

# **Oracle® Database Firewall**

Administration Guide

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# Preface

Welcome to *Oracle Database Firewall Administration Guide*. This section contains:

- [Audience](#)
- [Documentation Accessibility](#)
- [Related Documents](#)
- [Conventions](#)

## Audience

This guide has been written for system administrators who are responsible for the initial deployment and day-to-day administration of Oracle Database Firewall. It includes:

- An introduction to the concepts and components of Oracle Database Firewall
- Instructions on how to set up the system for the first time
- Details of routine tasks such as monitoring the system, deploying policies, producing archives and running reports

This guide does not provide detailed information about the Oracle Database Firewall Analyzer software. *Oracle Database Firewall Security Guide* is provided for that purpose.

## Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

### Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## Related Documents

For more information, see the following documents in the Oracle Database Firewall Release documentation set:

- *Oracle Database Firewall Release Notes*
- *Oracle Database Firewall Installation Guide*

- *Oracle Database Firewall Security Guide*
- *Oracle Database Firewall Licensing Information*

## Conventions

The following text conventions are used in this document:

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

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# Introducing Oracle Database Firewall

This chapter contains:

- [Downloading the Latest Version of This Manual](#)
- [Oracle Database Firewall System Architecture](#)
- [Using the Oracle Database Firewall Administration Console](#)
- [Security Guidelines](#)

## Downloading the Latest Version of This Manual

You can download the latest version of this manual from the Oracle Database Firewall Web site, which is in the Database section of Oracle Technology Network. The URL is as follows:

<http://www.oracle.com/technetwork/indexes/documentation/index.html>

## Oracle Database Firewall System Architecture

This section contains:

- [About the Oracle Database Firewall System Architecture](#)
- [High-Availability Resilient Pairs](#)
- [Ways to Connect Oracle Database Firewall to a Database Network](#)
- [Integrating Oracle Database Firewall with Third-Party Products](#)

## About the Oracle Database Firewall System Architecture

The typical Oracle Database Firewall architecture has the following main components:

- **The database network, containing the database server and its clients:** You are not required to install Oracle Database Firewall onto the database server or clients. However, if needed, you can install the Database Firewall Local Monitoring on the database server, which enables the Database Firewall to monitor SQL traffic originating from the users or processes that have direct access (for example, through the console) to the database computer.
- **The Database Firewall:** This is a dedicated server that runs the Oracle Database Firewall software. Each Database Firewall collects SQL data from SQL databases, and then sends this SQL data to the Database Firewall Management Server to be analyzed in reports. After the Database Firewall sends the SQL data to the

Management Server, it deletes it locally. The SQL data is then stored in the Management Server.

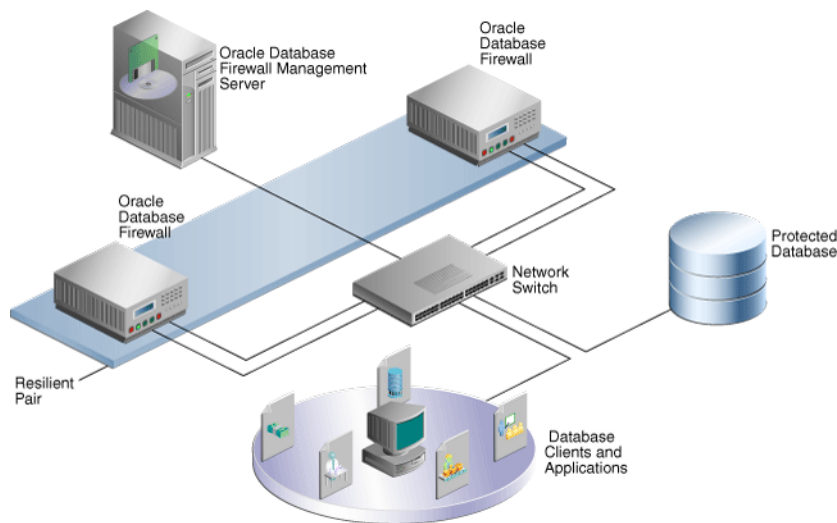
- Database Firewall applications and other third-party applications:** These applications perform system configuration, monitoring, and administration. If necessary, you can use a single computer to operate these applications. However, typically, there is a separate computer for each application, because applications are often used by different people or from different locations.

Examples of Database Firewall applications include the Oracle Database Firewall Administration Console and Oracle Database Analyzer. For details about the Analyzer, see the *Oracle Database Firewall Security Guide*.

You must use a Database Firewall Management Server to control one or more Database Firewall installations. Figure 1-1 shows an architecture for such a system. A Database Firewall Management Server is suitable for larger enterprise installations that protect multiple databases at different sites.

Figure 1-1 illustrates the position of the Management Server in the Database Firewall architecture.

**Figure 1-1 Enterprise Architecture Using a Database Firewall Management Server**




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**Note:**

- This figure shows only one protected database for simplicity. A typical architecture will have many protected databases.
  - Generally, Database Firewalls use different network ports (network devices and therefore, network paths) to connect to the Management Server. The Network Switch in this diagram shows two port connections for each of the Database Firewalls.
- 

## High-Availability Resilient Pairs

You can configure pairs of Database Firewalls or pairs of Database Firewall Management Servers, or both, to provide a high-availability system architecture. These pairs are known as **resilient pairs**. The resilient pair configuration works in Database Activity Monitoring (DAM) mode only.



During system configuration, one device is nominated as the primary device and the other as the secondary device. The primary device carries out all normal operations while the secondary device monitors traffic, but gives alerts only if the primary device fails.

Both primary and secondary Database Firewalls:

- Receive the same span traffic
- Have the same configuration (the Management Server synchronizes this)
- Create log files according to the policy applied

Only the primary Database Firewall:

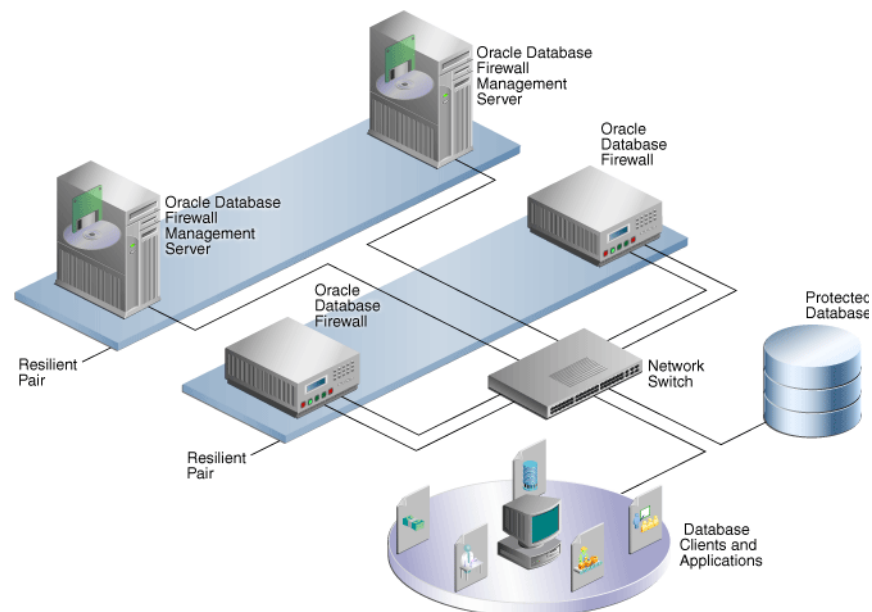
- Sends out real-time alerts
- Runs user role audits (URA) and stored procedure audits (SPA)

The Management Server collects logs from the Primary Database Firewall, and deletes the log files from both Database Firewalls.

If the Primary Database Firewall is not available or cannot be contacted by the Management Server, it collects the log files from the Secondary Database Firewall and promotes the Secondary Database Firewall to be the Primary (so it will start sending out real-time alerts and running SPA/URA).

Figure 1–2 shows a pair of Oracle Database Firewalls and a pair of Database Firewall Management Servers being used to protect a single database.

**Figure 1–2 Oracle Database Firewall High Availability**



## Ways to Connect Oracle Database Firewall to a Database Network

Oracle Database Firewall can connect to the database network in one of two ways:

- **Through a hub, tap or network switch configured with a "spanning port":** This method sends a copy of all database traffic to the Database Firewall. This configuration enables a Database Firewall to operate as an off-line audit and monitoring system, and produce warnings of potential attacks, but it cannot block unwanted traffic.

For more information about connecting hubs, taps or switches, see the following Web site:

<http://www.sans.org/security-resources/idfaq/switched.php>

- **Inline between the database clients and database:** This method enables Database Firewall to both block potential attacks and/or operating as an audit or monitoring system.

## Integrating Oracle Database Firewall with Third-Party Products

You can integrate Oracle Database Firewall with the following third-party products:

- **BIG-IP Application Security Manager (ASM):** This product from F5 Networks, Inc. is an advanced Web Application Firewall (WAF) that provides comprehensive edge-of-network protection against a wide range of Web-based attacks. It analyzes each HTTP and HTTPS request, and blocks potential attacks before they reach the Web application server. For more information, see [Chapter 11, "Using Oracle Database Firewall with BIG-IP ASM."](#)
- **ArcSight Security Information Event Management (SIEM):** This product is a centralized system for logging, analyzing, and managing syslog messages from different sources. For more information, see [Chapter 12, "Using Oracle Database Firewall with ArcSight SIEM."](#)

## Using the Oracle Database Firewall Administration Console

This section contains:

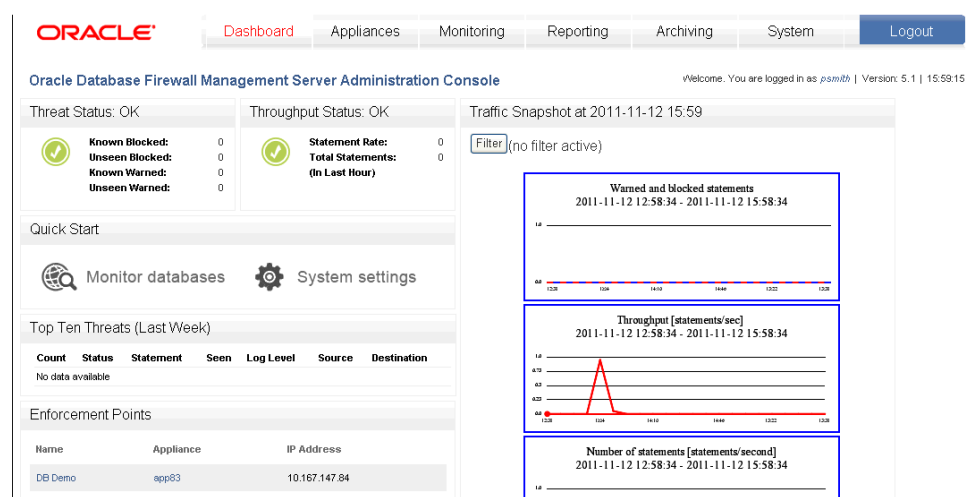
- [About the Oracle Database Firewall Administration Console](#)
- [Which Administration Console Should I Use?](#)
- [Logging in to the Administration Console](#)
- [Administration Console Tabs](#)

## About the Oracle Database Firewall Administration Console

The Administration Console is a Web browser-based application that you use to configure, manage, and monitor Oracle Database Firewall. It is available on each Database Firewall (either standalone or managed) and Management Server.

The Administration Console is intended for use by network or system administrators who are responsible for IT systems deployment, maintenance, monitoring, and reporting.

[Figure 1–3](#) shows the top portion of the status page of a managed Database Firewall Administration Console. (For a standalone Database Firewall, see "[Step 1: Set the Database Firewall Date and Time](#)" on page 2-1.)

**Figure 1–3 Dashboard Page of the Management Server Administration Console**

You use the Administration Console to:

- Deploy policies that were created in the Analyzer, by creating enforcement points for your site's protected databases
- Configure system settings for the Oracle Database Firewall.
- Configure ArcSight SIEM connectors.
- Create, find, and configure password security policies for users.
- View and capture logged data.

All users of the Administration Console must enter a valid login ID and password before access is granted.

Because the Administration Console is a browser-based application, you can use it from any computer that has a supported Web browser, such as Internet Explorer. You can restrict this access by IP address.

## Which Administration Console Should I Use?

There are three possible Administration Consoles that you can use: one for a standalone Database Firewall, one for a Database Firewall that is managed by a Management Server, or one used by the Management Server itself.

The tasks that you perform in each are as follows:

- [Tasks Performed in a Standalone Database Firewall Administration Console](#)
- [Tasks Performed in a Managed Database Firewall Administration Console](#)
- [Tasks Performed in a Management Server](#)

### Tasks Performed in a Standalone Database Firewall Administration Console

Tasks performed in a standalone Database Firewall Administration Console are as follows:

- Using the Dashboard to view the overall system behavior
- Management functions such as suspending, resuming, and changing Database Firewall controls or restarting a Database Firewall

- System settings, such as changing the IP address, time, and keyboard settings
- Checking the status of the standalone Database Firewall server
- Configuring e-mail setup, such as the SMTP server address
- Time synchronization and time offsets
- Configuring public key synchronization
- Configuring the Management Server certificate (this determines whether this is a standalone or managed Database Firewall)
- Managing log files
- Viewing system events
- Summarizing traffic log files
- Viewing and filtering the administration log
- Repairing log files
- Configuring, viewing, and approving changes found in stored procedure or user role auditing
- Managing syslog and ArcSight SEIM connectors, and e-mail alerts
- Creating and managing user accounts
- Showing network traffic and capturing it to a file; finding traffic sources
- Creating enforcement points and configuring protected databases
- Uploading policies
- Scheduling reports
- Archiving jobs

### **Tasks Performed in a Managed Database Firewall Administration Console**

Tasks performed in a managed Database Firewall Administration Console are as follows:

- Viewing and updating system settings
- Checking the status of the managed Database Firewall
- System and network settings, such as changing the IP address, time, and keyboard settings
- Time synchronization and time offsets
- Configuring public key synchronization
- Configuring the Management Server certificate (this determines whether this is a standalone or managed Database Firewall)
- Configuring the ArcSight connector
- Creating and managing user accounts
- Showing network traffic and capturing it to a file

### **Tasks Performed in a Management Server**

Tasks performed in a Management Server:

- Using the Dashboard to view the overall system behavior

- Management functions such as suspending, resuming, and changing Database Firewall controls or restarting a Database Firewall
- Configuring resilient pairs of Management Servers
- System settings, such as changing the IP address, time, and keyboard settings
- Checking the status of the Management Server server
- Configuring e-mail setup, such as the SMTP server address and so on
- Time synchronization and time offsets
- Configuring public key synchronization
- Managing log files
- Viewing system events
- Summarizing traffic log files
- Viewing and filtering the administration log
- Repairing log files
- Managing log files
- Configuring, viewing, and approving changes found in stored procedure or user role auditing
- Managing syslog and ArcSight SEIM connectors, and e-mail alerts
- Creating and managing user accounts
- Creating enforcement points and configuring protected databases
- Uploading policies
- Scheduling reports
- Archiving jobs

## Logging in to the Administration Console

To log in to the Administration Console:

1. Open a Web browser from any computer that has network access to Oracle Database Firewall.
2. Enter the following URL:

```
https://ip_address/user/login
```

Provide the IP address for the server on which Oracle Database Firewall is installed. For example:

```
https://192.0.2.206/user/login
```

If you change the user interface port number (by using the System Settings page of the Administration Console), then you must also include this port number in the URL. Use the following syntax:

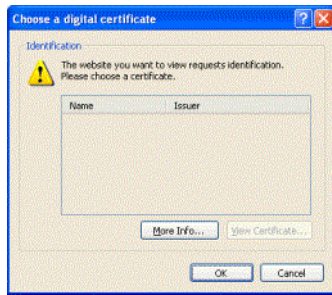
```
https://ip_address:port/user/login
```

For example:

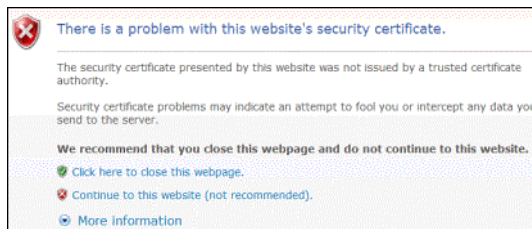
```
https://192.0.2.206:444/user/login
```

Add this address to your **Favorites** to make it easy to access.

3. If you see the following prompt in Internet Explorer, click **OK**.

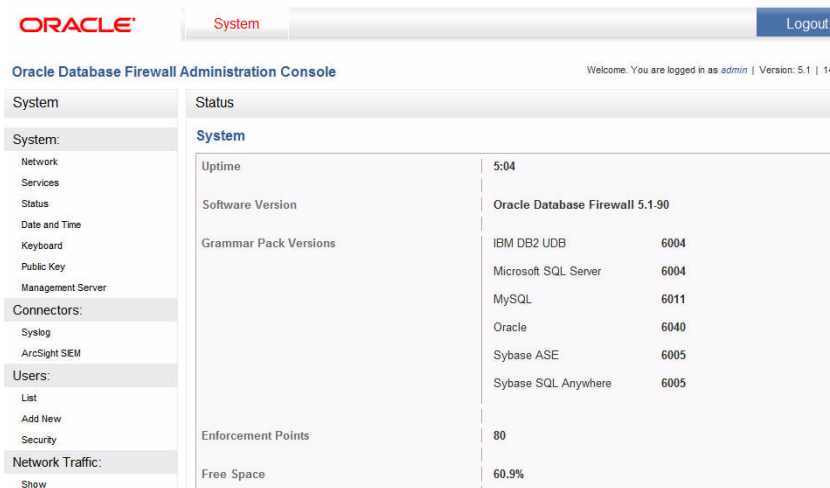


4. If you see the following message, click **Continue to this website**:

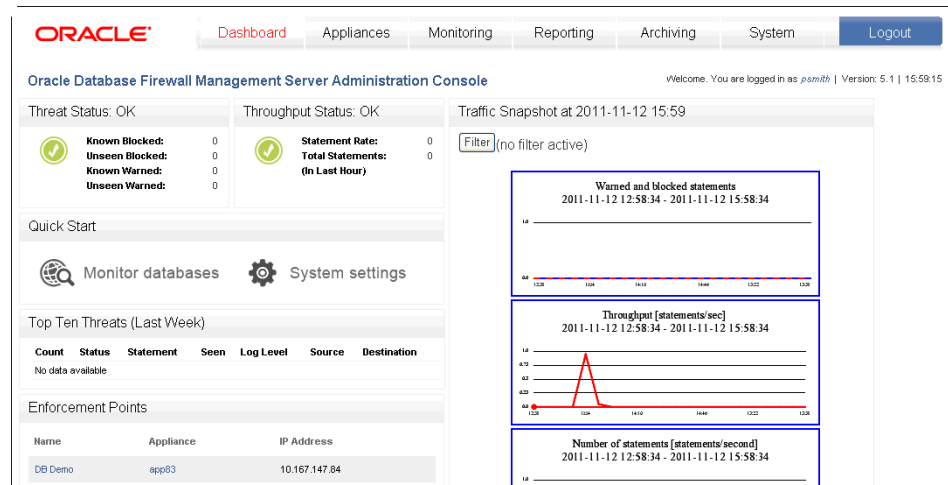


5. Enter the user name and password for an account that has System Administrator privileges.

The Administration Console appears. The following screen shows how the Administration Console appears for a managed Database Firewall.



When you log into the Management Server, the Administration Console appears as follows. You use the **Appliances** tab to manage individual Database Firewalls.



## Administration Console Tabs

The Administration Console contains a collection of tab along the top of the page, which contains the following options:

- Dashboard.** (Management Server and standalone Database Firewall only) Provides a high-level view of important information about the databases being protected, such as the threat status, throughput, and top ten threats (see [Chapter 13, "System Administration"](#)). Key indicators are shown in charts, which are intended to be used by IT and security managers who are responsible for the day-to-day monitoring of the system.

The Dashboard also provides **Quick Start** options that allow the system's configuration settings to be set up with ease.

- Appliances.** (Management Server only) Enables you to define each Oracle Database Firewall that the Oracle Database Firewall Management Server is required to manage (see ["Configuring Oracle Database Firewalls"](#) on page 13-2).
- Monitoring.** (Management Server and standalone Database Firewall only) Allows you to configure enforcement points, set up the details of the protected databases, and deploy policies. See the following sections for more information:
  - ["Listing, Creating, and Configuring Enforcement Points"](#) on page 13-6
  - ["Configuring BIG-IP Application Security Manager Settings"](#) on page 13-9
  - Oracle Database Firewall Security Guide* for information about listing and uploading policies
- Reporting.** (Management Server and standalone Database Firewall only) Allows you to generate a wide variety of different types of reports. The reports can be generated and displayed as Adobe Acrobat PDF documents or Microsoft Excel (XLSX) spreadsheets.

You can schedule reports to run automatically at defined intervals, such as every day, week or month. Scheduled reports are automatically forwarded to named e-mail addresses. See the *Oracle Database Firewall Security Guide* for how to schedule reports.

Oracle Database Firewall provides a large number of data access, management, security, system, Sarbanes-Oxley (SOX), Payment Card Industry (PCI), Data Protection Act (DPA), Gramm-Leach-Bliley Act (GLBA) and Health Insurance

Portability and Accountability Act (HIPAA) report types by default, giving full traceability of all essential information over a selected date and time range.

- **Archiving.** (Management Server and standalone Database Firewall only) Provides options that enable important data to be archived to prevent loss of data in the unlikely event of a disk or other system error (see "[Archiving Data](#)" on page 13-13).
- **System.** (Management Server, standalone Database Firewall, and managed Database Firewall) Allows initial configuration of Oracle Database Firewall, such as IP addresses and time settings. These options are used during initial deployment of Oracle Database Firewall (see "[Configuring the System](#)" on page 13-12).

Most pages accessed from the top bar contain a menu of further sub-options along the left side of the page.

## Security Guidelines

Consult the *Oracle Database Firewall Security Guide* for information on protecting your data and general recommendations about deploying Database Firewall in a network and in special configurations.



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## Configuring an Oracle Database Firewall

This chapter contains:

- [About Configuring an Oracle Database Firewall](#)
- [Step 1: Set the Database Firewall Date and Time](#)
- [Step 2: Specify the Database Firewall System Settings](#)
- [Step 3: Enable Secure Log Access in the Standalone Database Firewall](#)
- [Step 4: Configure the Standalone Database Firewall Syslog Destinations](#)
- [Step 5: Configure the Standalone Database Firewall Enforcement Points](#)
- [Step 6: Configure the Database Firewall Bridge IP Address](#)
- [Step 7: Test the Standalone Database Firewall System Operation](#)
- [What's Next?](#)

### About Configuring an Oracle Database Firewall

This chapter explains how to configure a standalone Oracle Database Firewall. Where indicated, a procedure also applies to a managed Oracle Database Firewall. For more information on which tasks can be done on which type of Database Firewall, see these topics:

["Tasks Performed in a Standalone Database Firewall Administration Console"](#) on page 1-5

["Tasks Performed in a Managed Database Firewall Administration Console"](#) on page 1-6

If you want to configure a standalone Database Firewall to be managed by a Management Server, see [Chapter 3, "Configuring a Database Firewall Management Server."](#)

Before you start, ensure that the Database Firewall has been installed, as described in the *Oracle Database Firewall Installation Guide*.

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**Note:** Some error messages that may occur during configuration require that your Web browser have JavaScript enabled.

---

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### Step 1: Set the Database Firewall Date and Time

It is important to ensure that the Database Firewall uses the correct date and time so that log event times are accurate and scheduled tasks, such as archiving and reports,

function correctly. Correct time settings are also needed so that Database Firewall Analyzer uses the correct time ranges when training on log data.

To set the Database Firewall date and time:

1. In the Database Firewall Administration Console, select the **System** tab.
2. Click **Date and Time** under the **System** menu on the left, and then scroll down and click the **Change** button.

#### Date and Time

System Time	September 06, 2011	-	13	:	00	:	19
Time Offset	UTC						

#### Time Synchronization

Enable NTP Synchronization	<input type="checkbox"/>
Synchronize Time After Save	<input type="checkbox"/>

<b>Server 1</b>	Test Server
Address	0.centos.pool.ntp.org
Server Time	Failed to query ntp server.

<b>Server 2</b>	Test Server
Address	1.centos.pool.ntp.org
Server Time	Failed to query ntp server.

<b>Server 3</b>	Test Server
Address	2.centos.pool.ntp.org
Server Time	Failed to query ntp server.

3. Enter the correct date and time.  
If a managed Database Firewall and Management Server are in different time zones, then the audit reports and summary reports will use the time zone of the Database Firewall that created the log file.
4. Use the **Time Offset** menu to select your local time with respect to Coordinated Universal Time (UTC).  
For example, **UTC-5** is five hours behind UTC. It is essential to select the correct setting to ensure that the time is set accurately during synchronization.  
If you do not select the correct setting, the time will be set incorrectly when time synchronization occurs.
5. (Optional) Select **Enable NTP Synchronization**.  
Selecting Enable NTP Synchronization keeps the time synchronized with the average of the time recovered from the time servers specified in the **Server 1/2/3** fields, which can contain an IP address or name. If a name is specified, the DNS server specified in the System Settings page is used for name resolution.

- Use the default server addresses, or enter the addresses of your preferred time servers.

---

**Note:** If using names instead of IP addresses, you must have DNS already configured, otherwise name resolution will not work.

---

**Test Server** displays the time from the server, but does not update the time at the Oracle Database Firewall Management Server or Oracle Database Firewall.

Selecting **Synchronize Time After Save** causes the time to be synchronized when you click **Save**.

---

**WARNING:** In DPE (blocking) mode, **Synchronize Time After Save** causes all enforcement points to restart, thereby dropping existing connections to protected databases. This would cause a temporary traffic disruption.

---

- Click **Save**.

To enable time synchronization, you also must specify the IP address of the default gateway and a DNS server, as described in "[Step 2: Specify the Database Firewall System Settings](#)" on page 2-3.

## Step 2: Specify the Database Firewall System Settings

You specify system settings from each Database Firewall's administration console. System settings consist of network and services configuration as shown in the following procedures.

To configure the Database Firewall network settings:

- In the **System** tab, select **Network** from the **System** menu on the left.
- In the Network Configuration page, click the **Change** button.
- Complete the fields as necessary, then click **Save**.
  - IP Address:** The IP address of the currently accessed Database Firewall. This IP address connects to the Administration Console, or accesses the unit from Oracle Database Firewall applications such as the Analyzer. An IP address was set during installation. If you want to use a different address, then you can change it now. The IP address is static and must be obtained from the network administrator.
  - Network Mask:** The subnet mask of Oracle Database Firewall.
  - Gateway:** (optional) The IP address of the default gateway (for example, for internet access). The default gateway must be on the same subnet as the host.
  - Name:** Enter a descriptive name for this Database Firewall, such as Database Firewall to monitor Oracle Database.
  - Link properties:** Leave the setting at the default, unless your network has been configured not to use autonegotiation.

To configure the Database Firewall services:

- In the **System** tab, under the **System** menu, click **Services**.

2. Click the **Change** button.

Services

**Configure Network Services**

---

DNS Server 1 (Optional)

DNS Server 2 (Optional)

DNS Server 3 (Optional)

---

**Web Access**

Controls access to this Admin Console.

Set Web Access to "all" to allow access from any IP Address or a space separated list of IP addresses to control access from specific clients.

---

**Terminal Access**

Controls access using terminal connections.

Set Terminal Access to "all" to allow access from any IP Address, enter "disabled" to block access altogether or a space separated list of IP addresses to control access from specific clients.

3. Complete the following fields as necessary, then click **Save**.

---

---

**Caution:** When allowing access to the Database Firewall you must be careful to take proper precautions to maintain security. See the Security Guidelines chapter in *Oracle Database Firewall Security Guide* for a list of recommendations before completing this step.

---

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- **DNS Servers:** (optional) The IP addresses of up to three DNS servers on the network. These are used to resolve any network names that may be used by Oracle Database Firewall. Keep the fields blank if there is no DNS server, otherwise system performance may be impaired.
- **Web Access:** If you want to allow only selected computers to access the Administration Console, enter their IP addresses in the box. Using the default of **all** allows access from any computer in your site.
- **Terminal Access:** You can specify a list of IP addresses that are allowed to access Oracle Database Firewall from a remote console. Entering **all** allows access from any computer in your site. The default of **disabled** prevents console access from any computer.
- **SNMP Access:** Specifies a list of IP addresses that are allowed to access the network configuration of Oracle Database Firewall through SNMP (settings as per **Terminal Access**). The SNMP community string is gT8@fq+E.

- **Secure Log Access (Reporting):** Specifies a list of IP addresses that are allowed to access the log data held on the Oracle Database Firewall Management Server, for example, to report using external reporting systems (settings as per **Terminal Access**). If you complete this setting, then ensure that you complete "[Step 3: Enable Secure Log Access in the Standalone Database Firewall](#)" on page 2-5.
- **Traffic Log Access (Analyzer):** Specifies a list of IP addresses of computers running the Analyzer software that are allowed to access the traffic log on the Oracle Database Firewall Management Server (settings as per **Terminal Access**).

### Step 3: Enable Secure Log Access in the Standalone Database Firewall

If you changed the default settings in the **Secure Log Access (Reporting)** field in "[Step 2: Specify the Database Firewall System Settings](#)" on page 2-3, then you must enable the access in the Database Firewall server.

1. Log in to the Database Firewall server as user root.

2. Change to the oracle user.

```
su - oracle
```

3. Execute the following command:

```
. oraenv
```

4. When prompted, enter dbfwdb for the Oracle SID.

5. The following message is displayed:

```
The Oracle base has been set to /var/lib/oracle
```

6. Log in to the database on this server using SQL\*Plus.

```
sqlplus / as sysdba
```

7. Enable the dbfw\_report account and grant this user a password.

```
ALTER USER dbfw_report ACCOUNT UNLOCK IDENTIFIED BY password;
```

8. Exit SQL\*Plus.

### Step 4: Configure the Standalone Database Firewall Syslog Destinations

Use the following procedure to configure the types of syslog messages to send from this Database Firewall (for example, to signal blocked statements).

1. In the standalone Database Firewall Administration Console, click the **System** tab.
2. Click **Syslog** in the **Connectors** menu.

The following page appears.

3. Complete the fields, as necessary:
  - **Syslog Destinations (UDP):** Use this box if you are using User Datagram Protocol (UDP) to communicate syslog messages. Enter the IP address of each computer that is permitted to receive the syslog messages.
  - **Syslog Destinations (TCP):** Use this box if you are using Transmission Control Protocol (TCP) to communicate syslog messages. TCP guarantees that the packets are sent and received correctly. Enter the IP address and port number of each machine that is permitted to receive the syslog messages.
  - **Syslog Categories:** You can select the types of syslog messages to generate. The syslog messages are in the following categories:
    - **System:** System messages generated by Oracle Database Firewall or other software, which have a syslog priority level of at least "INFO".
    - **Alerts:** Oracle Database Firewall and F5 alerts (Oracle Database Firewall syslog message IDs 9, 10, 11 and 12).
    - **Info:** General Oracle Database Firewall messages and property changes (Oracle Database Firewall syslog message IDs 1, 4 and 8).
    - **Debug:** Engineering debug messages (for Oracle support use only).
    - **Heartbeat:** Oracle Database Firewall heartbeat message and current statistics (Oracle Database Firewall syslog message ID 3). Oracle Database Firewall sends a heartbeat every second for each Enforcement Point that you have configured for this system. (If you select this check box, be aware of the potential volume issues when you enable the **Heartbeat** feature.)
4. Click **Apply**.

## Step 5: Configure the Standalone Database Firewall Enforcement Points

You must configure each **enforcement point** that the standalone Database Firewall will use. (For a managed Database Firewall, you use the Management Server.)

To configure the enforcement points:

1. In the standalone Database Firewall Administration Console, select the **Monitoring** tab.
2. In the Enforcement Points menu, select **Create**.

The Enforcement Point Wizard: Step 1 page appears.

3. Enter the following information:
  - **Name:** Enter a name for the enforcement point.
  - **Use a builtin enforcement point (Monitor locally):** The number of currently available enforcement points you can create, up to 80, is displayed.
4. Click **Next**.

The Enforcement Point Wizard: Step 2 page appears.

5. Select one or more traffic sources you want this enforcement point to monitor. If you select a proxy traffic source, you cannot select any other traffic sources. If **Management** appears in the list, then the Management Interface can be configured and used as a proxy.
6. Enter the following information:
  - **Protected Database:** Select **Create New** or choose from the list of available databases.

- **Name:** If creating a new protected database, enter a name for the database to be monitored.
- **Database Type:** If creating a new protected database, select the database type.
- **Address and Port:** If creating a new protected database, specify the IP address and port number of the database management system (i.e. the IP settings used by database clients to send traffic to the database), then click **Add**. If the protected database has more than one interface and/or port, enter the additional **Address** and **Port** details, then click **Add** again. If you are using a Domain Name Server (DNS), you can enter a hostname instead of an IP address.

7. Click **Next**.

The Enforcement Point Wizard: Step 3 page appears.

8. Enter the following settings:

- **Monitoring Mode:** Select **Database Activity Monitoring (DAM)** if the enforcement point is to be used only to log statements and provide warnings of potential attacks. Select **Database Policy Enforcement (DPE)** if the enforcement point is also required to block potential attacks. **Database Policy Enforcement** is available only if you upload a policy (as described next).

If you have selected a traffic proxy as a traffic source for this Enforcement Point, then DPE mode is required and you cannot select DAM mode.

---

**Note 1:** When you use a Database Firewall in DPE mode, you must configure any IP or MAC address spoofing detection rules so that they ignore database IP or MAC address changes made by that Database Firewall.

**Note 2:** When you set a Database Firewall to DPE mode (through Enforcement Point Settings or by restarting a Database Firewall with network passthrough), ensure that all connections to the database are forced to reconnect. In addition, in DPE mode, if you change Enforcement Point Settings, you must also force all database connections to reconnect.

---

- **Policy:** Select a baseline policy. To upload a custom policy developed using the Analyzer software, click **Browse** to select the file, then **Upload**. Use the text box to add a description. If this is the first time you are creating a baseline policy, then Oracle recommends that you select the **unique.dna** policy.

9. Click **Next**.

The Enforcement Point Wizard: Step 4 page appears.

10. Check your settings, and if you are satisfied, then click the **Finish** button.

## Step 6: Configure the Database Firewall Bridge IP Address

If you want Oracle Database Firewall to block potential attacks, and Database Firewall is not in proxy mode, then you must allocate an additional IP address that is unique to the database network. This is used as a bridge IP address to redirect traffic within the Database Firewall. When Database Firewall is used as a proxy (proxy mode) you do not need to allocate this additional IP address. See "[Configuring Database Firewall as a Traffic Proxy](#)" on page 13-9 for details.



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**Note 1:** The IP address of the bridge must be on the same subnet as all protected databases deployed in DPE mode on that bridge. This restriction does not apply to protected databases deployed in DAM mode.

**Note 2:** If the Database Firewall Management Server and the Bridge are connected to physically separate networks that are on the same subnet, Database Firewall may route responses out of the wrong interface. If physically separate networks are required, use different subnets.

---

---

To configure the standalone Database Firewall bridge IP address:

1. In the Database Firewall Administration Console, click the **System** tab, then click **Network** under the **System** menu on the left.
2. Click the **Change** button.
3. In the Traffic Sources section, find the network that you want to configure.
4. Select **Bridge Enabled** for this network.
5. Specify an IP address and subnet mask if either of the following is true:
  - The pair of network interface ports connect the Oracle Database Firewall in-line between the database and clients (whether Database Policy Enforcement or Database Activity Monitoring mode is used).
  - The network interface ports are used to monitor traffic with the Oracle Database Firewall Local Monitoring software.

The IP address must be unique to the network, and is used as a bridge IP address to redirect traffic within the Database Firewall.

**Enabled** is automatically selected if the network interface ports are currently used to monitor traffic for enforcement points that have the Local Monitoring or DPE (Database Policy Enforcement) mode selected.

6. Click **Save**.

## Step 7: Test the Standalone Database Firewall System Operation

You should verify that the standalone Database Firewall configuration is fully operational before you begin monitoring your protected database SQL traffic.

To test the system operation:

1. In the standalone Database Firewall Administration Console, click the **Monitoring** tab, and then from the **Enforcement Points** menu, select **List** to display the list of configured enforcement points. Check the status as follows:
  - a. Click the **Status** button for the appropriate enforcement point.
  - b. In the **Appliances** area, ensure that you see a green check-mark indicator in the **Status** column against the device that is performing the monitoring.
2. Click the **Dashboard** tab, and check that **Number of statements** increases every minute. This setting indicates that statements are being recognized.
3. Click the **System** tab, then in the **Logs** menu, click **Traffic Log Files**.

Check that the log files exist. If you want to see the statements, create Log Search Results (in the **Reporting** tab, under the **Traffic Log** menu).

4. Verify that data can be obtained from the traffic log.

See *Oracle Database Firewall Security Guide* for information about accessing and viewing the traffic log.

## What's Next?

The tasks in chapter complete the initial configuration of a Database Firewall. Your next step is to configure the Management Server, described in [Chapter 3, "Configuring a Database Firewall Management Server."](#) Depending on site requirements, you may need to configure other features, such as stored procedure auditing, user role auditing and local monitoring. These features are explained in later chapters of this guide.

After you have configured the standalone Database Firewall, users will be able to begin analyzing data. Once a policy has been developed, you must upload it. The *Oracle Database Firewall Security Guide* covers these tasks in detail.

[Chapter 13, "System Administration,"](#) explains system administration tasks, including how to set up new users, monitor the system and produce reports.

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# Configuring a Database Firewall Management Server

This chapter contains:

- [About Configuring an Oracle Database Firewall Management Server-Based System](#)
- [Step 1: Perform Initial Tasks for Each Database Firewall Management Server](#)
- [Step 2: Perform Tasks for Each Oracle Database Firewall](#)
- [Step 3: Complete the Final Database Firewall Management Server Tasks](#)
- [Step 4: Configure the Management Server Enforcement Points](#)
- [Step 5: Test the Management Server System Operation](#)
- [What's Next?](#)

## About Configuring an Oracle Database Firewall Management Server-Based System

This chapter explains how to configure a Management Server for one or more Database Firewalls in your system.

Before you start, make sure that each device has been installed, as described in *Oracle Database Firewall Installation Guide*.

There are five main steps involved in the configuration process:

1. Perform the initial configuration tasks at the Oracle Database Firewall Management Server, for example, to confirm the Database Firewall Management Server IP address and set the date and time.
2. Configure each managed Database Firewall (for example, install the certificate from the Management Server).
3. Add each Oracle Database Firewall at the Oracle Database Firewall Management Server.
4. Run the Enforcement Point Wizard at the Oracle Database Firewall Management Server.
5. Check that the system is functioning correctly.

Each of these steps is described next. If resilient pairs of Oracle Database Firewall Management Servers or Oracle Database Firewalls are required, some of the above steps must be completed for each device.

**Note:** Some error messages that may occur during configuration require that your Web browser have JavaScript enabled.

## Step 1: Perform Initial Tasks for Each Database Firewall Management Server

If you plan to use two Management Servers as a resilient pair for a high-availability environment, then perform the following steps for each Management Server.

- [Step 1A: Specify the Management Server System Settings](#)
- [Step 1B: Enable Secure Log Access](#)
- [Step 1C: Set the Database Firewall Management Server Date and Time](#)
- [Step 1D: Configure the Management Server Syslog Destinations](#)

### Step 1A: Specify the Management Server System Settings

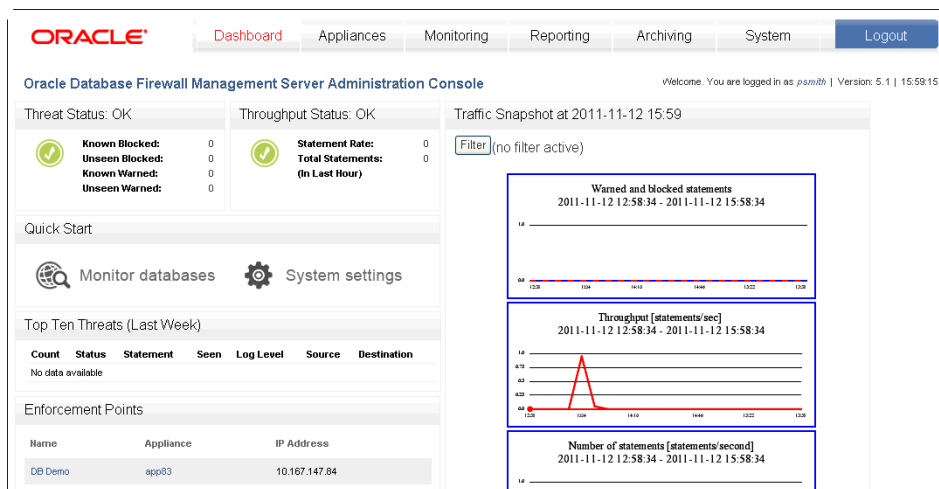
System settings consist of network and services configuration as shown in the following procedures.

To configure the Management Server network settings:

1. Log in to the Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

The Management Server Administration Console appears:



2. Select the **System** tab.
3. In the **System** menu, click **Network**.
4. In the **Network Configuration** page, click the **Change** button.
5. Complete the fields as necessary, then click **Save**.
  - **IP Address:** The IP address of the Oracle Database Firewall Management Server for use by Oracle Database Firewall applications such as the Analyzer, or to connect to the Administration Console. An IP address was set during the installation of the Oracle Database Firewall Management Server; if you want to use a different address, you can change it now. The IP address is static and must be obtained from the network administrator.

