.fingerprint.type.enum.flash.dp= Dots-per-inch (DPI)
vcrypt.fingerprint.type.enum.flash.r= Screen resolution
vcrypt.fingerprint.type.enum.flash.v= Flash version

vcrypt.fingerprint.type.enum.monitordata=3
vcrypt.fingerprint.type.enum.monitordata.name=MonitorData
vcrypt.fingerprint.type.enum.monitordata.description=Monitor Data

vcrypt.fingerprint.type.enum.applet=999
vcrypt.fingerprint.type.enum.applet.name=Applet
vcrypt.fingerprint.type.enum.applet.description=Applet
vcrypt.fingerprint.type.enum.applet.processor=com.bharosa.uio.processor.device.App
letDeviceIdentificationProcessor
vcrypt.fingerprint.type.enum.applet.header_
list=java.version,java.vendor,os.name,os.arch,os.version
vcrypt.fingerprint.type.enum.applet.header_name_nv=java.version,Java
Version,java.vendor,Java Vendor Name,os.name,Operating System
Name,os.arch,Operating System Architecture,os.version,Operating System Version
vcrypt.fingerprint.type.enum.applet.header_value_nv=t,true,f,false

vcrypt.fingerprint.type.enum.native_mobile=900
vcrypt.fingerprint.type.enum.native_mobile.name=Native Mobile
vcrypt.fingerprint.type.enum.native_mobile.description=Native Mobile
implementation using OIC
vcrypt.fingerprint.type.enum.native_
mobile.processor=com.bharosa.uio.processor.device.NativeMobileDeviceIdentification
Processor
vcrypt.fingerprint.type.enum.native_mobile.header_
list=os.type,os.version,hw.imei,hw.mac_addr
vcrypt.fingerprint.type.enum.native_mobile.header_name_nv=os.type,Operating System
Type,os.version,Operating System Version,hw.imei,Hardware IMEI Number,hw.mac_
addr,Hardware Mac Address
vcrypt.fingerprint.type.enum.native_mobile.header_value_nv=t,true,f,false
```

E.3 Custom Fingerprint

OAAM allows you to display and search for custom fingerprinting data generated by a custom device identification applet along with the out of the box available fingerprint data in various details tabs and pages. Custom fingerprint information is available for native Mobile and applet.

E.3.1 Set Up Custom Fingerprinting

You can set up custom fingerprinting at the time of deployment. See the "Extending Device Identification" in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager* for setup instructions.

E.3.2 Custom Fingerprinting Display

The following detail pages display custom fingerprint information:

- Search and View Fingerprint in User Details Page
- Details Pages: Fingerprint
- Fingerprint Details
- Sessions Details
- Device Details Summary Tab

E.3.2.1 Search and View Fingerprint in User Details Page

The Summary tab of the User Details page provides fingerprint data in the Profile Data section.

To see fingerprint information from the User Details Summary page:

1. Click the User ID or User Name link from the Sessions page for a valid user.

   The User Details page is displayed. For information, see Section 6.11, "User Details Page."

2. View the fingerprint information in the User Details Summary tab.

   This tab lists fingerprints created for the user during login. For information, refer to Section 6.11.1, "User Details: Summary Tab."

   The Fingerprint Data ID numbers shown on this panel is the same as those shown in the Fingerprint Data tab. The difference between Fingerprint Data and the Fingerprint Data tab is that the tab shows the ID numbers and other information such as the browser, locale, and so on.

E.3.2.2 Details Pages: Fingerprint

The Fingerprint Data tab in the User, Device, Alert, Location, and IP details pages provides custom fingerprint data as filters and search results along with the available out of the box fingerprint information.

The Add Fields filter items to choose from depend on the fingerprint type selected. For example, if the you select Browser and Flash in the Fingerprint Type field, then the Add fields only list the search fields relevant to those fingerprint types. By default, the fingerprint type is set to the browser.

The list in the drop down and the results column for each fingerprint type is determined at deployment time. Not all parameters from a fingerprint type are available for the search.

E.3.2.3 Fingerprint Details

The Fingerprint Details Summary tab shows the custom fingerprinting type and parameters along with available out of the box fingerprint information.

E.3.2.4 Sessions Details

The Session Details Summary shows additional information about the custom fingerprinting type along with available out of the box fingerprint information. Browser type and Operating System are always displayed. Flash and Browser fingerprint ID are displayed.

The Digital Fingerprint Type field in the Session Details Summary tab displays the type of digital fingerprint used to collect the digital fingerprint. If custom fingerprinting is used, it shows the custom fingerprinting type name.

E.3.2.5 Device Details Summary Tab

The Device Details Summary tab shows the hierarchical view of the browser and digital fingerprint data information including the custom fingerprinting data.

- Browser fingerprint is supported by default. OAAM shows one custom fingerprint.
- If a device has Flash as the custom fingerprint, then in addition to the browser fingerprint, the digital fingerprint shows flash fingerprint details such as operating system type, browser type, Player Type, Has audio, Has mp3, Supports streaming audio, and so on. Flash fingerprint details and parameters are not displayed if Flash is not associated with the device.
- If the digital fingerprint changes for a particular device, the device ID is retained and a new device will not be created because the secure cookie is the same as the previous request, so it continues to be used as the existing Device ID.

E.3.3 Custom Attribute Use Cases

The following are use cases that illustrate how custom fingerprinting is deployed and how it behaves.

E.3.3.1 Custom Attribute Available

Mike is a web application developer at Acme Corp. He has developed a browser extension which captures the MAC address of an end user's machine and sends it to the OAAM server as part of the browser/server interaction. If OAAM device fingerprinting is set up to utilize the Media Access Control address (MAC address) as the digital fingerprint and the end user has the extension installed, then the OAAM Administration Console displays the MAC Address labeled as the "Digital Fingerprint" in the detail pages.

E.3.3.2 Custom Attribute Not Available and Flash Not Installed

In the Acme Corporation deployment, if the end user does not have the extension installed and he does not have Flash installed, OAAM device fingerprinting utilizes the secure cookie and browser data alone to fingerprint the device. The OAAM Administration Console does not display anything as the "Digital Fingerprint" in the detail pages.

E.3.3.3 Custom Attribute Search

Jeff is a security analyst at Acme Corp. He opens the Search Transactions page and configures search filters to locate any employee profile access transactions from a device with the specific Media Access Control address (MAC address) and from New York in the last 24 hours. The query returns 25 transactions.

E.3.3.4 What if Digital Cookie is Cleared?

Oracle Adaptive Access Manager does not solely rely on one element to develop the "device fingerprint". If the digital cookie is cleared, Oracle Adaptive Access Manager still has other information to use in identifying the device. OAAM only supports FSO out of the box, but custom client can also be used. OAAM is able to uniquely identify the devices, even if the digital fingerprint have changed or altered. OAAM needs some client fingerprint device to identify the device being used, in case, all of the fingerprints are missing (browser, flash or applet).

E.3.3.5 What if Secure Cookies are Deleted?

Oracle Adaptive Access Manager's fingerprinting technology does not solely rely on one element. Oracle Adaptive Access Manager uses dozens of attributes to recognize and "fingerprint" the device you typically use to login, providing greater "coverage" for an institution's customer base. If secure cookies are missing or disabled, Oracle Adaptive Access Manager uses other elements such as flash movie and HTTP headers for device identification.

E.3.4 Device Fingerprinting Troubleshooting

The following is the sort of information to collect to aid you in troubleshooting device fingerprinting issues.

1. Does the use case as described seem to be OAAM functionality as designed?
2. Are the device fingerprinting polices loaded?
3. If this is a JAVA/.Net/SOAP integration, are API calls for device fingerprinting the same or similar to the sequence in the Sample application and documentation?
4. If this is a JAVA/.Net/SOAP integration, have all patches containing known bug fixes for device fingerprinting been applied?
5. Review the exact sequences and data.

   To capture data execute the following SQL command:

   ```
   select * from VCRYPT_TRACKER_USERNODE_LOGS where USER_LOGIN_ID=loginId and
   CREATE_TIME > beginTime and CREATE_TIME < endTime;
   ```

6. Note the browser and client application and settings of the end point machines involved. Are cookies enabled? Is Flash installed?
7. Try to determine if there was any unaccounted for use case steps such as an operating system or browser upgrade.
8. Collect HTTP header trace; are cookies and Flash object missing when they are expected?

F

Globalization Support

This chapter provides information on customizing Oracle Adaptive Access Manager for your locale.

F.1 Supported Languages

Oracle Adaptive Access Manager 11*g* is translated into 9 Admin languages for OAAM Admin and 26 languages for OAAM Server. These translations are bundled along with the English version of the product.

The languages and their locale identifiers (in parentheses) are listed below. A locale identifier consists of at least a language identifier, and a region identifier (if required).

OAAM Admin is translated into French (fr), German (de), Italian (it), Spanish (es), Brazilian Portuguese (pt_br), Japanese (ja), Korean (ko), Simplified Chinese (zh_cn), and Traditional Chinese (zh_tw).

When one of the non-OAAM Admin locale languages is set in the browser (for example Arabic), OAAM Admin uses the default locale, English. When one of the non-standard runtime locale languages is set in the browser, OAAM Server uses the default locale, English.

OAAM Server is translated into 26 languages: French (fr), German (de), Italian (it), Spanish (es), Brazilian Portuguese (pt_br), Japanese (ja), Korean (ko), Simplified Chinese (zh_cn), Traditional Chinese (zh_tw) Arabic (ar), Czech (cs), Danish (da), Dutch (nl), Finnish (fi), Greek (el), Hebrew (iw), Hungarian (hu), Norwegian (no), Polish (pl), Portuguese (pt), Romanian (ro), Russian (ru), Slovak (sk), Swedish (sv), Thai (th), and Turkish (tr).

F.2 Dashboard

The Oracle Adaptive Access Manager Dashboard is an application that provides a high-level view of real monitor data. Monitor data is a representative sample of data. It presents a real-time view of activity via aggregates and trending.

To view the Dashboard in the language you want, set your browser's language preference to the appropriate language.

All data viewed in the Dashboard is based on the time zone of the server. This means that any data generated by OAAM is governed by the time zone of the server, and not the user time zone, but the information is presented per your browser settings. For information on setting the time zone, refer to Section 2.9, "Setting the Time Zone Used for All Time Stamps in the OAAM Administration Console."

For more information on the dashboard, refer to Chapter 23, "Monitoring OAAM Administrative Functions and Performance."

F.3 Knowledge Based Authentication

Oracle Adaptive Access Manager provides out-of-the-box secondary authentication in the form of knowledge based authentication (KBA). KBA provides an infrastructure for challenge question creation and logic algorithm for registration and answers. This section contains information customizing certain KBA user experiences.

F.3.1 Answer Logic Phonetics Algorithms

Answers that "sound like" the registered answer, regional spelling differences, and common misspellings are handled by the phonetics algorithm.

For information on customization, see Customizing English Abbreviations and Equivalences in the *Oracle Fusion Middleware Developer's Guide for Oracle Adaptive Access Manager*.

The phonetics algorithm is only supported in English.

F.3.2 Keyboard Fat Fingering

Oracle's Fat Fingering algorithm accounts for typos due to the proximity of keys on a standard keyboard and transposed letters. Answers with typos due to the proximity of keys on a standard keyboard are handled by the fat fingering algorithm.

The fat fingering algorithm is only supported in English.

F.3.3 Adding Registration Questions

The deployment administrator must ensure that there are enough questions in the database for each of the supported locale as configured in OAAM Admin during deployment; otherwise, OAAM Server displays only the English language questions during registration.

