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Primary Author: Robert Farrington

Contributor: Max Arderius, Robert Azzopardi, Nadia Bendjedou, Michael Bernstein, Eric Bing, Anne Carlson, Subash Chadalavada, Steven Chan, Christina Clark, Ivo Dujmovic, Carole Eubanks, Eric Fichet, Henriette Fux, Ric Ginsberg, Cliff Godwin, Brad Goodwin, William Greene, John Heimann, Theresa Hickman, Clara Jaeckel, Jeff Lunn, Steve Mayze, Leigh Miller, Christine Monk, K.R. Narayanan, Kent Noble, Sarita Nori, Terri Noyes, Lisa Parekh, Gabriel Plumlee, Lyn Pratt, Joan Ryan, Greg Seiden, Yun Shaw, Leslie Studdard, Keith M. Swartz, Andy Tremayne, Sean Tuck, Mildred Wang

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Preface

Intended Audience

Welcome to Release 12 of the *Oracle Applications Concepts.*

This guide assumes you have a working knowledge of the following:

- The principles and customary practices of your business area.
- Computer desktop application usage and terminology

If you have never used Oracle Applications, we suggest you attend one or more of the Oracle Applications training classes available through Oracle University.

This book is intended for all those planning to deploy Oracle E-Business Suite Release 12, or contemplating significant changes to a configuration. It focuses on high-level, strategic topics, to enable system administrators and others to make informed decisions about the various installation and configuration choices open to them.

The book does not attempt to replace or supplant the installation, maintenance, and upgrade manuals. As such, it does not describe procedures in depth, but gives a broad outline of the actions needed to achieve a particular goal. The book is arranged such that it starts with topics that will apply to all installations, then examines areas which, while optional, will be relevant to most sites. Typically, these optional subjects are interrelated, so that a site will most likely be implementing more than one. Finally, several specialized areas are discussed; these are mainly topics that are mentioned primarily for reference.

> **Note:** This book typically uses UNIX nomenclature in specifying files and directories. Windows users should substitute the appropriate Windows terms where applicable. For example, a UNIX .env (environment) file will be a .cmd (command) file on Windows.

See Related Information Sources on page xiii for more Oracle Applications product information.

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Related Information Sources

This book is included on the Oracle Applications Documentation Library, which is supplied in the Release 12 Media Pack. You can download soft-copy documentation as PDF files from the Oracle Technology Network at http://otn.oracle.com/documentation, or you can purchase hard-copy documentation from the Oracle Store at http://oraclestore.oracle.com. The Oracle Applications Release 12 Documentation Library contains the latest information, including any documents that have changed significantly between releases. If substantial changes to this book are necessary, a revised version will be made available on the "virtual" documentation library on Oracle *MetaLink*.

For a full list of documentation resources for Oracle Applications Release 12, see *Oracle Applications Documentation Resources, Release 12*, Oracle*MetaLink* Document 394692.1.

If this guide refers you to other Oracle Applications documentation, use only the Release 12 versions of those guides.

Online Documentation

All Oracle Applications documentation is available online (HTML or PDF).

- **Online Help** - Online help patches (HTML) are available on Oracle*MetaLink*.

- **PDF Documentation** - See the Oracle Applications Documentation Library for current PDF documentation for your product with each release. The Oracle Applications Documentation Library is also available on Oracle*MetaLink* and is updated frequently.

- **Oracle Electronic Technical Reference Manual -** The Oracle Electronic Technical Reference Manual (eTRM) contains database diagrams and a detailed description of database tables, forms, reports, and programs for each Oracle Applications product. This information helps you convert data from your existing applications and integrate Oracle Applications data with non-Oracle applications, and write custom reports for Oracle Applications products. The Oracle eTRM is available on Oracle *MetaLink*.

Related Guides

You should have the following key books on hand as you deploy and maintain Oracle Applications. Depending on the requirements of your particular installation, you may also need additional manuals or guides.

Oracle Alert User's Guide

This guide explains how to define periodic and event alerts to monitor the status of your Oracle Applications data.

Oracle Applications CRM System Administrator's Guide

This manual describes how to implement the CRM Technology Foundation (JTT) and use its System Administrator Console.

Oracle Applications Developer's Guide

This guide contains the coding standards followed by the Oracle Applications development staff. It describes the Oracle Application Object Library components needed to implement the Oracle Applications user interface described in the *Oracle Applications User Interface Standards for Forms-Based Products*. It also provides information to help you build your custom Oracle Forms Developer forms so that they integrate with Oracle Applications.

Oracle Applications Flexfields Guide

This guide provides flexfields planning, setup, and reference information for the Oracle Applications implementation team, as well as for users responsible for the ongoing maintenance of Oracle Applications product data. This guide also provides information on creating custom reports on flexfields data.

Oracle Application Framework Developer's Guide

This guide contains the coding standards followed by the Oracle Applications development staff to produce applications built with Oracle Application Framework. This guide is available in PDF format on Oracle*MetaLink* and as online documentation in JDeveloper 10*g* with Oracle Application Extension.

Oracle Application Framework Personalization Guide

This guide covers the design-time and run-time aspects of personalizing applications built with Oracle Application Framework.

Oracle Applications Installation Guide: Using Rapid Install

This book is intended for use by anyone who is responsible for installing or upgrading Oracle Applications. It provides instructions for running Rapid Install either to carry out a fresh installation of Oracle Applications Release 12, or as part of an upgrade from Release 11*i* to Release 12. The book also describes the steps needed to install the technology stack components only, for the special situations where this is applicable.

Oracle Applications Multiple Organizations Implementation Guide

This guide describes the multiple organizations concepts in Oracle Applications. It describes in detail on setting up and working effectively with multiple organizations in Oracle Applications.

Oracle Application Server Adapter for Oracle Applications User's Guide

This guide covers the use of OracleAS Adapter in developing integrations between Oracle applications and trading partners.

Please note that this guide is in the Oracle Application Server 10*g* (10.1.3.1)

Documentation Library.

Oracle Applications Supportability Guide

This manual contains information on Oracle Diagnostics and the Logging Framework for system administrators and custom developers.

Oracle Applications System Administrator's Guide Documentation Set

This documentation set provides planning and reference information for the Oracle Applications System Administrator. *Oracle Applications System Administrator's Guide - Configuration* contains information on system configuration steps, including defining concurrent programs and managers, enabling Oracle Applications Manager features, and setting up printers and online help. *Oracle Applications System Administrator's Guide - Maintenance* provides information for frequent tasks such as monitoring your system with Oracle Applications Manager, managing concurrent managers and reports, using diagnostic utilities, managing profile options, and using alerts. *Oracle Applications System Administrator's Guide - Security* describes User Management, data security, function security, auditing, and security configurations.

Oracle Applications User's Guide

This guide explains how to navigate, enter data, query, and run reports using the user interface (UI) of Oracle Applications. This guide also includes information on setting user profiles, as well as running and reviewing concurrent requests.

Oracle Applications User Interface Standards for Forms-Based Products

This guide contains the user interface (UI) standards followed by the Oracle Applications development staff. It describes the UI for the Oracle Applications products and how to apply this UI to the design of an application built by using Oracle Forms.

Oracle e-Commerce Gateway User's Guide

This guide describes the functionality of Oracle e-Commerce Gateway and the necessary setup steps in order for Oracle Applications to conduct business with trading partners through Electronic Data Interchange (EDI). It also contains how to run extract programs for outbound transactions, import programs for inbound transactions, and the relevant reports.

Oracle e-Commerce Gateway Implementation Manual

This guide describes implementation details, highlights additional setups for trading partner, code conversion, and Oracle Applications as well as provides the architecture guidelines for transaction interface files. This guide also contains troubleshooting information and how to customize EDI transactions.

Oracle Integration Repository User's Guide

This guide covers the employment of Oracle Integration Repository in researching and deploying business interfaces to produce integrations between applications.

Oracle Report Manager User's Guide

Oracle Report Manager is an online report distribution system that provides a secure and centralized location to produce and manage point-in-time reports. Oracle Report Manager users can be either report producers or report consumers. Use this guide for information on setting up and using Oracle Report Manager.

Oracle iSetup User Guide

This guide describes how to use Oracle iSetup to migrate data between different instances of the Oracle E-Business Suite and generate reports. It also includes configuration information, instance mapping, and seeded templates used for data migration.

Oracle Web Applications Desktop Integrator Implementation and Administration Guide

Oracle Web ADI brings Oracle E-Business Suite functionality to a spreadsheet where familiar data entry and modeling techniques can be used to complete Oracle E-Business Suite tasks. You can create formatted spreadsheets on your desktop that allow you to download, view, edit, and create Oracle E-Business Suite data that you can then upload. Use this guide to implement Oracle Web ADI and for information on defining mappings, layouts, style sheets, and other setup options.

Oracle Workflow Administrator's Guide

This guide explains how to complete the setup steps necessary for any product that includes workflow-enabled processes. It also describes how to manage workflow processes and business events using Oracle Applications Manager, how to monitor the progress of runtime workflow processes, and how to administer notifications sent to workflow users.

Oracle Workflow Developer's Guide

This guide explains how to define new workflow business processes and customize existing Oracle Applications-embedded workflow processes. It also describes how to define and customize business events and event subscriptions.

Oracle Workflow User's Guide

This guide describes how users can view and respond to workflow notifications and monitor the progress of their workflow processes.

Oracle Workflow API Reference

This guide describes the APIs provided for developers and administrators to access Oracle Workflow.

Oracle XML Gateway User's Guide

This guide describes Oracle XML Gateway functionality and each component of the Oracle XML Gateway architecture, including Message Designer, Oracle XML Gateway Setup, Execution Engine, Message Queues, and Oracle Transport Agent. The integrations with Oracle Workflow Business Event System and the Business-to-Business transactions are also addressed in this guide.

Oracle XML Publisher Report Designer's Guide

Oracle XML Publisher is a template-based reporting solution that merges XML data with templates in RTF or PDF format to produce a variety of outputs to meet a variety of business needs. Using Microsoft Word or Adobe Acrobat as the design tool, you can create pixel-perfect reports from the Oracle E-Business Suite. Use this guide to design your report layouts.

Oracle XML Publisher Administration and Developer's Guide

Oracle XML Publisher is a template-based reporting solution that merges XML data with templates in RTF or PDF format to produce a variety of outputs to meet a variety of business needs. Outputs include: PDF, HTML, Excel, RTF, and eText (for EDI and EFT transactions). Oracle XML Publisher can be used to generate reports based on existing E-Business Suite report data, or you can use Oracle XML Publisher's data extraction engine to build your own queries. Oracle XML Publisher also provides a robust set of APIs to manage delivery of your reports via e-mail, fax, secure FTP, printer, WebDav, and more. This guide describes how to set up and administer Oracle XML Publisher as well as how to use the Application Programming Interface to build custom solutions.

Integration Repository

The Oracle Integration Repository is a compilation of information about the service endpoints exposed by the Oracle E-Business Suite of applications. It provides a complete catalog of Oracle E-Business Suite's business service interfaces. The tool lets users easily discover and deploy the appropriate business service interface for integration with any system, application, or business partner.

The Oracle Integration Repository is shipped as part of the E-Business Suite. As your instance is patched, the repository is automatically updated with content appropriate for the precise revisions of interfaces in your environment.

Do Not Use Database Tools to Modify Oracle Applications Data

Oracle STRONGLY RECOMMENDS that you never use SQL*Plus, Oracle Data Browser, database triggers, or any other tool to modify Oracle Applications data unless otherwise instructed.

Oracle provides powerful tools you can use to create, store, change, retrieve, and maintain information in an Oracle database. But if you use Oracle tools such as SQL*Plus to modify Oracle Applications data, you risk destroying the integrity of your data and you lose the ability to audit changes to your data.

Because Oracle Applications tables are interrelated, any change you make using an Oracle Applications form can update many tables at once. But when you modify Oracle Applications data using anything other than Oracle Applications, you may change a row in one table without making corresponding changes in related tables. If your tables get out of synchronization with each other, you risk retrieving erroneous information and you risk unpredictable results throughout Oracle Applications.

When you use Oracle Applications to modify your data, Oracle Applications automatically checks that your changes are valid. Oracle Applications also keeps track of who changes information. If you enter information into database tables using database tools, you may store invalid information. You also lose the ability to track who has changed your information because SQL*Plus and other database tools do not keep a record of changes.

1

Oracle Applications Architecture

Introduction

This chapter describes the Oracle Applications architecture and some of the features that this architecture supports. The following topics are included:

- Overview
- The Desktop Tier
- The Application Tier
- The Database Tier
- The Oracle Applications Technology Layer

The *Oracle Applications Architecture* is a framework for multi-tiered, distributed computing that supports Oracle Applications products. In this model, various *servers* or *services* are distributed among three levels, or *tiers*.

A server (or services) is a process or group of processes that runs on a single machine and provides a particular functionality. For example, For example, *Web services* process HTTP requests, and *Forms services* process requests for activities related to Oracle Forms. The *Concurrent Processing server* supports data-intensive programs that run in the background.

> **Important:** The term *server*, in the sense of a single process, is less appropriate in the Release 12 architecture. Where applicable, replacement terms such as *services* are used.

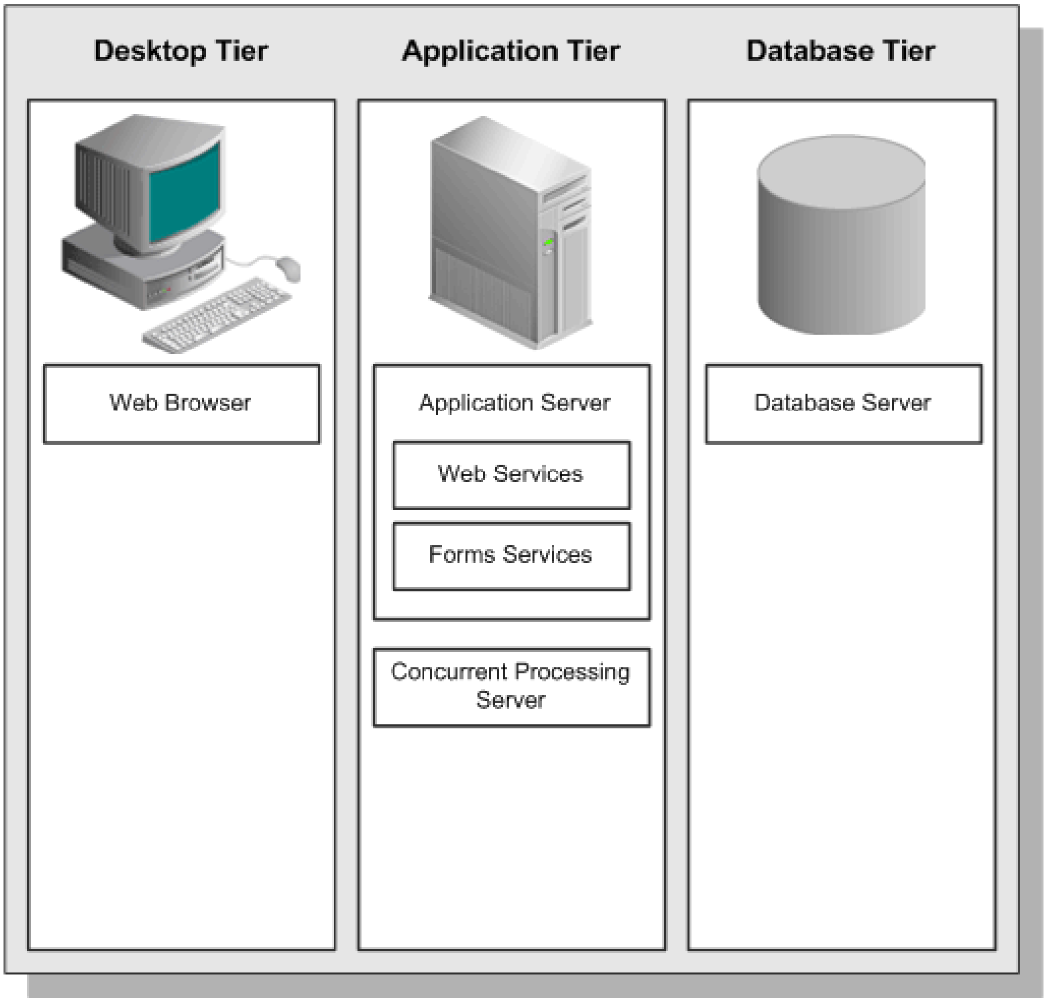
A tier is a logical grouping of services, potentially spread across more than one physical machine. The three-tier architecture that comprises an Oracle E-Business Suite installation is made up of the *database tier*, which supports and manages the Oracle database; the *application tier*, which supports and manages the various Applications components, and is sometimes known as the middle tier; and the *desktop tier*, which provides the user interface via an add-on component to a standard web browser.

A machine may be referred to as a *node*, particularly in the context of a group of computers that work closely together in a *cluster*. Each tier may consist of one or more nodes, and each node can potentially accommodate more than one tier. For example, the database can reside on the same node as one or more application tier components, for example in a test system. Note, however, that a node is also a software concept, referring to a logical grouping of servers.

Centralizing the Oracle Applications software on the application tier eliminates the need to install and maintain application software on each desktop client PC, and also enables Oracle Applications to scale well with an increasing load. Extending this concept further, one of the key benefits of using the *Shared Application Tier File System* model (originally *Shared APPL_TOP*) is the need to maintain only a single copy of the relevant Applications code, instead of a copy for every application tier machine.

On the database tier, there is increasing use of *Oracle Real Application Clusters* (Oracle RAC) , where multiple nodes support a single database instance to give greater availability and scalability.

Figure 1-1 Oracle Applications Architecture

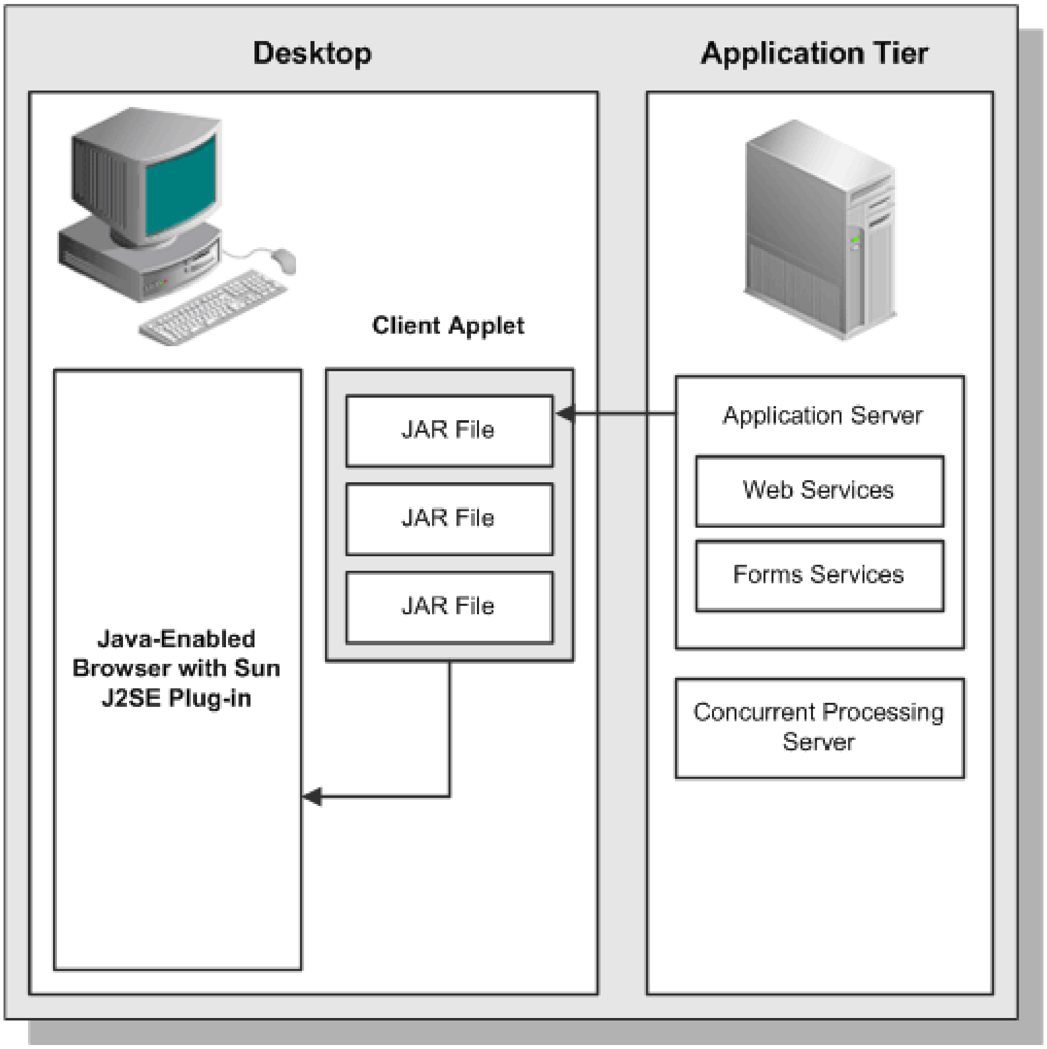


The connection between the application tier and the desktop tier can operate successfully over a Wide Area Network (WAN). This is because the desktop and application tiers exchange a minimum amount of information, for example only field values that have changed. In a global operation with users at diverse locations, requiring less network traffic reduces telecommunications costs and improves response times.

The Desktop Tier

The client interface is provided through HTML for HTML-based applications, and via a Java applet in a Web browser for the traditional Forms-based applications.

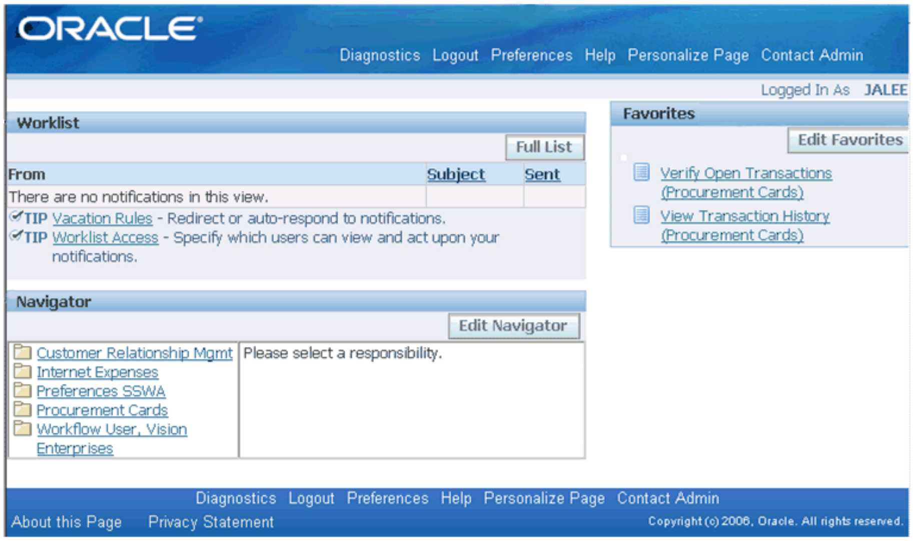
Figure 1-2 Forms-based Desktop Tier Architecture



In Oracle Applications Release 12, each user logs in to Oracle Applications through the E-Business Suite Home Page on a desktop client web browser. The E-Business Suite Home Page provides a single point of access to HTML-based applications, Forms-based applications, and Business Intelligence applications.

Once logged in via the E-Business Suite Home Page, you need not sign on again to access other parts of the system. Oracle Applications does not prompt again for user name and password, even when you navigate to other tools and products. Oracle Applications also retains preferences as you navigate through the system. For example, if you registered in the E-Business Suite Home Page that German is your preferred language, this preference carries over whether you access Forms-based or HTML-based applications.

Figure 1-3 Example Oracle E-Business Suite Home Page


ORACLE
Diagnostics Logout Preferences Help Personalize Page Contact Admin
Logged In As JALEE
Worklist
Full List
Favorites
Edit Favorites
Navigator
Edit Navigator
Diagnostics Logout Preferences Help Personalize Page Contact Admin
About this Page Privacy Statement

From	Subject	Sent
There are no notifications in this view.		

TIP Vacation Rules - Redirect or auto-respond to notifications.

TIP Worklist Access - Specify which users can view and act upon your notifications.

- Verify Open Transactions (Procurement Cards)
- View Transaction History (Procurement Cards)

- Customer Relationship Mgmt
- Internet Expenses
- Preferences SSWA
- Procurement Cards
- Workflow User, Vision Enterprises

Please select a responsibility.

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Forms Client Applet

The *Forms client applet* is a general-purpose presentation applet that supports all Oracle Applications Forms-based products, including those with customizations and extensions. The Forms client applet is packaged as a collection of *Java Archive* (JAR) files. The JAR files contain all Java classes required to run the presentation layer of Oracle Applications forms.

Desktop Java Client

The Forms client applet must run within a *Java Virtual Machine (JVM)* on the desktop client. The *Sun J2SE Plug-in* component allows use of the Oracle JVM on web clients, instead of the browser's own JVM. This component is implemented as a standard browser plug-in.

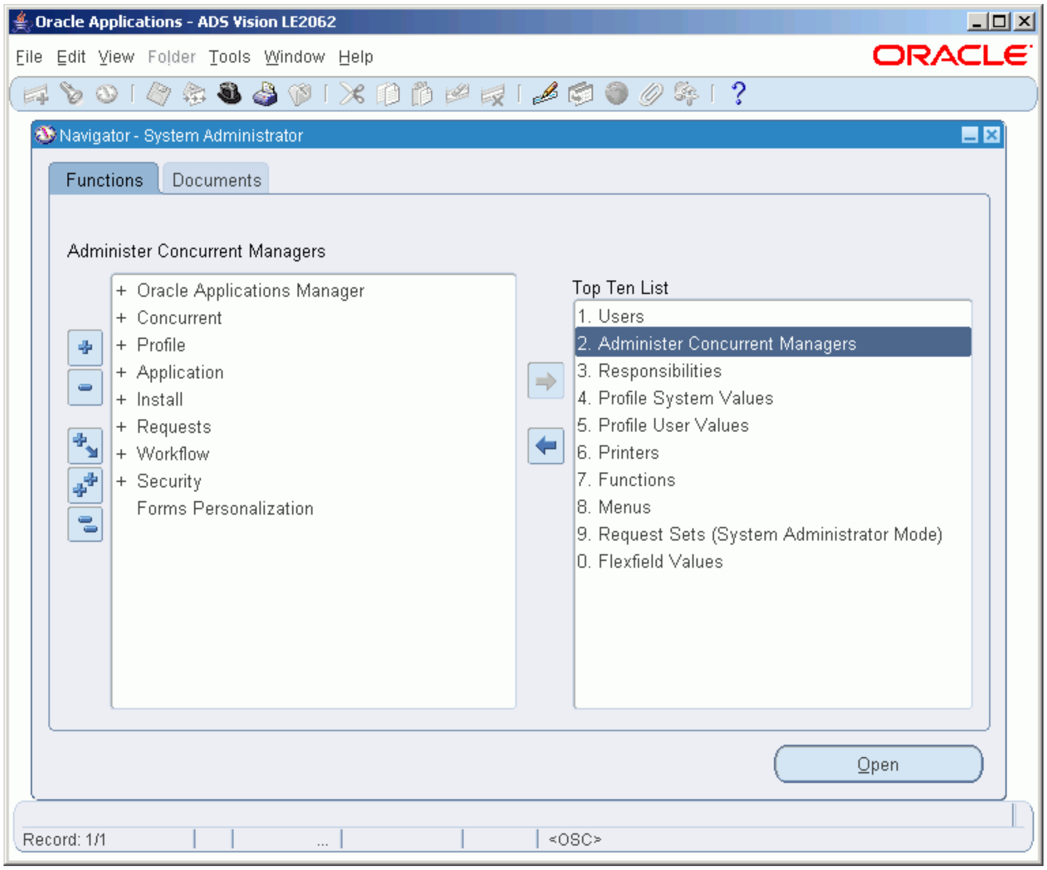
In the traditional, Forms-based Oracle Applications environment, the JVM (which in earlier releases was Oracle JInitiator) was run as part of the standard Applications sign-on process. Now, with the move to a mainly HTML-based environment, the JVM (now the J2SE Plug-in) is only invoked when a user chooses to access functions that require it, such as running a form. If the J2SE Plug-in has not been installed, the browser prompts the user to download the required installation executable. For example, if you select the System Administrator responsibility and then choose Define Concurrent Manager, you will see a message that looks like this:

```
In order to access this application, you must install the J2SE
Plug-in version 1.5.0_07. To install this plug-in, click here to
download the oaj2se.exe executable. Once the download is
complete, double-click the oaj2se.exe file to install the
```

```
plug-in. You will be prompted to restart your browser when the
installation is complete.
```

After you download and install the plug-in, you will be able to run Forms-based applications, for example as shown in Figure 1-4.

Figure 1-4 Example of Forms-based Applications interface



The Forms client applet and commonly used JAR files are downloaded from the Web server at the beginning of the client's first session. Less commonly used JAR files are downloaded as needed. All downloaded JAR files are cached locally on the client, ready for future sessions. This eliminates the network traffic that would be involved in downloading them whenever they were required.

In Release 12, the cache directory path is of the form:

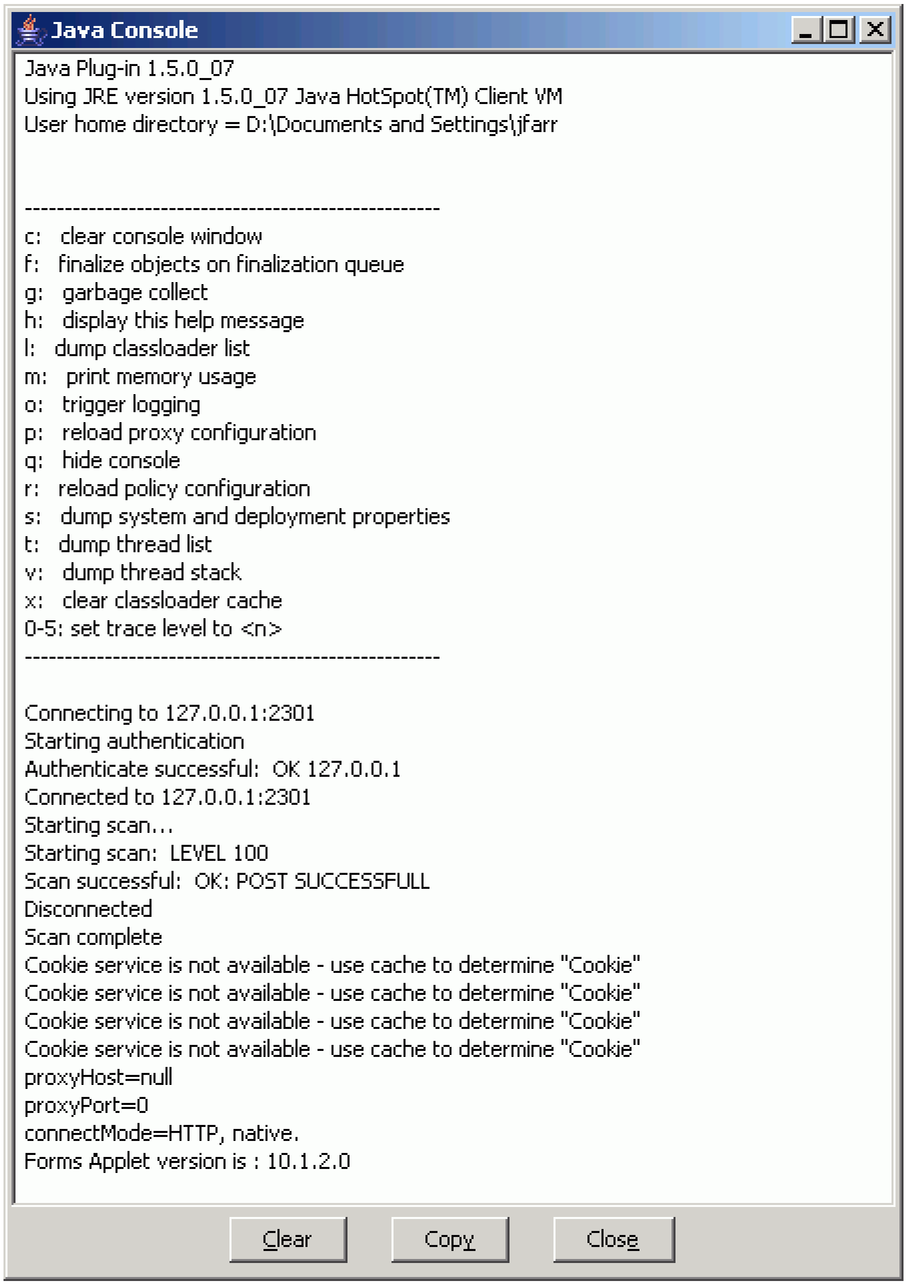
```
<HOMEDRIVE>\Documents and Settings\<Windows User
Name>\Application Data\Sun\Java\Deployment\cache
```

For example:

```
C:\Documents and Settings\jalee\Application
Data\Sun\Java\Deployment\cache
```

Selecting "Show console" on the "Advanced" tab of the J2SE Plug-in control panel will allow you to observe downloading of JAR files, to confirm they are being downloaded when they should be. The Java console is shown in Figure 1-5.

Figure 1-5 Java Console



```
Java Plug-in 1.5.0_07
Using JRE version 1.5.0_07 Java HotSpot(TM) Client VM
User home directory = D:\Documents and Settings\jfarr


----------------------------------------------------
c:   clear console window
f:   finalize objects on finalization queue
g:   garbage collect
h:   display this help message
l:   dump classloader list
m:   print memory usage
o:   trigger logging
p:   reload proxy configuration
q:   hide console
r:   reload policy configuration
s:   dump system and deployment properties
t:   dump thread list
v:   dump thread stack
x:   clear classloader cache
0-5: set trace level to <n>
----------------------------------------------------

Connecting to 127.0.0.1:2301
Starting authentication
Authenticate successful:  OK 127.0.0.1
Connected to 127.0.0.1:2301
Starting scan...
Starting scan:  LEVEL 100
Scan successful:  OK: POST SUCCESSFULL
Disconnected
Scan complete
Cookie service is not available - use cache to determine "Cookie"
Cookie service is not available - use cache to determine "Cookie"
Cookie service is not available - use cache to determine "Cookie"
Cookie service is not available - use cache to determine "Cookie"
proxyHost=null
proxyPort=0
connectMode=HTTP, native.
Forms Applet version is : 10.1.2.0
```

All updates to JAR files are installed on the application tier and downloaded to the client automatically, via the caching mechanism outlined above.

> **Note:** For further details of using the Sun J2SE Native Client with Oracle E-Business Suite, see Oracle*MetaLink* Note 393931.1, *Upgrading*

Sun J2SE (Native Plug-in) with Oracle Applications 12.0 for Windows Clients.

The Application Tier

The *application tier* has a dual role: hosting the various servers and service groups that process the business logic, and managing communication between the desktop tier and the database tier. This tier is sometimes referred to as the *middle tier*.

Three servers or service groups comprise the basic application tier for Oracle Applications:

- Web services
- Forms services
- Concurrent Processing server

In Release 12, Web and Forms services are provided by *Oracle Application Server* (OracleAS) 10g. They are no longer servers in the sense of being a single process, as was the case in previous Applications releases.

> **Note:** There is no concept of an Administration server in Release 12. By default, patching can be undertaken from any application tier node.

It is advisable to avoid using a mixture of different platforms on your application tier. This makes maintenance easier, since only one set of patches needs to be downloaded.

Load Balancing

The application tier supports load balancing among many of its servers and services to help provide higher availability, fault tolerance, reliability, and optimal scalability. If you have more than one of any of the following types of server, load balancing can be employed:

- Web services
- Forms services
- Concurrent Processing server

Chapter 10 discusses the various types of load balancing in more detail.

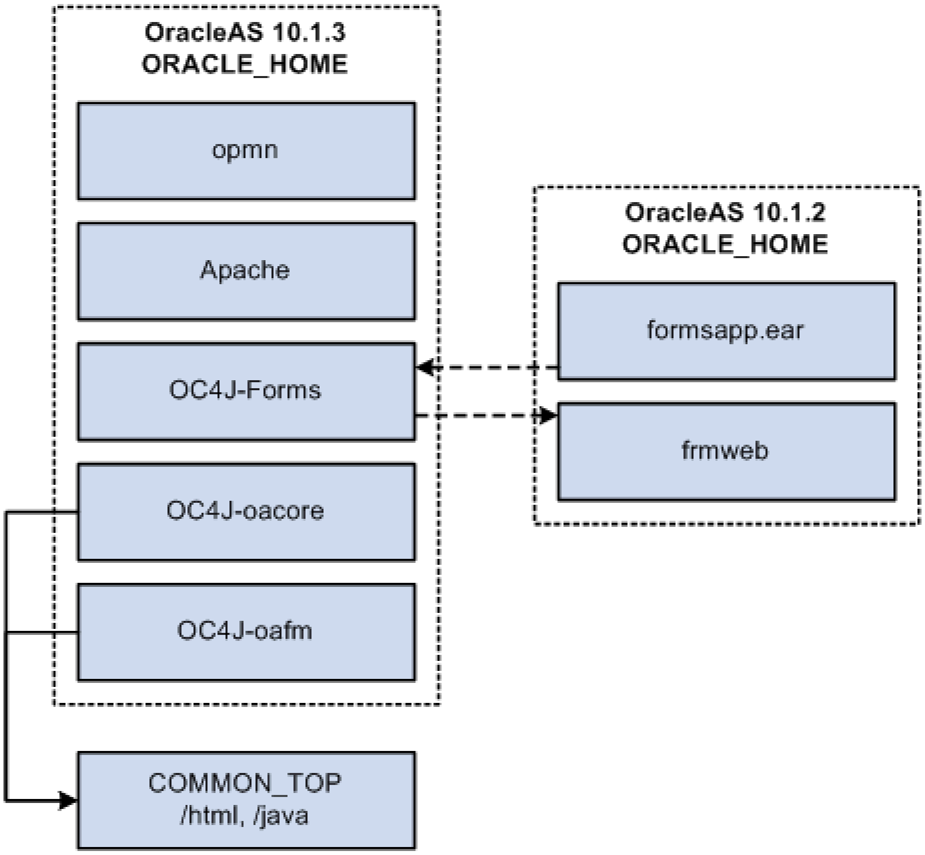
Use of Two Oracle Application Server ORACLE_HOMEs in Release 12

Two different Oracle Application Server (OracleAS) 10g releases, in separate ORACLE_HOMEs, are used in Oracle Applications Release 12. This enables

Applications to take advantage of the latest Oracle technologies.

Figure 1-6 illustrates the functional usage of the two Oracle Application Server ORACLE_HOMEs.