The specified IP Address may need to be added to routing tables to enable traffic to go between the Database Firewall Management Server and Oracle Database Firewall applications.

- **Network Mask:** The subnet mask of the Oracle Database Firewall Management Server.
- **Gateway:** (optional) The IP address of the default gateway (for example, to access the management interface from another subnet). The default gateway should be on the same subnet as the host.
- **Name:** Enter the host name for the Management Server. The host name must start with a letter, can contain a maximum number of 24 characters, and cannot contain spaces in the name.
- **Link properties:** Leave the setting at the default, unless your network has been configured not to use autonegotiation.

To configure the Management Server services:

1. In the **System** tab, under the **System** menu, click **Services**.
2. Click the **Change** button.

Services

**Configure Network Services**

DNS Server 1 (Optional)	<input type="text"/>
DNS Server 2 (Optional)	<input type="text"/>
DNS Server 3 (Optional)	<input type="text"/>

**Web Access**

Controls access to this Admin Console.

Set Web Access to "all" to allow access from any IP Address or a space separated list of IP addresses to control access from specific clients.

**Terminal Access**

Controls access using terminal connections.

Set Terminal Access to "all" to allow access from any IP Address, enter "disabled" to block access altogether or a space separated list of IP addresses to control access from specific clients.

3. Complete the following fields as necessary, then click **Save**.

---

**Caution:** When allowing access to the Database Firewall you must be careful to take proper precautions to maintain security. See the Security Guidelines chapter in *Oracle Database Firewall Security Guide* for a list of recommendations before completing this step.

---

- **DNS Servers:** (optional) The IP addresses of up to three DNS servers on the network. These are used to resolve any network names that may be used by Oracle Database Firewall Management Server. Keep the fields blank if there is no DNS server, otherwise system performance may be impaired.
- **Web Access:** If you want to allow only selected computers to access the Administration Console, enter their IP addresses in the box. Using the default of **all** allows access from any computer in your site.
- **Terminal Access:** You can specify a list of IP addresses that are allowed to access Oracle Database Firewall Management Server from a remote console. Entering **all** allows access from any computer in your site. The default of **disabled** prevents console access from any computer.
- **SNMP Access:** Specifies a list of IP addresses that are allowed to access the network configuration of Oracle Database Firewall Management Server through SNMP (settings as per **Terminal Access**). The SNMP community string is `gT8@fq+E`.
- **Secure Log Access (Reporting):** Specifies a list of IP addresses that are allowed to access the log data held on the Oracle Database Firewall Management Server, for example, to report using external reporting systems (settings as per **Terminal Access**). If you complete this setting, then ensure that you complete "[Step 1B: Enable Secure Log Access](#)" on page 3-4.
- **Traffic Log Access (Analyzer):** Specifies a list of IP addresses of computers running the Analyzer software that are allowed to access the traffic log on the Oracle Database Firewall Management Server (settings as per **Terminal Access**).

## Step 1B: Enable Secure Log Access

If you changed the default settings in the **Secure Log Access (Reporting)** field in "[Step 1A: Specify the Management Server System Settings](#)" on page 3-2, then you must enable the access in the Database Firewall server.

1. Log in to the Database Firewall server as user `root`.
2. Change to the oracle user.

```
su - oracle
```

3. Execute the following command:

```
. oraenv
```

4. When prompted, enter `dbfwdb` for the Oracle SID.
5. Log in to the database on this server using SQL\*Plus.

```
sqlplus / as sysdba  
Enter password: password
```

6. Enable the `dbfw_report` account and grant this user a password.

```
ALTER USER dbfw_report ACCOUNT UNLOCK IDENTIFIED BY password;
```

7. Exit SQL\*Plus.

## Step 1C: Set the Database Firewall Management Server Date and Time

It is important to ensure that the date and time set for the Management Server are correct, because events performed by the Management Server are logged with the date and time at which they occur. In addition, archiving occurs and specified intervals based on the time settings. Correct time settings are also needed so that Database Firewall Analyzer uses the correct time ranges when training on log data.

To set the Database Firewall Management Server date and time:

1. In the Management Server Administration Console, select the **System** tab.
2. Click **Date and Time** under the **System** menu on the left, and then scroll down and click the **Change** button.

### Date and Time

System Time	September 06, 2011	-	13	:	00	:	19
Time Offset	UTC						

### Time Synchronization

Enable NTP Synchronization	<input type="checkbox"/>
Synchronize Time After Save	<input type="checkbox"/>

Server 1	Test Server
Address	0.centos.pool.ntp.org
Server Time	Failed to query ntp server.

Server 2	Test Server
Address	1.centos.pool.ntp.org
Server Time	Failed to query ntp server.

Server 3	Test Server
Address	2.centos.pool.ntp.org
Server Time	Failed to query ntp server.

3. Enter the correct date and time.

If a managed Database Firewall and Management Server are in different time zones, then the audit reports and summary reports will use the time zone of the Database Firewall that created the log file.

4. Use the **Time Offset** menu to select your local time with respect to Coordinated Universal Time (UTC).

For example, **UTC-5** is five hours behind UTC. It is essential to select the correct setting to ensure that the time is set accurately during synchronization.

If you do not select the correct setting, the time will be set incorrectly when time synchronization occurs.

5. (Optional) Select **Enable NTP Synchronization**.

Selecting Enable NTP Synchronization keeps the time synchronized with the average of the time recovered from the time servers specified in the **Server 1/2/3** fields, which can contain an IP address or name. If a name is specified, the DNS server specified in the System Settings page is used for name resolution.

6. Use the default server addresses, or enter the addresses of your preferred time servers.

**Test Server** displays the time from the server, but does not update the time at the Oracle Database Firewall Management Server or Oracle Database Firewall.

Selecting **Synchronize Time After Save** causes the time to be synchronized when you click **Save**.

---

---

**WARNING:** In DPE (blocking) mode, **Synchronize Time After Save** causes all enforcement points to restart, thereby dropping existing connections to protected databases. This would cause a temporary traffic disruption.

---

---

7. Click **Save**.

To enable time synchronization, you also must specify the IP address of the default gateway and a DNS server, as described in "[Set or Change Network Configuration or Services](#)" on page 3-8.

## Step 1D: Configure the Management Server Syslog Destinations

Use the following procedure to configure the types of syslog messages to send from the Oracle Database Firewall Management Server (for example, to signal blocked statements).

1. In the Management Server Administration Console, click the **System** tab.
2. In the Connectors menu, select **Syslog**.

The following page is displayed.

Syslog Settings

Note: you may enter IP addresses or hostnames as destinations; configure at least one DNS server before using hostnames. For TCP destinations the port number is also required. UDP port is defaulted to 514.

Syslog Destinations (UDP): none

Syslog Destinations (TCP):

Select syslog categories to be forwarded.

Syslog Categories:

- System
- Alerts
- Info
- Debug
- Heartbeat

Apply



3. Complete the fields, as necessary:
  - **Syslog Destinations (UDP):** Use this box if you are using User Datagram Protocol (UDP) to communicate syslog messages from the Oracle Database Firewall Management Server. Enter the IP address of each machine that is permitted to receive the syslog messages.
  - **Syslog Destinations (TCP):** Use this box if you are using Transmission Control Protocol (TCP) to communicate syslog messages from the Oracle Database Firewall Management Server. Enter the IP address and port number of each server that is permitted to receive the syslog messages.
  - **Syslog Categories:** You can select the types of syslog messages to generate. The categories have the following meanings:
    - **System:** System messages generated by Oracle Database Firewall or other software, which have a syslog priority level of at least "INFO".
    - **Alerts:** Oracle Database Firewall and F5 alerts (Oracle Database Firewall syslog message IDs 9, 10, 11 and 12).  
This category is not present on the Management Server.
    - **Info:** General Oracle Database Firewall messages and property changes (Oracle Database Firewall syslog message IDs 1, 4 and 8).
    - **Debug:** Engineering debug messages (for Oracle Database Firewall use only).
    - **Heartbeat:** Oracle Database Firewall heartbeat message and current statistics (Oracle Database Firewall syslog message ID 3).  
This category is not present on the Management Server.

For more information about the meaning of each syslog message, see [Appendix B, "Syslog Message Format."](#)

4. Click **Apply**.

If you are using two Oracle Database Firewall Management Servers as a resilient pair, repeat "[Step 1: Perform Initial Tasks for Each Database Firewall Management Server](#)" on page 3-2 for the second Database Firewall Management Server.

## Step 2: Perform Tasks for Each Oracle Database Firewall

This section contains:

- [Step 2A: Configure the Database Firewall System and Time Settings](#)
- [Step 2B: Enter the Database Firewall Management Server Certificate and IP Address](#)

### Step 2A: Configure the Database Firewall System and Time Settings

Perform the tasks described here for each Oracle Database Firewall that will be managed by the Oracle Database Firewall Management Server.

#### Set Date and Time

To configure the time settings, refer to "[Step 1: Set the Database Firewall Date and Time](#)" on page 2-1.

### Set or Change Network Configuration or Services

To set or change network or services settings for a Database Firewall, refer to "[Step 2: Specify the Database Firewall System Settings](#)" on page 2-3

For more information on network configuration refer to steps in "[Changing the Network Configuration](#)" on page 13-11.

## Step 2B: Enter the Database Firewall Management Server Certificate and IP Address

Change each Oracle Database Firewall that will be managed by the Oracle Database Firewall Management Server from standalone to managed mode. To do so, copy the certificate details held on the Oracle Database Firewall Management Server and paste them into each Oracle Database Firewall. This enables Oracle Database Firewall to communicate with the Oracle Database Firewall Management Server.

1. At the Oracle Database Firewall Management Server Administration Console:
  - a. Click **Certificate** in the **System** menu.
  - b. Copy all the text displayed in the large box.
2. At Oracle Database Firewall Administration Console:
  - a. Click **Management Server** in the **System** menu.
  - b. Enter the IP address of the Management Server in the **Oracle Database Firewall Management Server IP Address** field.
  - c. Paste the Oracle Database Firewall Management Server certificate text into the **Certificate** box.
  - d. Click **Apply**.

When you click **Apply**, Oracle Database Firewall changes from standalone to managed mode and all tabs at the top of the console interface, except **System**, are removed. Removing the certificate or IP address reverts the Database Firewall to standalone mode.

3. If you want to use a resilient pair of Management Servers for a high availability environment, then select the **Add Second Oracle Database Firewall Management Server** check box and repeat steps 1 and 2 to enter the details of the second Oracle Database Firewall Management Server.

## Step 3: Complete the Final Database Firewall Management Server Tasks

This section contains:

- [Step 3A: Specify Management Server Partner Settings \(Resilient Pair Only\)](#)
- [Step 3B: Add Each Oracle Database Firewall to the Management Server](#)
- [Step 3C: Define Resilient Pairs of Oracle Database Firewalls](#)

### Step 3A: Specify Management Server Partner Settings (Resilient Pair Only)

Follow this procedure if you are setting up the Management Server for high availability.

To specify the Management Server Partner Settings:

1. Copy the certificate details from the Management Server that will be used as the partner for the Management Server you are configuring, as described in the previous section.

2. At the Management Server you are configuring, select the **System** tab.
3. In the **System** menu, select **High Availability**.

The following is displayed:

Management Server High Availability Settings

Management Server: standalone  
Status:

Synchronization:

Enter the certificate and IP address of another Management Server on the network to form a high availability pairing. Set the preferred status of this Management Server if it is connecting to another configured Management Server.

Change Status:

Partner Address:

Partner Certificate:

4. Select primary or secondary under **Status**. (Only one of the pair will be primary.)
5. Enter the IP address and paste the certificate of the partner Management Server and save the changes.
6. Repeat the preceding steps for the second Management Server.

**Synchronize Now** is enabled when you enter the partner details. Selecting the **Synchronize Now** button forces an immediate synchronization of the two Oracle Database Firewall Management Servers. It is not normally necessary to use this button, since an auto-synchronization occurs 5 minutes after the last change.

### Step 3B: Add Each Oracle Database Firewall to the Management Server

Add each Oracle Database Firewall as follows:

1. Display the Oracle Database Firewall Management Server Administration Console.

This must be the primary Oracle Database Firewall Management Server if a resilient pair of Oracle Database Firewall Management Servers is used.

---

**Note:** You can determine which Oracle Database Firewall Management Server is the primary from the **Status** field in the **High Availability** section of the System Status page.

Also, the secondary Management Server has a red bar on its user interface, which identifies it as secondary.

---

2. Click the **Appliances** tab.
3. Click **Add** in the **Appliances** menu.
4. Enter a name for Oracle Database Firewall in the first field, and its IP address in the second.
5. Click **Save**.

If there is a message that indicates that there is a problem with the certificate, check that the date and time are set consistently across both the Oracle Database Firewall and the Management Server.

6. Click the link on the name of the appliance to go to the Administration Console for that managed Database Firewall, and specify the following settings for that appliance.

- Click **Date and Time** in the **System** menu, then click the **Change** button:

Set the time (to the time that you want the traffic to be logged. Typically, you set it to the local time. Set the Time Offset if you are using NTP time synchronization.

**Enable NTP Time Synchronization:** Select the check box to synchronize this Database Firewall's time with the specified NTP servers.

**Synchronize Time After Save:** Select the check box to apply the NTP server time after you save and exit this page.

---

---

**WARNING:** In DPE (blocking) mode, Synchronize Time After Save causes all enforcement points to restart, thereby dropping existing connections to protected databases. This would cause a temporary traffic disruption.

---

---

Click **Save** when finished with Date and Time.

- Click **Services** in the **System** menu, and then click the **Change** button:

For the **DNS Server 1**, **DNS Server 2**, and **DNS Server 3** fields, enter the IP addresses of up to three DNS servers on the network. Oracle Database Firewall uses these addresses to resolve any network names that may be used at the Oracle Database Firewall Management Server. Keep the fields blank if there is no DNS server, otherwise system performance may be impaired.

**Web Access:** If you want to allow only selected computers to access the Oracle Database Firewall Management Server Administration Console, enter their IP addresses in the box. Using the default of **all** enables access from any computer on your site.

**Terminal Access:** You can specify a list of IP addresses that are allowed to access the Oracle Database Firewall Management Server from a remote console. Entering **all** allows access from any computer on your site. The default of **disabled** prevents console access from any computer.

**SNMP Access:** Specifies a list of IP addresses that are allowed to access the Oracle Database Firewall Management Server's network configuration through SNMP (settings as per **Terminal Access**). The SNMP community string is `gT8@fq+E`.

**Secure Log Access (Reporting):** Specifies a list of IP addresses that are allowed to access the log data held on the Oracle Database Firewall

Management Server, for example, to report using external reporting systems (settings as per **Terminal Access**). If you complete this setting, then ensure that you complete "[Step 3: Enable Secure Log Access in the Standalone Database Firewall](#)" on page 2-5.

**Traffic Log Access (Analyzer):** Specifies a list of IP addresses of computers running the Analyzer software that are allowed to access the traffic log on the Oracle Database Firewall Management Server (settings as per **Terminal Access**).

Click **Save**.

- Click **Syslog** in the **Connectors** menu:

**Syslog Destinations (UDP):** Use this box if you are using a User Datagram Protocol (UDP) to communicate syslog messages (for example, disk full) from the Oracle Database Firewall Management Server. Enter the IP address of each machine that is permitted to receive the syslog messages.

**Syslog Destinations (TCP):** Use this box if you are using Transmission Control Protocol (TCP) to communicate syslog messages from the Oracle Database Firewall Management Server. Enter the IP address and port number of each server that is permitted to receive the syslog messages.

**Syslog Categories:** Select from the following types of syslog messages to generate:

- **System:** System messages generated by Oracle Database Firewall or other software, which have a syslog priority level of at least "INFO".
- **Alerts:** Oracle Database Firewall and F5 alerts (Oracle Database Firewall syslog message IDs 7, 9, 10, 11 and 12).

This category is not present on the Management Server.

- **Info:** General Oracle Database Firewall messages and property changes (Oracle Database Firewall syslog message IDs 1, 4 and 8).
- **Debug:** Engineering debug messages (for Oracle Database Firewall use only).
- **Heartbeat:** Oracle Database Firewall heartbeat message and current statistics (Oracle Database Firewall syslog message ID 3).

This category is not present on the Management Server.

**Maximum Syslog Message Length (bytes):** Enter the maximum number of character bytes for each syslog message. The accepted range of values is 1024 to 1048576. The default is 1024.

Click **Apply** when finished with the Syslog settings.

- Click **Network** in the **System** menu, and configure the network settings as described in "[Changing the Network Configuration](#)" on page 13-11.
7. Repeat the procedure for each Oracle Database Firewall that the Oracle Database Firewall Management Server manages, including the second Oracle Database Firewall of a resilient pair.

### Step 3C: Define Resilient Pairs of Oracle Database Firewalls

Complete the following steps if you want to create a resilient pair of Oracle Database Firewalls:

1. Display the Oracle Database Firewall Management Server Administration Console (this must be the primary Database Firewall Management Server if a resilient pair of Oracle Database Firewall Management Servers is used).
2. Select the **Appliances** tab.
3. In the **Resilience** menu, select **Create Pair**.
4. To add a resilient pair, click the **Add** button, and then enter the name and IP address of the Database Firewall that you want to use. Then click **Save**.

## Step 4: Configure the Management Server Enforcement Points

You must configure each **enforcement point** at the Management Server. If you have configured a resilient pair of Management Servers, then you must configure the enforcement points on the primary server.

To configure the Management Server enforcement points:

1. In the standalone Database Firewall Administration Console, select the **Monitoring** tab.
2. In the Enforcement Points menu, select **Create**.

The Enforcement Point Wizard: Step 1 page appears.

Enforcement Point Wizard: Step 1

1 ... 2 ... 3 ... 4

Specify enforcement point details:

Name:

Select the appliance(s) to use for monitoring:

Name	Address	Enforcement Points Available
<input checked="" type="radio"/> app53	10.167.147.53	80

3. Enter the following information:
  - **Name:** Enter a name for the enforcement point.
  - **Select the appliance(s) to use for monitoring:** Select the Database Firewall(s) to use for monitoring this enforcement point. The number of currently available enforcement points is displayed (up to 80).
4. Click **Next**.

The Enforcement Point Wizard: Step 2 page appears.

Enable	Traffic Source
<input type="checkbox"/>	Network 0
<input type="checkbox"/>	Network 1
<input type="checkbox"/>	Network 2
<input type="checkbox"/>	Proxy 0
<input type="checkbox"/>	Management
<input type="checkbox"/>	Proxy 2

Select a protected database:

Protected Database:

Specify the details of the protected databases you wish to monitor:

Name:

Database Type:

Address	Port	Resolved Address
<input type="text"/>	<input type="text"/>	<input type="button" value="Add"/>

5. Select one or more traffic sources you want this enforcement point to monitor. If you select a proxy traffic source, you cannot select any other traffic sources. If **Management** appears in the list, then the Management Interface has been configured as a proxy and can be used as such.
6. Enter the following information:
  - **Protected Database:** Select **Create New** or choose from the list of available databases.
  - **Name:** If creating a new protected database, enter a name for the database to be monitored.
  - **Database Type:** If creating a new protected database, select the database type.
  - **Address and Port:** If creating a new protected database, specify the IP address and port number of the database management system (i.e. the IP settings used by database clients to send traffic to the database), then click **Add**. If the protected database has more than one interface and/or port, enter the additional **Address** and **Port** details, then click **Add** again. If you are using a Domain Name Server (DNS), you can enter a hostname instead of an IP address.
7. Click **Next**.

The Enforcement Point Wizard: Step 3 page appears.

8. Enter the following settings:
  - **Monitoring Mode:** Select **Database Activity Monitoring (DAM)** if the enforcement point is to be used only to log statements and provide warnings of potential attacks. Select **Database Policy Enforcement (DPE)** if the enforcement point is also required to block potential attacks.

If you have selected a traffic proxy as a traffic source for this Enforcement Point, then DPE mode is required and you cannot select DAM mode.

---

---

**Note 1:** When you use a Database Firewall in DPE mode, you must configure any IP or MAC address spoofing detection rules so that they ignore database IP or MAC address changes made by that Database Firewall.

**Note 2:** When you set a Database Firewall to DPE mode (through Enforcement Point Settings or by restarting a Database Firewall with network passthrough), ensure that all connections to the database are forced to reconnect. In addition, in DPE mode, if you change Enforcement Point Settings, you must also force all database connections to reconnect.

---

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- **Policy:** Select a baseline policy. To upload a custom policy developed using the Analyzer software, click **Browse** to select the file, then **Upload**. Use the text box to add a description. If this is the first time you are creating a baseline policy, then Oracle recommends that you select the **unique.dna** policy.
9. Click **Next**.  
The Enforcement Point Wizard: Step 4 page appears.
  10. Check your settings, and if you are satisfied, then click the **Finish** button.

## Step 5: Test the Management Server System Operation

You should verify that the system is fully operational before commencing normal day-to-day operations.

To test the system operation:

1. In the Firewall Management Server Administration Console, click the **Monitoring** tab.
2. In the **Enforcement Points** menu, select **List**.  
The Enforcement Points page appears.
3. Click the **Status** button.  
In the **Appliances** area, ensure that there is a green check-mark indicator in the **Status** column against the device that is performing the monitoring.
4. Click the **Dashboard** tab, and check that **Total Statements** increases every minute. This indicates that statements are being recognized.
5. Click the **Reporting** tab, then **View** in **Traffic Log** menu. Click **Start** to see the statements that are being saved to the traffic log (the latest information may take up to five minutes to display).
6. Use the Analyzer software to verify that data can be obtained from the traffic log.

## What's Next?

The tasks in chapter complete the initial configuration of Database Firewall Management Server. Your next step is to configure the connection between the protected databases and Database Firewalls. Depending on site requirements, you may need to configure other features, such as stored procedure auditing, user role auditing and local monitoring. These features are explained in later chapters of this guide.



After you have configured the installed Database Firewalls and the Management Server, users will be able to begin analyzing data. Once a policy has been developed, you must upload it. See *Oracle Database Firewall Security Guide* for information about listing and uploading policies.

[Chapter 13, "System Administration,"](#) explains system administration tasks, including how to set up new users, monitor the system and produce reports.



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# Configuring Oracle Database Firewall for High Availability

This chapter contains:

- [About Using High Availability with Oracle Database Firewall](#)
- [Configuring a Resilient Pair of Oracle Database Firewall Management Servers](#)
- [Configuring a Resilient Pair of Oracle Database Firewalls](#)
- [Pairing Enforcement Points](#)
- [Archiving Data](#)
- [Updating the Oracle Database Firewall Software in Resilient Pairs](#)

## About Using High Availability with Oracle Database Firewall

This section contains:

- [How Does High Availability Work with the Oracle Database Firewall Components?](#)
- [Incorporating Resilient Pairs of Oracle Database Firewall Management Servers](#)
- [Adding Paired Enforcement Points](#)
- [Network Communication for the Resilient Pairs](#)

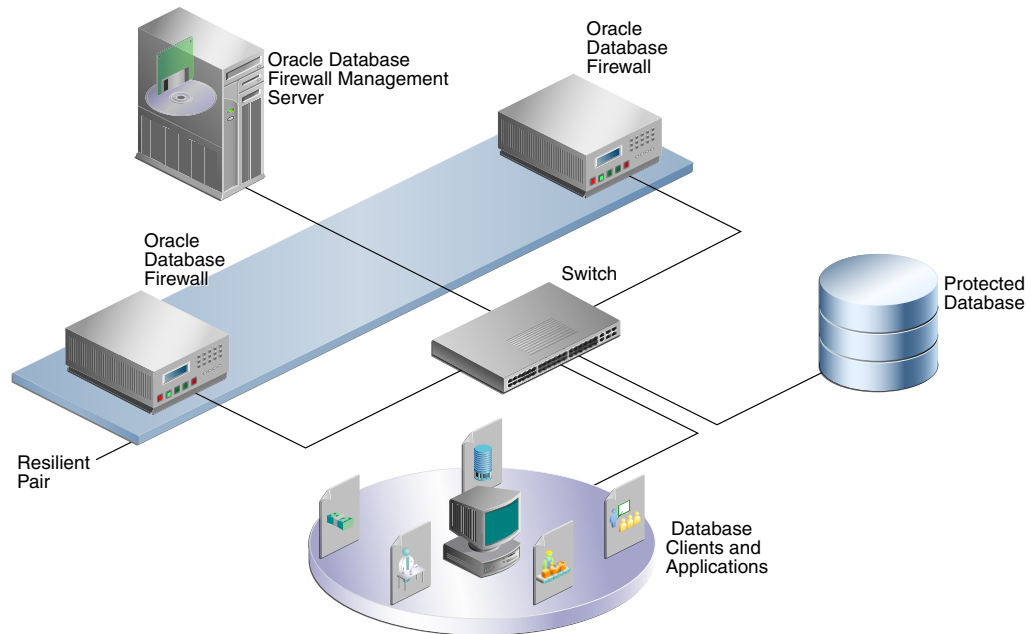
## How Does High Availability Work with the Oracle Database Firewall Components?

Oracle Database Firewall provides high-availability solutions by allowing two Database Firewalls to be configured in a resilient pair. During normal operation, one unit (the primary) carries out all normal operations, while the other (the secondary) monitors traffic, but alerts only in the unlikely event that the primary should fail.

Both devices connect to the network normally. All settings necessary to configure the resilient pair are available from the Management Server Administration Console.

[Figure 4-1](#) shows an example of two Database Firewalls being used as a resilient pair.

**Figure 4–1 High Availability Using a Resilient Pair of Oracle Database Firewalls**



High availability is available only when the Oracle Database Firewall is configured in Database Activity Monitoring mode.

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**Note:** In this configuration, If the Oracle Database Firewall Management Server fails, it is not possible to generate reports, monitor system status and change configuration settings, although Oracle Database Firewalls will continue to monitor and log traffic. When the Oracle Database Firewall Management Server returns to an online status, it collects logged data from the Oracle Database Firewalls and automatically generates any outstanding scheduled reports.

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## Incorporating Resilient Pairs of Oracle Database Firewall Management Servers

Optionally, two Oracle Database Firewall Management Servers can also be configured as a resilient pair. The primary Oracle Database Firewall Management Server carries out all tasks while the secondary Oracle Database Firewall Management Server stands by, ready to assume control.

The main benefit of a resilient pair of Oracle Database Firewall Management Servers is that it provides continuous service to generate reports, monitor system status and change configuration settings in the event of a failure of the primary Oracle Database Firewall Management Server.

The secondary Oracle Database Firewall Management Server obtains its configuration settings automatically from the primary. To ensure that settings remain consistent between the two devices, the Administration Console allows configuration settings to be saved only from the primary Oracle Database Firewall Management Server.

---



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**Note:** In an Oracle Database Firewall system you can have a single Management Server or two Management Servers configured as a resilient pair.

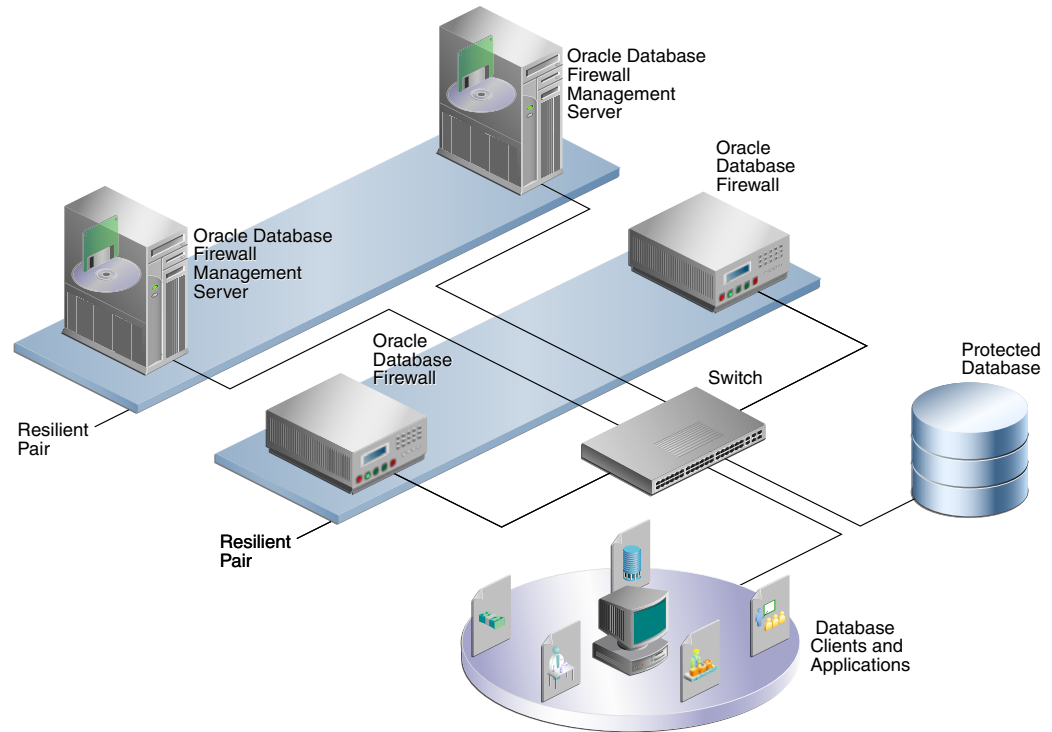
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Figure 4–2 shows an example of high availability using a resilient pair of Database Firewalls and a resilient pair of Management Servers.

**Figure 4–2 High Availability Using a Resilient Pair of Management Servers and Database Firewalls**



## Adding Paired Enforcement Points

Oracle Database Firewall also allows two enforcement points to be paired. This may be useful in certain high-availability architectures that have two data centers. See "[Pairing Enforcement Points](#)" on page 4-5 for more information.

## Network Communication for the Resilient Pairs

When you use resilient pairs, it is important to ensure that the network allows both devices in the pair to communicate with each other. Oracle Database Firewall must be able to communicate with both the primary and secondary Oracle Database Firewall Management Servers, and vice versa.

## Configuring a Resilient Pair of Oracle Database Firewall Management Servers

[Chapter 3, "Configuring a Database Firewall Management Server,"](#) explains how to set up a new Oracle Database Firewall system, including the steps necessary to configure a resilient pair of Database Firewalls. This section provides steps that are specific to creating a resilient pair of Management Servers, which may be useful when adding high availability to an existing system.

This section contains:

- [Procedure for Configuring a Pair of Resilient Database Firewall Management Servers](#)

- [Swapping the Primary and Secondary Database Firewall Management Servers](#)

## Procedure for Configuring a Pair of Resilient Database Firewall Management Servers

To set up a resilient pair of Oracle Database Firewall Management Servers:

1. Ensure that the Management Server software is installed and running on two servers.
2. For each Database Firewall that will be managed by the resilient pair of Management Servers:
  1. Log in to the Administration Console of the Database Firewall.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
  2. Click the **System** tab, then click **Management Server** in the **System** menu.
  3. Enter the **IP address** and **certificate** of one of the installed Management Servers.
  4. Check **Add Second Management Server**, and then add the **IP address** and **certificate** of the other installed Management Server.
3. For each of the paired Management Servers:
  1. Log in to the Administration Console of the Management Server.
  2. Click the **System** tab, and in the **High Availability Pairing** section, click **Change**.
  3. Select whether this is the **primary** or **secondary** Management Server in the **Change Status** field.
  4. Enter the **IP address** and **certificate** of the partner Management Server, then click **Apply**.
  5. Add each managed Database Firewall as an appliance in both Management Servers in the resilient pair. See "[Step 3B: Add Each Oracle Database Firewall to the Management Server](#)" on page 3-9.

To view the high availability settings for the Database Firewall Management Server:

1. In the Management Server's administration console, click the **System** tab, and then click **Status** under the **System** menu.
2. View the Management Server's high availability settings in the **High Availability** section of the Status page.

## Swapping the Primary and Secondary Database Firewall Management Servers

There is normally no need to manually swap the status of an Oracle Database Firewall Management Server from primary to secondary and vice versa. However, there may be times when you want to swap the primary and secondary Management Servers, for example, in the event that the primary server fails, or during the upgrade process. During upgrades, you may want to swap the primary Management Server with the secondary Management Server in order to perform the upgrade on the secondary server.

To swap the primary and secondary Database Firewall Management Servers:

1. Log in to the Administration Console for the current primary Management Server.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Click **Change** in the **High Availability Pairing** section.
3. Click the **Secondary** button.

## Configuring a Resilient Pair of Oracle Database Firewalls

This section explains the steps necessary to configure a resilient pair of Oracle Database Firewalls. Although these steps are covered in [Chapter 3](#), which explains how to set up a new Oracle Database Firewall system, the summary of the steps given below may be useful if you are adding high availability to an existing system.

This section contains:

- [Procedure for Configuring a Pair of Oracle Database Firewalls](#)
- [Swapping the Primary and Secondary Oracle Database Firewalls](#)

### Procedure for Configuring a Pair of Oracle Database Firewalls

When you configure a High Availability environment, ensure that the specifications of the hardware used for paired Database Firewalls are identical.

To set up a resilient pair of Oracle Database Firewalls:

1. Log in to the Administration Console for the current primary Management Server (or the Management Server if you only have one).

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Select the **Appliances** tab, and in the **Resilience** menu, click **Create Resilient Pair**.
3. Use the **Primary** and **Secondary** menus to choose the two Oracle Database Firewalls.

The **Status** column in the Appliances page shows which Oracle Database Firewall is the primary, and which is the secondary, as shown next. The status is refreshed each time the page is displayed.

Clicking **Unpair** removes the two devices from the resilient pair.

4. When setting up an enforcement point, the paired Oracle Database Firewalls are listed together, with a single radio button:

### Swapping the Primary and Secondary Oracle Database Firewalls

There is normally no need to manually swap the status of an Oracle Database Firewall from primary to secondary and vice versa, since this is handled automatically in the event of a failure of the primary. However, if there are circumstances where you do want to make the change, such as during a software update:

1. Log in to the Administration Console for the current primary Management Server.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Appliances** tab, and then in the Appliances page, click **Swap**.

## Pairing Enforcement Points

Some high-availability architectures employ two data centers in different locations, each of which has a local database, but which are viewed from the client applications as a single database. In this scenario, you should set up a separate enforcement point for each database and pair the two enforcement points in the Administration Console.

Pairing the enforcement points prevents duplicate records from appearing for user role auditing (see [Chapter 6, "Configuring and Using Role Auditing"](#)) and stored procedure auditing (see [Chapter 5, "Configuring Stored Procedure Auditing"](#)), and allows any change to the policy to be automatically applied to both databases.

---

**Note:** There is no concept of a primary and secondary enforcement points; both enforcement points monitor at the same time. High-availability redundancy is achieved only by setting up resilient pairs of Oracle Database Firewalls, and (optionally) resilient pairs of Oracle Database Firewall Management Servers.

---

To pair two enforcement points:

1. Log in to the Administration Console for the current primary Management Server. See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Monitoring** tab in the Administration Console of the primary Oracle Database Firewall Management Server.
3. In the **Resilience** menu, click **Create Pair**.
4. Use the **Primary** and **Secondary** menus to choose the two enforcement points.  
**Note:** The two selected enforcements points must monitor the same protected database and use the same policy in DAM mode.
5. Save the changes.

You can unpair two enforcement points by clicking **Unpair** in the Enforcement Points page.

## Archiving Data

You can archive data from Oracle Database Firewall Management Servers and Oracle Database Firewalls that are in resilient pairs by performing an archive in the normal way from only the primary Oracle Database Firewall Management Server. The secondary Oracle Database Firewall Management Server obtains configuration and SPA/URA audit data automatically from the primary. See "[Archiving Data](#)" on page 13-13 for more information.

## Updating the Oracle Database Firewall Software in Resilient Pairs

Updating the Oracle Database Firewall software with patch updates should not require you to interrupt database monitoring and protection. A patch installation can be carried out for resilient pairs with the primary server remaining online at all times.

When updating Oracle Database Firewall software in resilient pairs, you should first update the secondary server, swap the primary and secondary servers, and then update the new secondary server. This process is described in the *Oracle Database Firewall Installation Guide*.



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## Configuring Stored Procedure Auditing

This chapter contains:

- [About Stored Procedure Auditing \(SPA\)](#)
- [Setting User Permissions for SPA](#)
- [Enabling SPA on the Database Firewall](#)
- [Disabling SPA](#)

### About Stored Procedure Auditing (SPA)

Stored procedure auditing (SPA) enables users to audit and approve changes to stored procedures on monitored databases. Oracle Database Firewall connects to the database server at scheduled intervals and discovers any changes or additions that have been made to stored procedures. Stored Procedure Auditing is supported for Oracle, Microsoft SQL Server, MySQL, Sybase ASE, Sybase SQL Anywhere, and IBM DB2 (Microsoft Windows, UNIX, and Linux) databases.

This chapter explains how to configure a Database Firewall-protected database so that users can audit changes to stored procedures. Instructions for performing the audit are in *Oracle Database Firewall Security Guide*.

### Setting User Permissions for SPA

This section contains:

- [Setting SPA User Permissions on Oracle Databases](#)
- [Setting SPA User Permissions for SQL Server Databases](#)
- [Setting SPA User Permissions for MySQL Databases](#)
- [Setting SPA User Permissions for Sybase ASE Databases](#)
- [Setting SPA User Permissions for Sybase SQL Anywhere Databases](#)
- [Setting SPA User Permissions for IBM DB2 SQL Databases](#)

### Setting SPA User Permissions on Oracle Databases

To set up the user account for Oracle databases (all releases later than Oracle Database 8i):

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.

2. On this server, go to the `database/spa` directory and uncompress the `oracle` compressed file, preferably into a directory called `oracle`.
3. Go to this `oracle` directory and review the uncompressed file (`spa_setup.sql`) so that you will understand its settings.

The `spa_setup.sql` script contains settings for the following information:

- `$(username)` refers to the user account that will be responsible for stored procedure auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, `spa_auditor`).
  - `$(password)` refers to the password for this user account.
4. Log in to Oracle Database as a user with privileges to create users and set user permissions.

For example:

```
sqlplus sys/ as sysdba
Enter password: password
Connected.
SQL>
```

If the database has been enabled with Oracle Database Vault, then log in as a user who has been granted the `DV_ACCTMGR` role.

5. Run the `spa_setup` script and answer the prompts.

For example:

```
SQL> @database/spa/oracle/spa_setup.sql
username: as parameter 1:
Enter value for 1: user_name
password: as parameter 2:
Enter value for 2: password
```

The `spa_setup.sql` script grants the stored procedure auditing user account the following privileges:

- `CREATE SESSION`
  - `SELECT` on the `sys.dba_objects` and `sys.dba_source` system tables
6. (Optional) If you need to remove this user account, run the `spa_drop` script.

For example:

```
SQL> @database/spa/oracle/spa_drop.sql
username: as parameter 1:
Enter value for 1: user_name
```

## Setting SPA User Permissions for SQL Server Databases

To set up the user account for Microsoft SQL Server (2000, 2005, or 2008) databases:

1. Decide where you are going to run the scripts: on the database server (locally) or from another computer (remotely).
2. Ensure that the computer where you will run the scripts has the `sqlcmd.exe` utility installed.

3. Choose a user name and password for the database user account that will be responsible for the stored procedure auditing.

You will create this user account and password later in this procedure.

4. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
5. On this server, go to the database/spa directory and uncompress the sqlserver compressed file, preferably into a directory called sqlserver.
6. Go to this sqlserver directory and review the uncompressed files so that you will understand their settings.

The scripts contain settings for the following information:

- \$(username) refers to the user account that will be responsible for stored procedure auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, spa\_auditor).
  - \$(password) refers to the password for this user account.
  - \$(database) refers to the database that you want to audit.
7. As a user who has privileges to create users and set user permissions, run the spa\_add\_user script on the SQL Server database.

The syntax is as follows:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_add_user.sql
-v username="username" password="password"
```

In this specification:

- *server\_name*: Enter the name or the IP address of the database server where the protected database resides. Only use this argument if you are running the script from a remote server.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.
- *username*: Enter the user account that you plan to create for stored procedure auditing, specified by \$(username) in the scripts. Enclose this user name in double quotation marks.
- *password*: Enter the password for the stored procedure auditing user account, specified by \$(password) in the scripts. Enclose this password in double quotation marks.

Following are two command examples. (The lines wrap below, but you may see them on one line.)

```
sqlcmd -U sa -P sa_password -i spa_add_user.sql -v username="spa_auditor"
password="abcd1234"
```

```
sqlcmd -S my_server -U sa -P sa_password -i spa_add_user.sql
-v username="spa_auditor" password="abcd1234"
```

8. Grant the user permissions by running the spa\_add\_db\_permissions or spa\_add\_all\_db\_permissions script.

The following examples show how to run the scripts remotely, but if you are running the scripts locally, then omit the `-S server_name` argument.

For permissions to a specific database, use the following syntax:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_add_db_permissions.sql  
-v username="username" database="protected_database"
```

For the `database="protected_database"` setting:

- Enter the name of the database within this server that you want to audit, specified by `$(database)` in the scripts.
- Enclose this database name in double quotation marks.

For permissions to all databases, use this syntax:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_add_all_db_permissions.sql  
-v username="username"
```

Below are two command examples. (The lines wrap below, but you may see each command on one line.)