The number of locale-specific questions must be equal to or greater than the "Questions User Will Register" multiplied by the "Questions per Menu" multiplied by the "Categories per Menu."

For information on adding registration questions, refer to Section 7.5.3, "Creating a New Question."

G

OAAM Access Roles

This section summarizes the OAAM access roles, sets of functionality, and levels of access in OAAM. "Access roles" control access to functionality within OAAM.

G.1 Understanding Users and Roles for OAAM

The Oracle Adaptive Access Manager users can access functionality based on the roles they are assigned. These administrator roles have specific permissions assigned to them based on their responsibilities.

Oracle Adaptive Access Manager ships the following default roles:

- OAAMCSRGroup - Support Personnel
- OAAMCSRManagerGroup - Support Personnel
- OAAMInvestigatorGroup - Investigators
- OAAMInvestigationManagerGroup - Investigators
- OAAMRuleAdministratorGroup - Security Administrators
- OAAMEnvAdminGroup - System Administrators

You can create new users and assign the relevant Oracle Adaptive Access Manager roles in the Oracle Adaptive Access Manager domain by using the Oracle WebLogic Administration console. Best practices is to refrain from assigning multiple roles to a single user. If a user has multiple roles assigned to him, the user will have all of the permissions from the different groups.

Note: Starting with OAAM 11g Release 2 (11.1.2.0.0), the default mechanism to secure Web Services is by using Oracle Web Service Manager policies. OAAMSOAPServicesGroup is no longer used and should not be created.

G.2 CSR (OAAMCSRGroup)

Support personnel such as CSRs have very limited access to the OAAM Administration Console. Support personnel (CSR and CSR Managers) use Oracle Adaptive Access Manager's case management tools to handle customer cases day-to-day. They have detailed knowledge about user activity.

Table G–1 Support Representatives

Items	Support Representatives (CSR) have access to these features	Notes
	Users with the Support Representative role have very limited access to the OAAM Administration Console.	
Cases	CSRs have access to search, open and create CSR type cases. There are no outward facing hyperlinks in any of the pages CSRs have access to. They have access to a limited list of actions. They have no access to bulk edit functions on search cases page.	Search cases ▪ They can search for CSR cases; They cannot search for agent and escalated cases ▪ They can search for open and closed cases but they cannot reopen closed cases; They can only add notes. ▪ They can search for Expired cases and view detailsbuttheycannotperformanyactions

Table G–1 (Cont.) Support Representatives

Items	Support Representatives (CSR) have access to these features	Notes
		New cases ■ They can open only CSR cases
		View case details ■ They can view Expired Case details ■ They cannot view Escalated Case or agent cases ■ They can view closed case details and add notes ■ They can view Transactions in sessions tab
		Edit case ■ They can change case status and severity ■ They cannot add public notes to Escalated Cases ■ They cannot bulk edit cases ■ They can escalate cases ■ They cannot temp allow users ■ They cannot OTP bypass users ■ They cannot extend expiration ■ All customer and KBA resets ■ KBA phone challenge ■ They can perform Customer Resets - a. Image and Phrase. ■ Challenge Questions Reset Questions Reset Question Set Unlock Question Ask Question ■ Expired status cases - Search Access; No access to open ■ OTP Actions Reset Email Reset Phone Reset All Unlock OTP

G.3 CSR Managers (OAAMCSRManagerGroup)

CSR Managers have the access privileges of the CSR and access to some other limited functionality. Support personnel (CSR and CSR Managers) use Oracle Adaptive Access Manager's case management tools to handle security and customers cases day-to-day. They have detailed knowledge about user activity and security issues.

Table G–2 Support Manager

Items	Support Managers have access to these features	Notes
	Support Managers have the access privileges of the Support Representative and some other limited functionality.	
Cases	No create agent type cases. Hide actions, log and linked/related tabs in agent cases	Search Cases ■ They can search for CSR, Agent and Escalated cases ■ They can search for open and closed cases. ■ They can search for expired cases.

Table G–2 (Cont.) Support Manager

Items	Support Managers have access to these features	Notes
		New Case ■ Only CSR cases
		View Case Details ■ They can view Escalated Case details (including logs and sessions); but cannot perform any actions ■ They can view closed case details (They can only add notes or change status) ■ They can view Transactions in sessions tab ■ They can view expired case details (They can only add notes and extend expiration date)

Table G–2 (Cont.) Support Manager

Items	Support Managers have access to these features	Notes
		Edit cases ■ They cannot perform any actions on Escalated Cases ■ They can Re-open closed cases Add notes in CSR cases Change status and severity Bulk edit CSR cases Escalate cases Grant temporary allow to users OTP bypass users Extend expiration Perform all customer and KBA resets Perform KBA phone challenge Change Status Change Severity ■ Temporary Allow Single login 2 hours Set end date ■ Customer Resets Image Phrase Image and phrase Customer (all) ■ Challenge Questions Unlock Question Reset Questions Reset Question Set Next Question Ask Question ■ Closed status cases - Search and open Access ■ Expired status cases - Search and Open Access ■ Escalate a CSR case - Full Access ■ Link Sessions tab in escalated status ■ OTP Actions ■ Can search for and view session details; but no access to detail pages or policy explorer

G.4 Fraud Investigator (OAAMInvestigatorGroup)

Fraud Investigators have wide access to the OAAM Administration Console. Fraud Investigators use Oracle Adaptive Access Manager's case management tools to handle security cases day-to-day.

Table G–3 Fraud Investigator

Items	Fraud Investigators have access to these features	Notes
	Fraud Investigators have wide access to the OAAM Administration Console.	
		Also access to add /remove/delete group memberships from details pages
Navigation Tree	None	■ No access to bulk editing of cases. ■ Full access for CSR, Agents and Escalated cases
Cases	Full access.	
Search page	Search Agent Cases	
Scheduler	No access	
Environment	No access	

G.5 Fraud Investigation Managers (OAAMInvestigationManagerGroup)

Fraud Investigation Managers have wide access to the OAAM Administration Console. Fraud Investigation Managers use Oracle Adaptive Access Manager's case management tools to handle security cases day-to-day.

Table G–4 Fraud Investigation Manager

Items	Fraud Investigation Managers have access to these features	Notes
	Fraud Investigation Managers have wide access to the OAAM Administration Console.	
		Access to add /remove/delete group memberships from other pages
Navigation tree	None	■ Full access to bulk editing of cases ■ Full access to CSR, Agent and Escalated cases
Cases	Full access.	
Scheduler	No access	
Environment	No access	
Home Page	Search Agent Cases	

G.6 Security Administrator (OAAMRuleAdministratorGroup)

Security Administrators have wide access to the OAAM Administration Console.

Security Administrators (Rule Administrators) gather intelligence from various sources to identify needs and develop requirements to address them. Some sources for intelligence include Investigators, industry reports, antifraud networks, compliance mandates, and company polices.

Security Administrators plan, configure and deploy policies based on the requirements from analysts.

Table G–5 Security Administrator

Items	Security Administrators have access to these features	Notes
	Security Administrators have wide access to the OAAM Administration Console.	
		Except Environment node and security dashboard (should be hidden by default)
Navigation Tree	Full Access	Not closable
Home Page	Search Policies	
Cases	View only access	
Scheduler	Access for Offline Security Administrators	
Environment	No access	

G.7 System Administrator (OAAMEnvAdminGroup)

System Administrators have limited access to the OAAM Administration Console for system administration duties. They configure environment-level properties and transactions.

Table G–6 System Administrator

Items	System Administrators have access to these features	Notes
	System administrators have limited access to the OAAM Administration Console for system administration duties	
		■ No access to cases ■ Full access to Environment ■ Read-only access to everything else
Navigation Tree	Partial access	
Scheduler	Access to Online and Offline System Administrators	
Environment	Full access	
Home Page	Search Properties	

G.8 Auditor

Note: There is no auditor role in 11g OAAM.

Auditor has no access to the OAAM Administration Console. They will do their audit work in BIP.

Table G–7 Auditor

Items	Group has access to these features	Notes
	Auditor has no access to the OAAM Administration Console. They will do their audit work in BIP and the common audit framework.	

H

Pattern Processing

Autolearning is the application of several Oracle Adaptive Access Manager features to dynamically profile behavior of user, device, locations, and transaction entities. Patterns are defined by an administrator to automatically capture behavior. These patterns are in turn used by Oracle Adaptive Access Manager to dynamically create and populate buckets based on the pattern parameters. Oracle Adaptive Access Manager automatically records/maintains the bucket memberships of the users/devices/locations/entities over time so that the overall profile can be used to evaluate risk. As well, dynamic actions are used to populate groups based on rule outcomes to further profile behavior. The memberships of these automatically managed groups are also used to evaluate risk.

This appendix provides information about autolearning pattern data processing.

H.1 Pattern Data Processing

If the system load is light and if the pattern is configured, the data will be processed as soon as the clients calls the API that is used for triggering the data processing. The system load is the number of authentication, transaction, rule processing (and other) reports and requests served by the Oracle Adaptive Access Manager server.

The logic for processing the data is as follows.

For each (successful) transaction record, the following process occurs:

1. Gather all the attributes of the transaction from the database.
2. Determine the transaction type and if any of the patterns have the same transaction type as the one you have at hand.
3. If there are no patterns having the same transaction type as the one at hand, the process is stopped at this point and returns to the caller with nothing.
4. If there are patterns that have the same transaction type as the one at hand, then the following process is performed for each pattern.
    a. Get the parameters for that pattern and determine if the parameter values for the transaction at hand satisfy the requirements (like range for example). If not, move to next pattern.
    b. If the parameters satisfy the requirements, then go to the fingerprint table.
    c. If the fingerprint exists for such a combination, then go ahead and update the counters in workflow tables (hour, day, month, year) for entities added to the pattern.
    d. If the fingerprint does not exist, then create a fingerprint and create entries in the workflow table for that fingerprint and put the count there.

e. After this determine if the pattern is configured to capture the one-time or lifetime values for the parameters, if set to do so. Then go and update the correct profile table. While doing this, if the profile table does not have an entry for this entity, create the entry. Data1 through Data10 fields from entity profile tables will be used to capture the pattern membership and the values.

f. Repeat Steps a through e for rest of the patterns.

5. Repeat Steps 1 through 4 for each transaction.

H.2 APIs for Triggering Pattern Data Processing

The APIs for triggering patterning data processing are

- updateTransaction
- updateAuthStatus
- processPatternAnalysis

The updateAuthStatus and updateTransaction APIs are similar to other update authentication and transaction status APIs. The only difference is that updateTransaction, updateAuthStatus, and processPatternAnalysis perform pattern data processing in addition to the updating status of authentication or transaction.

H.2.1 updateTransaction

API to update a previously created transaction.

It also triggers pattern data processing if appropriate. A nonzero value of analyzePatterns will result in triggering the pattern processing if not already performed for this transaction.

