Oracle Enterprise Manager for Flash Storage Systems

User's Guide

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Preface

Oracle Resources

Important: For the latest version of this document, visit the *SAN Storage – Oracle Flash Storage System* section at the Oracle Help Center (http://www.oracle.com/goto/fssystems/docs).

Table 1: Oracle resources

For help with...	Contact...
Support	*http://www.oracle.com/support* (www.oracle.com/support)
Training	*https://education.oracle.com* (https://education.oracle.com)
Documentation	• *Oracle Help Center*: (http://www.oracle.com/goto/fssystems/docs) • From Oracle FS System Manager (GUI): Help > Documentation • From Oracle FS System HTTP access: (http://system-name-ip/documentation.php where system-name-ip is the name or the public IP address of your system)
Documentation feedback	*http://www.oracle.com/goto/docfeedback* (http://www.oracle.com/goto/docfeedback)
Contact Oracle	*http://www.oracle.com/us/corporate/contact/index.html* (http://www.oracle.com/us/corporate/contact/index.html)

Typographical Conventions

Table 2: Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate one of the following items: • Hypertext, as in a URL • A reference to a book title • New terms and emphasized words • Command variables
`monospace`	Indicates one of the following, depending on the context: • The name of a file or the path to the file • *Output* displayed by the system on the command line
`monospace` (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in Oracle FS System Manager (GUI). For example, “Click SAN > Storage > LUNS > Action > Clone” means to click the Clone link on the SAN page in the GUI.
...	Indicates that one or more steps have been omitted from the path or menu structure. The ellipsis is used within an expression of a navigation path or within a cascading menu structure. For example, in the SAN > Storage > LUNS > ... > Clone menu structure, the ... implies that one or more menu items have been omitted.

Command Syntax Conventions

Table 3: Typography to mark command syntax

Typographic symbol	Meaning
`[ ]`	Square brackets. Delimits an optional command parameter or a set of optional command parameters.
`{ }`	Braces. Delimits a set of command parameters, one of which must be selected.
`|`	Vertical bar. Separates mutually exclusive parameters.
`. . .`	Ellipsis. Indicates that the immediately preceding parameter or group of parameters can be repeated.
`monospace`	Indicates the name of a command or the name of a command option (sometimes called a *flag* or *switch*).
italic	Indicates a variable for which you need to supply a value.

Command parameters that are not enclosed within square brackets ([ ]) are required.

Important: The above symbols (and font styling) are based on the POSIX.1-2008 specification. These symbols are used in the command syntax only to clarify how to use the command parameters. *Do not enter these symbols on the command line.*

CHAPTER 1

Introduction

Oracle EM for FS Systems Overview

Oracle Enterprise Manager for Flash Storage Systems enables you to monitor an Oracle FS System from the Oracle Enterprise Manager version 11g.

Note: Within this documentation, the Oracle Enterprise Manager for Flash Storage Systems is referred to as the plug-in. The information in this document describes how to use the plug-in but does not provide detailed information on the Oracle FS System components. For detailed information on the Oracle FS System, review the *Oracle Flash Storage System Administrator's Guide*.

When you deploy the plug-in to Oracle Enterprise Manager, you can monitor the organization and components of your Oracle FS System. You can also view statistical metrics and generate reports.

Note: Make sure you use the plug-in designed to support the Oracle Flash Storage System, which is the Oracle Enterprise Manager for Flash Storage Systems. The Oracle Enterprise Manager for Pillar Axiom plug-in cannot be used to manage an Oracle Flash Storage System.

System Requirements

Make sure your system meets the requirements for Oracle Enterprise Manager for Flash Storage Systems and Oracle Enterprise Manager Grid Control 11g.

Oracle Enterprise Manager for Flash Storage Systems and Oracle Enterprise Manager Grid Control 11g require the software versions listed in the following table to function correctly:

Table 4: System requirements

Requirement	Version
Oracle FS System software	Release 6.0 or higher
Operating systems	Refer to the *Oracle Enterprise Manager Downloads* page (http://www.oracle.com/technetwork/oem/grid-control/downloads/index.html).

Monitoring Oracle FS Systems Overview

The Oracle Enterprise Manager for Flash Storage Systems enables you to view the organizational features and system components on your Oracle FS System. You can also view pre-defined reports and metrics to monitor system configuration and performance.

The plug-in allows you to view Oracle FS System LUN and Clone LUN details. You can also view regularly collected statistical metrics to monitor Oracle FS Systems, Pilots, Controllers, Drive Enclosures, and LUNs.

The plug-in also provides hardware reports, I/O reports, and storage usage reports that you can generate to monitor Oracle FS System configuration and performance. You can also create custom reports to supplement the available pre-defined reports.

Generating Oracle FS System Reports Overview

The Oracle Enterprise Manager for Flash Storage Systems provides pre-defined hardware, I/O, and storage usage reports that you can generate for the Oracle FS System.