```
sqlcmd -S my_server -U sa -P sa_password -i spa_add_db_permissions.sql  
-v username="jsmith" database="my_database"
```

```
sqlcmd -S my_server -U sa -P sa_password -i spa_add_all_db_permissions.sql  
-v username="jsmith"
```

The scripts grant the stored procedure auditing user account the following privileges:

- `VIEW DEFINITION` and `SELECT` on the `sys.all_objects` and `dbo.syscomments` system tables for product version greater than 8.
  - `SELECT` on `dbo.sysobjects` and `dbo.syscomments` for product version less than Version 8.
9. (Optional) If you need to remove the above user permissions run the `spa_drop_db_permissions` or `spa_drop_all_db_permissions` script.

Use the following syntax for a specific database:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_drop_db_permissions.sql  
-v username="username" database="protected_database"
```

Use the following syntax for all databases:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_drop_all_db_permissions.sql  
-v username="username"
```

Below are two command examples. (The lines wrap below, but you may see each command on one line.)

```
sqlcmd -S my_server -U sa -P sa_password -i spa_drop_db_permissions.sql  
-v username="jsmith" database="my_database"
```

```
sqlcmd -S my_server -U sa -P sa_password -i spa_drop_all_db_permissions.sql  
-v username="jsmith"
```

10. (Optional) If you need to remove the stored procedure auditing user from the SQL Server database, run the `spa_drop_user` script.

The syntax is as follows:

```
sqlcmd -S server_name -U sa -P sa_password -i spa_drop_user.sql
-v username="username" password="password"
```

For example:

```
sqlcmd -U sa -P sa_password -i spa_drop_user.sql -v username="spa_auditor"
```

## Setting SPA User Permissions for MySQL Databases

To set up the user account for MySQL databases:

1. Log in to the database as a user who has privileges to create users and set user permissions, and run the following command on the MySQL database:

```
create user 'username'@'hostname' identified by 'password'
```

For username, use the name of the Stored Procedure Auditing account, and for hostname use the hostname of the Database Firewall. For example:

```
create user 'spa_auditor'@'10.155.56.2' identified by 'jj_1234'
```

2. Grant required permissions to the user you just created by running the following command:

```
grant select on mysql.proc TO 'username'@'hostname'
```

For example:

```
grant select on mysql.proc TO 'spa_auditor'@'10.155.56.2'
```

The above command grants the stored procedure auditing user account the following privilege: SELECT on the `mysql.proc` system table.

3. (Optional) If you need to remove the stored procedure auditing user from the MySQL database, run the following command:

```
drop user 'username'@'hostname'
```

For example:

```
drop user 'spa_auditor'@'10.155.56.2'
```

## Setting SPA User Permissions for Sybase ASE Databases

For Sybase ASE stored procedure auditing, the `tempdb` database must be large enough to accommodate the generated temp files.

To check the size of `tempdb`:

1. Run the `sp_helpdb` system stored procedure.
2. Compare the `db_size` columns for the `sybsystemproc` and `tempdb` databases.

The `tempdb` database should be larger than `sybsystemproc`, at least by a couple of MBs.

To set up the Sybase Adaptive Server Enterprise user accounts:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.

2. On this server, go to the database/spa directory and uncompress the sybase compressed file, preferably into a directory called sybase.
3. As a user who has privileges to create users and set user permissions, run the spa\_add\_user script on the Sybase ASE database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i spa_add_user.sql
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.

Examples:

```
isql -U sa -P sa_password -i spa_add_user.sql
```

```
isql -S my_server -U sa -P sa_password -i spa_add_user.sql
```

This script adds a default stored procedure auditing user, `dbfw_spa_user`, with a default password, `defaultpassword`. It is good practice to change this password later.

4. Grant this user permissions by running the spa\_add\_db\_permissions script.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i spa_add_db_permissions.sql
```

In this specification:

- *server\_name*: Enter the name of the server or its IP address. Only use the argument `-S server_name` if the database is remote.
- *sa\_password*: Enter the system administrator password.

This script grants the stored procedure auditing user account the following privileges:

- SELECT on `dbo.sysdatabases`, `dbo.sysobjects`, and `dbo.syscomments`.

5. (Optional) If you need to remove the above permissions, run the spa\_drop\_db\_permissions script.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i spa_drop_db_permissions.sql
```

6. (Optional) If you need to remove the stored procedure auditing user, run the spa\_drop\_user script on the Sybase ASE database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i spa_add_user.sql
```

## Setting SPA User Permissions for Sybase SQL Anywhere Databases

This section contains:

- [Installing the Sybase SQL Anywhere ODBC Driver for Linux](#)

- [Setting Stored Procedure Auditing User Permissions](#)

### Installing the Sybase SQL Anywhere ODBC Driver for Linux

Before you can use Sybase SQL Anywhere, you must install the SQL Anywhere ODBC driver for Linux.

To install the ODBC driver for Linux:

1. Log in to the Database Firewall server as user root.
2. From the Sybase SQL Anywhere installation media, copy the `linux_x86_GA_sa1101_2044_110n.tar.gz` to a temporary location on the Database Firewall server.

3. Expand this archive file.

```
tar zxvf linux_x86_GA_sa1101_2044_110n.tar.gz
```

4. Run the setup utility to begin the installation of the client.

```
./setup
```

5. When prompted, select to install only 3. Administration Tools.
6. When prompted, install the client to the `/var/sqlanywhere11` directory.
7. From the Sybase SQL Anywhere installation media, copy `sa11_full_linux_x86+x64.1101_2420_ebf.tar.gz` to the Database Firewall server.

8. Expand this archive file.

```
tar zxvf sa11_full_linux_x86+x64.1101_2420_ebf.tar.gz
```

9. Run the setup utility to begin the installation of the client.

```
./setup
```

10. When prompted, select to install to the `/var/sqlanywhere11` directory.

### Setting Stored Procedure Auditing User Permissions

To set up the Sybase SQL Anywhere user accounts:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
2. On this server, go to the `database/spa` directory and uncompress the `sqlanywhere` compressed file, preferably into a directory called `sqlanywhere`.
3. Go to this `sqlanywhere` directory and review the uncompressed file (`spa_setup.sql`) so that you will understand its settings.

The `spa_setup.sql` script contains settings for the following information:

- `$(username)` refers to the user account that will be responsible for stored procedure auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, `spa_auditor`).
  - `$(password)` refers to the password for this user account.
4. As a user who has privileges to create users and set user permissions, run the `spa_setup.sql` script on the SQL Anywhere database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i spa_setup.sql
-v username="username" password="password" database="protected_database"
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *username*: Enter the user account that you plan to create for stored procedure auditing, specified by `$(username)` in the `spa_setup.sql` script. Enclose this user name in double quotation marks.
- *password*: Enter the password for the stored procedure auditing user account, specified by `$(password)` in the `spa_setup.sql` script. Enclose this password in double quotation marks.
- `database="protected_database"`: Enter the name of the database within this server that you want to protect, specified by `$(database)` in the `spa_setup.sql` script. Enclose this database name in double quotation marks.

For example:

```
isql -S my_server -U sa -P password -i spa_setup.sql
-v username="spa_auditor" password="$(password)_password" database="sales_db"
```

The `spa_setup.sql` script grants the stored procedure auditing user account the following privileges:

- CONNECT
  - SELECT on the `sys.sysuser`, `sys.sysprocedure`, and `sys.sysprocparm` system tables.
5. (Optional) If you need to remove the above permissions, run the `spa_drop` script on the SQL Anywhere database.

The syntax is as follows:

```
isql -S server_name -U sa -P password -i spa_drop.sql
-v username="username" password="password" database="protected_database"
```

## Setting SPA User Permissions for IBM DB2 SQL Databases

To set up an IBM DB2 user account, you do not need to run any scripts. Instead, you create a new user account or designate an existing user account to be used for the stored procedure auditing.

To set up the IBM DB2 user account:

1. Log in to the IBM DB2 Windows, UNIX, or Linux database that you want to audit.
2. Create a new user account or designate an existing user account to be used for the stored procedure auditing.
3. Grant the following privilege to this user:  

```
grant select on syscat.routines to user
```
4. (Optional) If you need to remove the above permission, either revoke the granted permission, or remove the user account from the IBM DB2 database.



## Enabling SPA on the Database Firewall

To enable stored procedure auditing:

1. Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. In the **Monitoring** tab, click **List** in the **Enforcement Points** menu.
3. Choose an enforcement point (or create one) to monitor the stored procedures, and click the **Settings** button.

All enforcement points also monitor SQL traffic to a nominated database server. If required, the enforcement point can monitor stored procedures in databases located on a different server.

4. Under Monitoring Settings, select the **SPA** check box.

SPA:  Activate Stored Procedure Auditing

Database Address:  Port:

Database Name:

User Name:

Password:

Password Confirmation:

Database Connection:

First Run Time:   -02 : 00 : 00

Repeat Every:  Hours  Days  Weeks  Months  Weeks

5. Complete the SPA fields and options:

- **Database Address and Port:** Specify the IP address of the server that holds the databases to be audited. For the port number, enter the port number used by the database. (For example, the default port number for Oracle databases is 1521. For Oracle databases, you can find this information in the `tnsnames.ora` file.) To use a hostname instead of an IP address, first configure DNS servers in System Services page.

The IP address of the protected database specified in the enforcement point is not automatically included in the audit.

- **Database Name:** Name of the database. For Oracle databases, enter the service name, as defined in the `tnsnames.ora` file.
- **User Name:** Enter the user name of the stored procedure auditing account, for example, `spa_auditor`.
- **Change Password:** If you want to change the password of the user, click the **Change Password** button and then enter a new password. (This field appears only if you are editing an existing configuration. The first time that you configure stored procedure auditing, the **Password** and **Confirm Password** fields appear.)

- **Database Connection (Test Now):** Clicking **Test Now** checks that the specified user can log into the databases and has the required permissions.
- **First Run Time and Repeat Every:** Specify the date and time to run the first audit and the frequency to repeat the audits. Select a time when the database is not busy, such as 2 a.m.

If you want to run an audit immediately, click **List** in the Enforcement Points menu, then the **Manage** button for the appropriate enforcement point, followed by **Run Now**.

## Disabling SPA

You can disable stored procedure auditing. If you want to completely remove stored procedure auditing, see *Oracle Database Firewall Installation Guide*.

To disable stored procedure auditing:

1. Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Select the **Monitoring** tab.

By default, the Enforcement Points page appears. If it does not, then click the **List** button in the Enforcement Points menu on the left side of the page.

3. Find the enforcement point for the stored procedure auditing that you want to disable.
4. Click the **Settings** button.

The Monitoring Settings page appears.

5. In the SPA area, clear the **Activate Stored Procedure Auditing** check box.
6. Scroll to the bottom of the Monitoring Settings page and click the **Save** button.

---

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## Configuring and Using Role Auditing

This chapter contains:

- [About User Role Auditing \(URA\)](#)
- [Setting User Permissions for URA](#)
- [Enabling URA on the Database Firewall](#)
- [Disabling URA](#)

### About User Role Auditing (URA)

User role auditing (URA) enables users to audit and approve changes to user roles in the databases on a specified database server. The Oracle Database Firewall connects to the database server at scheduled intervals and discovers any changes or additions that have been made to user roles. User role auditing is supported for Oracle, Microsoft SQL Server, My SQL, Sybase ASE, Sybase SQL Anywhere, and IBM DB2 (Microsoft Windows, UNIX, and Linux) databases.

This chapter explains how to configure a database protected by Database Firewall so that Database Firewall users can audit changes to user roles. Instructions for auditing the user roles are in *Oracle Database Firewall Security Guide*.

### Setting User Permissions for URA

This section contains:

- [Setting URA User Permissions for Oracle Databases](#)
- [Setting URA User Permissions for SQL Server Databases](#)
- [Setting URA User Permissions for MySQL Databases](#)
- [Setting URA User Permissions for Sybase ASE Databases](#)
- [Setting URA User Permissions for Sybase SQL Anywhere Databases](#)
- [Setting URA User Permissions for IBM DB2 SQL Databases](#)

### Setting URA User Permissions for Oracle Databases

To set up the user account for Oracle databases (all releases later than Oracle Database 8i):

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.

2. On this server, go to the database/ura directory and uncompress the oracle compressed file, preferably into a directory called oracle.
3. Go to this oracle directory and review the uncompressed file (ura\_setup.sql) so you will understand its settings.

The ura\_setup.sql script contains settings for the following information:

- \$(username) refers to the user account that will be responsible for user role auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, ura\_auditor).
  - \$(password) refers to the password for this user account.
4. Log in to Oracle Database as a user who has privileges to create users and set user permissions.

For example:

```
sqlplus sys/as sysdba
Enter password: password
Connected.
SQL>
```

If the database has been enabled with Oracle Database Vault, then log in as a user who has been granted the DV\_ACCTMGR role.

5. Run the ura\_setup script and answer the prompts as needed.

For example:

```
SQL> @database/ura/oracle/ura_setup.sql
username: as parameter 1:
Enter value for 1: user_name
password: as parameter 2:
Enter value for 2: password
```

The ura\_setup.sql script grants the user role auditing user account the following privileges:

- CREATE SESSION
- SELECT on these system tables:

```
sys.dba_users
sys.dba_role_privs
sys.dba_sys_privs
sys.proxy_users
v$pwfile_users
```

6. (Optional) If you need to remove this user account, run the ura\_drop script.

For example:

```
SQL> @database/ura/oracle/ura_drop.sql
username: as parameter 1:
Enter value for 1: user_name
```

## Setting URA User Permissions for SQL Server Databases

To set up the user account for Microsoft SQL Server (2000, 2005, or 2008) databases:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
2. Ensure that the computer where you will run the scripts has the `sqlcmd.exe` utility installed.
3. On this server, go to the database/ura directory and uncompress the `sqlserver` compressed file, preferably into a directory called `sqlserver`.
4. Go to this `sqlserver` directory and review the uncompressed files so you will understand their settings.

The scripts contain settings for the following information:

- `$(username)` refers to the user account that will be responsible for user role auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, `ura_auditor`).
  - `$(password)` refers to the password for this user account.
  - `$(database)` refers to the database that you want to audit.
5. As a user who has privileges to create users and set user permissions, run the `ura_add_user` script on the SQL Server database.

The syntax is as follows:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_add_user.sql
-v username="username" password="password"
```

In this specification:

- `server_name`: Enter the name or the IP address of the database server where the protected database resides. Only use this argument if you are running the script from a remote server. You can omit it if you are running the script locally.
- `sa`: Enter the system administrator user name.
- `sa_password`: Enter the system administrator password.
- `username`: Enter the user account that you plan to create for user role auditing, specified by `$(username)` in the scripts. Enclose this user name in double quotation marks.
- `password`: Enter the password for the user role auditing user account, specified by `$(password)` in the scripts. Enclose this password in double quotation marks.

Following are two command examples. (The lines wrap below, but you may see them on one line.):

```
sqlcmd -U sa -P sa_password -i ura_add_user.sql -v username="ura_auditor"
password="abcd1234"
```

```
sqlcmd -S my_server -U sa -P sa_password -i ura_add_user.sql
-v username="ura_auditor" password="abcd1234"
```

6. Grant the user permissions by running the `ura_add_db_permissions` or `ura_add_all_db_permissions` script.

The following examples show how to run the scripts remotely, but if you are running the scripts locally, then omit the `-S server_name` argument.

For permissions to a specific database, use the following syntax:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_add_db_permissions.sql  
-v username="username" database="protected_database"
```

For the `database="protected_database"` setting:

- Enter the name of the database within this server that you want to audit, specified by `$(database)` in the scripts.
- Enclose this database name in double quotation marks.

For permissions to all databases, use this syntax:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_add_all_db_permissions.sql  
-v username="username"
```

Below are two command examples. (The lines wrap below, but you may see each command on one line.)

```
sqlcmd -S my_server -U sa -P sa_password -i ura_add_db_permissions.sql  
-v username="jsmith" database="my_database"
```

```
sqlcmd -S server_name -U sa -P sa_password -i ura_add_all_db_permissions.sql  
-v username="jsmith"
```

The scripts grant the user role auditing user account the following privileges:

- VIEW ANY DEFINITION for SQL Server 2005 and later
- SELECT on these tables:

```
master.dbo.sysdatabases  
master.dbo.syslogins  
specific_database.dbo.sysmembers  
specific_database.dbo.sysusers
```

7. (Optional) If you need to remove the above user permissions run the `ura_drop_db_permissions` or `ura_drop_all_db_permissions` script.

Use the following syntax for a specific database:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_drop_db_permissions.sql  
-v username="username" database="protected_database"
```

Use the following syntax for all databases:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_drop_all_db_permissions.sql  
-v username="username"
```

Below are two command examples. (The lines wrap below, but you may see each command on one line.)

```
sqlcmd -S my_server -U sa -P sa_password -i ura_drop_db_permissions.sql  
-v username="jsmith" database="my_database"
```

```
sqlcmd -S server_name -U sa -P sa_password -i ura_drop_all_db_permissions.sql  
-v username="jsmith"
```

8. (Optional) If you need to remove the user role auditing user from the SQL Server database, run the `ura_drop_user` script.

The syntax is as follows:

```
sqlcmd -S server_name -U sa -P sa_password -i ura_drop_user.sql
```

```
-v username="username" password="password"
```

For example:

```
sqlcmd -U sa -P sa_password -i ura_drop_user.sql -v username="ura_auditor"
```

## Setting URA User Permissions for MySQL Databases

To set up the user account for MySQL databases:

1. Log in to the database as a user who has privileges to create users and set user permissions, and run the following command on the MySQL database:

```
create user 'username'@'hostname' identified by 'password'
```

For username, use the name of the User Role Auditing account, and for hostname use the hostname of the Database Firewall. For example:

```
create user 'ura_auditor'@'10.155.56.2' identified by 'jj_1234'
```

2. Grant required permissions to the user you just created by running the following command:

```
grant select on mysql.user TO 'username'@'hostname'
```

For example:

```
grant select on mysql.user TO 'ura_auditor'@'10.155.56.2'
```

The above command grants the stored procedure auditing user account the following privilege: SELECT on the `mysql.user` system table.

3. (Optional) If you need to remove the stored procedure auditing user from the MySQL database, run the following command:

```
drop user 'username'@'hostname'
```

For example:

```
drop user 'spa_auditor'@'10.155.56.2'
```

## Setting URA User Permissions for Sybase ASE Databases

To set up the Sybase Adaptive Server Enterprise user accounts:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
2. On this server, go to the database/ura directory and uncompress the sybase compressed file, preferably into a directory called sybase.
3. As a user who has privileges to create users and set user permissions, run the `ura_add_user.sql` script on the Sybase ASE database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i ura_add_user.sql
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.

Examples:

```
isql -U sa -P sa_password -i ura_add_user.sql
```

```
isql -S my_server -U sa -P sa_password -i ura_add_user.sql
```

4. Grant this user permissions by running the `ura_add_db_permissions.sql` script.

The syntax is as follows:

```
isql -S server_name -U sa -P password -i ura_add_db_permissions.sql
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.

The scripts grant the user role auditing user account the following privileges:

- SELECT on these tables:
  - `master.dbo.sysdatabases`
  - `master.dbo.syslogins`
  - `master.dbo.sysloginroles`
  - `master.dbo.sysssrvroles`
  - `master.dbo.sysattributes`
  - `specific_database.sysusers`
  - `specific_database.sysalternates`
  - `specific_database.sysroles`

5. (Optional) If you need to remove the above permissions, run the `ura_drop_db_permissions` script.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i ura_drop_db_permissions.sql
```

6. (Optional) If you need to remove the user role auditing user, run the `ura_drop_user` script on the Sybase ASE database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i ura_add_user.sql
```

## Setting URA User Permissions for Sybase SQL Anywhere Databases

This section contains:

- [Installing the Sybase SQL Anywhere ODBC Driver for Linux](#)
- [Setting URA User Permissions](#)



## Installing the Sybase SQL Anywhere ODBC Driver for Linux

Before you can use Sybase SQL Anywhere, you must install the SQL Anywhere ODBC driver for Linux.

To install the ODBC driver for Linux:

1. Log in to the Database Firewall server as user `root`.
2. From the Sybase SQL Anywhere installation media, copy the `linux_x86_GA_sa1101_2044_110n.tar.gz` to a secure location on the Database Firewall server.

3. Expand this archive file.

```
tar zxvf linux_x86_GA_sa1101_2044_110n.tar.gz
```

4. Run the setup utility to begin the installation of the client.

```
./setup
```

5. When prompted, select to install only 3. Administration Tools.
6. When prompted, install the client to the `/var/sqlanywhere11` directory.
7. From the Sybase SQL Anywhere installation media, copy `sa11_full_linux_x86+x64.1101_2420_ebf.tar.gz` to the Database Firewall server.

8. Expand this archive file.

```
tar zxvf sa11_full_linux_x86+x64.1101_2420_ebf.tar.gz
```

9. Run the setup utility to begin the installation of the client.

```
./setup
```

10. When prompted, select to install to the `/var/sqlanywhere11` directory.

## Setting URA User Permissions

To set up the Sybase SQL Anywhere user accounts:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the `database` directory to the server where you plan to run the scripts.
2. On this server, go to the `database/ura` directory and uncompress the `sqlanywhere` compressed file, preferably into a directory called `sqlanywhere`.
3. Go to this `sqlanywhere` directory and review the uncompressed file (`ura_setup.sql`) so you will understand the privileges that the users in these scripts will have.

The `ura_setup` script contains settings for the following information:

- `$(username)` refers to the user account that will be responsible for user role auditing. Ideally, this user account should be different from the user accounts specified for user role auditing and direct database interrogation (DDI) (for example, `ura_auditor`).
  - `$(password)` refers to the password for this user account.
4. As a user who has privileges to create users and set user permissions, run the `ura_setup` script on the SQL Anywhere database.

The syntax is as follows:

```
isql -S server_name -U sa -P password -i ura_setup.sql
```

```
-v username="username" password="password" database="protected_database"
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *username*: Enter the user account that you plan to create for user role auditing, specified by `$(username)` in the scripts. Enclose this user name in double quotation marks.
- *password*: Enter the password for the user role auditing user account, specified by `$(password)` in the scripts. Enclose this password in double quotation marks.
- `database="protected_database"`: Enter the name of the database within this server that you want to protect, specified by `$(database)` in the scripts. Enclose this database name in double quotation marks.

For example:

```
isql -S my_server -U sa -P password -i ura_setup.sql
-v username="ura_auditor" password="$(password)_password" database="sales_db"
```

The `ura_setup` script grants the user role auditing user account the following privileges:

- CONNECT
- SELECT on these system tables:

```
sys.sysuser
sys.sysuserauthority
sys.sysremoteuser
sys.sysloginmap
sys.sysgroup
```

5. (Optional) If you need to remove the above permissions, run the `ura_drop` script on the SQL Anywhere database.

The syntax is as follows:

```
isql -S server_name -U sa -P password -i ura_drop.sql
-v username="username" password="password" database="protected_database"
```

## Setting URA User Permissions for IBM DB2 SQL Databases

To set up an IBM DB2 user account, you do not need to run any scripts. Instead, you create a new user account or designate an existing user account to be used for the user role auditing.

To set up the IBM DB2 user account:

1. Log in to the IBM DB2 Windows, UNIX, or Linux database that you want to audit.
2. Create a new user account or designate an existing user account to be used for the user role auditing.
3. Grant the following privileges to this user:

```
grant select on sysibmadm.authorizationids to user
grant select on syscat.dbauth to user
```

- (Optional) If you need to remove the above permissions, either revoke the granted permissions, or remove the user account from the IBM DB2 database.

## Enabling URA on the Database Firewall

To enable user role auditing:

- Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

- Click **List** in the **Enforcement Points** menu of the Monitoring page.
- Choose an enforcement point to monitor user roles, and click the **Settings** button.

All enforcement points also monitor SQL traffic to a nominated database server. If required, the enforcement point can monitor user roles in databases located on a different server.

- Select the **URA** check box:

URA:  Activate User Role Auditing

Database Address:  Port:

Database Name:

User Name:

Password:

Password Confirmation:

Database Connection:

First Run Time:   -  :  :

Repeat Every:  Hours  Days  Weeks  Months  Weeks

- Complete the URA fields and options:

- Database Address and Port:** Specify the IP address of the server that holds the databases to be audited. For the port number, enter the port number used by the database. (For example, the default port number for Oracle databases is 1521. For Oracle databases, you can find this information in the `tnsnames.ora` file.) All databases on the server will be included in the audit. If you are using a Domain Name Server (DNS), you can enter a hostname instead of an IP address.

The IP address of the protected database specified in the enforcement point is not automatically included in the audit.

- Database Name:** Name of the database. For Oracle databases, enter the service name, as defined in the `tnsnames.ora` file.
- User Name:** Enter the user name of the user who was created by the scripts described in "[Setting User Permissions for URA](#)" on page 6-1.
- Change Password:** If you want to change the password of the user, click the **Change Password** button and then enter a new password. (This field appears only if you are editing an existing configuration. The first time that you

configure user role auditing, the **Password** and **Confirm Password** fields appear.)

- **Database Connection (Test Now):** Clicking **Test Now** checks that the specified user can log into the databases and has the required permissions.
- **First Run Time and Repeat Every:** Specify the date and time to run the first audit and the frequency to repeat the audits. Select a time when the database is not busy, such as 2 a.m."

If you want to run an audit immediately, click **List** in the Enforcement Points menu, then the **Manage** button for the appropriate enforcement point, followed by **Run Now**.

## Disabling URA

You can disable user role auditing. If you want to completely remove user role auditing, see *Oracle Database Firewall Installation Guide*.

To disable user role auditing:

1. Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Select the **Monitoring** tab.

By default, the Enforcement Points page appears. If it does not, then click the **List** button in the Enforcement Points menu on the left side of the page.

3. Find the enforcement point for the user role auditing that you want to disable.
4. Click the **Settings** button.

The Monitoring Settings page appears.

5. In the URA area, clear the **Activate User Role Auditing** check box.
6. Scroll to the bottom of the Monitoring Settings page and click the **Save** button.

---

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## Configuring and Using Local Monitoring

This chapter contains:

- [About Local Monitoring](#)
- [Installing Local Monitoring](#)
- [Enabling Local Monitoring](#)
- [Disabling Local Monitoring](#)

### About Local Monitoring

The local monitoring software enables an enforcement point to monitor (but not block) SQL traffic that originates from sources that have direct access to the database, such as console users or batch jobs that run on the database server. Local monitoring does not send traffic across the network. You install the Oracle Database Firewall local monitoring software directly into the database that you are monitoring. Local monitoring uses an additional table in the database, which logs:

- The last statement sent to the database by a console user or other process.
- All statements originating from console users or processes that affect the data in the database, such as `ALTER TABLE` and `DROP TABLE` operations. Mechanisms including triggers (Oracle and Sybase) and event notifications (Microsoft SQL Server) log such statements.

The enforcement point collects the data by querying the database at regular intervals, then uses the data in the same manner as statements originating from database clients. Depending on the design of the policy, the statements may be logged or produce warnings, but since local monitoring is not inline between the traffic and database, the statements cannot be blocked. Logged traffic from the Local Monitor has its source IP address as 0.0.0.0.

Oracle Database Firewall supports local monitoring for Oracle, SQL Server, and Sybase ASE databases. For a full list of supported database products, see *Oracle Database Firewall Installation Guide*.

Note the following guidelines:

- When using a Microsoft SQL Server 2005 or later database, ensure that the database uses mixed-mode authentication.
- Local monitoring uses a source IP address of 0.0.0.0, and port 0, for statements originating from a console user or other process. The destination address (displayed in the traffic log) is the same as one of the protected databases being monitored.

- Local monitoring does not record duplicate SQL statements. It only records the last SQL statement in a set of duplicate SQL statements.
- Local Monitor does both a forward and reverse DNS lookup to determine if a session is from the local machine. If a DNS configuration is broken and prevents the server from doing the lookup successfully, then the Local Monitor cannot record console events. To ensure that Local Monitor records all local sessions, check that your DNS configuration is correct.

## Installing Local Monitoring

This section contains:

- [Accessing the Scripts Required to Install Local Monitoring](#)
- [Database Accounts Created for Local Monitoring](#)
- [Installing Local Monitoring in an Oracle Database](#)
- [Installing Local Monitoring in a Microsoft SQL Server Database](#)
- [Installing Local Monitoring in a Sybase ASE Database](#)

## Accessing the Scripts Required to Install Local Monitoring

The scripts that you use to install the local monitoring components on the protected database are located in the Oracle Database Firewall Utilities 5.1 disc, in the `database\localmonitor` folder. Separate scripts are provided for Oracle, Sybase, and Microsoft SQL databases.

If the database is on a Windows platform, obtain the scripts from the `.zip` archive file. If you are using a Linux platform, you can unpack the `.tar` archive file as follows:

```
mkdir localmonitoring
cd localmonitoring
tar -xvf oracle.tar
```

## Database Accounts Created for Local Monitoring

The installation process automatically creates the following two database accounts, with the necessary privileges:

- `DBFW_CONSOLE_ACCESS` owns the schema objects.
- `DBFW_CONSOLE_ACCESS_QRY` is used by Oracle Database Firewall to query the database.

The `DBFW_CONSOLE_ACCESS` account has the following privileges:

- `CREATE SESSION`
- `ADMINISTER DATABASE TRIGGER`
- `CREATE PROCEDURE`
- `CREATE SEQUENCE`
- `CREATE TABLE`
- `CREATE TRIGGER`

The `DBFW_CONSOLE_ACCESS_QRY` account has the following privilege:

- `CREATE SESSION`

## Installing Local Monitoring in an Oracle Database

To install the local monitoring components on an Oracle database:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
2. On this server, go to the database/localmonitor directory and uncompress the oracle compressed file, preferably into a directory called oracle.
3. Go to this oracle directory and review the uncompressed files so you will understand the privileges that the users in these scripts will have.
4. Log in to Oracle Database as a user who has privileges to create users and set user permissions.

For example:

```
sqlplus sys/as sysdba
Enter password: password
Connected.
SQL>
```

If the database has been enabled with Oracle Database Vault, then log in as a user who has been granted the DV\_ACCTMGR role.

5. Run the script named dcam\_new\_user to create the DBFW\_CONSOLE\_ACCESS account.

For example:

```
SQL> @dcam_new_user password1 password2
```

For *password1* enter the password for the DBFW\_CONSOLE\_ACCESS account.

For *password2* enter the password for the DBFW\_CONSOLE\_ACCESS\_QRY table.

If you omit the passwords you will be prompted for them. For better security, allow the script to prompt you for the passwords.

6. Run the script named dcam\_setup as the DBFW\_CONSOLE\_ACCESS account:

```
connect DBFW_CONSOLE_ACCESS
Enter password: password1
SQL> @dcam_setup.sql
```

This script creates the tables and triggers that the monitoring system uses, and then grants access to the DBFW\_CONSOLE\_ACCESS\_QRY table.

Provide the password of the DBFW\_CONSOLE\_ACCESS\_QRY table to the person who is to enable local monitoring from the Administration Console.

7. (Optional) If you need to remove the above permissions, tables, and triggers, run the dcam\_drop script:

```
connect DBFW_CONSOLE_ACCESS
Enter password: password1
SQL> @dcam_drop.sql
```

8. (Optional) If you need to disable the DBFW\_CONSOLE\_ACCESS account and remove access to the DBFW\_CONSOLE\_ACCESS\_QRY table, run the dcam\_remove\_user script:

```
SQL> @dcam_remove_user.sql
```

## Installing Local Monitoring in a Microsoft SQL Server Database

To install the local monitoring components on a Microsoft SQL Server database running mixed-mode authentication:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.
2. On this server, go to the database/localmonitor directory and uncompress the sqlserver compressed file, preferably into a directory called sqlserver.
3. Go to this sqlserver directory and review the uncompressed files so you will understand the privileges that the users in these scripts will have.
4. Log in to the SQL Server as a user who has privileges to create users and set user permissions.

```
sqlcmd -S server_name -U sa -P password
```

5. Run the script named dcam\_new\_user to create the accounts.

```
1> :r dcam_new_user.sql
```

The script creates the DBFW\_CONSOLE\_ACCESS and DBFW\_CONSOLE\_ACCESS\_QRY accounts with default passwords.

6. Change the passwords for the two accounts.

```
1> alter login DBFW_CONSOLE_ACCESS with password = 'new password';
2> go
1> alter login DBFW_CONSOLE_ACCESS_QRY with password = 'new password';
2> go
```

7. Run the script named dcam\_setup.sql.

```
1> :r dcam_setup.sql
```

This script creates the tables and event notification framework that the monitoring system uses, and then grants access to the table DBFW\_CONSOLE\_ACCESS\_QRY.

Provide the password of the DBFW\_CONSOLE\_ACCESS\_QRY account to the person who is to enable local monitoring from the Administration Console.

8. (Optional) To remove the user accounts created in Step 5, run the dcam\_remove\_user script:

```
1> :r dcam_remove_user.sql
```

9. (Optional) To remove the tables and notifications created in Step 7, run the dcam\_drop script:

```
1> :r dcam_drop.sql
```

## Installing Local Monitoring in a Sybase ASE Database

To install the local monitoring components on a Sybase ASE database (not supported with a Sybase SQL Anywhere database):

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the scripts.



2. On this server, go to the database/localmonitor directory and uncompress the sybase compressed file, preferably into a directory called sybase.
3. Go to this sybase directory and review the uncompressed files so you will understand the privileges that the users in these scripts will have.
4. As a user who has administrative privileges and privileges to create users, run the dcam\_sa\_setup script on the Sybase ASE database:

```
isql -S server_name -U sa -i dcam_sa_setup.sql
```

This script creates the dbfw\_console\_access\_qry account with a default password.

5. Change the password for the dbfw\_console\_access\_qry account.

```
isql -S server_name -U sa
1> sp_password "sa password", new password, dbfw_console_access_qry
2> go
```

Enter the dbfw\_console\_access\_qry account name in lower case only. This account name is case sensitive.

6. Run the following scripts on the Sybase ASE database:

```
isql -S server_name -U dbfw_console_access_qry -i dcam_setup.sql
isql -S server_name -U sa -i dcam_sa_setup_global_trigger.sql
```

These scripts create the tables and global triggers that the monitoring system uses, and then grant access to the tables to the dbfw\_console\_access\_qry account.

7. Provide the password that you created in Step 5 for the dbfw\_console\_access\_qry account to the person who is to enable local monitoring from the Administration Console.
8. Restart Sybase ASE.
9. (Optional) To remove the permissions and tables added in this procedure, run the dcam\_drop script, and restart Sybase ASE.

## Enabling Local Monitoring

To enable local monitoring for a SQL database:

1. Log in to the Management Server Administration Console.  
See ["Logging in to the Administration Console"](#) on page 1-7 for more information.
2. Click the **Monitoring** tab.
3. Click the **Settings** button for the appropriate enforcement point.
4. Select **Activate Local Monitor** in the Monitoring Settings page.

The Activate Local Monitor area expands as follows:

Local Monitor:  Activate Local Monitor

Database Address:  Port:

Database Name:

Password:

Password Confirmation:

5. Specify the following settings:
  - **Database Address, Port, and Database Name:** Specify the database name, IP address or name of the database machine, and the port number. If you are using a Domain Name Server (DNS), you can enter a hostname instead of an IP address.
  - **Password and Password Confirmation:** The password of the DBFW\_CONSOLE\_ACCESS\_QRY account specified during the installation of the software at the protected database.
6. Click **Save**.

You can test local monitoring by performing an appropriate query in the database server and ensuring Oracle Database Firewall logs it.

## Disabling Local Monitoring

You can disable local monitoring. If you want to completely remove local monitoring, see *Oracle Database Firewall Installation Guide*.

To disable local monitoring:

1. Log in to the Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Monitoring** tab.  
By default, the Enforcement Points page appears. If it does not, then click the **List** button in the Enforcement Points menu on the left side of the page.
3. Find the enforcement point whose local monitoring you want to disable.
4. Click the **Settings** button.  
The Monitoring Settings page appears.
5. In the Local Monitoring area, clear the **Activate Local Monitoring** check box.
6. Scroll to the bottom of the Monitoring Settings page and click the **Save** button.
7. After completing this procedure in the UI, you must run the `dcam_drop` script. See the appropriate database section in this chapter for an example for each database type. If you do not perform this step, the database will eventually run out of space.

---

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# Configuring and Using Remote Monitoring

This section contains:

- [About Remote Monitoring](#)
- [Installing and Enabling Remote Monitoring](#)
- [Disabling Remote Monitoring](#)

## About Remote Monitoring

Remote monitoring enables an enforcement point to directly monitor SQL traffic in a database. To use remote monitoring, you run a script from the operating system of the Linux server that you want to use for the remote monitor. (Unlike local monitoring, you do not install the remote monitoring software into the database that you want to protect.) The script captures the SQL traffic from the network card and sends it over the network to an Oracle Database Firewall. This SQL data is then available for reports generated by this Database Firewall. You can configure one Database Firewall to manage multiple remote monitoring configurations on your network.

Remote monitoring is designed for situations when you have many small databases in a distributed environment, and you want Oracle Database Firewall to manage all of these small databases centrally. If you want to use remote monitoring for larger databases, then contact Oracle Support.

The remote monitoring files that you use are as follows:

- **remote-agent:** The remote monitoring executable script. Typically, you download this script from the `extras` directory in the Oracle Database Firewall Utilities 5.1 disc into the `/bin` directory of the Linux server.
- **remote-agent.conf:** A configuration file that the remote monitor uses to determine which traffic to forward to the Database Firewall for processing. Typically, you download this configuration file by using the Management Server Administration Console, and then you place it into the `/etc` directory. Do not edit this configuration file.

In the simplest configuration, you download and run the remote monitoring software onto the same Linux server as the database. If you want to install the remote monitoring software onto a server that is different from the database server, then you must use a spanning port to connect this database server to the Linux server that you want to use for the remote monitor.

## Installing and Enabling Remote Monitoring

This section contains:

- [Step 1: Configure the Remote Monitor in the Administration Console](#)
- [Step 2: Access and Run the remote-agent Remote Monitor Script](#)
- [Step 3: Ensure That the Remote Monitor Is Active](#)

## Step 1: Configure the Remote Monitor in the Administration Console

In this step, you tell the Administration Console which Linux server to use for the remote monitor, and then you download the remote monitor configuration file.

To configure the remote monitor in the Administration Console:

1. Log in to the Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Select the **Monitoring** tab.

By default, the Enforcement Points page appears. If it does not, click **List** in the Enforcement Points menu on the left side of the page.

3. Find the enforcement point that you want to use for the remote monitor, and then click the **Settings** button for that enforcement point.

The Monitoring Settings page appears.

4. Scroll down to the Remote Monitor area and click the **Activate Remote Monitor** check box.

The Activate Remote Monitor section expands to enable you to add an IP address.

Remote Monitor:  Activate Remote Monitor

Enabled Monitor Address

5. In the **Monitor Address** field, enter the IP address of the Linux server where you plan to install the remote monitor software, and then click the **Add** button.

The IP address is added, and now the Remote Monitor area appears similar to the following:

Remote Monitor:  Activate Remote Monitor

Enabled Monitor Address

<input checked="" type="checkbox"/>	192.0.2.254	<input type="button" value="Configure"/>	<input type="button" value="Remove"/>
-------------------------------------	-------------	--	---------------------------------------

6. Scroll to the end of the Monitoring Settings page, and then click the **Save** button.
7. Return to the Remote Monitor area, and then click the **Configure** button.  
The Download Monitor Configuration File page appears.
8. Under Configuration for Remote Monitor at *ip\_address*, in the third bulleted item, click the **enforcement point status** page link, so that you can confirm that the connection that you created is valid.

In the Status of Enforcement Point page, the Remote Monitors area should have a check box in the Enabled column for the IP address you entered. If it does not, then ensure that you have entered a valid IP address.

9. In the Web browser, click the **Back** button to return to the Download Monitor Configuration File page of the Administration Console.
10. Click the **Download Configuration File** button, and then save the `remote-agent.conf` file to the Linux server that you specified in the Administration Console.

Ideally, save this file in the `/etc` directory of this Linux server. You can rename this file if you want, for cases where you have multiple remote monitors configured. Oracle recommends that you rename this file only if you have a good reason. Do not edit this file.

## Step 2: Access and Run the remote-agent Remote Monitor Script

In this step, you copy the remote monitor script to the Linux server and then run the script.

To access and run the remote monitor script:

1. On the Linux server on which you plan to run the remote monitoring software, log in as the root user.
2. Insert the Oracle Database Firewall Utilities 5.1 disc, and go to the `extras` directory.
3. From the `extras` directory, copy the remote monitor script, entitled `remote-agent`, to the Linux server, preferably to the `/bin` directory.
4. Enable the `remote-agent` script to be run as an executable.

```
chmod +x remote-agent
```

5. Run the `remote-agent` script.