```
public VCryptResponse updateTransaction(
                    Transaction UpdateRequestData transactionUpdateRequest Data);
```

Table H–1 updateTransaction Parameter and Returned Value

Parameter	Description
TransactionUpdateRequestData	The object to update a transaction; a handle to the transaction to be updated is either the Transaction ID returned by the method createTransaction, or the external Transaction ID passed to the method createTrasnaction. it throws the exception BharosaException if it fails validation. The structure of this object is as follows: ■ requestId, identifies the user session; required ■ requestTime, the time of the request; can be null; if null, the server uses the current time ■ transactionId ID, the ID returned by a previous call to createTransaction ■ status, the transaction status ■ analyzePatterns, Boolean to indicate if pattern processing should be performed. When the value is passed in as "true," the pattern processing is performed for the transaction if the "resultStatus" value is "success." ■ externalTransactionId, the external Transaction ID that was passed to createTransaction when the transaction was created
VCryptResponse	The response object; make sure to check isSuccess() before obtaining the Transaction ID with the method getTransactionResponse()

H.2.2 updateAuthStatus

API to update the user node log auth status and trigger the pattern data processing if appropriate. A value of true for analyzePatterns and a value of "success" for the resultStatus of the transaction will result in triggering the pattern processing if not already performed for this transaction.

- public VCryptResponse updateAuthStatus(java.lang.String requestId, int resultStatus, int clientType, java.lang.String clientVersion, boolean analyzePatterns)
- public VCryptResponse updateAuthStatus(java.lang.String requestId, java.util.Date requestTime, int resultStatus, int clientType, java.lang.String clientVersion, boolean analyzePatterns)

Table H–2 updateAuthStatus Parameters

Parameter	Description
requestId	Request ID
requestTime	Time of update
resultStatus	The authentication result. This is the enumeration value of the authentication result.
clientType	This is an enum value defined to identify the client type used for authentication.
clientVersion	Optional parameter to specify the version of the client used
analyzePatterns	Boolean to indicate if pattern processing should be performed. When the value is passed in as "true," the pattern processing is performed for the transaction if the "resultStatus" value is "success."

H.2.3 processPatternAnalysis

API to trigger the processing of data for pattern matching. This call will only trigger the processing of data for pattern matching. The last parameter transactionType can be used by the authentication type user interactions, since authentication (or login) are not first-class transactions.

public VCryptResponse processPatternAnalysis(java.lang.String requestId, long transactionId, int status, java.lang.String transactionType)

Table H–3 processPatternAnalysis

Parameter	Description
requestId	Request ID
transactionId	Transaction ID to be updated.
status	New Status
transactionType	String that indicates the type of transaction. Has to be "auth" for authentication type. For other types it can be "bill_pay, ..."; basically the type name of the transaction.

Configuring SOAP Web Services Access

This appendix presents instructions on configuring SOAP Web services access.

I.1 Web Services Access

Out-of-the-box, OAAM publishes Web services at the URL: `/oaam_server/services`. Starting with OAAM 11*g* Release 2 (11.1.2.0.0), the default mechanism to secure OAAM Web Services is by using Oracle Web Services Manager (OWSM) policies. Configuration of OWSM policies for authentication (HTTP Basic authentication with username and password request) and authorization (user's membership in configured group of users) is covered in this section. Authentication checks whether the passed user credentials are correct and authorization checks whether user is allowed to access the requested resource based on the user's membership in a group, for example, the user/group in the WebLogic embedded user store. Oracle Web Services Manager (OWSM) policies manage SOAP authentication and authorization through Oracle Enterprise Manager Fusion Middleware Control.

I.2 Requirements

The requirements for accessing the OAAM web service are the following:

- Configuration of the SOAP web access requires the OAAM Extensions Shared Library for Native Integration using SOAP
- The configurable properties must be specified in `oaam_custom.properties` and this file should be in the Java Classpath of the client application.

I.3 Configuring SOAP Web Services Access Overview

An overview of tasks you need to perform to secure OAAM Web Services is provided below.

Table I–1 Securing OAAM Web Access

No.	Task	Information
1	Enable web services authentication. Set up the Oracle Web Services Manager (OWSM) Policy to set HTTP Basic Authentication on `/oaam_server/services`.	OAAM Web Services can be protected by Oracle Web Services Manager (OWSM) using the policy `oracle/wss_http_token_service_policy`. The `wss_http_token_service_policy` policy enforces authentication and uses the credentials in the HTTP header to authenticate users. SOAP requests would be authenticated (HTTP Basic authentication) against the configured realm (users in WebLogic embedded user store).
2	Create a user with valid username and password and associate the user to a group that will be configured to be able to access OAAM web services.	SOAP authentication is implemented using a user name and password. Web Services/SOAP clients need to send the user name and password for successful communication with OAAM web services. The user name and password must be associated with a user that is accessible to the application server. In order for that user to have permissions to perform operations on web services, the user must be in a group that is associated with an authorization policy.
3	Configure web services authorization.	Using the Oracle Web Services Manager (OWSM) policy `oracle/binding_authorization_permitall_policy`, authorization can be configured for OAAM Web Services. The `binding_authorization_permitall_policy` policy provides simple permission-based authorization for the request based on the authenticated user at the SOAP binding level. This policy ensures that the user has permission to perform an operation. This policy should follow an authentication policy where the user is established and can be attached to Web Service Endpoints.
4	Set up security for web services.	Web Services/SOAP clients need to send the user name and password for successful communication with OAAM web services. The password needs to be stored in a KeyStore for security. **Note**: This step is not required if SOAP Authentication is disabled on the OAAM server.

I.4 Enabling Web Services Authentication

OAAM Web Services can be protected by Oracle Web Services Manager (OWSM) using the policy `oracle/wss_http_token_service_policy`. The `wss_http_token_service_policy` policy enforces authentication and uses the credentials in the HTTP header to authenticate users. SOAP requests would be authenticated (HTTP Basic authentication) against the configured realm (users in WebLogic embedded user store).

To set up the Oracle Web Services Manager (OWSM) Policy to set HTTP Basic Authentication on `/oaam_server/services` follow these steps:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control using the URL `http://weblogic-admin-hostname:port/em`.
2. Under **weblogic_domain**, select the domain and select **oaam_server_server1** and right-click and select the **Web Services** option.
3. Click **Attach Policies**.
4. Select all the rows corresponding to OAAM Web Services and click the **Next** button
5. To enable SOAP Authentication:
   a. Select the row **oracle/wss_http_token_service_policy**.
6. To disable SOAP Authentication:
   a. Select the rows **oracle/no_authentication_service_policy** and **oracle/no_authorization_service_policy**.
   b. Click the **Next** button.

      If you disable the SOAP Web Service authentication on the server (which is by default enabled), the client can use the Web service without having been authenticated.
7. Click the **Attach** button in the next page.
8. Restart OAAM Server if required.

I.5 Creating User and Group

By performing the authentication configuration in this section, OAAM Web Services can be accessed by any valid username/password present in a configured realm, for example, all the user credentials which can pass authentication, can access OAAM Web Services.

SOAP authentication is implemented using a user name and password. This user name and password must be associated with a user that is accessible to the application server. In order for that user to have permissions to perform operations on the web services, the user should be added to a group that can access the OAAM web services.

This section provides instructions to:

- Create a group. Later you will associate the group with the authorization policy. This chapter will use OAAM_WebServices_Group as an example of a group that will have access to URL: /oaam_server/services.
- Create a user that you will add to the OAAM_WebServices_Group.

In a WebLogic deployment, this SOAP user can be stored and managed within the WebLogic security realm.

OAAM clients are configured to use this user name and password when invoking web services through the following `oaam_custom.properties` properties:

```
vcrypt.soap.auth.keystorePassword - Base64 encoded Password used to open the
   system_soap.keystore
vcrypt.soap.auth.aliasPassword - Base64 encoded Password used to retrieve the key
   stored in the keystore
vcrypt.soap.auth.username - Username of the SOAP user
vcrypt.soap.auth.keystoreFile -
```

```
Filename of the keystore (should be system_soap.keystore)
```

To create the user and group, proceed as follows:

1. Using the WebLogic console, create a group in configured realm. This group will contain users who will be allowed access to OAAM web services once the group is associated with the authorization policy. For example, the `OAAM_WebServices_Group` group can be created.
2. Create a user, `oaamsoap1`, by providing details to identify the user and a username and password for the user.
3. Associate the user, `oaamsoap1`, with the group, `OAAM_WebServices_Group`, by configuring the group membership for the `oaamsoap1`.

I.6 Configuring Web Services Authorization

Using the Oracle Web Services Manager (OWSM) policy `oracle/binding_authorization_permitall_policy`, authorization can be configured for OAAM Web Services. The `binding_authorization_permitall_policy` policy provides simple permission-based authorization for the request based on the authenticated user at the SOAP binding level. This policy ensures that the user has permission to perform an operation. This policy should follow an authentication policy where the user is established and can be attached to Web Service Endpoints.

1. Associate the `OAAM_WebServices_Group` group with the authorization policy.
   a. Log in to Oracle Enterprise Manager Fusion Middleware Control using the URL

      `http://`*`weblogic-admin-hostname`*`:port/em`

   b. Expand the WebLogic Domain.
   c. Right-click the domain hosting OAAM Server, **Web Services**, and **Policies**.
   d. Select **oracle/binding_authorization_permitall_policy**.
   e. Click **Edit**, and then the Settings tab.
   f. Select **Selected Roles** from Authorization Setting.
   g. Click Add (plus sign) and move the `OAAM_WebServices_Group` group to **Roles Selected To Add** list, and then click **OK**. The group was created in Section I.5, "Creating User and Group."
   h. Click **Save** to save the policy.
2. To make sure that above policy configuration is working as expected, set property `active.protocol` to `remote`. The value for the property can be checked by navigating to domain hosting OAAM Server, right clicking **Web Services**, **Platform Policy Configuration**, and **Policy Accessor Properties**.
3. Attach the authorization policy to the Web Service Endpoints.

   Note: To get list of Web Service Endpoints exposed by OAAM Server on Enterprise Manager, go to Fusion Middleware Control, **Identity and Access**. Expand **OAAM**, then **oaam_server**, and right-click **Web Services**.

   a. Log in to Oracle Enterprise Manager Fusion Middleware Control using the URL

      `http://`*`weblogic-admin-hostname`*`:port/em`

b. Under **weblogic_domain**, select the domain and select **oaam_server_server1** and right-click and select the **Web Services** option.

c. Click **Attach Policies**.

d. Select all the rows corresponding to OAAM Web Services and click the **Next** button

e. Select the row **oracle/binding_authorization_permitall_policy**.

f. Click the **Next** button.

g. Click the **Attach** button in the next page.

h. Restart OAAM Server if required.

I.7 Setting Up Client Side Keystore to Secure the SOAP User Password

Web Services/SOAP clients need to send the user name and password for successful communication with OAAM web services.

The password needs to be stored in a KeyStore for security.

To set up security for Native Client web services:

1. In the *$ORACLE_HOME*/oaam/cli directory, create a file, for example, soap_key.file, and enter the HTTP authentication user password in it. (The password from the user that was added to the OAAM Web Services Group role/group).

2. Copy sample.config_3des_input.properties to soap_3des_input.properties.

```
cp sample.config_3des_input.properties soap_3des_input.properties
```

3. Update soap_3des_input.properties with the keystore password, the alias password, and password file.

```
#This is the password for opening the keystore.
keystorepasswd=

#This is the password reading alias (key) in the keystore. For example,
#Welcome1
keystorealiaspasswd=

#File containing from key. Please note, keys in AES could be binary.
#Also note algorithms like 3DES require minimum 24 characters in the key
#keyFile=soap_key.file
keyFile=

keystorefilename=system_soap.keystore
keystorealias=vcrypt.soap.call.passwd
```

4. Set ORACLE_MW_HOME and JAVA_HOME and source setCliEnv.sh.

5. Generate the keystore.

   - For Unix/Linux, run

```
$JAVA_EXE -Djava.security.policy=conf/jmx.policy -classpath
$CLSPTH com.bharosa.vcrypt.common.util.KeyStoreUtil
updateOrCreateKeyStore readFromFile=soap_3des_input.properties
```

   - For Windows, run

```
genkeystore.cmd soap_3des_input.properties
```

If the KeyStore command was successful, you will see output similar to the following:

```
updateOrCreateKeyStore done!
Keystore file:system_soap.keystore,algorithm=DESede
KeyStore Password=ZG92ZTEyMzQ=
Alias Password=ZG92ZTEyMw==
```

6. Write down the Keystore password and Alias Password printed on the screen. You will need to add these to oaam_custom.properties.
7. Add the following properties with the encoded passwords (from step 5) and the authentication user name to oaam_custom.properties.

   OAAM clients are configured to use this user name and password when invoking web services through the following oaam_custom.properties properties:

```
vcrypt.soap.auth.keystorePassword - Base64 encoded keystore password used to
open the system_soap.keystore
vcrypt.soap.auth.aliasPassword - Base64 encoded password to the alias used to
retrieve the key stored in the keystore
vcrypt.soap.auth.username - Username of the SOAP user configured for accessing
the SOAP services
vcrypt.soap.auth.keystoreFile - Filename of the keystore (should be system_
soap.keystore)
```

8. Save the system_soap.keystore file in your source code control system. Ensure you take adequate security precaution while handling this file. The file contains critical password information. Ensure that only authorized personnel have read access to this file. If you lose it, Oracle Adaptive Access Manager will not be able to recover data that is encrypted.
9. Copy your system_soap.keystore to *application*/WEB-INF/classes (classpath of the native client deployment).
10. Delete both the soap_key.file and soap_3des_input.properties files.

I.8 Setting SOAP Related Properties in oaam_custom.properties

Set the following properties in oaam_custom.properties of the native application:

Specify SOAP Class

Set the vcrypt.common.util.vcryptsoap.impl.classname property.

This setting specifies for the application which libraries to use when creating SOAP messages to exchange with the OAAM services.

The available option is:

```
com.bharosa.vcrypt.common.impl.VCryptSOAPGenericImpl
```

Specify SOAP Server Side URL

Set the vcrypt.tracker.soap.url property:

```
vcrypt.tracker.soap.url=http://host-name:port/oaam_server/services
```

This setting is the location of the web services with which the application will communicate.

For example,

```
vcrypt.tracker.soap.url=http://localhost:14300/oaam_server/services/
```

Specify SOAP Call Timeout

Set the `vcrypt.soap.call.timeout` property in milliseconds.

For example,