Figure 1-6 Relationship between the two Application Server ORACLE_HOMEs

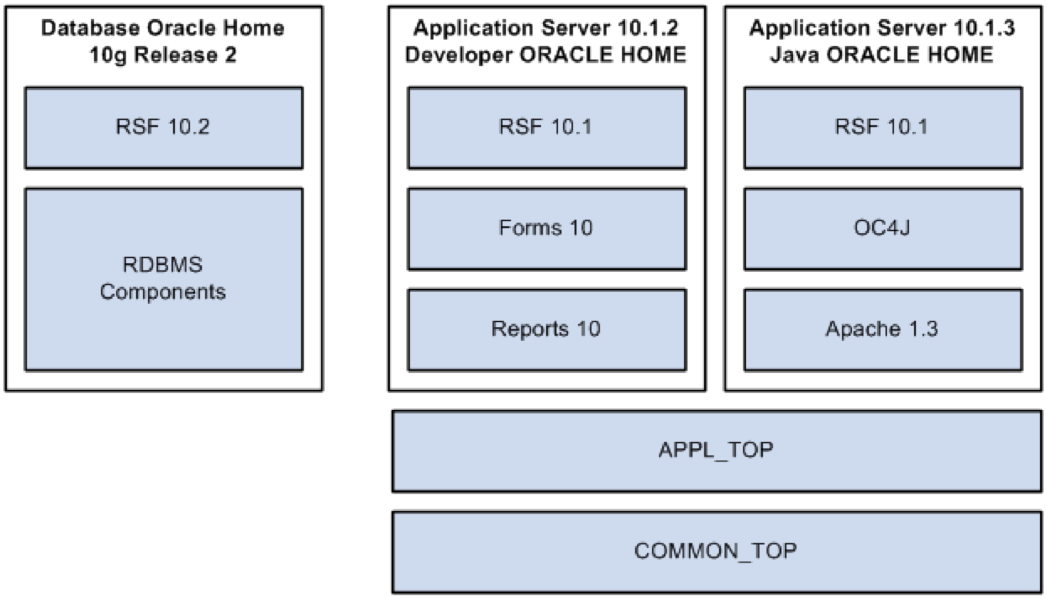


Notable features of this architecture include:

- The latest version of Oracle Containers for Java (OC4J), the successor to JServ, is included in Oracle Application Server 10.1.3.
- All major services are started out of the OracleAS 10.1.3 ORACLE_HOME.
- The Applications modules (packaged in the file formsapp.ear) are deployed into the OC4J-Forms instance running out of the OracleAS 10.1.3 ORACLE_HOME, while the `frmweb` executable is invoked out of the OracleAS 10.1.2 ORACLE_HOME.

Figure 1-7 illustrates the relationship of the two Application Server ORACLE_HOMEs and the database ORACLE_HOME.

Figure 1-7 Database and Application Server ORACLE_HOMEs



Notable features of this high-level architecture include:

- The 10g Release 2 (10.2) Database ORACLE_HOME replaces the Oracle9*i* ORACLE_HOME used in Release 11*i*.
- The Oracle Application Server 10.1.2 ORACLE_HOME (sometimes referred to as the Tools, C, or Developer ORACLE_HOME) replaces the 8.0.6 ORACLE_HOME provided by Oracle9*i* Application Server 1.0.2.2.2 in Release 11*i*.
- The Oracle Application Server 10.1.3 ORACLE_HOME (sometimes referred to as the Web or Java ORACLE_HOME) replaces the 8.1.7-based ORACLE_HOME provided by Oracle9*i* Application Server 1.0.2.2.2 in Release 11*i*.

Web Services

The Web services component of Oracle Application Server processes requests received over the network from the desktop clients, and includes the following components:

- Web Listener (Oracle HTTP Server powered by Apache)
- Java Servlet Engine (OC4J)
- Oracle Process Manager (OPMN)

The Web listener component of the Oracle HTTP server accepts incoming HTTP requests (for particular URLs) from client browsers, and routes the requests to the appropriate OC4J container.

If possible, the Web server services the requests itself, for example by returning the HTML to construct a simple Web page. If the page referenced by the URL needs advanced processing, the listener passes the request on to the *servlet engine*, which contacts the database server as needed.

HTML-Based Applications and the Oracle Applications Framework

The Oracle HTML-based Applications (formerly known as Self-Service Applications) have the following characteristics:

- Do not use Oracle Forms for the interface
- Are designed in pure HTML and JavaScript
- Dynamically generate HTML pages by executing Java code
- Use a metadata dictionary for flexible layout
- Operate by direct connection to the Web server

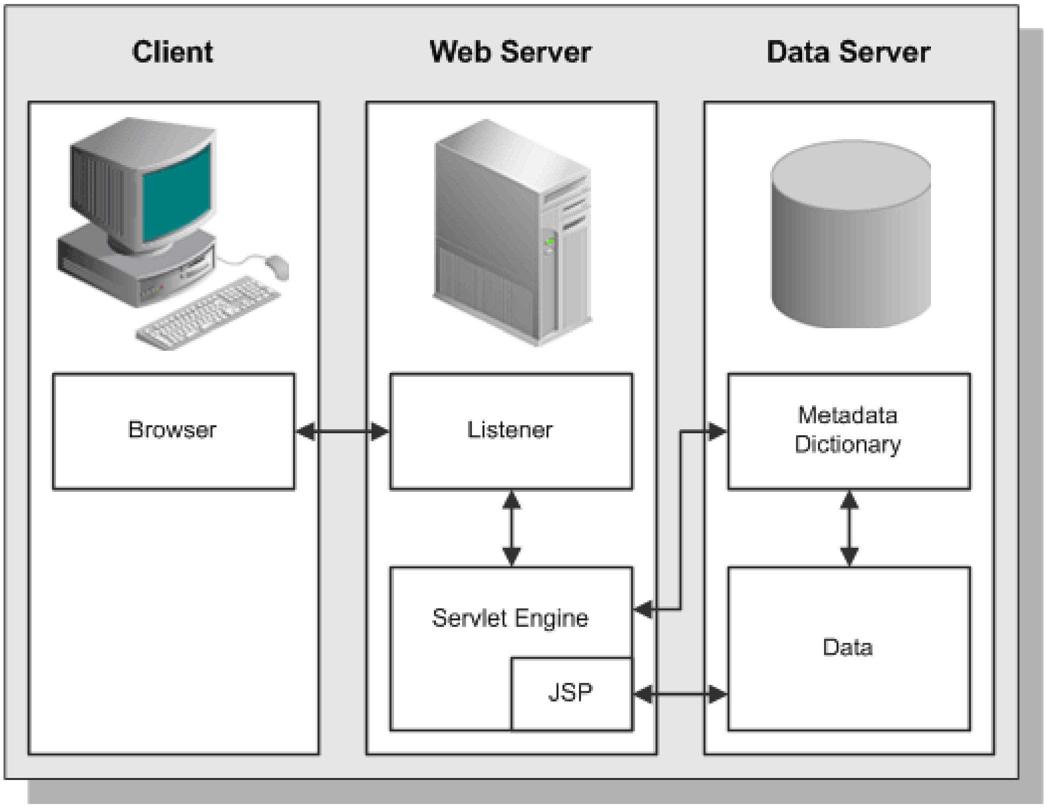
The *Oracle Applications Framework* is the development platform for HTML-based applications. It consists of a Java-based application tier framework and associated services, designed to facilitate the rapid deployment of HTML-based applications.

Notable Oracle Applications Framework components include:

- *Business Components for Java* (BC4J), included in Oracle JDeveloper, is used to create Java business components for representing business logic. It also provides a mechanism for mapping relational tables to Java objects, and allows the separation of the application business logic from the user interface.
- *AOL/J* supplies the Oracle Applications Framework with underlying security and applications Java services. It provides the Oracle Applications Framework with its connection to the database, and with application-specific functionality such as flexfields.

The Framework-based applications logic is controlled by procedures that execute through the Java servlet engine, which is provided by the Apache JServ module. The servlet engine uses the metadata dictionary in constructing the Framework UI.

Figure 1-8 HTML-Based Applications Architecture

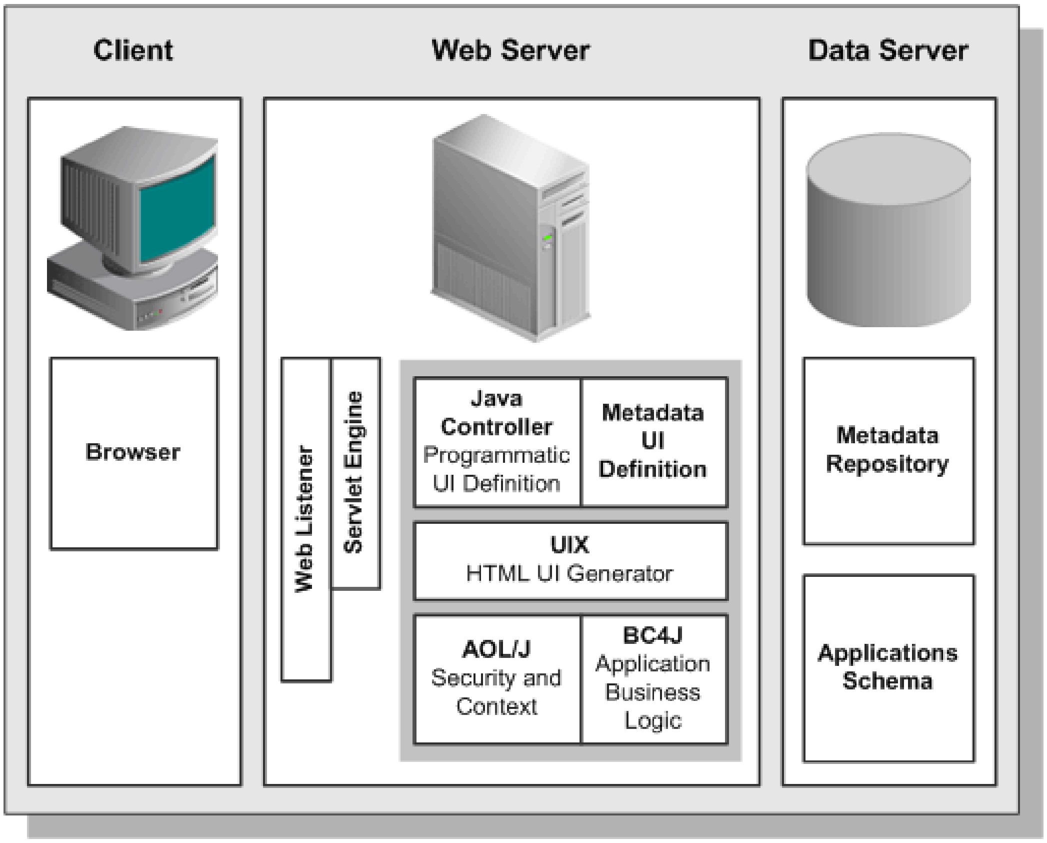


Java Servlet Access with HTML-Based Applications

An HTML-based Applications module uses the following access path:

1. The user clicks the hyperlink of a function from a browser.
2. The browser makes a URL request to the Web listener.
3. The Web listener contacts the Servlet engine (OC4J), where it runs a JSP.
4. The JSP obtains the content from the Applications tables and uses information from the metadata dictionary to construct the HTML page.
5. The resulting HTML page is passed back to the browser, via the Web server.

Figure 1-9 Oracle Applications Framework Architecture



Oracle Applications Framework Processing Details

The following is a more detailed explanation of how the JSP obtains the content from the Applications tables and uses information from the metadata dictionary to construct the HTML page.

1. AOL/J validates user access to the page.

2. The page definition (metadata UI definition) is loaded from the metadata repository on the database tier into the application tier.

3. The BC4J objects that contain the application logic and access the database are instantiated.

4. The Java Controller programmatically manipulates the page definition as necessary, based on dynamic UI rules.

5. UIX (HTML UI Generator) interprets the page definition, creates the corresponding HTML in accordance with UI standards, and sends the page to the browser.

Forms Services

By default, Forms services in Oracle Applications Release 12 are provided by the *Forms listener servlet*, which, as described further below, facilitates the use of firewalls, load balancing, proxies, and other networking options.

Benefits of using the Forms listener servlet include:

- Ability to re-establish dropped network connections
- Fewer machines and ports need to be exposed at the firewall
- Easier firewall/proxy server configuration
- More robust and secure deployment over the Internet

Forms Listener Servlet Architecture

The Forms listener servlet is a Java servlet that delivers the ability to run Oracle Forms applications over HTTP or HTTPS connections. It hosts the Oracle Applications forms and associated runtime engine, mediating the communication between the desktop client and the Oracle database server, displaying client screens, and initiating changes in the database according to user actions.

The Forms listener servlet caches data and provides it to the client as needed, for example when scrolling through multiple order lines that exceed the limitations of a single screen.

Forms listener servlet can communicate with the desktop client using these network protocols:

- Standard HTTP network connection
- Secure HTTPS network connection
- TCP/IP connection

The Forms listener servlet communicates with the Oracle database server using the *Oracle Net* networking infrastructure.

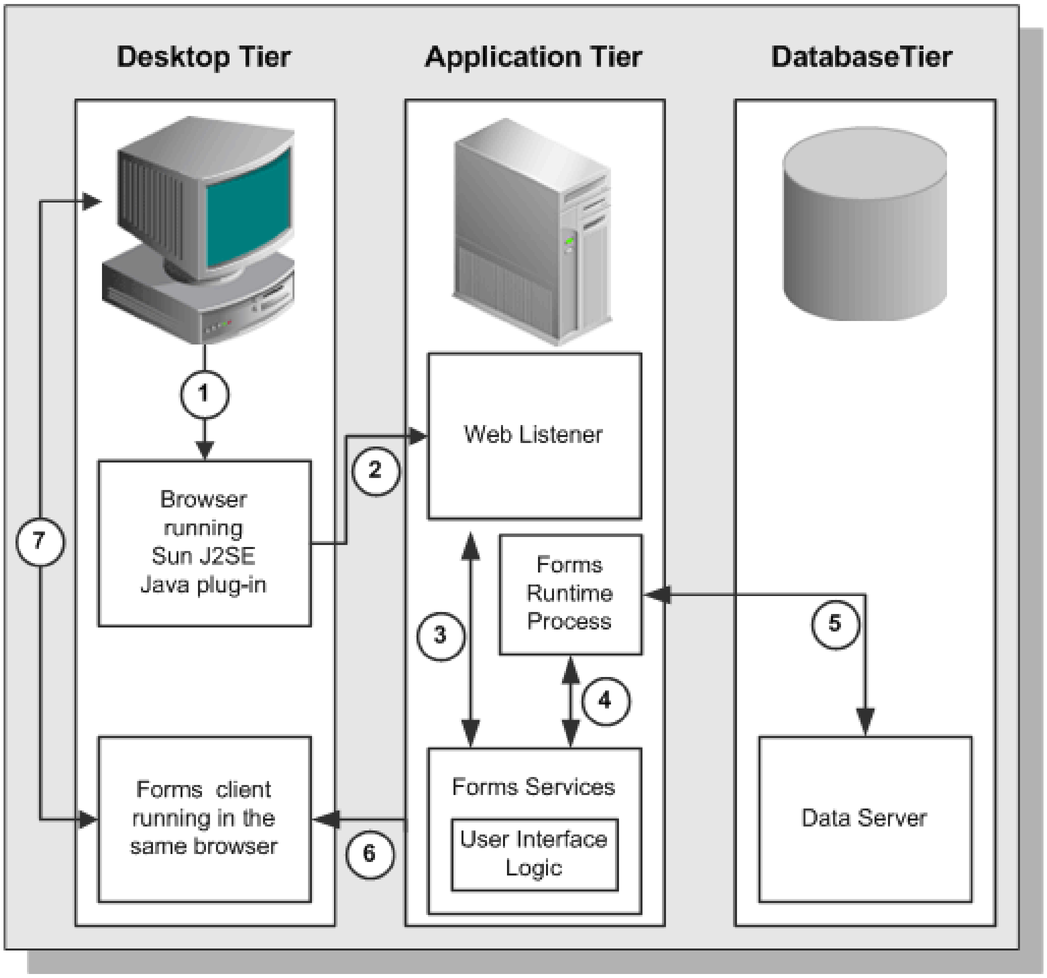
The Forms listener servlet manages the creation of a Forms runtime process for each client, as well as network communications between the client and its associated Forms runtime process. The client sends HTTP requests and receives HTTP responses from the Web services, which acts as the network endpoint for the client.

> **Note:** Although the OC4J-Forms instance runs out of the OracleAS 10.1.3 ORACLE_HOME, the `frmweb` executable is invoked out of the OracleAS 10.1.2 ORACLE_HOME.

Forms Socket Mode Architecture

In the traditional Forms server *socket mode* architecture, when a user initiates an action in the Forms client applet (such as entering data into a field or clicking a button), data is passed to a Forms server on the application tier. The user interface logic runs in the Forms server, and determines the appropriate user interface effect based on the user's action. For example, a window may open, or another field value may be populated. If necessary, the database tier is contacted for any data not already cached on the application tier, or for data-intensive processing.

Figure 1-10 Forms Socket Mode



Once a connection has been made, many operations can be performed with little or no further interaction with the Forms server. For example, when a few field values change in response to a user action, there is no need to update the entire screen. In this scenario, only the changed fields are updated with the new values.

Choice of Mode

As stated, by default Oracle Applications Release 12 utilizes Forms listener servlet mode. However, socket mode is still fully supported, and may be required in a WAN environment to maximize performance.

> **Note:** For more details of utilizing Forms Socket Mode, see Oracle *MetaLink* Note 384241.1, *Using Forms Socket Mode with Oracle E-Business Suite Release 12*.

Concurrent Processing Server

As described previously, user interactions with Oracle Applications data can be conducted via HTML-based Applications or the more traditional Forms-based Applications. However, there are also reporting programs and data updating programs that need to run either periodically, or on an ad hoc basis. These programs, which run in the background while users continue to work on other tasks, may require a large number of data-intensive computations, and are run using the *Concurrent Processing* architecture. Concurrent Processing is an Oracle Applications feature that allows these non–interactive and potentially long-running functions to be executed efficiently alongside interactive operations. It uses operating system facilities to facilitate background scheduling of data- or resource-intensive jobs, via a set of programs and forms. To ensure that resource-intensive concurrent processing operations do not interfere with interactive operations, they are run on a specialized server, the *Concurrent Processing server*.

Processes that run on the Concurrent Processing server are called *concurrent requests*. When you submit such a request, either through HTML-based or Forms-based Applications, a row is inserted into a database table specifying the program to be run. A *concurrent manager* then reads the applicable requests in the table, and starts the associated concurrent program.

Concurrent Manager Characteristics

Concurrent managers are fundamental to concurrent processing. Acting as a job scheduling and execution system, a concurrent manager:

- Is an executable that is registered as a program library within Oracle Applications, and which runs in its own operating system process

- Runs operating system processes called *target processes* (often referred to as *workers*), each of which can start one concurrent program at a time

- Can optionally run an *immediate program* that runs as part of the concurrent manager's own operating system process

- Can be allowed to run any concurrent program, or be specialized to run certain programs

- Operates during the days and times defined by a *work shift*

Types of Concurrent Manager

The *Internal Concurrent Manager* (ICM) controls all other concurrent managers. It administers the startup and shutdown of managers as defined by their work shift, monitors for process failure, and cleans up if a failure occurs. The ICM does not process concurrent requests itself (except for queue control requests, such as ACTIVATE, DEACTIVATE, or ABORT).

While the basic ICM definition should not be changed, you can if required modify the *sleep time* (number of seconds the ICM waits between checking for new concurrent requests), *PMON (process monitor) cycle time* (number of sleep cycles the ICM waits between checking for failed workers), and *queue size* (duration between checks for number of active workers, measured in PMON cycles). If Parallel Concurrent Processing (described below) is being used, you can also set some options for this.

The *Conflict Resolution Manager* (CRM) enforces rules designed to ensure that incompatible concurrent requests do not run in the same *conflict domain*(an abstract representation of the groupings used to partition data). As with the Internal Concurrent Manager, the basic CRM definition should not be changed, but you can modify the sleep time for each work shift, as well as some Parallel Concurrent Processing options.

The *Standard Manager* as shipped with Oracle Applications will accept and run any concurrent requests, as it has no specialization rules that would restrict its activities. Consequently, the definition of the Standard Manager should not be altered without careful planning, otherwise some programs might not be able to run at all. Jobs should only be excluded from the Standard Manager after ensuring they can be run by an alternative manager, such as a product-specific manager or user-defined manager.

Transaction Managers support synchronous request processing, whereby a pool of server processes responds to requests from client programs. Instead of polling the concurrent requests table to obtain instructions, a transaction manager waits to be signaled by a client. An example is approval of an order, where execution of the request must take place quickly.

The relevant transaction manager program runs on the server, transparently to the client. All transaction programs for a given manager process run in the same database session. Communication between the client and the server is conducted synchronously via pipes, using the FND_TRANSACTION.SYNCHRONOUS function. At the end of program execution, the client program receives a completion message and a return value, for example denoting approval of the order. This strategy of using non-persistent connections between the client and Transaction Manager processes enables a small pool of server processes to service a large number of clients with near real-time response.

Setting Up Concurrent Managers

The *Oracle Applications System Administrator's Guide* gives full details of the steps and options involved in setting up and monitoring concurrent managers. Some of the key steps include:

- Name and description of the manager
- Assignment of a concurrent program library
- Assignment of work shifts to the manager
- Definition of the maximum number of workers (target processes) the manager can run concurrently
- Optionally specializing the manager to run certain types of requests

> **Tip:** It is easier to identify the optimum number of workers by being conservative initially, and defining additional workers later if needed (subject to availability of system resources).

Multiple managers can be run on multiple nodes using *Parallel Concurrent Processing*, as described below.

Concurrent Processing Architecture

In Concurrent Processing, programs are run as operating system background processes. These programs may be written using a variety of Oracle tools, programming languages for executables, or the host operating system scripting language.

As noted above, a concurrent program that runs in the concurrent manager's own operating system process is known as an immediate program. Immediate programs run as a function within the concurrent manager's program library. Examples include PL/SQL programs. In contrast, a concurrent program that runs in a child process of the concurrent manager process is known as a *spawned program*. Examples include SQL programs, SQL Loader programs, Oracle Reports programs, spawned C programs, and host language programs such as UNIX shell scripts or Windows command files.

> **Important:** The Reports server is obsolete in Release 12. All reports are now run through the Concurrent Processing server manager via the `rwrun` executable, which spawns an in-process server.

> **Note:** While C programs can be run as immediate programs, it is advisable to run them as spawned programs. This simplifies maintenance, without introducing any disadvantages.

A concurrent request has a life cycle, which consists of three or possibly four phases:

Table 1-1 Concurrent Request Life Cycle

Phase	Activity
Pending	The request is waiting to be run
Running	The request is running
Completed	The request has finished
Inactive	The request cannot be run

A *concurrent program library* contains concurrent programs that can be called by a concurrent manager. An important example is the Oracle Application Object Library program library (FNDLIBR), which contains Oracle Applications immediate concurrent programs, and is assigned to the standard concurrent manager. Although each concurrent manager can only run immediate concurrent programs from its own concurrent program library, it can also run spawned or Oracle tool concurrent programs.

Various database tables are employed by the concurrent processing architecture:

Table 1-2 Concurrent Processing Database Tables

Table	Content
FND_CONCURRENT_REQUESTS	Details of user requests, including status, start date, and completion date
FND_CONCURRENT_PROGRAMS	Details of concurrent programs, including execution method, whether the program is constrained, and whether it must be run alone.
FND_CONCURRENT_PROCESSES	Cross-references between concurrent requests and queues, and a history of concurrent manager processes
FND_CONCURRENT_QUEUES	Information about each of the concurrent manager queues

Caution: Do not update these tables manually. You can (subject to your organization's archiving requirements) periodically run the "Purge

Concurrent Requests and/or manager data" program to prevent these tables growing too large. See the *Oracle Applications System Administrator's Guide* for details.

Concurrent Processing Operations

Because the Internal Concurrent Manager controls all the other managers, it must be running before any other manager can be activated. Once the ICM has been activated, it starts a Service Manager on each node that is enabled for concurrent processing. Acting as an agent of the ICM, the Service Manager starts the concurrent managers on its node, excluding any managers that have been deactivated, or that have no current work shift. The ICM can be activated and deactivated from the operating system prompt, or Oracle Applications Manager. It can also be deactivated (but not activated) from the Administer Concurrent Managers form.

When the ICM is initiated on UNIX, the $FND_TOP/bin/startmgr program is invoked. This calls $FND_TOP/bin/batchmgr, which then:

1. Starts a shell process

2. Starts the ICM process using the command FNDLIBR, with startup parameters FND, CPMGR, and FNDCPMBR

3. Creates log files (std.mgr and wnnn.mgr) in $APPLCSF/$APPLLOG

Normally, startmgr is run by the user account that owns the application software (for example, applmgr). This account must have write privileges to the log and out directories where the log and output files respectively are written.

The ICM starts up a Service Manager on each node that is enabled for concurrent processing, by instructing the Applications listener on the node to spawn a process running the Service Manager executable (FNDSM). The listener must be configured to source the Applications environment file before FNDSM is spawned. Following startup, the Service Manager acts as an agent of the ICM to start and stop concurrent managers on that node, according to their defined work shifts.

> **Note:** The Service Manager is a component of the Generic Service Management (GSM) architecture rather than Concurrent Processing, although GSM and Concurrent Processing are closely integrated.

Concurrent manager processes on a specific node can be seen by running the UNIX commands:

```
ps -ef | grep FNDLIBR
```

```
ps -ef | grep FNDSM
```

The Service Manager PID seen in the output of the second command can then, if desired, be used to locate all concurrent manager and service processes on the node, since the Service Manager is the parent process for them:

```
ps -ef | grep <sm_pid>
```

On Windows, the Task Manager can be used to locate concurrent manager processes. An FNDLIBR process runs for the Internal Concurrent Manager and each standard manager. The ICM can be distinguished by additional details being displayed, including some of the parameters it was started with.

For every process that was successfully started at operating system level, the ICM inserts a row into FND_CONCURRENT_PROCESSES. It then updates the RUNNING_PROCESSES column to reflect the actual running processes as shown in FND_CONCURRENT_QUEUES.

Viewing Concurrent Processing Output

The output from a concurrent processing job goes through several stages before being displayed to the user.

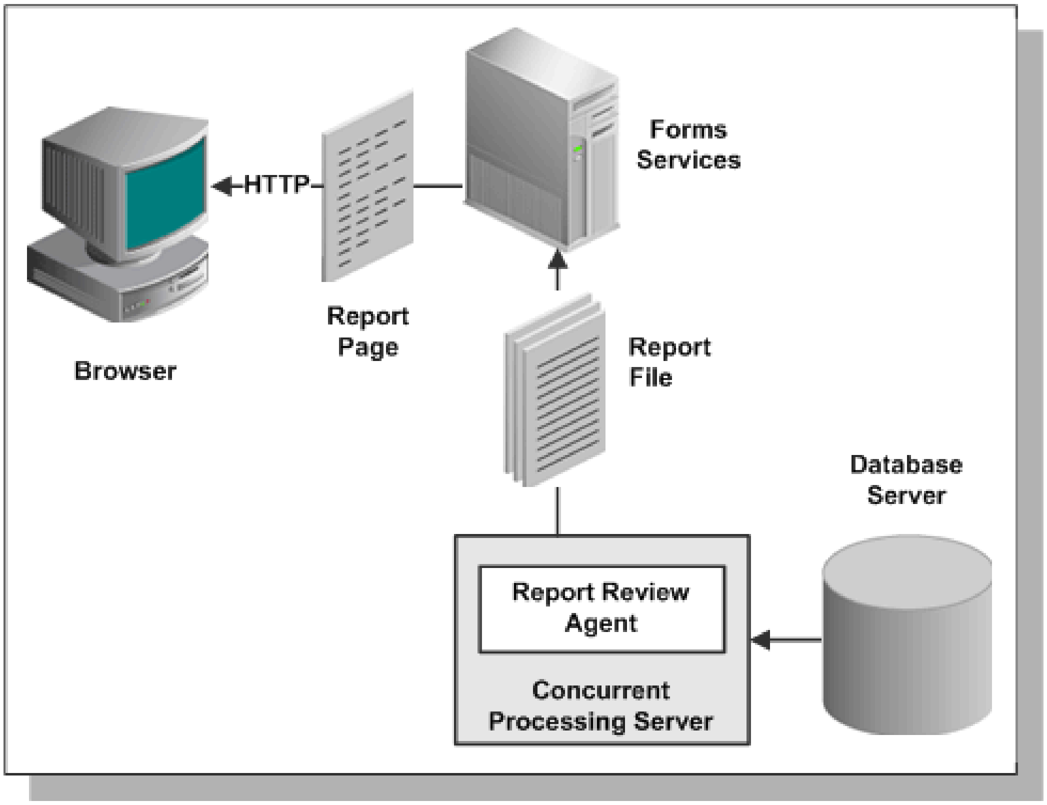
1. The Concurrent Processing server communicates with the database server via Oracle Net.

2. The log or output file associated with a concurrent request is passed back to the *Report Review Agent*, also known as the *Web Review Agent*.

3. The Report Review Agent passes a file containing the entire report to the Forms services.

4. The Forms services pass the report back to the user's browser one page at a time.

Figure 1-11 Viewing Concurrent Processing Output



You can cater for your network capacity and report volume by using profile options to specify the maximum size of the files and pages that can be passed through the system.

Parallel Concurrent Processing

Parallel Concurrent Processing (PCP) allows concurrent processing activities to be distributed across multiple nodes in an Oracle Real Application Clusters (Oracle RAC) environment or similar cluster system. By distributing concurrent processing in this way, hardware resources can be fully utilized, maximizing throughput and providing resilience to node failure, while retaining a central point of control.

Parallel Concurrent Processing enables you to:

- Run concurrent processes on multiple nodes to improve concurrent processing throughput

- Continue running concurrent processes on the remaining nodes when one or more nodes fail

- Administer concurrent managers running on multiple nodes from any node in the cluster

One or more concurrent managers can be specified to run on one or more nodes, to best suit your processing needs and fully utilize available hardware resources.

Parallel Concurrent Processing is enabled by default, so PCP is always available for use in environments where one or more concurrent processing nodes exist.

> **Note:** PCP does not require an Oracle RAC environment. Conversely, you do not have to use PCP in an Oracle RAC environment, although it typically makes sense to do so.

Managing Concurrent Processing

From the command line, two commands can be entered to control the Internal Concurrent Manager: `startmgr`, which starts the ICM; and `concsub`, which is used to stop or abort the ICM, or request the ICM to check on the operating system process for each manager. In addition, an AutoConfig-enabled environment provides a number of scripts for starting and stopping application tier services from the command line. The script for concurrent processing startup and shutdown is INST_TOP/admin/scripts/adcmctl.sh.

The various components of the concurrent processing system can be managed from various forms, such as *Concurrent Manager: Administer*, or from *Concurrent Managers* or *Concurrent Requests* under Oracle Applications Manager (OAM).

> **Note:** For details of setting up and managing concurrent processing, see *Oracle System Administrator's Guide - Configuration*, Chapter 7.

Administration Server

This term is a historical one: there is no Administration server as such in Oracle Applications Release 12. Any application tier node can be used to carry out the following operations:

- **Applying database patches to Oracle Applications**

  In general, *Applications patches* consist of files and scripts that update the file system and database objects. In Release 12, a single *unified (u) driver* file combines the features of the older *copy* (c), *database* (d), and *generate* (g) driver files.

  You use the *AutoPatch* utility (*adpatch*) to perform these updates. AutoPatch may also be used to apply cumulative patches such as *mini-packs* and *maintenance packs*.

- **Maintaining Oracle Applications data**

  Some features require updates to the tables and schemas they use. The *AD Administration* utility (*adadmin*) enables you to carry out this and various other file system and database maintenance tasks.

Daily Business Intelligence (DBI)

Daily Business Intelligence (DBI) is a reporting framework that is integrated with Oracle E-Business Suite. It replaces the Business Intelligence System (BIS), and includes a new set of materialized views that pre-summarize transaction data. Using Daily Business Intelligence *overview pages*, managers can view summarized information across multiple organizations, drilling down to specific transaction details on a daily basis.

For example, the *Profit and Loss page* provides an overview of revenue, cost of goods sold, expenses, and gross margin by line of business. Managers can use this page to view revenue to date, track it against forecast, and compare it to previous periods. If actual revenue is trailing forecast revenue, managers can investigate the root cause, drilling down to specific lines of business, specific managers, or even specific customer invoices in Oracle Receivables.

Daily Business Intelligence resides in the same instance as the transactional system. This single instance architecture reduces the need for a separate maintenance and administration team, and optimizes reporting performance. It also utilizes the materialized view and incremental refresh capabilities of the Oracle database, thereby enabling organizations to refresh data daily, hourly, or at any required frequency.

> **Note:** The old BIS views are still available for use, although they may occasionally be altered or replaced to reflect changes to underlying table definitions.

The Database Tier

The database tier contains the Oracle database server, which stores all the data maintained by Oracle Applications. The database also stores the Oracle Applications online help information.

More specifically, the database tier contains the Oracle data server files and Oracle Applications database executables that physically store the tables, indexes, and other database objects for your system.

The database server does not communicate directly with the desktop clients, but rather with the servers on the application tier, which mediate the communications between the database server and the clients.

Using a Mixed Platform Architecture

The Oracle database server is sometimes available on platforms where Oracle Applications is not currently certified. In such a case, it may be possible to utilize a *mixed platform architecture*, where the database is installed on one platform and the application tier on another. (In Release 11*i*, this was referred to as a *split configuration*).

This type of deployment can enable the database to utilize the specific features offered by a particular platform (such as a 64-bit architecture). It can also allow the application tier to be managed in a more cost-effective way.

> **Note:** For up-to-date details of Release 12 support with mixed platform architectures, see Certify on Oracle*MetaLink*.

The Oracle Applications Technology Layer

The Oracle Applications technology layer lies between the Oracle Applications technology stack and the Oracle Applications product-specific modules. It provides features common to all Oracle Applications products.

Products in the Oracle Applications technology layer include:

- Oracle Applications DBA (AD)
- Oracle Applications Object Library (FND)
- Oracle Applications Utilities (AU)
- Oracle Common Modules (AK)
- Oracle Workflow (WF)
- Oracle Alert (ALR)
- Oracle Applications Framework (FWK)
- Oracle XML Publisher (XDO)

Oracle Applications DBA (AD)

The Applications DBA product provides a set of tools for administration of the Oracle Applications file system and database. AD tools are used for installing, upgrading, maintaining, and patching the Oracle Applications system.

The AD utilities include:

- **AD Administration** - Performs general maintenance tasks for Oracle Applications.
- **AD Merge Patch** - Merges multiple patches into a single, integrated patch.
- **AutoConfig** - Manages configuration changes in an Oracle Applications system.
- **AutoPatch** - Applies patches and adds new languages and products to an Oracle Applications system.
- **Rapid Clone** - Used to copy (clone) an Oracle Applications system.

- **Rapid Install** - Sets up a fully configured Oracle Applications system, including the latest certified technology stack and all patches, mini-packs, and other updates.

Oracle Common Modules (AK)

AK is an active data dictionary that enables you to define Oracle Applications components for the HTML-based Applications, and generate many of the characteristics of Oracle Applications at runtime.

The *Oracle Common Modules* can be used to develop inquiry applications for the HTML-based Applications, without the need for any programming. They allow storage of language-translated labels for all the attributes on a transaction page, thus assisting with the provision of support for multiple languages.

For example, the AK Runtime Dictionary may be used to define an attribute or reusable component such as the customer name attribute, which can be reused any time a customer name field is displayed on an HTML page.

Oracle Applications Utilities (AU)

The Applications Utilities (AU) component is used to maintain the Oracle Applications system.

AU hosts a collection of files copied from other products. This allows generating on-site classes of files such as Forms and reports. Generating forms or reports may require access to shared PL/SQL libraries, so these files are copied to AU_TOP as well.

Oracle Application Object Library (FND)

The Oracle Application Object Library is a key component of the Applications technology layer. It consists of a collection of reusable code, programs, and database objects that provides common functionality across all products.

Oracle Application Object Library offers many features to make system administration easier, such as security setup and maintenance, and management of concurrent processing. Using Application Object Library ensures that the processing of flexfields or the procedure for report submission, for example, does not vary from one product to another. Oracle Application Object Library also provides capabilities for developers to extend the operation of Oracle Applications by allowing the creation of custom programs that interact with the base modules.

End User Features

Oracle Application Object Library includes several features that help provide uniformity of function across the various Applications products.

Standard User Interface

Oracle Application Object Library supports the integration of Oracle Applications by providing standardized functionality and capabilities across all products so that the look and feel remains the same from product to product.

Shared Flexfield value sets

Flexfields allow the entry of certain important information to be standardized across all products. One example is the Accounting Flexfield, which is used by Financials products and Manufacturing products.

Standard Report Submission (SRS)

The procedure to submit a background report to the concurrent manager using SRS is the same, regardless of the product that owns the report. SRS takes advantage of shared flexfield value sets.

Applications Online Help

The presentation of Applications Online Help is also standardized across all products.

Developer Features

Oracle Application Object Library provides many features for developers creating custom forms, reports, or programs that interface with Oracle Applications:

- The same coding and Graphical User Interface (GUI) standards used by Oracle Applications developers are available for custom development.
- Custom reports can be integrated into Standard Report Submission so that they can be submitted and monitored using the same procedures as other Oracle Applications reports, and developers can set up certain menus and responsibilities to access custom reports or standard objects.
- Flexfields used on custom forms can take advantage of existing flexfield capabilities such as value sets, validation, and security rules.
- Custom menus and responsibilities can be seamlessly integrated with Oracle Applications.

Features for System Administrators

Oracle Application Object Library provides many features to simplify administration of Oracle Applications, enabling the system administrator to carry out routine tasks quickly and easily. These features include:

- Registering new Oracle Applications users, and giving them access to only those Forms, functions, and reports they need to do their jobs.
- Deciding which users have access to each product, and within a product, which Forms, functions, and reports a user can access.
- Monitoring what users do, and when, via comprehensive auditing capabilities.
- Setting user and system *profiles* to modify the look and behavior of Oracle Applications products; profiles can be set at site, application, responsibility, and

user levels.

- Monitoring and controlling concurrent processing using interfaces such as Oracle Applications Manager (OAM).

Oracle Application Object Library Security

Oracle Application Object Library controls access to the data in Oracle Applications via user sign-ons and responsibilities. Each user must have a valid user name and password to gain access to Oracle Applications.

A *responsibility* is a level of authority in Oracle Applications that lets Applications users access only those functions and data appropriate to their roles in the organization. For example, responsibilities may be used to allow access to a specific product, ledger, operating unit, or to a restricted list of windows, functions, reports, and groups of products, or data groups.

Note that the Forms available from the navigation menus vary by responsibility. For example, the Purchasing User navigation menu does not include all the forms that are available to the Purchasing Superuser navigation menu.

When you install Oracle Applications, a standard Applications user called SYSADMIN is created for you. Several default responsibilities are also created. Since the SYSADMIN sign-on is automatically assigned to the System Administrator responsibility, you can use SYSADMIN to create new user signons and assign them to responsibilities. You can also create any custom responsibilities you need.