```
./remote-agent
```

For a distributed environment where you have multiple remote monitors, you can run a command similar to the following. For example, suppose the configuration file is named `db_sales_remote-agent.conf`. You would run the `remote-agent` script using the following command:

```
./remote-agent --config=/etc/db_sales_remote-agent.conf
```

At this stage, the remote monitor should start collecting and sending SQL traffic to the Database Firewall that you are using to manage the remote monitor. The script runs until you disable the remote monitoring or until the process exits, for example if the Linux server is restarted. You may want to add this script execution to the startup script for the Linux server.

### Options for Running the remote-agent Script

To display the options for the `remote-agent` executable, run the following command:

```
./remote-agent -help
```

The options are as follows:

- **verbose:** Displays diagnostics. Disabled by default.

- **interface:** Specifies a network interface to listen to. Use this setting for a computer that has multiple interfaces, to ensure that the correct interface is used. The default interface is `eth0`.
- **config:** Specifies a directory path for the configuration file, if you have renamed it or if it is in a directory other than `/etc`. The default setting is `/etc/remote-agent.conf`.

These options require a leading double hyphen, for example, `--verbose`.

### Step 3: Ensure That the Remote Monitor Is Active

To ensure that the remote monitor is active:

1. Log in to the Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Monitoring** tab.
3. In the Enforcement Points page, select **Status** for the enforcement point configured to use the remote monitors.

If you have just added a remote monitor and you still have the Monitoring Settings page displayed, then you can refresh the Web page to see the current status.

4. Under Details, go to the Remote Monitor area.

The Remote Monitor area should have checkmarks under both the Enabled and Connected labels for the remote monitor address. If it does not, then ensure that the IP address is correct and that the `remote-agent` execution script is running on that Linux server.

## Disabling Remote Monitoring

You can temporarily disable individual remote monitors or all remote monitors. Oracle Database Firewall saves the configuration information that you have created for the next time that you want to enable it. If you want to remove the remote monitor configuration and software, see *Oracle Database Firewall Installation Guide*.

To disable remote monitoring:

1. Log in to the Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Monitoring** tab.  
By default, the Enforcement Points page appears.
3. Click the **Settings** button for the enforcement point with the remote monitor.  
The Monitoring Settings page appears.
4. Scroll down to the Remote Monitor area.
5. Disable the remote monitors as follows:
  - **To disable individual remote monitors:** Clear the check box under the Enabled label for each remote monitor that you want to disable.
  - **To disable all remote monitors:** Clear the **Activate Remote Monitor** check box.

6. Scroll to the end of the Monitoring Settings page, and then click the **Save** button.





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# Configuring and Using Direct Database Interrogation

This chapter contains:

- [About Direct Database Interrogation \(DDI\)](#)
- [Configuring DDI for SQL Server and Sybase SQL Anywhere Databases](#)
- [Configuring DDI for an Oracle Database With Oracle Advanced Security](#)
- [Enabling DDI](#)
- [Disabling DDI](#)

## About Direct Database Interrogation (DDI)

Direct database interrogation (DDI) allows Database Firewall to interrogate certain supported databases for specific information. The information collected depends on the database type.

## Using DDI to Interrogate SQL Server and SQL Anywhere Databases

You can use DDI to interrogate a monitored Microsoft SQL Server and Sybase SQL Anywhere database to obtain the name of the database user, operating system, and client program that originated a SQL statement, if this information is not available from the statement itself. This information then is made available in the Database Firewall reports.

To configure DDI for these two databases you must:

- Run a provided script to grant privileges to an existing user account in the protected database. See "[Configuring DDI for SQL Server and Sybase SQL Anywhere Databases](#)" on page 9-2.
- Enable DDI in the enforcement point that monitors the protected database. See "[Enabling DDI](#)" on page 9-6.

## Using DDI to Monitor Oracle Databases That Use Oracle Advanced Security

If you are monitoring an Oracle Database that uses Oracle Advanced Security encryption, you must use DDI in order to decrypt statements sent to, and responses received from, that database so they can be analyzed.

### Configuring DDI for an Oracle Database Using Oracle Advanced Security

To configure DDI for an Oracle Database with Oracle Advanced Security, you must:

- Apply a patch to the protected Oracle Database. See ["Applying the Specified Patch to the Oracle Database"](#) on page 9-4.
- Provide a public key from the Database Firewall to the protected Oracle Database. ["Providing a Public Key to the Oracle Database"](#) on page 9-5.
- Enable DDI in the enforcement point that monitors that database. See ["Enabling DDI"](#) on page 9-6.

#### **Limitations on Decryption of Oracle Database Statements**

Configuring Database Firewall to decrypt traffic with Oracle Advanced Security has the following limitations:

- The supported Oracle Database versions are: 10.x, 11.1, 11.2
- There is no statement substitution in Database Firewall when Oracle Advanced Security checksum is used.
- There is no support for Oracle Advanced Security RC4 cipher.

## **Configuring DDI for SQL Server and Sybase SQL Anywhere Databases**

This section contains:

- [Setting DDI User Permissions in a Microsoft SQL Server Database](#)
- [Setting DDI User Permissions in a Sybase SQL Anywhere Database](#)
- [Enabling DDI in an Enforcement Point for SQL Server or SQL Anywhere Databases](#)

### **Setting DDI User Permissions in a Microsoft SQL Server Database**

To set up the user account for a Microsoft SQL Server (versions 2005 or 2008) database:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the script.
2. Ensure that the computer where you will run the scripts has the `sqlcmd.exe` utility installed.
3. On this server, go to the `database/ddi` directory and uncompress the `sqlserver` compressed file, preferably into a directory called `sqlserver`. This directory will contain the uncompressed file `ddi_add_user.sql`.

The `ddi_add_user.sql` script contains settings for the following information:

- `$(username)` refers to the user account that will be responsible for direct database interrogation. Ideally, this user account should be different from the user accounts specified for stored procedure and user role auditing (for example, `ddi_auditor`).
  - `$(password)` refers to the password for this user account.
4. As a user who has privileges to create users and set user permissions, run the `ddi_add_user.sql` script on the SQL Server database.

The syntax is as follows:

```
sqlcmd -S server_name -U sa -P sa_password -i ddi_add_user.sql
-v username="username" password="password"
```

In this specification:

- *server\_name*: Enter the name or the IP address of the database server where the protected database resides. Only use this argument if you are running the script from a remote server. You can omit it if you are running the script locally.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.
- *username*: Enter the user account that you plan to create for direct database interrogation, specified by `$(username)` in the `ddi_add_user.sql` script. Enclose this user name in double quotation marks.
- *password*: Enter the password for the direct database interrogation user account, specified by `$(password)` in the `ddi_add_user.sql` script. Enclose this password in double quotation marks.

Examples:

```
sqlcmd -U sa -P sa_password -i ddi_add_user.sql -v username="ddi_auditor"
password="abcd1234"
```

```
sqlcmd -S my_server -U sa -P sa_password -i ddi_add_user.sql
-v username="ddi_auditor" password="abcd1234"
```

The `ddi_add_user.sql` script grants the direct database interrogation user account the following privileges:

- `VIEW ANY DEFINITION` and `VIEW SERVER STATE` for SQL Server 2005 and later
- `SELECT` on the `master.dbo.sysdatabases` table:

## Setting DDI User Permissions in a Sybase SQL Anywhere Database

To set user permissions for direct database interrogation in a Sybase SQL Anywhere database:

1. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to the server where you plan to run the script.
2. On this server, go to the `database/ddi` directory and uncompress the `sqlanywhere` compressed file, preferably into a directory called `sqlanywhere`. This directory contains the uncompressed file `ddi_add_user.sql`.

This script contains settings for the following information:

- `$(username)` refers to the user account that will be responsible for direct database interrogation. Ideally, this user account should be different from the user accounts specified for stored procedure and user role auditing (for example, `ddi_auditor`).
  - `$(password)` refers to the password for this user account.
3. As a user who has privileges to create users and set user permissions, run the `ddi_add_user.sql` script on the SQL Anywhere database.

The syntax is as follows:

```
isql -S server_name -U sa -P sa_password -i ddi_add_user.sql
-v username="username" password="password" database="protected_database"
```

In this specification:

- *server\_name*: Only use this argument if the database is remote. You can enter the name of the server or its IP address. If you are running the script locally, then you can omit the `-S server_name` argument.
- *sa*: Enter the system administrator user name.
- *sa\_password*: Enter the system administrator password.
- *username*: Enter the user account that you plan to create for direct database interrogation, specified by `$(username)` in the `ddi_add_user.sql` script. Enclose this user name in double quotation marks.
- *password*: Enter the password for the direct database interrogation user account, specified by `$(password)` in the `ddi_add_user.sql` script. Enclose this password in double quotation marks.
- *database="protected\_database"*: Enter the name of the database within this server that you want to protect, specified by `$(database)` in the `ddi_add_user.sql` script. Enclose this database name in double quotation marks.

Examples:

```
isql -U sa -P sa_password -i sddi_add_user.sql  
-v username="ddi_auditor" password="abcd1234" database="sales_db"
```

```
isql -S my_server -U sa -P sa_password -i sddi_add_user.sql  
-v username="ddi_auditor" password="abcd1234" database="sales_db"
```

The `ddi_add_user.sql` script grants the direct database interrogation user account the following privileges:

- CONNECT
- SELECT on these system tables:

```
sys.sysuser  
sys.sysuserauthority  
sys.sysremoteuser  
sys.sysloginmap  
sys.sysgroup
```

## Enabling DDI in an Enforcement Point for SQL Server or SQL Anywhere Databases

Follow the procedure in ["Enabling DDI"](#) on page 9-6 to complete the DDI setup for a Microsoft SQL Server or Sybase SQL Anywhere database.

## Configuring DDI for an Oracle Database With Oracle Advanced Security

This section contains:

- [Applying the Specified Patch to the Oracle Database](#)
- [Providing a Public Key to the Oracle Database](#)
- [Enabling DDI in an Enforcement Point for an Oracle Database](#)

### Applying the Specified Patch to the Oracle Database

You must apply the patch specified in this section to the Oracle Database that is using Oracle Advanced Security.

To apply the patch:

1. Shut down the Oracle Database.

2. Execute the command:

```
$ORACLE_HOME/OPatch/opatch apply path_to_patchfile.zip
```

The patch is identified by the bug number 13051081. So the patch file will be in the format: `p13051081_OracleVersion_Platform.zip`

3. Start the Oracle Database.
4. From the Oracle Database Firewall Product CD (Oracle Database Firewall Utilities 5.1), copy the database directory to a location from which you can connect to the Oracle Database being patched.
5. In this location, go to the `database/ddi` directory and uncompress one of the two oracle compressed files (both contain the same content), preferably into a directory called `oracle`.

This directory now contains the uncompressed file:  
`advanced_security_integration.sql`.

6. Execute the following command as a user that has privileges to create users and grant privileges:

```
sqlplus / as sysdba @advanced_security_integration schema password
```

For *schema*, use the name of an existing schema or choose a name for a new schema. We do not recommend using `SYSTEM` or `SYS` as the target schema. If the schema does not exist, this procedure will create a user and a schema.

This command grants the `create session` and `resource` privileges to the schema user.

The password for the schema is set to *password*.

A package supporting Oracle Advanced Security integration is installed into *schema*.

## Providing a Public Key to the Oracle Database

You must provide a public key to the Oracle Database that is using Oracle Advanced Security in order for to decrypt database traffic using direct database interrogation.

To provide the public key to the Oracle Database:

1. In the Administration Console of the Database Firewall that will be monitoring this Oracle Database, click the **System** tab, then **Public Keys** in the System menu.

### Oracle Advanced Security Decryption

If you have enabled Oracle Advanced Security decryption in an enforcement point that monitors an Oracle database, you must provide the public key

```
-----BEGIN PUBLIC KEY-----
MIIBIDANBgkqhkiG9w0BAQEFAAOCAQ0AMIIBCACCAQEAAuokzCGENT1iqT2seytkr
qq7sDij8X27oUUmriZv6ICRZmNJIE0tq7aPc0JHB06K8d6tJ6kXjkiyCnmTAJW
DameM/tLwi7WSnZ4P1ic17ia/8LWu0y0l9tmq4QiXTfmDMU1Ux4S4Mb5rhcKfmql
p3y+qT5P06qkQjzMyzleavQXUNgxpayNdgjW8CzEppiTV5CyladzRa48Y+xFScCi
OAbF4Nx4AZ1vixBQC+3b/qqNawWW37TVw6XUiltufFyg5eeXZYfGip37WezBINb
ZUYH9vpzoGnUhnQtp5MTJEXTEsEGP8g3NH2AM5ehqkPluxwExLyGw9gM23GeMF
7wBlw==
-----END PUBLIC KEY-----
```

2. Copy the public key under Oracle Advanced Security Decryption and paste it into a text file, for example, `dbfw_public_key.txt`.

Each Database Firewall has its own public key. In a case where you have Database Firewall high availability or Enforcement Point resiliency, when you have more than one Database Firewall monitoring this protected database, each Database Firewall public key must be copied and appended to the `dbfw_public_key.txt` file.

**Note:** For security purposes the `dbfw_public_key.txt` file must have the same access permissions as the `sqlnet.ora` file on the Oracle Database server.

3. Modify the `sqlnet.ora` file in the Oracle Database to include the public key and to require Oracle Advanced Security native traffic encryption:

- a. Put the file you created in Step 2 on the Oracle Database server, preferably in the same directory as the `sqlnet.ora` file.

- b. Open the `sqlnet.ora` file and append the following parameters (in this example the public key file is `dbfw_public_key.txt`):

```
SQLNET.ENCRYPTION_TYPES_SERVER=AES256
SQLNET.DBFW_PUBLIC_KEY="/path_to_file/dbfw_public_key.txt"
```

- c. Save and close the `sqlnet.ora` file.

## Enabling DDI in an Enforcement Point for an Oracle Database

Follow the procedure in "[Enabling DDI](#)" on page 9-6 to complete the DDI setup for an Oracle Database that uses Oracle Advanced Security.

## Enabling DDI

To enable direct database interrogation in a Database Firewall:

1. Log in to the Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Click the **Monitoring** tab.

By default, the Enforcement Points page appears. If it does not, click **List** in the Enforcement Points menu on the left side of the page.

3. Find the enforcement point that monitors the protected database that will be interrogated, and then click the **Settings** button for that enforcement point.

The Monitoring Settings page appears.

4. Scroll down to the Database Interrogation area and click the **Activate Database Interrogation** check box.

The Activate Database Interrogation area expands to enable you to complete the necessary authentication details.

Database Interrogation:

Activate Database Interrogation

Database Address:  Port:

Database Name:

User Name:

Password:

Password Confirmation:

Database Connection:

5. Scroll to the end of the Monitoring Settings page, and then click the **Save** button.

## Disabling DDI

You can temporarily disable direct database interrogation. Oracle Database Firewall saves the configuration information that you have created for the next time that you want to enable it. If you want to remove the direct database interrogation configuration and software, see *Oracle Database Firewall Installation Guide*.

To disable direct database interrogation:

1. Log in to the Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Monitoring** tab.  
By default, the Enforcement Points page appears.
3. Click the **Settings** button for the enforcement point that monitors the database for which you want to disable DDI.  
The Monitoring Settings page appears.
4. Scroll down to the Direct Database Interrogation area.
5. Clear the **Activate Database Interrogation** check box.
6. Scroll to the end of the Monitoring Settings page, and then click the **Save** button.





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# Configuring and Using Database Response Monitoring

This chapter contains:

- [About Database Response Monitoring](#)
- [Configuring Database Response Monitoring](#)

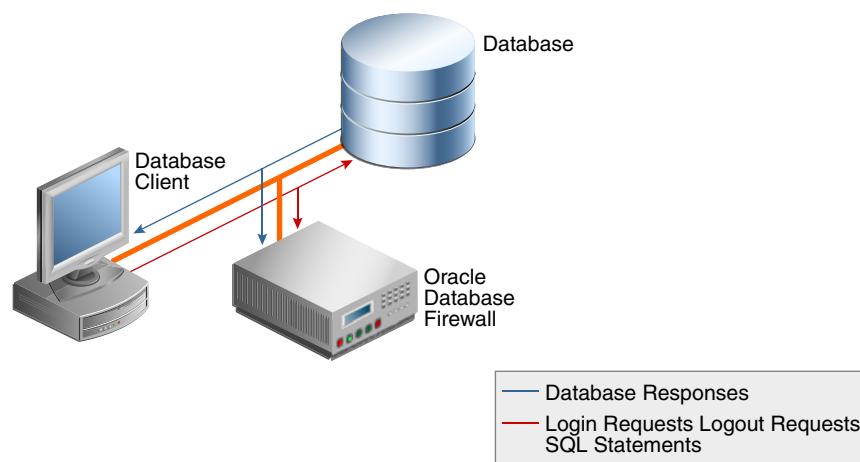
**See Also:** *Oracle Database Firewall Security Guide* for information about viewing the traffic log for direct database response monitoring

## About Database Response Monitoring

Enabling the Database Response Monitoring feature in the Administration Console allows Oracle Database Firewall to record responses that the protected database makes to login requests, logout requests and SQL statements sent from database clients, as shown in [Figure 10-1](#). This feature allows you to determine whether the database executed logins, logouts and statements successfully, and can provide useful information for audit and forensic purposes.

[Figure 10-1](#) illustrates the process flow of database response monitoring.

**Figure 10-1 Database Response Monitoring**



You can view database responses by opening the traffic log in the normal way.

Database Response Monitoring records database responses for all SQL statements, logins and logouts that are logged by the policy, as configured using the Oracle Database Firewall Analyzer (see the *Oracle Database Firewall Security Guide*).

The information recorded in the traffic log includes the response interpreted by Oracle Database Firewall (such as "statement fail"), the detailed status information from the database, and the database response text (which may be displayed at the database client).

## Configuring Database Response Monitoring

This section contains:

- [Enabling Database Response Monitoring](#)
- [Setting Up Login/Logout Policies in the Analyzer](#)

### Enabling Database Response Monitoring

To enable database response monitoring:

1. Log in to the Management Server Administration Console.
2. Select the **Monitoring** tab.
3. Click **List** in the **Enforcement Points** menu.
4. Click the **Settings** button of the enforcement point that is being used to monitor the database.

The Monitoring Settings page appears.

5. Select **Activate Database Response Monitoring**.

If you also select **Full error message annotation**, any detailed response text messages generated by the database are also logged.

Database Response:	<input checked="" type="checkbox"/> Activate Database Response Monitoring
	<input checked="" type="checkbox"/> Full error message annotation. Enabling this option will log the error message associated with the error code.
Database Interrogation:	<input type="checkbox"/> Activate Database Interrogation

6. Click **Save** to save the changes.

### Setting Up Login/Logout Policies in the Analyzer

The login and logout policies are stored in the Oracle Database Firewall and must be configured using the Oracle Database Firewall Analyzer software. See the *Oracle Database Firewall Security Guide* for details.

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## Using Oracle Database Firewall with BIG-IP ASM

This appendix contains:

- [About the Integration of Oracle Database Firewall with BIG-IP ASM](#)
- [Key Benefits of Integrating Oracle Database Firewall with BIG-IP ASM](#)
- [How the Integration Works](#)
- [Deploying the Oracle Database Firewall-BIG-IP ASM Integration](#)
- [Presentation of Data in Oracle Database Firewall](#)

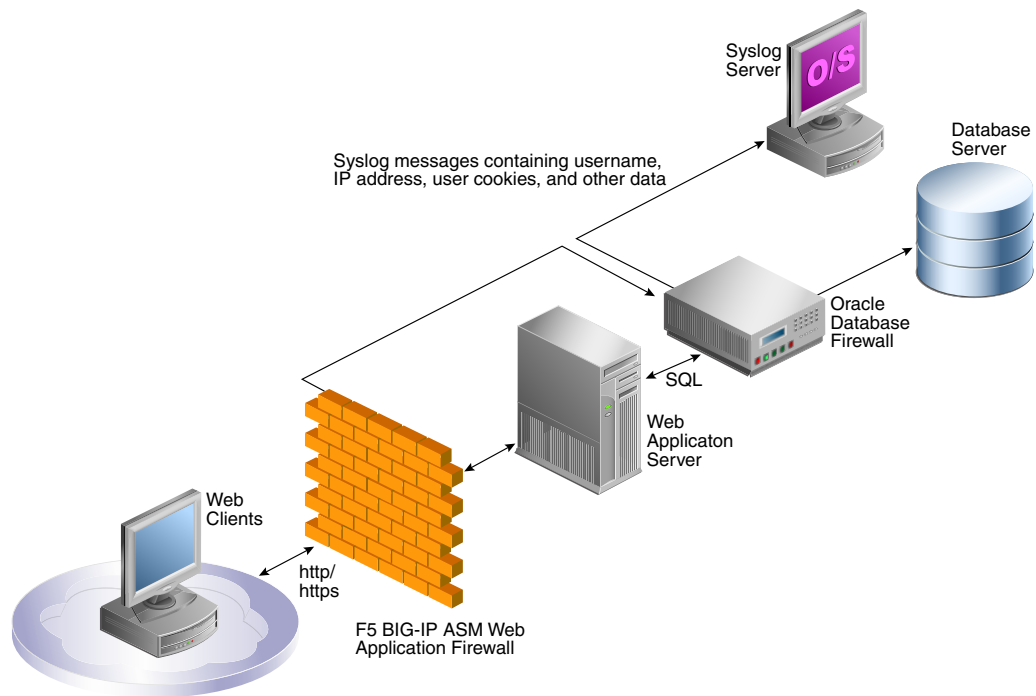
### About the Integration of Oracle Database Firewall with BIG-IP ASM

This chapter discusses integration of Oracle Database Firewall, BIG-IP Application Security Manager (ASM), Web clients, and the Web application server, how the integration works, and its key benefits.

BIG-IP Application Security Manager (ASM), from F5 Networks, Inc., is an advanced Web Application Firewall (WAF) that provides comprehensive edge-of-network protection against a wide range of Web-based attacks.

BIG-IP ASM is deployed between the Web clients and the Web application server, see [Figure 11-1](#). It analyzes each HTTP and HTTPS request, and blocks potential attacks before they reach the Web application server. BIG-IP ASM can be installed on a wide range of BIG-IP platforms, see "[Deploying the Oracle Database Firewall-BIG-IP ASM Integration](#)" on page 11-3.

The integration of Oracle Database Firewall with BIG-IP ASM works well with an ArcSight SIEM integration. See [Chapter 12, "Using Oracle Database Firewall with ArcSight SIEM,"](#) for more information.

**Figure 11–1 Oracle Database Firewall with F5 BIG-IP ASM Data Flow Unit**

Oracle Database Firewall is deployed between the Web application server and database. It provides protection against attacks originating from inside or outside the network and works by analyzing the intent of the SQL statements sent to the database. It is not dependent on recognizing the syntax of known security threats, and can therefore block previously unseen attacks, including those targeted against an organization.

A deployment that includes both BIG-IP ASM and Oracle Database Firewall provides all the security benefits of both products and enables the two systems to work in partnership to reach unparalleled levels of data security.

A key benefit of the integration is that it allows BIG-IP ASM to pass Oracle Database Firewall additional information about the SQL statements sent to the database, including the Web user name and IP address of the Web user who originated them. This information is not usually available from the SQL statements generated by the Web application server.

The information obtained from BIG-IP ASM, and from the Oracle Database Firewall system itself, is logged by Oracle Database Firewall as attributes of the appropriate statements. Once the data has been logged, it can be retrieved in views of the traffic logs to give complete visibility into the source and nature of any attacks.

## Key Benefits of Integrating Oracle Database Firewall with BIG-IP ASM

The key benefits of the integration are as follows:

- Improves security through a partnership of the two systems.
- Allows Oracle Database Firewall to provide detailed information about the origin and context of the SQL statements from the Web application layer.
- Enables Oracle Database Firewall to act as a log store for data generated by BIG-IP ASM.

- Provides layered security at the edge of the network, and close to the database.

## How the Integration Works

The integration works by using a syslog messaging system to deliver alerts from the Web application firewall. Standard BIG-IP ASM syslog messages enabled through the ASM logging profile provide details of each alert, such as the user's source IP address and other attributes of the session.

In addition, an optional BIG-IP ASM iRule™ can be set up, which generates a syslog message during a user login to provide the Web username. Oracle Database Firewall provides a sample iRule, which must be customized to match the specific login procedures of the Web application. See "[Developing a BIG-IP ASM iRule](#)" on page 6.

During the deployment procedure, BIG-IP ASM is set up to route all its syslog messages to an Oracle Database Firewall. The Oracle Database Firewall attempts to match each relevant BIG-IP ASM syslog message with the appropriate SQL statements generated by the Web application server. If a match is found, it extracts the information contained in the BIG-IP ASM syslog message, and stores that information as attributes of the logged SQL statements. If a match is not found, a separate record is added to the traffic log, containing the attributes from the syslog message.

The software uses cookies to match SQL statements with Web users. When the user logs in, BIG-IP ASM assigns a unique cookie to that user (normally the cookie's name starts with "TS"). The cookie and the name of the user is sent to the Oracle Database Firewall by a syslog message generated by the Oracle Database Firewall iRule. If the user's actions cause an alert or other event, BIG-IP ASM generates an additional syslog message containing the same identifying cookie, which enables the software to match the syslog message with the specific user. Since the Oracle Database Firewall system is also able to match syslog messages with SQL statements, this enables individual SQL statements relating to potential threats to be attributed to specific Web users.

The Oracle Database Firewall can automatically relay all syslog messages received from BIG-IP ASM to an external syslog server, up to a maximum size of 2KB each. If required, syslog messages generated by the Oracle Database Firewall itself can be routed to the same destination. The Oracle Database Firewall does not alter the BIG-IP ASM syslog traffic in any way.

The Oracle Database Firewall monitors the status of the connection to BIG-IP ASM, and generates syslog messages every two minutes if the connection is not present or has been lost.

**See Also:** [Appendix B, "Syslog Message Format,"](#) for more information about the syslog format

## Deploying the Oracle Database Firewall-BIG-IP ASM Integration

This section contains the following topics:

- [About the Deployment](#)
- [System Requirements](#)
- [Configuring Oracle Database Firewall](#)
- [Configuring BIG-IP ASM](#)
- [Developing a BIG-IP ASM iRule](#)

## About the Deployment

Deploying BIG-IP ASM with Oracle Database Firewall requires the configuration of a few straightforward settings in both systems, and the customization of an iRule so that it matches the Web application's configuration.

## System Requirements

The integration requires:

- Oracle Database Firewall
- F5 BIG-IP ASM version 9.4.5 and version 10. Other F5 products, such as FirePass®, BIG-IP LTM™, BIG-IP GTM™, WebAccelerator™ or WANJet® are not currently supported.

At the time of publishing this guide, BIG-IP ASM is supported on BIG-IP 3600, 4100, 6900, 8400, and 8800 hardware platforms. If necessary, visit the F5 Web site for the latest information. The URL is:

<http://www.f5.com/>

## Configuring Oracle Database Firewall

Configuration of Oracle Database Firewall to operate with F5 BIG-IP ASM can be carried out only after the enforcement point(s) have been set up for the protected database.

To configure Oracle Database Firewall to operate with F5 BIG-IP ASM:

1. Log in to the Administration Console for the Management Server.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Ensure that an enforcement point has been defined for the protected database.
3. Click the **Monitoring** tab.

The enforcement points are listed, as shown next.

Enforcement Points					
Name	Appliances	Baseline	Mode	Protected Database	Advanced
ep_01	Local	logall.dna	DAM	orcl	<input type="button" value="Manage"/> <input type="button" value="Status"/> <input type="button" value="Settings"/> <input type="button" value="Advanced"/>

4. Click **Advanced** for the enforcement point that will monitor the protected database.
5. Complete the options:
  - **System Address:** This read-only information shows the IP address of the Oracle Database Firewall, as set up in the System Settings page. BIG-IP ASM must send syslog messages to this address and port.
  - **WAF Addresses:** Enter the IP address of each BIG-IP ASM system that generates syslog messages to send to the Oracle Database Firewall. Separate each IP address with a space character.
  - **Destination Host and TCP Port:** Specify the IP address and port number of the syslog server that is to receive the BIG-IP ASM syslog messages forwarded by the Oracle Database Firewall. The Oracle Database Firewall relays these messages unmodified.

The IP address does not need to be the same as the syslog destination used for syslog messages generated by the Oracle Database Firewall itself.

- **Disable WAF Alert Forwarding:** Select this check box to stop the Oracle Database Firewall from forwarding syslog messages. The current status of alert forwarding is displayed below this option.
- **Enhance reports with WAF logging data:** Select this check box to enable the Oracle Database Firewall traffic log to record BIG-IP ASM attributes obtained from the syslog messages, such as the IP address and name of the Web application user. If this box is not checked, Database Firewall will not attempt to match F5 and Database Firewall SQL messages.
- **Session Idle Timeout:** The user's cookie is stored only for the length of time specified in this field. This enables the same cookie to be used by different users, providing the time period specified here has elapsed.
- **Exclude Addresses:** You can specify a list of IP addresses of Web application servers or other SQL-generating sources to ignore for reporting purposes. For example, you may want to add the IP address of an internal Web application server.

## Configuring BIG-IP ASM

This section describes how to create the logging profile and write policy settings.

### Logging Profile

Configure the Web application's logging profile to send BIG-IP ASM syslog messages to the Oracle Database Firewall. Use Server IP and Server Port, for example 5514, to specify the IP address of the Oracle Database Firewall (this is the same IP address used to connect to the Administration Console). Select TCP for the Protocol.

The Selected Items box must include the following attributes:

- violations
- unit\_hostname
- management\_ip\_address
- policy\_name
- policy\_apply\_date
- x\_forwarded\_for\_header\_value
- support\_id
- request\_blocked for F5 v9, or request\_status for F5 v10 and v11
- response\_code
- method
- protocol
- uri
- query\_string
- ip for F5 v9, or ip\_client for F5 v10 and v11
- web\_application\_name
- request

---

---

**Note:** The attributes must appear in the Selected Items box in the order shown here.

---

---

## Policy Settings

In the policy settings, enable the required events to send through the syslog (refer to the ASM help if you are not sure how to do this).

Oracle Database Firewall recognizes the following events:

- Evasion technique detected
- Request length exceeds defined buffer size
- Illegal dynamic parameter value
- Illegal meta character in header
- Illegal meta character in parameter value
- Illegal parameter data type
- Illegal parameter numeric value
- Illegal parameter value length
- Illegal query string or POST data
- Illegal static parameter value
- Parameter value does not comply with regular expression
- Attack signature detected
- Illegal HTTP status in response

## Developing a BIG-IP ASM iRule

Optionally, an iRule can be used to monitor the login page and generate a syslog message each time a user logs into the Web application. The syslog message contains the username of the Web application user, and the cookies associated with that user. The message is routed to the Oracle Database Firewall, which logs the username against SQL statements generated by the Web application server.

The sample iRule provided by Oracle Database Firewall contains the required format of the syslog message, but must be customized to handle the specific login requirements of your Web application.

```
# F5 BIG-IP example iRule
# Description: Capture username and cookies from user login to web application
#
# Global variable definitions and other initialisation logic goes here
when RULE_INIT {
    ### Customise this to suit your application
    # The page that user logs from
    set ::login_page "/login.asp"
    # The name of the field holding the user name
    set ::login_parameter_name "Uname"
    # The method of authentication which will be sent to Oracle Database
    Firewall
    set ::auth_method "webforms"
    # HTTP protocol methods that is used by the login form
    set ::login_method "POST"
    ### Don't change these
```



```

# Limit the length of the HTTP request for safety
set ::max_header_content_length 5242880
# Log iRule trace messages to /var/log/ltn? 1=yes, 0=no
# Must be set to 0 for production systems
set ::payload_debug 0
}
# HTTP request received, check if it's a login request and start assembling the
# data
when HTTP_REQUEST {
# Log the debug message if trace is enabled
if {$::payload_debug}{log local3. "[IP::client_addr]:[TCP::client_port]:
    New HTTP
[HTTP::method] request to [HTTP::host][HTTP::uri]" }
# Reset cookies to empty, later used as an indicator of the fact that
# login HTTP
request has been received
set cookie_all ""
# If the request is to the login page populate cookie_all variable with
# all the cookies received
if {[HTTP::path] starts_with $::login_page and [HTTP::method] eq
    $::login_method}
{
    set cookie_name [HTTP::cookie names]
for {set c 0}{$c < [HTTP::cookie count]}{incr c}{
    set cookie_string [split [lindex $cookie_name $c] " "]
    set cookie_list $cookie_string=[HTTP::cookie [lindex
        $cookie_string 0]]
    append cookie_all "," $cookie_list
}
# Log the debug message if trace is enabled
if {$::payload_debug}{log local3. "[IP::client_addr]:[TCP::client_port]:
Matched path and method check"}
# Validate the Content-Length value and set the content_length variable
if {[HTTP::header value Content-Length] > $::max_header_content_length }
{set content_length $::max_header_content_length
} else {
set content_length [HTTP::header value Content-Length]
}
# Get the payload data
if {$content_length > 0}{
HTTP::collect $content_length
# Log the debug message if trace is enabled
if {$::payload_debug}{log local3.
"[IP::client_addr]:[TCP::client_port]: Collecting $content_length
bytes"}
}
}
}
# Got the data, parse them and generate the syslog message
when HTTP_REQUEST_DATA {
# If cookies are present this is a login request, get the user name
if {$cookie_all != "" } {
# Log the debug message if trace is enabled
if {$::payload_debug}{log local3. "[IP::client_addr]:
    [TCP::client_port]:
Collected request data: [HTTP::payload]" }
# Reset the error flag to 0
set uname_logged 0
# Find the $::login_parameter_name among the parameters in the request and

```

```

extrat its value
set param_value_pairs [split [HTTP::payload] "&"]
for {set i 0} {$i < [llength $param_value_pairs]} {incr i} {
    set params [split [lindex $param_value_pairs $i] "="]
    if { [lindex $params 0] equals $::login_parameter_name } {
        # User name was found, generate the syslog message
        # which includes IP, port, all the cookies, user name and
        # the auth_method string
        set username [lindex $params 1]
        log local3. "DBFIREWALL:CLIENT=[IP::client_
            addr]:[TCP::client_port]$cookie_all,
            USERNAME=$username,AUTHMETHOD=$::auth_method"
        # Set the flag so not to trigger the error reporting log
        message below
        set uname_logged 1
        break
    }
}
# If user name has not been found in parameters log an error
if {$uname_logged == 0 } {
    log local0. "ERROR: iRule failed to extract user name from
    page $login_page with parameter $login_parameter_name"
}
}
}

```

### Required Syslog Message Format

The required format of the syslog message to be generated by the custom iRule is as follows:

```

Rule [iRuleName] HTTP_REQUEST_DATA:
DBFIREWALL:CLIENT=[ClientIPAddress]:[ClientPort],[Cookies],
USERNAME=[Name],AUTHMETHOD=[AuthMethod]

```

In this specification:

- `[iRuleName]` is the name of the iRule.
- `[ClientIPAddress]` is the source IP address of the Web client.
- `[ClientPort]` is the source port number of the Web client.
- `[Cookies]` is a list of cookies available from the BIG-IP ASM HTTP object.
- `[Name]` is the user name.
- `[AuthMethod]` is the method of authentication used between the F5 Web server and its Web clients, as set up in BIG-IP ASM. Oracle Database Firewall does not use this information, other than to report the authentication method used.

For example:

```

Rule capture_login_rule HTTP_REQUEST_DATA:
DBFIREWALL:CLIENT=10.190.0.1:443,ASPSESSIONIDSASSBSCD=1234,TS10da7b=23545,
    USERNAME=FredBloggs,AUTHMETHOD=webforms

```

### Configuring syslog-ng.conf

To enable the iRule syslog messages to be transmitted to the Oracle Database Firewall, it is necessary to log in to the BIG-IP hardware platform and execute the following BIG-IP ASM command, which modifies `/etc/syslog-ng /syslog-ng.conf` (do not modify the file directly, because changes will not persist after you restart the system):

```
bigpipe syslog include "destination d_dbfw { tcp(\"dbfw_ip_address\" port(dbfw_
port));};log { source(local); filter(f_local3); destination(d_dbfw);};"
```

Where *dbfw\_ip\_address* and *dbfw\_port* are the IP address and port number of the Oracle Database Firewall (as in Step 5 on page 11-4). For example:

```
bigpipe syslog include "destination d_dbfw { tcp(\"192.168.0.181\"
port(5514));};log { source(local); filter(f_local3); destination(d_dbfw);};"
```

The two instances of the syslog destination name (*d\_dbfw*) need to be changed only in the unlikely event that the destination name is already in use.

## Presentation of Data in Oracle Database Firewall

This section contains the following topics:

- [Administration Console Dashboard](#)
- [Viewing the Traffic Log Generated by BIG-IP ASM](#)
- [Web Application Firewall \(WAF\) Reports](#)

### Administration Console Dashboard

The Dashboard page of the Oracle Database Firewall Administration Console provides an overview of the top-ten threats by Web user, statistics about any blocked statements, and the current status of the link to BIG-IP ASM. You may want to display this information to obtain an overview of the threats and to confirm that the system is operational.

To display the information, log in to the Oracle Database Firewall Administration Console, and display the Dashboard page.

Two areas are provided on the Dashboard page for WAF information:

- **WAF Status:** This provides the current status of the link to BIG-IP ASM (on the top line), and the following statistics:
  - **Policy Confirmed:** The number of BIG-IP ASM syslog messages over the last hour that have been matched with SQL statements and generated an Oracle Database Firewall "block" or "warn".
  - **Policy Conflict:** The number of BIG-IP ASM syslog messages over the last hour that have been matched with SQL statements, but did not generate an Oracle Database Firewall "block" or "warn".
  - **Matched:** The number of BIG-IP ASM syslog messages that have been successfully matched with SQL statements over the last hour.
  - **Unmatched:** The number of BIG-IP ASM syslog messages that have not been successfully matched with SQL statements over the last hour.
  - **Events in Last Hour:** The total number of syslog messages from BIG-IP ASM over the last hour.
- **Top Ten Threats by Web User:** This lists the most significant threats over the indicated period of time. The threats are listed by Web username. Each row is for a separate user.

Clicking a user lists all attacks made by the user.

**Note:** The WAF sections appear on the Dashboard when the WAF settings have been configured, as described on "[Web Application Firewall \(WAF\) Reports](#)" on page 11-11.

## Viewing the Traffic Log Generated by BIG-IP ASM

You can display the data collected from BIG-IP ASM by viewing the traffic log in the Oracle Database Firewall Administration Console. The traffic log stores:

- Each SQL statement that has been logged by the Oracle Database Firewall, and the attributes associated with each statement. The attributes include the data from the Oracle Database Firewall system (such as the threat severity and action level), and if available, data obtained from any BIG-IP ASM syslog messages that have been matched with the SQL statement.
- Each violation reported by a BIG-IP ASM syslog message that has not been matched with an SQL statement.

To display the traffic log:

1. Log in to the Administration Console for the Management Server.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Click the **Reporting** tab.
3. Select **Search Log** from the **Traffic Log** menu. The page shown next is displayed.

4. Enter a title, and specify the search conditions to use to obtain the required records from the traffic log. Click **Search**.

See *Oracle Database Firewall Security Guide* for more information about accessing the Search Traffic Log page.

5. When the Searches page indicates that the search is complete, click the report title. The Search Results page displays the statements found.

## Understanding the Attributes

The attributes shown with the Oracle Database Firewall logo are obtained from the Oracle Database Firewall system. Those with an F5 logo are obtained or derived from BIG-IP ASM. See [Appendix C, "Traffic Log Attributes"](#) for details of the attributes.

## Web Application Firewall (WAF) Reports

You can generate several reports from the Oracle Database Firewall Administration Console, including the following:

- **F5 Alerts Blocked by F5:** All alerts blocked by BIG-IP ASM.
- **F5 Confirmed Alert:** Alerts detected by BIG-IP ASM that generate a "block" or "warn" in Oracle Database Firewall.
- **F5 Incident Report:** List of all incidents by time.
- **F5 Incident Summary by User:** List of incidents grouped by user.
- **F5 Incident Summary by Cluster:** List of incidents grouped by cluster of SQL statements.
- **F5 No WAF Match:** Alerts detected by BIG-IP ASM that Oracle Database Firewall has not matched with SQL statements.
- **F5 Policy Conflict:** Alerts detected by BIG-IP ASM that do not cause a "block" or "warn" in Oracle Database Firewall.
- **F5 Policy Conflict by User:** Policy Conflict report grouped by user.



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# Using Oracle Database Firewall with ArcSight SIEM

This appendix contains:

- [About the Integration of Oracle Database Firewall with ArcSight SIEM](#)
- [Enabling the Oracle Database Firewall-ArcSight SIEM Integration](#)
- [Oracle Database Firewall-ArcSight SIEM Syslog Mapping Tables](#)

## About the Integration of Oracle Database Firewall with ArcSight SIEM

The ArcSight Security Information Event Management (SIEM) system is a centralized system for logging, analyzing, and managing syslog messages from different sources. ArcSight SIEM enables Oracle Database Firewall to provide full details of any security alerts or other selected event types, including the message text, priority and IP address of any attacker. If you are using a Management Server, then it sends the ArcSight SIEM messages, otherwise the events are sent from the standalone Database Firewall.

If you are also using the BIG-IP ASM interface, and an attack originates from the internet, Database Firewall provides the actual IP address of the attacking Web client. This feature enables you to pinpoint the source of the internet-based attack.

You do not need to install additional software if you want to integrate ArcSight SIEM with Database Firewall. You can configure the integration by using the Database Firewall Administration Console, which is described in the next section.

The syslog messages sent to the ArcSight SIEM Server are independent of any other syslog messages that may be sent from Database Firewall. This means you can send standard syslog messages to a different destination.

## Enabling the Oracle Database Firewall-ArcSight SIEM Integration

When you enable the Oracle Database Firewall and ArcSight SIEM integration, the settings take effect immediately. You do not need to restart Database Firewall.

To enable ArcSight SIEM for Oracle Database Firewall:

1. Log in to the Administration Console for the standalone Database Firewall or the Management Server.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **System** tab.
3. In the **Connectors** menu, select **ArcSight SIEM**.

The ArcSight SIEM page appears.

4. Specify the following options:
  - **Enable ArcSight event forwarding:** Select this check box to enable the ArcSight interface.
  - **ArcSight destinations:** Depending on the communications protocol you are using, enter the IP address or host name of the ArcSight server in the **UDP** or **TCP** field. This setting enables the syslog log output to be sent to this ArcSight server in **Common Event Format (CEF)**.
  - **Event categories:** Select any combination of syslog categories depending on which type of messages that are needed in the ArcSight server. For detailed information about the message types, see "[Oracle Database Firewall-ArcSight SIEM Syslog Mapping Tables](#)" on page 12-2.
  - **Limit message length:** To avoid sending large amounts of SQL text across the network, you can choose to limit the message to a specified number of bytes.
  - **Maximum message length (bytes):** Enter the maximum length that you want. The range allowed is 1024 to 1048576 characters. The default is 256 bytes.
5. Click the **Apply** button.

## Oracle Database Firewall-ArcSight SIEM Syslog Mapping Tables

This section contains:

- [About the ArcSight SIEM Integration](#)
- [DBFW:3 \(Heartbeat\)](#)
- [DBFW:4 \(Property Change\)](#)
- [DBFW:8 \(Database Audit\)](#)
- [DBFW:9 \(Statement Alert\)](#)
- [DBFW:10 \(Statement Alert \(WAF\)\)](#)



- DBFW:11 (Login Alert)
- DBFW:12 (Logout Alert)
- DBFW:system (System Message (Operating System Alerts))

## About the ArcSight SIEM Integration

You can send the ArcSight SEIM syslog output, as described in Oracle Database Firewall Security Guide. The following tables describe which messages are passed to ArcSight SIEM and the fields of the Oracle Database Firewall messages map to the relevant ArcSight keys.

Table 12–1 describes the message types that Oracle Database Firewall sends to ArcSight SIEM.

**Table 12–1 Message Types Sent to ArcSight SIEM**

Message Type	Event Name	Description
DBFW:3	Heartbeat	Heartbeat messages. One message is generated every second while Database Firewall is running.
DBFW:4	Property change	Property change message. Describes configuration changes that are made by users.
DBFW:8	Database audit	Database Object Auditing messages. These are generated by the Stored Procedure Auditing or User Role Auditing functionality of the Database Firewall.
DBFW:9	Statement alert	Statement alerts. An alert of this type is given to display a full SQL statement and associated details. If database response monitoring is enabled, the response information is included in the alert.
DBFW:10	Statement alert (WAF)	Statement Web Application Firewall (WAF) alerts. An alert of this type is given when the Database Firewall appliance is working together with a Web Application Firewall. If database response monitoring is enabled, the response information is included in the alert.
DBFW:11	Login alert	A user has attempted to log in to the database. If database response monitoring is enabled, the result of the login attempt (success or failure) is included in the alert.
DBFW:12	Logout alert	A user has explicitly logged out from the database, or their TCP session has been closed.
DBFW:system	System messages	System messages in operating system format. These are alerts generated by the underlying operating system on which Database Firewall is installed.

## DBFW:3 (Heartbeat)

DBFW:3 heartbeat messages are generated every second while Database Firewall is running. The heartbeat message contains statement counts.

Table 12–2 describes the DBFW:3 CEF header fields.

**Table 12–2 DBFW:3 (Heartbeat) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable

**Table 12–2 (Cont.) DBFW:3 (Heartbeat) CEF Header Fields**

Header Name	Content	Example
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:3	Not applicable
Name	Fixed string: Heartbeat	Not applicable
Severity	Fixed integer: 0	Not applicable

Table 12–3 describes the DBFW:3 extension fields.

**Table 12–3 DBFW:3 (Heartbeat) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.1
timestamp	Time stamp of event. Must be converted to milliseconds.	rt	1147344001516
Rest of message	All fields of a DBFW:3 heartbeat message	msg	0 0 0 6067 0 0 1147367001.097 0

## DBFW:4 (Property Change)

DBFW:4 property change messages describe configuration changes made by users to the Database Firewall or Management Server.

Table 12–4 describes the DBFW:4 CEF header fields.

**Table 12–4 DBFW:4 (Property Change) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:4	Not applicable
Name	Fixed string: Property change	Not applicable
Severity	Fixed integer: 0	Not applicable

Table 12–5 describes the DBFW:4 extension fields.

**Table 12–5 DBFW:4 (Property Change) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.2

**Table 12–5 (Cont.) DBFW:4 (Property Change) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
timestamp	Time stamp of event. Must be converted to milliseconds.	rt	1231924678000
category	Category of event	cat	appliance
name	Name of system property changed	cs4	heartbeat_interval
Not applicable	Fixed string: Property name	cs4Label	Not applicable
value	Value property is assigned	cs2	1
Not applicable	Fixed string: Property value	cs2Label	Not applicable

## DBFW:8 (Database Audit)

DBFW:8 database audit messages capture audits from stored procedure auditing and user role auditing, after each run is completed. (See [Chapter 5, "Configuring Stored Procedure Auditing,"](#) and [Chapter 6, "Configuring and Using Role Auditing,"](#) for more information about this type of auditing.)

[Table 12–6](#) describes the DBFW:8 CEF header fields.

**Table 12–6 DBFW:8 (Database Audit) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:8	Not applicable
Name	Fixed string: Database audit	Not applicable
Severity	Fixed integer: 0.	Not applicable

[Table 12–7](#) describes the DBFW:8 extension fields.

**Table 12–7 DBFW:8 (Database Audit) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.42
Target Database	Connection string for audit database	request	192.0.2.43:5000/
Protected Database	Name of database	cs3	sales_db
Not applicable	Fixed string: Protected database	cs3Label	Not applicable

**Table 12–7 (Cont.) DBFW:8 (Database Audit) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Audit start time	Starting time stamp of audit. Value is milliseconds since 1-Jan-1970.	start	1219414043931
Object collected time	Time when all information had been collected from the database. Value is milliseconds since 1-Jan-1970.	rt	1219414046031
Audit end time	End time stamp of audit. Value is milliseconds since 1-Jan-1970.	end	1219414047357
Database counter	Number of databases found	flexNumber1	15
Not applicable	Fixed string: Database count	flexNumber1Label	Not applicable
New counter	Count of new items	flexNumber2	1000
	Fixed string: New	flexNumber2Label	Not applicable
Modified counter	Count of modified items	cn1	0
Not applicable	Fixed string: Modified	cn1Label	Not applicable
Deleted counter	Count of deleted items	cn2	0
Not applicable	Fixed string: Deleted	cn2Label	Not applicable
Unchanged counter	Count of unchanged items	cn3	1234
Not applicable	Fixed string: Unchanged	cn3Label	Not applicable

## DBFW:9 (Statement Alert)

DBFW:9 statement message alerts include the full audited SQL statement and associated details. Statement alerts are individual to each user, depending on how the user has configured the baseline. If database response monitoring is enabled, then the response information is included in the alert. To enable database response monitoring, see [Chapter 10, "Configuring and Using Database Response Monitoring."](#)

[Table 12–8](#) describes the DBFW:9 CEF header fields.

**Table 12–8 DBFW:6 (Statement Alert) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1

**Table 12–8 (Cont.) DBFW:6 (Statement Alert) CEF Header Fields**

Header Name	Content	Example
SignatureID	Fixed string: DBFW:6	Not applicable
Name	Fixed string: Statement alert	Not applicable
Severity	Value between 0 and 10	8

Table 12–9 describes the DBFW:9 extension fields.

**Table 12–9 DBFW:6 (Statement Alert (WAF)) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.2
action	Action taken. Should be translated into the words in the syslog spec doc.	act	Unknown Alerted
timestamp	Time stamp of event. Must be converted to milliseconds.	rt	1231924678000
db_client	Database client IP address	src	192.0.2.3
db_server	Database server IP address	dst	192.0.2.30
user_name	Database username. If blank it should say not recorded	duser	Not recorded
statement	SQL statement	msg	<pre>select dvdcatalog.*, fullpromoname,        imageurl, imagealt, landingpageid from dvdcatalog, dual   left join promo on promo.catalog_no =     catalog_no and sysdate     between startdate and enddate  where ((select count(*) from star inner         join starlink on         star.starid = starlink.starid  where starlink.catalog_no =     catalog_no and (starname like     '#####' and starname like     '#####' )) &gt; 0) and status = 0  and not art_type = 0  and not art_class = '###'  and rownum &lt; 000  order by ordered desc, title</pre>

## DBFW:10 (Statement Alert (WAF))

DBFW:10 statement Web Application Firewall (WAF) message alerts are generated when Database Firewall is working with a Web Application Firewall. If database response monitoring is enabled, then the alert includes the response information. To enable database response monitoring, see [Chapter 10, "Configuring and Using Database Response Monitoring."](#)

Table 12–10 describes the DBFW:10 CEF header fields.

**Table 12–10 DBFW:7 (Statement Alert (WAF)) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:10	Not applicable
Name	Fixed string: Statement alert (WAF)	Not applicable
Severity	Value between 0 and 10	4

Table 12–11 describes the DBFW:10 extension fields.

**Table 12–11 DBFW:7 (Statement Alert (WAF)) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.2
action	Action taken. Should be translated into the words in the syslog spec doc.	act	Known Alerted
db_client	Database client IP address	src	192.0.2.31
db_server	Database server IP address	dst	192.0.2.40
user_name	Database username. If blank it should say not recorded	duser	sa
web user name	Username used by Web application	suser	purchase@amazon
HTTP request	Full HTTP request	request	POST /faq.asp?dummy=yes HTTP/1.1\x0d\x0aReferer: http://10.190.0.203/faq.asp\x0d\x0aContent-Type: application/x-www-form-urlencoded \x0d\x0aUA-CPU:x86\x0d\x0a
Http Method	HTTP method	requestMethod	POST
Http Protocol	Protocol	app	http
Policy Name	Policy Name	cs1	toolshed_policy
Not applicable	Fixed string: Policy Name	cs1Label	Not applicable
Session Cookies	Session cookies	requestCookies	ASPSESSIONIDQASTDTDC=OCOPOPPDAOLM PKMOGNDLHFJN;TS10da7b=868388b6d 3c881a3342f0f7d2d2a3be38453eb9d2 627f7b048edb424f5ff84534d7fb9f2
Http Referer	Referring URL	requestContext	http://10.190.0.203/faq.asp

**Table 12–11 (Cont.) DBFW:7 (Statement Alert (WAF)) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Http User Agent	Browser type	requestClientApplication	Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1)
Cardinal IP Address	IP address of originating Web client	sourceTranslatedAddress	192.0.2.41
statement	SQL statement	msg	SELECT * FROM \"A_updates\" WHERE id = '10'

## DBFW:11 (Login Alert)

DBFW:11 login message alerts reveal when a user has attempted to log in to the database. If database response monitoring is enabled, then the result of the login attempt (success or failure) is included in the event. To enable database response monitoring, see [Chapter 10, "Configuring and Using Database Response Monitoring."](#)

[Table 12–12](#) describes the DBFW:11 CEF header fields.

**Table 12–12 DBFW:11 (Login Alert) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:11	Not applicable
Name	Fixed string: Login Alert	Not applicable
Severity	Value between 0 and 10	8

[Table 12–13](#) describes the DBFW:11 extension fields.

**Table 12–13 DBFW:11 (Login Alert) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Enforcement point IP	IP address of originating enforcing point	dvc	192.0.2.44
action	Action	act	AlwaysAlert
timestamp	Time stamp of event. Must be converted to millisecs.	rt	1231924678000
db_client	Database client IP	src	192.0.2.22
db_server	Database server IP	dst	192.0.2.123
user_name	Database username. If blank it should say not recorded	duser	not recorded
db_resp	String representing Database Firewall's interpretation of the database response	cs2	DB Success

**Table 12–13 (Cont.) DBFW:11 (Login Alert) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Not applicable	Fixed string: Execution result	cs2Label	Not applicable
db_resp_code	Signed Integer code returned from the database	cn1	4002
Not applicable	Fixed string: Database response code	cn1Label	Not applicable
db_resp_text	Response text returned from the database	cs5	Login failed.
Not applicable	Fixed string: Database response text	cs5Label	Not applicable
db_resp_detail	Detailed response text returned from the database	cs6	Severity: 14
Not applicable	Fixed string: Database response detail text	cs6Label	Not applicable

## DBFW:12 (Logout Alert)

DBFW:12 logout message alerts reveal when a user has explicitly logged out of the database, or if the user's TCP session has closed.

Table 12–14 shows the DBFW:12 CEF header fields.

**Table 12–14 DBFW:12 (Logout Alert) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:12	Not applicable
Name	Fixed string: Logout Alert	Not applicable
Severity	Fixed integer: 0	Not applicable

Table 12–15 shows the DBFW:12 extension fields.

**Table 12–15 DBFW:12 (Logout Alert) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Enforcement point IP	IP address of originating enforcement point	dvc	192.0.2.55
timestamp	Time stamp of event. Must be converted to milliseconds.	rt	1231924678000



**Table 12–15 (Cont.) DBFW:12 (Logout Alert) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
db_client	Database client IP	src	192.0.2.32
db_server	Database server IP	dst	192.0.2.56
user_name	Database username. If username is not determined, then the string will be not recorded	duser	not recorded

## DBFW:system (System Message (Operating System Alerts))

DBFW:system message alerts, which are in operating system file format, are generated by the underlying operating system on which Database Firewall is installed. An example of this type of alert is a hardware failure notification.

Table 12–16 describes the DBFW:system CEF header fields.

**Table 12–16 DBFW:system (System Message) CEF Header Fields**

Header Name	Content	Example
Version	Fixed integer: 0	Not applicable
Device Vendor	Fixed string: Oracle	Not applicable
Device Product	Fixed string: Database Firewall	Not applicable
Device Version	Database Firewall version	5.1
SignatureID	Fixed string: DBFW:system	Not applicable
Name	Fixed string: System message	Not applicable
Severity	Fixed integer: 0	Not applicable

Table 12–17 describes the DBFW:system extension fields.

**Table 12–17 DBFW:system (System Message) Extension Fields**

Database Firewall Field	Description	ArcSight Key Name	Example
Monitoring point IP	IP address of originating monitoring point	dvc	192.0.2.44
timestamp	Time stamp of event. Must be converted to milliseconds.	rt	1231924678000
Whole syslog message	The entire syslog message	msg	Mar 23 12:06:39 multi-lu kernel: br0: port 1(eth0) entering forwarding state



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---

# System Administration

This chapter describes routine tasks that may need to be carried out from time to time. It does not attempt to explain all options available from the Administration Console.

This chapter contains:

- [Security Guidelines](#)
- [Using the Dashboard](#)
- [Configuring Oracle Database Firewalls](#)
- [Configuring Protected Databases](#)
- [Listing, Creating, and Configuring Enforcement Points](#)
- [Configuring a Resilient Pair of Enforcement Points](#)
- [Configuring Traffic Sources](#)
- [Configuring Database Firewall as a Traffic Proxy](#)
- [Changing the Network Configuration](#)
- [Configuring the System](#)
- [Archiving Data](#)
- [Viewing the Logs](#)
- [Configuring Connectors to Third-Party Systems](#)
- [Configuring E-Mail Alerts](#)
- [Configuring Users](#)
- [Viewing and Capturing Network Traffic in an Individual Database Firewall](#)
- [Monitoring the Database Firewall's Embedded Oracle Database](#)

## Security Guidelines

System administration tasks should take into account Oracle's security recommendations. Consult the *Oracle Database Firewall Security Guide* for information on protecting your data and general recommendations about deploying Database Firewall in a network and in special configurations.

## Using the Dashboard

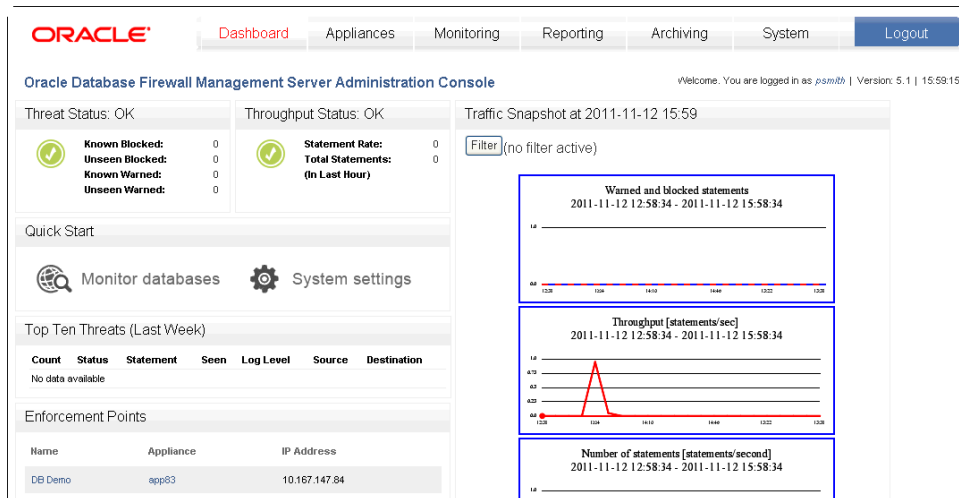
The Dashboard page of the Administration Console provides a high-level view of important information about the databases being protected, such as the threat status,

throughput and top ten threats. Key indicators are shown in charts, which are intended to be used by IT and security managers who are responsible for the day-to-day monitoring of the system.

See the *Oracle Database Firewall Security Guide* for more information on using the Dashboard.

Figure 13–1 shows an example of the Dashboard page of the Administration Console for a Management Server.

**Figure 13–1 Dashboard Page of the Management Server Administration Console**



**Note 1:** The Dashboard can include statistics from BIG-IP Application Security Manager, a Web application firewall product from F5 Networks, Inc. See [Chapter 11](#) for more information.

**Note 2:** Certain long running operations, such as deleting large amounts of traffic log data, may interfere with the Management Server Administration Console. Wait until these operations are complete before performing administration tasks.

## Configuring Oracle Database Firewalls

You can configure the Oracle Database Firewalls managed by a Database Firewall Management Server by using the Appliances tab. The Appliances tab is available only in the Oracle Database Firewall Management Server Administration Console.

Figure 13–2 shows the Appliances tab of the Management Server Administration Console.

**Figure 13–2 Appliances Tab for Configuring Oracle Database Firewalls**

Use the **Add** button to add an Oracle Database Firewall. See "[Step 3B: Add Each Oracle Database Firewall to the Management Server](#)" on page 3-9.

Use the **Create Resilient Pair** button to create a resilient pair of Oracle Database Firewalls. See "[Step 3C: Define Resilient Pairs of Oracle Database Firewalls](#)" on page 3-11. After creating a resilient pair, **Unpair** and **Swap** buttons are displayed. You can use **Swap** to force the primary to become the secondary, and vice versa.

The following buttons are provided for each Oracle Database Firewall:

- **Manage:** Allows you to perform operations such as to reboot or power off the Oracle Database Firewall, install software updates, remove the Database Firewall device from the appliances list, backup/restore configuration data to or from the Oracle Database Firewall Management Server, and perform file system checks. See [Chapter 4, "Configuring Oracle Database Firewall for High Availability,"](#) if you must update a resilient pair of Oracle Database Firewalls.
- **Status:** To view detailed status information for the standalone or managed Oracle Database Firewall.

---

**Note:** If you have a high availability environment and you have disabled JavaScript, you must manually refresh the appliances list to obtain their status.

---

- **Edit:** To edit the name or IP address you have entered for the Oracle Database Firewall at the Oracle Database Firewall Management Server. This edits your entry for the appliance on this page, but does not change the actual IP address of the Oracle Database Firewall, which can only be set from the Database Firewall's Administration Console.

## Configuring Protected Databases

This section contains:

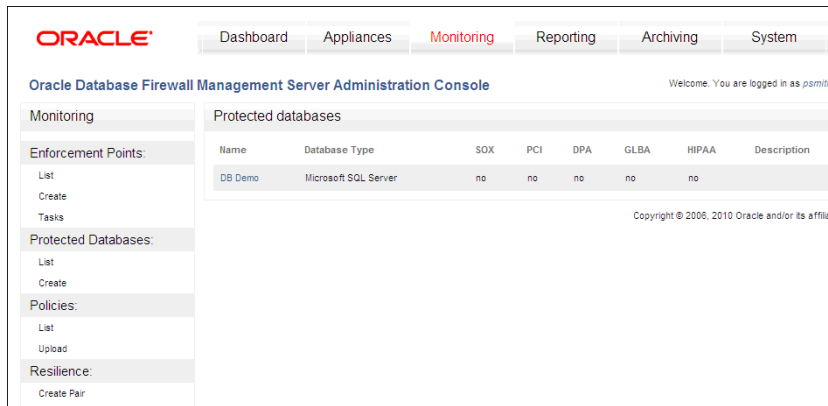
- [About Configuring Protected Databases](#)
- [Configuring User Settings for Protected Databases](#)

### About Configuring Protected Databases

You can set up the details of the protected databases using the options in the **Protected Databases** menu of the **Monitoring** tab.

[Figure 13–3](#) shows the Protected Databases page in the Administration Console.

**Figure 13–3 Configuring a Protected Database**

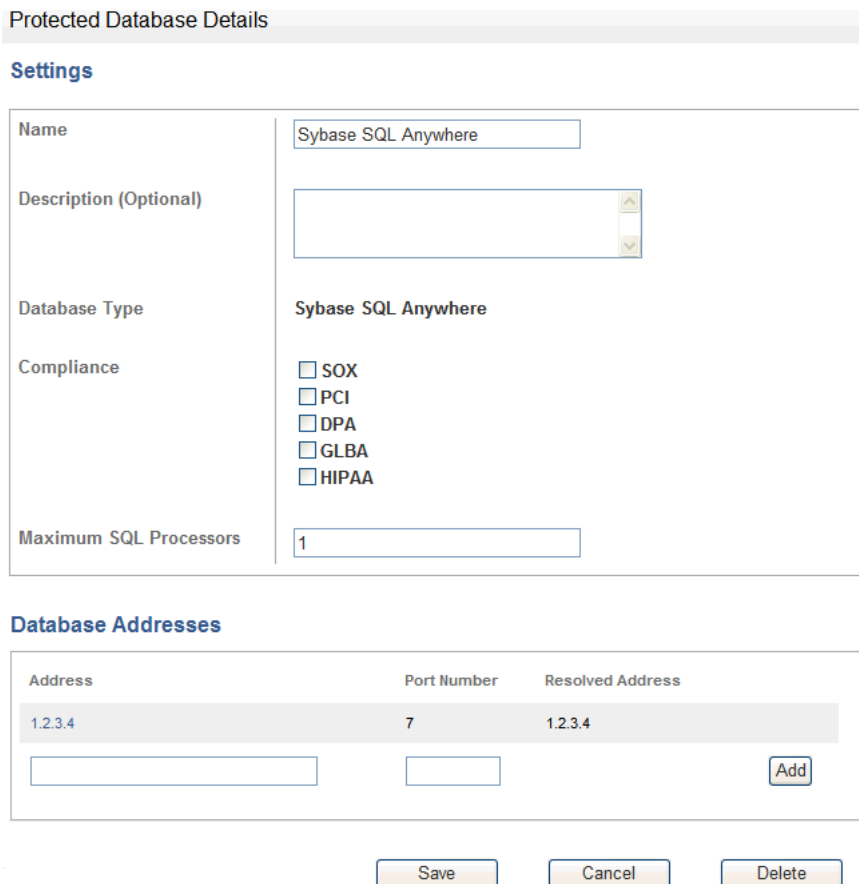


Clicking **List** in the **Protected Databases** menu lists all the protected databases that have already been configured. The picture shown above shows an example.

Clicking **Create** in the **Protected Databases** menu lets you create a new protected database.

Clicking a database name enables you to change the protected database settings. [Figure 13–4](#) shows the settings that are available.

**Figure 13–4 Protected Database Settings**



Checkboxes let you select the types of compliance reports that can be produced. (*Oracle Database Firewall Security Guide* provides more information about these report types.) If you need to produce Sarbanes-Oxley (**SOX**), Payment Card Industry (**PCI**), Data Protection Act (**DPA**), Gramm-Leach-Bliley Act (**GLBA**) or Health Insurance Portability and Accountability Act (**HIPAA**) reports for the database, then select the appropriate checkboxes. The compliance reports will contain data relevant to the standard you select here.

The **Maximum SQL Processors** field lets you define the number of Database Firewall processes that may be used for an Enforcement Point associated with this protected database. This setting is used for load balancing purposes for high throughput protected databases. Each process uses an associated amount of available RAM on the Database Firewall, therefore, when defining this setting you must take into account the total number of processes allocated across all protected databases currently being monitored, as well as the total amount of available memory.

At the bottom of the page, enter the address and port number of the protected database and click **Add**.

---

---

**Note:** Do not create two or more protected databases containing the same database details (IP address and port number). This can cause problems with report generation.

---

---

Click **Save** when finished.

## Configuring User Settings for Protected Databases

To configure user settings for a protected database:

1. Select the **Monitoring** tab.
2. Under **Protected Databases**, select **List**.
3. In the Protected Databases page, select the **users** link.

Clicking **users** in the protected database list allows you to view the names of the users who have accessed the database (this is determined from database traffic). You can click the name of a user to configure the user's "profile", such as the IP addresses that the user is expected to connect from; and whether the user should no longer be accessing the database (**Access terminated since**).

4. In the Users for protected database page, select the user name that you want to configure.
5. In the Edit Database User page, enter the appropriate user settings.

Edit Database User (from protected database: DB Demo)

User Name: sa

IP address: 192.0.2.101  
192.0.2.23  
192.0.2.14

The list of IP addresses this user is expected to connect from.

Is database administrator

Access terminated since:  
2010 November 10 21:53

Save Settings

6. Click the **Save Settings** button.

These settings are used in reports to show deviations from expected database usage.

## Listing, Creating, and Configuring Enforcement Points

This section contains:

- [About Working with Enforcement Points](#)
- [Managing Enforcement Points](#)
- [Finding the Status of an Enforcement Point](#)
- [Changing the Settings of an Enforcement Point](#)
- [Configuring BIG-IP Application Security Manager Settings](#)

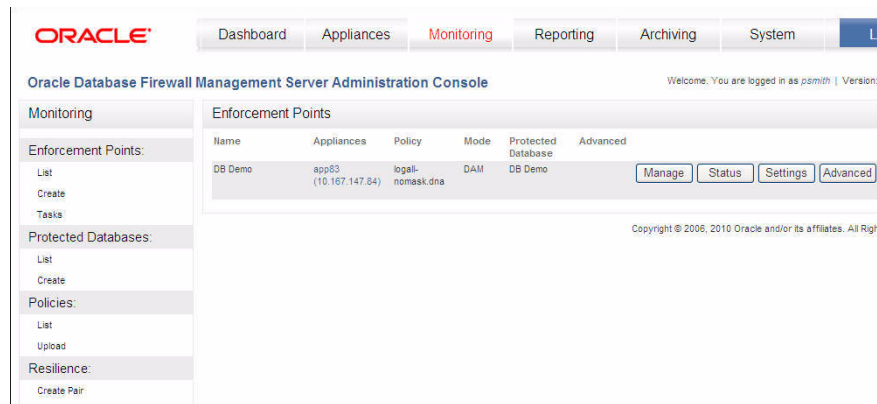
### About Working with Enforcement Points

An Enforcement Point lets you associate a policy with a specific protected database and network traffic sources.

The **Enforcement Points** menu in the **Monitoring** page enables you to list existing enforcement points, create new enforcement points (using the Enforcement Point Wizard), and view outstanding tasks for enforcement points. You can configure settings that are not available in the Enforcement Point Wizard. See "[Step 5: Configure the Standalone Database Firewall Enforcement Points](#)" on page 2-6 for more information.

[Figure 13-5](#) shows the Enforcement Points page of the Administration Console.



**Figure 13–5 Finding Existing Enforcement Points**

Clicking **List** displays all existing enforcement points, as shown in the picture above. Four buttons are provided for each enforcement point listed: **Manage**, **Status**, **Settings** and **Advanced**, as described in the following sections.

## Managing Enforcement Points

The **Manage** button enables you to:

- Suspend, resume, or delete the enforcement point.
- Run, suspend, or resume a stored procedure audit or user role audit for the selected enforcement point.

## Finding the Status of an Enforcement Point

Click the **Monitoring** tab, then select **List** from the Enforcement Points menu. The **Status** button displays the details for an enforcement point, its status and the database it protects. If the enforcement point is in a managed Database Firewall, the **Appliances** tab in the Management Server shows the Oracle Database Firewall device that contains the enforcement point.

## Changing the Settings of an Enforcement Point

The **Settings** button enables you to change the settings of the enforcement point, such as the database it protects, the policy that is used, and the protection mode.

[Figure 13–6](#) shows an example of changing the settings of an enforcement point.

**Figure 13–6 Changing Settings of an Enforcement Point**

**Monitoring Settings**

Protected Database:

Traffic Sources:

Enable	Network Interface
<input checked="" type="checkbox"/>	Network 1

Database Response:  Activate Database Response Monitoring

Database Interrogation:  Activate Database Interrogation

Remote Monitor:  Activate Remote Monitor

Local Monitor:  Activate Local Monitor

SPA:  Activate Stored Procedure Auditing

URA:  Activate User Role Auditing

Appliance Mode:  Database Policy Enforcement (DPE)  
 Database Activity Monitoring (DAM)

Policy:

Microsoft SQL Server	
Name	Description
<input checked="" type="radio"/> logall-nomask.dna	Log all statements for offline analysis without masking data (Note: if this policy is applied, it can use significant amounts of storage for the logged data. Sensitive information may be logged if you select this policy)
<input type="radio"/> logall.dna	Log all statements for offline analysis (Note: if this policy is applied, it can use significant amounts of storage for the logged data)
<input type="radio"/> logsample.dna	Log a sample of statements for offline analysis (Note: if this policy is applied, although it will store less statements than logging all statements, it can still use significant amounts of storage for the logged data)
<input type="radio"/> passall.dna	Pass all statements
<input type="radio"/> unique-nomask.dna	Log examples of statements for offline analysis covering each distinct source of traffic without masking data (Note: if this policy is applied, although it will store less statements than logging all statements, it can still use significant amounts of storage for the logged data. Sensitive information may be logged if you select this policy)
<input type="radio"/> unique.dna	Log examples of statements for offline analysis covering each distinct source of traffic (Note: if this policy is applied, although it will store less statements than logging all statements, it can still use significant amounts of storage for the logged data)

The following options are available:

- **Protected Database:** This can be used to change the database that is protected.
- **Traffic Sources:** Enables you to specify the network port(s) being used for the enforcement point.
- **Database Response:** Select the check box to enable database response monitoring (see [Chapter 10, "Configuring and Using Database Response Monitoring"](#)).
- **Database Interrogation:** Select this option to give Oracle Database Firewall the ability to interrogate the monitored database to obtain the name of the database user, operating system, and client program that originated an SQL statement, if this information is not available from the statement itself. See ["Enabling DDI"](#) on page 9-6.
- **Remote Monitor:** Selecting **Activate Remote Monitor** enables the enforcement point to accept and process SQL traffic detected by the remote monitoring software. See ["Installing and Enabling Remote Monitoring"](#) on page 8-1.
- **Local Monitor:** Selecting **Activate Local Monitor** enables the enforcement point to monitor SQL traffic detected by the local monitoring software. See ["Enabling Local Monitoring"](#) on page 7-5.
- **SPA:** Select this option to enable stored procedure auditing. See [Appendix 5, "Configuring Stored Procedure Auditing"](#).
- **URA:** Select this option to enable user role auditing. See [Appendix 6, "Configuring and Using Role Auditing"](#).
- **Appliance Mode:** Select one of these modes:

Select **Database Policy Enforcement (DPE)** if the enforcement point is required to block potential attacks. You must also use DPE mode, even if you are not currently blocking statements, if you have selected a proxy as the network interface in the Traffic Sources section of this page.

---

**Note 1:** When you use a Database Firewall in DPE mode, you must configure any IP or MAC address spoofing detection rules so that they ignore database IP or MAC address changes made by that Database Firewall.

**Note 2:** When you set a Database Firewall to DPE mode (through Enforcement Point Settings or by restarting a Database Firewall with network passthrough), ensure that all connections to the database are forced to reconnect. In addition, in DPE mode, if you change Enforcement Point Settings, you must also force all database connections to reconnect.

---

Select **Database Activity Monitoring (DAM)** if the enforcement point is to be used only to log statements and provide warnings of potential attacks. DPE is not available if the Oracle Database Firewall is in a resilient pair.

- **Policy:** You can choose the baseline that the enforcement point uses.

## Configuring BIG-IP Application Security Manager Settings

Click the **Advanced** button to configure settings for BIG-IP Application Security Manager. See [Chapter 11](#) for more information.

## Configuring a Resilient Pair of Enforcement Points

The **Resilience** menu is available when you are using the Oracle Database Firewall Management Server Administration Console. You can use the **Create Pair** option to set up a pair of enforcement points. See "[Pairing Enforcement Points](#)" on page 4-5 for more information.

## Configuring Traffic Sources

You can set up **Traffic Sources** using the Administration Console for an Oracle Database Firewall. See the following two sections for more information:

- "[Configuring Database Firewall as a Traffic Proxy](#)" on page 13-9
- "[Changing the Network Configuration](#)" on page 13-11

## Configuring Database Firewall as a Traffic Proxy

Depending on your network configuration, when using Oracle Database Firewall in DPE mode, you may prefer to configure a traffic proxy in Oracle Database Firewall instead of a bridge inline with network traffic. You can then associate the proxy with an Enforcement Point. You can also specify multiple ports for a proxy in order to use them for different Enforcement Points.

The following procedure must be done directly on the Database Firewall that is acting as a proxy.

To configure a traffic proxy:

**Note:** The IP address of the proxy interface must be on the same subnet as the protected database.

1. In the Administration Console of the Oracle Database Firewall that will act as a proxy, click **System**.
2. Click **Network**, then click the **Change** button.
3. In the Unallocated Network Interfaces area of the page, find an available network interface, and select **Traffic Proxy** in Traffic Source drop-down list.

**Unallocated Network Interfaces**

MAC Address	Bus Info	Identifier	Manufacturer	Link	Traffic Source
08:00:27:c4:9a:71	0000:00:11:0	82540EM Gigabit Ethernet Controller	Intel Corporation	<span style="color: red;">✖</span>	<div style="border: 1px solid gray; padding: 2px;"> <span>Traffic Source</span> <span>▼</span> <span>Add</span>  <span>Traffic Source</span>  <span style="background-color: #0070c0; color: white;">Traffic Proxy</span>  <span>Network 2</span> </div>

To free up additional network interfaces, you must first remove them either from an existing traffic source or traffic proxy by clicking the **Remove** button for the appropriate interface.

4. Click **Add**.

The new traffic proxy appears under the Traffic Proxies area of the page.

**Note:** To add a traffic proxy to the management interface, click **Add Traffic Proxy** in the Management Interface area, and enter the port number for the proxy.

5. In the new proxy area, check **Enabled**, enter the **Port** number, and then click **Add**.

Check **Enabled** next to the port number also. See the *Oracle Database Firewall Installation Guide* for information on ports used by the Database Firewall.

You can specify more than one port per proxy by entering another port number and clicking **Add**.

<p><b>Proxy 5</b> <span style="float: right;"><input type="button" value="Remove"/></span></p> <p>IP Address <input type="text" value="192.168.5.220"/></p> <p>Network Mask <input type="text" value="255.255.255.0"/></p> <p>MAC Address <input type="text" value="00:0c:29:c8:b2:f8"/></p> <p>Enabled <input type="checkbox"/></p>	<p><b>Device</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th>MAC Address</th> <th>Bus Info</th> <th>Identifier</th> <th>Manufacturer</th> </tr> </thead> <tbody> <tr> <td>00:0c:29:c8:b2:f8</td> <td>0000:02:02:0</td> <td>79c970 [PCnet32 LANCE]</td> <td>Advanced Micro Devices [AMD]</td> </tr> </tbody> </table> <p><b>Traffic Ports</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Traffic Source Id</th> <th>Port</th> <th>Enabled</th> </tr> </thead> <tbody> <tr> <td></td> <td><input type="text"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p style="text-align: right;"><input type="button" value="Add"/></p>	MAC Address	Bus Info	Identifier	Manufacturer	00:0c:29:c8:b2:f8	0000:02:02:0	79c970 [PCnet32 LANCE]	Advanced Micro Devices [AMD]	Traffic Source Id	Port	Enabled		<input type="text"/>	<input type="checkbox"/>
MAC Address	Bus Info	Identifier	Manufacturer												
00:0c:29:c8:b2:f8	0000:02:02:0	79c970 [PCnet32 LANCE]	Advanced Micro Devices [AMD]												
Traffic Source Id	Port	Enabled													
	<input type="text"/>	<input type="checkbox"/>													

6. Click the **Save** button.

The traffic proxy is now available to assign to an Enforcement Point. See "[Step 5: Configure the Standalone Database Firewall Enforcement Points](#)" on page 2-6, and "[Step 4: Configure the Management Server Enforcement Points](#)" on page 3-12.

## Changing the Network Configuration

You can change network settings from the Network page in the System menu. You must make these changes on each individual server, whether it is a Management Server, Standalone Database Firewall, or Managed Database Firewall.

To change network settings:

1. In the Administration Console of the Oracle Database Firewall or Management Server, click **System**, then click **Network** under the **System** menu on the left.
2. Click the **Change** button.
3. Edit the settings in the following sections of the page as needed:
  - **Management Interface:**
    - To change the IP address, network mask, gateway, name, or add or change a proxy port for the Management Interface, edit the appropriate field(s).
  - **Traffic Sources:**
    - To change the IP address or network mask of the traffic source, edit the appropriate field.
    - To enable or disable a bridge in a traffic source, check or uncheck the **Bridge Enabled** box (this is possible only if the traffic source has two network interfaces associated with it).
    - To remove the traffic source, click the **Remove** button on the left.
    - To remove a network interface (i.e., network card) from the traffic source, click the **Remove** button on the right next to the specific device.
  - **Traffic Proxies:**
    - To change the IP address, port, or network mask of the traffic proxy, edit the appropriate field.
    - To add and enable a port, enter the **port number** in the field provided, click **Enabled**, and then click **Add**. Repeat for additional ports.
    - To enable or disable the traffic proxy, check or uncheck the **Enabled** box on the left.
    - To remove the traffic proxy, click the **Remove** button for that proxy.

See also "[Configuring Database Firewall as a Traffic Proxy](#)" on page 13-9.

- **Unallocated Network Interfaces:**

This section appears only if you have unallocated network cards. A green icon appears in the **Link** column if the card is currently physically connected to a network (this indicator appears if the network card supports this feature).

- To assign a network interface to a traffic source or proxy, select the traffic source or proxy from the drop-down menu, then click **Add**.
- To assign a network interface to a new traffic source, select **New** in the dropdown menu and click **Add**. The network interface is assigned to the new traffic source, and the new traffic source is shown in the **Traffic Sources** section.
- **Link Properties:**

- If for some reason your network is not using auto-negotiation, to set link properties for your network, choose one of the available radio buttons.

4. Click the **Save** button.

## Configuring the System

You can configure the Oracle Database Firewall system settings using the options in the **System** menu of the System page. These options are used during initial deployment of Oracle Database Firewall.

Except where noted, the following options are available from the **System** menu of a Management Server or Standalone Database Firewall. The options Manage and Email Configuration are not available on a managed Database Firewall.

- **Manage:** Provides options to:
  - Suspend and resume system operation.
  - Change the system to operate in test mode (not recommended in production systems).
  - Perform a diagnostic file system check.
  - Delete logged traffic.
  - Reboot or power off the system.
- **Network:** Allows you to change network settings such as IP address, network mask, and default gateway, configure traffic sources, and allocate network interfaces (network cards), and link properties.
- **Services:** Allows you to optionally set DNS server addresses, and control web, terminal, SNMP, secure log and traffic log access.
- **High Availability:** (Management Server only) Lets you specify a partner Management Server to use in a high availability pair, and to select the primary server in the pair. (See "[Step 3A: Specify Management Server Partner Settings \(Resilient Pair Only\)](#)" on page 3-8).
- **Status:** Displays detailed status information, software license details, attribution notices and disclaimers.
- **Email Configuration:** Used to configure the SMTP e-mail settings for scheduled reports (see *Oracle Database Firewall Security Guide*) and e-mail alerts (see "[Configuring E-Mail Alerts](#)" on page 13-21).
- **Date and Time:** Use to configure date, time, time offset, and time synchronization with an NTP server. See "[Step 1: Set the Database Firewall Date and Time](#)" on page 2-1 for details.
- **Keyboard:** This is used to specify the language to use for a keyboard connected to the Oracle Database Firewall Management Server or Oracle Database Firewall. The selection determines which characters appear on the screen when keys are pressed on the keyboard.
- **Public Key:** Displays the public key, which may be necessary for archiving. for further information, see the notes on the page displayed.
- **Management Server:** This is displayed only for an Oracle Database Firewall. The option allows you to make this a managed Database Firewall by entering the Management Server's IP address and certificate (see "[Step 2B: Enter the Database Firewall Management Server Certificate and IP Address](#)" on page 3-8). An **Add**

**Second Management Server** option is available if a resilient pair of Oracle Database Firewall Management Servers is used.

- **Certificate:** This is displayed only for a Management Server. The option allows you to display the Management Server certificate, which can be copied to Oracle Database Firewalls to make them managed Database Firewalls (see "[Step 2: Perform Tasks for Each Oracle Database Firewall](#)" on page 3-7).

## Archiving Data

This section contains:

- [About Archiving Data](#)
- [Defining Archiving Destinations](#)
- [Creating an Archive Schedule](#)
- [Starting an Archive Job Manually](#)
- [Starting a Configuration Archive Job](#)
- [Restoring an Archive](#)

## About Archiving Data

The Archiving page of the Administration Console provides options that enable important data to be archived to prevent loss of data in the unlikely event of a disk or other system error. It is recommended that archiving is carried out regularly in accordance with your corporate policy. If required, you can create different archives for each protected database.

[Figure 13-7](#) shows the Archiving Jobs page of the Administration Console.

**Figure 13-7 Archiving Data**



image\_139.gif shows part of the Archiving Jobs page. The archiving jobs are categorized under the following sections:

- Logfile Archive Jobs
- Logfile Restore Jobs

\*\*\*\*\*

**Archive Data** and **Backup** (accessed in the Appliances tab by clicking the **Manage** button for an appliance) archive the traffic logs or audit history for stored procedure

auditing and user role auditing. **Archive Configuration** archives system configuration data, including the baseline policies.

---

---

**Notes:**

- The amount of data in the traffic log depends on the logging settings specified in the policy in the Analyzer. Excessive logging leads to rapid use of large amounts of disk space.

To prevent problems that might occur by the accumulation of processed traffic log files on the Oracle Database Firewall or Oracle Database Firewall Management Server, the system ensures that a target of 25% of the disk space remains free. You must take this into account when calculating the amount of disk space required for storage of traffic log files.

Once the free disk space target is exceeded, logfiles may be deleted by the system and will no longer be available for archiving and ad-hoc searching. When logfiles are deleted, you will see this indicated in the `/var/www/log/backgroundrb.log` file.

- All files used by the Analyzer must be archived separately by your company's normal backup/archive systems. It is recommended that the following Analyzer files are archived:

**Policy Files:** File extension `.dna`

**Model Files:** File extensions `.smdl` and `.smdl_data`

**Training Files:** File extension `.train`

---

---

## Defining Archiving Destinations

Before an archive can be started, you must define one or more archive destinations as follows. An archiving destination specifies the archive storage locations and other configuration settings.

1. Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.

2. Click the **Archiving** tab.
3. Click **Create** in the **Destinations** menu. The following is displayed:



Create Archiving Destination

Transfer Method:  Secure Copy (scp)  Window File Sharing (smb)

Name:

Username:

When specifying an address for Windows File Sharing, specify the IP address rather than the name.

Address:

Port:

When specifying a path for Windows File Sharing, type the service first then subdirectory separated by the "/" character. e.g:  
/public\$/archive/

Path:

Authentication Method:  Key Authentication  Password

Password:

Confirm Password:

The figure shows the Create Archiving Destination page. The various fields are described in text.

\*\*\*\*\*

#### 4. Complete the following fields:

- **Transfer Method:** The method used to transfer data from the Oracle Database Firewall Management Server to the machine that archives the data. Normally, you should select **Secure Copy (scp)** if the data is archived by a Linux machine, and **Windows File Sharing (smb)** if the data is archived by a Windows machine.
- **Name:** The name of the archiving destination. This name is used to select the archiving destination when starting an archive.
- **Username:** The account name on the machine to which the archive data will be transferred.
- **Address:** The name or IP address of the machine that archives the data. If **Windows File Sharing** is selected, specify an IP address.
- **Port:** This is the port number used by the secure copy or Windows fileshare service on the machine that archives the data. You can normally use the default port number.

If you selected **Windows File Sharing** as the Transfer Method, it is recommended you use port 445.

- **Path:** The path to the archive storage location. If Secure Copy (scp) is used to archive the data and there is no leading slash character; the path is relative to the user's home directory. If there is a leading slash, the path is relative to the root directory. For a Windows machine, enter the sharename, followed by a forward slash and the name of the folder (for example, /sharename/myfolder).
- **Authentication Method:** If Window File Sharing (smb) is used to archive the data, select **Password** and enter the login password. If a Linux machine is used, you can select **Key Authentication**. Follow the instructions that appear after selecting **Key Authentication**.

- **Password and Confirm Password:** The password to log into the machine that archives the data.
5. Click **Save**.

## Creating an Archive Schedule

You can create a schedule to archive the traffic logs or audit files automatically at midnight on specified days. To do, this:

1. Log in to the standalone Database Firewall or Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Click the **Archiving** tab.
3. Under **Jobs**, select **Schedule**.
4. In the Archiving page, click the **Add** button.
5. Select **Log Files** to create a schedule to archive traffic logs, or **Db Audit** to create a schedule to archive the history for stored procedure auditing and user role auditing.
6. Select **Recurring** if you want the archive to occur automatically at a specified interval.

If the check box is not selected, the archive will occur only once.

7. Use **Date**, **Month** and **Weekday** to specify the interval.  
For example, if you select only **Mon**, the archive will take place at midnight on every Monday. If you select **1** and **Jan**, the archive will take place only on the 1st January every year (not recommended; the archive should occur more frequently).
8. Use **Host** to select the archive destination.
9. Select the protected database, or **All**.
10. Click **Save**.

## Starting an Archive Job Manually

If you do not want to set up an archive schedule, use the following procedure to archive the traffic logs or audit files manually:

1. Log in to the standalone Database Firewall or Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Click the **Archiving** tab.  
Any existing archive or restore jobs are listed on the Archiving Jobs page.
3. Ensure that you have created an archiving destination first.  
In the **Destinations** menu, select **Create** to create the archiving destination.
4. In the **Jobs** menu, select **Archive Data**.

The following screen is displayed:

The screenshot shows the 'Create Archive Job' page with the following details:

- Job Name:** [Empty text box]
- Archive Destination:** admin (scp://admin@192.0.2.140.22/public\$/archive)
- Archive class:** Log Files (selected), Audit Files (unselected)
- Options:**  Include files that have already been archived
- Note:** All files that contain logs for the specified protected database will be archived, including those that contain logs for other protected databases.
- Protected Database:** All (selected), DB Demo
- Log Files:**
  - Created after: November 04, 2010 00:00:20
  - and before: November 11, 2010 00:00:20
- Archive** button at the bottom right.

The figure shows the Create Archive Job page. The various fields are described in text.

\*\*\*\*\*

5. Complete the following fields:

- **Job Name:** Give each archive a name.
- **Archive Destination:** Choose the archive destination.
- **Archive class:** Choose whether to archive the **Log Files** (traffic logs), or the **Audit Files** (the archive history for stored procedure auditing and user role auditing). If you choose **Log Files**, the following options are also displayed:
  - **Include files that have already been archived:** Select this check box to re-archive files that have already been archived.
  - **Protected Database:** Choose **All**, or a specified database.
  - **Log Files:** Choose the period to archive.

6. Click **Archive**.

You can view the progress of an archive job from the Archiving Jobs page (click the **Archiving** tab).

Clicking the job number in the Archiving Jobs page displays a page in which you can choose to pause or delete the job.

## Starting a Configuration Archive Job

Before archiving configuration data from the Oracle Database Firewall Management Server, backup the configuration on each managed Database Firewall:

1. In the Management Server console, click the **Appliances** tab.
2. For each listed Database Firewall, click the **Manage** button.
3. Click the **Backup** button.
4. (Optional) You can check the **Backup with pass phrase** checkbox. For security reasons, this is not recommended. See "[Restoring a Configuration in which the Pass Phrase was not Archived](#)" on page 18.

Use the following procedure to archive configuration data, including Analyzer policies:

1. In the standalone Database Firewall or Management Server Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Click the **Archiving** tab.
3. In the **Jobs** menu, select **Archive Configuration**.
4. In the Create Archive Job page, under the Settings section, complete the **Job Name** and **Archive Destination** fields.
5. (Optional) Under the Security section, you can check the **Archive With Pass Phrase** checkbox. For security reasons, you should not archive the pass phrase. See "[Restoring a Configuration in which the Pass Phrase was not Archived](#)" on page 18.
6. Click the **Archive** button.  
After you click **Archive**, the archive job appears in the Configuration Archive Jobs list in the Archiving Jobs page.

## Restoring an Archive

If you want to restore data from an archive, click **Restore Data** or **Restore Configuration** in the **Jobs** menu. The page that is displayed enables you to choose the archive destination to restore. All data stored at the archive destination will be restored.

The system overwrites the existing configuration when you restore a configuration. This can lead to traffic logs being removed. If you merge an old configuration with current traffic logs, first archive the data, then restore the configuration, and then restore the data.

When you restore previously archived traffic log data to a system using the Restore functionality, determine whether or not these log files must be associated with a monitoring point. You can do this from the **Repair** menu option in the **System** menu.

After restoring configuration data at an Oracle Database Firewall Management Server, display the **Appliances** page, click **Manage** for each Oracle Database Firewall device being controlled and select the **Restore** option.

---

---

**Note:** Performing a Configuration Restore job will delete any Archive Jobs that have been made previously.

---

---

### Restoring a Configuration in which the Pass Phrase was not Archived

A pass phrase is used to decrypt obfuscated passwords used in a Database Firewall system. The pass phrase is randomly generated at installation time, and is unique to each Database Firewall installation. For security reasons, we recommend that you do not archive the pass phrase when you archive a configuration.

There are three possible scenarios if you are restoring a configuration with no pass phrase archived:

- Restoring a configuration archive to the same Database Firewall installation:

When you are restoring from a configuration archive with no pass phrase to the same Database Firewall installation, the existing pass phrase will be used and no further steps are needed.

- Restoring a configuration archive to a new Database Firewall installation:
 

If to create a new system you are restoring from a configuration archive from an existing system with no pass phrase, you need to retrieve the pass phrase file from the existing system from which the configuration archive was created. Copy the pass phrase file `dbfw_random_pass` from the archive installation at this directory: `/usr/local/dbfw/etc/`. Place this file in the same directory in the installation where you are restoring, overwriting the existing pass phrase file. In a managed Database Firewall environment, replace this file in the Management Server as well as all managed Database Firewalls.
- Restoring a configuration archive from a system that no longer exists:
 

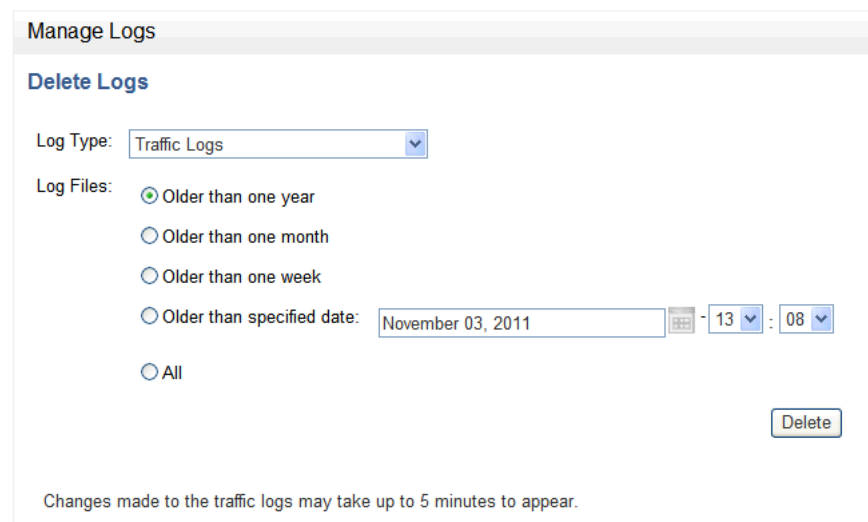
If you have configuration archive with no pass phrase, and the system from which it the archive was created no longer exists, you need to re-enter all system passwords in the new system. The new system will use its own randomly generated pass phrase to decrypt passwords.

## Viewing the Logs

The Database Firewall log files capture only SQL statements. You can view logged information using the options in the **Logs** menu of the **System** tab.

Figure 13–8 shows the Manage Logs page of the Administration Console.

**Figure 13–8** Managing Logs



The **Logs** menu contains the following options:

- **Manage:** Enables you to delete log files to free disk space. Always use this utility to delete files. You should never delete log files at the operating system level.

---

**Note:** Before deleting log files, it is recommended that you archive the data and save it to long-term storage media to ensure that all logged data is available for possible future analysis.

---

- **System Events:** Displays the contents of the event log, which stores system events that are not directly related to the Oracle Database Firewall software, such as operating system warnings.
- **Traffic Log Files:** Displays the traffic log files and enables you to download them.

---

**Note:** If you want the most recent data to be made available for reporting purposes, click **Summarize Now** in Traffic Log Files page. Summarizing makes the data in the traffic log files available for reporting. Automatic summarizing takes place every hour.

---



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**Note:** A more user friendly method of viewing the data in the traffic log is to use the **Traffic Log** options in the Reporting page (see *Oracle Database Firewall Security Guide* for more information about accessing the traffic log).

---

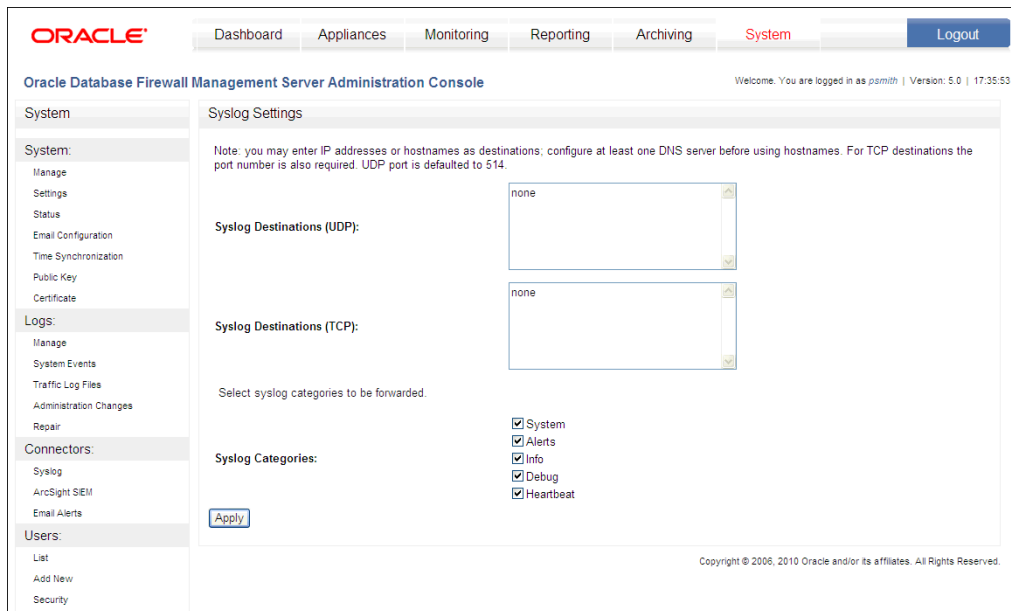
- **Administration Changes:** Displays the contents of the administration log, which stores system actions such as logins, shutdowns, restarts, and baseline policy uploads.
- **Repair:** Allows you to attach log files to a log source, such as an enforcement point. This may be necessary if log files have been restored from an archive and the original log source has been removed.

## Configuring Connectors to Third-Party Systems

You can configure connections to third-party systems by selecting **Syslog** from the **Connectors** menu in the **System** tab.

Figure 13–9 shows the Syslog Settings page of the Administration Console.

**Figure 13–9 Syslog Settings**



The **Connectors** menu contains the following options:

- **Syslog:** Allows you to configure the types of syslog messages to send and to specify the syslog destinations. See "[Step 1D: Configure the Management Server Syslog Destinations](#)" on page 3-6 (Oracle Database Firewall Management Server-based systems) or "[Step 4: Configure the Standalone Database Firewall Syslog Destinations](#)" on page 2-5 (standalone systems).
- **ArcSight SIEM:** Enables you to configure communications to the ArcSight Security Information Event Management (SIEM) system. For more information about ArcSight SIEM, including details of the syslog message mapping between Oracle Database Firewall and ArcSight SIEM, see [Chapter 12, "Using Oracle Database Firewall with ArcSight SIEM."](#)
- **Email alerts:** Enables you to send e-mail alerts to one or more users, including e-mail aliases. Allows you to send alerts to specified e-mail addresses. Enabling email alerts forwards all syslog alert message types (DBFW:9, DBFW:10, DBFW:11 and DBFW:12) to the specified email addresses. See "[Configuring E-Mail Alerts](#)" on page 13-21. See [Appendix B, "Syslog Message Format,"](#) for the meanings of the syslog message types.

## Configuring E-Mail Alerts

You can configure e-mail alert notification for users. This section contains:

- [Configuring the SMTP Server](#)
- [Configuring E-Mail Recipients](#)
- [Example E-Mail Alert Notification](#)

### Configuring the SMTP Server

The SMTP protocol is widely used and recognized by internet mail servers.

To configure the SMTP server:

1. From the **System** tab, in the **System** menu, select **Email Configuration**.
2. Enter the following settings:
  - **SMTP Server Address:** Enter the SMTP server address, using either an IP address or the host name. Examples are as follows:
 