```
vcrypt.soap.call.timeout=10000
```

Other Properties

```
vcrypt.tracker.impl.classname=
com.bharosa.vcrypt.tracker.impl.VCryptTrackerSOAPImpl
vcrypt.user.image.dirlist.property.name=bharosa.image.dirlist
bharosa.config.impl.classname=com.bharosa.common.util.BharosaConfigPropsImpl
bharosa.config.load.impl.classname=
com.bharosa.common.util.BharosaConfigLoadPropsImpl
vcrypt.tracker.soap.useSOAPServer=true
vcrypt.soap.disable=false
vcrypt.soap.auth.keystoreFile=system_soap.keystore


# Environment specific values need to be replaced below this line
bharosa.image.dirlist=absolute_folder_path_where_oaam_images_are_available

# If SOAP Authentication is enabled, then the following have to be set
# otherwise just set the property vcrypt.soap.auth=false
vcrypt.soap.auth=true
vcrypt.soap.auth.keystorePassword=Java_keystore_password
vcrypt.soap.auth.aliasPassword=Keystore_alias_password
vcrypt.soap.auth.username=SOAP_User_name
```

I.9 Setting Up the Base Environment in OAAM Native SOAP Integration

The required JAR files for setting up the base environment in OAAM native SOAP integration are listed in this section. The following JAR files must be set in the `JAVA` classpath:

- `jps-api.jar`
- `jps-common.jar`
- `jps-internal.jar`

I.10 Disabling SOAP Service Authentication on the Server

You can enable or disable authentication using Oracle Web Services Manager (OWSM) policies through Oracle Enterprise Manager Fusion Middleware Control.

If you disable the SOAP Web Service authentication on the server (which is by default enabled), the client can use the web service without having been authenticated.

1. Log in to Oracle Enterprise Manager Fusion Middleware Control of the Identity Management domain using the URL `http://<host-name>:7001/em` and WebLogic Admin user name and password.
2. Locate **oaam_server_server1** in the left hand side menu by expanding **WebLogic Domain** and the OAAM domain under it.
3. Right click the **oaam_server_server1** and select the **Web Services** menu option.
4. Click the **Oracle Infrastructure Web Services** tab.
5. Click the **Attach Policies** link in the top-right area of the page.

6. Select all the rows related to the OAAM Web services in the next page and click the **Next** button.
7. Select the rows **oracle/no_authentication_service_policy** and **oracle/no_authorization_service_policy** and click the **Next** button.
8. Click the **Attach** button in the next page.
9. Restart OAAM Server if required.

J

Configuring Logging

Logging is the mechanism by which components write messages to a file.

Oracle Adaptive Access Manager 11*g* components use the package java.util.logging as part of its logging infrastructure. This package is available in all Java environments.

> **Note:** On a production machine, you want to manage the amount of time logging is enabled since increasing the amount of logging may negatively affect performance.

J.1 Logging Configuration File

Logging is initialized using the default logging configuration file, `logging.properties`, that is read at startup.

The file is located in the Home directory. It configures the Oracle Adaptive Access Manager Framework loggers to print messages. Through editing this file, you can:

- Specify the level of detail in the log messages.
- Specify whether log messages are sent to the console, to a file or to both
- Specify logging at the level of individual areas for which a logger is defined

J.2 Oracle Adaptive Access Manager Loggers

The OAAM loggers generate logging messages to report on errors, and provide additional information about OAAM. Oracle Adaptive Access Manager Loggers are described in Table J–1.

Table J–1 Oracle Adaptive Access Manager Loggers

Logger	Components
oracle.oaam.model	ADF Models package, all classes with package starting with oracle.oaam.model
oracle.oaam.view	ADF View package, all classes with package starting with oracle.oaam.view
oracle.oaam.alerts	Alerts, rules engine specifically uses this logger so that custom handlers can consume these log records
oracle.oaam	root Logger controls all oaam logging

J.3 Logging Levels

The log levels define the importance and urgency of a log message. The class Level is used to define which messages should be written to the log. Log messages have an associated log level. Logging levels in descending order are listed below.

Table J–2 Logging Levels

Level	Description
SEVERE	The highest value; intended for extremely important messages (for example, fatal program errors). SEVERE is used to diagnose if there is improper functioning of the system.
WARNING	Intended for warning messages.
INFO	Informational runtime messages. Any logging at INFO and above provides complete details. Any logging message below INFO should have its logging enabled to check for performance reasons (isDebugEnabled() / isLevelEnabled()).
CONFIG	Informational messages about configuration settings/setup.
FINE	Used for greater detail, when debugging/diagnosing problems.
FINER	Even greater detail.
FINEST	The lowest value; greatest detail.
ALL	Enables logging of all records
OFF	Used to turn off logging

Property to Control Logging Level

The following property controls the level of logging:

```
Logger Name=Level
```

Enable Debug Log

Example, to enable debug logs:

```
oracle.oaam.level=FINER
```

Enable Debug Logs for ADF Models

To enable debug logs for ADF models package and reset all information logging, the following entries may be added:

```
oracle.oaam.level=INFO
oracle.oaam.model.level=FINER
```

Configure all logs to use FINER logging (include debug)

To configure oracle.oaam to use FINER logging (include debug)

```
oracle.oaam.level=FINER
```

J.4 Handlers

Each logger has access to handlers. The handler receives the log message from the logger and output the log messages to a file or to both.

Appendix J–3 shows the handlers used by Oracle Adaptive Access Manager

Table J–3 Handler Classes

Handler Class	Function
FileHandler	Writes formatted log records either to a single file, or to a set of rotating log files.
ConsoleHandler	Writes formatted records to System.err

J.4.1 Configuring the File Handler

To send logs to a file, add FileHandler to the handlers property in the `logging.properties` file. This will enable file logging globally.

```
handlers= java.util.logging.FileHandler
```

Configure the handler by setting the following properties:

```
java.util.logging.FileHandler.pattern=<home directory>/logs/oaam.log
java.util.logging.FileHandler.limit=50000
java.util.logging.FileHandler.count=1
java.util.logging.FileHandler.formatter=java.util.logging.SimpleFormatter
```

java.util.logging.FileHandler.pattern specifies the location and pattern of the output file. The default setting is your home directory.

java.util.logging.FileHandler.limit specifies, in bytes, the maximum amount that the logger writes to any one file.

java.util.logging.FileHandler.count specifies how many output files to cycle through.

java.util.logging.FileHandler.formatter specifies the java.util.logging formatter class that the file handler class uses to format the log messages. SimpleFormatter writes brief "human-readable" summaries of log records.

J.4.2 Configuring Both Console Logging and File Logging

You can set logging to output log messages to both the console and to a file by specifying the console handler and the file handler, separated by a comma, as shown:

```
handlers= java.util.logging.FileHandler, java.util.logging.ConsoleHandler
```

J.5 Redirecting oracle.oaam Logs

To redirect oracle.oaam logs to file handler (oaam.log), set the following property:

```
oracle.oaam.handlers=java.util.logging.FileHandler
```

If you want logs to go to both console and file, comment the following property:

```
oracle.oaam.useParentHandlers=false
```

To instruct java to use this configuration file instead of *$JDK_HOME*`/jre/lib/logging.properties`:

```
java -Djava.util.logging.config.file=/scratch/user/config/logging.properties
```

K

Rule and Fingerprint Logging

You can enable logging to help troubleshoot problems or test rules. In rule logging, rows are written to the VR_RULE_LOGS table.

This appendix describes how to configure rule logging in OAAM. It contains the following sections:

K.1 About Rule Logging

Rule logging records the required rule processing information so that the Administrator can monitor the required information from a user session. Rule log details are captured in the VR_RULE_LOGS table while executing various policies and rules at different checkpoints. The information shown in the Session Details page is based on the rule logs that are written when the rules execute.

K.1.1 Fingerprint Rule Logging

Fingerprint rule logging records the policies and rules that were executed. Fingerprint-based logs are a shorter version of the rule logs; they do not include alert sources and per rule time, and so on. Fingerprint based logging is done to minimize data growth and also keep the logging overhead to a minimum. The fingerprint is a digest of a set of rules that were triggered. When a set of rules is triggered, a digest of the triggered rules is created and persisted in the database. The next time the same set of rules is triggered, the digest is reused and persisted so that the new session will have the same digest now for the runtime. When fingerprint logging is performed, the time required for the rule and policy execution is not captured and displays as -1 or N/A in the Session Details page. Fingerprint rule logging is enabled by default.

K.1.2 Detailed Rule Logging

Detailed rule logging captures the rules that were executed and the length of time that the rule or policy took to execute. The execution time is used as a performance statistic. Detailed rule logs are created only if the execution time is more than a threshold value that you have configure. On a production machine, you want to manage the amount of time before detailed logging is enabled since increasing the amount of logging may negatively affect performance. If the details are logged about the rules (runtime) that have a long execution time, the overhead for logging is decreased.

If the runtime requires an unusual amount of time, you might want to run detailed rule logging so that you can perform further analysis on why the rule took that amount of time to run. Fingerprinting logging does not capture the timing information. Timing is an important factor in troubleshooting the "slow" runtime. In detailed logging, by default, only log timing for the rules that triggered are logged. The untriggered rules are not logged unless you specify you want to capture the untriggered rules also. Untriggered are captured in fingerprint rule logging.

K.1.3 Status Columns in the VR_RULE_LOGS Table

The VR_RULE_LOGS table enables administrators to view the status of the rules. This information can be used for troubleshooting rules.

This status columns are explained in this section.

0 = notfired

The rule was tested but the conditions were not satisfied, so the rule was not triggered.

Rule logs are not always created for `notfired` status. There are properties that control whether the `notfired` status is shown or not.

If `vcrypt.tracker.rules.trace.notTriggered` is set to `false`, then rule logs for the `notfired` status are never created.

The property `vcrypt.tracker.rules.trace.notTriggered.logMillis` contains a threshold in milliseconds. If the rule executed in fewer milliseconds than this threshold, then the rule log will not be created.

If you want to always log `notfired` status rules, then set `vcrypt.tracker.rules.trace.notTriggered` to `true` and set `vcrypt.tracker.rules.trace.notTriggered.logMillis` to 0.

If you never want to log `notfired` status rules, then set `vcrypt.tracker.rules.trace.notTriggered` to false.

If you only want to log `notfired` status rules that take longer than a certain amount of time to test the conditions, then set `vcrypt.tracker.rules.trace.notTriggered` to `true` and set `vcrypt.tracker.rules.trace.notTriggered.logMillis` to the threshold millisecond value that you want.

1 = fired

The rule was tested and the conditions were satisfied, so the rule was triggered.

2 = override

This status is not used currently.

3 = error

An internal error occurred while testing this rule. Check the logs for more details.

Status 4-8

These columns all deals with preconditions. If the rule was not tested because preconditions were set up to exclude the device, city, state, country, or group, then the rule log will show a status that matches the precondition.

4 = deviceScoreExclude

5 = cityScoreExclude

6 = stateScoreExclude

7 = countryScoreExclude

8 = groupExclude

99 = unknown

You should never have a rule log with this status.

K.2 Rule Logging Properties

Table K–1 shows the rule logging configuration properties.

Table K–1 Rule Logging Properties

Properties	Description
vcrypt.tracker.rules.trace.policySet	True/False Enables rule logging.
vcrypt.tracker.rules.trace.policySet.*checkpoint*	True/False Enables rule logging. You can specify the checkpoint in which to log the rules. The variable *checkpoint* corresponds to the checkpoint. If the logging configuration is explicitly set at the given checkpoint, the Rules Engine uses that value; otherwise, it uses the value of vcrypt.tracker.rules.trace.policySet.
vcrypt.tracker.rules.trace.policySet.min.ms	1000 (milliseconds) Specifies when to perform rule logging. You must configure this property to enable rule logging. You can configure this property for time so that logging is performed only if the total time taken for the runtime is greater than this value. The property, as set, logs for all runtime process rules only if the total time taken is more than 1000 ms. -1 If you are unable to see the rules log in the Session Details page with the above property value, change it to -1.
vcrypt.tracker.rules.trace.notTriggered	False If set to `true`, untriggered rules are logged along with the triggered rules
vcrypt.tracker.rules.trace.notTriggered.logMillis	Narrows down which rules are logged. If the rule execution for untriggered rules exceeds the value specified then untriggered rules are logged.

Table K–1 (Cont.) Rule Logging Properties

Properties	Description
vcrypt.tracker.rulelog.detailed.minMillis	2000 Determines the minimum time required for detailed logging. You can configure rule logging such that detailed rule logs are created only if the execution time is more than a threshold. That way, details are logged against the rules (runtime) with long execution time and hence the overhead of detailed logging is reduced. Controls threshold for the logging for rules. By default, the Session Details page does not display the trigger sources if the execution time for alerts is less than 2000 millisecond (2000 ms) since detailed logging is dependent on the execution time.
vcrypt.tracker.rulelog.fingerprint.enabled	True/False Enables fingerprint logging.
vcrypt.tracker.rulelog.exectime.maxlimit	Determine if fingerprint or detailed logging runs. If the value is exceeded, detailed logging is performed. Both are run if the property is set to -1.

K.3 Enabling Rule Logging

Enable rule logging by using the Properties editor. The steps are as follows:

1. Log in to the OAAM Admin Console.
2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. Enter `vcrypt.tracker.rules.trace.policySet` in the **Name** field and click **Search**.

   You should see the property in the Search Results section.
4. Click to select the property in the Search Results section.
5. In the `vcrypt.tracker.rules.trace.policySet` details section, enter `true` in the **Value** field.
6. Click **Save**.

   A confirmation dialog is displayed.
7. Click **OK** to dismiss the dialog.
8. If the property does not exists, from the Properties Search page, click the **New Property** button or **Create new Property** icon.

   A New Property dialog is displayed.
9. In the New Property dialog, type in the property name and value.
10. Click **Create**.

K.4 Enabling Rule Logging for a Specific Checkpoint

Enable rule logging for a specific checkpoint by using the Properties editor. The steps are as follows:

1. Log in to the OAAM Admin Console.

2. In the Navigation pane, double-click **Properties** under the **Environment** node. The **Properties Search** page is displayed.
3. From the Properties Search page, click the **New Property** button or **Create new Property** icon.

   A New Property dialog is displayed.
4. In the New Property dialog, type in `vcrypt.tracker.rules.trace.policySet.`*`checkpoint`* in the **Name** field.
5. Enter `true` in the **Value** field and click **Create**.

To illustrate how rule logging for checkpoints is control by property combinations, a matrix is shown below. The Post-Authentication checkpoint is used to illustrate checkpoint rule logging flow.

The flow is as follows:

1. The Rules Engine checks for a configuration for `vcrypt.tracker.rules.trace.policySet.postauth`.
2. If there is no configuration for `vcrypt.tracker.rules.trace.policySet.postauth`, the Rules Engine checks the configuration value of `vcrypt.tracker.rules.trace.policySet`.

If the logging configuration is explicitly set at the given checkpoint, the Rules Engine uses that value; otherwise, it uses the value of `vcrypt.tracker.rules.trace.policySet`.

The following matrix shows an example of how value combinations control logging for a specified checkpoint.

vcrypt.tracker.rules.trace.policySet.postauth	vcrypt.tracker.rules.trace.policySet	Checkpoint Rule logging enabled?
true	false	yes
true	true	yes
true	not set	yes
false	false	no
false	true	no
false	not set	no
not set	false	no
not set	true	yes
not set	not set	yes

K.5 Enabling Logging of Untriggered Rules

To configure rule logging to log untriggered rules, use the Properties editor to set the following properties:

```
vcrypt.tracker.rules.trace.notTriggered=[true|false]
vcrypt.tracker.rules.trace.notTriggered.logMillis=[millis]
```

The value of `vcrypt.tracker.rules.trace.notTriggered` adds rules to log. If set to `true`, rules that are not triggered are logged along with the triggered rules.

The value of `vcrypt.tracker.rules.trace.notTriggered.logMillis` narrows down which rules are logged.

If the rule execution for untriggered rules exceeds the value of `vcrypt.tracker.rules.trace.notTriggered.logMillis`, only then will the Rules Engine log the untriggered Rules.

The following table shows the property values that control rule logging for untriggered rules.

vcrypt.tracker.rules.trace.notTriggered	vcrypt.tracker.rules.trace.notTriggered.logMillis	Result
true	n	Logs the untriggered Rules that took more than "n" milliseconds. If "n" is set to a negative value, all rules are logged
false	n	None of the untriggered rules are logged

K.6 Enabling Detailed Logging

Configure the minimum time required for detailed logging so that details are logged for rules (runtimes) that have long execution times. Detailed rule logs are created only if the execution time is more than a threshold.

1. In the Navigation tree, double-click **Properties** under **Environment**.
2. Enter **vcrypt.tracker.rulelog.detailed.minMillis** in the **Name** field and click **Search**.
3. In the Results table, select **vcrypt.tracker.rulelog.detailed.minMillis**.
4. In the Details vcrypt.tracker.rulelog.detailed.minMillis section, edit the value in the **Value** field.
5. Click **Save**.

   A confirmation dialog is displayed.
6. Click **OK** to dismiss the dialog.

If a policy takes more than "n" in milliseconds specified, Oracle Adaptive Access Manager starts the detailed rule logging.

K.7 Enabling Fingerprint Rule Logging

To enable or disable fingerprint rule logging, modify the following property using the Property editor:

```
vcrypt.tracker.rulelog.fingerprint.enabled=true
```

K.8 Other Fingerprint and Detailed Logging Properties

Properties can be set for

- Running either fingerprint or detailed logging
- Running both fingerprint and detailed logging and when
- Fingerprint logging threshold

Specify Whether Fingerprint or Detailed Logging Runs

To set a property to determine if fingerprint or detailed logging runs, set

```
vcrypt.tracker.rulelog.exectime.maxlimit
```

If the value is exceeded, detailed logging is performed.

Specify to Include Other Limits

To include all specified properties in determining the use of both, set

```
vcrypt.tracker.rulelog.exectime.maxlimit=-1
```

Specify Not to Use Both

To specify to perform logging with both logging mechanisms (detailed and fingerprint), set

```
vcrypt.tracker.rulelog.logBoth
```

to true. The value overrides `vcrypt.tracker.rulelog.exectime.maxlimit`.

Configuring Fingerprint Logging Threshold Time

To modify the threshold time after which fingerprint rule logging should be used, set the following property in milliseconds:

```
vcrypt.tracker.rulelog.exectime.maxlimit=
```

K.9 Archiving and Purging Rule Log Data

The OAAM archive and purge script will archive and purge all rule log data that is 30 days old, but you should set the value based on the customer care requirement. If the reporting database is used, then, rule logging data retention should be less than 30 days.

Table K–2 Rules and Policy Log Data Tables

Rules, Policy Log Tables	Corresponding Archived Tables
VR_POLICYSET_LOGS	VR_POLICYSET_LOGS_PURGE
VR_RULE_LOGS	VR_RULE_LOGS_PURGE
VR_MODEL_LOGS	VR_MODEL_LOGS_PURGE
VR_POLICY_LOGS	VR_POLICY_LOGS_PURGE

L

VCryptUser Table

The VCryptUser table contains user details.

This appendix contains a description of the VCryptUser table.

L.1 VCryptUser

Description: This contains the user details.

Database table name : VCRYPT_USERS

Primary Keys : userId (USER_ID)

Table L–1 VCryptUser

Name	DB name	DB type	Java type	Description	Length	Enum value
userId	USER_ID *(PK)*	BIGINT	Long	Id for the User	16	-
externalUserId	EXT_USER_ID	VARCHAR	String	User id used by the external system	255	-
loginId	LOGIN_ID	VARCHAR	String	Login id of the User	255	-
groupId	GROUP_ID	BIGINT	Long	Group Id.	16	-
acctId	ACCT_ID	BIGINT	Long	Account Id to which this user belongs to	16	-
userName	USER_NAME	VARCHAR	String	Name of the User	255	-
userEmail	USER_EMAIL	VARCHAR	String	Email address of the User.	255	-
password	PASSWORD	VARCHAR	String	Password for the User	255	-
pin	PIN	VARCHAR	String	Password for the User	255	-
createTime	CREATE_TIME	DATETIME	Date	Date/Time creation of this user.	-	-
updateTime	UPDATE_TIME	TIMESTAMP	Date	Date value.	-	-

Table L–1 (Cont.) VCryptUser

Name	DB name	DB type	Java type	Description	Length	Enum value
statusUpdateTime	STATUS_UPDATE_TIME	DATETIME	Date	Date/Time when the status was updated.	-	-
userType	USER_TYPE_CODE	INT	int	Type of the User	2	USER_USER
authMode	AUTH_MODE_CODE	INT	int	Mode of authorization	2	-
authType	AUTH_TYPE_CODE	INT	int	Type of authorization	2	AUTH_TYPE_NORMAL AUTH_TYPE_VCRYPT AUTH_TYPE_PERSONALIZED_VCRYPT
status	USER_STATUS_CODE	INT	int	Status of the User	2	STATUS_PENDING_ACTIVATION STATUS_ACTIVE STATUS_DISABLED STATUS_DELETED
isPinEnabled	IS_PIN_ENABLED	CHAR	boolean	Whether PIN is enabled for this user	-	-
isADA	IS_ADA	CHAR	boolean	Is ADA	-	-
isLocked	IS_LOCKED	CHAR	boolean	Is this user locked.	-	-
lockedTime	LOCKED_TIME	DATETIME	Date	Date/Time when this user was locked.	-	-
passwordStatus	PASSWORD_STATUS	INT	int	Status of the password	2	-
passwordUpdateTime	PASSWORD_UPDATE_TIME	DATETIME	Date	Date/Time when the password was last updated.	-	-
passwordHistory	PASSWORD_HISTORY	TEXT	String	List of password which was used by this user.	4000	-
pinStatus	PIN_STATUS	INT	int	Status of the pin	2	-

Table L–1 (Cont.) VCryptUser

Name	DB name	DB type	Java type	Description	Length	Enum value
pinUpdateTime	PIN_UPDATE_TIME	DATETIME	Date	Date/Time when the pin was last updated.	-	-
pinHistory	PIN_HISTORY	TEXT	String	List of pin which was used by this user.	4000	-
imagePath	IMAGE_PATH	VARCHAR	String	Path to the image file	255	-
personalNote	PERSONAL_NOTE	TEXT	String	Personalized note	4000	-
imageStatus	IMAGE_STATUS	INT	int	Status of the image	4	-
phraseStatus	PHRASE_STATUS	INT	int	Status of the phrase	4	-
questionStatus	QUESTION_STATUS	INT	int	Status of the question	4	-
currentQAId	CURRENT_QA_ID	BIGINT	Long	The Id of the current question given to the user	-	-
defaultLocaleId	DEFAULT_LOCALE_ID	BIGINT	Long	Default locale for the user	16	-
phraseLocaleId	PHRASE_LOCALE_ID	BIGINT	Long	Locale for the phrase	16	-
notes	NOTES	TEXT	String	Note	4000	-

Glossary

Abbreviation

This algorithm handles common abbreviations, common nicknames, common acronyms, and date format.

Access Authentication

In the context of an HTTP transaction, the basic access authentication is a method designed to allow a web browser, or other client program, to provide credentials – in the form of a user name and password – when making a request.

Action

Rule result which can impact users such forcing them to register a security profile, KBA-challenging them, blocking access, asking them for PIN or password, and so on.

Actions Group

An actions group is a set of responses that are triggered by a rule.

Action groups are used as results within rules so that when a rule is triggered all of the actions within the groups are activated.

Adaptive Risk Manager

A category of Oracle Adaptive Access Manager features. Business and risk analytics, fraud investigation and customer service tools fall under the Adaptive Risk Manager category.

Adaptive Strong Authenticator

A category of Oracle Adaptive Access Manager features. All the end-user facing interfaces, flows, and authentication methods fall under the Adaptive Strong Authenticator category.

Agent Case

An OAAM Agent case is used to manage and conduct investigations on fraudulent sessions and transactions. The following are some specific functions of an Agent type case. Agent cases are used to perform the following:

- An investigator utilizes a case to capture findings gathered in the process of investigation
- Cases are used to manage the life cycle of an investigation.
- White/black listing of devices, location and other entities.
- Influence future risk evaluations based on findings

- Export finding to a spreadsheet

The decision to create a fraud case stems from its sources. Examples of sources are as follows:

- Investigators monitor or analyze the sessions from a given day continuously. If they find a high "fraud" alert that warrants immediate attention, they file an Agent case. A Fraud Investigator picks up the case and begins investigating further. The Fraud Investigator can create an agent case for alerts, multiple block sessions from a user, multiple blocked sessions from a device, high risk scores, and other situations.
- A configurable action creates an Agent case automatically as a supplementary action that is triggered based on a result action and/or a risk score after a checkpoint execution.
- A CSR case is escalated because investigation is needed for some reason.

Agent Case Feedback

Agent case "feed" back closed findings into the risk engine to improve accuracy of future evaluations automatically.

For example, an investigator creates an Agent case and links several fraudulent sessions to it. Later, the investigator closes the case with a disposition of confirmed fraud. A predictive model is rebuilt every "n" hours to take into account data from sessions linked to cases with a confirmed fraud disposition. Investigators can determine the frequency of rebuilding the models. Each session in the system is compared to see how close it is to the fraudulent ones. The closer the match the higher the risk. An example evaluation would be, was the probability more than 50% that this login session is fraudulent based on all sessions linked to confirmed fraud cases?

Alert

Rule results containing messages targeted to specific types of Oracle Adaptive Access Manager users.

Alert-centric Investigation Workflow

A Fraud Investigators starts each investigation by searching for sessions or transactions with high severity alerts and reviewing suspect transactions to identify fraud. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. He creates a case to link data to narrow the investigation. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

Alert Group

Alerts are indicators to personnel (CSR, Investigators, and so on). An alert group contains graded messages that can be triggered by a rule.

Alert groups are used as results within rules so that when a rule is triggered all of the alerts within the groups are activated.

Answer Logic

Answer Logic is a unique combination of Knowledge Based Authentication with registration, answer, and fuzzy logic used in the processing of challenge question responses. It increases the usability of a challenge answer flow by accepting variations of the valid answer.

Attribute

Attributes are the particular pieces of information associated with the activity being tracked. An example is the time of day for a login. Patterns collect data about members. If the member type is **User**, the pattern will collect data about users.

Authentication

The process of verifying a person's, device's, application's identity. Authentication deals with the question "Who is trying to access my services?"

Authentication Status

Authentication Status is the status of the session (each login/transaction attempt creates a new session).

Examples are listed below:

- If a user logs in for the first time and he goes through the registration process, but decides not to complete the registration process and logs out, the authentication status for this user session is set as "Pending Activation."
- If a user logs in from a different device/location, he is challenged. He answers the challenge questions incorrectly in all the three attempts, the authentication status for this session is set as "Wrong Password."
- If a user logs in and is taken to the final transaction page or success page, the authentication status for the particular session is set as "Success."
- If the user is a fraud and is blocked, the status for the session is set as "Block."

Authorization

Authorization regards the question "Who can access what resources offered by which components?"

Auto-generated case

An auto-generated case is created when a security administrator configures an action to create an Agent case when specific rules trigger. In other words, the new Agent case is dynamically created as a result of a particular event. This Agent case contains the session data for which it was created. An investigator starts his investigation by performing a search for all cases with **New** status.

Auto-generated Investigation Workflow

The investigator starts each investigation by searching for new Agent cases dynamically created as a result of a particular event. He performs a search for all cases with new status. The fraud investigator selects the first case. A session is already linked to the case so he drills in on the session for which the case was generated. He looks at the case and other data in the linked session. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

Autolearning

Autolearning is a set of features in Oracle Adaptive Access Manager that dynamically profile behavior in real-time. The behavior of users, devices and locations are recorded and used to evaluate the risk of current behavior.

Black List

A given list of users, devices, IP addresses, networks, countries, and so on that are blocked. An attack from a given member can show up on a report and be manually added to a blacklist at the administrator's discretion.

Blocked

If a user is "Blocked," it is because a policy has found certain conditions to be "true" and is set up to respond to these conditions with a "Block Action." If those conditions change, the user may no longer be "Blocked." The "Blocked" status is not necessarily permanent and therefore may or may not require an administrator action to resolve. For example, if the user was blocked because he was logging in from a blocked country, but he is no longer in that country, he may no longer be "Blocked."

Bots

Software applications that run automated or orchestrated tasks on compromised PCs over the internet. An organization of bots is known as a bot net or zombie network.

Browser Fingerprinting

When the user accesses the system, OAAM collects information about the computer. By combining all that data, the site creates a fingerprint of the user's browser. This fingerprint could potentially uniquely identify the user. Information gathered that makes up the browser fingerprint include the browser type used, extensions installed, system fonts, and the configuration and version information from the operating system, and whether or not the computer accepts cookies.

The browser and flash fingerprints are tracked separately. The fingerprints are available in the session listing and details pages and you can get further details about the fingerprint by opening the respective details pages. Hence, you can have both fingerprints available, but if the user has not installed flash then the digital fingerprint (flash) is set to null.

Buckets

Patterns are configured by an administrator and Oracle Adaptive Access Manager uses that configuration to create buckets as it needs them. Administrators do not deal or see buckets directly in any way.

Patterns are configured to create either one bucket or multiple buckets. Buckets are containers that are used to capture the frequency of behaviors. Rules evaluate the counters in these buckets for specific members to determine if a situation is anomalous.

Cache Data

Information about historical data during a specified time frame

Cache Policy

Groups offer two Cache Policy options: Full Cache or None.

The "Full Cache" option caches group contents in server memory for the lifetime of the server. Static lookup groups and read-only groups are good candidates for the "Full Cache" option. Administrators must be careful using this option as it uses server memory. A long list of elements can have an adverse affect since groups are re-cached if there are changes to the list.

The "None" Cache Policy option does not use cache and consults the database every time. Device group types are set to "None" because in most cases, they are dynamic

and manipulated while the server is running. If you have groups that stay static for the lifetime of the server, you can use the "Full Cache" option instead of "None."

Case

Cases provide tools to track and solve customer service issues.

A **case** is a record of all the actions performed by the CSR to assist the customer as well as various account activities of the customer. Each case is allocated a **case number**, a unique case identification number.

Case Created

The date and time the case was created.

Case Description

The details for the case. A description is required for cases.

Case Number

A unique identification number allocated to each case.

Case Status

Case Status is the current state of a case. Status values used for the case are New, Pending, Escalated, or Closed. When a case is created, the status is set to New by default.

Case Type

Type of case.

- CSR - CSR Cases are used in customer care situations associated within the normal course of doing business online and over the phone when providing assistance to customers. The customer support representatives can use the CSR set of tools for handling inquiries associated with Oracle Adaptive Access Manager. A CSR case is attached to a user.
- Escalated - When a CSR Manager identifies that a particular case needs additional investigation and escalates the case and the CSR Case becomes an escalated case. It is associated with a user.

Challenge Questions

Challenge Questions are a finite list of questions used for secondary authentication.

During registration, users are presented with several question menus. For example, he may be presented with three question menus. A user must select one question from each menu and enter answers for them during registration. Only one question from each question menu can be registered. These questions become the user's "registered questions."

When rules in OAAM Admin trigger challenge questions, OAAM Server displays the challenge questions and accepts the answers in a secure way for users. The questions can be presented in the QuestionPad, TextPad, and other pads, where the challenge question is embedded into the image of the authenticator, or simple HTML.

Challenge Type

Configuration of a type of challenge (ChallengeEmail, ChallengeSMS, ChallengeQuestion)

Checkpoint

A checkpoint is a specified point in a session when Oracle Adaptive Access Manager collects and evaluates security data using the rules engine.

Examples of checkpoints are:

- Pre-authentication - Rules are run before a user completes the authentication process.
- Post-authentication - Rules are run after a user is successfully authenticated.

Configurable Actions

Actions that a security administrator configures that are performed based on the rule execution result. Configurable actions are available for checkpoints. One or more configurable action can be specified for a checkpoint. The configurable action is associated with a trigger criteria, which is either an action or result score or both. The configurable action can be specified so that it executes either in synchronous mode or asynchronous mode. Custom configurable actions can be implemented and added to the application. They have to be coded in Java language and they have to implement a predefined interface

Once the configurable action is associated to a checkpoint, it is ready to be triggered after the rules execution of a checkpoint is complete. After the checkpoint is executed, the rules engine returns a result that specifies the final action, score, and the other result actions. Based on the final action and score, relevant configurable actions are executed in synchronous or asynchronous mode.

Completed Registration

Status of the user that has completed registration. To be registered a user may need to complete all of the following tasks: Personalization (image and phrase), registering challenge questions/answers and email/cell phone.

Complex Entity

An entity can be linked to multiple entities based on a relationship name. A complex entity has other entities linked to it by a relationship name.

Condition

Conditions are configurable evaluation statements used in the evaluation of historical and runtime data.

Cookie

A cookie (also browser cookie, computer cookie, tracking cookie, web cookie, internet cookie, and HTTP cookie) is a small string of text stored on a user's computer by a web browser. A cookie consists of one or more name-value pairs containing bits of information such as user preferences, shopping cart contents, the identifier for a server-based session, or other data used by websites. It is sent as an HTTP header by a web server to a web client (usually a browser) and then sent back unchanged by client each time it accesses that server. A cookie can be used for authenticating, session tracking (state maintenance), and maintaining specific information about users, such as site preferences or the contents of their electronic shopping carts.

Creation Method (Buckets)

Patterns are configured to create either one bucket or multiple buckets. Buckets are containers that are used to capture the frequency of behaviors. Rules evaluate the counters in these buckets for specific members to determine if a situation is anomalous.

- Single-bucket patterns create and populate one bucket with the exact data points and value ranges specified in the pattern.

  For example, if you choose to create an authentication pattern for users (member type) with the country United States (attribute), exactly one bucket is created and populated with users. If a user logs in from the United States, he or she becomes a member of the bucket and the bucket counts are incremented; if he or she does not log in from the United States, the bucket count is not incremented.

- Multi-bucket patterns usually create more buckets than single-bucket patterns. They create buckets as required based on the parameter configurations.

  You configure the data types and samples you want Oracle Adaptive Access Manager to generate buckets from, and then during pattern processing Oracle Adaptive Access Manager creates buckets as needed to capture behaviors.

CSR

Customer service representatives resolve low risk customer issues originating from customer calls. CSRs has limited access to the OAAM Administration Console

- View the reason why a login or transaction was blocked
- View a severity flag with alert status to assist in escalation
- Complete actions such as issuing temporary allow for a customer

CSR Manager

A CSR Manager is in charge of overall management of CSR type cases. CSR Managers have all the access and responsibilities of a CSR plus access to more sensitive operations.

Dashboard

Provides a real-time view of activity via aggregates and trending.

Data Elements

An entity is a set of attributes. Data elements are what is used to describe the attributes that make up an entity. For example, the credit card entity has attributes such as address line 1, address line 2, city, zip, and state. Data elements, such as description, length, type, and so on, are used to describe each attribute.

Data Mining

Data mining is the practice of automatically searching large stores of data to discover patterns and trends that go beyond simple analysis. Data mining uses sophisticated mathematical algorithms to segment the data and evaluate the probability of future events. Data mining is also known as Knowledge Discovery in Data (KDD). Data mining can answer questions that cannot be addressed through simple query and reporting techniques.

Data Type

Entity data may be configured as one of four types including string, numeric, date and Boolean. The string data type is used for the majority of use cases. The numeric data type should be used when arithmetic calculations will be performed on the data by the rules. The date data type is used for data specific data. Boolean data type is used for True/False data.

Date of Last Case Action

In cases, the date when last action occurred.

Date of Last Global Case Action

The last action performed against the user online.

Date of Last Online Action

Date when last online action was executed

Delivery Channel

Delivery mechanism used to send the OTP to the user. Email, SMS, IM, and so on are delivery channels.

Device

A computer, PDA, cell phone, kiosk, etc used by a user

Device Fingerprinting

Device fingerprinting collects information about the device such as browser type, browser headers, operating system type, locale, and so on. Fingerprint data represents the data collected for a device during the login process that is required to identify the device whenever it is used to log in. The fingerprinting process produces a fingerprint that is unique to the user and designed to protect against the "replay attacks" and the "cookie based registration bypass" process. The fingerprint details help in identifying a device, check whether it is secure, and determine the risk level for the authentication or transaction.

A customer typically uses these devices to log in: desktop computer, laptop computer, PDA, cell phone, kiosk, or other web enabled device.

Device Identification

During the registration process, the user is given an option to register his device to the system. If a user tries to login from a registered device, the application knows that it is a safe and secure device and allows the user to proceed with his transactions. This process is also called device identification.

Digest Identification Scheme

The Digest Identification Scheme creates a unique identifier by hashing the values of the selected elements of the entity. The resultant key is usually cryptic.

display scheme

The display scheme consists of the elements you want to present and the order when you want to display the value of an entity in a user interface. For example, if you want to display an address, you would want to show address line 1 as the first item, address line 2 as the second item, city as the third item, state as the fourth item, and zipcode as the fifth item.

Disposition

When an investigation is complete a case is closed with a disposition. A disposition both summarizes how the case was resolved and how the findings may influence future risk evaluation.

Device Registration

Device registration is a feature that allows a user to flag the device (computer, mobile, PDA, and others) being used as a safe device. The customer can then configure the rules to challenge a user that is not coming from one of the registered devices.

Once the feature is enabled, information about the device is collected for that user. To make use of the information being collected, policies must be created and configured. For example, a policy could be created with rules to challenge a user who is not logging in from one of the registered devices.

encrypted

Information that is made unreadable to anyone except those owning special knowledge

Entities Editor

A tool to edit entities, a user-defined structure that can be reused across different transactions. Only appropriate and related fields should be grouped into an Entity.

Entity

An entity is a data structure that can be reused in multiple transactions. For example, the Address entity could be used as a shipping address, billing address, home address, and so on. Most entities also combine multiple data points into the structure for data optimization. For example, the set of properties in an address could include street number, street name, apartment number, city, state, postal code, and country entity properties.

Entities can be defined and associated as an instance of a transaction. For example, a security administrator can define a Customer entity to be used in an ecommerce transaction. As part of the Customer entity definition, he can link the Address entity as a Shipping Address and as a Billing Address. Shipping Address and Billing Address are two instances of the Address entity. An entity definition is the original model on which the entity instance is patterned. Entity instance creation will only be possible if its corresponding entity definition already exists in the database.

Entity Instance

When an entity linked to another entity or used in a transaction definition an instance is created such as home address or work address

entity Key

The entity Key is the unique identifier provided by the system integrator which is used when creating and updating entities via the API.

Entity Occurrence

When an entity instance is used in a runtime operation an individual occurrence is created such as the shipping address used in order number 356893

Environment

Tools for the configuration system properties and snapshots

Expiration Date

Date when CSR case expires. By default, the length of time before a case expires is 24 hours. After 24 hours, the status changes from the current status to Expired. The case could be in pending, escalated statuses when it expires. After the case expires, the user will not be able to open the case anymore, but the CSR Manager can. The length of time before a case expires is configurable.

Execution Types

Two execution types for configurable actions are listed:

- Synchronous - Synchronous actions are executed in the order of their priority in ascending order. For example, if the user wants to create a case and then send an email with the Case ID, the user would choose synchronous actions. Synchronous actions will trigger/execute immediately.

  If the actions are executing in sequential order and one of the actions in the sequence does not trigger, the other actions will still trigger.

- Asynchronous actions are queued for execution but not in any particular sequence. For example, if you want to send an email or perform some action and do not care about executing it immediately and are not interested in any order of execution, you would choose asynchronous actions.

Enumerations

User-defined enums are a collection of properties that represent a list of items. Each element in the list may contain several different attributes. The definition of a user-defined enum begins with a property ending in the keyword ".enum" and has a value describing the use of the user-defined enum. Each element definition then starts with the same property name as the enum, and adds on an element name and has a value of a unique integer as an ID. The attributes of the element follow the same pattern, beginning with the property name of the element, followed by the attribute name, with the appropriate value for that attribute.

The following is an example of an enum defining credentials displayed in the login page of an OAAM Server implementation:

```
bharosa.uio.default.credentials.enum = Enum for Login Credentials
bharosa.uio.default.credentials.enum.companyid=0
bharosa.uio.default.credentials.enum.companyid.name=CompanyID
bharosa.uio.default.credentials.enum.companyid.description=Company ID
bharosa.uio.default.credentials.enum.companyid.inputname=comapanyid
bharosa.uio.default.credentials.enum.companyid.maxlength=24
bharosa.uio.default.credentials.enum.companyid.order=0
bharosa.uio.default.credentials.enum.username=1
bharosa.uio.default.credentials.enum.username.name=User name
bharosa.uio.default.credentials.enum.username.description=User name
bharosa.uio.default.credentials.enum.username.inputname=userid
bharosa.uio.default.credentials.enum.username.maxlength=18
bharosa.uio.default.credentials.enum.username.order=1
```

Escalated cases

These special escalated cases retain the user information used to create the CSR case. The flow is as follows: the CSR submits a CSR case for investigators to look into when there is suspicious activity associated with the case. Once escalated the case is treated as an Agent case. It is no longer visible to the CSR. Escalated cases from customer service have the **Escalated** status and when accessed for the first time, the status automatically changes to **Pending**. The investigator searches for cases with the **Escalated** status and filters the results on the severity column so the highest severity cases are shown at the top. Best practice is to open the escalated case and view the logs for notes entered by the CSR and CSR Manager. For example, the notes can show that the CSR escalated the CSR case to an Agent case because he suspected fraud activity.

Example of searching by **Escalated** status: A CSR Manager escalates a CSR case. Matt is a fraud investigator specializing in customer specific security issues. He searches for all cases with the **Escalated** case status.

Escalated Case Investigation Workflow

An investigator starts the investigation by searching for all the cases with the Escalated status. He filters the results on the severity column so the highest severity cases are shown at the top. He opens the escalated case and views the logs for notes entered by the CSR and CSR Manager. He searches for sessions based on the user in the case. He views the data involved in an incident and locates related situations by using the complex data relationships captured by OAAM. When fraud is identified the investigator records findings, blacklists entities, and closes out cases with a disposition.

Evaluation Priority

The priority in which the collected data is evaluated:

- High

  Most of the resources are assigned for the data to be evaluated.

- Low

  The resources assigned to data evaluation is half as much as the High priority.

Fat Fingering

This algorithm handles Answers with typos due to the proximity of keys on a standard keyboard.

Filter Panel

The Filters panel provides a quick way to perform targeted searches for sessions and transactions simultaneously. Investigators drag and drop individual data points from different pages, such as the case linked sessions tab, search sessions, search transaction and compare transactions.

Flash Fingerprinting

Flash fingerprinting is similar to browser fingerprinting but a flash movie is used by the server to set or retrieve a cookie from the user's machine so a specific set of information is collected from the browser and from flash. The flash fingerprint is only information if flash is installed on the client machine.

The fingerprints are tracked separately. The fingerprints are available in the session listing and details pages and you can get further details about the fingerprint by opening the respective details pages. Hence, you can have both fingerprints available, but if the user has not installed flash then the digital fingerprint (flash) is set to null.

Fraud Investigation

The purpose of a fraud investigation is to evaluate situations where the security policies have detected a high risk scenario that require human intelligence and/or non-electronic interaction to determine whether fraud has occurred and if there were other related incidents. Fraud investigators examine suspicious session and transaction data across events to locate related incidents.

Fraud Investigator

A Fraud Investigator primarily looks into suspicious situations either escalated from customer service or directly from Oracle Adaptive Access Manager alerts. Agents have access to all of the customer care functionality as well as read only rights to security administration and BI Publisher reporting.

Fraud Investigation Manager

A Fraud Investigation Manager has all of the access and duties of an investigator plus the responsibility to manage all cases. An Investigation Manager must routinely search for expired cases to make sure none are pending.

Fraud Scenario

A fraud scenario is a potential or actual deceptive situation involving malicious activity directed at a company's online application.

For example, you have just arrived at the office on Monday and logged into the OAAM Administration Console. You notice that there are a high number of logins with the status "Wrong Password" and "Invalid User" coming in from a few users. Some appear to be coming in from different countries, and some appear to be local. You receive a call from the fraud team notifying you that some accounts have been compromised. You must come up with a set of rules that can identify and block these transactions.

Gated Security

The multiple security checkpoints a user must pass through to gain access to sensitive data or transactions.

Grey List

Anyone not in the black list and white list. Grey list members are subject to various levels of challenges.

Groups

Collection of like items. Groups are found in the following situations

- Groups are used in rule conditions
- Groups that link policy to user groups
- Action and alert groups

HTTP

Hypertext Transfer Protocol

ID Label

When runtime entity data is displayed in the OAAM Administration Console the labels shown will be those defined in the ID Scheme tab of the entity definition.

ID Scheme

An ID scheme consists of the data elements that can uniquely identify an entity, in other words, you are defining the unique combination that identifies the entity. For example, the credit card entity has many attributes, but the way to uniquely identify a credit card is by using the 16-digit credit card number. In that case, the ID scheme is just the credit card number.

Another example, the address entity has address line 1, address line 2, city, state, and zipcode as attributes. Address line 1, address line 2, and zipcode, without the state and city attributes, can still be used to identify the address uniquely.

Investigation Workflow

OAAM provides three workflows, which make it easier for an investigator to examine fraudulent transactions. The investigation workflow includes interfaces to search and compare runtime data, isolate related incidents, capture findings, and affect future risk

analysis. Each customer deployment generally utilizes a combination of the following three common workflows depending on business need:

- Alert-centric
- Auto-generated
- Escalated

IP address

Internet Protocol (IP) address

Jail broken

Jail-breaking is the process of removing or circumventing the limitations that manufacturers impose on their devices. Jail breaking, while legal, is a form of privilege escalation that can present a heightened security risk to protected resources.

Job

A job is a collection of tasks that can be run by OAAM. You can perform a variety of jobs such as load data, run risk evaluation, roll up monitor data, and other jobs.

KBA Phone Challenge

Users can be authenticated over the phone using their registered challenge questions. This option is not available for unregistered users or in deployments not using KBA.

KeyPad

Virtual keyboard for entry of passwords, credit card number, and on. The KeyPad protects against Trojan or keylogging.

Keystroke Loggers

Software that captures a user's keystrokes. Keylogging software can be used to gather sensitive data entered on a user's computer.

Key Identification Scheme

The Key Identification Scheme creates a unique identifier by simply concatenating the selected elements of the entity.

Knowledge Based Authentication (KBA)

OAAM knowledge based authentication (KBA) is a user challenge infrastructure based on registered challenge questions. It handles Registration Logic, challenge logic, and Answer Logic.

Last Case Action

The last action executed in the CSR case.

Last Global Case Action

The last action that occurred for this user in all CSR cases. Escalated cases are not taken into account.

Last Online Action

The last action that user executed, for example - Answered challenge question would show "Challenge Question" or if user is blocked, "Block."

Linked Entities

Linked entities are used to configure relationships between entities. Linked entities are created and updated via either the Entity CRUD API or via the transaction CRUD API.

An entity can be linked to another entity. A relationship is the association between entities. The Patient entity can be linked to another entity of type Address. The relationship between "Patient" and "Address" entities can be said to be one-to-one (1:1) because they have a one to one direct mapping. The Address entity is not dependant on the Patient and can reside by itself. It can be linked to other entities like Customers and Providers.

Link Name

When an entity is linked to another the linked entity is given a name which will be used to identify it in other Admin console screens including transaction definitions.

Location

A city, state, country, IP, Network ID, etc from which transaction requests originate.

Locked

"Locked" is the status that Oracle Adaptive Access Manager sets if the user fails a KBA or OTP challenge. The "Locked" status is only used if the KBA or One Time-Password (OTP) facility is in use.

- OTP: OTP sends a one-time PIN or password to the user through a configured delivery method, and if the user exceeds the number of retries when attempting to provide the OTP code, the account becomes "Locked."
- KBA: For online challenges, a customer is locked out of the session when the Online Counter reaches the maximum number of failures. For phone challenges, a customer is locked out when the maximum number of failures is reached and no challenge questions are left.

After the lock out, a Customer Service Representative must reset the status to "Unlocked" before the account can be used to enter the system.

Malware

Malware is software designed to infiltrate or damage a computer system without the owner's informed consent. Malware may contain key loggers or other types of malicious code.

Man-In-The-Middle-Attack (Proxy Attacks)

An attack in which a fraudster is able to read, insert and modify at will, messages between two parties without either party knowing that the link between them has been compromised

Manually Created Case

Only an investigator can create a manual Agent case directly. No user information is shown or required for creation of an Agent case. The only required inputs to create an Agent case are Organization ID, name, and description. Manually created Agent cases have a **Pending** status when the case is created.

Member

Member represents the actor in the system.

Mobile Device

A mobile device is a device that runs a mobile operating system, such as the iOS mobile operating system from Apple, while a non-mobile device is a device that runs a non-mobile operating system, such as Mac OS X, Windows 7, and Linux desktop. Because mobile devices and non-mobile devices present different security challenges, mobile authentication and non-mobile authentication are managed separately in Mobile and Social. New mobile devices come online much more frequently and therefore require greater scrutiny, including fraud detection measures.

Mobile Security

Enhanced mobile security includes:

- Better mobile browser UX
- Mobile tuned security policies
- REST services and SDK for mobile application developers
- Hardened mobile device fingerprinting
- Lost and stolen mobile device security

Multifactor Authentication

Multifactor authentication (MFA) is a security system in which more than one form of authentication is implemented to verify the legitimacy of a transaction. In contrast, single factor authentication (SFA) involves only a User ID and password.

Multiprocessing Modules (MPMs)

Apache httpd ships with a selection of Multi-Processing Modules (MPMs) which are responsible for binding to network ports on the machine, accepting requests, and dispatching children to handle the requests.

Mutual Authentication

Mutual authentication or two-way authentication (sometimes written as 2WAY authentication) refers to two parties authenticating each other suitably. In technology terms, it refers to a client or user authenticating himself to a server and that server authenticating itself to the user in such a way that both parties are assured of the others' identity.

Nested Policies

A nested policy is a secondary policy used to further quantify the risk score in instances where the original result output by the system is inconclusive. Nested Policies can be assigned to ensure a higher degree of accuracy for the risk score. A nested policy is run only when a specific sequence of answers is returned from the primary policy. Nested policies therefore reduce false positives and negatives.

OAAM Admin

Administration Web application for all environment and Adaptive Risk Manager and Adaptive Strong Authenticator features.

OAAM Server

Adaptive Risk Manager and Adaptive Strong Authenticator features, Web services, LDAP integration and user Web application used in all deployment types except native integration

One Time Password (OTP)

One Time Password (OTP) is a form of out of band authentication that is used as a secondary credential and generated at pre-configured checkpoints based on the policies configured.

OTP Anywhere

OTP Anywhere is a risk-based challenge solution consisting of a server generated one time password delivered to an end user via a configured out of band channel. Supported OTP delivery channels include short message service (SMS), eMail, and instant messaging. OTP Anywhere can be used to compliment KBA challenge or instead of KBA. As well both OTP Anywhere and KBA can be used alongside practically any other authentication type required in a deployment. Oracle Adaptive Access Manager also provides a challenge processor framework. This framework can be used to implement custom risk-based challenge solutions combining third party authentication products or services with OAAM real-time risk evaluations.

Oracle Adaptive Access Manager

A product to protect the enterprise and its customers online.

Oracle Adaptive Access Manager

- provides multifactor authentication security
- evaluates multiple data types to determine risk in real-time
- aids in research and development of fraud policies in offline environment
- integrates with access management applications

Oracle Adaptive Access Manager is composed of two primary components: OAAM Server and OAAM Admin.

Oracle Data Mining (ODM)

Oracle Data Mining is an option to the Oracle Database EE, provides powerful data mining functionality

Order

The order determines how the data is concatenated while forming the data that identifies the entity.

Organization ID

The unique ID for the organization the user belongs in

Out Of Band Authentication

The use of two separate networks working simultaneously to authenticate a user. For example: email, SMS, phone, and so on.

Pattern

Patterns are configured by an administrator and record the behavior of the users, device and locations accessing the system by creating a digest of the access data. The digest or profile information is then stored in a historical data table. Rules evaluate the patterns to dynamically assess risk levels.

Pattern Name

Patterns are features characteristic of an individual or a group. Usually these patterns represent behavior considered to be high risk based on industry expertise.

Pattern Status

Status is the current state of a Pattern. There are 4 states in pattern creation.

- Active

  If data must be collected, the pattern must be in the active state.

- Inactive

  If the pattern is complete, but you do not want to collect data, select **Inactive**.

- Incomplete

  If pattern creation has started, but you need to save it for completion later, select **Incomplete**. Data is not collected for this state.

- Invalid

  The administrator may choose to mark the pattern as invalid if he or she does not want the pattern used. Data is not collected for this state.

Personalization Active

Status of the user who has an image, a phrase and questions active. Personalization consists of a personal background image and phrase. The timestamp is generated by the server and embedded in the single-use image to prevent reuse. Each Authenticator interface is a single image served up to the user for a single use.

Pharming

Pharming (pronounced farming) is an attack aiming to redirect a website's traffic to another, bogus website.

Phishing

A criminal activity utilizing social engineering techniques to trick users into visiting their counterfeit Web application. Phishers attempt to fraudulently acquire sensitive information, such as user names, passwords and credit card details, by masquerading as a trustworthy entity. Often a phishing exercise starts with an email aimed to lure in gullible users.

Phonetics

This algorithm handles Answers that "sound like" the registered answer, regional spelling differences, and common misspellings

PinPad

Authentication entry device used to enter a numeric PIN.

Plug-in

A plug-in is an extension and consists of a computer program that interacts with a host application (a web browser or an email client, for example) to provide a certain, usually very specific, function "on demand".

Policy

Policies contain security rules and configurations used to evaluate the level of risk at each checkpoint.

Policy Set

A policy set is the collection of all the currently configured policies used to evaluate traffic to identify possible risks. The policy set contains the scoring engine and action/score overrides.

Policy Status

Policy has three status which defines the state of the object or its availability for business processes.

- Active
- Disabled
- Deleted

Deleted is not used.

When a policy is deleted, it is permanently deleted from the database.

By Default every new policy created has status as "Active."

Every copied policy has a default status as "Disabled."

Predictive Analysis

Predictive analytics encompasses a variety of techniques from statistics, data mining and game theory that analyze current and historical facts to detect if a transaction is anomalous or not and to provide a higher identity assurance.

Questions Active

Status of the user who has completed registration and questions exists by which he can be challenged.

Question Set

The total number of questions a customer can choose from when registering challenge questions.

QuestionPad

Device that presents challenge questions for users to answer before they can perform sensitive tasks. This method of data entry helps to defend against session hijacking.

Registered Questions

A customer's registered questions are the questions that he selected and answered during registration or reset. Only one question from each question menu can be registered.

Registration Logic

The configuration of logic that governs the KBA registration process.

Risk Score

The numeric risk level associated with a checkpoint.

Row and Column

In element definition, row and column is the location where data is stored in the database. The row and column are automatically assigned. It is optional for the administrator to change these.

Rule Conditions

Conditions are the basic building blocks for security policies.

Rules

Rules are a collection of conditions used to evaluate user activity.

Scores

Score refers to the numeric scoring used to evaluate the risk level associated with a specific situation. A policy results in a score.

Scoring Engine

Oracle Adaptive Access Manager uses scoring engines to calculate the risk associated with access requests, events, and transaction.

Scoring engines are used at the policy and policy set levels. The Policy Scoring Engine is used to calculate the score produced by the different rules in a policy. The Policy Set Scoring Engine is used to calculate the final score based on the scores of policies.

Where there are numerous inputs, scoring is a able to summarize all these various points into a score that decisions can be based on.

Security Token

Security tokens (or sometimes a hardware token, hard token, authentication token, USB token, cryptographic token) are used to prove one's identity electronically (as in the case of a customer trying to access their bank account). The token is used in addition to or in place of a password to prove that the customer is who they claim to be. The token acts like an electronic key for access a resource.

Severity Level

A marker to communicate to case personnel how severe this case is. The severity level is set by whomever creates the case. The available severity levels are High, Medium, and Low. If a customer suspects fraud, then the severity level assigned is "High." For example, if the customer wants a different image, then the severity level assigned is "Low." Severity levels of a case can be escalated or de-escalated as necessary.

Session Hijacking

The term Session Hijacking refers to the exploitation of a valid computer session - sometimes also called a session key - to gain unauthorized access to information or services in a computer system

Simple Entity

A simple entity is created without any previously linked entities or new linked entities.

Snapshot

A snapshot is a zip file that contains Oracle Adaptive Access policies, dependent components and configurations for backup, disaster recovery and migration. Snapshots can be saved to the database for fast recovery or to a file for migration between environments and backup. Restoring a snapshot is a process that includes visibility into exactly what the delta is and what actions will be taken to resolve conflicts. For information on snapshots, refer to Chapter 14, "Managing System Snapshots."

SOAP

SOAP, originally defined as Simple Object Access Protocol, is a protocol specification for exchanging structured information in the implementation of Web Services in computer networks. It relies on Extensible Markup Language (XML) as its message format, and usually relies on other Application Layer protocols (most notably Remote Procedure Call (RPC) and HTTP) for message negotiation and transmission. SOAP can form the foundation layer of a web services protocol stack, providing a basic messaging framework upon which web services can be built.

Social Engineering

Social engineering is a collection of techniques used to manipulate people into performing actions or divulging confidential information to a fraudulent entity.

Spoofing Attack

In the context of network security, a spoofing attack is a situation in which one person or program successfully masquerades as another by falsifying data and thereby gaining an illegitimate advantage.

Source Data

All parameters (data fields) for the transaction from the external application (client's end) that will be sent to the Oracle Adaptive Access Manager Server.

Spyware

Spyware is computer software that is installed surreptitiously on a personal computer to intercept or take partial control over the user's interaction with the computer, without the user's informed consent.

Strong Authentication

An authentication factor is a piece of information and process used to authenticate or verify the identity of a person or other entity requesting access under security constraints. Two-factor authentication (T-FA) is a system wherein two different factors are used in conjunction to authenticate. Using two factors as opposed to one factor generally delivers a higher level of authentication assurance.

Using more than one factor is sometimes called strong authentication.

Temporary Allow

Temporary account access that is granted to a customer who is being blocked from logging in or performing a transaction.

Temporary Allow Active

Temporary allow is active.

Temporary Allow Expiration Date

Date when temp allow expires.

TextPad

Personalized device for entering a password or PIN using a regular keyboard. This method of data entry helps to defend against phishing. TextPad is often deployed as the default for all users in a large deployment then each user individually can upgrade to another device if they want. The personal image and phrase a user registers and sees every time they log in to the valid site serves as a shared secret between user and server.

Transaction

Any process a user performs after successfully logging in can be termed as a transaction. Examples are making a purchase, bill pay, money transfer, stock trade, and address change. The core elements of an Oracle Adaptive Access Manager transaction are entities and transaction data. Entities can be defined and associated as an instance of a transaction. An entity is a user-defined data structure, which comprises of a set of attributes. The entity can be reused across different transactions. An example of an entity is an address. When associating the entity with a transaction he can create a shipping address and billing address from the address entity.

Transactional autolearning

Transactional autolearning includes:

- Customizable patterning
- Transaction rule conditions

Transaction Data

Data that is an abstract item or that does not have any attributes by itself, does not fit into any entity, which exists or is unique by itself is defined as transaction data.

Items that cannot fall into an entity are classified as standalone data.

A classic example is amount or code.

Transaction Definition

Application data is mapped using the transaction definition before transaction monitoring and profiling can begin. Each type of transaction Oracle Adaptive Access Manager deals with should have a separate transaction definition.

Transaction Key

This key value is used to map the client/external transaction data to transactions in the Oracle Adaptive Access Manager Server.

Trigger

A rule evaluating to true.

Transaction Type

The Transaction Definitions that have been configured in this specific installation such as authentication, bill pay, wire transfer, and others.

Trigger Combinations

Additional results and/or policy evaluation based on rule outcome combinations. You can specify a score, action group and alert group based on different rule outcome combinations or you can point to a nested policies to further evaluate the risk.

Trojan/Trojan Horse

A program that installs malicious software while under the guise of performing some other task.

User

A business, person, credit card, etc that is authorized to conduct transactions.

Utility Panel

The Utility panel is specialized for performing searches and is readily accessible from every page in the OAAM workflows. It is used for quickly finding sessions and transactions that are related to one another based on common data.

Using the Utility Panel enables the investigator to:

- Quickly locate sessions and transactions with data in common
- Iterate on a query to expand and contract returns
- Both view aggregate numbers of sessions and transactions found and drill in to expand investigation

Validations

Answer validation used in the KBA question registration and challenge process

Virtual Authentication Devices

A personalized device for entering a password or PIN or an authentication credential entry device. The virtual authentication devices harden the process of entering and transmitting authentication credentials and provide end users with verification they are authenticating on the valid application.

Virus

A computer program that can copy itself and infect multiple computers without permission or knowledge of the users.

White List

A list of trusted members. Any activity that originates from these users, devices, IP addresses, networks, countries, and so on can be trusted.

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