Oracle Workflow (OWF)

Oracle Workflow delivers a complete workflow management system that supports business process based integration. Its technology enables modeling, automation, and continuous improvement of business processes, routing information of any type according to user-defined business rules. Oracle Workflow also provides an infrastructure for the enterprise-wide communication of data related to defined business events, providing the capabilities needed to:

- Manage enterprise business processes that may span trading partners
- Support standard and personalized business rules
- Streamline and automate transaction flows
- Manage exceptions without manual intervention

Oracle Workflow lets you model and maintain your business processes using a graphical workflow builder. You can model and automate sophisticated business processes, defining processes that can loop, branch into parallel flows and rendezvous, decompose into sub-flows, branch on task results, time out, and more.

Acting as a *system integration hub*, Oracle Workflow can apply business rules to control objects and route them between applications and systems. It extends the reach of business process automation throughout an enterprise and beyond, to include any email user, web user, or system, enabling people to receive, analyze, and respond to *notifications* needing their attention. Users can respond to a notification via any standard email system or standard Web browser.

Workflow Components

Oracle Workflow Builder provides a graphical drag and drop process designer. You can create and evolve business processes to incorporate existing business practices between your organization and customers or suppliers, without modifying existing business processes and without changing applications code.

The *Workflow Engine*, embedded in the Oracle database, implements process definitions at runtime. The Workflow Engine monitors workflow states and coordinates the routing of activities for a process. Changes in workflow state, such as the completion of workflow activities, are signaled to the engine via a PL/SQL or Java API.

The Oracle Workflow *Business Event System* provides a workflow-enabled solution for your enterprise application integration requirements. The Business Event System is an application service delivered with Oracle Workflow that uses Oracle Advanced Queuing technology to communicate business events between systems. The Business Event System supports the following types of integration:

- Message-based point-to-point system integration
- System integration messaging hubs
- Distributed applications messaging

The Business Event System uses Oracle Advanced Queuing to propagate messages between communication points on systems, called *agents*, using a specified protocol. Events received from external systems are processed by an agent listener that runs on that agent's queue.

The *Oracle Workflow Event Manager* enables registration of significant business events for selected applications, including functions that generate the XML event messages. Users of those applications can register *subscriptions* on events that are significant to their systems, to take actions such as triggering custom code.

Features and Usage

A completed application transaction or event can initiate a workflow process by raising a business event or by calling a series of Workflow Engine APIs. The Workflow Engine drives through the process, performing all automated steps and calling the Notification System to deliver notifications for steps that involve human intervention.

You can review and respond to your business process notifications from one central window, known as the *worklist*, using a standard Web browser. This offers the flexibility to prioritize tasks and to define sort criteria, giving you the flexibility to organize your work the way you wish. For example, you can group notifications by type or subject, to avoid having to jump from one context to another. Alternatively, you can focus on time critical tasks first, sorting by priority or due date. Oracle Workflow is fully integrated with the Oracle E-Business Suite, providing the ability to drill down to any Oracle E-Business Suite or associated URL to view or complete a transaction.

When a business event occurs, the Workflow Event Manager executes any subscriptions registered on the event. For local events, the subscribing code can be executed synchronously, in the same database transaction as the code that raised the event, or asynchronously, deferring costly subscription processing to a later time, and thus allowing control to be returned more quickly to the calling application. Events can also be received asynchronously from external systems. Before producing the XML event message, the Event Manager minimizes processing by checking whether event information is required by subscriptions on the event.

Additional Capabilities

The flexibility of the powerful Workflow Engine event activities enable you to model business events within workflow processes. Event activities can be used to model content-based routing, transformations, error handling, and so on. A workflow process can be started or processed by an inbound message, and can send an outbound message or raise an event to the Event Manager. XML function activities give you access to event content data within workflow processes. Workflow processes based on business events give the greatest flexibility when implementing an integration solution. However, the Business Event System can also run independently of the Workflow Engine, to enable point-to-point messaging to be utilized.

You can perform complex transformations between different formats required for your business documents. Oracle Workflow allows you to apply a stylesheet to an XML event message. In addition, when queues are defined within the Business Event System, you specify the logic used to enqueue and dequeue messages. This logic, called a *queue handler*, can include transformations.

Oracle Alert (ALR)

Oracle Alert (ALR) allows you to email system notifications to users when an exception or event has occurred. Some products are delivered with predefined alerts, which can be used to notify users about specified database exceptions as they occur, and perform routine tasks automatically according to a schedule you define.

For example, you can configure Oracle Alert to send an email to key database administrators when a tablespace in the Oracle Applications database does not have adequate free space.

Oracle XML Publisher (XDO)

Oracle XML Publisher is a Java-based product based on the World Wide Web Consortium (W3C) *Extensible Stylesheet Language* (XSL). Specifically, XML Publisher utilizes the *XSL-FO* standard to transform XML data into a *formatting object* (FO). A formatting object contains both data and formatting information, and can be further transformed to an output format such as Portable Document Format (PDF).

XML Publisher uses *data definitions* and *templates* to produce output reports in the desired format. A data definition is a data source (or a combination of data sources) that either is XML or can produce XML. Examples include output from concurrent programs and Web services. A template is a report definition, which sets out how a report should look. The template layout can be user-specified. Supported templates currently include RTF, PDF Forms, and XSL.

Key features of XML Publisher include:

- Provides a template-based, easy-to-use publishing solution that enables end-users to develop and maintain report formats to suit specific business needs.
- Allows users to employ familiar desktop tools such as Adobe Acrobat, Microsoft Excel, and Microsoft Word to create and maintain reports in their preferred format, and then use XML Publisher to convert these documents to the XSL-FO format.
- Offers a variety of options for published documents, such as multiple output formats, multiple languages, and multiple delivery options.

Core Components

The core components of XML Publisher are a Java-based set of publishing tools accessible via Java APIs from Oracle Applications or from any Java-based application.

- **FO Processor** - The formatting object that results from the application of the XSL-FO template to the XML data is used by the FO Processor to generate the required output document. Currently the FO Processor only supports PDF as an output format; other formats such as HTML and RTF will be supported in future releases of XML Publisher.
- **PDF Document Merger** - The PDF Document Merger accepts XML data and a PDF document as input, and uses a mapping between the XML and the fields in the document to merge the data into the PDF document.
- **PDF Form Processor** - The PDF Form Processor is used to add attributes such as watermarks to a merged document.
- **RTF Template Parser** - Report templates can be created in the *Rich Text Format*(RTF) document format, and converted to an XSL-FO format that can be applied to XML data.

Template Manager

The Template Manager enables you to upload and maintain your templates and data sources. Key features include:

- **Data Source Registration** - Data sources that generate XML data can be registered with XML Publisher. These can be concurrent programs such as Oracle Reports, or

BC4J objects that are able to generate XML data.

- **Template Registration** - Templates used to format report data must be registered with XML Publisher. They can then be applied to the report data to create the final published output. Supported template types include PDF, RTF, and XSL-FO.

- **XML Publisher APIs** - XML Publisher provides APIs to allow other Oracle Applications products to communicate directly with the underlying processes.

2

Applications File System

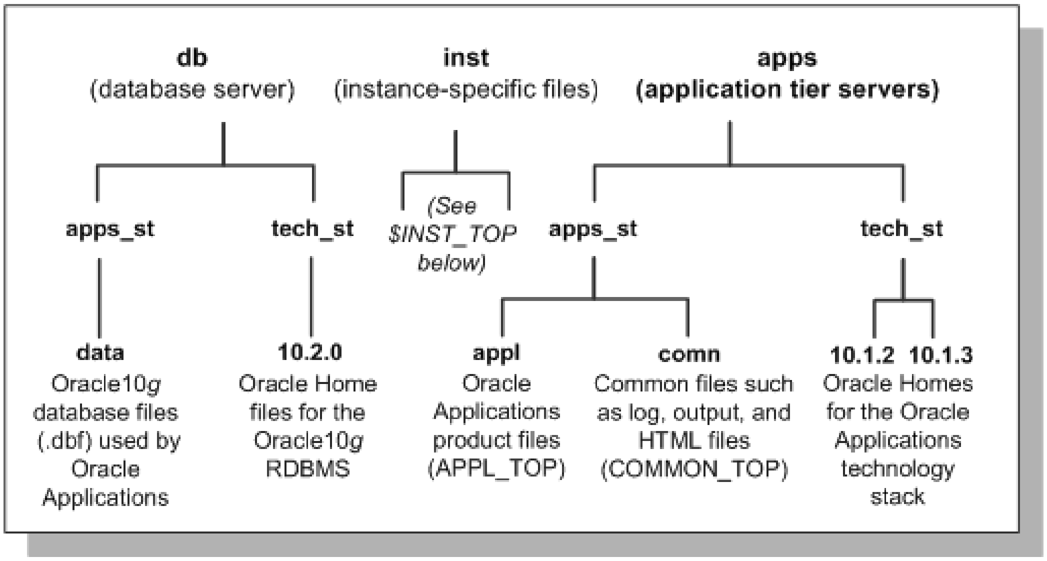
Introduction

An Oracle Applications Release 12 system utilizes components from many Oracle products. These product files are stored below a number of key top-level directories on the database and application server machines.

> **Note:** No Oracle Applications components are installed on desktop client machines, although JAR files and their supporting utilities are downloaded as required.

Depending on how you chose to install Applications, these product directories may be located on a single machine (the simplest case) or on multiple machines (the most common type of deployment). Operating system environment settings indicate the location of the various files in the file systems of the database and application tier machines. This chapter discusses the association between these environment settings and the corresponding files and directories.

Figure 2-1 Top-Level Applications Directory Structure


db
(database server)
inst
(instance-specific files)
apps
(application tier servers)
apps_st
tech_st
(See
$INST_TOP
below)
apps_st
tech_st
data
Oracle10g database files (.dbf) used by Oracle Applications
10.2.0
Oracle Home files for the Oracle10g RDBMS
appl
Oracle Applications product files (APPL_TOP)
comn
Common files such as log, output, and HTML files (COMMON_TOP)
10.1.2 10.1.3
Oracle Homes for the Oracle Applications technology stack

- The **db/apps_st/data** directory is located on the database node machine, and contains the system tablespaces, redo log files, data tablespaces, index tablespaces, and database files

- The **db/tech_st/10.2.0** directory is located on the database node machine, and contains the ORACLE_HOME for the Oracle10*g* database

- The **apps/apps_st/appl** (APPL_TOP) directory contains the product directories and files for Oracle Applications

- The **apps/apps_st/comn** (COMMON_TOP) directory contains Java classes, HTML pages, and other files and directories used by multiple products

- The **apps/tech_st/10.1.2** directory contains the ORACLE_HOME used for the Applications technology stack tools components

- The **apps/tech_st/10.1.3** directory contains the ORACLE_HOME used for the Applications technology stack Java components

Oracle Applications Environment

Oracle Applications makes extensive use of environment settings to locate executable programs and other files essential to Applications operation. These environment settings are defined when you install Oracle Applications. Many of the settings are defined by information you provide when running Rapid Install, while others have the same values in all installations.

The environment settings and their associated values are stored in *environment files*, which have a `.env` suffix on UNIX (`.cmd` on Windows). Environment files and settings are discussed in more detail later in this chapter.

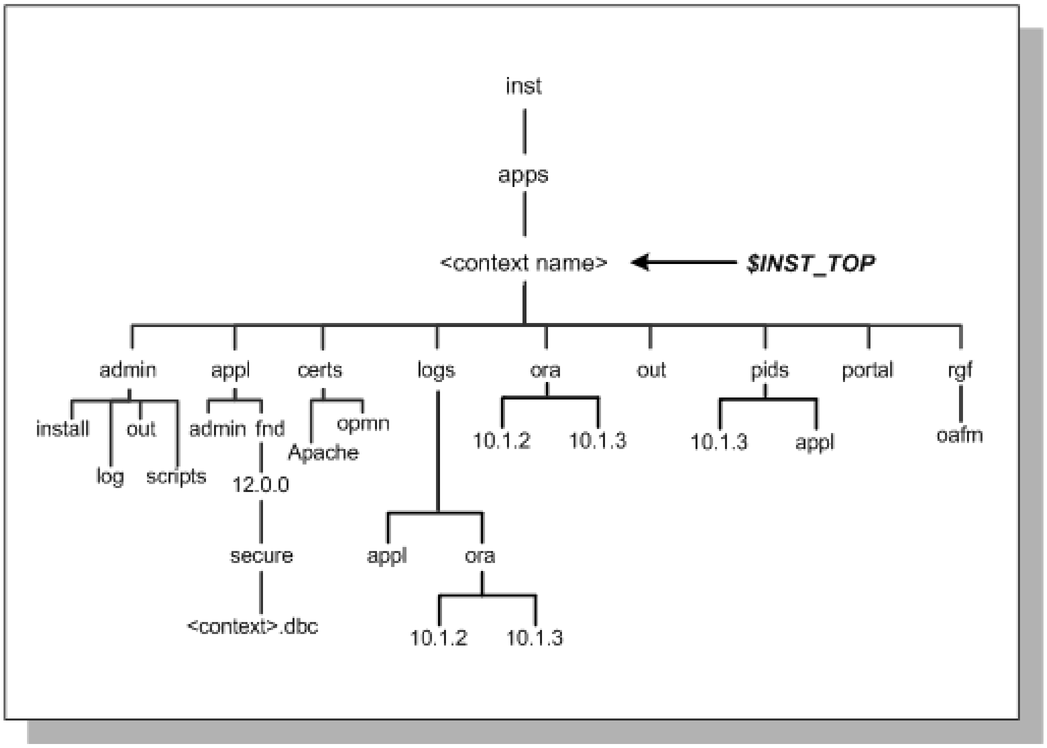
Instance Home ($INST_TOP)

Oracle Applications Release 12 introduces the concept of a top-level directory for an Applications instance. This directory is referred to as the *Instance Home*, and denoted by the environment variable $INST_TOP.

Using an Instance Home provides the ability to share Applications and technology stack code among multiple instances, for example a development instance and a test instance. Other benefits include support for read-only file systems and centralization of log files, both of which are discussed further below.

The basic structure of the instance home is: <APPS_BASE>/inst/apps/<context_name>, where APPS_BASE (which does not have or need a corresponding environment variable) is the top level of the Applications installation, and <context_name> is the highest level at which the Applications context exists. For example, the setting of $INST_TOP might be <diskresource>/applmgr/inst/apps/testsys2, where testsys2 is the context name. All configuration files created by AutoConfig are stored under the Instance Home. This facilitates use of a shared application tier file system, as described below.

Figure 2-2 Instance Top



> **Note:** For further details of shared file system usage, see Oracle *MetaLink* Note 384248.1, *Sharing the Application Tier File System in Oracle E-Business Suite Release 12*.

Read-Only File Systems

A key benefit of moving to the new Instance Home model is that as AutoConfig no longer writes to the APPL_TOP or ORACLE_HOME directories, both of these can be made into read-only file systems if required. In previous Applications releases, the `adpatch` utility wrote to $APPL_TOP/admin on an administration (patching) node. Under the new model, $APPL_CONFIG_HOME/admin is used instead. $APPL_CONFIG_HOME will equate to a value such as /u01/oracle/VIS/apps/apps_st/appl.

> **Note:** In a shared file system environment, Oracle recommends that the INST_TOP should be located on a local disk and not on a shared resource such as NFS, because of possible issues storing log files on shared resources.

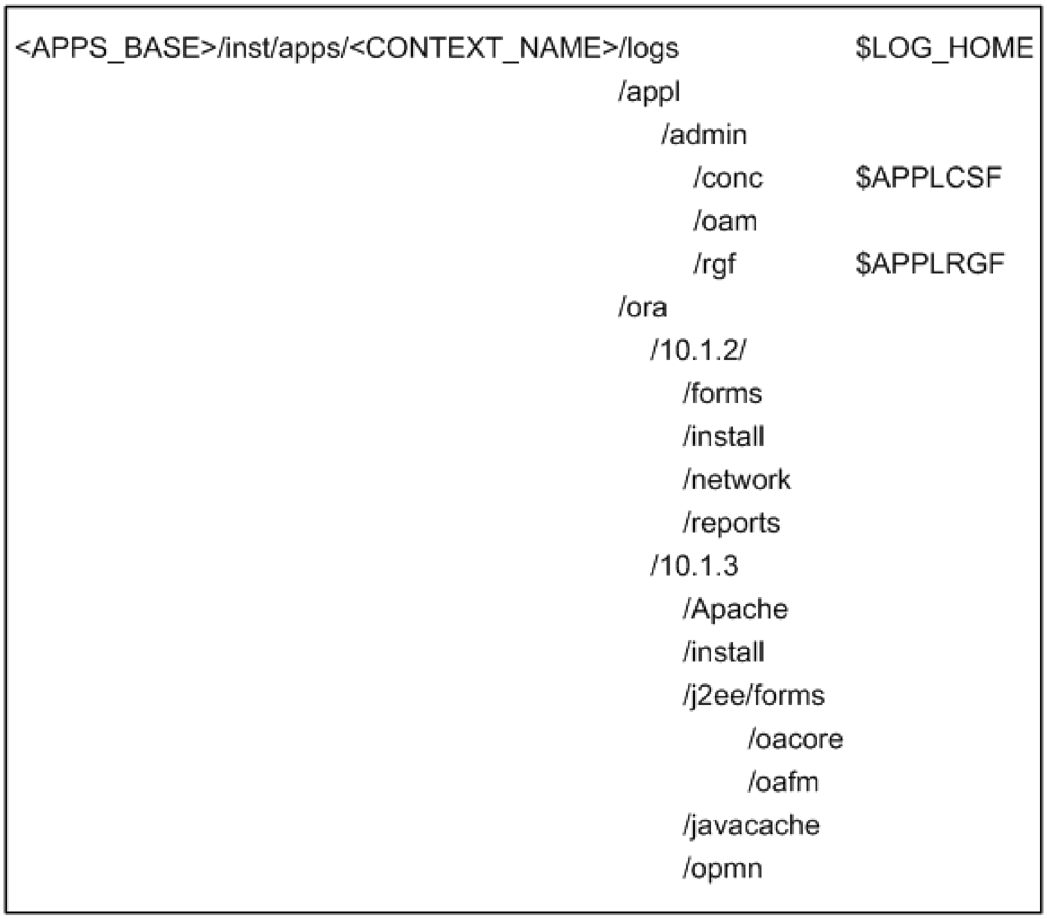
Log Files

Another advantage of employing the concept of an Instance Home is that log files can be stored centrally for an instance, and therefore managed more easily.

> **Important:** This is particularly significant from a security perspective, as log files may contain sensitive data that should not be accessible to general users.

The following diagram shows the directory structure used for log files in Release 12, with some of the subdirectories used to categorize the log files:

Figure 2-3 Log Files



```
<APPS_BASE>/inst/apps/<CONTEXT_NAME>/logs          $LOG_HOME
                                     /appl
                                        /admin
                                           /conc    $APPLCSF
                                           /oam
                                           /rgf     $APPLRGF
                                     /ora
                                        /10.1.2/
                                          /forms
                                          /install
                                          /network
                                          /reports
                                        /10.1.3
                                          /Apache
                                          /install
                                          /j2ee/forms
                                                /oacore
                                                /oafm
                                          /javacache
                                          /opmn
```

The data Directory

The **db/apps_st/data** file system contains the data (.dbf) files of the Oracle database. Rapid Install installs the system, data, and index files in directories below several mount points on the database server. You can specify the directory names of the mount points on the database server during installation.

The db Directory

Oracle Applications supports employing an Applications database running out of one ORACLE_HOME, while running other Applications components out of additional ORACLE_HOMEs. This *multiple ORACLE_HOMEs* configuration allows Applications to utilize new features of the Oracle database and associated technologies in the most flexible manner.

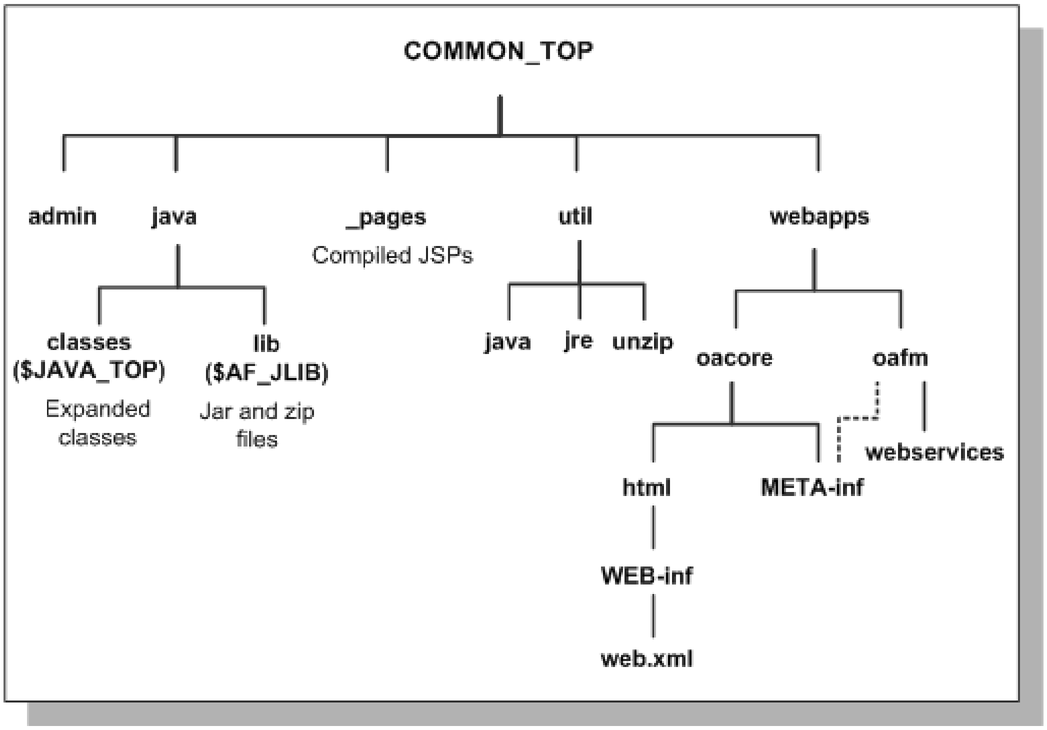
Release 12 utilizes a 10g Release 2 (10.2) ORACLE_HOME, (Applications database home)whose files are located under the *db* directory. These files are needed for running and maintaining the Oracle Applications database.

> **Tip:** Oracle E-Business Suite is always certified with database server *patchsets* (minor maintenance releases).

The comn Directory

The **apps/apps_st/comn** (COMMON_TOP) directory contains files used by many different Oracle Applications products, and which may also be used with third-party products.

Figure 2-4 COMMON_TOP Directory Structure



The admin directory

The admin directory, under the COMMON_TOP directory, is the default location for the concurrent manager log and output directories. When the concurrent managers run Oracle Applications reports, they write the log files and temporary files to the *log* subdirectory of the admin directory, and the output files to the *out* subdirectory of the admin directory.

You can change the location the concurrent managers write these files to, so that, for example, the log and output files are written to directories in each <PROD>_TOP directory. This may be more desirable in terms of disk space management, or the need to avoid a possible performance bottleneck on a system that has a high concurrent processing throughput.

> **Note:** For further details, see *Concurrent Processing Server* in Chapter 1 of this book, and Chapters 6, 7 and 8 of *Oracle Applications System Administrator's Guide - Configuration*.

The *install* subdirectory of the admin directory contains scripts and log files used by Rapid Install. The *scripts* subdirectory of admin contains scripts used to start and stop services such as listeners and concurrent managers.

The html directory

The OA_HTML environment setting points to the html directory. The Oracle Applications HTML-based sign-on screen and Oracle HTML-based Applications HTML files are installed here. The html directory also contains other files used by the HTML-based products, such as JavaServer Page (JSP) files, Java scripts, XML files, and style sheets. Typically, the path will look like: <diskresource>/applmgr/apps/apps_st/comn/webapps/oacore/html. Two new subdirectories are META-INF and WEB-INF, introduced to meet J2EE specifications.

The java directory

Release 12 introduces some significant changes to the locations in which the various types of Java files are stored. Rapid Install installs all Oracle Applications class files in the COMMON_TOP/classes directory, pointed cto by the $JAVA_TOP environment variable. Zip and jar files are installed in the $COMMON_TOP/java/lib directory, pointed to by the $AF_JLIB environment variable (introduced with Release 12). The top-level Java directory, $COMMON_TOP/java, is pointed to by the $JAVA_BASE environment variable.

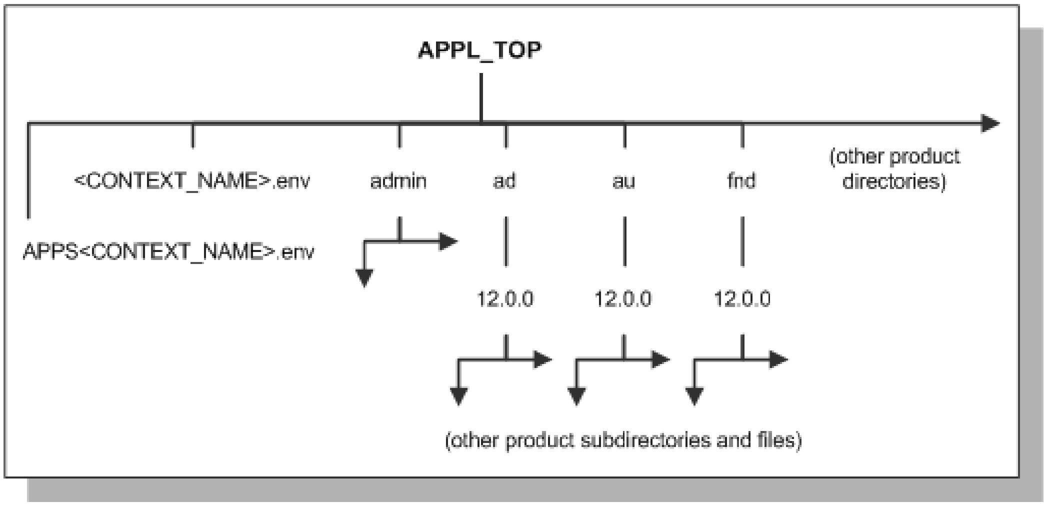
The util directory

The *util* directory contains the third-party utilities licensed to ship with Oracle Applications. These include, for example, the Java Runtime Environment (JRE), Java Development Kit (JDK), and the Zip utility.

The appl (APPL_TOP) Directory

Oracle Applications files are stored in the <*dbname*>APPL directory, which is known as the *APPL_TOP* directory.

Figure 2-5 APPL_TOP Directory Structure



The APPL_TOP directory contains:

- The core technology files and directories.
- The product files and directories (for all products).
- The main applications environment file, called *<CONTEXT_NAME>.env* on UNIX, and *<CONTEXT_NAME>.cmd*on Windows.
- The consolidated environment file, called *APPS<CONTEXT_NAME>.env* on UNIX, and *APPS<CONTEXT_NAME>.cmd* on Windows.

> **Note:** CONTEXT_NAME is the *Applications context*, described further in Chapter 5. Its default value is <SID>_<hostname>.

Rapid Install creates a directory tree for every Oracle Applications product in this APPL_TOP directory, whether licensed or not.

> **Warning:** *All* Oracle Applications products are installed in the database and the file system, regardless of registration status. Do not attempt to remove files for any unregistered products.

Rapid Install installs a new Applications top directory when you upgrade. Rapid Install does not delete any existing product files from earlier releases, but unloads new product files into a new apps/apps_st/appl directory tree.

Each Applications top directory is associated with a single Oracle Applications database on the Oracle database server. If you install both a Vision Demo system and a test system, Rapid Install will lay down two file systems, one for each of these Applications systems.

Product Directories

Each product has its own subdirectory under APPL_TOP. The subdirectories are named in accordance with the product's standard abbreviation, such as *gl* for Oracle General Ledger. Within each product directory is a subdirectory that is named using the base Oracle Applications release number, such as 12.0.0. This directory contains the various subdirectories for the product files.

<PROD>_TOP Directory

The <APPL_TOP>/<prod>/<version> path is known as the *product top directory* (<PROD>_TOP), and its value is stored in the <PROD>_TOP environment variable.

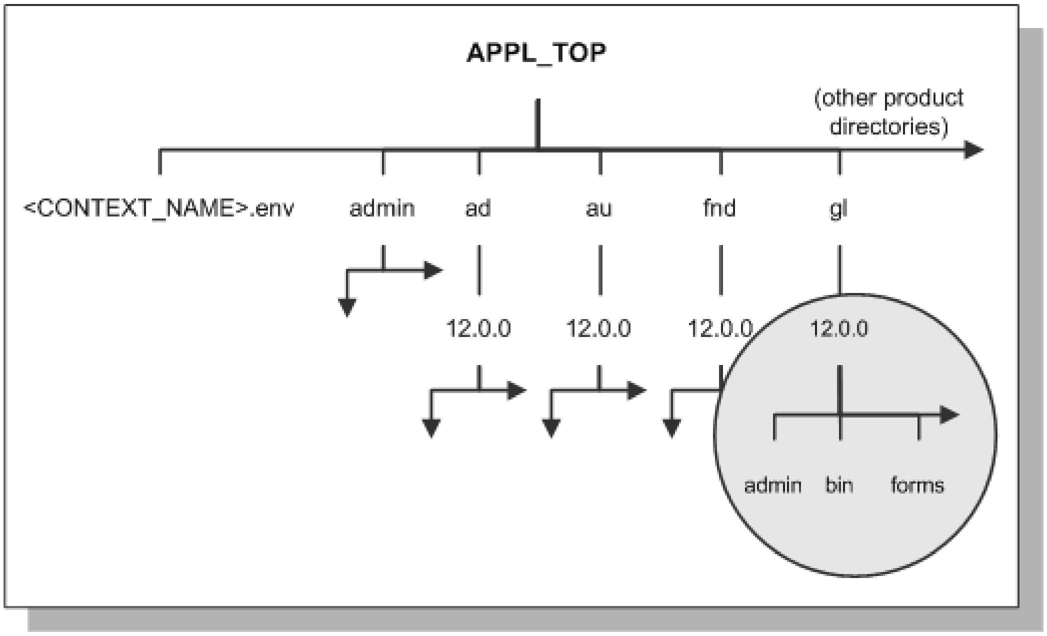
For example, if APPL_TOP=/d01/oracle/prodapps, then the value contained in the AD_TOP environment variable is /d01/oracle/prodapps/ad/12.0.0, and the AD_TOP environment variable points to the <APPL_TOP>/ad/12.0.0 directory.

For the same APPL_TOP, the value of AU_TOP is /d01/oracle/prodapps/au/12.0.0, and the AU_TOP environment variable points to the <APPL_TOP>/au/12.0.0 directory. The same principle applies to all directories, apart for the admin directory.

Product Files

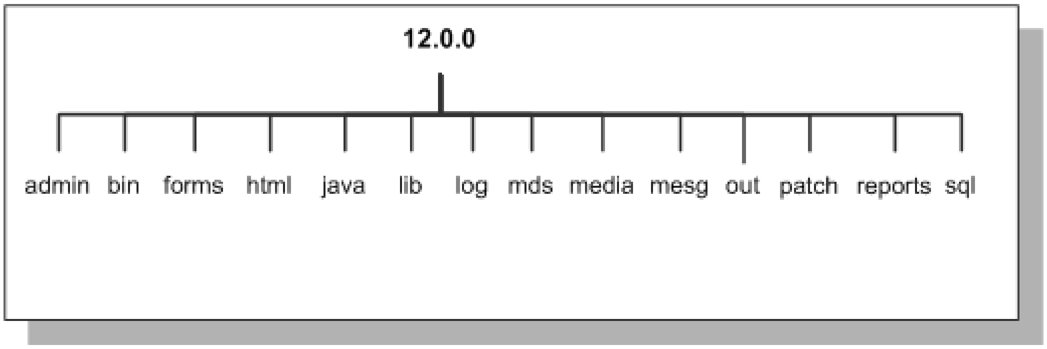
Each <PROD>_TOP directory, such as <APPL_TOP>/gl/12.0.0, contains subdirectories for product files. Product files include forms files, reports files, and files used to upgrade the database. To display data entry forms for Oracle General Ledger, for example, Oracle Applications accesses files in the forms subdirectory under the 12.0.0 directory.

Figure 2-6 APPL_TOP Directory Structure



Within each <PROD>_TOP directory, the product's files are grouped into subdirectories according to file type and function. The next figure expands the inset to show the full directory structure for gl.

Figure 2-7 Detail of gl Directory Structure



The following table summarizes product subdirectories and the types of files each one may contain.

> **Note:** Not all products use all the subdirectories listed in this table.

Table 2-1 Applications Product Subdirectories and File Types

Subdirectory Name	Description
admin	The <PROD>_TOP/admin directory contains *product-specific* files used to upgrade each product. This is in distinction to the <APPL_TOP>/admin directory, which contains upgrade-related files for *all* products.
driver	Contains driver files (.drv files) used in upgrading.
import	Contains DataMerge files used to upgrade seed data.
odf	Contains object description files (.odf files) used to create tables and other database objects.
sql	Contains SQL*Plus scripts used to upgrade data, and .pkh, .pkb, and .pls scripts to create PL/SQL stored procedures.
bin	Contains concurrent programs, other C language programs and shell scripts for each product.
forms	Contains Oracle Forms generated runtime (.fmx) files (Oracle Forms form files).
help	Contains the online help source files. Within this directory are subdirectories for each language installed.
html	Contains HTML, JavaScript, and JavaServer Page (JSP) files, primarily for HTML-based Applications products.
include	Contains C language header (.h) files that my be linked with files in the lib directory. Not all products require this directory.

Subdirectory Name	Description
java	Contains JAR files (Java Archive files) and Java dependency files. Copies of JAR files are also located in the $AF_JLIB directory.
lib	Contains files used to relink concurrent programs with the Oracle server libraries. These files include: • object files (.o on UNIX, .OBJ on Windows), with compiled code specific to one of the product's programs. • library files (.a on UNIX, various including .DLL on Windows), with compiled code common to the product's programs. • make files (.mk) that specify how to create executables from object files and library files.
log and out	Contains output files for concurrent programs: • .mgr (master log file for concurrent manager) • .req (log file for a concurrent process) Note that *log* and *out* subdirectories under a product directory are not used if you choose to set up a common directory for log and output files (FND_TOP is the only exception to this).
media	Contains .gif files used in the display of text and graphics on the desktop client.

Subdirectory Name	Description
mesg	Concurrent programs also print messages in the log and output files. This directory contains the .msb files (binary message files used at runtime), and language-specific message files (such as a US.msb file for American English and a D.msb file for German). The files contain the forms messages that are displayed at the bottom of the screen or in popup windows.
patch	Updates to the data or data model utilize this directory to store the patch files.
reports	Contains Oracle Reports platform-specific rdf binary report files for each product. Reports for each language are stored in subdirectories of the *reports* directory.
resource	Contains .pll files (PL/SQL library files for Oracle Forms), which, like the *plsql* directory files, are later copied to AU_TOP.
sql	Contains .sql files (SQL*Plus scripts) for concurrent processing.

Language Files

When you install Oracle Applications in a language other than American English, each product tree includes directories that use the relevant NLS language code. These directories hold translated data, forms, and message files. For example, the language directory named D designates German. The data loader files in the D subdirectory of the admin directory contain the German translation of the product seed data.

The US subdirectory in the forms directory contains Oracle Forms forms in American English. The D directory in the forms directory contains the same forms, translated into German. However, the mesg directory contains message files in both American English and German.

Note: For further details, see the *Oracle Globalization Support Guide*.

Core Technology Directories

The admin, ad, au, and fnd directories are the *core technology directories*.

The admin directory

This directory and its subdirectories contain files and scripts used by the AD utilities during upgrade and maintenance processes.

These files and scripts include:

- The adovars.env environment file, which defines certain file and directory locations
- Scripts run during the upgrade
- <SID>/log and <SID>/out directories for upgrade, log, and output files respectively
- A <SID>/restart directory where AD programs create restart files

The ad (Applications DBA) directory

This directory and its subdirectories contain installation and maintenance utilities, including:

- AD Administration (adadmin)
- AutoConfig (adconfig.sh)

The au (Applications Utilities) directory

This directory and its subdirectories contain product files that are consolidated in a single location for optimal processing. These files include:

- PL/SQL libraries used by Oracle Forms, in the resource subdirectory
- Oracle Forms source files, in the forms subdirectory
- A copy of all Java files used when regenerating the desktop client JAR files, in the java subdirectory
- Certain reports needed by products such as Discoverer, in the reports subdirectory

The fnd (Application Object Library) directory

This directory and its subdirectories contain the scripts and programs that are used as the foundation for all Applications products to build data dictionaries, forms and C object libraries.

Sharing the Applications File System Across Disks

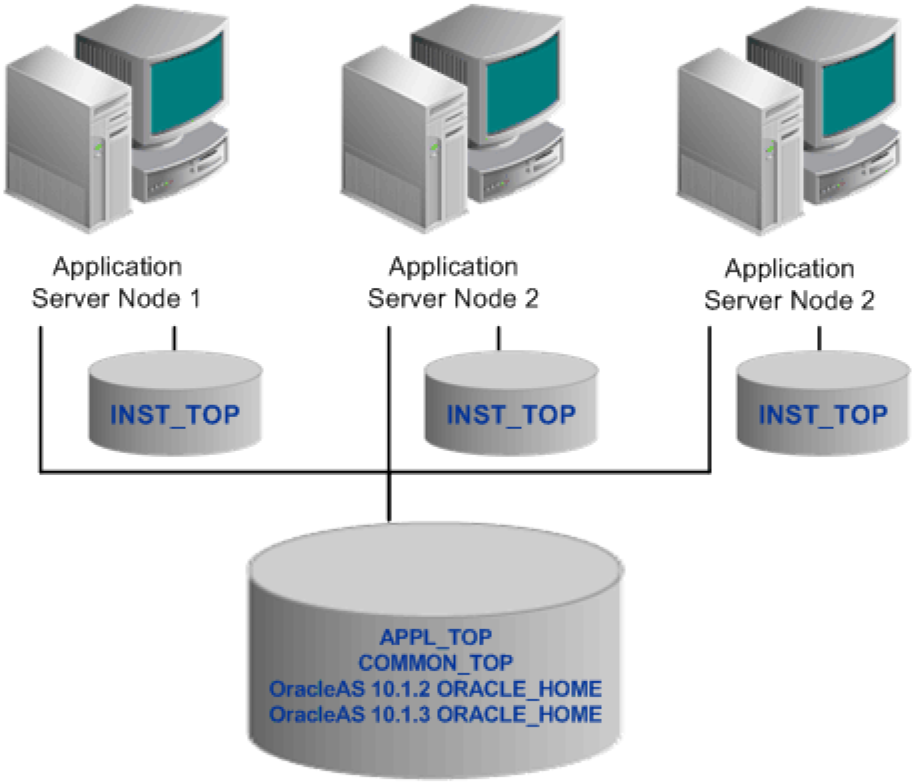
A traditional multi-node installation of Release 11*i* required each application tier to maintain its own file system, consisting of the APPL_TOP file system (APPL_TOP, COMMON_TOP, and a few related directories) and the application tier technology stack file system (8.0.6 ORACLE_HOME and iAS ORACLE_HOME). Subsequently, this was modified to allow the APPL_TOP to be shared across machines, and later to enable sharing of the entire application tier file system.