```
auth.smtp.example.com
mail.example.com
192.0.2.20
```
  - **Port:** Enter the port number, which is typically 25.
  - **Username:** (Optional) Enter the user name.
  - **Password and Password Confirmation:** (Optional) Enter the password.
  - **From Address:** Enter the appropriate e-mail address, which will be displayed as the sender in e-mails.
  - **Reply-to Address:** Enter the appropriate e-mail address, which will be used as the reply address.
3. Click the **Save** button.

4. To test the email configuration, enter a valid e-mail address in the **Email Address** field and then click **Test**. In a moment, an e-mail should appear in the e-mail tool used by the e-mail address.

## Configuring E-Mail Recipients

After you have configured an SMTP server, you can configure one or more e-mail addresses of users who want to receive e-mail alerts.

To configure e-mail alert forwarding:

1. From the **System** tab, in the **Connectors** menu, select **Email Alerts**.  
The Email Alerts page appears.
2. Select the **Enable email alert forwarding** check box.
3. Enter one or more e-mail recipient addresses, separated by a space, or new line.

The screenshot shows a dialog box titled "Email Alerts". It contains the following elements:

- A checked checkbox labeled "Enable email alert forwarding".
- Instructional text: "Add the addresses that you would like email alerts forwarded to. Please ensure that you have set the Email configuration before proceeding."
- A text input field labeled "Email Recipients" containing the text: "psmith@example.com" and "sec\_admins@example.com" on separate lines.
- "Apply" and "Cancel" buttons at the bottom right.

4. Click the **Apply** button.

## Example E-Mail Alert Notification

**Example 13-1** shows an example of an e-mail notification. The subject header is Oracle Database Firewall: Alert from device 192.0.2.82 for database 192.0.2.81 - Statement Alert.

### **Example 13-1** Contents of an E-Mail Alert Notification

Details of the alert:

Alert name:	Statement Alert
Device:	192.0.2.82
Alert severity:	Undefined
Action:	Warn
Action Type:	Unknown Alerted
Message timestamp:	2010-11-12 13:45:05.746
Cluster ID:	2362095612
Logging level:	Always
Client address:	192.0.2.237:4743
Server address:	192.0.2.81:1433
Database username:	unknown_username
SQL statement ID:	4cdd44e129500000
Database response:	Not collected
Response code	0
Response text	
Response detail	
SQL:	select * from creditcard where 0=0



## Configuring Users

This section contains:

- [About Configuring Users](#)
- [Creating a New User Account](#)
- [Creating Password Policies](#)

### About Configuring Users

You can use the **Users** menu of the System page to create, list, and edit Administration Console user accounts. A valid user name and password must be provided when the Administration Console is started, or when a user of the Analyzer software connects using **Train on Log Data** or **Test with Log Data**.

You can create users in both standalone and managed Database Firewalls, and in the Management Server. These user accounts are local to each system, even after you have configured a Database Firewall to connect to a Management Server. For a standalone Database Firewall, in which both the Database Firewall and the Management Server are on the same Linux server, the system administrator user can perform all functions. However, if the Database Firewall is on a separate server from the Management Server, after you connect the Management Server to this Database Firewall, the system administrator functions change. For example:

- **Database Firewall administrator:** Can now only change network settings, view network traffic, remove the Database Firewall from the Management Server, and similar tasks specific to the current Database Firewall.
- **Management Server administrator:** Can create and manage enforcement points, configure policies, run reports, archive, and so on.

See "[Which Administration Console Should I Use?](#)" on page 1-5 for a full list of the privileges associated with these two accounts.

The default administrator user name is `admin` (lower case only). For better security and separation of duty, Oracle recommends that you reserve the `admin` user account as a back-up user account, and then create a separate administrative account for each existing user for day-to-day operations. These accounts should never be shared. This allows better auditing of administrator activity, and if the administrative user is unavailable or leaves the company, you have a back-up administrative user account to take this user's place. For all of the user account options, you can create as many users as your site requires.

To ensure full traceability of system changes, the administration log stores the login ID of any person who makes a change from the Administration Console. Another reason for having separate Administration Console accounts is that this log enables you to easily track users who make changes to the Database Firewall system. See "[Viewing the Logs](#)" on page 13-19.

[Figure 13-10](#) shows the Users page of the Administration Console.

**Figure 13–10 Configuring Users**

Users						
Login	First name	Last name	Email	Role	Created	Suspended
admin	Admin	Account		System Administrator	2010-07-20 03:23:10	no
lbernstein	M	Bernstein	mbernstein@example.com	System Administrator	2010-08-25 21:03:15	no
psmith	Patricia	Smith	psmith@example.com	System Administrator	2010-08-25 21:04:01	no

## Creating a New User Account

To create a new user account:

1. Log in to the Administration Console.

You can log in to a standalone or managed Database Firewall, or a Management Server. See "[Logging in to the Administration Console](#)" on page 1-7 for more information about logging in.

2. Select the **System** tab.

The System Settings page appears.

3. In the **Users** menu, select **Add New**.

The Add User page appears.

4. Complete the following information:

- **User name:** Enter the login user name for the account (for example, psmith or lbernstein). Remember that this name is case sensitive. For example, if you create lbernstein, trying to log in as LBERNSTEIN will fail.
- **First Name:** Enter the user's first name.
- **Last Name:** Enter the user's last name.
- **Email:** Enter the user's e-mail address.
- **Role:** Select from the following roles:
  - **System Administrator:** Gives the user full access to all options in the Administration Console, and to connect from the Analyzer.
  - **View-only User:** Enables the user to view log data, change his or her password, and connect from the Analyzer. This role enables the user to see statement details in the Analyzer. This user can create a policy file, but cannot upload it.
  - **Log Administrator:** Enables a user of the Administration Console to view log data, change his or her password, configure logging, run archive or restore jobs, and connect from the Analyzer.
- **Suspended:** Select this check box to suspend the user account.
- **Force Password Change on Next Login:** Select this check box to enable the user to create a private password the first time that the user logs in. By default, this check box is selected.
- **Password:** Enter a secure password. Follow these guidelines:
  - Make the password between 8 and 30 characters and numbers.
  - Include in the password at least one digit, one upper-case character, and one lower-case character.

- Do not use an actual word for the entire password.
  - Combine two weaker passwords, such as welcome and binky1 into WelBinky1Come.
  - **Confirm Password:** Re-enter the password.
5. Click the **Signup** button.

Later on, if you must change the user account, select **List** from the **Users** menu, and then click the name of the user account that you want to change. The Edit User page appears.

## Creating Password Policies

For better security, you can create password policies to force users to use strong passwords. The password policy applies to all users managed by the Database Firewall.

To create a password policy:

1. Log in to the Administration Console.
 

You can log in to a standalone or managed Database Firewall, or a Management Server. See "[Logging in to the Administration Console](#)" on page 1-7 for more information about logging in.
2. Select the **System** tab.
 

The System Settings page appears.
3. In the **Users** menu, select **Security**.
 

The User Security Settings page appears.
4. Specify the following settings:
  - **Enforce Strong Passwords:** Select this check box to enforce the following criteria:
    - Must contain lowercase and uppercase characters
    - Must contain at least one non alphabetical character
    - Must not be systematic or simple (for example, abcde or 12345)
    - Must not be made up of mostly the same characters (for example, aaaaaa11111)

If you disable this option, Oracle Database Firewall will give users advice about the strength of their passwords but will not enforce these guidelines.
  - **Minimum Password Length:** Enter a numeric value. The default is 6.
  - **Enforce Novel Passwords:** Select this check box to prevent users from specifying a password that they have used in the past.
  - **Expire Passwords:** Enter a numeric value to force users to change their passwords after a specified number of days. To disable password expiration, enter 0.
5. Click the **Save** button.

## Viewing and Capturing Network Traffic in an Individual Database Firewall

This section contains:

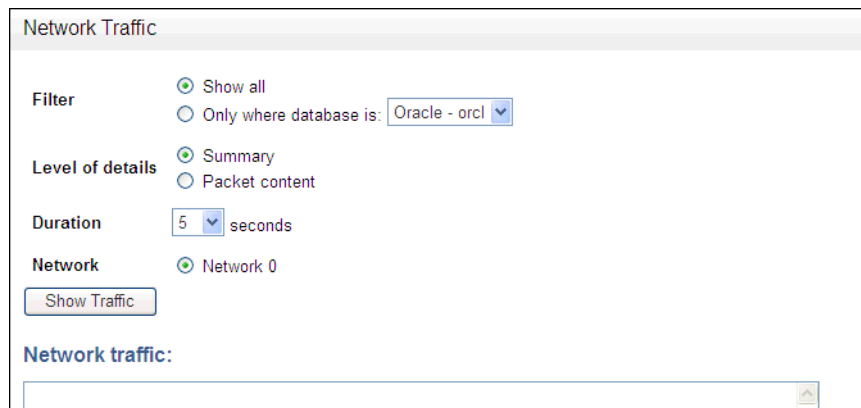
- [Viewing Network Traffic](#)
- [Capturing Network Traffic](#)

## Viewing Network Traffic

You may wish to view network traffic for debugging purposes. You can view network traffic for standalone or managed Database Firewalls. You can display network traffic in real time on the screen by clicking **Show** in the **Network Traffic** menu of the **System** tab. This option is not available for the Management Server.

[Figure 13–11](#) shows the Network Traffic page of the Administration Console of a Database Firewall.

**Figure 13–11** Viewing Network Traffic from a Database Firewall



## Capturing Network Traffic

You can capture the network traffic to a file (.pcap file type) that you can later download and analyze.

To capture the network traffic to a file:

1. Log in to the standalone or managed Database Firewall Administration Console.  
See "[Logging in to the Administration Console](#)" on page 1-7 for more information about logging in.
2. Select the **System** tab.
3. Under the **Network Traffic** menu, select **Capture to File**.

In a moment, the Network Traffic page lists the traffic file:

Network Traffic

Filter  Show all  Only where database is: Microsoft SQL Server - DB Demo

Duration 5 seconds

Network  Network 0

Capture

Network traffic files:

Name	Size	Network	Started	Duration	Database	Traffic file
network_traffic20101119000209.pcap	5437	Network 0	2010-11-19 00:02:09	5		download

- In the Network traffic files area, click the **download** button.
- In the File Download dialog box, click **Save**.
- In the Save As dialog box, navigate to the directory where you want to save the file, and then click the **Save** button.

## Monitoring the Database Firewall's Embedded Oracle Database

You can use the Oracle Enterprise Manager Database Control to monitor the Oracle database embedded in the Database Firewall. Use the configuration steps in this section to set up monitoring of the Oracle embedded database in a Standalone Database Firewall or Management Server.

To configure monitoring of the embedded Oracle database:

- On the computer running the Database Firewall or Management Server, log in as support and switch to user root.

- Run the command:

```
/usr/local/dbfw/bin/dbfwdbctrl-cfg configure
```

- When prompted for a password, enter the Oracle database sys password you specified when installing the Database Firewall or Management Server.

- Run these two commands to start monitoring:

```
/etc/init.d/dbfwdbctrl autostart on
```

```
/etc/init.d/dbfwdbctrl start
```

After the next reboot, the Oracle Enterprise Manager Database Control will start automatically.

- To access the Enterprise Manager Database Control in a browser, use the following URL:

```
https://Database_Firewall_or_Management_Server_IP_address:1158/em
```

The Oracle Enterprise Manager Database Control console appears.

- Use the following access credentials:

- **User Name:** enter sys
- **Password:** enter the sys password
- **Connect As:** select sysdba

For information on managing Oracle Enterprise Manager Database Control, see the Oracle Database Administrator's Guide:

[http://docs.oracle.com/cd/E11882\\_01/server.112/e25494/toc.htm#BEGIN](http://docs.oracle.com/cd/E11882_01/server.112/e25494/toc.htm#BEGIN)

To stop and restart monitoring of the embedded Oracle database:

1. Run the following commands to stop monitoring and to disable autostart:

To stop monitoring, run: `/etc/init.d/dbfwdbctrl stop`

To disable autostart, run: `/etc/init.d/dbfwdbctrl autostart off`

2. Run the following commands to restart monitoring and enable autostart:

`/etc/init.d/dbfwdbctrl autostart on`

`/etc/init.d/dbfwdbctrl start`

After the next reboot, the Oracle Enterprise Manager Database Control will start automatically.

To check the status of the Enterprise Manager 11g Database Control (monitoring the embedded Oracle database):

1. On the computer running the Database Firewall or Management server, log in as root.
2. Run the command: `/etc/init.d/dbfwdbctrl status`

Here is a sample output:

```
[root@dbfw080027c47bb5 ~]# /etc/init.d/dbfwdbctrl status
Oracle Enterprise Manager 11g Database Control Release 11.2.0.2.0
Copyright (c) 1996, 2010 Oracle Corporation. All rights reserved.
https://127.0.0.1:1158/em/console/aboutApplication
Oracle Enterprise Manager 11g is running.
-----
Logs are generated in directory /var/lib/oracle/dbfw/127.0.0.1_dbfwdb/sysman/log
```

---

---

## Oracle Database Firewall Database Schema

This appendix contains:

- [About the Oracle Database Firewall Schema](#)
- [Summary Tables](#)
- [Log Forensic Tables](#)
- [Stored Procedure and User Role Audit Tables](#)
- [Report-Related Functions](#)

### About the Oracle Database Firewall Schema

The Oracle Database Firewall tables are stored in the SECURELOG schema. This schema contains a set of logically related tables, which are described in this appendix.

### Summary Tables

This section contains:

- [About the Summary Tables](#)
- [applied\\_baselines Table](#)
- [database\\_user\\_addresses Table](#)
- [database\\_users Table](#)
- [dictionary Table](#)
- [protected\\_database\\_addresses Table](#)
- [protected\\_databases Table](#)
- [sources Table](#)
- [summary\\_clusters Table](#)
- [cluster\\_components Table](#)
- [summary\\_records Table](#)
- [summary\\_sessions Table](#)
- [summary\\_statement\\_attributes Table](#)
- [traffic\\_events Table](#)
- [traffic\\_summaries View](#)

- [Relationship Diagram of the Summary Tables](#)

## About the Summary Tables

The summary tables store general information about the data that is being monitored, such as the names of the users logging in, the monitored databases, user sessions, database traffic, events, and so on.

### applied\_baselines Table

[Table A-1](#) provides the name of the policy that is currently used for while traffic is being captured.

**Table A-1** *applied\_baselines Table*

Column	Datatype	NULL	Description
baseline_id	INTEGER	NOT NULL	Unique ID of this record
name	VARCHAR2(1024 CHAR)	NOT NULL	Name of the baseline (also available from traffic_summaries view ( <a href="#">Table A-14</a> ))
database_id	INTEGER	NOT NULL	ID of the protected database in the protected_databases table ( <a href="#">Table A-6</a> )

### database\_user\_addresses Table

[Table A-2](#) provides IP addresses that are expected to be used by a user who has accessed the protected database.

**Table A-2** *database\_user\_addresses Table*

Column	Datatype	NULL	Description
address_id	INTEGER	NOT NULL	ID of the address record in this table
user_id	INTEGER	NULL	ID of the database user in the database_users table ( <a href="#">Table A-3</a> )
address	VARCHAR2(30)	NULL	Expected IP address of the user (possible one of many)

### database\_users Table

[Table A-3](#) records each user who has accessed a protected database.

**Table A-3** *database\_users Table*

Column	Datatype	NULL	Description
user_id	INTEGER	NOT NULL	ID of the user record in this table
user_name	VARCHAR2(255)	NULL	Name of the user who started the session (also available from traffic_summaries view <a href="#">Table A-14</a> )
database_id	INTEGER	NULL	ID of the protected database in the protected_databases table ( <a href="#">Table A-6</a> )



**Table A-3 (Cont.) database\_users Table**

Column	Datatype	NULL	Description
terminated_at	TIMESTAMP	NULL	Time that the session was ended
is_admin	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if the user is an administrator of the database
is_predefined	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if the user is a predefined user of the database (that is, automatically created when the protected_databases table (Table A-6) was created)

## dictionary Table

Table A-4 provides a set of mappings from coded values to meaningful text. This table is useful in generating understandable text in a report, without hard-coding the values into the report query. The tables throughout this appendix use values listed in this table. For example, several tables have a column entitled `cluster_type`. The values possible for the `cluster_type` column are listed in the dictionary table.

**Table A-4 dictionary Table**

Column	Datatype	NULL	Description
category	VARCHAR2 (30)	NOT NULL	Name of item. Possible values: <ul style="list-style-type: none"> <li>▪ dialect (database product)</li> <li>▪ event_action</li> <li>▪ log_action</li> <li>▪ logging_code</li> <li>▪ threat_severity</li> <li>▪ cluster_type</li> <li>▪ doa_object_type</li> <li>▪ doa_object_subtype</li> <li>▪ doa_object_class</li> <li>▪ doa_edit_type</li> <li>▪ database_event_type</li> <li>▪ record_type</li> <li>▪ response_status</li> <li>▪ log_cause</li> <li>▪ event_action_code</li> <li>▪ session_data_origin</li> </ul>
value	INTEGER	NOT NULL	Value of the item listed in the <code>category</code> column. For example, if the category is <code>dialect</code> and the database product listed is Oracle, then the value listed here is 2.
name	VARCHAR2 (100)	NULL	Description of value listed in the <code>value</code> column. For example, if the category is <code>dialect</code> and the value is 2, then the name listed here is Oracle.

## protected\_database\_addresses Table

Table A-5 provides address and port details for each protected database.

**Table A-5** *protected\_database\_addresses* Table

Column	Datatype	NULL	Description
address_id	INTEGER	NOT NULL	Unique ID of this record
address	VARCHAR2(255)	NOT NULL	IP address of the protected database
port_number	INTEGER	NOT NULL	Port number used to access the protected database
service_name	VARCHAR2(255 CHAR)	NULL	Database service name (optional)
database_id	INTEGER	NULL	ID of the protected database in the protected_databases table (Table A-6)

## protected\_databases Table

Table A-6 provides details about each protected database.

**Table A-6** *protected\_databases* Table

Column	Datatype	NULL	Description
database_id	INTEGER	NOT NULL	Unique ID of the database
name	VARCHAR2(250 CHAR)	NOT NULL	Name of the database
dialect	SMALLINT	NOT NULL	SQL dialect: <ul style="list-style-type: none"> <li>■ 1 - Microsoft SQL Server</li> <li>■ 2 - Oracle</li> <li>■ 5 - Sybase</li> <li>■ 7 - IBM DB2 (Linux, UNIX, Windows)</li> </ul>
description	VARCHAR2(1024 CHAR)	NULL	Description of the database
is_sox_database	CHAR (ONLY:'0','1')	NOT NULL	Set to 1 if SOX reports can be produced from the database (also available from traffic_summaries view (Table A-14))
is_pci_database	CHAR (ONLY:'0','1')	NOT NULL	Set to 1 if PCI reports can be produced from the database (also available from traffic_summaries view (Table A-14))
is_dpa_database	CHAR (ONLY:'0','1')	NOT NULL	Set to 1 if DPA reports can be produced from the database (also available from traffic_summaries view (Table A-14))
is_glba_database	CHAR (ONLY:'0','1')	NOT NULL	Set to 1 if GLBA reports can be produced from the database (also available from traffic_summaries view (Table A-14))
is_hipaa_database	CHAR (ONLY:'0','1')	NOT NULL	Set to 1 if HIPAA reports can be produced from the database (also available from traffic_summaries view (Table A-14))

## sources Table

Table A-7 provides details about the source of an event: either the relevant hardware (or virtual) device for events that apply system-wide, or the monitoring enforcement point for events detected by monitoring.

**Table A-7** *sources Table*

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the source of the event, which can be an appliance (physical server), in the case of syslog messages, or the enforcement point (in the case of database traffic related events, or enforcement point related syslog messages).
time	TIMESTAMP	NOT NULL	Time that the source of the event was added to the database
name	VARCHAR2 (30)	NOT NULL	Short name of the source of the event
is_hardware	CHAR (ONLY: '0', '1')	NULL	Set to 1 if the source of the event is a syslog source other than an enforcement point

### summary\_clusters Table

[Table A-8](#) provides information about individual clusters for the purpose of reporting. As well as providing a unique identity to each cluster, this table provides an example statement that would appear in the cluster.

**Table A-8** *summary\_clusters Table*

Column	Datatype	NULL	Description
cluster_id	INTEGER	NOT NULL	Source ID of the binary data
grammar_version	INTEGER	NOT NULL	Grammar-specific version number
dialect	SMALLINT	NOT NULL	SQL dialect: <ul style="list-style-type: none"> <li>■ 1 - Microsoft SQL Server</li> <li>■ 2 - Oracle</li> </ul>
cluster_type	SMALLINT	NOT NULL	Type of statements included in the cluster: <ul style="list-style-type: none"> <li>■ 0 - Composite</li> <li>■ 1 - Data manipulation</li> <li>■ 2 - Data definition</li> <li>■ 3 - Data control</li> <li>■ 4 - Procedural statement</li> <li>■ 5 - Data manipulation</li> <li>■ 6 - Transaction</li> <li>■ 7 - Transaction composite</li> <li>■ 8 - Invalid</li> </ul> See also <code>traffic_summaries</code> view ( <a href="#">Table A-14</a> )
representation	CLOB	NOT NULL	String representation of cluster (path). Not used
cluster_example	CLOB	NULL	An example of a statement in the cluster (also available from <code>traffic_summaries</code> view ( <a href="#">Table A-14</a> ))

## cluster\_components Table

[Table A-9](#) breaks down information from the cluster path representation into cluster components. This information can be used in reporting to select clusters related to specified database tables or table columns.

**Table A-9 cluster\_components Table**

Column	Datatype	NULL	Description
cluster_id	INTEGER	NOT NULL	Cluster global identifier
grammar_version	INTEGER	NOT NULL	Grammar-specific version number
dialect	SMALLINT	NOT NULL	Database type of the cluster. See dictionary table for meaning ( <a href="#">Table A-9</a> )
component_index	INTEGER	NOT NULL	Index of the component (starts with 1)
component_type	VARCHAR2 (15)	NOT NULL	Component type may be one of: 'keyword', 'column', 'table', 'stored_procedure', 'cluster_set
component_value	VARCHAR2 (4000)	NULL	The component string

## summary\_records Table

[Table A-10](#) provides primary information collected in the traffic log, as an hourly summary of the count of occurrences of each cluster.

**Table A-10 summary\_records Table**

Column	Datatype	NULL	Description
summary_id	INTEGER	NOT NULL	Unique ID of the summary record
session_id	INTEGER	NOT NULL	ID of the session in the summary_sessions table
attribute_set_id	INTEGER	NOT NULL	Set with session attributes
cluster_id	INTEGER	NOT NULL	ID of the cluster in the summary_clusters table ( <a href="#">Table A-10</a> ); also available from traffic_summaries view ( <a href="#">Table A-14</a> )
attribute_id	INTEGER	NULL	ID of the attribute in the summary_statement_attributes table ( <a href="#">Table A-12</a> ).
grammar_version	INTEGER	NOT NULL	Grammar-specific version number
response_status	INTEGER	NOT NULL	Response code of the statement for database response monitoring: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Unknown</li> <li>■ 2 - Login success</li> <li>■ 3 - Login fail</li> <li>■ 4 - Statement success</li> <li>■ 5 - Statement fail</li> </ul> See also traffic_summaries view ( <a href="#">Table A-14</a> )
time	TIMESTAMP	NOT NULL	Time that the SQL statement was captured by the Database Firewall (also available from traffic_summaries view ( <a href="#">Table A-14</a> ))

**Table A–10 (Cont.) summary\_records Table**

Column	Datatype	NULL	Description
threat_severity	INTEGER	NOT NULL	Threat severity of the statements: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Insignificant</li> <li>■ 2 - Minor</li> <li>■ 3 - Moderate</li> <li>■ 4 - Major</li> <li>■ 5 - Catastrophic</li> </ul> See also traffic_summaries view (Table A–14)
logging_code	SMALLINT	NOT NULL	Logging level of the statements: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Never</li> <li>■ 2 - Sample</li> <li>■ 3 - Always</li> <li>■ 4 - Once</li> <li>■ 5 - Unique</li> </ul> See also traffic_summaries view (Table A–14)
action_code	SMALLINT	NOT NULL	Action level of the statements: <ul style="list-style-type: none"> <li>■ 1 - Known blocked</li> <li>■ 2 - Known warned</li> <li>■ 3 - Unseen blocked</li> <li>■ 4 - Unseen warned</li> </ul> See also traffic_summaries view (Table A–14)
statement_count	INTEGER	NULL	Number of statements that have the same characteristics, as listed above (also available from traffic_summaries view (Table A–14))

## summary\_sessions Table

A new session is started when a client application successfully logs into a database. This session lasts for as long as the connection exists (often, until the application logs out from the database, although the session may terminate in a less controlled way). Sessions are associated with a client application, and with the authentication or identification information (primarily the user name) used to establish the connection. A simple client application creates a single session, or in some cases, one session after another. More complex applications may have many simultaneously active sessions.

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**Note:** This table does not record each session. Instead, a new record is added when one or more of the fields (source\_id, client, user\_id, baseline\_id, and dialect\_version) is different from an existing record.

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Table A–11 provides details about each database session, typically identified by the source address of the session.

**Table A-11** *summary\_sessions Table*

Column	Datatype	NULL	Description
session_id	INTEGER	NOT NULL	Unique ID of the database session
source_id	INTEGER	NULL	ID of the sources in the sources table (also available from traffic_summaries view <a href="#">Table A-14</a> )
client	VARCHAR2(30)	NULL	IP address of the database client (also available from traffic_summaries view <a href="#">Table A-14</a> )
user_id	INTEGER	NULL	ID of the user who started the session ( <a href="#">Table A-3</a> )
baseline_id	INTEGER	NULL	ID of the policy in the applied_baselines table ( <a href="#">Table A-1</a> )
dialect_version	VARCHAR2(20)	NULL	Not used
application_name	VARCHAR2(255)	NULL	Name of the client program used in this session
os_user_name	VARCHAR2(255)	NULL	Operating system user name

## summary\_statement\_attributes Table

[Table A-12](#) stores statement attribute values that can be summarized from the summary\_records table.

**Table A-12** *summary\_statement\_attributes Table*

Column	Datatype	NULL	Description
id	INTEGER	NULL	ID of each record in this table
hash	INTEGER	NULL	Result of the CRC32 (Cyclic Redundancy Check) of the concatenation of all attribute values. This is for internal use only to enable fast searching.
f5_response_code	VARCHAR2(4000)	NULL	HTTP response code  <b>Note:</b> This and the remaining fields in this table are relevant to the F5 BIG-IP ASM integration only. See <a href="#">Chapter 11, "Using Oracle Database Firewall with BIG-IP ASM,"</a> for more information.
f5_method	VARCHAR2(4000)	NULL	HTTP request method
f5_protocol	VARCHAR2(4000)	NULL	Request protocol
f5_uri	VARCHAR2(4000)	NULL	Requested resource
f5_ip	VARCHAR2(15)	NULL	Web client IP address
f5_web_application_name	VARCHAR2(64)	NULL	Web application name
f5_unit_hostname	VARCHAR2(64)	NULL	Name of the WAF box
f5_management_ip_address	VARCHAR2(15)	NULL	IP address of the WAF management interface
f5_policy_name	VARCHAR2(128)	NULL	WAF policy name
f5_x_forwarded_for_header_value	VARCHAR2(4000)	NULL	List of IP addresses provided by X-FORWARDED-FOR field in HTTP request

**Table A–12 (Cont.) summary\_statement\_attributes Table**

Column	Datatype	NULL	Description
f5_request_blocked	CHAR (ONLY: '0', '1')	NULL	Set to 1 if the http request was blocked
f5_web_username	VARCHAR2 (128)	NULL	Name of the Web user
f5_referer	VARCHAR2 (4000)	NULL	HTTP referrer
f5_web_host	VARCHAR2 (256)	NULL	Web application server name
f5_user_agent	VARCHAR2 (1024)	NULL	IHTTP user agent
f5_cardinal_ip	VARCHAR2 (15)	NULL	IP address of the client that initiated the HTTP request. It is either the client IP address of the HTTP connection over which the request was issued, or if the HTTP header record "X-FORWARDED-FOR" is present, then it's value is used.
f5_primary_violation	VARCHAR2 (64)	NULL	Violation from attr_f5_violations that have the highest priority
f5_match_result	VARCHAR2 (4000)	NULL	One of the following: <ul style="list-style-type: none"> <li>■ 1 - PolicyConflict</li> <li>■ 2 - PolicyConfirmed</li> <li>■ 3 - WAFBlocked</li> <li>■ 4 - NoMatchDataMasked</li> <li>■ 5 - NoMatch</li> </ul>

## traffic\_events Table

[Table A–13](#) provides details about events that have been transmitted, or potentially transmitted, over syslog by the enforcement point. These events are primarily alerts from monitoring.

**Table A–13 traffic\_events Table**

Column	Datatype	NULL	Description
event_id	INTEGER	NOT NULL	Unique ID of the traffic event
source_id	INTEGER	NOT NULL	ID of the source event in the sources table " <a href="#">sources Table</a> " on page A-4)
time	TIMESTAMP	NOT NULL	Time of the event
cluster_id	INTEGER	NULL	ID of the cluster
action	INTEGER	NULL	Action level of the cluster that the statement belongs to: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Block</li> <li>■ 2 - Warn</li> <li>■ 3 - Pass</li> </ul>

**Table A-13 (Cont.) traffic\_events Table**

Column	Datatype	NULL	Description
threat_severity	INTEGER	NULL	Threat severity of the cluster: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Insignificant</li> <li>■ 2 - Minor</li> <li>■ 3 - Moderate</li> <li>■ 4 - Major</li> <li>■ 5 - Catastrophic</li> </ul>
log_level	INTEGER	NULL	Logging level of the cluster: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Never</li> <li>■ 2 - Sample</li> <li>■ 3 - Always</li> <li>■ 4 - Once</li> <li>■ 5 - Unique</li> </ul>
db_client	VARCHAR2 (30 CHAR)	NULL	IP address of the database client that sent the statement
db_server	VARCHAR2 (30 CHAR)	NULL	IP address of the database server
db_user	VARCHAR2 (255 CHAR)	NULL	Name of the database user who sent the statement
web_user	VARCHAR2 (255 CHAR)	NULL	Name of the Web user (available only in WAF alerts)
web_application	VARCHAR2 (255 CHAR)	NULL	Web application name (available only in WAF alerts)
http_protocol	VARCHAR2 (255 CHAR)	NULL	Request protocol (available only in WAF alerts): <ul style="list-style-type: none"> <li>■ http</li> <li>■ https</li> </ul>
http_method	VARCHAR2 (255 CHAR)	NULL	HTTP request method (available only in WAF alerts). For example, POST, GET, and so on
http_uri	VARCHAR2 (255 CHAR)	NULL	Requested resource (available only in WAF alerts). For example: <code>faq.asp</code>
http_query_string	VARCHAR2 (2048 CHAR)	NULL	Request. for example, GET parameters: <code>action=save</code>
http_referrer	VARCHAR2 (255 CHAR)	NULL	HTTP referrer (available only in WAF alerts). For example: <code>http://192.0.2.220</code>
http_host	VARCHAR2 (255 CHAR)	NULL	Web application server name (available only in WAF alerts). Can be an IP address (for example, 192.0.2.220)
http_user_agent	VARCHAR2 (255 CHAR)	NULL	HTTP user agent (available only in WAF alerts). For example, <code>Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1</code>
http_response_code	VARCHAR2 (30 CHAR)	NULL	HTTP response code (available only in WAF alerts)



**Table A–13 (Cont.) traffic\_events Table**

Column	Datatype	NULL	Description
http_request	VARCHAR2(2048 CHAR)	NULL	Full HTTP request. Includes POST data (available only in WAF alerts)
waf_host_name	VARCHAR2(255 CHAR)	NULL	Name of the WAF appliance (available only in WAF alerts)
waf_management_ip	VARCHAR2(30 CHAR)	NULL	IP address of the WAF management interface (available only in WAF alerts)
waf_policy_name	VARCHAR2(255 CHAR)	NULL	WAF policy name (available only in WAF alerts)
waf_policy_date	TIMESTAMP	NULL	The time when the WAF policy was applied (available only in WAF alerts)
waf_support_id	VARCHAR2(255 CHAR)	NULL	Unique ID of the event in the WAF system (available only in WAF alerts)
waf_request_blocked	VARCHAR2(30 CHAR)	NULL	TRUE if the http request was blocked (available only in WAF alerts)
waf_session_cookies	VARCHAR2(512 CHAR)	NULL	Contains all the session cookies sent with the HTTP request (available only in WAF alerts)
primary_violation	VARCHAR2(255 CHAR)	NULL	Violation with the highest priority (available only in WAF alerts)
cardinal_ip	VARCHAR2(30 CHAR)	NULL	IP address of attacker
match_result	INTEGER	NULL	One of the following (which are available only in WAF alerts): <ul style="list-style-type: none"> <li>■ 1 - Confirmed</li> <li>■ 2 - Not confirmed</li> <li>■ 3 - Not proven</li> </ul>
statement_id	INTEGER	NULL	Unique ID of the statement (sequential number)
statement	VARCHAR2(2048 CHAR)	NULL	SQL statement string (may be truncated)

**traffic\_summaries View**

[Table A–14](#) provides a view to data in other tables.

**Table A-14** *traffic\_summaries View*

Column	Datatype	NULL	Description
database_id	INTEGER	NOT NULL	Identifier of the database in the protected_databases table
db_name	VARCHAR2 (250)	NOT NULL	Name of the protected database: <ul style="list-style-type: none"> <li>■ Microsoft SQL Server</li> <li>■ Oracle</li> <li>■ Sybase ASE</li> <li>■ Sybase SQL Anywhere</li> <li>■ DB2/LUW (Linux, UNIX, Windows)</li> </ul>
dialect	SMALLINT	NOT NULL	SQL dialect used by the database: <ul style="list-style-type: none"> <li>■ 1 - Microsoft SQL Server</li> <li>■ 2 - Oracle</li> <li>■ 5 - Sybase ASE</li> <li>■ 6 - Sybase SQL Anywhere</li> <li>■ 8 - DB2/LUW (Linux, UNIX, Windows)</li> </ul>
is_sox_database	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if SOX reports can be produced from the database (from protected_databases (Table A-6))
is_pci_database	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if PCI reports can be produced from the database (from protected_databases (Table A-6))
is_dpa_database	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if DPA reports can be produced from the database (from protected_databases (Table A-6))
is_glba_database	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if GLBA reports can be produced from the database (from protected_databases (Table A-6))
is_hipaa_database	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if HIPAA reports can be produced from the database (from protected_databases (Table A-6))
baseline_id	INTEGER	NOT NULL	Identifier of the baseline in the applied_baselines table
baseline_name	VARCHAR2 (1024)	NOT NULL	Name of the baseline
grammar_version	INTEGER	NOT NULL	Grammar version
session_id	INTEGER	NOT NULL	Identifier of the session in the summary_sessions table
client	VARCHAR2 (30)	NULL	IP address of the database client
user_id	INTEGER	NULL	Identifier of the user in the database_users table
user_name	VARCHAR2 (255)	NULL	Name of the database user
dialect_version	VARCHAR2 (20)	NULL	Not used
source_id	INTEGER	NULL	ID of the source in the sources table (Table A-7)
application_name	VARCHAR2 (255)	NULL	The application name used as a client software in this session
os_user_name	VARCHAR2 (255)	NULL	Operating system user name
cluster_example	CLOB	NULL	An example statement in the cluster

**Table A-14 (Cont.) traffic\_summaries View**

Column	Datatype	NULL	Description
summary_id	INTEGER	NOT NULL	Identifier of the record in the summary_records table
time	TIMESTAMP	NOT NULL	Time of the statement count
cluster_id	INTEGER	NOT NULL	ID of the cluster (from summary_records table (Table A-10))
attribute_id	INTEGER	NULL	Identifier of the cluster in the summary_clusters table
threat_severity	INTEGER	NOT NULL	Threat severity of the statements: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Insignificant</li> <li>■ 2 - Minor</li> <li>■ 3 - Moderate</li> <li>■ 4 - Major</li> <li>■ 5 - Catastrophic</li> </ul>
logging_code	SMALLINT	NOT NULL	Logging level of the statements: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Never</li> <li>■ 2 - Sample</li> <li>■ 3 - Always</li> <li>■ 4 - Once</li> <li>■ 5 - Unique</li> </ul>
action_code	SMALLINT	NOT NULL	Action level of the statements: <ul style="list-style-type: none"> <li>■ 1 - Known blocked</li> <li>■ 2 - Known warned</li> <li>■ 3 - Unseen blocked</li> <li>■ 4 - Unseen warned</li> </ul>

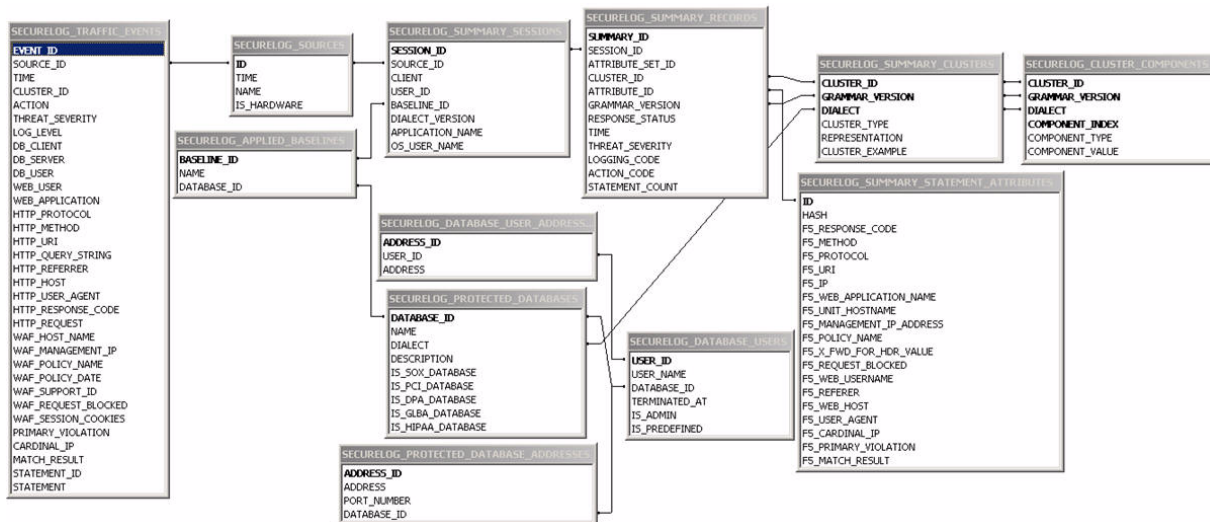
**Table A-14 (Cont.) traffic\_summaries View**

Column	Datatype	NULL	Description
cluster_type	SMALLINT	NOT NULL	Type of statements included in the cluster: <ul style="list-style-type: none"> <li>■ 0 - Composite</li> <li>■ 1 - Data manipulation</li> <li>■ 2 - Data definition</li> <li>■ 3 - Data control</li> <li>■ 4 - Procedural statement</li> <li>■ 5 - Data manipulation</li> <li>■ 6 - Transaction</li> <li>■ 7 - Transaction composite</li> <li>■ 8 - Invalid</li> </ul>
response_status	INTEGER	NOT NULL	Response code of the statement: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Unknown</li> <li>■ 2 - Login success</li> <li>■ 3 - Login fail</li> <li>■ 4 - Statement success</li> <li>■ 5 - Statement fail</li> </ul>
statement_count	INTEGER	NULL	Number of SQL statements that have the same characteristics, as listed in this table

## Relationship Diagram of the Summary Tables

Figure A-1 illustrates the relationships between the summary database tables.

**Figure A-1 Relationship Diagram of the Summary Tables**



## Log Forensic Tables

This section contains:

- [About the Forensic Tables](#)
- [traffic\\_log\\_queries Table](#)
- [traffic\\_log\\_query\\_results Table](#)

### About the Forensic Tables

The forensic tables contain information about all the SQL statements that Oracle Database Firewall logs. Because the amount of data can be large, Oracle Database Firewall enables you to query the log files through the Administration Console. It stores these log files in the two tables described in this section, `traffic_log_queries` and `traffic_log_query_results`.

To search through the log files:

1. Log in to the standalone Database Firewall or Management Server Administration Console.  
See ["Logging in to the Administration Console"](#) on page 1-7 for more information.
2. Select the **Reporting** tab.
3. In the **Traffic Log** menu, select either **Search Log** or **Log Search Results**.

See *Oracle Database Firewall Security Guide* for more information about accessing the traffic log.

In addition to these two tables, for each search, Oracle Database Firewall creates a new table. This table is derived from `traffic_log_query_results` and has a name in form of `traffic_log_query_results_id` where `id` is the identifier of the search. This table is deleted when the entry in the `traffic_log_queries` table for a given search is deleted.

### traffic\_log\_queries Table

[Table A–15](#) provides the properties of each log search, such as the period that the log search covers and the filter settings. Each use of **Search Log** in the reporting page of the Administration Console adds a new row to the table. See [Table A–16](#) for more information about the meaning of each field.

**Table A–15** *traffic\_log\_queries Table*

Column	Datatype	NULL	Description
<code>id</code>	INTEGER	NOT NULL	Unique ID for the query
<code>title</code>	VARCHAR2 (100)	NULL	The title of the report
<code>started_at</code>	TIMESTAMP	NULL	The time when the query was started
<code>finished_at</code>	TIMESTAMP	NULL	The time when the query was finished
<code>aborted_at</code>	TIMESTAMP	NULL	The time when the user cancelled the query
<code>deleted_at</code>	TIMESTAMP	NULL	The time when the query was deleted
<code>results_table</code>	VARCHAR2 (30)	NULL	The name of the results table: <code>traffic_log_query_results_id</code> , where <code>id</code> is an integer that specifies the ID of the search (see <a href="#">Table A–16</a> )

**Table A-15 (Cont.) traffic\_log\_queries Table**

Column	Datatype	NULL	Description
time_from	TIMESTAMP	NOT NULL	The begin of the data time range to be extracted (filtering)
time_to	TIMESTAMP	NOT NULL	The end of the data time range to be extracted (filtering)
real_time_from	INTERVAL DAY(3) TO SECOND(2)	NULL	The beginning of the time range relative to end of the time range
real_time_to	INTERVAL DAY(3) TO SECOND(2)	NULL	The ending of the time range relative to arbitrary time
filter	CLOB	NULL	Filter to reduce the number of entries
records_limit	INTEGER	NULL	Specifies the maximum number of records that should be extracted (filtering) (NULL is not recommended.)
records_count	INTEGER	NULL	Records how many records were found and displayed in the Administration Console
searched_files	INTEGER	NULL	Records how many files have already been searched and displayed in the Administration Console
total_files	INTEGER	NULL	Records how many files are be searched and displayed in the Administration Console
status	VARCHAR2(255)	NULL	Status for the search

## traffic\_log\_query\_results Table

Table A-16 provides a template for `traffic_log_query_results_id`, where `id` is an integer that specifies the ID of the search. The table stores the results of a log search and contains one row for each SQL statement retrieved. The table `traffic_log_query_results_id` is created automatically when a log search is performed, and is deleted when the user deletes the log search.

**Table A-16 traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	ID of this result set
query_id	INTEGER	NULL	ID of the query used to define this result set
logfile_id	INTEGER	NULL	ID of the log file containing this particular statement.
statement_id	INTEGER	NULL	ID of the statement or event
record_type	SMALLINT	NOT NULL	Type of the record: <ul style="list-style-type: none"> <li>■ 1 - Statement record</li> <li>■ 2 - Session record</li> </ul>
source_name	VARCHAR2(30)	NULL	Name of the device that collected the log file
origin	VARCHAR2(255)	NULL	Origin of the record. Can be one of the following: <ul style="list-style-type: none"> <li>■ dbfw</li> <li>■ f5</li> <li>■ dbfw, f5</li> </ul>

**Table A-16 (Cont.) traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
protected_database	VARCHAR2 (250)	NULL	Name of the protected database
database_dialect	SMALLINT	NOT NULL	The database type (dialect) of the protected database: <ul style="list-style-type: none"> <li>▪ 1 - Microsoft SQL Server</li> <li>▪ 2 - Oracle</li> <li>▪ 5 - Sybase</li> <li>▪ 7 - IBM DB2 (Linux, UNIX, Windows)</li> </ul>
user_name	VARCHAR2 (255)	NULL	Database user name associated with the statement
user_name_origin	SMALLINT	NULL	Origin of the database user name: <ul style="list-style-type: none"> <li>▪ 0 - Undefined</li> <li>▪ 1 - Generated</li> <li>▪ 2 - Network</li> <li>▪ 3 - DB query</li> </ul>
raw_user_name	VARCHAR2 (255)	NULL	The database user name that was used at the time Oracle Database Firewall applied the statement policy
session_seq	INTEGER	NULL	Internal session sequence number
client_ip	VARCHAR2 (30)	NULL	IP address of the database client that sent the statement
client_port	INTEGER	NULL	Port number of the database client that sent the statement
server_ip	VARCHAR2 (30)	NULL	IP address of the database server that received the statement
server_port	INTEGER	NULL	Port number of the database server that received the statement
baseline	VARCHAR2 (1024)	NULL	Name of the policy used when the statement was recorded
traffic_source	VARCHAR2 (30)	NULL	Source of the traffic: <ul style="list-style-type: none"> <li>▪ network</li> <li>▪ local agent</li> </ul>
dialect_version	VARCHAR2 (20)	NULL	Internal version or revision of the grammar implementation
statement	CLOB	NOT NULL	Statement text captured by the system
time	TIMESTAMP	NOT NULL	Time when the statement was captured by the system
threat_severity	INTEGER	NOT NULL	Threat severity of the statement: <ul style="list-style-type: none"> <li>▪ 0 - Unassigned</li> <li>▪ 1 - Insignificant</li> <li>▪ 2 - Minor</li> <li>▪ 3 - Moderate</li> <li>▪ 4 - Major</li> <li>▪ 5 - Catastrophic</li> </ul>

**Table A-16 (Cont.) traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
logging_code	SMALLINT	NOT NULL	Logging level of the statement: <ul style="list-style-type: none"> <li>■ 0 - Unassigned</li> <li>■ 1 - Never</li> <li>■ 2 - Sample</li> <li>■ 3 - Always</li> <li>■ 4 - Once</li> <li>■ 5 - Unique</li> </ul>
log_cause	SMALLINT	NOT NULL	Reason for logging the statement: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Cluster</li> <li>■ 2 - Novelty</li> <li>■ 3 - Baseline anomaly</li> <li>■ 4 - Invalid SQL</li> <li>■ 5 - WAF</li> <li>■ 6 - Login</li> <li>■ 7 - Logout</li> </ul>
action_code	SMALLINT	NOT NULL	Action level of the statement: <ul style="list-style-type: none"> <li>■ 1 - Known blocked</li> <li>■ 2 - Known warned</li> <li>■ 3 - Unseen blocked</li> <li>■ 4 - Unseen warned</li> </ul>
event_action_code	SMALLINT	NULL	Alert criterion that caused the statement to be logged: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - No alert</li> <li>■ 2 - Always alert</li> <li>■ 3 - Alert on success</li> <li>■ 4 - Alert on failure</li> <li>■ 5 - Block</li> </ul>
freq_code	INTEGER	NOT NULL	Number of the statements that this record represents. <ul style="list-style-type: none"> <li>■ In log all mode, the value is 1, because each statement is logged separately.</li> <li>■ In log unique mode, the value is 1, because only the first occurrence with the unique combination of user name, IP address and cluster is logged.</li> <li>■ In log sample mode, the value can be greater than 1.</li> </ul>
cluster_id	INTEGER	NOT NULL	Global ID of the cluster associated with the statement



**Table A-16 (Cont.) traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
cluster_type	INTEGER	NOT NULL	Type or class of statement included in the cluster: <ul style="list-style-type: none"> <li>▪ 0 - Composite</li> <li>▪ 1 - Data manipulation</li> <li>▪ 2 - Data definition</li> <li>▪ 3 - Data control</li> <li>▪ 4 - Procedural statement</li> <li>▪ 5 - Data manipulation</li> <li>▪ 6 - Transaction</li> <li>▪ 7 - Transaction composite</li> <li>▪ 8 - Invalid</li> </ul>
grammar_version	INTEGER	NOT NULL	Grammar-specific version number
response_code	INTEGER	NULL	Response code returned by the database server
response_text	CLOB	NULL	Error message returned by a database query failure
response_detailed_status	CLOB	NULL	Detailed text of the response returned by the database server
failure_count	INTEGER	NULL	Number of subsequent failed statements
response_time	TIMESTAMP	NULL	Time that Oracle Database Firewall captures the statement response
response_status	INTEGER	NULL	Status of the response: <ul style="list-style-type: none"> <li>▪ 0 - Undefined</li> <li>▪ 1 - Unknown</li> <li>▪ 2 - Login success</li> <li>▪ 3 - Login fail</li> <li>▪ 4 - Statement success</li> <li>▪ 5 - Statement fail</li> </ul>
transaction_time	DOUBLE PRECISION	NULL	Difference between response time and request time
application_name	VARCHAR2 (255)	NULL	Name of the client application connected to the database
application_name_origin	SMALLINT	NULL	Origin of the application: <ul style="list-style-type: none"> <li>▪ 0 - Undefined</li> <li>▪ 1 - Generated</li> <li>▪ 2 - Network</li> <li>▪ 3 - DB query</li> </ul>
os_user_name	VARCHAR2 (255)	NULL	Operating system user name that executed the statement

**Table A-16 (Cont.) traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
os_user_name_origin	SMALLINT	NULL	Origin of the operating system user: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Generated</li> <li>■ 2 - Network</li> <li>■ 3 - DB query</li> </ul>
attr_f5_request	CLOB	NULL	Full HTTP request, including POST data <b>Note:</b> This and the remaining fields in this table are relevant to the F5 BIG-IP ASM integration only. See <a href="#">Appendix 11, "Using Oracle Database Firewall with BIG-IP ASM,"</a> for more information.
attr_f5_headers	CLOB	NULL	HTTP request
attr_f5_response_code	CLOB	NULL	HTTP response code
attr_f5_method	CLOB	NULL	HTTP request method
attr_f5_protocol	CLOB	NULL	Request protocol
attr_f5_uri	CLOB	NULL	Requested resource
attr_f5_query_string	CLOB	NULL	Part of the URL containing request parameters sent using the GET method
attr_f5_ip	VARCHAR2(15)	NULL	Web client IP address
attr_f5_web_application_name	VARCHAR2(64)	NULL	Web application name
attr_f5_violations	CLOB	NULL	Identified WAF violations
attr_f5_unit_hostname	VARCHAR2(64)	NULL	Name of the WAF box
attr_f5_management_ip_address	VARCHAR2(15)	NULL	IP address of the WAF management interface
attr_f5_policy_name	VARCHAR2(128)	NULL	WAF policy name
attr_f5_policy_apply_date	TIMESTAMP	NULL	The time when the policy was applied
attr_f5_x_forwarded_for_header_value	CLOB	NULL	List of IP addresses provided by X-FORWARDED-FOR field in HTTP request.
attr_f5_support_id	VARCHAR2(20)	NULL	Unique ID of the event in the WAF system
attr_f5_request_blocked	CHAR (ONLY: '0', '1')	NULL	Set to 1 if the HTTP request was blocked
attr_f5_web_username	VARCHAR2(128)	NULL	Name of the Web user
attr_f5_authentication_method	CLOB	NULL	Session authentication method
attr_f5_referer	CLOB	NULL	HTTP referrer
attr_f5_web_host	VARCHAR2(256)	NULL	Web application server name
attr_f5_user_agent	VARCHAR2(1024)	NULL	HTTP user agent
attr_f5_cardinal_ip	VARCHAR2(15)	NULL	IP address derived from attr_f5_ip and attr_f5_x_forwarded_for_header_value
attr_f5_primary_violation	VARCHAR2(64)	NULL	Violation from attr_f5_violations that have the highest priority

**Table A–16 (Cont.) traffic\_log\_query\_results Table**

Column	Datatype	NULL	Description
attr_f5_session_cookies	CLOB	NULL	Contains all the session cookies sent with the HTTP request
attr_f5_match_result	CLOB		Match result may be one of: <ul style="list-style-type: none"> <li>▪ PolicyConflict</li> <li>▪ PolicyConfirmed</li> <li>▪ WAFBlocked</li> <li>▪ NoMatchDataMasked</li> <li>▪ NoMatch</li> </ul>
attr_f5_match_tokens	CLOB	NULL	List of matched tokens

## Stored Procedure and User Role Audit Tables

This section contains:

- [About the Stored Procedure and User Role Audit Tables](#)
- [doa\\_approved\\_edits Table](#)
- [doa\\_approved\\_objects Table](#)
- [doa\\_edit\\_comments Table](#)
- [doa\\_edits Table](#)
- [doa\\_pending\\_approvals Table](#)
- [doa\\_tag\\_definitions Table](#)

### About the Stored Procedure and User Role Audit Tables

The database object auditing tables contain information about the stored procedures and user roles collected by the stored procedure auditing and user role auditing functions.

To find reports that describe the information captured in the Stored Procedure and User Role Audit tables:

1. Log in to the standalone Database Firewall or Management Server Administration Console.

See "[Logging in to the Administration Console](#)" on page 1-7 for more information.
2. Select the **Reporting** tab.
3. Do one of the following:
  - For stored procedure auditing, select from the **Stored Procedure Auditing** menu.

For more information, see *Oracle Database Firewall Security Guide*.
  - For user role auditing, select from the **User Role Auditing** menu.

For more information, see *Oracle Database Firewall Security Guide*.

## doa\_approved\_edits Table

[Table A-17](#) provides details about each set of changes to an object (stored procedure or user role) that have been approved. This information is used for user role auditing and stored procedure auditing.

**Table A-17** *doa\_approved\_edits Table*

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the monitoring point auditing this object
source_id	INTEGER	NOT NULL	ID of the enforcement point monitoring the object
database_id	INTEGER	NULL	ID of the protected database
object_type	INTEGER	NOT NULL	Object type: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Stored procedure</li> <li>■ 2 - User</li> </ul>
object_subtype	INTEGER	NOT NULL	Object subtype: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Procedure</li> <li>■ 2 - Function</li> <li>■ 3 - Trigger</li> <li>■ 4 - Package</li> <li>■ 5 - Package body</li> <li>■ 6 - Java source</li> <li>■ 7 - Extended procedure</li> <li>■ 8 - Scalar function</li> <li>■ 9 - Inline table function</li> <li>■ 10 - Replication filter</li> <li>■ 11 - Table function</li> </ul>
object_class	INTEGER	NOT NULL	Object class: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - System</li> <li>■ 2 - User</li> </ul>
name	VARCHAR2 (1024)	NOT NULL	Name of the object
tags	VARCHAR2 (2048)	NULL	Tags associated with the object
changes_summary	VARCHAR2 (255)	NULL	Contains a summary of the set of changes approved (for example: 3 modifications). This is a copy of the value from <code>doa_pending_approvals</code> ( <a href="#">Table A-21</a> ).
changed_by	VARCHAR2 (2048)	NULL	Comma-separated list of the names of the database users who were responsible for the modifications (copy of the value from <code>doa_pending_approvals</code> ( <a href="#">Table A-21</a> )).
last_changed_at	VARCHAR2 (2048)	NULL	The date and time when the object was changed

**Table A-17 (Cont.) *doa\_approved\_edits* Table**

Column	Datatype	NULL	Description
detected_at	TIMESTAMP	NOT NULL	The date and time when the change was detected on the Management Server
approved_by	VARCHAR2 (255)	NOT NULL	The name of the Administration Console user who approved the set of changes
approved_at	TIMESTAMP	NOT NULL	The date and time when the changes were approved
user_comment	CLOB	NOT NULL	Comment added by the user when the changes were approved

## **doa\_approved\_objects** Table

[Table A-18](#) provides a summary of the last set of changes to an object (stored procedure or user role) that have been approved. This information is used for user role auditing and stored procedure auditing.

**Table A-18 *doa\_approved\_objects* Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the object
source_id	INTEGER	NOT NULL	ID of the enforcement point monitoring the object
database_id	INTEGER	NULL	ID of the protected database
object_type	INTEGER	NOT NULL	Object type: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Stored procedure</li> <li>■ 2 - User</li> </ul>
object_subtype	INTEGER	NOT NULL	Object subtype: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Procedure</li> <li>■ 2 - Function</li> <li>■ 3 - Trigger</li> <li>■ 4 - Package</li> <li>■ 5 - Package body</li> <li>■ 6 - Java source</li> <li>■ 7 - Extended procedure</li> <li>■ 8 - Scalar function</li> <li>■ 9 - Inline table function</li> <li>■ 10 - Replication filter</li> <li>■ 11 - Table function</li> </ul>
object_class	INTEGER	NOT NULL	Object class: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - System</li> <li>■ 2 - User</li> </ul>
name	VARCHAR2 (1024)	NOT NULL	Name of the object
tags	VARCHAR2 (2048)	NULL	Tags associated with the object

**Table A-18 (Cont.) *doa\_approved\_objects* Table**

Column	Datatype	NULL	Description
signature	VARCHAR2 (40)	NULL	Hash of the object (base64) (signature change means object change)
changes_summary	VARCHAR2 (255)	NULL	Summary of the changes
changed_by	VARCHAR2 (2048)	NULL	Database users who modified the object
changed_at	TIMESTAMP	NULL	Time when the object was changed
approved_by	VARCHAR2 (255)	NOT NULL	The name of the Administration Console user who approved the last set of changes
approved_at	TIMESTAMP	NOT NULL	The date and time when the changes were approved
content	CLOB	NULL	Current approved content of the object

### doa\_edit\_comments Table

[Table A-19](#) provides details about each comment added when approving changes. This information is used for user role auditing and stored procedure auditing.

**Table A-19 *doa\_edit\_comments* Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the comment
approval_id	INTEGER	NOT NULL	ID of the pending approval in the <i>doa_pending_approvals</i> table ( <a href="#">Table A-21</a> )
user_comment	CLOB	NOT NULL	The comment text
created_by	VARCHAR2 (255)	NOT NULL	The name of the Administration Console user who added the comment
created_at	TIMESTAMP	NOT NULL	The date and time that the comment was created

### doa\_edits Table

[Table A-20](#) provide details about all approved objects. This information is used for stored procedure auditing and user role auditing.

**Table A-20 *doa\_edits* Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the object (stored procedure or user role)
approval_id	INTEGER	NOT NULL	ID of the pending approval in the <i>doa_pending_approvals</i> table ( <a href="#">Table A-21</a> )
signature	VARCHAR2 (40)	NULL	The hash of the object (signature change means object change)
content	CLOB	NULL	New content of the object
edit_type	SMALLINT	NOT NULL	Type of change: <ul style="list-style-type: none"> <li>▪ 1 - New</li> <li>▪ 2 - Modify</li> <li>▪ 3 - Delete</li> </ul>

**Table A–20 (Cont.) *doa\_edits* Table**

Column	Datatype	NULL	Description
changed_by	VARCHAR2 (255)	NULL	Name of the database user who modified the object
changed_at	TIMESTAMP	NULL	The date and time when the object was changed
detected_at	TIMESTAMP	NULL	The date and time when the change was detected on the Management Server

## **doa\_pending\_approvals Table**

Table A–21 provides a summary of the changes to an object (stored procedure or user role) that are pending approval. This information is used for User Role Auditing and Stored Procedure Auditing.

**Table A–21 *doa\_pending\_approvals* Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID of the object
source_id	INTEGER	NOT NULL	ID of the enforcement point monitoring the object
database_id	INTEGER	NULL	ID of the protected database
object_type	INTEGER	NOT NULL	Object type: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Stored procedure</li> <li>■ 2 - User</li> </ul>
object_subtype	INTEGER	NOT NULL	Object subtype: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Procedure</li> <li>■ 2 - Function</li> <li>■ 3 - Trigger</li> <li>■ 4 - Package</li> <li>■ 5 - Package body</li> <li>■ 6 - Java source</li> <li>■ 7 - Extended procedure</li> <li>■ 8 - Scalar function</li> <li>■ 9 - Inline table function</li> <li>■ 10 - Replication filter</li> <li>■ 11 - Table function</li> </ul>
object_class	INTEGER	NOT NULL	Object class: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - System</li> <li>■ 2 - User</li> </ul>
name	VARCHAR2 (1024)	NOT NULL	Name of the object
tags	VARCHAR2 (2048)	NULL	Tags associated with the object
is_declined	CHAR (ONLY: '0', '1')	NULL	Set to 1 if the change must not be approved in bulk operation (default is FALSE)

**Table A-21 (Cont.) *doa\_pending\_approvals* Table**

Column	Datatype	NULL	Description
is_updated	CHAR (ONLY: '0', '1')	NULL	Set to 1 if the change has been updated by the Management Server after being previously declined. (To decline this pending approval, set is_declined to 1 and is_updated to 0.)
changed_by	VARCHAR2 (2048)	NULL	Comma-separated list of the names of the database users who have modified the object since the previous approval
last_changed_at	TIMESTAMP	NULL	The date and time of the last change to the object
last_signature	VARCHAR2 (40)	NULL	The hash of the object (signature change means object change)
last_edit_type	SMALLINT	NOT NULL	Last type of change: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - New</li> <li>■ 2 - Modify</li> <li>■ 3 - Delete</li> <li>■ 4 - Unchanged</li> </ul>
edit_cnt_new	INTEGER	NULL	Specifies the number of new changes of type new
edit_cnt_modify	INTEGER	NULL	Specifies the number of new changes of type modify
edit_cnt_delete	INTEGER	NULL	Specifies the number of new changes of type delete
changes_summary	VARCHAR2 (255)	NULL	Contains a summary of the above changes (for example, 3 modifications)
updated_at	TIMESTAMP	NOT NULL	Specifies the date and time that the record was last updated in the Database Firewall

## doa\_tag\_definitions Table

Table A-22 contains the definitions of tags that may be applied to stored procedures or user roles.

**Table A-22 *doa\_tag\_definitions* Table**

Column	Datatype	NULL	Description
id	INTEGER	NOT NULL	Unique ID for the definition
object_type	INTEGER	NOT NULL	Type of the object that will have the tag applied: <ul style="list-style-type: none"> <li>■ 0 - Undefined</li> <li>■ 1 - Stored procedure</li> <li>■ 2 - User</li> </ul>
dialect	SMALLINT	NOT NULL	Database type (dialect) of the database: <ul style="list-style-type: none"> <li>■ 1 - Microsoft SQL Server</li> <li>■ 2 - Oracle</li> <li>■ 5 - Sybase ASE</li> <li>■ 7 - IBM DB2 (Linux, UNIX, Windows)</li> </ul>



**Table A–22 (Cont.) *doa\_tag\_definitions* Table**

Column	Datatype	NULL	Description
key	VARCHAR2 (255)	NOT NULL	ID of the tag definition. It should be unique within type and dialect
pattern	VARCHAR2 (2048)	NULL	Regular expression that will be matched against the object content to apply the tag
tag	VARCHAR2 (255)	NULL	Tag that will be applied
is_enabled	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if the tag definition can be used
is_predefined	CHAR (ONLY: '0', '1')	NOT NULL	Set to 1 if the tag definition was supplied with the product

## Report-Related Functions

The Oracle Database embedded in the Oracle Database Firewall includes a `report_lib` package that contains functions you can use to unify the data presentation in the reports. These functions are described below, with the functions in **bold**.

**compact(a\_content CLOB, a\_max\_len NUMBER, a\_truncation\_suffix VARCHAR2 )**

Returns: VARCHAR2

The function converts a CLOB into VARCHAR2. The duplicated white space characters are removed from the input string. If the length of the processed string is greater than specified maximum length, the string is truncated and the suffix is attached. If the input data contains more than 30% of duplicated whitespaces, the output string may be shorter than `a_max_len`. To improve performance the input CLOB is initially truncated to 3 times the `a_max_len` before the data is processed for duplicated whitespaces.

**format\_timestamp(tm TIMESTAMP)**

Returns: VARCHAR2

The function returns the string representing date, time and fraction of seconds. Using this function helps in managing the formatting of the timestamp in the reports from a single place. The default format is: `dd-MON-yyyy HH24:MI:SS.FF3` (for example: `18-JAN-2011 17:23:45.678`).

**format\_datetime(tm TIMESTAMP)**

Returns: VARCHAR2

The function returns the string representing date and time. Using this function helps managing the formatting of the date and time in the reports from a single place. The default format is: `dd-MON-yyyy HH24:MI:SS` (for example: `18-JAN-2011 17:23:45`).

**sortable\_ip\_address(ip VARCHAR2)**

Returns: VARCHAR2

The function transforms the IP address to a form that allows correct sorting. For example address "192.168.0.4" will be returned as "192.168.000.004" and address "10.4.3.2" as "010.004.003.002".

**LimitedListAgg(LimitedListAgg\_T(str VARCHAR2,separator VARCHAR2,max\_size INTEGER, suffix VARCHAR2))**

Returns: VARCHAR2

The aggregate function is located outside the `report_lib` package and is a standalone function. It concatenates the input strings using the separator. If the output string exceeds the requested limit, the result is truncated and the suffix is added.

Usage example:

```
SELECT LimitedListAgg(LimitedListAgg_T  
(data_column, ',', 200, '... [TRUNCATED]')) FROM table_name
```

---

---

# Syslog Message Format

This appendix contains:

- [About Syslog Messages](#)
- [Message Format](#)

## About Syslog Messages

The syslog message format is consistent with generally-accepted industry practices outlined in RFC 3164.

This appendix describes the syslog messages that can be generated by Oracle Database Firewalls and Oracle Database Firewall Management Servers. The syslog messages include alerts, periodically-updated statistics and heartbeat messages. Oracle Database Firewall updates the syslog messages in real time.

If a protected database being monitored receives more than 1000 alerts in one minute, subsequent alerts are not shown in the syslog messages. In this event, the following message is written to the syslog,:

```
WARN - More than 1000 alerts in the last minute. Subsequent alerts will not be processed.
```

## Message Format

The syslog message format is as follows.