Continuing this strategy, Rapid Install for Release 12 creates a system that shares not only the APPL_TOP and COMMON_TOP file systems, but the application node technology stack file system as well. Rapid Install sets up this configuration as the default for nodes that are running the same operating system. These files make up the Applications node file system, and can be shared across multiple Applications nodes (provided they are running the same operating system).

> **Note:** A shared file system configuration is currently not supported on application tier server nodes running Windows.

With a shared application tier file system, all application tier files are installed on a single shared disk resource that is mounted from each application tier node. Any application tier node can then be used to provide standard services, such a serving forms or Web pages, or concurrent processing.

Figure 2-8 Shared Application Tier File System


Application Server Node 1
Application Server Node 2
Application Server Node 2
INST_TOP
INST_TOP
INST_TOP
APPL_TOP
COMMON_TOP
OracleAS 10.1.2 ORACLE_HOME
OracleAS 10.1.3 ORACLE_HOME

As well as reducing disk space needed, there are several other benefits of a shared application tier configuration:

- Most administration, patching, and maintenance tasks need be performed only once, on a single application tier node
- Changes made to the shared file system are immediately accessible on all application tier nodes
- Distributes processing tasks to run in parallel on multiple nodes (Distributed AD)
- Reduces overall disk requirements
- Makes adding additional application tier nodes easier

> **Note:** For details of shared application tier file system usage in the context of high availability, see Chapter 9. For further details of shared application tier file system usage in general, see Oracle*MetaLink* Note 384248.1, *Sharing the Application Tier File System in Oracle E-Business Suite Release 12*.

Environment Settings

Rapid Install creates several environment files that set up the Oracle database, the Oracle technology stack, the Oracle HTTP server, and the Oracle Applications environments.

The location of these environment files is shown in the following table:

Table 2-2 Locations of Applications Environment Files

Filename	Location	Path	Environment
<CONTEXT_NAME>.env or CONTEXT_NAME>.cmd	10.2.0.2 ORACLE_HOME	db/tech_st/10.2.0	Oracle Server Enterprise Edition
<CONTEXT_NAME>.env or <CONTEXT_NAME>.cmd	OracleAS 10.1.2 ORACLE_HOME	inst/apps/<context>/ora/10.1.2	Oracle tools technology stack
<CONTEXT_NAME>.env or <CONTEXT_NAME>.cmd	OracleAS 10.1.3 ORACLE_HOME	inst/apps/<context>/ora/10.1.3	Java technology stack

Filename	Location	Path	Environment
<CONTEXT_NAME>.env or <CONTEXT_NAME>.cmd	APPL_TOP	apps/apps_st/appl	Applications
APPS<CONTEXT_NAME>.env or APPS<CONTEXT_NAME>.cmd	APPL_TOP	apps/apps_st/appl	Consolidated setup file

On UNIX, Oracle Applications includes a consolidated environment file called `APPS<CONTEXT_NAME>.env`, which sets up both the Oracle Applications and Oracle technology stack environments. When you install Oracle Applications, Rapid Install creates this script in the APPL_TOP directory. Many of the parameters are specified during the install process.

On Windows, the equivalent consolidated environment file is called `%APPL_TOP%\envshell<CONTEXT_NAME>.cmd`. Running it creates a command window with the required environment settings for Oracle Applications. All subsequent operations on the APPL_TOP (for example, running adadmin or adpatch) must be carried out from this window.

The following table lists the key environment settings in APPS<CONTEXT_NAME>.env.

Table 2-3 Key Environment Settings

Parameter	Description
APPLFENV	The name of the environment file, <CONTEXT_NAME>.env. If you rename the environment file, this parameter setting must be updated.
PLATFORM	The operating system in use. The value (for example, LINUX) should match the value in the APPL_TOP/admin/adpltfrm.txt file.
APPL_TOP	The top-level directory for this Oracle Applications installation.

Parameter	Description
ADMIN_SCRIPTS_HOME	Directory under $INST_TOP that Identifies the location of scripts such as adautocfg.sh, adpreclone.sh, adstrtal.sh, and adstpall.sh.
FNDNAM	The name of the ORACLE schema to which the System Administration responsibility connects. The default is APPS.
GWYUID	The public ORACLE username and password that grants access to the Oracle Applications initial sign-on form. The default is APPLSYSPUB/PUB.
FND_TOP	The path to the Application Object Library directory. For example, apps/apps_st/appl/fnd/12.0.0.
AU_TOP	The path to the Applications Utilities directory. For example, apps/apps_st/appl/au/12.0.0.
<PROD>_TOP	The path to a product's top directory. There is one entry for each Oracle Applications product.
PATH	Sets the directory search path, for example for FND_TOP and AD_TOP.
APPLDCP	Specifies whether distributed concurrent processing is being used. Distributed concurrent processing distributes processing load across multiple concurrent processing nodes.
APPCPNAM	Indicates whether the format of the concurrent manager log and output files follow 8.3 file name conventions (maximum of 8 characters to the left of the dot and 3 to the right; for example, alogfile.log). If this parameter is set to "REQID" (required), the concurrent manager uses file names that meet 8.3 naming requirements.

Parameter	Description
APPLCSF	Identifies the top level directory for concurrent manager log and output files if they are consolidated into a single directory across all products. For example, /inst/apps/<context>/logs/appl/conc.
APPLLOG	The subdirectory for concurrent manager log files. The default is *log*.
APPLOUT	The subdirectory for concurrent manager output files. The default is *out*.
APPLTMP	Identifies the directory for Oracle Applications temporary files. The default is */tmp* on UNIX and *C:\temp* on Windows.
APPLPTMP	Identifies the directory for temporary PL/SQL output files. The possible directory options must be listed in the init.ora parameter *utl_file_dir*.
INST_TOP	Identifies the top-level directory for this instance. For example, inst/apps/<context>. Introduced with Release 12.
NLS_LANG	The language, territory, and character set installed in the database. The default for a fresh install is "AMERICAN_AMERICA.US7ASCII".
NLS_DATE_FORMAT	The National Language Support date format. The default is "DD-MON-RR", for example 14-JUN-07.
NLS_NUMERIC_CHARACTERS	The National Language Support numeric separators. The default is ".," (period and comma).

Most temporary files are written to the location specified by the APPLTMP environment setting, which is set by Rapid Install.

Applications also produces temporary PL/SQL output files used in concurrent processing. These files are written to a location on the database server node specified by the APPLPTMP environment setting. The APPLPTMP directory must be the same directory as specified by the utl_file_dir parameter in your database initialization file.

Rapid Install sets both APPLPTMP and the *utl_file_dir*parameter to the same default directory.

Some Oracle Applications utilities use your operating system's default temporary directory even if you define the environment settings listed in the previous paragraph. You should therefore ensure there is adequate free disk space in this directory, as well as in those denoted by APPLTMP and APPLPTMP. On a multi-node system, the directory defined by APPLPTMP does not need to exist on the application tier servers.

> **Note:** The temporary files placed in the utl_file_dir directory can be secured against unauthorized access by ensuring that this directory has read and write access for the Oracle database account only.

Other Environment Files

Several other key environment files are used in an Oracle Applications system.

The adovars.env file

The adovars.env file, located in $APPL_TOP/admin, specifies the location of various files such as Java files, HTML files, and JRE (Java Runtime Environment) files. It is called from the main applications environment file, <CONTEXT_NAME>.env. The adovars.env file includes comments on the purpose and recommended setting of each variable. In a Release 12 environment, adovars.env is maintained by AutoConfig, and should not be edited manually.

The adovars.env file includes the following parameters:

Table 2-4 Parameters Specified in the adovars.env File

Parameter	Description
AF_JLIB	Indicates the directory to which all Java archive files are copied. For example, apps/apps_st/comn/java/lib. Introduced with Release 12.
JAVA_BASE	Indicates the top-level Java directory . For example, apps/apps_st/comn/java. Introduced with Release 12.
JAVA_TOP	Indicates the directory to which all Java class files are copied. For example, apps/apps_st/comn/java/classes. Definition has changed with Release 12.

Parameter	Description
OA_JAVA	Indicates the directory to which all Java archive files are copied. For example, apps/apps_st/comn/java/classes.
OA_JRE_TOP	Indicates the location where the JRE is installed. For example, /local/java/jdk1.5.0_08.
OAH_TOP	Defines the location to which HTML files are copied. For example, apps/apps_st/comn/webapps/oacore.
OAD_TOP	Defines the locations to which context-sensitive documentation files are copied. For example, apps/apps_st/comn.
LD_LIBRARY_PATH	Path used on many UNIX platforms to list the directories that are to be scanned for dynamic library files needed at runtime.
CLASSPATH	Lists the directories and zip files scanned for Java class files needed at runtime.

The adconfig.txt file

AD utility programs perform a variety of database and file management tasks. These utilities need to know certain configuration information to run successfully. This configuration information is specified when Oracle Applications is installed, and subsequently stored in the adconfig.txt file in the <APPL_TOP>/admin directory. Once it has been created, this file is used by other Oracle Applications utilities.

> **Note:** adconfig.txt is created with the APPL_TOP file system, and it shows the tiers that have been configured on a particular node. It is distinct from the *config.txt* file employed by Rapid Install.

The fndenv.env file

This file sets additional environment variables used by the Application Object Library. For example, it sets APPLBIN as the name of the subdirectory where product executable programs and shell scripts are stored (bin). This file should not be modified: the default values are applicable for all customers. The file is located in the FND_TOP directory.

The devenv.env file

This file sets variables that let you link third-party software and your own custom-developed applications with Oracle Applications. In Release 12, this script is located in FND_TOP/usrxit, and is automatically called by fndenv.env. This allows you to compile and link custom Oracle Forms user exits and concurrent programs with Oracle Applications.

3

Applications Database Organization

Introduction

This chapter describes the Oracle Applications data model, including schemas, Oracle user IDs, and related database server features.

Schemas

A given Oracle database can store the objects associated with a single installation of Oracle E-Business Suite. In general, product *code* objects are stored in the *APPS schema*, whereas product *data* objects are stored in the relevant *base product schemas*. These schemas are described further below.

The APPS Schema

The APPS schema has access to the complete Oracle E-Business Suite data model. It is analogous to the SYSTEM schema, which has access to the entire database. Oracle Applications responsibilities connect to an APPS schema, and the environment variable FNDNAM is set to the name of the APPS schema. The APPS schema owns all the code objects for the Oracle E-Business Suite, and has access to all data objects. There is one APPS schema for every product installation group.

Utilizing a single schema that has access to all objects avoids cross-product dependencies, and creates a hub-and-spoke access model rather than the spider web model that would otherwise be needed. The APPS schema also improves the reliability of and reduces the time needed for installation, upgrading, and patching, by eliminating the need for cross-product grants and synonyms.

The following code objects are installed in the APPS schema:

- Packages

- Procedures

- Functions
- Triggers
- Views
- Materialized views
- Java classes
- Queues

Base Product Schemas

All data objects for a product are owned by a specific schema for that product, known as the base product schema.

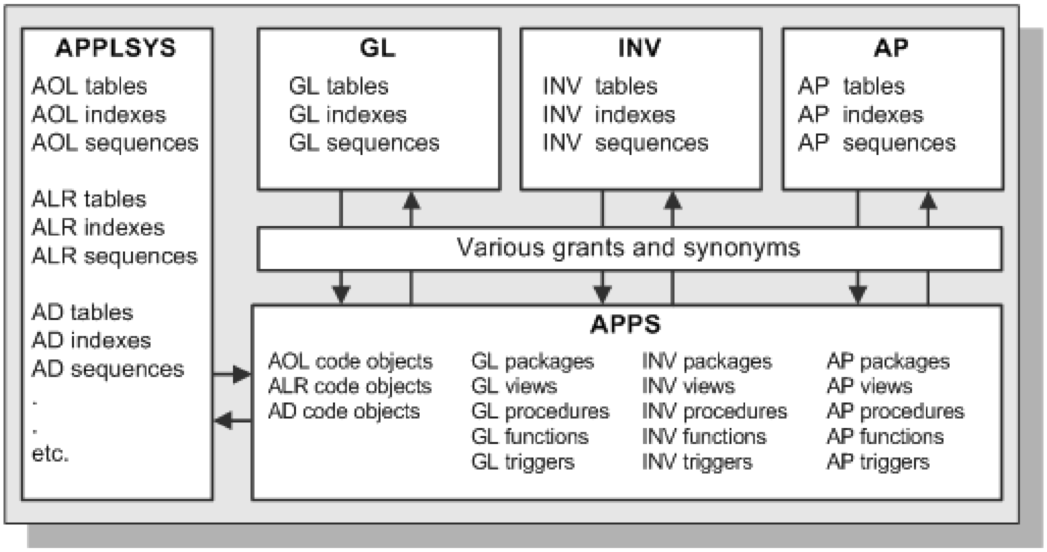
The following objects are installed in the base product schemas:

- Tables
- Sequences
- Indexes
- Constraints
- Queues

Relationship Between APPS Schema and Base Product Schemas

The base product schemas also contain grants from various tables and sequences to the APPS schema, as well as synonyms from the APPS schema to the same objects.

Figure 3-1 APPS Schema and Base Product Schemas



Custom Schema Access

In some circumstances, you may wish to create a schema that has limited or read-only access to Oracle Applications data.

> **Warning:** Since the APPS schema has all privileges to all Oracle Applications objects, you should never give users direct access to this schema.

You will need to grant access on objects to the user schema from the base product schema.

> **Note:** You may need to re-grant access if the underlying object is dropped and recreated.

Schemas and Data Access

Some views access packages or functions, where the value returned by the package or function may depend on the environment having been set up properly. The environment is initialized automatically when accessing Oracle Applications through the Sign-On screen, or when using concurrent processing with Oracle Reports or SQL scripts.

Consequently, if you connect directly to a schema, the rows returned by the view may be different from those returned from when you are running in an Oracle Applications environment. For example, a view may reference a profile option: when accessed from

SQL*Plus, the site value of the profile option will be used, rather than the setting for a particular Applications user.

Oracle User IDs

Each Oracle E-Business Suite product has a default Oracle user ID, with the product abbreviation used as both the schema name and password. For example, the default Oracle user ID/password combination for Oracle General Ledger is *GL*/*GL*.

> **Important:** For security, you should change the default passwords immediately after installation. However, Oracle recommends that you do not change the default user IDs.

A product's schema determines the ownership of the product's data objects, such as sequences, tables, and indexes. If two products are installed under the same schema, that schema owns the data objects for both products.

Since a product's data objects are created in their own schema (such as the GL schema), but the user accesses all data objects through the APPS schema, appropriate grants and synonyms are required between the APPS schema and the base product schemas (see Figure 3-1 above).

Space Management

This section discusses how the Oracle database is set up to meet the space management needs of Oracle Applications. It provides information on tablespaces, firstly outlining the basic tablespaces required, then discussing the traditional tablespace structure used to support Applications products, and finally describing the tablespace model that is used as standard with Oracle Applications Release 12.

> **Important:** Oracle Applications Release 12 requires an Oracle database block size of 8K. No other block size may be used.

Introduction to Tablespaces

The Oracle 10g Release 2 Database server always requires the following tablespaces to be available:

- **System Tablespace** - This tablespace holds data dictionary tables owned by the SYS account, and is created when the database is installed.

- **Undo Tablespace** - This tablespace holds undo (rollback) information that is used to track database changes until they are either committed or undone (rolled back).

- **Temporary Tablespace** - Temporary tablespaces are used to sort data while it is being processed. It is possible to use a single temporary tablespace, typically called

TEMP, for all Oracle Applications products. Alternatively, separate temporary tablespaces can, if desired, be created for individual products. Since users access Applications objects through the APPS schema, the temporary tablespace for that schema (initially the same as that for the Oracle Application Object Library) is used by all products.

The traditional Oracle Applications tablespace model employed separate tablespaces for a product's tables and indexes. The resulting tablespaces were named by appending 'D' for data or 'X' for an index to the product's short name or Oracle schema name. For example, APD was the tablespace for Oracle Payables data, and APX was the tablespaces for Oracle Payables indexes.

> **Note:** For further information about tablespaces, see the *Oracle Database Administrator's Guide 10g Release 2 (10.2)*.

Employing separate table and index tablespaces for each product made it easier maintain products, and helped to improve database performance. However, with an increasing number of products, this model could easily require several hundred product tablespaces, plus a system tablespace, undo (rollback) tablespace, and temporary tablespace.

In addition, the traditional tablespace model used a database *sizing factor* to set the extent sizes for an Oracle Applications product's tables and indexes. The value of this factor was a percentage of the typical estimated growth rate for Applications database objects. The sizing factor affected only the size of subsequent extents, as determined by the NEXT database object creation parameter. Most objects were defined with small first extents and larger additional extents.

During installation, Rapid Install provides the option of distributing tablespaces across different disks, to reduce disk head contention and improve overall system performance. In addition to this, many production systems utilize sophisticated disk and volume management technologies at operating system level to further enhance performance.

Oracle Applications Tablespace Model

Oracle Applications Release 12 utilizes as standard a modern infrastructure for tablespace management, the *Oracle Applications Tablespace Model* (OATM). The Oracle Applications Tablespace Model is similar to the traditional model in retaining the system, undo, and temporary tablespaces. The key difference is that Applications products in an OATM environment share a much smaller number of tablespaces, rather than having their own dedicated tablespaces.

Applications schema objects are allocated to the shared tablespaces based on two main factors: the type of data they contain, and I/O characteristics such as size, life span, access methods, and locking granularity. For example, tables that contain *seed data* are allocated to a different tablespace from the tables that contain *transactional data*. In addition, while most indexes are held in the same tablespace as the base table, indexes on transaction tables are held in a single tablespace dedicated to such indexes.

The Oracle Applications Tablespace Model provides a variety of benefits, summarized in the list below and discussed in more detail later:

- Simplifies maintenance and recovery by using far fewer tablespaces than the older model.
- Makes best use of the restricted number of raw devices available in Oracle Real Applications Cluster (Oracle RAC) and other environments, where every tablespace requires its own raw device.
- Utilizes locally managed tablespaces, enabling more precise control over unused space and hence reducing fragmentation.
- Takes advantage of automatic segment space management, eliminating the need for manual space management tasks.
- Increases block-packing compared to the older model, reducing the overall number of buffer gets and improving runtime performance.
- Maximizes usefulness of wide disk stripe configurations.

The Oracle Applications Tablespace Model uses *locally managed tablespaces*, which enables extent sizes either to be determined automatically (*autoallocate*), or for all extents to be made the same, user-specified size (*uniform*). This choice of extent management types means that locally managed tablespaces offer greater flexibility than the *dictionary-managed tablespaces*used in the traditional tablespace model. However, when using uniform extents with locally managed tablespaces, the extent size must be chosen with care: too small a size can have an adverse effect on space management and performance.

A further benefit of locally managed tablespaces, and hence use of OATM, is the introduction of *automatic segment space management*, a simpler and more efficient way of managing space within a segment. It can require more space, but eliminates the need for traditional manual segment space management tasks such as specifying and tuning schema object storage parameters such as PCTUSED. This and related storage parameters are only used to determine space allocation for objects in dictionary-managed tablespaces, and have no meaning in the context of locally managed tablespaces.

Automatic segment space management is self-tuning, so can take into account an increase in the number of users. A further benefit in Oracle Real Applications Cluster (Oracle RAC) environments is *dynamic affinity of space to instances*, which avoids the hard partitioning of space inherent with the traditional use of free list groups.

Table 3-1 OATM Tablespace Types and Contents

Tablespace Type	Tablespace Contents
Transaction Tables	Tables that contain transactional data.
Transaction Indexes	Indexes on transaction tables.
Reference	Reference and setup data and indexes.
Interface	Interface and temporary data and indexes.
Summary	Summary management objects, such as materialized views, and other objects that record summary information.
Nologging	Materialized views that are not used for summary management and temporary objects.
Advanced Queueing	Advanced Queuing (AQ) tables and indexes.
Media	Multimedia objects, such as text, video, sound, graphics, and spatial data.
Archive	Tables that contain archived purge-related data.
Undo	Automatic Undo Management (AUM) tablespace. Undo segments are equivalent to rollback segments when AUM is enabled. See note below.
Temp	Temporary tablespace for global temporary table, sorts, and hash joins.
System	System tablespace used by the Oracle database.

In Oracle database server releases prior to Oracle9*i*, undo space management was performed using rollback segments. For clarity, this method is now referred to as *manual undo management*. Its successor, *automatic undo management*is based on the use of a small number of *undo tablespaces*, in contrast to the larger number of variously-sized rollback segments typically used in manual undo management.

4

Database Features

Introduction

Many features in Oracle E-Business Suite Release 12 are built on the advanced capabilities of the underlying Oracle database technology. Release 12 utilizes various Oracle database features to optimize performance and scalability.

Monitoring Features

Oracle Database 10g Release 2, the version used by Release 12 of Oracle Applications, includes a number of sophisticated features that enable you to track the performance of your database, and if necessary take the appropriate corrective action.

> **Note:** For further details of the capabilities and usage of the tools described, see *Oracle Database Performance Tuning Guide 10g Release 2*.

Automatic Workload Repository (AWR)

The *Automatic Workload Repository* is a repository of database performance statistics built in to every Oracle 10g Release 2 database. AWR automatically generates snapshots of performance data at regular intervals (typically, once an hour) and collects the statistics for use in problem detection and tuning. The gathered data can be displayed in both reports and views.

You can access AWR through Oracle Enterprise Manager Database Control, managing snapshots or modifying settings in order to create baselines that capture typical performance periods. The baselines can be used for comparisons with similar workload periods where performance problems have been reported.

Automatic Database Diagnostic Monitor (ADDM)

The *Automatic Database Diagnostic Monitor* is a tool that allows an Oracle database to diagnose its performance, and determine how identified problems could be resolved.

ADDM analyzes the AWR data on a regular basis, locating the root causes of performance problems and providing recommendations for correcting them. Because AWR is a repository of historical performance data, ADDM can be used to analyze performance issues *after* the event, saving time and resources in reproducing a problem (which may not even be possible).

Automatic database diagnostic monitoring is enabled by default, and its primary interface is Oracle Enterprise Manager Database Control.

Active Session History (ASH)

Active Session History is a means by which a detailed history of database activity is captured and stored. Only active sessions are captured, so the amount of data recorded is directly related to the work being performed. The V$ACTIVE_SESSION_HISTORY view records current sampled session activity.

Unlike the instance-level statistics gathered by AWR, ASH gathers data at the session level. You can run ASH reports to analyze transient performance problems with the database that may only occur during specific times. For example, ASH can often be used to identify short-duration problems (perhaps lasting only a couple of minutes) that would represent too small a proportion of an ADDM analysis period to show up.

Performance Features

Database performance features include optimization, resource usage, space management, and access rights.

Query Optimization

The SQL used in Release 12 has been extensively tuned for *cost-based optimization*. In calculating the lowest cost (most efficient) method of executing an SQL statement, the Oracle query optimizer evaluates many factors to calculate the most efficient way to execute a SQL statement. For example, the optimizer considers the available access paths, factoring in statistical information for the tables and indexes that the SQL statement will access. The optimizer also considers *hints*, which are optimization suggestions placed in a comment of the SQL statement.

As part of its operation, the optimizer creates a set of potential execution plans for the SQL statement, based on the available access paths and any hints. It then estimates the *cost* of each execution plan, based on data dictionary statistics for the data distribution and storage characteristics of the tables, indexes, and partitions. Finally, the optimizer compares the costs of the execution plans and chooses the one with the smallest cost, which means optimum execution characteristics.

For some operations, such as batch processing, Release 12 uses cost-based optimization to achieve the most efficient means of processing *all rows* that are accessed by the statement. For other operations, such as accessing forms or communication with the desktop client, Release 12 uses cost-based optimization to achieve the best response time for processing the *first rows* that are accessed by the statement.

Several other Oracle database performance features used in Release 12, such as partitioned tables, also require use of the cost-based query optimizer.

> **Note:** For further details of optimization, see: *Oracle Database Concepts 10g Release 2 (10.2)* and *Oracle10g Release 2 Database Performance Tuning Guide*.

Database Resource Manager

The gives the system administrator extensive control over processing resources on the database node. The administrator can distribute server CPU based on business rules, ensuring that the highest priority activities always have sufficient CPU resources. The administrator could, for example, guarantee Order Entry users 40% of CPU resources during business hours, regardless of the load or number of users in other groups on the system.

System administrators can also use the Database Resource Manager to limit the impact of any inefficient ad hoc queries. For example, a limit of 5% of CPU resources could be placed on ad hoc queries against the database.

> **Note:** For further details, see *Oracle Database Concepts 10g Release 2 (10.2)* and *Oracle Database Administrator's Guide 10g Release 2 (10.2)*

Partitioned Tables

Partitioning helps support very large tables and indexes by dividing them into smaller, more manageable pieces called *partitions*. Once the desired partitions have been defined, SQL statements can access them instead of the original tables or indexes.

> **Note:** Custom partitioning of standard Applications tables in Release 12 is fully supported.

Partitioning reduces access time, and partitions are especially useful in data warehouse applications, which often store and analyze large amounts of historical data. For example, operations that involve copying or deleting data are improved by use of partitioned tables. Creating and deleting all rows of a partitioned table is a much faster operation than selectively inserting rows into an existing table, then selectively deleting rows from the table. Some operations that might have taken hours can now be completed in seconds.

Most Applications tables do not have a natural partitioning key that would apply to all installations, because of differences in data distribution and access paths in different implementations. Tables should therefore be partitioned in a logical manner, to meet your specific requirements. For example, *period_name* and *ledger_id* are likely candidates for partitioning the GL_BALANCES table.

Important: Custom partitioning should be planned carefully. After it has been implemented, you should test that the desired performance benefits have been achieved; it is possible for performance to be degraded if partitioning is not planned properly.

Scalability Features

As well as providing more computing power, multi-node systems facilitate the addition of machines to meet increases in demand. They also provide resilience in the event of failures of individual components.

Oracle Real Application Clusters

Oracle Real Application Clusters (Oracle RAC) harness the processing power of multiple interconnected computers. Oracle RAC software called *Oracle Clusterware* and a collection of computers (known as a *cluster*) harness the processing power of each component to create a robust and powerful computing environment. A large task divided into subtasks and distributed among multiple nodes is completed more quickly and efficiently than if the entire task was processed on one node. Cluster processing also facilitates deployment of additional hardware resources for larger workloads and rapidly growing user populations.

In Oracle RAC environments, all active instances can concurrently execute transactions against a shared database. Oracle RAC coordinates each instance's access to the shared data, to provide data consistency and data integrity. From a developer's point of view, Oracle RAC enables applications to be scaled to meet increasing data processing demands, without the need to change the application code.

All E-Business Suite modules can be successfully deployed against a Oracle RAC-enabled database. Using Parallel Concurrent Processing (see Chapter 1), concurrent managers on separate application tier machines can be configured to direct requests to different database servers in an Oracle RAC cluster.

Automatic Storage Management

Automatic Storage Management (ASM) provides a file system and volume manager dedicated to the storage of Oracle database files. It extends the concepts of disk striping and mirroring, to optimize performance and remove the need for manual I/O tuning.

Note: For further details of scalability options, see Oracle*MetaLink* Note 388577.1,*Oracle E-Business Suite Release 12 with 10g Release 2 Real Application Clusters and Automatic Storage Management*.

Business Intelligence Features

To meet the increasing demand for up-to-date details of business activities, Oracle Applications utilizes Oracle database features that help to optimize the types of query typically required in such environments.

Materialized Views

Materialized views are schema objects that can be used to summarize, precompute, replicate, and distribute data. They can markedly increase the speed of queries on very large databases when used to precompute and store aggregated data such as sums and averages. Materialized views can therefore improve performance of Oracle Applications products, such as Daily Business Intelligence, that perform many queries on summary data.

Query optimization can use materialized views to improve query performance by automatically recognizing when one can be used to satisfy a request. The optimizer transparently rewrites the request to use the materialized view. Queries are then directed to the materialized view, and not to the underlying detail tables or views.

In distributed environments, materialized views can be used to replicate data at remote sites, providing local access to data that would otherwise have to be accessed from the main site, with any network delays this might introduce.

5

AutoConfig

Introduction

Configuring a new installation of Oracle Applications includes a number of stages:

- Collection of information required to create the desired configuration
- Storage of configuration information in the correct locations on the relevant machines
- Creation of technology stack configuration files with the appropriate details
- Creation of Applications configuration files with the appropriate details
- Starting of all required processes in the correct order

AutoConfig is a tool that simplifies and standardizes configuration management tasks in an Oracle Applications environment. A fresh install of Release 12 includes AutoConfig as a standard (and required) configuration management tool. AutoConfig can also be used with earlier releases of Oracle Applications.

The Applications Context

Where the *System Identifier* (SID) has traditionally been used to identify a file as belonging to a particular Oracle Applications environment, an *Applications context* is used in an AutoConfig-managed Applications environment such as E-Business Suite Release 12. The default *context name*, also referred to in this chapter as <*CONTEXT_NAME*>, is <*SID*>_<*hostname*>.

Using an Applications context has a number of advantages:

- Simplifies overall management of an Applications system
- Allows easier startup and shutdown of Applications services

- Permits services to be installed or deinstalled independently of others
- Integrates seamlessly with a shared application tier file system (see Chapter 9)
- Enables use of Oracle Applications Manager for configuration management (see Chapter 7)
- Facilitates support for Real Application Clusters (see Chapter 4)

Before the Applications context and AutoConfig were introduced, configuration management tasks could be time-consuming and prone to error, in some cases requiring manual changes to be made to several configuration files. While individual configuration files are still used in an AutoConfig-enabled environment, they play a secondary role to an XML-based repository of Applications environment information, called the *context file*.

By centralizing the configuration information, AutoConfig simplifies procedures for activities that range from upgrading a technology stack component to starting and stopping Applications services. Another benefit is that the various files AutoConfig employs can be updated via standard Applications patches.

There are separate context files for the application and database tiers of an Applications system.

Applications Context File - The Applications context file, <INST_TOP>/appl/admin/<CONTEXT_NAME>.xml, is a repository for environment-specific details used by AutoConfig to configure the application tier. Information from this file is used to generate Applications configuration files and update relevant database profiles.

Information stored includes:

- Name and location of the database
- Port numbers for Forms and Web services
- Product-specific port numbers
- Information about application tier services controlled by AutoConfig

The values of the *context variables* that make up the context file are in part determined by the choices you make when you run Rapid Install. For example, when you specify that a particular application tier node is to be used as a concurrent processing server, the relevant variable will be set to execute the scripts that start the service.

Database Context File - The database context file, <RDBMS_ORACLE_HOME>/appsutil/<CONTEXT_NAME>.xml, performs an equivalent role on the database tier. Information from this file is used to generate configuration files used on the database tier when AutoConfig is next run.

AutoConfig Scripts and Directories

A number of key configuration and control scripts are employed in an AutoConfig environment. AutoConfig creates several directories for these scripts and their associated files.

AutoConfig Scripts

Key AutoConfig configuration scripts on UNIX (command files on Windows) include:

- **adautocfg.sh** - Wrapper script that passes the name of the specific environment context file to adconfig.sh. Located in <INST_TOP>/admin/scripts on the application tier, and <RDBMS_ORACLE_HOME>/appsutil/scripts/<CONTEXT_NAME> on the database tier.

- **adconfig.sh** - Invoked by `adautocfg.sh`, this script is a wrapper for adconfig.pl. Located in <AD_TOP>/bin on the application tier, and <RDBMS_ORACLE_HOME>/appsutil/bin on the database tier.

- **adconfig.pl** - Invoked by `adconfig.sh`, this Perl script calls the Java API to carry out the actual configuration tasks. Located in <AD_TOP>/bin on the application tier, and <RDBMS_ORACLE_HOME>/appsutil/bin on the databccase tier.

In addition to these configuration scripts, several additional AutoConfig scripts are used to help manage the Applications system. These are described later in this chapcter, under *Management Tasks*.

AutoConfig Directories

Several directories are created by AutoConfig, as shown in the following table.

Table 5-1 AutoConfig Directories

Directory Name	**Directory Contents**
<INST_TOP>/admin/install	Install scripts
<INST_TOP>/admin/scripts	Control scripts
<INST_TOP>/admin/log	Log files

AutoConfig Operation

As AutoConfig is used for a wide range of system configuration activities, from installation to maintenance, the following discussion of its operations is divided into several sections.

Context Value Management

Context Value Management (CVM) is an AutoConfig component that is used to manage the values of variables in the context file, and automate required updates to it. CVM supports updates to both the application tier and database tier context files.

CVM actions include:

- Adding new variables to a context file
- Updating values of variables in an existing context file
- Applying new versions of context file templates
- Executing scripts or configuration tools that must complete before the AutoConfig engine starts, for example when generating the tnsnames.ora file

CVM is activated when the Applications context file is updated, but before the AutoConfig engine itself starts. This enables CVM to execute scripts or other tools to manipulate any required file on the file system, and allow the appropriate settings to be propagated as needed to both the file system and database. For example, it is possible to update values in the context file which will then be propagated to the file system.

> **Note:** AutoConfig does not undertake all aspects of configuration management, such as operations at operating system level that may have implications outside the context of Oracle E-Business Suite.

Like the core AutoConfig components, CVM utilizes configuration files on both the application and database tiers, as shown in the following tables.

Table 5-2 Application Tier CVM Files

File Location	Description
<AD_TOP>/bin/adcvm.sh	Main CVM script
<AD_TcOP>/admin/template/adcvmat.xml	Stores CVM-related data for the application tier

Table 5-3 Database Tier CVM Files

File Location	Description
<RDBMS_ORACLE_HOME>/appsutil/bin/adcvm.sh	Main CVM script
<RDBMS_ORACLE_HOME>/appsutil/template/adcvmdb.xml	Stores CVM-related data for the database tier

AutoConfig Files

As well as the context files and configuration scripts that have already been described, AutoConfig uses several other types of file in its configuration management activities. These may themselves be divided into different categories.

Template Files

AutoConfig template files are used as the starting point for creating site-specific configuration files. AutoConfig evaluates the context variables in a template file, determines the actual values required, and creates a configuration file with these values substituted. This process, described in more detail later in this chapter, is called *instantiation*. There is one template file for each configuration file. Template files are located in the various <PROD_TOP>/admin/template directories on the application tier, and in the <RDBMS_ORACLE_HOME>/appsutil/template directory on the database tier.

Template files used by AutoConfig can be divided into the following categories:

Templates for APPL_TOP Configuration Files - These are either files requiring configuration-specific information in the APPL_TOP, or files used to load configuration profiles into the Applications database.

Templates for Management Scripts - To run all the standard processes required by Applications, Rapid Install creates scripts to start and stop each of these required processes. These scripts need configuration information in order to:

- Create the correct environments for each process
- Start the processes with the correct parameters
- Point the processes at the correct database instance (if applicable)

Driver Files

AutoConfig driver files are used to list the corresponding template files and locations, and specify the commands to be executed. For example, the commands might update profile options.

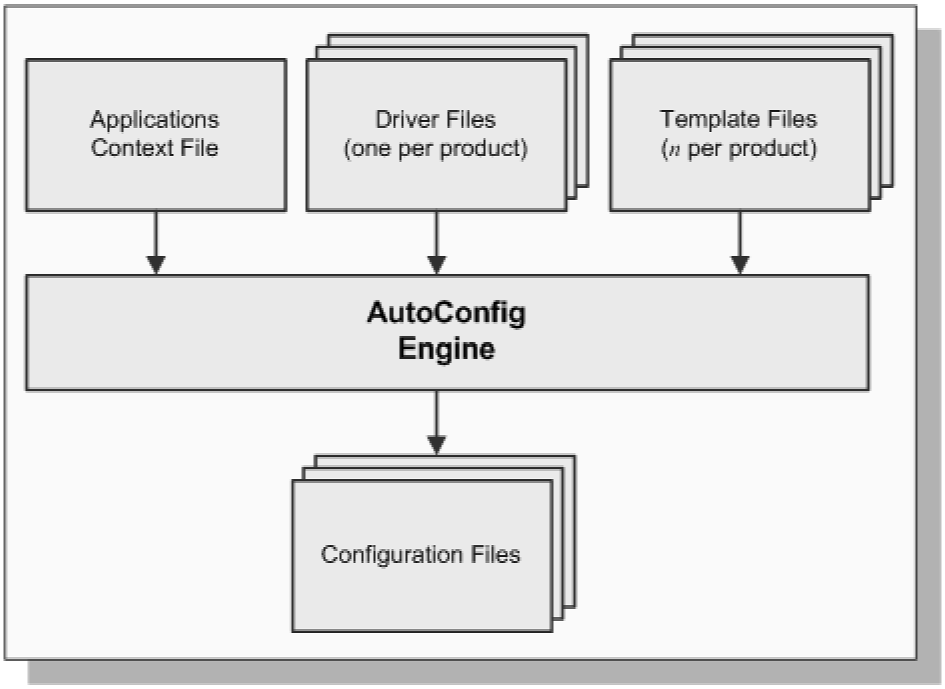
Driver files are located in each <PROD>_TOP/admin/driver directory on the application tier, and in the <RDBMS_ORACLE_HOME>/appsutil/template directory on the database tier.

Configuration Files

AutoConfig configuration files, such as *httpd.conf*, are created as a result of AutoConfig instantiating the corresponding template files. Configuration files contain values corresponding to the settings specified for a particular site. After AutoConfig has been run, numerous configuration files will have been created in various directories.

Figure 5-1 illustrates the relationship between the different types of file AutoConfig uses.

Figure 5-1 Relationship Between AutoConfig Files


Applications Context File
Driver Files (one per product)
Template Files (*n* per product)
AutoConfig Engine
Configuration Files

Instantiation

As mentioned earlier, instantiation is the process whereby AutoConfig creates a configuration file with contents tailored for a specific environment. AutoConfig can be used to instantiate files or scripts, and then execute them for installation and configuration.

Examples of instantiation include:

- Instantiation of a configuration file to be used at runtime
- Instantiation of an SQL script to set profile options
- Instantiation of a shell script or Windows command file to run an SQL script in

SQL*Plus

- Instantiation of scripts to start up and shut down application tier services

The *adautocfg.sh* script updates configuration files and profile options in the following way:

1. Instantiates template files with instance-specific values derived from the relevant context file

2. Copies in any customizations

3. Overwrites existing configuration files with newly instantiated ones

4. Runs SQL scripts to update database profile options

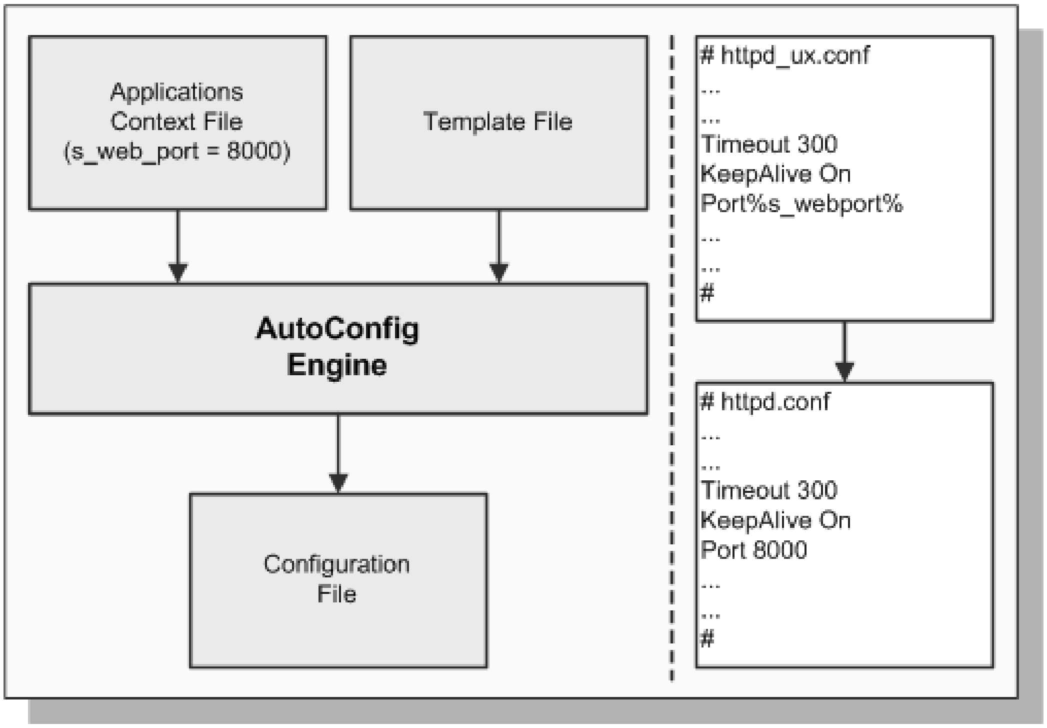
Role of the template and driver files

AutoConfig uses the various *template* files to determine the basic settings needed. There is one template file for each configuration file. Different versions of the template files exist for UNIX (for example `httpd_ux.conf`), and Windows (for example `httpd_nt.conf`).

The *driver* files list the names and locations of the files that need to have context variables replaced. They also define the phases into which instantiation is divided, and specify the commands that are to be executed for specific products. When AutoConfig runs, it cycles through the various <PROD>_TOP/admin/driver directories looking for driver files such as adtmpl.drv, fndtmpl.drv, and icxtmpl.drv.

Figure 5-2 illustrates the instantiation mechanism used by AutoConfig to create the various configuration files.

Figure 5-2 AutoConfig Instantiation Mechanism



Note: For further details of AutoConfig operation, see Oracle*MetaLink* Note 387859.1, *Using AutoConfig to Manage System Configurations with Oracle E-Business Suite Release 12*.

Execution of Scripts

As well as its instantiation activities, AutoConfig may execute other scripts, depending on the requirements of the specific Applications system.

Phases of Operation

As AutoConfig parses the driver files, it carries out a series of actions, grouped into several distinct phases:

- **INSTE8** - Instantiates AutoConfig template files to the AutoConfig configuration files specified in the relevant template driver files.
- **INSTE8_SETUP** - Executes setup scripts that carry out activities not involving connection to the database.
- **INSTE8_PRF** - Executes setup scripts that update profile options.

- **INSTE8_APPLY** - Executes setup scripts that carry out activities involving updates to the database.

- **BINCPY** - Copies the file mentioned from the source file to the configuration file, creating parent directories for the latter if necessary. AutoConfig will report an error if the source file cannot be found.

- **BINCPY_IGERR** - Copies the file mentioned from the source file to the configuration file, creating parent directories for the latter if necessary. AutoConfig will *not* report an error if the source file cannot be found.

AutoConfig carries out these actions in the following order:

1. **All INSTE8 and BINCPY actions** - Carries out all file instantiations called for during INSTE8, INSTE8_SETUP, INSTE8_PRF and INSTE8_APPLY, and all copying from source files to target configuration files.

2. **INSTE8_SETUP actions** - For the files that were instantiated in Step 1, AutoConfig runs all SETUP scripts.

3. **INSTE8_PRF actions** - For the files that were instantiated in Step 1, AutoConfig runs all PRF scripts.

4. **INSTE8_APPLY actions** - For the files that were instantiated in Step 1, AutoConfig runs all APPLY scripts.

At the end of this process, the required configuration files and profile options have been created for the E-Business Suite installation.

Management Tasks

There are several areas in which an administrator can use AutoConfig to update, control, and monitor an Applications system. While many tasks will normally be undertaken from Oracle Applications Manager, you may on occasion need to run a script (command file on Windows) from the command line.

Managing the Context

Oracle Applications Manager (see Chapter 7) enables you to edit the Applications context as required. From the Administration tab, choose AutoConfig and click on *Edit Parameters* for the relevant context file. After making a change to the context, you must run AutoConfig to update the relevant configuration files. Before doing so, you should examine the proposed changes by running the `adchkcfg.sh` configuration check script (described below under *Checking the System*).

> **Warning:** Do not edit E-Business Suite configuration files manually. Any changes will be lost when AutoConfig is next run.

An AutoConfig-managed environment such as Release 12 will also be updated by applying an Applications patch that adds or modifies variables in the Applications context file, AutoConfig template files, or AutoConfig driver files.

On occasion, you may need to undo configuration changes that have been made. The previous configuration can be restored by running the `restore.sh` utility, which enables you to roll back the changes made by an AutoConfig run. This is achieved by utilizing the backup copies of the configuration files that are created when AutoConfig is run.

The backup files are located in <INST_TOP>/admin/out/<MMDDhhmm> on the application tier, and <RDBMS_ORACLE_HOME>/appsutil/out/<CONTEXT_NAME><MMDDhhmm> on the database tier, where the <MMDDhhmm> directory name indicates the month, day, hour and minute of the AutoConfig run.

You can restore the configuration that existed immediately before the current one by navigating to the appropriate backup directory and running the `restore.sh` script. To restore an earlier configuration, you must use the *Context File History* feature of Oracle Applications Manager.

Controlling the System

AutoConfig utilizes a number of application tier control scripts, located in <INST_TOP>/admin/scripts.

Table 5-4 Key Application Tier Control Scripts

Script Name	Function
adstrtal.sh	Starts all application tier server processes
adstpall.sh	Stops all application tier server processes
adautocfg.sh	Runs AutoConfig

The corresponding directory on the database tier is <RDBMS_ORACLE_HOME>/appsutil/scripts/<CONTEXT_NAME>, where control scripts allow the database and database listener processes to be started and stopped, and AutoConfig to be run.

Checking the System

Several other scripts facilitate system management in an AutoConfig-managed environment such as Release 12. For example, you can identify the effects of proposed changes.

Examining changes

`adchkcfg.sh` is located in <AD_TOP>/bin on the application tier, and in <RDBMS_ORACLE_HOME>/appsutil/bin on the database tier.

This utility generates a report that highlights differences between existing configuration files and the new ones that AutoConfig will generate. The report is called `cfgcheck.html`.

Running `adchkcfg.sh` is useful both in carrying out a test run before a planned environment change is made, and when investigating problems.

> **Note:** For further details on managing system configuration parameters, see *Oracle Applications Maintenance Procedures*.

6

Cloning

Introduction

Cloning is the act of creating an identical copy of an existing Oracle E-Business Suite system. The system to be cloned is referred to as the *source system*, and the newly created system is referred to as the *target system*.

Cloning has various uses, such as:

- Creating a copy of a production system for patch testing
- Creating a staging area to reduce the downtime required for patching
- Refreshing a test system from a production system
- Moving an existing system to a different machine or platform

Simply copying the existing components to a new location will not provide a working Applications installation. For example, there are numerous configuration files in the file system that must be modified, depending on the physical configuration of the target environment. In addition, the Applications installation process utilizes the *Oracle Universal Installer*, which maintains key information about the installation. Copying the installation to a new location would invalidate this information, preventing the application of patches to components maintained by the Installer.

Cloning Tools

Cloning an Oracle E-Business Suite Release 12 system can be accomplished by running the *Rapid Clone* tool. This tool can be employed with Oracle E-Business Suite Release 12, or any AutoConfig-enabled earlier releases.

Alternatively, you can license *Oracle Application Management Pack for Oracle E-Business Suite*, which extends Enterprise Manager 10g Grid Control to help monitor and manage an Oracle E-Business Suite system. The pack integrates Oracle Applications Manager with Grid Control to provide a consolidated E-Business Suite management solution.

> **Note:** See Chapter 7 for further details of cloning features and options.

Cloning Across Platforms

When cloning from one machine to another, the simplest case is where the two machines are running the same version of the same operating system.

A slightly more complex case occurs where the two operating systems are binary compatible, and the source system is running an earlier version of the same operating system that is being used on the target system. While Rapid Clone can often be used successfully in such cases, you should generally aim to clone between machines that are running identical versions of an operating system. This minimizes the risk of problems arising because of differences between the versions.

> **Warning:** It is not supported to clone from a later version of an operating system to an earlier one.

Cloning Options

The following list summarizes the cloning options currently available with Rapid Clone.

> **Note:** In this context, *node* refers to a logical collection of E-Business Suite processes, and not necessarily a physical machine.

- Single node to Single node
- Recloning (of database only)[1]
- Clone existing Clone [2]
- Multi-node to Multi-node
- Single node to Multi-node [3]
- Multi-node to Single node [4]

Footnotes on List

1. Recloning of the database only can be useful if the source system has changed, and the target system needs to be updated with these changes. However, if any Applications patches have been applied to the source system, the rest of the components (APPL_TOP, COMMON_TOP and ORACLE_HOMEs) must also be

cloned, in order to keep the file system and database synchronized.

2. A cloned system created with Rapid Clone can be used as the source system for another round of cloning.

3. If moving to a multi-node system, it is preferable to implement a shared APPL_TOP rather than clone from a single node to multiple nodes. See Chapter 9 for details.

4. This procedure is often referred to as merging APPL_TOPs.

> **Note:** For further details of cloning options, see *Oracle Applications Maintenance Procedures*.

Rapid Clone Operation

Rapid Clone does not modify the source system. The `adpreclone.pl` script prepares the source system to be cloned by collecting information about the database, and creating generic templates from existing files that contain source-specific hard-coded values. The template files are located in <RDBMS_ORACLE_HOME>/appsutil/template on the database tier.

> **Important:** Rapid Clone requires all the expected binary files to be in place on the source system, and may fail to operate correctly if any are missing.

After running `adpreclone.pl`, you copy the relevant files and directories from the source system files to the target system, and then run the `adcfgclone.pl` configuration script. The values for various parameters are required to create the context file that will be used to configure the target system. A few of these values are calculated from the current target system, and `adcfgclone.pl` will prompt for the others.

For example, you will be prompted to specify a *port pool*, to use a particular range of predefined server ports. There are 100 port pools, so if, for example, you select pool port 3, the default database port number (1521) is replaced by 1524.

> **Note:** If you are cloning to the same machine, you must specify a different port pool from the source system.

If desired, it is possible to set a specific port to a value other than the one assigned from the port pool. This requires editing the context file on the target system after `adcfgclone.pl` completes, then running AutoConfig to update the system with the new value.

Rapid Clone and Oracle Universal Installer

The Oracle Universal Installer's *global inventory* is simply a list of pointers to each *local inventory* location. There is one local inventory per ORACLE_HOME, located in <ORACLE_HOME>/inventory, which contains all the patch information for the ORACLE_HOME in question.

Rapid Clone first ensures that the source system local inventory is in XML format, converting it from the older binary format if necessary. The local inventory (inside the ORACLE_HOME to be cloned) is then copied to the target system and reconfigured with the new values for the target system. Rapid Clone subsequently attaches the reconfigured local inventory to the target system global inventory. If the target system does not have a global inventory, a new global inventory is created when Rapid Clone goes to attach the local inventory.

Additional Cloning Features

Several features are designed to make cloning more straightforward, and give greater flexibility in response to issues such as:

- Whether cloning is being used to add a node to an existing installation, or to create an entirely new installation. In the former case, there will be fewer ancillary changes.

- Types of table modification that need to take place. For example, when using Rapid Clone to add a node, a new row is inserted into FND_NODES, whereas when creating a new installation, FND_NODES is purged and a completely new set of rows inserted.

- Whether services should be set to start automatically after cloning is complete.

- Whether any data alteration is needed after cloning.

Summary

In essence, Rapid Clone does the following on the target system.

Database tier:

- Creates the Database context file

- Registers the ORACLE_HOME in the Global Inventory

- Relinks the ORACLE_HOME

- Configures the ORACLE_HOME

- Recreates the database control files

- Starts the database
- Configures the database
- Starts the database listener

Application tier:

- Creates the Applications context file
- Registers the OracleAS 10.1.2 and OracleAS 10.1.3 ORACLE_HOMEs in the Global Inventory
- Relinks the OracleAS ORACLE_HOMEs
- Configures the OracleAS ORACLE_HOMEs
- Configures the APPL_TOP
- Creates the INST_TOP
- Starts application tier server processes

In addition, there are a number of associated actions relating to the database.

> **Note:** For further details of Rapid Clone capabilities and operation, see Oracle *MetaLink* Note 406982.1, *Cloning Oracle Applications Release 12 with Rapid Clone*.

7

Oracle Applications Manager

Introduction

Oracle Applications Manager (OAM) is a powerful, easy to use tool that enables you to manage and monitor an Oracle Applications system from an HTML-based central control console. Among other E-Business Suite system management tasks, Oracle Applications Manager can help you to:

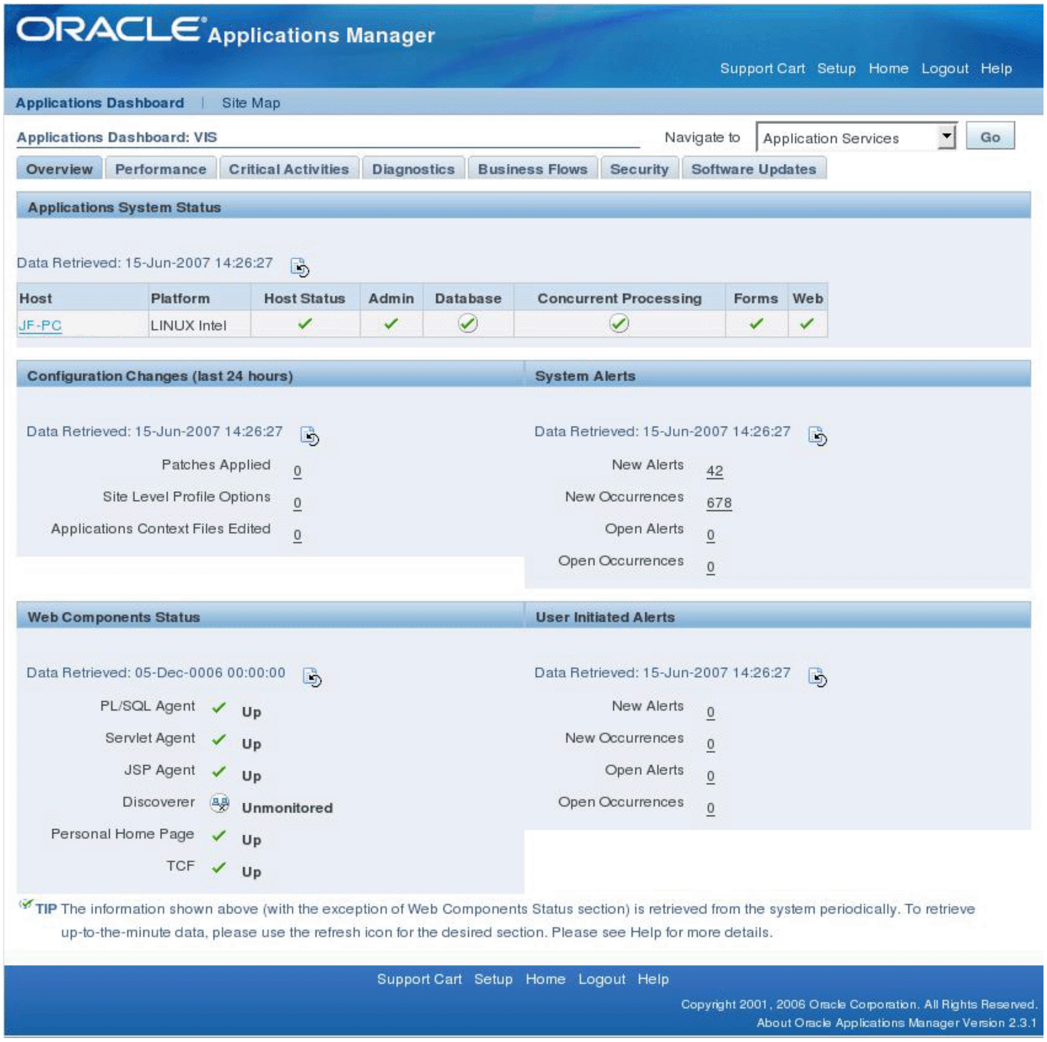
- Configure and administer your system
- Diagnose and correct problems
- Manage patches
- Monitor and tune performance
- Monitor system security

Oracle Applications Manager is built directly into the E-Business Suite system, and complements the features of the *Oracle Enterprise Manager* tool.

Oracle Applications Manager Features

The *Applications Dashboard* provides an overview of the key features of an E-Business Suite installation, including summaries of current status, performance, critical activities, diagnostics, business flows, and security. You can then view additional information on any of these areas.

Figure 7-1 Oracle Applications Manager Dashboard



ORACLE Applications Manager

Support Cart Setup Home Logout Help

Applications Dashboard | Site Map

Applications Dashboard: VIS

Navigate to: Application Services — Go

Overview | Performance | Critical Activities | Diagnostics | Business Flows | Security | Software Updates

Applications System Status

Data Retrieved: 15-Jun-2007 14:26:27

Host	Platform	Host Status	Admin	Database	Concurrent Processing	Forms	Web
JF-PC	LINUX Intel	✓	✓	✓	✓	✓	✓

Configuration Changes (last 24 hours)

Data Retrieved: 15-Jun-2007 14:26:27

Patches Applied	0
Site Level Profile Options	0
Applications Context Files Edited	0

System Alerts

Data Retrieved: 15-Jun-2007 14:26:27

New Alerts	42
New Occurrences	678
Open Alerts	0
Open Occurrences	0

Web Components Status

Data Retrieved: 05-Dec-0006 00:00:00

PL/SQL Agent	✓	Up
Servlet Agent	✓	Up
JSP Agent	✓	Up
Discoverer		Unmonitored
Personal Home Page	✓	Up
TCF	✓	Up

User Initiated Alerts

Data Retrieved: 15-Jun-2007 14:26:27

New Alerts	0
New Occurrences	0
Open Alerts	0
Open Occurrences	0

TIP The information shown above (with the exception of Web Components Status section) is retrieved from the system periodically. To retrieve up-to-the-minute data, please use the refresh icon for the desired section. Please see Help for more details.

Support Cart Setup Home Logout Help

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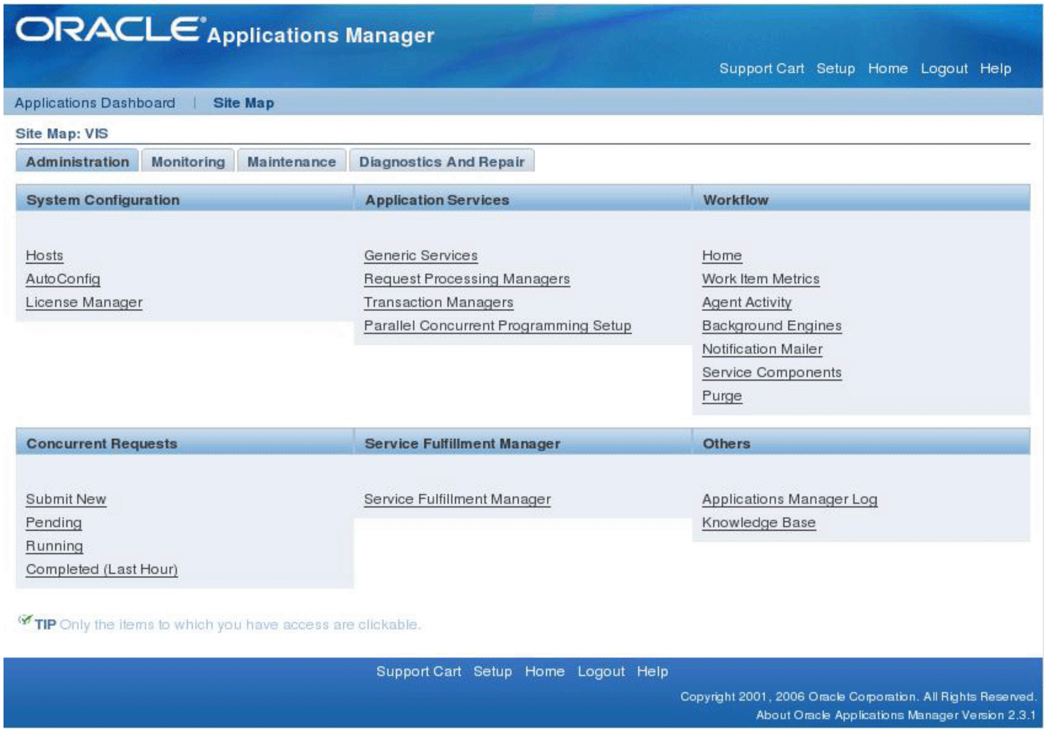
A more detailed view of the Applications system is offered by the *Site Map*, which provides easy access to the numerous features and options that exist in the areas of administration, monitoring, maintenance, and diagnostics and repair.

Administration

Oracle Applications Manager provides a comprehensive system configuration editor, for use in conjunction with the AutoConfig configuration management tool (see Chapter 5). Previous configuration settings can easily be compared with the current settings, allowing changed settings to be identified and rolled back as necessary.

Figure 7-2 Site Map - Administration



TIP Only the items to which you have access are clickable.

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About Oracle Applications Manager Version 2.3.1

Additionally, Oracle Applications Manager helps you track configuration changes, such as recently altered site-level profile option settings. It can also helps you detect potential configuration problems, such as database initialization parameters that do not meet Oracle requirements or recommendations. Oracle Applications Manager can be used to configure and control critical application tier services such as concurrent processing, Forms listeners, and Web servers. For example, you can monitor and administer concurrent requests, and easily analyze the concurrent request workload to make informed configuration changes for concurrent processing.

Oracle Applications Manager can also be used to control Oracle Workflow system services, such as background engines, notification mailers, agent listeners, and queue propagation. You can monitor and analyze Oracle Workflow system activity, suspend and resume processes, retry activities that end in error, and purge obsolete Workflow data.

The *License Manager* component of Oracle Applications Manager enables you to manage all aspects of licensing your products and related features. For example, you can obtain reports of currently licensed products, country-specific functionalities, and languages, as well as an overall licensing summary for your system You can also license additional products, country-specific functionalities, and languages.

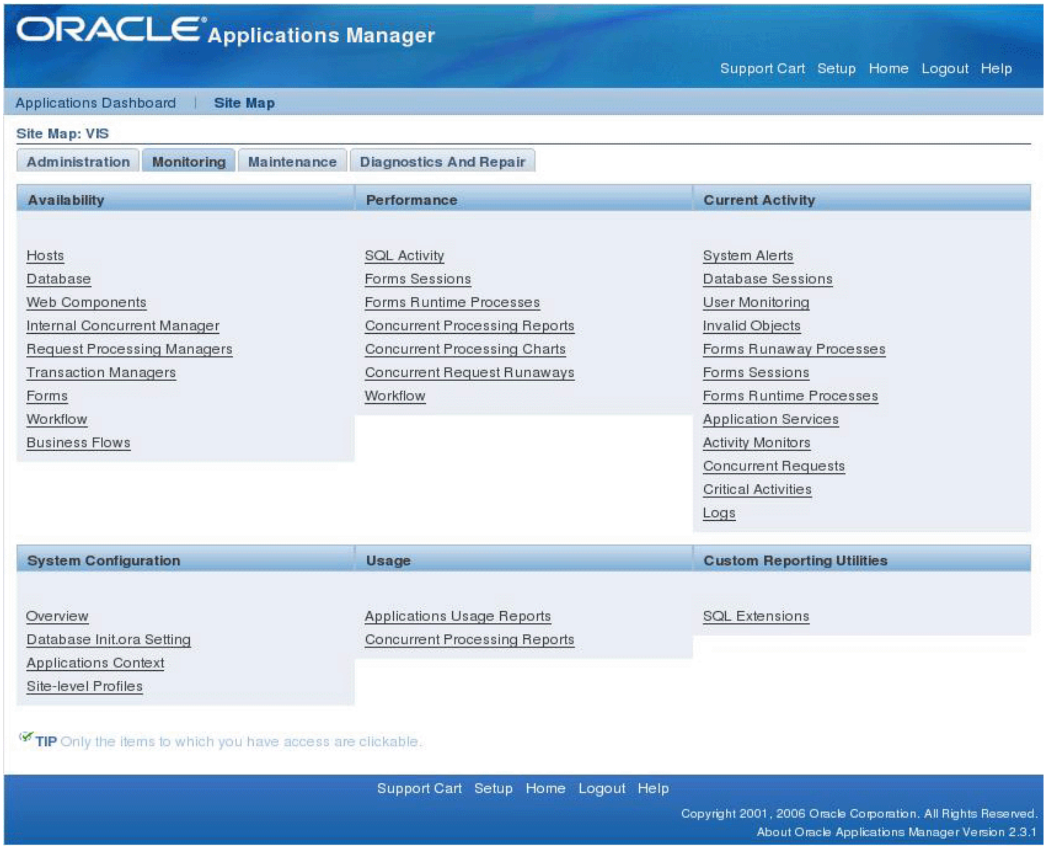
You can extend Oracle Applications Manager using your own custom SQL scripts. Not only can SQL scripts be organized and accessed from within the OAM console, but drilldowns can be enabled from script output to standard Oracle Applications Manager interfaces. For example, if you obtain concurrent request IDs from an SQL script, you can then drill down into the standard Oracle Applications Manager interface to obtain details of the concurrent requests.

Monitoring

Oracle Applications Manager provides extensive monitoring features for Oracle E-Business Suite. Charts and graphs provide high-level summaries, and you can drill down for more detailed information as required.

The Monitoring tab provides key performance metrics related to online, batch, and workflow activity. Additionally, system administrators can now subscribe to receive automated alerts when concurrent requests run longer or wait longer than specified thresholds.

Figure 7-3 Site Map - Monitoring



Applications Manager

Support Cart Setup Home Logout Help

Applications Dashboard | **Site Map**

Site Map: VIS

Administration | **Monitoring** | Maintenance | Diagnostics And Repair

Availability

Hosts
Database
Web Components
Internal Concurrent Manager
Request Processing Managers
Transaction Managers
Forms
Workflow
Business Flows

Performance

SQL Activity
Forms Sessions
Forms Runtime Processes
Concurrent Processing Reports
Concurrent Processing Charts
Concurrent Request Runaways
Workflow

Current Activity

System Alerts
Database Sessions
User Monitoring
Invalid Objects
Forms Runaway Processes
Forms Sessions
Forms Runtime Processes
Application Services
Activity Monitors
Concurrent Requests
Critical Activities
Logs

System Configuration

Overview
Database Init.ora Setting
Applications Context
Site-level Profiles

Usage

Applications Usage Reports
Concurrent Processing Reports

Custom Reporting Utilities

SQL Extensions

TIP Only the items to which you have access are clickable.

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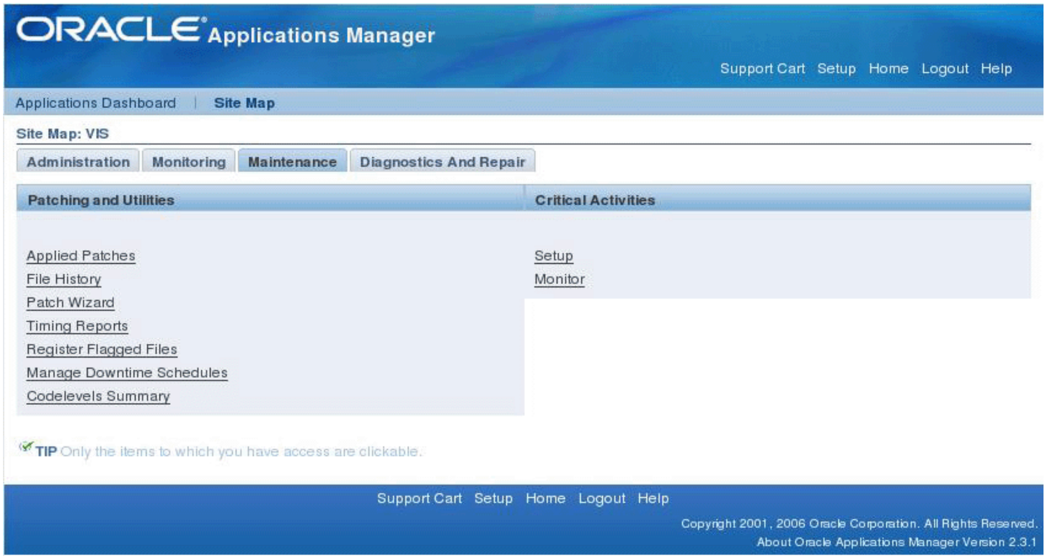
Monitoring support is provided for application tier services such as concurrent managers and Web services. For currently running processes such as forms or concurrent requests, you can examine both application tier and database session details, right down to the currently executing SQL.

OAM can alert you when certain errors occur within the E-Business Suite system, and will provide detailed context information to help in diagnosing those errors. Information from system components, including performance details, availability, configuration, diagnostic data, and security concerns can all be presented in the context of affected business flows, so that you can better understand any impact on your business.

Maintenance

You can easily determine which patches have been applied to a system, including the individual patches included in mini-packs, maintenance packs, and merged patches. Oracle Applications Manager also enables you to examine the patched files on a system, and identify all the patches that altered a given file. For each patch applied, you can see the actions taken by each patch driver.

Figure 7-4 Site Map - Maintenance



TIP Only the items to which you have access are clickable.

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The *Patch Wizard* tool built into Oracle Applications Manager can recommend patches for your Oracle Applications system. The wizard takes patch data downloaded from Oracle, analyzes that data against the Applications system, and recommends patches based on criteria you specify. The wizard can also analyze individual patches, identify any prerequisites missing on the system, and show the impact that the patches would have on the system in terms of affected applications, files, and other areas. Additionally, the wizard can download multiple patches from Oracle and merge them into a single patch.

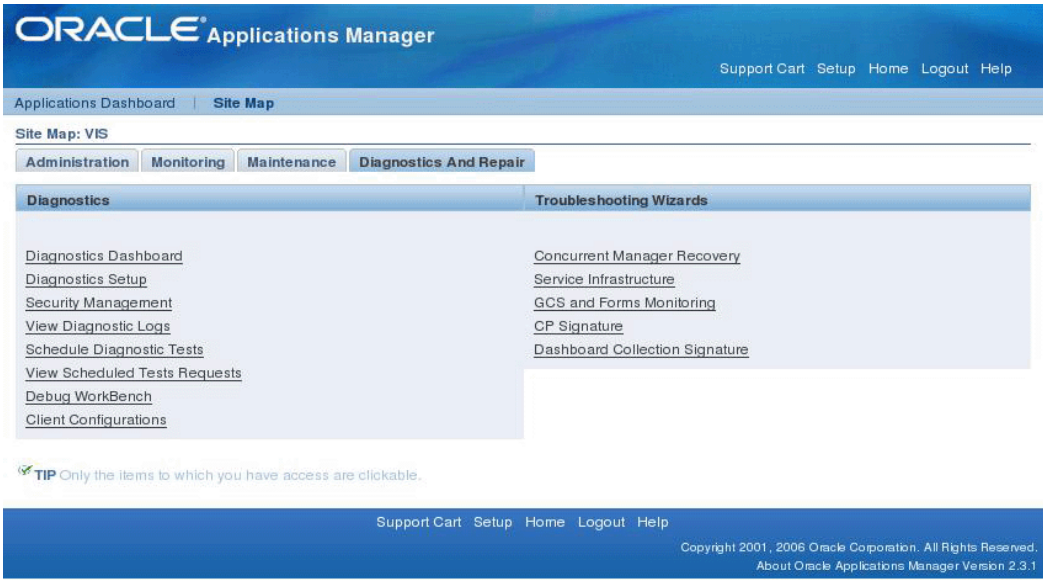
Administrators can use the *Manage Downtime* feature to schedule downtimes. When a downtime is scheduled, a message on the Home Page notifies users of the period when the system will not be available. The user has to log in, or return to the Home Page to see this message. If the downtime is in progress, an appropriate warning page will replace the login page.

During the scheduled downtime period, administrators with suitable database privileges are able to log into OAM to monitor the progress of AutoPatch and other Applications DBA utilities; access to other parts of the E-Business Suite is not allowed.

Diagnostics and Repair

Oracle Applications Manager for E-Business Suite Release 12 provides troubleshooting wizards that automate complex recovery steps. Tools such as Concurrent Manager Recovery help you diagnose problems and take corrective action from the same screen. The Service Infrastructure Troubleshooting Wizard ensures that the Generic Service Management (GSM) infrastructure is running normally, and if not, guides the administrator through the steps needed to bring GSM back up.

Figure 7-5 Site Map - Diagnostics and Repair



TIP Only the items to which you have access are clickable.

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About Oracle Applications Manager Version 2.3.1

The Applications Dashboard provides a gateway into Oracle Diagnostics for Oracle Applications, provides new graphical views of diagnostic test executions and failures, summarizing test results, and providing access to detailed test reports. Keyword searches can be performed on the test repository to locate relevant tests, which can then be grouped and executed directly from the same interface.

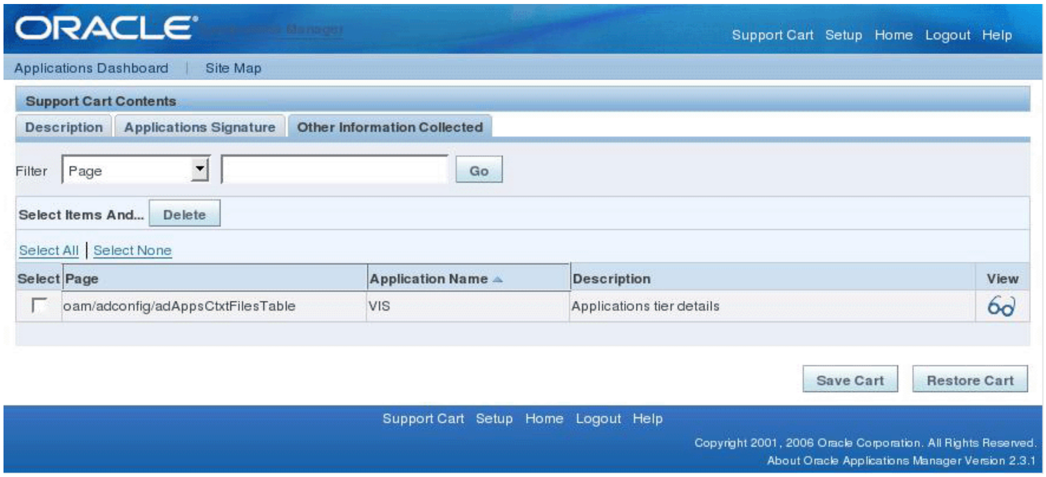
Additionally, system administrators can schedule and run diagnostics tests as batch programs, and output from all diagnostic interfaces can be captured and packaged for shipment to Oracle Support quickly and easily. Other features include provision for customers to download the latest diagnostics pack supplied by Oracle Support, and create their own diagnostic tests as required.

Finally, the system alerting infrastructure has been enhanced with a new flood control mechanism to prevent multiple instances of a given alert from overwhelming the alert system. Additionally, alerts have been enhanced to allow summary and context information to be retrieved in XML format via standard business event integration mechanisms.

Support Cart

The OAM *Support Cart* automates the collection of detailed node-specific information that can be sent to Oracle Support to assist with problem diagnosis.

Figure 7-6 Oracle Applications Manager Support Cart



Select	Page	Application Name	Description	View
□	oam/adconfig/adAppsCtxtFilesTable	VIS	Applications tier details	👓

The information collected includes details of products installed, patches applied, database version, current database parameters, and system topology. Other pages from OAM can be added to the Support Cart if desired.

Using Oracle Applications Manager with Grid Control

Oracle Applications Manager can be used in conjunction with *Oracle Enterprise Manager Grid Control* via the supporting *Application Management Pack for E-Business Suite*, to create a comprehensive, top-down approach to system monitoring and administration.

Application Management Pack for E-Business Suite supports the following features:

- **Automatic Discovery of Oracle Applications**: Grid Control has the capability to discover Oracle E-Business Suite systems automatically.

- **Configuration Management:** The Application Management Pack for Oracle E-Business Suite enables administrators to collect, compare, and search Oracle E-Business Suite configuration details

- **Oracle Applications Topology View**: Grid Control allows system to view the infrastructure service topology, showing the dependencies between infrastructure services, key system components, and other services. In the event of service failure, the potential causes are highlighted in the topology view.

- **Monitoring JVM Usage:** Grid Control monitors JVM usage by E-Business Suite, including JVMs deployed across multiple nodes.

- **Application Service Level Management:** Application Management Pack for E-Business Suite automatically provides service level reporting for the key Oracle E-Business Suite infrastructure and application services.

Generic Service Management

Traditionally, application tier processes such as Forms listeners, HTTP servers, and concurrent managers had to be started and monitored individually by system administrators, a time-consuming and potentially error-prone exercise. With the transition to web-based applications, the number of application tier processes required for Oracle's Applications products has increased significantly, with many Applications products making use of multiple application tier *services* to support one or more processes.

Service processes are similar to concurrent manager and transaction manager processes, and must be kept running on an application tier for the proper functioning of their associated products. Management of the services is complicated by the fact that they may be distributed across multiple host machines.

The *Generic Service Management* (GSM) feature simplifies management of these generic service processes, by providing a fault-tolerant framework with a central management console built into Oracle Applications Manager. With Generic Service Management, the Internal Concurrent Manager (ICM) manages the various service processes across multiple hosts. On each host, a *Service Manager* acts on behalf of the ICM, allowing the ICM to monitor and control service processes on that host.

System administrators can configure, monitor, and control services though Oracle Applications Manager, which communicates with the ICM. Generic Service Management provides a fault-tolerant system: if a service process exits unexpectedly, the ICM will automatically attempt to restart the process. If a host fails, the ICM may start the relevant service processes on a secondary host. The ICM itself is monitored and kept alive by Internal Monitor processes located on various hosts.

This new application tier service management infrastructure has several benefits:

- The service processes no longer need to be manually and individually started and monitored by Applications system administrators

- Administrators can configure and control the services through Oracle Applications Manager

- As with concurrent manager processes, system administrators can use work shifts to determine the number of processes that will be active for a service on a given node for a given time period

- Services can take advantage of the process distribution and fault tolerance capabilities that have been developed for concurrent processing

Generic Service Management is available out of the box with Oracle E-Business Suite Release 12, and can also be used with other AutoConfig-enabled releases.

8

Authentication and Integration

Introduction

The subject of authentication is a broad one, which covers a variety of technologies and components. This chapter provides a survey of the key architectural concepts and decisions involved in setting up the required level of authentication for an organization.

> **Note:** For a complete list of the relevant authentication and authorization documentation, see Oracle*MetaLink* Note 380482.1, *Oracle Application Server with Oracle E-Business Suite Release 12 Documentation Roadmap*.