```
message = date time hostname source num: DBFW:id message_text
```

In this specification:

- *message* is the syslog message. The data up to the first colon is the message header; the data after the first colon is the message body. The text "DBFW" in the message body indicates that the syslog message is from Oracle Database Firewall. The maximum length of *message* is 1024 bytes.
- *date* is the date the message was generated.
- *time* is the date the message was generated.
- *hostname* is the host name of the system that generated the message.
- *source* is "DBFW", except for DBFW:8 where it is "dbaudit".
- *num* is the instance number of the enforcement point that generated the message.

- *id* is the message identifier, in the range 1 to 12. This specifies the type of message described by *message\_text*. The meaning of each message identifier is described in the following sections.
- *message\_text* is the message text, which depends on the type of message.

For example:

```
Aug 15 11:02:57 DBFW DBFW1: DBFW:1 Configuration file reloaded
```

The maximum size of a DBFW syslog message is 2kB.

## Message ID = 1 (General Messages)

Message identifier 1 is used for general messages, such as Configuration file reloaded.

## Message ID = 3 (Heartbeat)

Message identifier 3 is for the heartbeat message, which is sent by the Oracle Database Firewall to indicate that it is operating and to provide current counters of the number of statements that have been passed, blocked, etc. The message text contains a number of fields, separated by spaces:

```
message_text = timestamp known_blocked known_warned known_passed unseen_blocked
unseen_warned unseen_passed reset_time resilience_mode
```

For example:

```
Aug 15 11:02:57 DBFW DBFW1: DBFW:3 1147344001.516 0 0 0 6067 0 0 1147367001.097 0
```

In this specification:

- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *known\_blocked* is an integer that specifies the number of known statements that have been blocked since monitoring started.
- *known\_warned* is an integer that specifies the number of known statements that have generated a warning since monitoring started.
- *known\_passed* is an integer that specifies the number of known statements that have been passed since monitoring started.
- *unseen\_blocked* is an integer that specifies the number of previously unseen statements that have been blocked since monitoring started.
- *unseen\_warned* is an integer that specifies the number of previously unseen statements that have generated a warning since monitoring started.
- *unseen\_passed* is an integer that specifies the number of previously unseen statements that have been passed since monitoring started.
- *reset\_time* is the number of seconds between 1st January 1970 and the time the counters were last reset, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *resilience\_mode* is an integer that specifies whether the device is currently the active device in a resilient set (0), or currently a passive device (1). If the device is

not in a resilient set, the value is 0. This setting should always be 0 in the current version of Oracle Database Firewall.

## Message ID = 4 (Property Change)

Message identifier 4 is used for messages that indicate a change in the value of a property at the device, such as a change in the baseline used or a change in the IP address. The message text contains a number of fields, separated by spaces:

```
message_text = timestamp category name value comment
```

For example:

```
Aug 15 11:02:57 DBFW DBFW1: DBFW:4 1147344001.516 "category" "name" "value" "My
comment is %22Hello World%22"
```

In this specification:

- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *category* indicates the general type of change that has been made, enclosed in quotation marks. The string can contain a maximum of 30 characters. Quotation mark ("), percent (%) and any characters with an ASCII value of less than 32 or greater than 126 are hexadecimal encoded (for example, %22 is used for quotation marks).
- *name* is the name of the property, enclosed in quotation marks (30 characters max.). Hexadecimal encoding is the same as *category*.
- *value* is the new value of the property, enclosed in quotation marks (30 characters max.). Hexadecimal encoding is the same as *category*.
- *comment* is a comment added by the person who made the change, enclosed in quotation marks (30 characters max.). Hexadecimal encoding is the same as *category*.

## Message ID = 8 (Database Audit Summary)

This message is sent when a Stored Procedure Audit or User Role Audit has completed (see [Chapter 5, "Configuring Stored Procedure Auditing,"](#) and [Chapter 6, "Configuring and Using Role Auditing,"](#) respectively).

```
message_text = object_type type_of_scan audit_completion_flag target_database
database_type protected_database audit_start_time object_collected_time audit_end_
time database_counter database_object_counter new_counter modified_counter deleted
counter unchanged_counter
```

For example:

```
Aug 15 11:02:57 multi000c2937e324 dbaudit1: DBFW:8 1 1 1 "192.168.0.57:5000/" 5
"test_pdb" 2009-03-24T11:59:59.123 2009-03-24T11:59:59.777 2009-03-24T11:59:59.801
15 2234 1000 0 0 1234
```

In this specification:

- *object\_type* is 1 for stored procedure and 2 for user roles.
- *type\_of\_scan* is 0 for manual scan and 2 for scheduled scan.
- *audit\_completion\_flag* is 0 for failure and 1 for success.

- *target\_database* is the connection string for audited database.
- *database\_type* is 1 for Microsoft SQL Server, 2 for Oracle, 5 for Sybase ASE and 6 for Sybase SQL Anywhere.
- *protected\_database* is the protected database name (as it appears in the Administration Console).
- *audit\_start\_time* is the time when the audit started.
- *object\_collected\_time* is the time when all information had been collected from the database.
- *audit\_end\_time* is the time when the audit finished.
- *database\_counter* is the number of databases found and interrogated.
- *database\_object\_counter* is the number of objects found (in the complete set of databases) in this scan.
- *new\_counter* is the number of objects created since the previous scan.
- *modified\_counter* is the number of objects modified since the previous scan.
- *deleted\_counter* is the number of objects deleted since the previous scan.
- *unchanged\_counter* is the number of objects unchanged since the previous scan.

## Message ID = 9 (Statement Alerts)

Message identifier 9 indicates a message resulting from a specific action that Oracle Database Firewall has taken after receiving an SQL statement. The message text contains a number of fields, separated by spaces:

```
message_text = action timestamp cluster_id threat_severity logging_level db_
client_ip db_client_port db_server_ip db_server_port user_name database_name
statement_id event_status database_status_code database_status_detail database_
response_text statement
```

For example:

```
Nov 9 15:02:56 multi000c29198b62 DBFW1: DBFW:9 2 1257778976.429 4 4 3
"192.168.100.99" 1138 "192.168.100.100" 5000 "sa" "" 4af82f20df900003 2 14216
"Severity: 16" "Function 'db_property' not found." "SELECT db_property('name')"
```

In this specification:

- *action* is one of the following: 1 = known blocked; 2 = known alerted; 3 = unknown blocked; 4 = unknown alerted.
- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *cluster\_id* is an integer that specifies the id of the cluster the statement belongs to.
- *threat\_severity* is an integer in the range 0 to 5 that specifies the threat severity of the message. The value 5 is the most severe.
- *logging\_level* is an integer in the range 1 to 5 that specifies the logging of the message: 1 = do not log; 2 = log sample; 3 = always log; 5 = log unique.
- *db\_client\_ip* is the IP address of the client that sent the message, enclosed in quotation marks.

- *db\_client\_port* is an integer that specifies the port number of the database client that originated the statement.
- *db\_server\_ip* is the IP address of the database server, enclosed in quotation marks.
- *db\_server\_port* is an integer that specifies the port number of the database management system.
- *user\_name* is the database user associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_name* is the name of the database associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *statement\_id* is a unique hexadecimal number for the monitored SQL statement.
- *event\_status* is an integer that gives the database response (see [Chapter 10, "Configuring and Using Database Response Monitoring"](#)) to the statement: 1 = success; 2 = failure; 3 = database response monitoring switched off; 4 = response not seen.
- *database\_status\_code* is an integer that gives the status code returned by the database. This applies only if database response monitoring is switched on.
- *database\_status\_detail* is the detailed response string returned from the database (such as database status codes and severity of the error). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_response\_text* is the response string returned from the database (the text intended for the database client). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *statement* is the statement that caused the alert, enclosed in quotation marks (UTF-8 encoded). The string may be truncated to contain a maximum of 1024 characters (including a final "...", if necessary). Backslash (\) characters are preceded by an additional backslash (\\). Quotation marks (") are preceded by a backslash (\"). Character codes with a hexadecimal value of 00 to 1f are replaced by the string "\x00" to "\x1f". The character with a hexadecimal value of 7f is replaced by "\x7f".

## Message ID = 10 (F5 BIG-IP ASM Alerts)

Message identifier 10 indicates a message resulting from alerts from the F5 BIG-IP ASM Web application firewall and database response information. The message text contains a number of fields, separated by spaces:

```
message_text = action timestamp cluster_id threat_severity logging_level db_
client_ip db_client_port db_server_ip db_server_port user_name database_name
statement_id event_status database_status_code database_status_detail database_
response_text web_user_name request response_code method protocol URL query_string
web_application_name unit_host_name management_IP_address policy_name policy_
apply_date support_id request_blocked session_cookies referrer http_host http_
user_agent primary_violation cardinal_ip_address match_result statement
```

For example:

```
Nov 9 16:02:32 multi000c29198b62 DBFW1: DBFW:10 2 1257782551.757 9 4 3
"192.168.100.99" 1138 "192.168.100.100" 5000 "sa" "" 4af83d17f9200006 1 0 "" ""
"Unknown_2" "GET /SearcStr.asp?txtSrc=CLASS+%27+or+1%3D1--+
```

```

HTTP/1.1\x0d\x0aAccept: image/gif, image/x-xbitmap, image/jpeg, image/pjpeg,
application/x-shockwave-flash, */*\x0d\x0aReferer:
http://10.190.0.203/SearcStr.asp?txtSrc=GEEZER+%27+or+1%3D1---+\x0d\x0aAccept-Langu
age: en-gb\x0d\x0aUA-CPU: x86\x0d\x0aAccept-Encoding: gzip,
deflate\x0d\x0aUser-Agent: Mozilla/4.0 (compatible; MSIE 7.0; Windows NT
5.1)\x0d\x0aHost: 10.190.0.203\x0d\x0aConnection: Keep-Alive\x0d\x0aCookie:
A-P$X123=123abc4561\x0d\x0a\x0d\x0a "200" "GET" "HTTP" "/SearcStr.asp"
"TaskIndex=3&TaskHTML=CACancelNoFields&TaskSectionReference=&TaskStreamType=Rule-0
bj-FlowAction&TaskStatus=CAEndInteraction&TaskInstructions=&TaskHelpPresent=false&
TaskHelpType=&TaskInstructionsCaption=Instructions&%24PpyWorkPage%24pCancelNotes=%
27+or+1%3D1%0D%0A%3Ch1%3E+Hello+%3C%2Fh1%3E&fred=sp_jdbc_getcatalogs" "toolshed_
class" "BIGIPASM01.SomeDomain.COM" "192.168.0.178" "toolshed_policy" "2008-10-10
16:02:59" "377647934653805214" "" ""
"http://10.190.0.203/SearcStr.asp?txtSrc=GEEZER+%27+or+1%3D1---" "10.190.0.203"
"Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1)" "Illegal meta character in
parameter value" "10.190.0.3" "2" "rpc sp_jdbc_getcatalogs"

```

In this specification:

- *action* is one of the following: 1 = known blocked; 2 = known alerted; 3 = unknown blocked; 4 = unknown alerted; 5 = known passed; 6 = unknown passed.
- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *cluster\_id* is an integer that specifies the id of the cluster the statement belongs to.
- *threat\_severity* is an integer in the range 0 to 5 that specifies the threat severity of the message. The value 5 is the most severe.
- *logging\_level* is an integer in the range 1 to 5 that specifies the logging of the message: 1 = do not log; 2 = log sample; 3 = always log; 5 = log unique.
- *db\_client\_ip* is the IP address of the client that sent the message, enclosed in quotation marks.
- *db\_client\_port* is an integer that specifies the port number of the database client that originated the statement.
- *db\_server\_ip* is the IP address of the database server, enclosed in quotation marks.
- *db\_server\_port* is an integer that specifies the port number of the database management system.
- *user\_name* is the database user associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_name* is the name of the database associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *statement\_id* is a unique hexadecimal number for the statement.
- *event\_status* is an integer that gives the database response (see [Chapter 10, "Configuring and Using Database Response Monitoring"](#)) to the statement: 1 = success; 2 = failure; 3 = database response monitoring switched off; 4 = response not seen.



- *database\_status\_code* is an integer that gives the status code returned by the database. This applies only if database response monitoring is switched on.
- *database\_status\_detail* is the detailed response string returned from the database (such as database status codes and severity of the error). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_response\_text* is the response string returned from the database (the text intended for the database client). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *web\_user\_name* is the name of the Web application user who originated the message, enclosed in quotation marks. Hexadecimal encoding is the same as *statement*. For more information refer to *Understanding the Attributes* in [Chapter 11](#).
- *request* is the BIG-IP ASM "request" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *response\_code* is the BIG-IP ASM "response\_code" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *method* is the BIG-IP ASM "method" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *protocol* is the BIG-IP ASM "protocol" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *URL* is the BIG-IP ASM "uri" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *query\_string* is the BIG-IP ASM "query\_string" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *web\_application\_name* is the name of the Web application, as obtained from the BIG-IP ASM "web\_application\_name" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *unit\_host\_name* is the BIG-IP ASM "unit\_hostname" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *management\_IP\_address* is the BIG-IP ASM "management\_ip\_address" attribute, enclosed in quotation marks.
- *policy\_name* is the BIG-IP ASM "policy\_name" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *policy\_apply\_date* is the BIG-IP ASM "policy\_apply\_date" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *support\_id* is the BIG-IP ASM "support\_id" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *request\_blocked* is the BIG-IP ASM "request\_blocked" attribute. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *session\_cookies* provides the user-identification cookies, extracted from the header of the HTTP request. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *referrer* is the name of the referrer, extracted from the header of the HTTP request. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.

- *http\_host* is the host name, extracted from the header of the HTTP request. It is enclosed in quotation marks and uses the same hexadecimal encoding as statement.
- *http\_user\_agent* is the name of the user agent, extracted from the header of the HTTP request. It is enclosed in quotation marks and uses the same hexadecimal encoding as statement.
- *primary\_violation* is the BIG-IP ASM violation associated with this statement, which the Database Firewall software believes is the most important. It is enclosed in quotation marks and uses the same hexadecimal encoding as statement.
- *cardinal\_ip\_address* is the IP address that the Database Firewall software believes is the most important for client identification. The client HTTP request may have been forwarded several times through proxies.
- *match\_result* is an integer that indicates whether the BIG-IP ASM syslog message has been successfully matched with the SQL statement. 1 = Policy Conflict; 2 = Policy Confirmed; 3 = WAF Blocked request; 4 = No Match Data Masked by WAF; 5 = No match made. For further information, please refer to *Understanding the Attributes* in [Chapter 11](#).
- *statement* is the statement that caused the alert, enclosed in quotation marks and hex encoded in UTF-8. The string may be truncated to contain a maximum of 1024 characters (including a final "...", if necessary). Backslash (\) characters are preceded by an additional backslash (\). Quotation marks (") are preceded by a backslash (\). Character codes with a hexadecimal value of 00 to 1f are replaced by "\x00" to "\x1f".

## Message ID = 11 (Login Alert)

Message identifier 11 indicates that Oracle Database Firewall has identified a user login request. If database response monitoring is switched on (see [Chapter 10, "Configuring and Using Database Response Monitoring"](#)), the alert includes the database response information. The message text contains a number of fields, separated by spaces:

```
message_text = action timestamp threat_severity logging_level db_client_ip db_
client_port db_server_ip db_server_port user_name database_name event_id connect_
seen failure_threshold threshold_count event_status database_status_code database_
status_detail database_response_text
```

For example:

```
Nov 9 16:21:18 multi000c29198b62 DBFW1: DBFW:11 2 1257783678.266 3 1
"192.168.100.99" 1137 "192.168.100.100" 5000 "sa" "" 4af8417e6e300001 1 0 0 2 4002
"Severity: 14" "Login failed.\x0a"
```

In this specification:

- *action* is one of the following: 1 = no alert; 2 = always alert; 3 = alert on request success; 4 = alert on request failure; 5 = block request.
- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *threat\_severity* is an integer in the range 0 to 5 that specifies the threat severity of the message. The value 5 is the most severe.

- *logging\_level* is an integer that specifies the logging of the message: 0 = do not log in traffic log; 1 = log in traffic log.
- *db\_client\_ip* is the IP address of the client that sent the message, enclosed in quotation marks.
- *db\_client\_port* is an integer that specifies the port number of the database client that originated the statement.
- *db\_server\_ip* is the IP address of the database management system, enclosed in quotation marks.
- *db\_server\_port* is an integer that specifies the port number of the database management system.
- *user\_name* is the database user associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as statement.
- *database\_name* is the name of the database associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as statement.
- *event\_id* is a unique hexadecimal number for the event.
- *connect\_seen* is an integer that specifies whether Oracle Database Firewall encountered a session connection for the session. 0 = connect not seen; 1 = connect seen.
- *failure\_threshold* is an integer that specifies the number of consecutive login failures that will trigger a change in policy (possibly to block logins).
- *threshold\_count* is an integer that specifies the current number of consecutive login failures.
- *event\_status* is an integer that gives the database response to the statement: 1 = success; 2 = failure; 3 = database response monitoring switched off; 4 = response not seen; 5 = request blocked.
- *database\_status\_code* is an integer that gives the status code returned by the database.
- *database\_status\_detail* is the detailed response string returned from the database (such as database status codes and severity of the error). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_response\_text* is the response string returned from the database (the text intended for the database client). It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.

## Message ID = 12 (Logout Alert)

Message identifier 12 indicates that Oracle Database Firewall has identified a user logout request. If database response monitoring is switched on (see [Chapter 10, "Configuring and Using Database Response Monitoring"](#)), the alert includes the database response information. The message text contains a number of fields, separated by spaces:

```
message_text = action timestamp threat_severity logging_level db_client_ip db_
client_port db_server_ip db_server_port user_name database_name event_id logout_
seen end_of_session_seen session_dropped_seen
```

For example:

```
Nov 10 09:34:46 multi000c29198b62 DBFW1: DBFW:12 2 1257845676.891 2 1
"192.168.100.99" 1138 "192.168.100.100" 5000 "sa" "" 4af933acb7700006
4af933abfce00003 1 1 0
```

In this specification:

- *action* is one of the following: 1 = no alert; 2 = always alert.
- *timestamp* is the time the alert occurred. This time is represented as the number of seconds since 1st January 1970 00:00:00 UTC, in the format *sec.msec*. The *sec* value is the number of whole seconds, and *msec* is the fractional part in milliseconds.
- *threat\_severity* is an integer in the range 0 to 5 that specifies the threat severity of the message. The value 5 is the most severe.
- *logging\_level* is an integer that specifies the logging of the message: 0 = do not log in traffic log; 1 = log in traffic log.
- *db\_client\_ip* is the IP address of the client that sent the message, enclosed in quotation marks.
- *db\_client\_port* is an integer that specifies the port number of the database client that originated the statement.
- *db\_server\_ip* is the IP address of the database management system, enclosed in quotation marks.
- *db\_server\_port* is an integer that specifies the port number of the database management system.
- *user\_name* is the database user associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *database\_name* is the name of the database associated with the session in which the alerting statement occurred. It is enclosed in quotation marks and uses the same hexadecimal encoding as *statement*.
- *event\_id* is a unique hexadecimal number for the event.
- *first\_event\_id* is the unique event identifier for the first event recorded for this session (hexadecimal number).
- *logout\_seen* is an integer that specifies whether Oracle Database Firewall encountered a logout for the session. 0 = logout not seen; 1 = logout seen.
- *end\_of\_session\_seen* is an integer that specifies whether Oracle Database Firewall encountered an end-of-session event for the session. 0 = event not seen; 1 = event seen.
- *session\_dropped\_seen* is an integer that specifies whether Oracle Database Firewall encountered a session-dropped event for the session. 0 = event not seen; 1 = event seen.

---



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## Traffic Log Attributes

This appendix describes the meaning of each attribute that is displayed when you expand a record in the traffic log Search Results dialog box.

This appendix contains:

- [Transaction Status](#)
- [Performance](#)
- [Context](#)
- [Attributes \(F5\)](#)

### Transaction Status

**Table C-1** *Transaction Status*

Attribute	Meaning or Source
SQL Request	SQL statement text, or text that indicates the response from logging in or out (e.g. "CONNECTED, FAILED LOGIN"). "CONNECTED" indicates that there is a connection between the database and database client.
Response Status	This shows whether or not the statement or login was successfully executed by the database.
Response Code	An integer response code as returned from the monitored database. The value and meaning are dependent on the database type. Please refer to your database system documentation for further information.
Response Detailed Status	Response status information as returned from the monitored database. Please refer to your database system documentation for further information.
Response Text	Detailed verbose response message as returned from the monitored database. For errors, this is typically the same as the error message displayed at the client. This information is available only if the <b>Full error message annotation</b> check box is selected (see " <a href="#">Configuring Database Response Monitoring</a> " on page 10-2).
Record Type	The type of record that is being displayed ("session" for a login or logout, or "statement" for SQL requests).

## Performance

**Table C-2 Performance**

Attribute	Meaning or Source
Request Time	The time that the SQL request was sent to the database.
Response Time	The time that the database response was generated.
Transaction Time	The time taken to execute the SQL request.

## Context

**Table C-3 Context**

Attribute	Meaning or Source
Traffic Source	The source of the SQL request. For example, "network", "local monitor" or "remote monitor".
DB User Name	Database login name.
DB User Name Origin	Method used to obtain the DB User Name. The possible value is: "generated" (the name "unknown_username" was assumed), "dbquery" (the name was obtained from a database query) or "network" (the name was obtained from the SQL traffic).
DB User Name (raw)	The DB User Name that was used at the time Oracle Database Firewall applied the statement policy. This may be the same as DB User Name (if the name was available from the statement or derived from a previous statement) or "unknown_username".
DB Client Program Name	Name of the software being used to connect to the database.
DB Client Program Name Origin	Method used to obtain the DB Client Program Name. See DB User Name Origin for possible values.
DB Client IP Address	IP address of the database client that originated the SQL request.
DB Client Port	Port of the database client that originated the SQL request.
DB Server IP Address	IP address of the database management system (i.e. the IP address used by database clients to send traffic to the database).
DB Server Port	Port number of the database management system.
Database Type	Name of the database type that the baseline applies to.
OS User Name	Operating system login name.
OS User Name Origin	Method used to obtain the DB Client Program Name. See DB User Name Origin for possible values.

## Attributes (F5)

**Table C-4 Attributes (F5)**

Attribute	Meaning or Source
Authentication Method	Obtained from the BIG-IP ASM "authentication method" defined in the iRule (e.g. "webform").

**Table C-4 (Cont.) Attributes (F5)**

Attribute	Meaning or Source
Cardinal IP Address	The client HTTP request may have been forwarded several times through proxies. The IP address shown in this attribute is the one the Oracle Database Firewall software believes is the most important for client identification.
Management IP Address	Obtained from the BIG-IP ASM "management_ip_address" attribute.
Match Result	<p>This can display:</p> <p><b>PolicyConfirmed</b> BIG-IP ASM generated an alert, and the associated SQL statement generated a "block" or "warn" in Oracle Database Firewall.</p> <p><b>NoMatch:</b> The BIG-IP ASM syslog message containing the information displayed in the traffic log record has not been matched with an SQL statement.</p> <p><b>NoMatchDataMasked</b> The BIG-IP ASM syslog message containing the information displayed in the traffic log record has at least one field containing star ("*") characters, which indicates sensitive data that has been obliterated by BIG-IP ASM. The Oracle Database Firewall software is not able to match syslog messages containing obliterated fields, as configured in BIG-IP ASM.</p> <p><b>PolicyConflict</b> BIG-IP ASM generated an alert, but the associated SQL statement did not generate a "block" or "warn" in Oracle Database Firewall.</p> <p><b>WAFBlocked</b> BIG-IP ASM blocked a request. Although a syslog message was generated, the Web application server generated no SQL statements for this request.</p>
Match Tokens	This is for Oracle Database Firewall engineers only. It indicates the tokens that were used to match syslog messages with the SQL statement.
Method (http)	Obtained from the BIG-IP ASM "method" attribute.
Policy Apply Date	Obtained from the BIG-IP ASM "policy_apply_date" attribute.
Policy Name	Obtained from the BIG-IP ASM "policy_name" attribute.
Primary Violation	The BIG-IP ASM violation associated with this statement, which the Oracle Database Firewall software believes is the most important.
Protocol (http)	Obtained from the BIG-IP ASM "protocol" attribute.
Query String (http)	Obtained from the BIG-IP ASM "query_string" attribute.
Referer (http)	This is the name of the referrer, extracted from the header of the HTTP request.
Request (http)	Obtained from the BIG-IP ASM "request" attribute.
Request Blocked	Obtained from the BIG-IP ASM "request_blocked" attribute.
Response Code (http)	Obtained from the BIG-IP ASM "response_code" attribute.
Session Cookies	This provides the user-identification cookies, extracted from the header of the HTTP request.
Support ID	Obtained from the BIG-IP ASM "support_id" attribute. Clicking the link provides details of the violation in BIG-IP ASM. <b>Note:</b> The link does not function if ASM is restarted after monitoring the traffic.
URI (http)	Obtained from the BIG-IP ASM "uri" attribute.

**Table C-4 (Cont.) Attributes (F5)**

<b>Attribute</b>	<b>Meaning or Source</b>
Unit Hostname (http)	Obtained from the BIG-IP ASM "unit_hostname" attribute.
User Agent (http)	Name of user agent, from the header of the HTTP request.
Violations	Obtained from the BIG-IP ASM "violations" attribute.
Web Application Name	Provides the name of the Web application, as obtained from the BIG-IP ASM "web_application_name" attribute.
Web Client IP Address	Displays the IP address of the Web client, as obtained from the BIG-IP ASM "ip" attribute.
Web Host	WAF host name, extracted from the header of the HTTP request.
Web Username	If known, this provides the login username of the user. If the user is not known, but cookies with the specified prefix are provided, this displays "Anonymous_<cookie value>". If the HTTP request in the syslog message contains no cookies with the specified prefix, "Unknown_<auto incrementing number>" is displayed.



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# Glossary

## **action**

A set of rules used by the baseline to evaluate statements for a cluster. These rules include four action levels: unassigned, block, warn, and pass.

## **action level**

A standard policy rule that describes the actions to take when evaluating statements that match the cluster.

A standard baseline rule that describes of the type of data the baseline collects about statements, how often to collect the data, and how many statements to include in the log.

## **Administration Console**

A browser-based application for configuring, managing, and monitoring the system. The Administration Console is displayed by logging into the Management Console or the standalone or managed Database Firewall from a Web browser, such as Internet Explorer. See "[Which Administration Console Should I Use?](#)" on page 1-5 for more information.

## **administration log**

The log type that stores system actions such as logins, shutdowns, restarts, and baseline uploads. To ensure full traceability of system changes, the administration log stores the login ID of any person who makes a change from the Administration Console.

## **Analysis tab**

A component of the user interface that is used to analyze the SQL statements that the Analyzer has read.

## **Analyzer**

See [Oracle Database Firewall Analyzer](#).

## **Background View**

One of two View menu options. The first option in the View menu toggles between Background and Profile. The Background option is available only when Profile mode is displayed. The effect of the selection depends on whether you are using the Analysis, Clusters, or Details tab.

## **baseline**

A configuration file that Oracle Database Firewall uses to determine the threat severity, action level, and logging level to use for each SQL statement it encounters.

You create baselines in the Oracle Database Firewall Analyzer. A baseline can attach separate action and logging level settings to each cluster in a model. A baseline also specifies a default action and logging level for clusters that have not been previously logged, and therefore do not appear in the model. Baseline files have a .dna file extension.

**bridge mode**

Configuration that enables Oracle Database Firewall to block attacks made by SQL statements.

**profile**

Any combination of an IP address set, DB user set, client program set, OS user set, and a timeslice. Profiles are used to analyze statements and set up baseline rules for statements occurring at specified times from selected database users, IP addresses, client programs, and operating system users. You can create profiles using the Profiles option in the Tools menu.

**client program set**

A set of one or more database client program names. Client program sets are used in profiles to analyze data originating from selected programs, or to set up baseline rules for selected programs. A client program can belong to only one set. You can create client program sets using the Client Program Sets option in the Tools menu.

The Baseline Options dialog enables you to specify whether the baseline should use case matching when checking client program names.

**cluster**

A set of semantically similar SQL statements that is created when the Analyzer reads logged SQL statements, either to create the model or when testing against new logged SQL data. The Analyzer uses its built-in knowledge of the SQL syntax to categorize the SQL statements into semantic clusters. When designing the baseline, you can specify the action and logging level for each cluster.

**cluster group**

A set of clusters grouped by the Analyzer according to the meaning of each statement.

**Clusters tab**

A component of the user interface that enables you to develop the baseline by specifying an action, logging level, and threat severity for each cluster. The Clusters tab provides a tabular view of the clusters the Analyzer has generated, and is an alternative to using the Details tab.

**Common Event Format (CEF)**

An open log management standard that ArcSight uses when collecting data from different sources. This common event log format enables the Database Firewall and ArcSight integration to easily collect and aggregate data for analysis.

**Create Policy option**

A File menu option used to create a baseline file for the model. The option prompts you to specify the name of the baseline file to create. Baseline files have a .dna extension.

**Database Activity Monitoring Mode**

One of the monitoring modes for an Oracle Database Firewall. In Database Activity Monitoring (DAM) mode, the system logs statements and provides warnings of potential attacks. It does not block potential attacks.

See also [Database Policy Enforcement Mode](#)

**Database Firewall**

See [Oracle Database Firewall](#).

**Database Firewall Administration Console**

See [Oracle Database Firewall Administration Console](#).

**Database Firewall Management Server**

See [Oracle Database Firewall Management Server](#).

**Database Firewall Network**

See [Oracle Database Firewall network](#).

**database network**

The database network contains the database server and database clients.

**Database Policy Enforcement Mode**

One of the modes in which Oracle Database Firewall can operate. In this mode, the system performs all the actions of database activity monitoring, and blocks SQL statements that appear to be potential attacks.

See also [Database Activity Monitoring Mode](#)

**Database Response Monitoring**

Database Response Monitoring records database responses for all SQL statements, logins and logouts that are logged by the baseline. This Administration Console feature allows you to determine whether the database executed logins, logouts and statements successfully, and can provide useful information for audit and forensic purposes.

**database user set**

A set of one or more database user login names. Database user sets are used in profiles to analyze data originating from selected login names, or to set up baseline rules for selected database users. You can create database user sets using the DB User Sets option in the Tools menu.

The Baseline Options dialog enables you to specify whether the baseline should use case matching when checking database user names.

**Details tab**

A component of the user interface that enables you to develop the baseline by specifying an action, logging level, and threat severity for each cluster. The Details tab organizes the clusters into cluster groups, and is an alternative to using the Clusters tab.

**direct database Interrogation**

The ability to interrogate the monitored database to obtain the name of the database user, operating system, and client program that originated an SQL statement, if this information is not available from the statement itself.

**enforcement point**

An Oracle Database Firewall logical configuration that associates a Database Firewall policy that you create with a specific protected database and network traffic source(s). In other words, the enforcement point defines the relationship between the protected database and the policy.

You can have multiple databases configured to use one enforcement point. The policy associated with an enforcement point is platform-specific, which means that the databases associated with it must be from the same database product line (for example, all Oracle databases).

**exception**

A feature that enables you to override standard baseline rules for specific cases. For example, you may want to set up an exception that overrides standard baseline rules (action level, logging level, and threat severity) for SQL statements originating from administrators.

**Export as HTML option**

A File menu option that enables you create an HTML file in which to export the properties and baseline information contained in the model displayed in the currently selected window. Use this option for reporting purposes, or to use the model data in other applications.

**event log**

Stores system events that are not directly related to the Oracle Database Firewall software, such as operating system warnings.

**Filters**

A Tools menu option used to manage which clusters to display in the Analysis and Details tabs.

**hexadecimal format**

The Base 16 representation used by the Inspect option on the Analysis tab to enable you to examine the characters in a selected statement. Displaying a statement in hexadecimal format may be useful if the statement includes unprintable characters.

**Invalid SQL tab**

A component of the user interface that displays any SQL statements that the Analyzer did not recognize (for example: statements that do not conform with the SQL syntax).

**Invalid Statement policy**

A Tools menu option used to define the action, logging level, and threat severity for invalid SQL statements. The Invalid Statement policy allows you to specify the policies the baseline must apply when Oracle Database Firewall encounters invalid SQL statements.

**IP address set**

A set of one or more IP addresses of database clients. IP address sets are used in profiles to analyze data originating from selected IP addresses, or to set up baseline rules for selected IP addresses. An IP address can belong to only one set. You can create IP address sets using the IP Address Sets option in the Tools menu.

**Load Policy option**

A File menu option used to create a model from a baseline that was created using the Create Policy option. The option prompts you to specify the name of the baseline file to load. This option is provided to enable recovery of a model from a baseline in the unlikely event that the original model data has been lost.

**local monitor**

An Oracle Database Firewall component that monitors SQL traffic that originates from sources that have direct access to the protected database, such as console users or batch jobs that run on a database server. The local monitor is a passive logging device. That is, you cannot use it to block SQL statements."

**log level**

A standard baseline rule that describes the type of data the baseline collects about statements, how often to collect the data, and how many statements to include in the log.

**login and logout policy**

A Tools menu option that enables you to specify the policies the baseline must apply when a database client logs into or logs out of the database. Use login policy to specify the login action level and threat severity of successful or unsuccessful database user logins, and whether to log logins. Use a logout policy to specify the logout action level and threat severity of database user logouts, and whether to log logouts.

**Management Server**

See [Oracle Database Firewall Management Server](#).

**model**

A component that stores all the data used to develop a baseline, including the properties and analysis data, and all the baseline information. Each model is stored in a pair of files with .smdl and .smdl\_data file extensions.

**novelty policy**

A set of rules that operate on the baseline. Novelty policies are used to loosen or tighten the default unseen statement policies for specific classes of statements, tables, or both. They specify the action level, logging level, and threat severity to use for unseen statements that operate on the specified classes of statements or tables.

For example, if the default action level is Warn, the user may want to set up novelty policies that apply a Pass action level to unseen statements that operate on tables containing public information, and a Block action to all unseen statements that operate on tables containing sensitive information.

**Oracle Database Firewall**

The Oracle Database Firewall component that performs these tasks:

- Handles real-time recording and analysis of SQL transaction requests and responses from one or more Oracle, Microsoft SQL Server, Sybase, Sybase SQL Anywhere, and IBM DB2 SQL databases
- Categorizes SQL transactions
- Enforces data policies
- Enables real-time alerting and event propagation

You can have multiple Database Firewalls connecting to one Management Server.

See also [Oracle Database Firewall Analyzer](#), [Oracle Database Firewall Management Server](#).

### **Oracle Database Firewall Administration Console**

The administrative console used to configure Oracle Database Firewall. This console is available on each Database Firewall and Management Server.

### **Oracle Database Firewall Analyzer**

The Oracle Database Firewall component that enables users to develop baselines and log SQL statements to be analyzed for security vulnerabilities and usage patterns. Users who have little knowledge of SQL can use the Analyzer to develop baselines, and users who have detailed knowledge of SQL can use Analyzer to customize baselines.

See also [baseline](#).

### **Oracle Database Firewall Management Server**

The Oracle Database Firewall component that performs these tasks:

- Aggregates SQL data from one or more Database Firewalls
- Serves as a reporting platform for business reports
- Centralizes the distribution of data control policies (but different policies can be applied to specific databases)
- Stores and manages log files, including archiving and restoring the log files
- Remotely manages all Database Firewalls to which it connects
- Integrates with third-party applications, such as ArcSight SIEM

See also [Oracle Database Firewall Analyzer](#) and [Oracle Database Firewall](#).

### **Oracle Database Firewall network**

A system for securing and protecting data in SQL databases. Oracle Database Firewall blocks and produces warnings of attempted attacks, logs activity, and provides intelligent tools to assess vulnerabilities. Oracle Database Firewall enhances existing database security features, such as field encryption and user authentication.

### **OS user set**

A set of one or more operating system user names. OS user sets are used in profiles to analyze data originating from selected OS users, or to set up baseline rules for selected OS users. You can create OS user sets using the OS User Sets option in the Tools menu.

The Baseline Options dialog enables you to specify whether the baseline should use case matching when checking operating system user names.

### **primary device**

In a resilient pair, this is the main Database Firewall or Management Server that carries out normal operations.

### **Profile View**

One of two options in the View menu. The first option in the View menu toggles between Background and Profile. The Profile option is available only when background mode is displayed. The effect of the selection depends on whether you are using the Analysis, Clusters, or Details tab.

**Properties tab**

A component of the user interface that contains general information about the selected model, such as the original source of the data for the model, statistics, change control information, and notes.

**protected database**

The database being monitored by Oracle Database Firewall. See also [local monitor](#) and [remote monitor](#).

**remote monitor**

Software that you install on a Linux server that has access to a database that you want to protect. Remote monitoring enables an enforcement point to directly monitor SQL traffic in a database. The remote monitor captures the SQL traffic and sends it over the network to an Oracle Database Firewall. This SQL data is then available for reports generated by this Database Firewall.

**resilient pair**

A feature of Oracle Database Firewall that enables the paired configuration of Oracle Database Firewall and Oracle Database Firewall Server to provide high-availability system architecture. During system configuration, one device is nominated as the primary device and the other as the secondary device. The primary device carries out all normal operations, while the secondary device monitors traffic. The secondary device alerts only when the primary device fails.

**secondary device**

In a resilient pair, this is the other Database Firewall or Management Server that monitors traffic and alerts when the primary fails.

**security index**

A measure of threat, expressed as a percentage. The higher the security index, the greater the threat. The security index is calculated as the sum of the product of the threat severity level of the cluster ID times the frequency of that cluster ID, where:

- **Threat severity** is the threat severity of the cluster ID, as set in the Analyzer (range 0 to 5).
- **cid** is the cluster ID. All clusters that occur over the specified time period are included in the calculation.
- **Frequency** is the percentage of all statements recorded over the specified period that match the cluster.

Use this formula to calculate the security index:

$$\text{Security Index} = \sum (\text{Threat severity (cid)} \times \text{Frequency (cid)}) / 5$$

**sensitive data masking**

A process used in the baseline that automatically replaces all user data (such as string constants, integer constants, hexadecimal constants, and float constants) in a statement with alternative characters. The replacement characters that are used depend on the data type. The masking process prevents sensitive data from appearing in log files.

**Sensitive data masking option**

A Tools menu option that enables you to set up rules for automatic masking of sensitive data in log files, such as credit card numbers.

**session**

A feature of Analyzer version 1.2 and earlier. A session (file extension .sshn) can contain multiple models. You can open session files from the Welcome dialog or using Open in the File menu. Each model in the session is displayed in a separate window. You cannot create sessions in Analyzer version 2.0 or later.

**spanning port**

A special port in a managed switch that can mirror the traffic of other ports in the same switch. Spanning ports are often used for network traffic monitoring. Spanning ports do not enable SQL statement blocking.

**Summary tab**

A policy that has had filtering added. A baseline displays the statement types, threat severities, and action levels currently in the baseline. From the Baseline tab, you can generate a baseline automatically, set up novelty and unseen statement policies, and filter the contents of the Details tab. The Baseline tab is the primary means of interacting with the baseline.

**testing**

The iterative process of developing the baseline. While the system is operational, a new set of SQL statements can be logged, and then imported into the Analyzer for analysis against the statements previously used to build the current baseline. This process (called "testing the model") enables possible security vulnerabilities to be identified and the baseline to be improved further. The process can be repeated as many times as required.

You can test the model using data in the traffic log, trace file, train file, or by entering single statements available from the Test menu.

The Analyzer reads each statement in the test data and assigns it to a cluster for analysis in the Analysis tab. Some statements in the test data may cause additional clusters to be generated.

**threat severity**

The measure of security risk for the policy item (be it cluster, novelty policy, and so on). Each cluster can have an optionally-assigned threat severity. There are six threat severity levels, ranging from Unassigned to Catastrophic (threat severity 5). When Oracle Database Firewall logs a statement, the threat severity of the statement is also logged. You can use third-party reports and syslog to display statements based on the logged threat severity.

**timeslice**

A set of one or more hours in a week (for example: 9 am to 5 pm, Monday to Friday). A timeslice can be used in a profile to define the hours of the week that the profile applies. You can create timeslices using the Timeslices option in the Tools menu. The same timeslice can be used in any number of profiles.

**trace file**

A binary log file obtained from a Microsoft SQL Server system, which contains a list of SQL statements. Trace files have a .trc file extension.

**traffic log**

A file that contains SQL statements that have been logged and stored on the Oracle Database Firewall Server or Oracle Database Firewall. If known, the traffic log stores



the following information about the originator of each statement, which enables the creation of IP address sets:

- IP address of the client
- Database user login name
- Database client program name
- Operating system user name

**train file**

A text file containing a list of SQL statements. Train files can contain blank lines or a combination of SQL statements on each line. However, statements must not be split across lines. Train files have a .train file extension.

**Training Mode**

One of the four modes in which Oracle Database Firewall can operate. In this mode, the system logs traffic for the purposes of automated baseline generation.

**unseen statement**

A statement that does not match any of the clusters in the baseline. You can set up policies for unseen statements from the **Summary** tab.



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