Authentication of Oracle E-Business Suite users can be configured to be straightforward and out of the box, using the traditional FND_USER mechanism, or it can involve various additional features and levels of sophistication, such as single sign-on and use of optional products such as Oracle Portal and Oracle Discoverer. The system administrator can choose the optimal solution for an installation, taking into account factors such as simplicity of setup and maintenance, the possible need for a single point of access to enterprise-wide applications, and the ability to integrate with third-party user directories, as well as the overall security requirements of the organization.

Advanced features that are discussed briefly include the tasks involved in keeping user profile information automatically synchronized across an enterprise, and the steps needed to link an account in Oracle Internet Directory to multiple application accounts in Oracle E-Business Suite Release 12.

> **Important:** Use of the advanced authentication features described in this chapter, such as Single Sign-On, are optional with Oracle E-Business Suite Release 12. If you wish to use them, you must carry out the requisite additional setup procedures as noted later.

The solutions described here do not address the issue of *authorization*. After a user has been authenticated, Oracle E-Business Suite Release 12 retrieves the authorization information associated with the application account the user is logged into. Authorization information for application accounts is managed through Applications responsibilities. Oracle E-Business Suite Release 12 applies authorization checks as and when required during the user's session.

Oracle Application Server 10*g* Optional Components

Benefits of utilizing Oracle Application Server 10*g* optional components with Oracle E-Business Suite Release 12 include:

- Performance, scalability and high-availability via distributed architectures.
- The ability to connect a single Enterprise Portal to web providers running on multiple Release 12 instances.
- Uniform Single Sign-On support for all Release 12 Applications products.
- Bidirectional Oracle Internet Directory-to-FND_USER synchronization.
- Link-on-the-fly support for environments where the Single Sign-On userids in Oracle Internet Directory differ from the Release 12 userids.
- One-to-many support for environments where a Single Sign-On userid may be associated with one or more Release 12 userids.
- Bookmarkable URLs, where Applications Navigator Portlet will produce links that authenticate users and create Applications sessions as needed.
- Integration with third-party single sign-on services (e.g. Netegrity, Tivoli, Entrust) and *Lightweight Directory Access Protocol (LDAP)* V.3 directories such as SunONE/iPlanet and Microsoft Active Directory.

Support for more advanced deployment topologies is also available, including multi-node load balancing configurations, Oracle Real Application Clusters (Oracle RAC), and other distributed architectures.

> **Note:** For further details of additional options, see *Oracle Applications System Administrator's Guide - Security*, Chapter 6.

Oracle Portal

Oracle Portal (part of Oracle Application Server 10g) is a complete, browser-based environment for the development, deployment, administration, and configuration of enterprise class portals. Oracle Portal incorporates a complete portal building framework, with self-service publishing features to facilitate creation and management of the information accessed within your portal. A wide variety of portal interfaces and configurations are possible, from a simple departmental-level publishing portal to an Internet-accessible portal that serves both customers and employees. Tight integration with other components of the Oracle Application Server and with the Oracle database ensures that the solution can scale to an enterprise class audience.

> **Note:** For further details of integrating Oracle Portal with E-Business Suite Release 12, see Oracle*MetaLink* Note 380484.1, *Using Oracle Portal 10g with Oracle E-Business Suite Release 12*.

Oracle Discoverer

Business users at all levels of an organization can use Discoverer 10.1.2 to gain immediate access to information from data marts, data warehouses, and online transaction processing (OLTP) systems. Discoverer 10.1.2 enables business analysts to create, modify, and execute ad hoc queries and reports. Casual users can utilize a range of predefined reports and graphs that enable them to obtain business views while hiding the complexity of the underlying data structures being reported upon.

Discoverer 10.1.2 is tightly integrated with Oracle E-Business Suite Release 12. Release 12 users can use Discoverer to analyze data from selected business areas in Financials, Operations, Human Resources, Purchasing, Process Manufacturing, Activity Based Management, and others.

You can integrate Discoverer into an existing Oracle E-Business Suite Release 12 environment by installing Discoverer 10.1.2 with Oracle Business Intelligence Server 10g Release 2 on a standalone application tier server node, or in a separate Oracle Business Intelligence Server 10g Release 2 ORACLE_HOME, on an existing application tier server node.

> **Note:** For further details of using Oracle Discoverer with Oracle E-Business Suite Release 12, see Oracle*MetaLink* Note 373634.1, *Using Discoverer 10.1.2 with Oracle E-Business Suite Release 12*.

Enterprise-Wide Single Sign-On

Single sign-on functionality enables users to access Oracle E-Business Suite and other applications through a single user ID, without having to log in to each application separately. Oracle E-Business Suite supports the use of single sign-on functionality via *Oracle Single Sign-On*, *Oracle Internet Directory (OID)*, and *Oracle Portal*.

Implementing an enterprise-wide single sign-on solution involves significant changes to the mechanism by which Oracle E-Business Suite Release 12 users are authenticated. Instead of authentication being performed natively, via the FND_USER table, this functionality is delegated to Oracle Single Sign-On, which can either:

- Perform user validation itself, against information stored in Oracle Internet

Directory.

- Delegate validation to a third-party single sign-on server.

With either of these solutions, Oracle E-Business Suite Release 12 accepts identities vouched for by the single sign-on mechanism. Oracle Internet Directory complements this by acting as an integration point that enables Oracle E-Business Suite Release 12 to participate in enterprise level user management.

> **Note:** Note that where a third-party single sign-on server is in use, Oracle Single Sign-On and Oracle Internet Directory are still required, to provide a bridge between E-Business Suite Release 12 and the third-party single sign-on solution.

Each E-Business Suite instance must still maintain a record of registered users, in the form of the traditional application accounts. However, the level of abstraction needed for an enterprise level user requires a mechanism that can uniquely identify a user across the enterprise. This is accomplished via a *globally unique identifier* (GUID). Oracle Internet Directory and Oracle E-Business Suite store GUID information for each enterprise level user. The GUID can be considered as an identity badge that is recognized by both Oracle Internet Directory and Oracle E-Business Suite.

Another requirement in such an environment is for user enrollment to be done only once, at well defined places, with the user subsequently being known to the rest of the enterprise. Two additional features enable this:

- Support for automatic propagation of application information across an enterprise, via a *synchronization* process between Oracle Internet Directory and a third-party LDAP server.

- Support for automatic propagation of user information across an enterprise, via a *provisioning* process between Oracle Internet Directory and Oracle E-Business Suite Release 12.

User information in external, third-party user directories can be synchronized with Oracle Internet Directory using the LDAP protocol. With Oracle Internet Directory, customers can manage and publish user information in a central location that various application systems, including the Oracle E-Business Suite, can reference.

Much of the complexity involved with integrating Oracle E-Business Suite into a single sign-on environment arises because of the need to consolidate fragmented or duplicated user data in the single sign-on environment, as a legacy of integrating previously-isolated systems.

The solution described in this chapter provides mechanisms to link the existing data together using the GUID. In addition, bulk migration tools can be used to move a large number of users between Oracle Internet Directory and E-Business Suite during the transition to an integrated single sign-on environment.

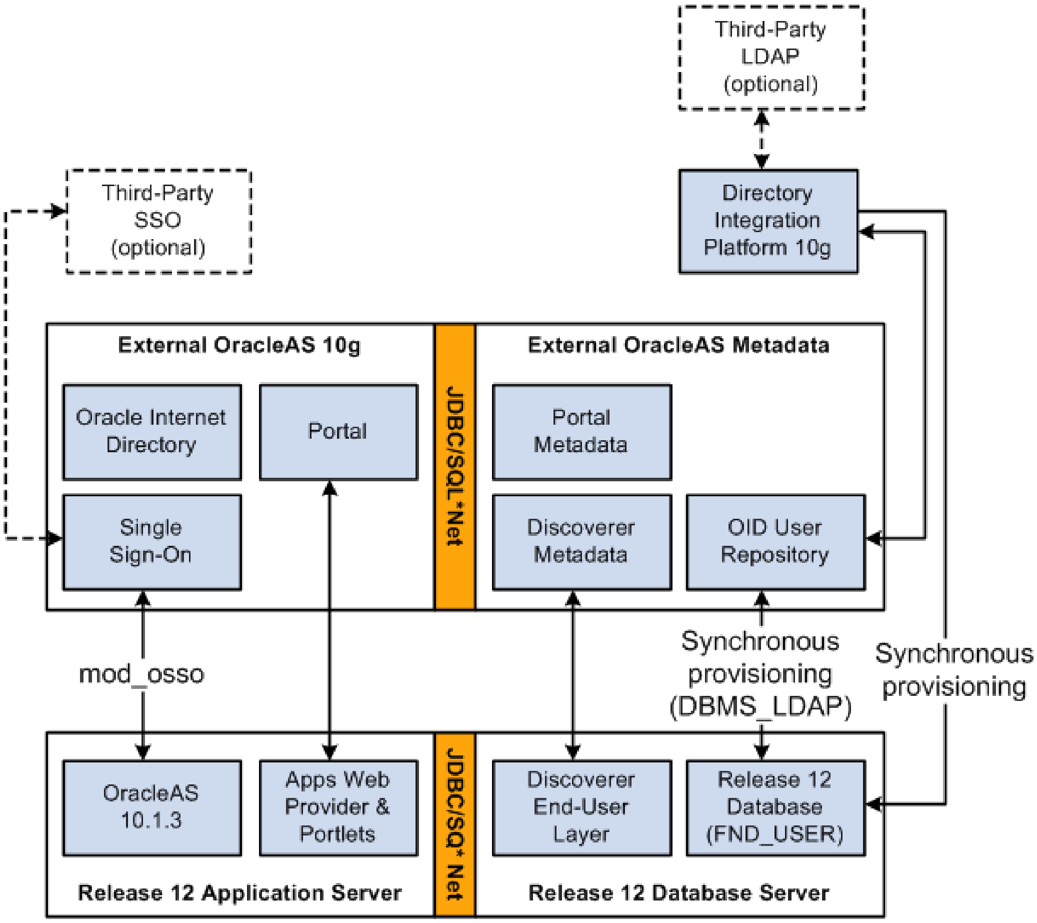
Note that full synchronization of user credentials between Oracle Internet Directory and E-Business Suite Release 12 requires deployment of the relevant Oracle Application Server 10*g* components.

> **Note:** For more information on implementing single sign-on with Oracle Single Sign-On and Oracle Internet Directory, see Chapter 6 of *Oracle Applications System Administrator's Guide - Security*, and Oracle *MetaLink* Note 376811.1, *Using Oracle Application Server 10g with Oracle E-Business Suite Release 12*.

Application Server Integration Options

Application Server 10*g* can act as an *integration hub* that enables the Oracle E-Business Suite to work in conjunction with other enterprise software, including software from third-party vendors.

Figure 8-1 Application Server Integration Architecture


Third-Party LDAP (optional)
Third-Party SSO (optional)
Directory Integration Platform 10g
External OracleAS 10g
Oracle Internet Directory
Portal
Single Sign-On
JDBC/SQL*Net
External OracleAS Metadata
Portal Metadata
Discoverer Metadata
OID User Repository
mod_osso
Synchronous provisioning (DBMS_LDAP)
Synchronous provisioning
OracleAS 10.1.3
Apps Web Provider & Portlets
JDBC/SQ* Net
Discoverer End-User Layer
Release 12 Database (FND_USER)
Release 12 Application Server
Release 12 Database Server

By default, Release 12 continues to use the local E-Business Suite user directory, FND_USER, for user authentication. Optionally, Release 12 user authentication can be delegated to Single Sign-On 10g and Oracle Internet Directory 10g running externally.

It is possible to integrate Release 12 with a third-party LDAP (such as Microsoft Active Directory or SunONE/iPlanet) or a third-party single sign-on solution (such as Microsoft Windows Kerberos or Netegrity SiteMinder). This requires integration of the chosen third-party solutions via an external Oracle Application Server 10g instance, as shown in the diagram above. Release 12 delegates user authentication to Oracle Single Sign-On, and Oracle Single Sign-On delegates authentication to the third-party single sign-on solution.

Conversely, user information from the third-party LDAP must be synchronized with Oracle Internet Directory 10g, which synchronizes its users with E-Business Suite's FND_USER directory. Synchronization is handled by the Oracle Directory Integration Platform.

Basic Single Sign-On Deployment Scenario

This section outlines a simple deployment scenario where an existing Oracle E-Business Suite instance is integrated with a new Oracle Single Sign-On and Oracle Internet Directory infrastructure. A subsequent discussion considers additional factors, such as the existence of a third-party single sign-on solution, or the presence of multiple user repositories.

> **Note:** This section provides a high-level overview of the common tasks that will apply to all installations. The exact steps needed for the requirements of a particular site will be more detailed.

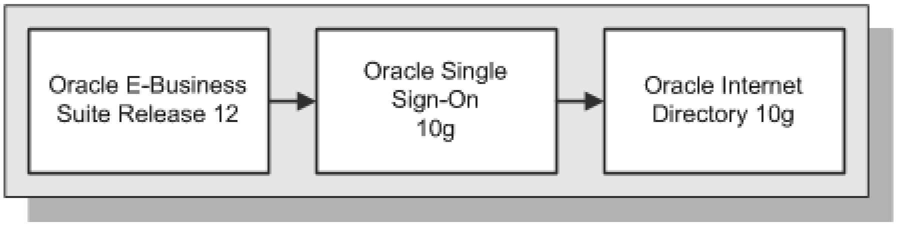
The starting point of this scenario is an existing Oracle E-Business Suite Release 12 installation, plus a new Oracle Application Server 10*g* installation (including Oracle Single Sign-On and Oracle Internet Directory) on a different machine.

Oracle Internet Directory has no currently existing users apart from pre-seeded users, and Oracle Portal is not implemented. The requirement is to integrate Oracle E-Business Suite Release 12 with Oracle Single Sign-On and Oracle Internet Directory.

Key Goals

- Oracle E-Business Suite Release 12 will delegate user sign-on and authentication to Oracle Single Sign-On
- Oracle Single Sign-On will authenticate user credentials against user entries in Oracle Internet Directory
- Oracle Internet Directory will store every user's single sign-on account id and password

Figure 8-2 Deploying E-Business Suite with Oracle Single Sign-On and Oracle Internet Directory


Oracle E-Business Suite Release 12
Oracle Single Sign-On 10g
Oracle Internet Directory 10g

User Management Options

Existing Oracle E-Business Suite Release 12 application accounts are migrated to single sign-on accounts in Oracle Internet Directory using the *Bulk Migration Tool*. After the migration, a system administrator has a number of user management options, related to the location(s) where user information is created, and where it is provisioned (sent) to.

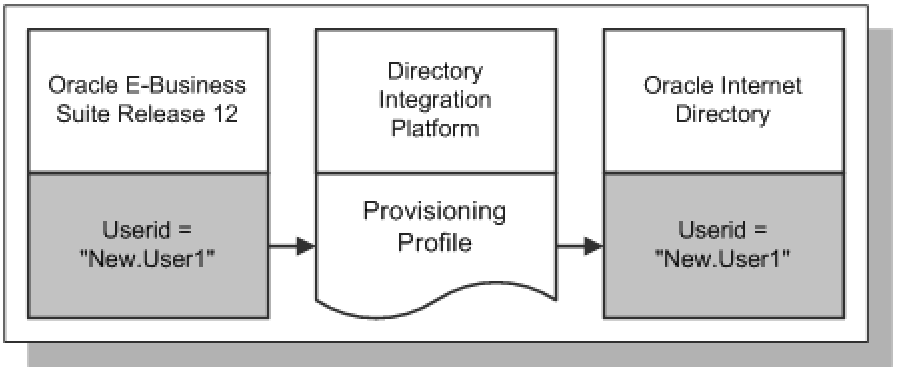
Option 1

All user information is created in Oracle E-Business Suite Release 12, then provisioned into Oracle Internet Directory.

- Oracle E-Business Suite Release 12 is configured as a *provisioning integrated application* with Oracle Internet Directory

- System administrators configure the provisioning integration via *provisioning profiles*

Figure 8-3 Provisioning User Information from E-Business Suite to Oracle Internet Directory


Oracle E-Business Suite Release 12
Userid = "New.User1"
Directory Integration Platform
Provisioning Profile
Oracle Internet Directory
Userid = "New.User1"

The creation of a new application account in Oracle E-Business Suite Release 12 will automatically trigger the creation of a new single sign-on account in Oracle Internet Directory. Some of the user attributes from the application account may be provisioned in the single sign-on account in Oracle Internet Directory during account creation.

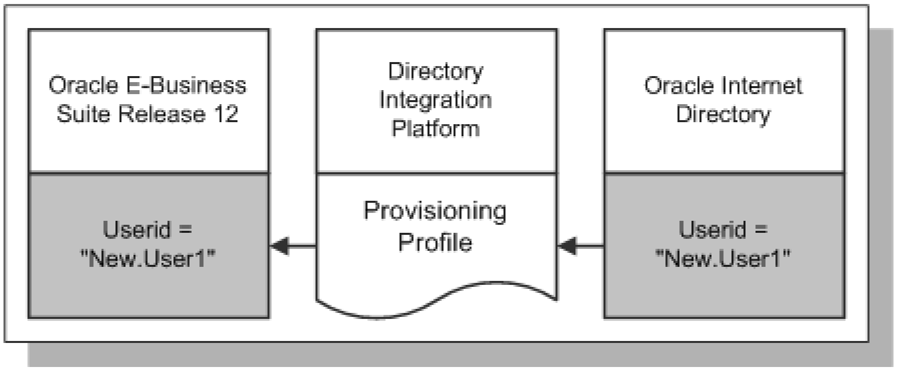
Option 2

All user information is created in Oracle Internet Directory, then provisioned into Oracle E-Business Suite Release 12:

- Oracle E-Business Suite Release 12 is configured as a provisioning integrated application with Oracle Internet Directory

- System administrators configure the provisioning integration via *provisioning profiles*

Figure 8-4 Provisioning User Information from Oracle Internet Directory to E-Business Suite


Oracle E-Business Suite Release 12
Directory Integration Platform
Oracle Internet Directory
Userid = "New.User1"
Provisioning Profile
Userid = "New.User1"

The creation of a new single sign-on account in Oracle Internet Directory will automatically trigger the creation of a new application account in Oracle E-Business Suite Release 12. Some of the user attributes from the single sign-on account may be provisioned in the application account in Oracle Internet Directory during account creation.

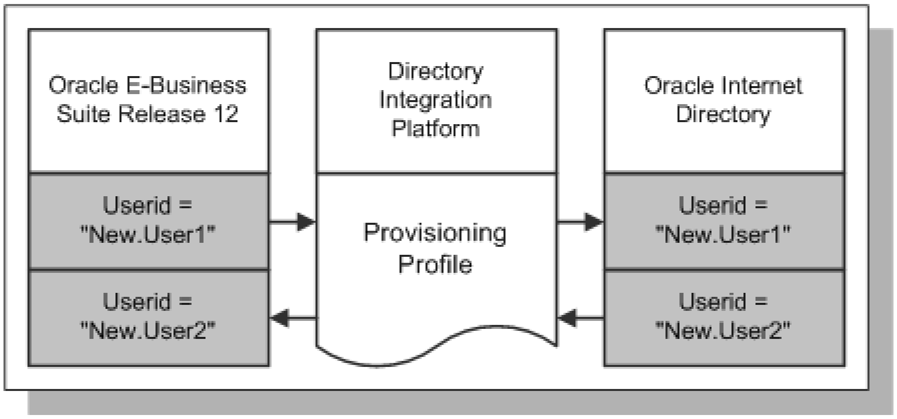
Option 3

All user information is created in either Oracle Internet Directory or Oracle E-Business Suite Release 12, then provisioned into the other system:

- Oracle E-Business Suite Release 12 is configured as a provisioning integrated application with Oracle Internet Directory

- System administrators configure the provisioning integration via provisioning profiles

Figure 8-5 Provisioning User Information Between E-Business Suite and Oracle Internet Directory



The creation of a new application account in Release 12 will automatically trigger the creation of a new single sign-on account in Oracle Internet Directory, and the creation of a new single sign-on account in Oracle Internet Directory will automatically trigger the creation of a new application account in Release 12.

During account creation, some of the user attributes from the application account may be provisioned in the single sign-on account in Oracle Internet Directory during account creation, and some of the user attributes from the single sign-on account may be provisioned in the application account in Oracle Internet Directory.

Synchronizing User Attributes

For all three of the above options, a set of user attributes can, on being updated from either system, optionally be synchronized between Oracle E-Business Suite Release 12 and Oracle Internet Directory. This is accomplished by configuring the provisioning profile.

Signing On

Attempting to gain access to an Oracle E-Business Suite Release 12 environment, a user who has not yet been authenticated with Oracle Single Sign-On is directed to a Single Sign-On login page, which can be customized to suit an individual site.

After authentication via Oracle Single Sign-On (or if authentication has previously been carried out) the user is redirected to the requested page or the user's home page in the Oracle E-Business Suite Release 12.

Signing Out

When a user logs out of an Oracle E-Business Suite instance, the user is also logged out of Oracle Single Sign-On, as well as any *partner applications* applications that have been integrated with Oracle Single Sign-On. The user will see a logout page that lists all the applications the user has been successfully logged out of.

Session Timeout

It is important to understand the timeout behavior of the different sessions in a single sign-on environment, to ensure the appropriate level of security is maintained.

- If a user's application session has timed out, but not his single sign-on session, he will be directed to Oracle Single Sign-On, and then back to Oracle E-Business Suite, without being prompted to re-authenticate.

- If a user's application session and single sign-on session have both timed out, he will be directed to the single sign-on login page to re-authenticate, and then redirected back to Oracle E-Business Suite.

Until a user's application session times out (or he explicitly logs out), he can continue to access the partner application even if his Oracle Single Sign-On security cookie has expired. Since the application session timeout value takes precedence over the Single Sign-On timeout setting, Oracle recommends setting the application session timeout value to be equal to or less than that of Oracle Single Sign-On.

Advanced Single Sign-On Deployment Scenarios

This section outlines four more deployment scenarios. The guidelines given should be regarded as providing a high-level strategy rather than definitive instructions, as all real world deployments will be unique, and require detailed planning. The outline solutions build upon the basic scenario discussed above.

Scenario 1

Requirement - Need to enable Oracle Single Sign-On with Oracle E-Business Suite Release 12

Starting Environment

- Multiple new Oracle E-Business Suite Release 12 environments have been installed
- Other than the default administrative accounts, no user accounts have been registered yet
- Oracle Portal is not implemented
- No Single Sign-On infrastructure in place

Solution

- Oracle Application Server 10*g* with Oracle Single Sign-On and Oracle Internet Directory are needed for the integration required
- Oracle E-Business Suite Release 12 will delegate user sign-on and authentication to Oracle Single Sign-On
- Oracle Single Sign-On authenticates user credentials against user entries in Oracle Internet Directory
- Oracle Internet Directory contains every user's single sign-on account ID and password

Either Oracle Internet Directory or one Oracle E-Business Suite Release 12 instance can be designated as the source of user enrollment, with the following implications:

- If Oracle Internet Directory is the source, details of user accounts can be propagated to each Oracle E-Business Suite instance via the provisioning process.
- If an Oracle E-Business Suite instance is the source, the provisioning process will propagate user accounts from that instance to Oracle Internet Directory, and then to the other Oracle E-Business Suite instances.

Optionally, user profile information in an Oracle E-Business Suite Release 12 instance can be kept synchronized with the information in Oracle Internet Directory.

Scenario 2

Requirement - Need to integrate new installation of Oracle E-Business Suite Release 12 with existing third-party single sign-on and user directory infrastructure

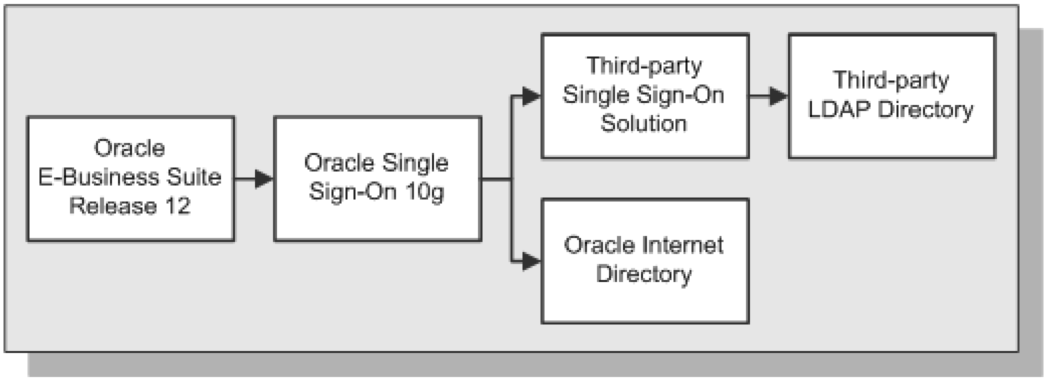
Starting Environment

- Oracle E-Business Suite Release 12 has been newly installed using the Rapid Install Wizard.
- Other than the default administrative accounts, no user accounts have been registered yet.
- Oracle Portal is not implemented.
- A third-party single sign-on solution such as Netegrity SiteMinder is in use as a corporate single sign-on solution.
- A third-party LDAP directory such as SunONE/iPlanet is in use as a corporate user directory.

Solution

- Oracle Application Server 10*g* (including Oracle Single Sign-On and Oracle Internet Directory) is needed for the integration.
- Oracle E-Business Suite and Oracle Single Sign-On must be set up so that Oracle E-Business Suite delegates authentication to Oracle Single Sign-On, which in turn delegates the functionality to the third-party single sign-on server in use.
- Oracle Internet Directory needs to be set up to synchronize a minimal set of information from the third-party LDAP directory for all users who will access Oracle E-Business Suite via single sign-on.
- Oracle Internet Directory also needs to be set up to provision users in Oracle Internet Directory to Oracle E-Business Suite.

Figure 8-6 Integrating E-Business Suite with Third-Party Single Sign-On and User Directory


Oracle E-Business Suite Release 12
Oracle Single Sign-On 10g
Third-party Single Sign-On Solution
Third-party LDAP Directory
Oracle Internet Directory

Existing users in the third-party LDAP directory can be bulk migrated into Oracle Internet Directory, and then bulk migrated into Oracle E-Business Suite.

Optionally, user profile information in Oracle E-Business Suite can be kept synchronized with the information in the third-party LDAP directory.

Scenario 3

Requirement - Need to integrate existing Oracle E-Business Suite Release 12 with existing third-party single sign-on and user directory infrastructure

Starting Environment

- Oracle E-Business Suite Release 12 is in use, and has an up to date user repository.
- Oracle Portal is not implemented.
- A third-party corporate single sign-on solution such as Netegrity SiteMinder is in use and is to be retained.
- A third-party LDAP directory such as SunONE/iPlanet is in place as a corporate user directory and is to be retained.
- At the start of the implementation, a given user may exist in both Oracle E-Business Suite Release 12 and the third-party LDAP directory, with either the same user name in both or a different user name in each.

Solution

- Oracle Application Server 10*g* (including Oracle Single Sign-On and Oracle Internet Directory) is needed for the integration.
- Oracle E-Business Suite and Oracle Single Sign-On need to be set up so that Oracle E-Business Suite delegates authentication to Oracle Single Sign-On, which in turn delegates the functionality to the third-party single sign-on server.

- Oracle Internet Directory must be configured to synchronize a minimal set of information from the third-party LDAP directory for users who will access Oracle E-Business suite via single sign-on.

- Existing users in the third-party LDAP directory can be bulk migrated into Oracle Internet Directory.

- Existing accounts in both Oracle E-Business Suite and the third-party LDAP directory can be linked.

- With proper planning, new users can be synchronized from the third-party LDAP directory into Oracle Internet Directory, and then into Oracle E-Business Suite.

- Optionally, user profile information in Oracle E-Business Suite can be kept synchronized with the information in the third-party LDAP directory.

A simpler variant of this scenario arises when no third-party single sign-on/LDAP directory is involved. There is only an existing Oracle E-Business Suite Release 12 installation plus an Oracle Single Sign-On and Oracle Internet Directory infrastructure. In such a case, all steps relating to third-party (non-Oracle) software can be ignored.

Scenario 4

Requirement - Need to enable Oracle Single Sign-On with multiple Oracle E-Business Suite Release 12 installations where no Oracle Single Sign-On infrastructure is currently in place

Starting Environment

- Multiple Oracle E-Business Suite Release 12 instances are implemented, and each has an existing user population.

- Oracle Portal is not implemented.

- No existing Oracle Single Sign-On infrastructure is in place.

Solution

- Oracle Application Server 10*g* (including Oracle Single Sign-On and Oracle Internet Directory) is needed for the integration.

- Each Oracle E-Business Suite instance delegates user sign-on and authentication to Oracle Single Sign-On.

- Oracle Single Sign-On authenticates user credentials against user entries in Oracle Internet Directory.

- Oracle Internet Directory contains every user's single sign-on account id and password.

- A single sign-on account needs to be created for every user in Oracle Internet

Directory.

- Existing applications accounts in Oracle E-Business Suite instances need to be linked to the single sign-on account.
- Optionally, user profile information in Oracle E-Business Suite can be kept synchronized with the information in Oracle Internet Directory.

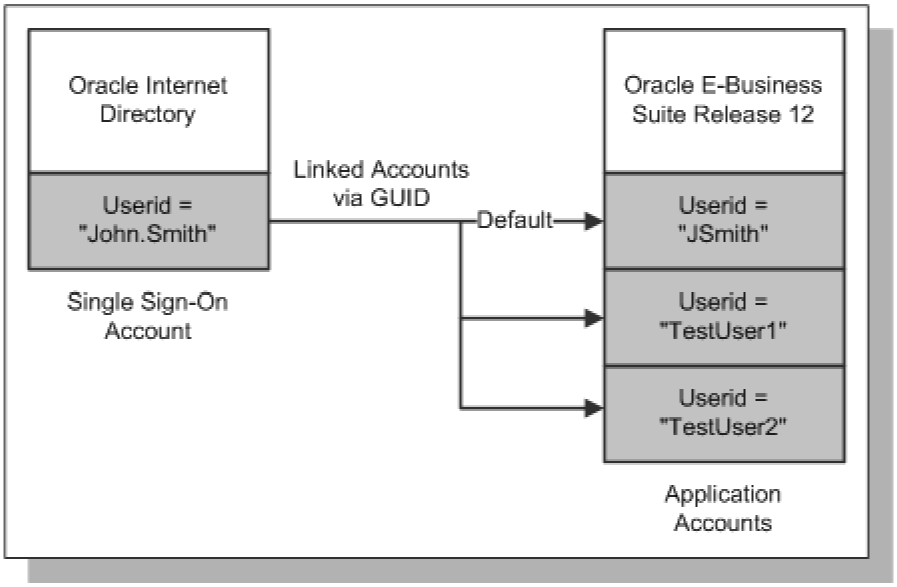
Advanced Single Sign-On Options

There are a number of advanced options that may be employed in specialized circumstances; one example is described here.

Linking Multiple Application Accounts to a Single Oracle Single Sign-On Account

Normally, a single sign-on account in Oracle Internet Directory will correspond to a single application account in Oracle E-Business Suite Release 12. However, in special cases a user may need to have a single sign-on account in Oracle Internet Directory and multiple application accounts in Oracle E-Business Suite Release 12.

Figure 8-7 Single Sign-On Account with Multiple Application Accounts



If required, this feature can be enabled by system administrators via the profile option 'Applications SSO Allow Multiple Accounts'.

9

High Availability

Introduction

The subject of High Availability covers a range of features and options that can help to minimize planned and unplanned downtime, or facilitate recovery after a period of downtime. They include:

- Patching Hints and Tips
- Maintenance Mode
- Shared Application Tier File System
- Nologging Operations
- Distributed AD
- Disaster Recovery best practices

This section will provide a high-level guide to the key features that can help make an Oracle E-Business Suite highly available, with the emphasis on guidelines for making the correct decisions when planning a new installation or upgrade.

Patching Hints and Tips

Patch application is a key activity undertaken by Oracle Applications DBAs. If you need to apply a large number of patches, the required downtime can be significant. However, there are several simple ways of minimizing this downtime:

- **Keep AD up-to-date** - Running at the latest AD mini-pack level allows you to take full advantage of new features designed to reduce downtime and simplify maintenance.
- **Use the Distributed AD feature** - This helps make full use of available hardware

resources.

- **Consolidate multiple patches with AD Merge Patch** - Merging multiple Applications patches into a single patch not only reduces overall downtime by eliminating duplicate tasks, but minimizes the scope for error that would arise in applying a number of separate patches.

- **Use a shared application tier file system** - By default, Release 12 will configure multiple application tier nodes to use a shared application tier file system.

- **Keep your test system current with your production system** - When you test the application of a patch, the test must be realistic in terms of current patch level and transaction data: you can employ either Oracle Applications Manager or the Rapid Clone tool to create a copy of your production system for tests.

- **Perform maintenance during normal operation where possible** - For example, you can gather schema statistics or patch online help while the system is in use.

- **Schedule periodic downtime for application of the latest maintenance packs or family packs** - The more up-to-date your system, the less likely you are to experience known problems, and the easier it will be to resolve any new issues that may arise.

Where applicable, these strategies are described further below.

Maintenance Mode

Maintenance Mode is a mode of operation in which the Oracle Applications system is made accessible only for patching activities. This provides optimal performance for AutoPatch sessions, and minimizes downtime needed.

> **Note:** Maintenance Mode is only needed for AutoPatch sessions. Other AD utilities do not require Maintenance mode to be enabled.

Administrators can schedule system downtime using Oracle Applications Manager, and send alert messages to users about the impending downtime. When Maintenance Mode is entered, users attempting to log on to Oracle Applications are redirected to a system downtime URL.

There are several practical points relating to the use of Maintenance Mode:

- You can toggle Maintenance Mode between Enabled and Disabled using the new *Change Maintenance Mode* menu in AD Administration, or the equivalent function in Oracle Applications Manager.

- Although you can run AutoPatch with Maintenance Mode disabled, there will be a significant degradation in performance.

- There is a separate logon page for *Restricted Mode* access while the system is in Maintenance Mode. Restricted Mode allows administrators access to specific privileged functionality, for example to view the timing report that shows the progress of a patching session.

Shared Application Tier File System

A traditional multi-node installation of Oracle Applications required each application tier node to maintain its own file system. Installation and migration options were subsequently introduced to enable a single APPL_TOP to be shared between all the application tier nodes of a multi-node system. This was referred to as a *Shared APPL_TOP File System*, usually abbreviated to *Shared APPL_TOP*.

A further capability that was introduced was the option to *merge* the APPL_TOPs of multiple nodes, each with its own set of application tier services, to give a single APPL_TOP that could then be shared between them all.

These concepts were subsequently extended to enable sharing of the application tier technology stack file system as well, the result being known as a *Shared Application Tier File System*.

This section describes the benefits of using a shared application tier file system in an Oracle Applications Release 12 environment. Current restrictions are also noted where applicable.

Shared Application Tier File System Features

In a shared application tier file system, all application tier files are installed on a single shared disk resource that is mounted on each application tier node. Any application tier node can be configured to perform any of the standard application tier services, such as serving forms or web pages, and all changes made to the shared file system are immediately visible on all the application tier nodes.

Benefits of using a shared application tier file system include:

- Overall disk space requirements are greatly reduced, as there is only a single copy of the relevant Applications code.

- Since there is only one physical application tier file system, administrative tasks need only be carried out once, on any node, and take effect immediately on all nodes.

Current restrictions on using a shared application tier file system include:

- An application tier file system can only be shared across machines running either identical or binary compatible operating systems.

- Sharing file systems between internal and external application tiers is not supported. This is true even for external application tiers that have reverse proxies in the DMZ.

- Shared application tier file system functionality is not currently available on Windows.

Shared Disk Resources

A shared application tier file system can reside on any standard type of shared disk resource, such as a remote NFS-mounted disk or part of a RAID array. However, you should ensure that performance of the chosen disk resource is adequate to meet peak demand. For example, NFS-mounted disks may give inadequate read or write performance when there is a large amount of network traffic, and RAID arrays must be implemented carefully to strike the appropriate balance between high availability, performance and cost.

Creating a Shared Application Tier File System

By default, the Release 12 Rapid Install will configure a multi-node application tier environment to use a shared application tier file system.

> **Note:** For further details of using a shared application tier file system, see Oracle*MetaLink* Note 384248.1, *Sharing the Application Tier File System in Oracle E-Business Suite Release 12*.

High Availability Features of Shared Application Tier File System

Utilizing a shared application tier file system improves high availability in the following ways:

- It is straightforward to add nodes to an existing installation, to provide greater resilience to node failure or to cater for additional users. This is particularly cost-effective with inexpensive Linux nodes.

- A patch only needs to be applied to one application tier node for its effects to be visible on all other nodes that share the file system. Such a single installation also helps to minimize the duration of planned maintenance downtimes, and reduces the scope for errors during installation.

Distributed AD

Many deployments utilize large database servers and multiple, smaller application (middle) tier systems. With the increasing deployment of low cost Linux-based systems, this configuration is becoming more common.

AD has always utilized a job system, where multiple workers are assigned jobs. Information for the job system is stored in the database, and workers receive their assignments based on the contents of the relevant tables. The *Distributed AD* feature offers improved scalability, performance, and resource utilization, by allowing workers of the same AD session to be started on multiple application tier nodes, utilizing available resources to complete their assigned jobs more efficiently.

Requirements for Distributed AD

Because the AD workers create and update file system objects as well as database objects, a shared application tier file system (shared APPL_TOP in earlier releases) must be employed to ensure the files are created in a single, centralized location.

Using Distributed AD

On one of your shared application tier nodes, you start your AutoPatch or AD Administration session, specifying the number of local workers and the total number of workers.

While using AutoPatch or AD Administration, you can start a normal AD Controller session from any of the nodes in the shared APPL_TOP environment to perform any standard AD Controller operations, using both local and non-local workers. This is possible because the job system can be invoked multiple times during AutoPatch and AD Administration runs. Each time an individual invocation of the job system completes, distributed AD Controller sessions will wait until either the job system is invoked again (at which point it will once again start the local workers) or until the AD utility session ends (at which point distributed AD Controller will exit).

> **Note:** See *Oracle Applications Maintenance Utilities* for further details of Distributed AD and AD Controller.

AD Controller Log Files

The log file created by AD Controller is created wherever the AD Controller session is started. This is to prevent file locking issues on certain platforms. It is therefore recommended that the AD Controller log file should include the node name from which the AD Controller session is invoked.

Nologging Operations

The *nologging* Oracle database feature is used to enhance performance in certain areas of Oracle E-Business Suite. For example, it is used during patch installation, and when building summary data for Business Intelligence.

Use of nologging in an operation means that the database redo logs will contain incomplete information about the changes made, with any data blocks that have been updated during the nologging operation being marked as *invalid*. As a result, a database restoration to a point in time (whether from a hot backup or a cold backup) may require additional steps in order to bring the affected data blocks up-to-date, and make the restored database usable. These additional steps may involve taking new backups of the associated datafiles, or by dropping and rebuilding the affected objects. The same applies to activation of a standby database.

> **Note:** Oracle database server 10g Release 2 also allows logging to be

forced to take place, ensuring all data changes are written to the database redo logs in a way that can be recreated in a restored backup, or propagated to a standby database. See *Oracle Data Guard Concepts and Administration 10g Release 2 (10.2)* for details of the *forcelogging* clause for database and tablespace commands.

Nologging Principles

At certain times, Oracle E-Business Suite uses the database nologging feature to perform resource-intensive work more efficiently. When an operation uses nologging, blocks of data are written directly to their data file, rather than going through the buffer cache in the System Global Area (SGA).

Instance recovery uses the online redo logs to reconstruct the SGA after a crash, rolling forward through any committed changes in order to ensure the data blocks are valid. Use of nologging does not affect instance recovery.

Database recovery requires rolling forward through the redo logs to recreate the requisite changes, and hence restore the database to the desired point in time. Since nologging operations write directly to the data files, bypassing the redo logs, the redo logs will not contain enough data to roll forward to perform media recovery. Instead, they will only contain enough information to mark the new blocks as invalid. Rolling forward through a nologging operation would therefore result in invalid blocks in the restored database. The same problems will potentially occur upon activating a standby database.

To make the backup or activated standby database usable after a nologging operation is carried out, a mechanism other than database recovery must be used to get or create current copies of the affected blocks.

There are two options, either of which may be appropriate depending on the specific circumstances:

- Create a new copy of the data files, either by backing up the tablespace again, or by refreshing the specific data files in the standby database.

- Drop and recreate the object with the invalidated blocks, using the program that maintains the object.

Nologging Usage

Nologging is used in the following situations in the Oracle E-Business Suite:

- Building new objects during patch application, where use of nologging makes the initial build faster, and the downtime required for patching shorter.

- Changing the physical structure of existing objects during patch application (such as partitioning a table), where use of nologging reduces the time needed for the operation itself, and consequently the overall downtime.

- Certain specialized tasks where logging is not required, such as manipulating data for data warehousing applications, or maintaining summary data for business intelligence queries.

- Certain concurrent manager jobs. In most such cases, the object affected by nologging will be dropped at the end of the job, and the invalidated blocks cleaned up. If a recovery is needed while concurrent jobs are in progress, re-running the affected jobs will clean up any invalidated blocks that may exist.

Actions Needed

To monitor nologging activity in your environment, you should periodically query your production database to identify any datafiles that have experienced nologging operations. You should also run the query before and after applying an Applications patch, to determine whether any nologging activity was carried out.

A suitable query can be run via monitoring software such as Oracle Enterprise Manager. Alternatively, you can construct a query based on the *unrecoverable_change#* and *unrecoverable_time* columns of the data dictionary view *v$datafile*. These are updated every time an unrecoverable or nologging operation marks blocks as invalid in the datafile.

The results of a query can be saved as a snapshot and compared to the last snapshot. You can then identify each occasion when nologging operations have been carried out in the database, and hence when you need to refresh backup datafiles with new copies that will be usable in the event of restoration being needed.

Disaster Recovery

A significant problem that strikes an Oracle E-Business Suite installation could put the viability of the organization at risk. Such a problem could be:

- An external disaster, such as a fire at a company's data center, resulting in a loss of service that severely hampers the organization's ability to do business.

- An internal disaster, such as a serious error by a privileged user, resulting in major loss or corruption of data.

- A hardware or system failure or malfunction, such as a media failure, or operating system problem that corrupts the actual data in the database

This section gives an overview of the area of disaster recovery, which can be considered as the final component of a high availability strategy. Disaster recovery involves taking steps to protect the database and its environment to ensure that they can still operate in the face of major problems. Oracle provides features such as *Oracle Data Guard* and *Flashback Database*.

- Data Guard is used to set up and maintain a secondary copy of a database, typically referred to as a *standby database*. Such a standby database is brought into use after a *failover* from the primary database when the primary becomes unavailable following a significant problem, or via a switchover operation that is executed to allow service to continue during planned maintenance of the environment's platform or building services.

- Flashback Database is used to "rewind" a database to a prior point in time, making it possible to recover from major logical corruptions of a database without requiring a complete restore.

You must also install any other hardware and software required to run your standby environment as a production environment after a failover, ensuring that any changes on the primary are matched on the standby. Examples include tape backup equipment and software, system management and monitoring software, and other applications.

Data Guard and Release 12

Oracle Data Guard provides mechanisms for propagating changes from one database to another, to avoid possible loss of data if one site fails. The two main variants of a Data Guard configuration are *Redo Apply* (often referred to as *Physical Standby*) and *SQL Apply* (often referred to as *Logical Standby*). . Both of these use the primary database's redo information to propagate changes to the standby database.

- Physical standby uses the normal database recovery mechanism to apply the primary database's redo to the standby database, resulting in an identical copy of the production database.

- Logical standby employs the Oracle LogMiner utility to build SQL statements that recreate changes made to the data. The logical standby mechanism is not currently utilized with Oracle E-Business Suite.

The secondary environment should be physically separate from the primary environment, to protect against disasters that affect the entire primary site. This necessitates having a reliable network connection between the two data centers, with sufficient bandwidth (capacity) for peak redo traffic. The other requirement is that the servers at the secondary site are the same type as at the primary site, in sufficient numbers to provide the required level of service; depending on your organization's needs, this could either be a minimal level of service (supporting fewer users), or exactly the same level of service as you normally provide.

Data Guard's reliance on redo generated from the production database has significant implications for operations in which Oracle E-Business Suite uses the nologging feature (described previously) to perform some resource-intensive tasks with faster throughput. Oracle recommends turning on the *force logging* feature at the database level to simplify your backup and recovery, and standby database maintenance procedures. In cases where the nologging feature is used in Release 12, and you have chosen not to use force logging, insufficient redo information will be generated to make the corresponding changes on the standby database. You must therefore may then be required to take manual steps to refresh the standby (or recreate the relevant objects) to ensure it will remain usable.

Finally, based on your organization's business requirements, choose one of the following protection modes:

- **Maximum protection**: This protection mode ensures that no data loss will occur if the primary database fails. To provide this level of protection, the redo data needed to recover each transaction must be written to both the local online redo log and to the standby redo log on at least one standby database before the transaction commits. To ensure data loss cannot occur, the primary database shuts down if a fault prevents it from writing its redo stream to the standby redo log of at least one transactionally-consistent standby database.

- **Maximum availability**: This protection mode provides the highest level of data protection that is possible without compromising the *availability* of the primary database. Like maximum protection mode, a transaction will not commit until the redo needed to recover that transaction is written to the local online redo log, and to the standby redo log of at least one transactionally-consistent standby database. However, unlike maximum protection mode, the primary database does not shut down if a fault prevents it from writing its redo stream to a remote standby redo log. Instead, the primary database switches to maximum performance mode until the fault is corrected, and all gaps in redo log files are resolved. When all gaps have been resolved, the primary database automatically resumes operating in maximum availability mode. This strategy ensures that no data loss will occur if the primary database fails, unless a second fault prevents a complete set of redo data from being sent from the primary database to at least one standby database.

- **Maximum performance**: This protection mode (the default) provides the highest level of data protection that is possible without affecting the *performance* of the primary database. This is accomplished by allowing a transaction to commit as soon as the redo data needed to recover that transaction is written to the local online redo log. The primary database's redo data stream is also written to at least one standby database, but that redo stream is written asynchronously with respect to the transactions that create the redo data. When network links with sufficient bandwidth are employed, this mode provides a level of data protection that approaches that of maximum availability mode, with minimal impact on primary database performance.

Flashback Database

Oracle recommends you enable the Flashback Database feature, to:

- Help protect against logical data corruption

- Allow you to reinstantiate the production database as a standby after a failover to your secondary site

- Create database restore points to which you can flash back in case an upgrade or major application change encounters a serious problem

Flashback Database enables you to rewind the database to a previous point in time without restoring backup copies of the data files. This is accomplished during normal operation by Flashback Database buffering and writing before images of data blocks into the *flashback logs*, which reside in the *flash recovery area*.

Flashback Database can also flashback a primary or standby database to a point in time prior to a Data Guard role transition. In addition, a Flashback Database operation can be performed to a point in time prior to a resetlogs operation, which allows administrators more flexibility to detect and correct human errors.

10

Load Balancing

Introduction

Oracle E-Business Suite provides numerous options for building and tailoring an installation to meet specific business and technical requirements. At a simple level, this includes the capability to utilize varying numbers of machines to distribute the various Applications technology layers according to desired expenditure and required performance. There are also more specific factors, such as physical site organization and expected growth rate. Other aspects are the possible need to provide extra capability to cope with fluctuations in demand, and the possible need for resilience in the event of problems affecting some of the hardware components. A final (and very important) consideration in planning a system is the need for the appropriate level of security to be put in place.

Many of these subjects are described in other chapters of this book. This section concentrates on how to make the decisions needed to balance the load on various components or layers, which is of particular importance for two reasons:

- Load balancing can involve the entire infrastructure of an E-Business Suite installation, with a change in one area potentially having significant effects elsewhere.
- Making informed decisions about load balancing can often enable a higher level of performance to be obtained without expenditure on additional hardware.

Load balancing areas include:

- Domain Name Server (DNS)
- Web (HTTP) Services
- Forms Services
- OC4J Layer

- Concurrent Processing Layer
- Database Layer

The emphasis here is on describing load balancing strategies and their key features, to allow an informed decision to be made regarding the applicability and usefulness of a particular area of load balancing in achieving the desired technical and business requirements.

Load Balancing Definitions

Load balancing is the means by which network traffic directed to a particular Web site is divided between one or more machines in a cluster of servers. Typically, the servers will all be running the same application, and use of load balancing presents the outside world with the appearance of a single server rather than a cluster. The relevant hardware device, often called a *server load balancer*, receives the relevant network traffic for the site, and distributes it to the various servers in the cluster based on the load balancing methodology that it supports. By sending requests to different nodes within the server cluster, system performance is optimized, scalability is simplified, and application availability (a key requirement of Web-based applications) is greatly enhanced.

Additional features of load balancing include *monitoring server availability* and *context-based load distribution*.

Monitoring server availability maintains a watch on the server pool, and periodically checking that all machines are responding to the traffic; if one is not (perhaps because of a network problem) it is taken out of the pool of servers, so that traffic can be routed to the servers that remain available.

Context-based load distribution is required for applications such as Oracle E-Business Suite that need to maintain *session persistent-connections*, whereby cookies are created when the session is initially established. To support this requirement, the load balancer reads and updates the network packet header information sent with each request made by the client, and routes the request to the node in the cluster with which the corresponding session was originally established and is subsequently being maintained.

Categories of Load Balancer

Load balancers are not installed as part of Oracle E-Business Suite. However, Oracle E-Business Suite can be configured for use with them as required.

The main categories of load balancer are:

Session Persistent Load Balancers - After a client's HTTP connection is established with a particular server, subsequent HTTP requests from that client are directed to the same server, for the duration of the session. This persistency is also referred to as *stickiness*.

Non-Session Persistent Load Balancers - These load balancers use a round-robin strategy for balancing incoming HTTP requests, and do not maintain session persistent client connections. After a client's initial HTTP connection is directed to a given server, subsequent HTTP requests from that client will be not necessarily be directed to the same server.

Secure Sockets Layer (SSL) Accelerators - Secure Sockets Layer (SSL) accelerators can be used to reduce the SSL traffic and workload of the Web servers.

Usually, an SSL accelerator is the target for HTTPS browser requests, and thus the target for all client communication. It is responsible for converting HTTPS SSL requests to non-SSL HTTP requests, directing the subsequent request to the HTTP server (running in non-SSL mode). Before sending the response back to the client browser, the SSL accelerator converts the non-SSL requests back to SSL requests, in a reverse of the initial process.

Load Balancing Options

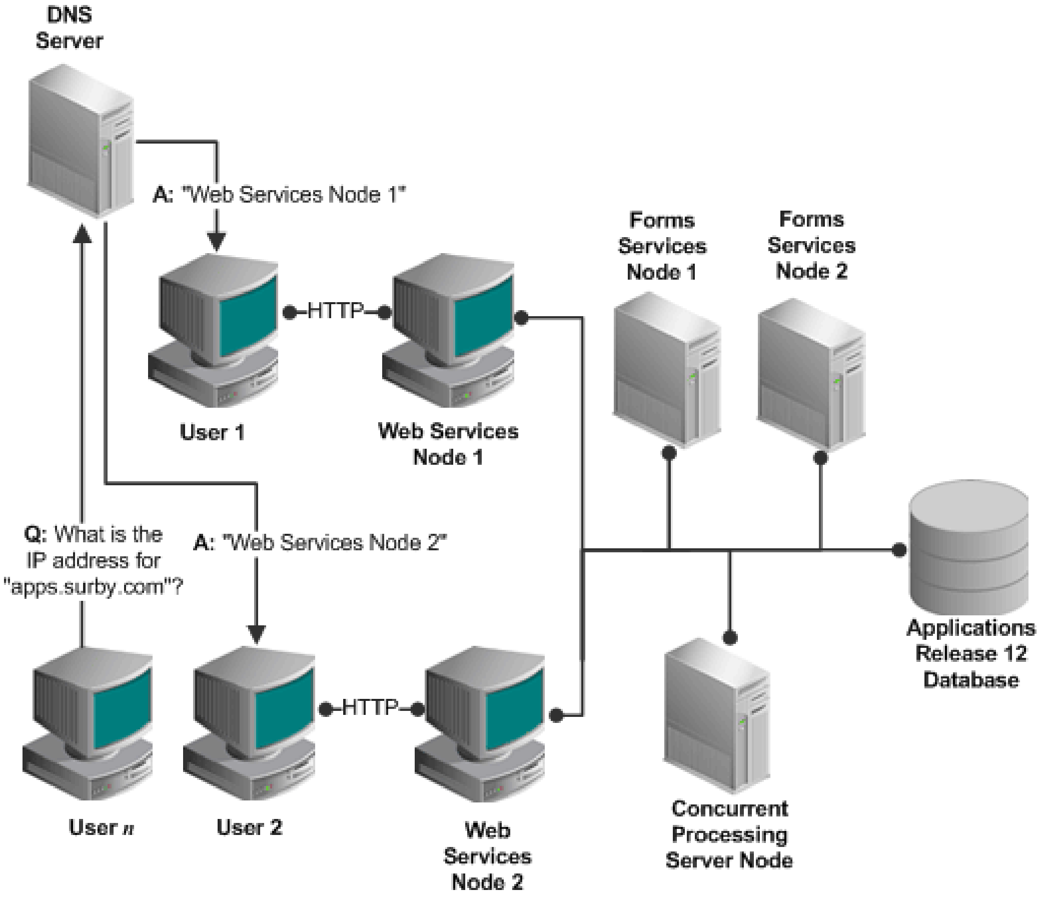
Different types of load balancing can be employed with Oracle E-Business Suite. The most suitable choice will depend on the specific needs and existing infrastructure of the site where deployment is to take place.

Domain Name Server (DNS) Layer Load Balancing

This type of load balancer distributes end-user requests across multiple server nodes, based on dynamic assignments of IP addresses to a *fully qualified domain name*.

Figure 10-1 shows an example of a configuration that uses DNS layer load balancing.

Figure 10-1 DNS Layer Load Balancing

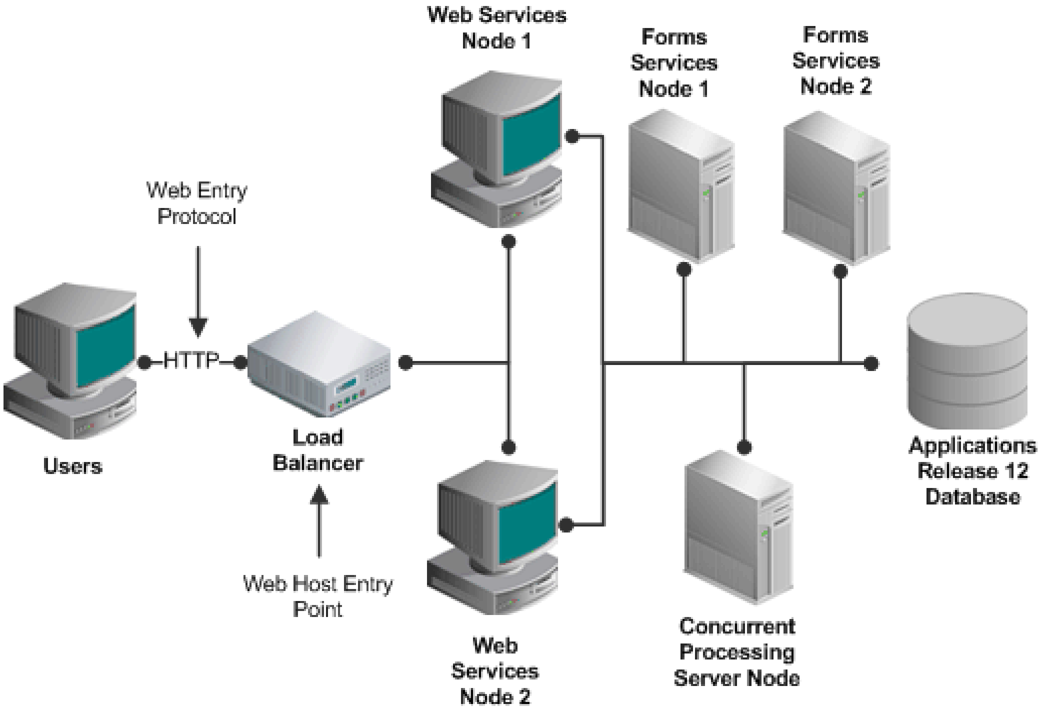


HTTP Layer Hardware Load Balancing

This type of load balancing can be used if you have a hardware load balancer that accepts HTTP communication and forwards it to a group of server nodes, sometimes referred to as a *farm*.

Figure 10-2 shows an example of a configuration where an HTTP load balancer distributes the load across a farm consisting of two Web server nodes.

Figure 10-2 HTTP Layer Load Balancing



Hardware-based HTTP load balancers must be configured for persistent session connections for all traffic through all ports for Oracle E-Business Suite Release 12 environments. This is required as various modules shipped with Oracle E-Business Suite need to maintain session state. If this is not set, users may experience transaction state loss errors while using E-Business Suite.

OC4J Load Balancing

Introduced in Oracle Applications Release 12.0.2, this feature utilizes Oracle Application Server 10g's built-in load-balancing capability at the JVM level.

> **Note:** For additional information on load balancing configurations, see Oracle*MetaLink* Note 380489.1, *Using Load-Balancers with Oracle E-Business Suite Release 12*.

11

Security

Introduction

The foundation of security is *access control*, which refers to how the system is being accessed and by whom. User security consists of three principal components: *authentication*, *authorization* and an *audit trail*. Authentication validates the user's identity, authorization controls the user's access based on responsibilities assigned, and the audit trail keeps track of the user's transactions to ensure that the user's privileges are not being misused.

Authentication

Identifying and verifying who is allowed to access the system is the first line of defense. The most common approach is *password-based authentication*: if the legitimate user is the only one who knows the password, then whoever just entered the correct password is very likely to be the person authorized to use the account.

A number of practical problems can arise with passwords. These include:

- Passwords that are allowed to be too short, and thus vulnerable to being observed on entry
- Passwords that are forced to be too long, and which the user might decide to write down
- Easy-to-guess passwords, chosen as being easy to remember
- Rarely changed passwords
- Passwords that are used for multiple accounts

In a single-sign on environment (see Chapter 8), a single password allows access to more than one application, so the consequences of it being discovered or divulged are proportionately much more serious.

An attacker will generally focus on identifying the password of a powerful user such as a system administrator. Such users are generally more aware of security risks, and can be persuaded to take more care in their choice of password and to change it regularly. The Oracle E-Business Suite features various password management policies that can be enabled to secure key user accounts.

Authorization

On entering the system, the user should only be granted access to the features and specific data needed to perform his job. Routine access to highly sensitive data should only be given to trusted users who need that level of access. The *Function Security* feature allows the System Administrator to manage the access privileges of individual users. By enforcing tighter security policies for more sensitive accounts, Function Security can mitigate the risk of unauthorized users' access to highly sensitive information.

Audit Trail

Even the most carefully planned user authentication and authorization policies cannot eliminate the risk of exploitation when the attacker is an authorized user. An *audit trail* can be used to keep track of a user's transactions to verify that the user is not misusing his access privileges. Oracle E-Business Suite can record details of every user's login, including time stamp, session ID, and information about the Function Security rules applying to that session. Information about the identity of the user is also attached to all transactions. This provides a method for detecting the party responsible for any transaction, or determining which users viewed sensitive data in a given time period.

If a valid user password has been compromised, and becomes known to an unauthorized person, it can be difficult to trace the intrusion back to the attacker. However, knowing the particular account that was used can help to identify other people who may have learned that user's password.

> **Note:** For further details of Audit Trail, see *Oracle Applications System Administrator's Guide - Security*.

Network Security

An organization may or may not have physical control over the network infrastructure in use. The Internet is the best example of a network where it will not have control, and where extra steps must be taken to ensure security is not compromised.

A common concern regarding use of a public network such as the Internet is the possibility of someone eavesdropping on password transmissions by using a network sniffer. In such a case, though, the concern should be wider, and reflect the possibility of someone eavesdropping on sensitive information in general. In such cases, HTTPS (secure HTTP) connection to the E-Business Suite is recommended. All current browser-based password login screens send the password as a parameter in the HTTP form submission. Using an HTTPS connection will encrypt this information. The best practice is therefore to use HTTPS for all web-based access. On the other hand, if you have control over your network to the point where you can rule out eavesdropping, then password interception should not be an issue.

The main reason not to run HTTPS by default is performance, since it does introduce some overhead. A more strategic way to address this concern is to integrate the Oracle E-Business Suite with Oracle Application Server 10g Single Sign-On (SSO). Here, the SSO server that is responsible for user authentication is a different Web server from the one used with the E-Business Suite. Hence you can run the SSO server in HTTPS mode, while running the E-Business Suite Web server in the better-performing HTTP mode.

Oracle User Management

Oracle User Management (UMX) is a secure and scalable system that enables organizations to define administrative functions and manage users based on specific requirements such as job role or geographic location.

With Oracle User Management, instead of exclusively relying on a centralized administrator to manage all its users, an organization can, if desired, create *functional administrators* and grant them sufficient privileges to manage a specific subset of the organization's users. This provides the organization with a more granular level of security, and the ability to make the most effective use of its administrative capabilities.

For example, a new feature in Release 12 provides a login assistance mechanism that is easily accessed from the E-Business Suite Login Page. A user simply clicks on the "Login Assistance" link located below the Login and Cancel buttons, and can then go to a Forgot Password section or Forgot User Name section to have the necessary action taken automatically, without the need for an administrator to become involved.

Another new feature in Release 12 allows users with the relevant privileges to enable other users to act on their behalf, as delegates, without having to share the account password. For example, managers may need to grant peers or subordinates limited authority to act on their behalf while they are out of the office. This *Proxy User* feature allows control over the pages, functions, and data security policies that can be granted, and includes an on-screen display that indicates when a user is acting on behalf of another user.

Role Based Access Control

Oracle User Management implements several different layers of security, requiring organizations to specify:

- The set of users that will be granted access to specific areas of Oracle Applications
- The information these users will require to do their jobs
- The extent to which the users can use this information

Oracle's function and data security models constitute the base layers of this system, and contain the traditional system administrative capabilities.

Organizations can optionally add more layers to the system depending on the degree of flexibility they require. *Role Based Access Control* (RBAC) enables organizations to create roles based on specific job functions, and to assign these roles the appropriate permissions. With RBAC, administrative privileges and user access are determined by assigning individuals the appropriate roles.

Key features of RBAC include:

- **Delegated Administration** - Enables system administrators to delegate some of their administrative privileges to individuals that manage a subset of the organization's users.

- **Registration Processes** - Enable organizations to provide end-users with a method for requesting various levels of access to the system, based on their eligibility.

- **Self-service Requests and Approvals** - Enable end users to request initial access or additional access to the system by clicking on links embedded in a Web application.

Security Strategies

The Oracle E-Business Suite tables are no different from any other Oracle database tables, as far as a DBA is concerned, and the same security issues that apply to Oracle database installations also apply to E-Business Suite installations. While the Oracle database provides multiple mechanisms to ensure security, recovery, and high availability of databases, no amount of technology can completely protect against human problems (error or sabotage), or poor disaster recovery and corporate security policies.

While technical measures exist to limit what a DBA can do, and selectively audit DBA activity, DBAs serve in positions of trust. Organizations must therefore take appropriate steps to ensure that persons assigned to such positions are worthy of trust. A company's data is just as sensitive and valuable as trade secrets; indeed, data should often be treated as the most closely-guarded secret. Therefore, the same checks should be made on DBAs as are made on staff given access to corporate secrets.

DBAs need to have extensive privileges to do their jobs; this also means that they can carry out destructive actions on a database, either by accident or intentionally. Such actions can directly and seriously impair an organization's ability to carry on with its business. For example, if your customer database is accidentally corrupted, and no backups have been made, you may lose vital customer information and not be able to fulfil orders.

Simply restricting the availability of the passwords for accounts with DBA privileges is an important first step in implementing security-oriented DBA access policies. This can then be extended by setting up procedures for *auditing* DBA actions, as described later in this section.

Data Encryption

For fields of especially sensitive information (such as credit card numbers), there is the possibility of *encrypting* the data stored. Currently, the Oracle E-Business Suite does not automatically encrypt data, the only exception being *i*Payment. There are several reasons for this:

- Different installations have different requirements for which data should be encrypted; for example, a chemical formula may be of the greatest sensitivity to a pharmaceutical company. Medical databases may have a number of fields that are confidential.

- While the underlying Oracle database does offer data encryption via the DBMS_OBFUSCATION_TOOLKIT, the keys cannot be stored in the database if a goal is to prevent the DBA from decrypting data. Also, encrypted data may be unrecoverable if the keys are lost.

- Encrypting columns has a relatively high cost in terms of resources, and encrypting numerous columns may impact system performance. It is therefore very important to be selective about the columns that are to be encrypted.

- Database-level encryption requires customized programming for each screen and report that accesses the data.

- Third party solutions that work in conjunction with the Oracle E-Business Suite can provide encryption of data where required.

Patching

Applying patches to the Oracle E-Business Suite requires the person performing the patching (normally, the DBA) to provide the passwords for both the SYSTEM and the APPLSYS accounts. Both of these accounts are highly privileged. It is possible to keep the passwords to these accounts secret until just before the patching process begins, at which point the passwords are changed to temporary values that are communicated to the DBA. When patching is complete, the passwords are set back to their previous, secret values. This procedure adds only a few minutes to the patching process, and can help improve security in cases where the DBA is, for example, located in a different country, but it must not be relied on for complete protection of data - the DBA could still carry out unauthorized actions, immediately before or after the patching operation.

Auditing DBA Activity

Rather than trying to *prevent* DBA access to data, it is more realistic to *audit* DBA access to data. The Oracle 10g Release 2 database includes features that can be used to track DBA actions. The audit trail, mentioned earlier, should not be used in place of procedures for hiring trustworthy DBAs, but can be a useful adjunct to them.

Oracle recommends that you strongly protect your audit trail records wherever they are stored. The most secure location for the audit trail, in terms of keeping the content from DBAs, is the operating system's own audit trail or operating system files. Oracle recommends that the database server should write audit records to the operating system, and the file to which Oracle writes audit records should have suitable operating system file protection.

Using an operating system audit trail requires a simple change of the AUDIT_TRAIL database initialization parameter from "DB" to "OS", and prevents privileged database users from reading, modifying or deleting audit records. However, this strategy is ineffective for users who have suitable operating system privileges. Also, the query advantage that SQL brings to audit analysis is lost, unless you have an operating system audit analysis tool that can read Oracle-generated operating system audit records.

> **Note:** For further details of recommended security practices, see Oracle *MetaLink* Note 403537.1, *Best Practices For Securing Oracle E-Business Suite Release 12*.

12

Network Topologies

Introduction

As large companies move to implement a global IT infrastructure, the choice of network topology becomes of increasing importance. This section describes the most significant strategic factors that can affect performance.

Strategies

A large, worldwide organization will typically benefit from the use of a "hub and spoke" network topology, with high-capacity links to regional hubs, and medium-capacity connections from the regional hubs to local offices. The locations of the regional hubs should be based on organizational need, carrier availability, pricing, and network latency. The routes and hops need to be as short and efficient as practicable. Network design for the Oracle E-Business Suite should be based around the needs of the majority of users; satellite users, for example, will normally be a small minority.

> **Note:** For a discussion of the effects of different network layers on load balancing, see Oracle*MetaLink* Note 380489.1, *Using Load-Balancers with Oracle E-Business Suite Release 12*.

Latency

Latency is the time for a packet to travel from its source to its destination, and is a key determinant of network efficiency. In general, Oracle E-Business Suite works very well with average latencies up to 300ms, and is usually found to give acceptable performance with latencies up to 500ms. Note that periods when forms are being loaded (for example, on startup) may be an issue in cases where latency is marginal. A consequence of this is that the newer HTML-based Applications (which do not use Forms) may give better performance than the traditional Forms-based Applications.

Satellite Links

Satellite links can be used with the Oracle E-Business Suite. They are considered to be just another network type, and may be the only choice for users in remote locations. In general, however, they should be employed only where use of terrestrial services is not feasible.

If satellite links are to be used, the network stack should be examined and tuned by a network specialist, to ensure device timeout settings, for example, are configured optimally. The goal is to achieve reliable operation, while maintaining an acceptable response time.

Wireless LANs

Wireless technology is becoming of increasing interest and use to some organizations. However, its deployment must be planned carefully. As well as the security aspects of wireless use, there are several technical considerations. For the Oracle E-Business Suite, the most important issue is the stability of the connection. It is not uncommon to experience dropouts (momentary loss of service) while using a wireless LAN. These may occur as a result of not having the latest firmware revision, or interference from devices that use a similar wavelength, such as cordless phones.

As far as supportability of wireless LANs goes, they are simply considered to be another network topology, and as such are neither supported nor unsupported. Hence it is feasible to run E-Business Suite client PCs over a wireless LAN. However, in the event of problems, it would be desirable to be able to determine whether the problem also occurs via a normal network link, i.e. whether the cause lies in the E-Business Suite or the network. Use of the Forms Listener Servlet architecture may be of benefit in a wireless LAN environment, as it is designed to attempt reconnection (via a configuration parameter) in the event of a network interruption.

13

Globalization Support

Introduction

Oracle Applications Release 12 is designed for ease of deployment in a single global instance that meets the complex requirements of a worldwide enterprise. *Globalization* is the process of designing and deploying software that supports a global enterprise. Key globalization features provided by Release 12 include support for a wide variety of languages and territories, flexible date and number formats to suit local custom, reporting currencies, and other country-specific functionality to provide compliance with local statutory requirements.

The majority of Release 12 Applications products provided multilingual support at the product data level, utilizing the *Unicode* character set. As Unicode supports all characters in common use in all of the world's modern languages, this means there is no inherent limitation on the number of supported languages that can be run in a single database.

> **Note:** To learn more about about character sets, see *Oracle Database Globalization Support Guide*. For more detailed information about globalization in Oracle Applications Release 12, see Oracle*MetaLink* Note 393861.1, *Oracle Applications Globalization Support Guide (Release 12)*
> .

National Language Support (NLS) refers to the ability to run an Applications instance in a supported language, including specific regional number and date formats.

Multiple Language Support (MLS) refers to the ability to support multiple languages in the same Oracle Applications instance. Most products in Applications Release 12 are MLS-enabled. Using a Unicode character set with the MLS architecture allows Oracle Applications to use any combination of supported languages from one database instance. Because it covers the widest range of characters, a Unicode character set such as UTF8 is recommended as the character set for installations that support, or plan to support, multiple languages. Oracle supports over thirty languages in Release 12, which are installed via NLS patches.

> **Note:** For a full list of supported languages, see *Oracle Applications Installation Guide: Using Rapid Install*.

Languages and Character Sets on the Database Tier

By default, Rapid Install creates a production database with the US7ASCII character set, and a Vision demo database with a Unicode character set such as UTF8 . However, you can if desired choose any other supported character set during the installation. Rapid Install recommends a character set based on the languages you license.

Before installing Oracle Applications, you should carefully consider the future language requirements of your installation. The character set you choose during installation determines which languages the instance can support. Review the *Oracle Globalization Support Guide* before choosing a character set. Changing character sets after installation is an involved process, and can be avoided by choosing a character set that will meet your long-term needs.

The US7ASCII character set only supports American English. All other character sets vary in the number of languages they support. For example, if you need to support the French language and also want to use the euro symbol, WE8ISO8859P15 is a superset of US7ASCII, supports both English and French, and contains the euro symbol. If, for example, you need to support English, French, Japanese, and Arabic, you must choose a Unicode character set (such as UTF8) to be able to support all these languages.

The extended multilingual support present in the Applications Release 12 data model may increase database storage requirements. For a new installation, consider the database space required for a single language, and multiply this by the number of languages you will license. In the case of an upgrade, some of the data currently in a single language structure will be converted to a multilingual structure, which will require additional storage.

> **Note:** For further details of installing character sets, see *Oracle Applications Installation Guide: Using Rapid Install*.

Using a multibyte character set such as Unicode UTF8 or Japanese JA16EUC (as opposed to a single-byte character set such as WE8ISO8859P15) may also affect the overall space required for language setup and transaction data, because some characters used may require more than one byte of storage space.

> **Note:** For further details of supported character sets, tips on choosing a database character set, and storage requirements, see the *Oracle Globalization Support Guide*.

Languages and Character Sets on the Application Tier

By default, Rapid Install creates the application tier file system for a production instance with the US7ASCII character set, and the file system for a Vision demo instance with the UTF8 character set. However, you can if desired choose any other supported character set during the installation. Rapid Install recommends the application tier character set based on the languages licensed.

To prevent data loss, character sets on all tiers must be compatible with each other. If one character set does not contain all characters in the other, replacement characters will be used and data lost as a result.

> **Note:** As UTF8 is a superset of all other supported character sets, there are no other fully compatible character sets. If you use UTF8 on the database tier, you must use UTF8 on all tiers.

Rapid Install installs American English on all servers in the application tier. Additional languages may also need be installed, so that all application tier servers have the same set of languages installed.

Character Sets on the Desktop Tier

Language support, which includes support for data input methods, character sets, and fonts, must be available on the desktop client. The character set of the browser is set by Oracle Applications for each session.

The desktop browser must support character set and language-specific capabilities. For instance, Hebrew and Arabic require bidirectional support for right-to-left display, and Arabic also requires a browser capable of special character shaping.

User Preferences

In Release 12, user runtime NLS settings are stored as profile options in the database. The profile options for language and territory are configured at site level when running Rapid Install. The base language is used for the default language setting. The default user territory you choose is used for the territory profile option.

The site level profile option values provide the default NLS settings for all end users. Users inherit these values the first time they log on to Oracle Applications using the E-Business Suite home page. A user can continue to use the default values, or change any of the NLS settings to alternative values. The updated values are stored in the database at user level, and all future sessions are started with them.

A user's NLS preferences (such as language, territory, date format, and number format) are passed with each user request to the application tier servers, where a session is started with the corresponding NLS settings. Application tier processes must be started with the character set of the server, as determined when Rapid Install was run.

Date and Number Formats

You can enter and view dates in any valid format, such as 12-31-06, 31/12/06, or 2006-12-31. The only exception is with Oracle Reports, which always uses the format DD-MON-RRRR, for example 31-DEC-2006.

You can also enter and view numbers with either the period (full stop) character or comma as the decimal separator. For example, 1.02 or 100,000.02 (using the period), or alternatively 1,02 or 100.000,02 (using the comma).

> **Note:** For further details of date and number formats, see *Oracle Globalization Support Guide*.

Regardless of the various formats that may be used to enter dates and numbers, the actual values are stored in the database in uniform canonical formats. This allows date and number values to be entered in one format, and viewed in an alternative format by another user.

Global Application Design

This section describes the key criteria involved in designing and implementing applications that will be used in multiple countries, perhaps all over the world.

Multiple Time Zone Support

Release 12 of Oracle E-Business Suite includes as standard a feature called *User-Preferred Time Zone Support*. In most existing E-Business Suite implementations, all users interact with the system in the "corporate" time zone, which will normally be the time zone of the headquarters of the implementing company, and the time zone in which the database runs. This means that remote users have to be aware of the time difference between their location and that of the corporate headquarters.

Employing the user-preferred time zone feature enables users to specify their local time zone for both display and entry of date-with-time fields. Key consequences of this are:

- Users see date-with-time fields in their preferred (local) time zone, and can enter dates with time in this time zone
- Date fields without a time component are not affected by this feature
- The data in the database continues to be stored in the standard corporate time zone

Time Zone Concepts

Conceptually, there are two types of date fields:

- Dates *with* a time component – used to indicate a specific point in time within a particular day

- Dates *without* a time component – used to denote a particular day, but not a specific point in time within that day

Date fields with a time component can be represented in any time zone, and thus displayed in whichever time zone is most meaningful to the end user. Generally, users prefer to view dates in their own (local) time zone. With the user-preferred time zone feature enabled, date with time fields will be converted to the user's preferred time zone for display.

Date fields without a time component cannot be represented in different time zones, because no meaningful conversion is possible for a date that does not include a specific time. Such a date is entered with respect to one time zone, and in general must be viewed as a day in that time zone, regardless of the location (and possibly different time zone) in which it is being viewed. Oracle E-Business Suite typically uses the corporate time zone for these day definitions: dates without a time component represent the day with respect to the corporate headquarters (corporate days).

There are some exceptions to the above rule. For example, dates without a time component may be held as *ANSI dates,* to represent dates independently of the time zone in which they are being viewed. In such a case, a benefit that starts on 1st January will start on that date wherever in the world it is made available; that is, it will apply to anyone who is in a time zone where it is 1st January.

Many dates without a time component represent pointers to a financial period. These dates are not meant to indicate the exact hour and minute that a transaction occurred, but rather the financial period into which the transaction is accounted. This is a financial bucketing from the perspective of the implementing company. For example, the invoice dates on Payables or Receivables invoices never change based on who is looking at them: they are classified as invoices for that day (and thus that period), regardless of the viewer or his local time zone.

> **Note:** For details of setting up Oracle Applications to use multiple time zones, see *Oracle Applications System Administrator's Guide - Configuration*. Also see Oracle*MetaLink* Note 402650.1, *User Preferred Time Zone Support in Oracle E-Business Suite Release 12*.

Reporting Currencies

The Reporting Currencies feature, described in more detail in Chapter 15, allows you to report on and maintain accounting records in more than one functional currency. This can be done at the subledger journal level, General Ledger journal level, or balance level. You define one or more *reporting currencies*, and assigning them to a *primary ledger* or *secondary ledger* using General Ledger's *Accounting Setup Manager*.

A secondary ledger is an optional, additional ledger that is associated with the primary ledger for an accounting setup. Secondary ledgers can be used to represent the primary ledger's accounting data in another accounting representation that differs in one or more of the following from the primary ledger: chart of accounts, accounting calendar/period type combination, currency, or subledger accounting method.

A *reporting currency* is a currency, other than your ledger currency, for which you need to report. The reporting currency shares the same chart of accounts and accounting calendar as the source ledger (either the primary ledger or secondary ledger), but typically uses a different currency. The reporting currency allows you to report in a different currency than that of your primary or secondary ledger.

Each ledger is defined with a ledger currency that is the primary record-keeping currency to record your business transactions and accounting data within subledgers and General Ledger. In the primary ledger, the ledger currency is always the primary ledger currency. Usually, the primary ledger currency is the currency in which you perform most of your business transactions, and the one you use for legal reporting.

You must define a separate reporting currency for each additional currency representation you need. You assign reporting currencies to primary and/or secondary ledgers using General Ledger's Accounting Setup Manager.

> **Note:** For further details about reporting currencies, see *Journal or Subledger Level Reporting Currencies in Oracle General Ledger User's Guide*, and *Reporting Currencies* in*Oracle Financials Implementation Guide.*.
>
> For further details about secondary ledgers, see *Secondary Ledgers* in *Oracle Financials Implementation Guide*.

Country-Specific Functionalities

One requirement for successful globalization is to meet the statutory, legal, and cultural practices of a given locality. In Oracle E-Business Suite Release 12, this is achieved is through national and regional extensions called *country-specific functionalities*. Because country-specific functionalities are all compatible with each other, installation of all required country-specific functionalities results in a globalized implementation.

All country-specific functionalities are installed when you run the Rapid Install. You simply need to license those you wish to use. The functionality of each country-specific functionality is described in a special *User's Guide* for each country.

External Documents

External documents are those documents intended for customers and trading partners, such as bills of lading, commercial invoices, and packing slips. Oracle E-Business Suite Release 12 is capable of producing external documents in any of the active languages, simultaneously and with a single request. A company's customer in Italy, for example, could receive invoices printed in Italian, and a customer in Poland could receive invoices printed in Polish.

You can send external documents to different printers based on language, and route completion notifications to different people according to the requested language. For example, you could route all French documents to one printer, and all other documents to another printer. You could send completion notifications for Spanish documents to one user, and all notifications, including Spanish, to another.

> **Note:** See *Oracle Applications System Administrator's Guide - Configuration* for a list of external documents provided in Release 12.

14

Multiple Organization Architecture

Introduction

The *Oracle Applications Multiple Organizations Architecture* (hereafter referred to as *Multiple Organizations*), provides support for multiple organizations in a single installation of Oracle E-Business Suite, with relationships you define. Multiple Organizations specifies how the different organizations interact, and how transactions flow between them. These organizations can be ledgers, business groups, legal entities, operating units, or inventory organizations.

Overview

When you run any Oracle Applications product in a Multiple Organizations environment, you first choose an organization, either implicitly (by choosing a responsibility), or explicitly (by selecting an operating unit when entering data in transaction entry pages, or by running reports). Inventory organizations can be selected in the Choose Organization window; each subsequent window and report displays information for the chosen organization only.

The following terms are fundamental to the Multiple Organizations architecture:

Table 14-1 Multiple Organizations Terminology

Ledger (Set of Books in previous releases)	A financial reporting entity that uses a particular chart of accounts, functional currency, accounting calendar, and subledger accounting method. Oracle General Ledger secures transaction information (such as journal entries and balances) by ledger. A single Oracle General Ledger responsibility can access, process, and report on data for one or more ledgers that is assigned to its Data Access Set.
Operating Unit	An organization used by Oracle subledgers, such as Oracle Cash Management, Oracle Order Management and Shipping Execution, Oracle Payables, Oracle Purchasing, or Oracle Receivables. In this context, the organization may be a sales office, a division, or a department. An operating unit is associated with a legal entity and primary ledger. Information is secured by operating unit. A single application responsibility can access, process, and report on data for one or more operating units that is assigned to its security profile.

Note: For further details, see: *Oracle Applications Multiple Organizations Implementation Guide*, *Oracle General Ledger Implementation Guide*, and *Oracle Financials Implementation Guide*.

Multiple Organizations Partitioned Objects

Tables that contain Multiple Organizations data can be identified by the suffix "_ALL" in the table name. These tables include a column called ORG_ID, which partitions Multiple Organizations data by organization..

Every Multiple Organizations table has a corresponding view that partitions the table's data by operating unit. Multiple Organizations views partition data by including a DECODE on the internal variable CLIENT_INFO. This variable is set by the security system to the operating unit designated for the responsibility. It operates is a similar way to the LANGUAGE variable, which returns the language of the current session.

Note: If accessing data from a Multiple Organizations partitioned object when CLIENT.INFO has not been set (for example, from SQL*Plus), you must use the _ALL table, not the view.

SO_HEADERS_ALL, with its corresponding view SO_HEADERS, is an example of a Multiple Organizations partitioned object.

Converting to Multiple Organizations

When you install a production E-Business Suite system, the data model is identical whether you implement Multiple Organizations or not. The Multiple Organizations views used to partition data are incorporated into the normal install, and use predefined text. When you convert to Multiple Organizations, tables are renamed to use the "_ALL" suffix to denote that they now contain Multiple Organizations partitioned data.

In Release 12, the AD Administration utility is used for the initial conversion of seed data and transaction data to Multiple Organizations format. Note that the underlying data model is not changed. When you create a new operating unit, a concurrent program adds the appropriate seed data.

> **Note:** For further details, see AD Administration, *Oracle Applications Maintenance Utilities*.

15

Reporting Currencies

Introduction

The *Reporting Currencies* feature allows you to report and maintain accounting records in more than one functional currency. You do this by assigning one or more *reporting currencies* to your primary ledger or secondary ledger using General Ledger's Accounting Setup Manager. A secondary ledger is an optional, additional ledger that is associated with the primary ledger for an accounting setup. Secondary ledgers can be used to represent the primary ledger's accounting data in another accounting representation that differs in one or more of the following from the primary ledger:

- Chart of accounts
- Accounting calendar/period type combination
- Currency
- Subledger accounting method
- Ledger processing options, such as Suspense Posting

Unlike secondary ledgers, reporting currencies must share the same chart of accounts, accounting calendar/period type combination, subledger accounting method, and ledger processing options as their source ledger.

As a general rule, always use reporting currencies instead of secondary ledgers if you only need to maintain an accounting representation that differs in currency alone. You can assign reporting currencies to both primary and secondary ledgers. Reporting currencies are maintained at one of the following currency conversion levels:

- **Subledger**: Maintains a currency representation of your subledger journals, General Ledger journal entries, and balances. When using the subledger level reporting currency, you must define subledger accounting rules using Subledger Accounting. These rules provide instructions on how to convert subledger data entered into the source ledger to one or more subledger level reporting currencies. You must also define journal conversion rules that General Ledger Posting uses to automatically convert specific journals, such as manual journal entries, to one or more subledger level reporting currencies.

> **Note:** Subledger level reporting currencies can only be assigned to primary ledgers, not secondary ledgers.

- **Journal**: Maintains General Ledger journal entries and balances in another currency representation. Journal level reporting currencies are maintained using the General Ledger Posting Program. Every time a journal is posted in the source ledger, such as the primary ledger or secondary ledger, the journal is automatically converted to the respective journal level reporting currency based on the journal conversion rules defined.

- **Balance**: Maintains balances in another currency. The General Ledger Translation program is used to convert balances from the source ledger to the balance level reporting currency. When you run Translation in your primary or secondary ledger and specify a target currency, the translated balances are reflected in the balance level reporting currency.

> **Note:** If a balance level reporting currency is not assigned to the ledgers in the accounting setup, a balance level reporting currency is automatically created the first time Translation is run. The name of the balance-level reporting currency is the same as its source ledger, except that its currency code, such as GBP, is appended to its name.

The subledger level and journal level reporting currencies act similarly to ledgers. You must open and close the periods for these reporting currencies before you can enter transaction and journal entries. You can also enable journal approval for these reporting currencies if planning to enter manual journal entries directly to these reporting currencies.

Functional Currencies

The following terms are fundamental to using Reporting Currencies:

Table 15-1 Functional Currencies and Ledgers

Functional Currency	Your organization's functional currency as discussed in SFAS #52 and IAS 21 can be different from the ledger currency that is assigned to primary and secondary ledgers. For example, you may choose Japanese Yen (JPY) for your ledger currency when your functional currency for the accounting purposes of your integrated business group is actually US Dollars (USD). The determination of the functional currency is based on a number of factors, discussed in SFAS #52 and IAS 21.
Ledger Currency	The ledger currency is the currency you assign to a ledger, such as the primary ledger or secondary ledger, and represents the base currency that is used to record transactions and maintain your accounting data within Oracle Applications. The primary ledger's currency is generally the currency in which you perform most of your business transactions and the one you use for legal reporting.
Reporting Currency	A currency, other than your ledger currency, for which you need to report. The reporting currency shares the same chart of accounts and accounting calendar as the source ledger (either the primary ledger or secondary ledger), but typically uses a different currency. The reporting currency allows you to report in a different currency than that of your primary or secondary ledger.
Primary Ledger	A financial reporting entity in which you conduct business. The primary ledger acts as the main, record-keeping ledger and uses a particular chart of accounts, accounting calendar, currency, and subledger accounting method.

Secondary Ledger	An optional, additional ledger that is associated with the primary ledger for an accounting setup. Secondary ledgers can be used to represent the primary ledger's accounting data in another accounting representation that differs in one or more of the following from the primary ledger: • Chart of accounts • Accounting calendar/period type combination • Currency • Subledger accounting method • Ledger processing options, such as Suspense Posting

Note: For further details about reporting currencies, see Journal or Subledger Level Reporting Currencies in *Oracle General Ledger User's Guide* and Reporting Currencies in *Oracle Financials Implementation Guide*. For further details about secondary ledgers, see Secondary Ledgers in *Oracle Financials Implementation Guide*.

Glossary

applet

A Java program that is downloaded to a desktop client from an HTTP server, and runs within a Java-enabled web browser. Applets are restricted in their capabilities compared to servlets.

See also: servlet

application server

Server that resides in an application (middle) tier, between the desktop clients and database tier. Desktop clients send their requests to an application server, which processes the request or send it to another server, such as the database server. The desktop clients never connect directly to the database server.

See also: tier

applmgr

The account used to install and upgrade Oracle Applications. This account owns the Oracle Applications product files.

APPS schema

An ORACLE schema that has access to the complete Oracle Applications data model.

audit trail

A record of every user's login, including time stamp, session ID, and transactions carried out in the session. Can be used to identify unauthorized access and activities.

AutoConfig

A configuration management tool for an Oracle Applications Release 12 environment, AutoConfig includes a number of scripts and other files that simplify the process of making updates to a system. A key file is the *Applications context file*.

Automatic Undo Management (AUM)

A database feature, automatic undo management is based on the use of *undo tablespaces* rather than *rollback tablespaces* and *rollback segments*.

See also: rollback tablespace, rollback segment, undo tablespace

background process

A noninteractive process that runs in an operating system environment and performs a specific task.

bandwidth

The amount of data that can be sent through a network connection in a fixed period of time, usually measured in bits per second (bps). The speed and capacity of a network depend on both bandwidth and latency.

See also: latency

base language

The language used for seed data and setup data for tables that are not structured for mulitlingual support.

BC4J

An acronym for Oracle *Business Components for Java*, BC4J is a 100% Java-compatible, XML-based framework designed to facilitate the development and portable deployment of multi-tier database applications.

browser

See: Web browser

CBO

See: cost-based optimizer

certificate file

Contains the identity of a trusted source that the desktop client uses to guarantee the authenticity of a JAR file. Information within the certificate file allows the desktop client to decrypt the digital signature of the JAR file. The identity must be validated successfully before the desktop client downloads and executes the JAR file.

See also: digital signature, JAR file

CGI

Acronym for *Common Gateway Interface*, a specification for transferring information between a Web server and a program designed to process data that conforms to the CGI specification. Such *CGI programs* are a very common way to enable a Web server to interact dynamically with users.

See also: Perl

character set

A set of encoded binary values that represents the letters, numerals, and punctuation marks of a language, or of a group of languages that use similar written symbols. For example, the WE8ISO8859P1 character set can be used by English and many other languages that use a Latin-based alphabet and Arabic numerals. Terminals and printers handle text data by converting these encoded values to characters. A character set may also be called a *codeset*.

client/server architecture

A configuration in which one or several servers perform database processing or other functions for applications that are run on clients. Software must be installed on each client before the client can interact with the servers. The client/server architecture is not used by Oracle E-Business Suite Release 12.

clone

A copy of an Oracle Applications system, typically used for testing purposes. A clone can be created by using the Rapid Clone tool, or from Oracle Applications Manager.

codeset

See: character set

command

An instruction or request for the system to perform a particular action. An entire command may consist of the command name, plus one or more parameters and qualifiers.

command file

A file containing a predefined sequence of commands to be executed by the operating system.

Common Gateway Interface

See: CGI

concurrency

Simultaneous access of the same data by multiple users.

concurrent manager

A process manager that coordinates the processes generated by users' requests to run various data-intensive programs. An Oracle Applications product group can have several concurrent managers.

See also: internal concurrent manager

concurrent process

A task run by a concurrent manager. A concurrent process runs simultaneously with interactive functions and other concurrent processes.

Concurrent Processing server

An Oracle Applications server that runs time-consuming, non-interactive tasks in the background.

concurrent queue

A list of concurrent requests awaiting completion. Each concurrent manager has its own queue of pending requests.

concurrent request

A request issued to the Concurrent Processing server to process a noninteractive task, such as running a report.

consolidated update

A collection of recommended patches and rollups for a particular maintenance release, consolidated into a single patch that is installed immediately following use of Rapid Install or application of a maintenance pack.

See also: maintenance pack, Rapid Install

cost-based optimizer

Oracle database server component that determines the optimum execution path for an SQL statement by considering statistical information for the tables and indexes that the SQL statement will access. The cost-based optimizer (CBO) also considers hints, which can be employed to suggest a particular access path. Oracle Applications Release 12 uses cost-based optimization exclusively.

See also: hint

customization

Enhancements to an Oracle Applications system made to fit the needs of a specific user community.

data dictionary

A set of Oracle database tables and views that contains administrative information about users, data storage, and privileges. It is created and maintained automatically.

database

A collection of data, stored in tables, and objects, such as stored procedures and triggers. The term can also refer to the software used to create, store, and manage this data, such as the Oracle database server.

See also: Database server, Oracle database

database administrator (DBA)

The person who prepares the Oracle database server and Oracle tools for an installation or upgrade of Oracle Applications, and performs maintenance on them after the installation. The DBA has highly privileged access to the database via the SYSTEM and SYS accounts.

database instance

The combination of background processes and memory used by an Oracle database. Often simply called an *instance*, and used to refer to a running Oracle database system. There is always a one-to-one correspondence between an Oracle instance and a system global area (SGA).

See also: SGA

database object

A logical entity created and stored in a database. Tables, views, synonyms, indexes, sequences, stored procedures, materialized views, and triggers are all examples of database objects.

Database server

[1] The Oracle database that constitutes the database tier of an Applications system. The database server stores the data maintained by Oracle Applications, and processes SQL and Java requests from Concurrent Processing servers, Forms services, and Web services.

[2] The machine on which an Oracle database resides.

See also: Oracle database

database space

The amount of disk space used by a set of database objects.

dbc file

A configuration file that contains information required to connect to the database.

demonstration product group

A product group that includes predefined transaction data for Oracle Applications products. It is used primarily for system testing and user training.

See also: product group

dependent product

An Applications product that is not licensed, but whose files are shared in part by a fully installed Applications product. A dependent product is also known as a *shared product*.

desktop client

A computer that sends user requests to the Web server and handles responses such as screen updates, popup lists, graphical widgets, and cursor movements.

diagnostic patch

A special patch used to gather additional information needed by Oracle to resolve a problem.

digital signature

A means of guaranteeing the authenticity of a program or collection of data, such as a JAR file. It is typically an encrypted message that contains the identity of the code's author.

See also: certificate file, SSL

distributed concurrent processing

See: parallel concurrent processing

distributed directory structure

Applications product files installed in more than one file system, as when there is insufficient disk space in a single file system for all Applications product files.

DMZ

The demilitarized zone (DMZ) is the area between outer and inner firewalls, used to protect servers from attempts at unauthorized access to a network or intranet.

See also: firewall

environment file

A command file that sets environment variables. Only servers running UNIX use environment files; Windows servers use the Windows registry instead.

See also: registry

environment setting

A parameter that controls the behavior of Applications and Applications programs for your installation. Environment settings are stored as environment variables on UNIX servers and as registry keys or environment variables on Windows servers.

environment variable

A variable maintained by the UNIX shell that can be referenced by any program running within the shell. Environment variables hold values used by many Oracle programs and utilities.

On Windows, a string consisting of environment information, such as a drive, path, or filename, associated with a symbolic name. You can define environment variables using the System applet in the Control Panel or from the Windows command prompt.

export utility

An Oracle database server utility used to write database data to operating system files external to the database. The corresponding *import* utility can subsequently be used to read the data back into the same database, or a different one.

See also: import utility

extension

The part of a filename (suffix) after the dot, used to indicate the type or purpose of the file. For example, the extension .sql denotes a SQL*Plus script.

extent

A specific number of contiguous data blocks that store a specific type of information. A *segment* is made up of a number of extents.

See also: segment

family consolidated update patch

An aggregation of all upgrade-related patches consolidated from all products within a single product family. Family consolidated update patches are released as needed.

family pack

A collection of patches at the product family level. Product family codes end in *_PF*. Successive family packs can be identified by the alphabetical suffix, such as .B or .C. Family packs are cumulative, each containing the fixes and enhancements that were in its predecessors.

failover

The utilization of an alternative component in a computer system to allow processing to continue after a similar component fails.

firewall

A computer that acts as an intermediary to protect a network from unauthorized access, by examining requests and countering suspicious access attempts. A firewall is often used in conjunction with a *proxy server*.

See also: proxy server

form

A related collection of fields, regions, and graphical components that appears in a single window. Data can be entered by typing information into the relevant fields.

Forms client

A Java applet that runs on a desktop client and provides the user interface and interaction with Forms.

Forms server

See: forms services

Forms services

An application component that hosts the Oracle Forms engine. Traditionally referred to as *Forms server*, a term that does not accurately reflect the architecture used in Release 12. Forms services mediate between the desktop client and the database, providing input screens for the Forms-based products on the desktop client and creating or changing database records based on user actions. Release 12 uses the *Forms Listener Servlet* by default.

Generic Service Management (GSM)

A fault-tolerant framework for generic service processes. GSM utilizes a central management console built into Oracle Applications Manager.

See also: Oracle Applications Manager

Gigabyte (GB)

A unit of memory or disk space equal to 1,073,741,824 bytes. One Gigabyte is equal to 1,024 Megabytes. Often rounded to 1,000,000,000 bytes, i.e. a billion bytes.

GSM

See: Generic Service Management

GUI (Graphical User Interface)

An interface used with personal computers and workstations that allows the user to access fields and regions of the screen with a pointing device, typically a mouse.

hint

An optimization suggestion placed in a Comment of an SQL statement.

See also: cost-based optimizer

HTML

An acronym for *HyperText Markup Language*, a simple predefined markup language used to format documents for viewing with a Web browser.

See also: XML

HTTP

An acronym for *HyperText Transfer Protocol*, the network protocol used for communication between an HTTP server and a Web browser, to determine the actions Web servers and browsers take in response to various commands.

See also: HTTPS

HTTPS

A version of HTTP that provides additional features needed for secure data transmission.

See also: HTTP

HTTP server

An server that sends out Web page content in response to HTTP requests from remote browsers. Often referred to as a *Web server*.

See also: Web browser

import utility

An Oracle database server utility used to read operating system files written by the *export* utility. Can be used to restore data into a database or transfer data to another database.

See also: export utility

index

A database object associated with a table, used by the Oracle database server to locate rows of that table quickly.

initialization parameters

Parameters defined in an initialization file that configure an Oracle database. The parameters affect many aspects of database activity, including performance, and should in general only have their values modified under expert supervision.

instance

See: database instance

internal concurrent manager

A special concurrent manager process that monitors, controls, and dispenses requests to all other concurrent manager processes.

See also: concurrent manager

interoperability patch

A patch needed to enable use of Oracle Applications products with a newer version of the technology stack, for example to enable integration with Oracle Single Sign-On.

intranet

A network of computers that are internal to an organization. An organization's intranet can be set up to communicate with the globally-distributed Internet, using appropriate security measures such as firewalls and demilitarized zones (DMZs).

See also: DMZ, firewall

J2EE

An acronym for *Java 2 Platform, Enterprise Edition*, J2EE is a development environment that facilitates development, deployment, and management of multi-tier enterprise level applications.

J2SE

A Sun plug-in component, J2SE enables use of the Oracle JVM on a desktop client, instead of the browser's own JVM. The J2SE Plug-in is installed when first required, the browser prompting the user to download the installation executable.

Java

A computer language used to produce programs that can be downloaded and run on a desktop client using a Web browser. It is also used to produce platform-independent programs that run on a server, either interactively or when invoked through a request from a Web browser.

See also: applet, servlet

JavaServer Page

See: JSP

JAR (Java ARchive) file

A collection of Java *classes* compressed into a file for faster download to a desktop client. There are several specialized types of JAR file.

See also: Java class

Java class

Components of a Java program that define objects and operations performed on objects. Also identifies an operating system file that contains a program or part of a program written in Java.

JDBC (Java Database Connectivity)

A Java programming interface that enables Java programs to access the Oracle database server.

JServ

A specialized type of servlet that was used for communication with the Oracle HTTP Server in earlier releases of Oracle Applications. Replaced by *OC4J* in Release 12.

See also: OC4J, Oracle HTTP Server, servlet

JSP

Acronym for *JavaServer Page*, an extension to Java servlet technology. JSPs are compiled into servlets when first requested, and can receive input from a servlet or send output to a servlet. Their dynamic scripting capability allows page logic to be separated from page display, giving greater flexibility in processing HTTP requests.

See also: servlet

JVM (Java Virtual Machine)

A runtime environment that interprets (translates) a compiled Java program, supplied in the form of *bytecode*, to machine code. Each operating system's JVM translates bytecode to instructions that can be executed by the CPU. Java bytecode is therefore executable by any JVM running on any machine. A Java-enabled Web browser has an internal JVM that allows it to execute applets or applications written in Java.

LAN (Local Area Network)

A limited-distance, high-speed, data communications network that allows various data processing resources to be connected and shared. A LAN is a network contained within a single physical site (one or more buildings), as opposed to a Wide Area Network (WAN).

See also: WAN

latency

In networking, the time a packet of data takes to travel from its source to destination. A measure of the speed of a network.

See also: bandwidth

LDAP

An acronym for Lightweight Directory Access Protocol, LDAP allows clients to access information from a directory server in which corporate directory entries are arranged in a hierarchical structure that can be used to reflect geographical or other organizational boundaries.

See also: Oracle Internet Directory

ledger currency

The currency used to record transactions and maintain Oracle Applications accounting data using primary and secondary ledgers.

See also: reporting currency

load balancing

The mechanism for distributing tasks to the least-busy server of the servers that are handling a particular workload.

LOCAL

A Windows-specific environment setting that identifies the network alias of an ORACLE instance running on the local machine or on a networked machine. This variable overrides any setting for ORACLE_SID and causes the Oracle Net software to manage the connection request.

See also: ORACLE_SID, TWO_TASK

locally managed tablespaces

Tablespaces that are not managed from the data dictionary. They offer a choice of extent management, allowing extent sizes either to be determined automatically by the system, or for all extents to be made the same size. This provides greater flexibility than the traditional dictionary-managed tablespaces.

See also: Oracle Applications Tablespace Model

log in

Perform a sequence of actions that authenticates a user and establishes communication with an operating system or application such as the Oracle database server or Oracle E-Business Suite. Logging in also sets up appropriate characteristics for the session, based on the user's particular privileges.

MAC address

A hardware address that uniquely identifies a node on a network, specifically in the Media Access Control (MAC) sub-layer of the Data Link layer of the OSI Reference Model. The other sub-layer of the Data Link layer is the Logical Link Control (LLC) layer.

materialized view

Schema objects that store the results of a specific query, enabling data to be summarized, precomputed, replicated, or distributed.

Megabyte (MB)

A unit of memory or disk space equal to 1,048,576 bytes (1024 x 1024). Often rounded down to 1,000,000 bytes for estimates of space needed.

Multi-Org

See: Multiple Organization Architecture

Multiple Organization Architecture

A single installation of any Oracle Applications product that can support any number of organizations and different ledgers. The data contained in product schemas is for all organizations, and is partitioned by the ORG_ID column in tables.

Maintenance Mode

A mode of operation in which the Oracle Applications system is accessible only for patching activities. Maintenance Mode status is controlled from within Oracle Applications Manager.

See also: Restricted Mode

maintenance pack

A large aggregation of patches that covers all products in the E-Business Suite. A new *Rapid Install* program is normally released with a maintenance pack.

See also: Rapid Install

minipack

An aggregation of patches at the product level, for example Oracle Inventory. Minipacks are cumulative, a later one including all the fixes and enhancements in its predecessors. Sometimes referred to as a *patchset*.

NLS (National Language Support)

Oracle's National Language Support (NLS) allows you to store, process, and retrieve data in the language native to your users. It ensures that database utilities and error messages, sort order, date, time, monetary, numeric, and calendar conventions automatically adapt to the native language and locale.

node

[1] A networked machine with its own *MAC address*.

[2] In the context of Oracle E-Business Suite, a logical set of processes running on one hardware machine. Sometimes used as a synonym for *server*. Multiple nodes can be created on one machine, or nodes can be allocated their own dedicated machines. There is an increasing trend towards deploying multiple nodes on multiple machines, to increase fault tolerance and lower the cost of ownership. This is particularly true for the application tier.

See also: MAC address, server

OC4J

Oracle Containers for Java (OC4J) is an Oracle Application Server component that replaces the JServ component used in earlier releases of E-Business Suite. Based on J2EE standards, OC4J allows execution of Servlets, Java Server Pages (JSP), and Enterprise Java Beans (EJB).

See also: JServ

OID

See: Oracle Internet Directory

one-off patch

A patch that addresses a single fix or enhancement. Such standalone patches are released only to meet an immediate need for a fix or enhancement that cannot wait until an aggregate bundling is available.

operating system

The computer software that performs basic tasks such as scheduling CPU time, allocating memory, and supervising communications between different computers.

ORACLE_HOME

An environment setting that specifies the top-level directory for Oracle database server program files.

ORACLE_SID

An environment setting that specifies the SID of an ORACLE instance. See also *TWO_TASK* and *LOCAL*.

See also: SID

Oracle Applications Manager

A sophisticated tool that enables system administrators to monitor and manage an Oracle Applications system from an HTML-based central control console.

Oracle Business Components for Java

See: BC4J

Oracle HTTP Server

Provides the foundation for the Oracle Application Server Web services. Built on Apache Web server technology, Oracle HTTP Server supports Java servlets, JavaServer Pages (JSPs), perl, PL/SQL, and CGI applications.

See also: JSP, servlet

Oracle Applications Tablespace Model (OATM)

A storage model used as standard in Oracle Applications Release 12, OATM uses locally managed tablespaces to provide more flexible storage options then the dictionary-managed tablespaces used in the traditional tablespace model.

See also: locally managed tablespaces

Oracle Database

The database management system used by Oracle Applications. An Oracle database is made up of various different types of file.

See also: instance

Oracle Discoverer

A component of Oracle Application Server that enables Applications end users to perform ad hoc queries and analyze the resulting query results, without knowing how the data is structured. Discoverer can also be used in a more sophisticated way by specialized users such as business analysts.

Oracle Internet Directory

Oracle Internet Directory (OID) is a general purpose directory service for retrieval of information about users and resources, which utilizes LDAP in conjunction with the high performance, scalability, robustness, and availability of the Oracle database.

See also: LDAP

Oracle Net

The Oracle software that enables network connectivity between a client machine and the Oracle database server. Oracle Net manages communication sessions between these machines by opening and closing sessions, and by packaging and sending SQL statements and the corresponding database responses.

Oracle Portal

Part of the Oracle Application Server product, Oracle Portal is a tool for building customized corporate pages to provide a personalized view of selected applications and data (called a *portal*). Oracle Portal provides a customizable, easy to use HTML-based interface. Support tools for performance monitoring and security management are also included.

ORACLE schema

See: schema

Oracle Single Sign-On

An Oracle product that authenticates the username and password of a user attempting to access an application, and passes the users's identity to various applications as required.

See also: single sign-on

ORACLE user ID

A user name employed to access an ORACLE instance. Used in conjunction with a *password*.

Oracle Workflow

A product that facilitates automation of business processes, internally or externally routing information of any type according to easily-changed business rules.

Oracle XML Publisher

An Oracle Applications product that uses standard technologies and tools to facilitate the rapid and easy development of reports in the end-user's preferred format.

See also: XML

parallel concurrent processing

Distribution of concurrent processes amongst multiple Concurrent Processing servers. Also called *distributed concurrent processing*.

password

An identification word, associated with a username, that must be supplied to access an ORACLE instance or an Oracle Applications system.

Perl

An acronym for *Practical Extraction and Report Language*, Perl is an interpretive programming language that is particularly useful for processing text. As such, it has become one of the most popular languages for writing CGI scripts.

See also: CGI

platform

The type of computer system (hardware and operating system), on which application programs run. Some Oracle Applications functionality is platform-specific, meaning its availability and behavior may vary between different platforms.

PL/SQL

A procedural extension of the SQL programming language that provides programming constructs such as blocks, conditionals, and functions.

portal

See: Oracle Portal

portlet

A reusable component that provides access to an information source, possibly summarizing the content. Portlets are the fundamental building blocks of an Oracle Portal page.

See also: Oracle Portal

primary ledger

A financial reporting entity in which business is conducted. The primary ledger acts as the main record-keeping ledger, and uses a specific chart of accounts, accounting calendar, currency, and subledger accounting method.

See also: reporting currency

Pro*C/C++

An Oracle precompiler product that allows developers to embed standard database calls to an ORACLE database in C and C++ programs.

product group

A set of Oracle Applications product schemas linked together by a single Oracle Application Object Library schema.

provisioning

The transfer of user attributes from one repository (such as Oracle E-Business Suite) to another (such as Oracle Internet Directory). Provisioning is controlled by *provisioning profiles*.

proxy server

A secure means of allowing users behind a firewall to access external Internet resources. All requests from intranet users go via the proxy server rather than directly to the destination server. The proxy server then passes the returned information on to the client. All Internet traffic for a site thereby passes through a single, secure point.

Oracle RAC

See: Oracle Real Application Clusters

Rapid Install

The installer for Oracle Applications. Normally, a new version is released to accompany a maintenance pack. Using Rapid Install provides the same Applications code as could be obtained by applying the associated maintenance pack to an earlier release level. It also provides the latest certified technology stack. In contrast, applying a maintenance pack provides Applications code only.

See also: maintenance pack

Oracle Real Application Clusters

Oracle Real Application Clusters (Oracle RAC) is a database clustering technology whose shared storage capabilities allow multiple machines to work in parallel on the same data, reducing processing time significantly. Oracle RAC also offers resilience, allowing processing to continue in the event of one or more machines being unavailable because of planned or unplanned downtime.

registry

On a Windows machine, a central repository that holds configuration information. During installation, Oracle Applications writes data to the registry. You can also edit the registry directly with the Registry editor (*regedt32.exe* or *regedit.exe*), though this should only be undertaken by an expert user.

See also: registry key, registry subkey

registry key

A folder that appears in the left pane of the Registry editor window. A key can contain *registry subkeys* and *value entries*.

See also: registry, registry subkey

registry subkey

A key within a registry key; analogous to a subdirectory in a file system. Subkeys are provided to carry out product-specific functions. Oracle E-Business Suite stores information about a product group in a registry subkey.

See also: registry, registry key

remote procedure call

A remote procedure call (RPC) is a protocol that enables a client to execute a program on a server. The client sends a message to the server with appropriate arguments, and the server returns a message containing the program's results.

report

A user-organized display of Oracle E-Business Suite information. A report can be viewed online or sent to a printer. The content of a report can range from a summary to a complete listing of values.

Report Review Agent

A tool used by Oracle Applications to view concurrent processing files online.

Reporting Currencies

An Oracle Applications feature that allows you to create, maintain, and report on accounting data in multiple currencies at one of the following levels: Subledger, Journal, and Balance.

reporting currency

A currency, other than your ledger currency, for which you need to report. The reporting currency shares the same chart of accounts and accounting calendar as the source ledger (either the primary ledger or secondary ledger), but typically uses a different currency. The reporting currency allows you to report in a different currency than that of your primary or secondary ledger.

See also: ledger currency

reserved word

A word that has a special meaning to a computer program, for example END. Custom-built programs that integrate with Oracle Applications must not use reserved words.

responsibility

A collection of functions within Oracle E-Business Suite. Each user is assigned one or more responsibilities to allow access to the appropriate functions and data.

Restricted Mode

A mode of operation that allows Applications administrators to carry out privileged tasks such as viewing the progress of a patching session.

See also: Maintenance Mode

rollback segment

Historically, an Oracle database object used to undo (roll back) changes to the database in the event of media recovery or request for transaction rollback. Superseded by *undo segment* in Oracle9*i* and later database server releases.

See also: undo tablespace

rollback tablespace

Historically, a tablespace created for rollback segments. Superseded by *undo tablespace* in Oracle9*i* and later database server releases.

See also: undo tablespace

rollup patch

An aggregation of patches at either a functional level (such as flexfields), or at a specific product or family release level (such as Oracle Marketing).

RPC

See: Remote procedure call

schema

An ORACLE account or ORACLE ID.

secondary ledger

An optional, additional ledger that is associated with the primary ledger. A secondary ledger can be used to represent the primary ledger's data in another accounting representation, which differs from the primary in one or more of the following: chart of accounts, accounting calendar/period type combination, currency, and subledger accounting method.

segment

A set of *extents* that contains all the data for a specific logical storage structure in a tablespace. Examples include the data segment for a table and index segment for an index.

See also: extent

server

[1} A process that provides a particular functionality. For example, the HTTP server responds to HTTP requests. In Release 12, *server* is, where applicable, being replaced by *services*, to reflect the architectural trend away from implementation via a single process.

[2} A computer dedicated to a particular role. For example, a database server.

service

[2] On Windows, a process that provides a particular operating system or application functionality, such as the telnet remote logon service. Used by Oracle E-Business Suite to support concurrent processing, for example.

servlet

A small Java program that runs on an HTTP server, rather than being downloaded to a desktop client and run as an applet in a Web browser environment. Servlets have greater capabilities and fewer restrictions than applets.

See also: applet, JSP

setup data

Company-specific configuration data, such as locations, freight terms, and payment terms. You create this data when initially configuring an Oracle Applications product.

SGA (System Global Area)

An Oracle-reserved section of memory that provides communication between database users and the ORACLE background processes.

shared product

See: dependent product

short name

An abbreviation for an Oracle Applications product (such as *po* for Purchasing).

SID

An acronym for *System Identifier*. The SID is used to distinguish between different Oracle instances that may be running on a system.

See also: ORACLE_SID

single sign-on

The infrastructure whereby a user need only be authenticated explicitly once, with subsequent connections to other applications being authenticated transparently to the user. SSO allows a user to access multiple accounts and applications with a single username and password.

See also: Oracle Single Sign-On

sizing factor

An integer that determines the growth rate, as a percentage of their defaults, for the database objects of an Oracle Applications product.

SQL (Structured Query Language)

An internationally standardized language that is used to access data in a relational database.

SQL script

A file containing SQL statements that you can run with a tool such as SQL*Plus to query or update ORACLE data.

SSL

An acronym for Secure Sockets Layer, SSL is a standard for the secure transmission of documents over the Internet using HTTPS. SSL uses digital signatures to check that transmitted data has not been tampered with.

See also: digital signature, HTTPS

subdirectory

A directory that is contained within another directory.

Support Cart

A component of Oracle Applications Manager. Support Cart is used to gather diagnostic information for use by Oracle Support.

See also: Oracle Applications Manager

synonym

An alias for a table, view, sequence, or program unit that masks the real name and owner of the object, provides public access to the object, and simplifies the writing of SQL access statements for the object.

syntax

The rules by which commands, qualifiers, and parameters are organized to form valid instructions to an operating system or application program.

SYS username

One of two standard DBA usernames automatically created with each database (the other is SYSTEM). SYS owns the base data dictionary tables and views.

See also: SYSTEM username

SYS.DUAL table

Owned by the SYS user, the DUAL table contains exactly one row. It is used as a "dummy" table in a SQL statement to return values that are not stored in tables, including constant values, evaluations of arithmetic expressions, or system values such as the current date.

system administrator

The person who manages administrative tasks in Oracle Applications, such as registering new users and defining system printers, using the System Administrator responsibility.

System Identifier

See: SID, ORACLE_SID

SYSTEM schema

See: SYSTEM username

SYSTEM tablespace

Holds data dictionary tables owned by the SYS account. It is created when you install the database.

SYSTEM username

One of two standard usernames automatically created with each database (the other is SYS). The SYSTEM username is the preferred username to use when performing database maintenance.

See also: SYS username

table

The basic unit of storage in a relational database management system. A table represents entities and relationships, and consists of one or more units of information (rows), each of which contains the same types of values (columns).

tablespace

An Oracle database storage unit that groups related logical structures together. Traditionally, one tablespace was needed for each Oracle Applications product's database tables, and another for its indexes. Release 12 uses the *Oracle Applications Tablespace Model*, which uses far fewer tablespaces.

See also: Oracle Applications Tablespace Model

TCP/IP

Acronym for *Transmission Control Protocol/Internet Protocol*, an industry-standard networking protocol used for communication between computers and related devices.

temporary tablespace

A tablespace used when a SQL statement requires the creation of temporary segments (for example, creation of an index).

three-tier architecture

A computing architecture where the components are separated into three layers, or tiers: the *desktop* (or *client*) tier, the *application* tier, and the *database* tier.

TWO_TASK

Under UNIX, an environment setting that identifies the network alias of an ORACLE instance running on the local machine or on a networked machine. This variable overrides any setting for ORACLE_SID and invokes the *Oracle Net* software to manage the connection request.

See also: LOCAL, ORACLE_SID

undo tablespace

Tablespace used to store *undo records*, which maintain read-consistency in the database during normal operation, and also play a key role in database recovery.

See also: rollback tablespace

URL

An acronym for *Uniform Resource Locator*, a URL is a text representation of the location of a resource available via an intranet or the Internet.

user ID

See: username

username

A name that identifies a user requesting access to a secure environment or program, such as an Oracle database or Oracle Applications system. Every username is associated with a password. In Oracle Applications, a username is normally associated with a *responsibility*.

See also: responsibility

view

A tailored presentation of data in one or more tables. A view can be thought of as a stored query.

WAN (Wide Area Network)

A communications network that connects geographically separated areas.

See also: LAN

Web browser

A program that runs on a desktop client, sending HTTP requests to a Web server to retrieve HTML pages and Java applets.

See also: HTML, HTTP, HTTP server

Web server

See: HTTP server

XML

eXtensible Markup Language, a metalanguage that allows specialized markup languages to be designed to suit different types of document. XML differs from HTML in not being based on a predefined format.

See also: HTML, Oracle XML Publisher

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