Hardware reports include an Oracle FS System summary report, a report of the disk drives in the Drive Enclosures associated with the Oracle FS System, and a hardware status report.

The I/O Access for LUNs report charts input and output statistics for the 10 most active LUNs on the Oracle FS System.

The Storage Usage reports show storage use per LUN associated with the Oracle FS System, and how much storage is used for the different priority, data access, and I/O bias Quality of Service categories.

CHAPTER 2

Installation

Deploying the Plug-In Overview

You can download the archive package from the Oracle Technology Network (OTN) and import the archive package into Oracle Enterprise Manager.

For information on the plug-in deployment process, review the *Workflow of Plug-In Deployment* topic in either the Oracle Enterprise Manager online help or the *Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1)*.

Make sure you download and install the plug-in designed to support the Oracle Flash Storage System, which is the Oracle Enterprise Manager for Flash Storage Systems. The Oracle Enterprise Manager for Pillar Axiom plug-in cannot be used to manage an Oracle Flash Storage System.

Download the plug-in from the OTN and manually install the plug-in.

The plug-in is packaged in the `oracle_flash_storage_system_1.0.2.jar` file. You need to import the archive package to Oracle Enterprise Manager (OEM) to make the plug-in visible in the OEM GUI. When the plug-in is available in the GUI, you can deploy the plug-in to the management server and management agent.

Note: Make sure the plug-in can communicate with the Oracle Flash Storage System as described in this document.

Related Links

Port Assignments
Add Oracle FS System Targets
Download the Plug-In Archive
Log In to Oracle Enterprise Manager

Port Assignments

The Oracle Enterprise Manager for Flash Storage Systems plug-in communicates with the Oracle FS System through port 8083.

Ensure that port 8083 is available (not blocked by a firewall or security software) and that the port is enabled on the Management Agent before you activate the plug-in. The following table provides information for the WebCLI HTTPS port type.

Table 5: Required port

Port type	Port number	Description

WebCLI HTTPS	8083	The port on which the plug-in communicates with the Oracle FS System WebCLI service.
		Use the following CLI command to verify that this service is enabled:
		`$ fscli webcli -list`
		If necessary, use the following CLI command to enable the service:
		`$ fscli webcli -enable`

Note: For information on the firewalls, review information in either the Oracle Enterprise Manager online help or the *Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1)*.

Download the Plug-In Archive

The Oracle Enterprise Manager for Flash Storage Systems plug-in and documentation are distributed as a single zip archive that is available for download from the Oracle Technology Network (OTN).

Prerequisite: Join the *Oracle Technology Network* (http://www.oracle.com/technetwork/community/join/why-join/index.html) to gain access to software and documentation downloads.

1. On the OTN, open the *Oracle Flash Storage and Pillar Axiom Downloads* page (http://www.oracle.com/technetwork/server-storage/san-storage/downloads/index.html) in a web browser.
2. From Oracle FS System and Pillar Axiom Downloads, select Accept License Agreement.
3. Locate and select the name of the software package to download.
4. Open the software archive and extract the contents to your workstation.

   The software archive contains a readme text file listing the contents of the archive, the installation executable file, and documentation.

After you download the software, you can install the software.

(Optional) Import the Plug-In Archive Manually into OEM

To activate the Oracle Enterprise Manager for Flash Storage Systems plug-in on your Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1) client, add the plug-in to the Oracle Enterprise Manager repository and then deploy the plug-in to your management server and management agent.

Prerequisites:

- Login credentials for the management server.
- Login credentials for the management agent running on the management server.

- The path to the `oracle_flash_storage_system_1.0.2.jar` file you downloaded from OTN.

Import the plug-in to the Oracle Enterprise Manager and then deploy the plug-in to the management server and the management agent from the Plug-Ins page.

Import the plug-in archive to the Oracle Software Library. Refer to *Importing Plug-In Archives* topic in the Oracle Enterprise Manager online help or theOracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1).

Verify Installation of the Plug-In

After you install the Oracle Enterprise Manager for Flash Storage Systems plug-in, verify that the plug-in was installed correctly.

Verify the installation of the plug-in after deploying the plug-in.

Follow the steps listed in *Verify Deployed Plug-Ins* topic in the Oracle Enterprise Manager online help or the *Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1).*

The plug-in appears in the Name column and the number one (1) or the number of agents appears in the Management Agent with Plug-in column. You can also verify the version under the Version column.

(Optional) Undeploy the Plug-In

You can remove the Oracle Enterprise Manager for Flash Storage Systems from Oracle Enterprise Manager when the plug-in is no longer needed.

Prerequisites:

- Log-in credentials for the management server.
- Log-in credentials for the management agent running on the management server.

To remove the plug-in, follow the steps to undeploy from the Oracle management agent.

1. Follow the instructions in either the *Undeploying Plug-Ins from Oracle Management Agent* topic in the Oracle Enterprise Manager online help or the *Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1)* to undeploy the Oracle Flash Storage System plug-in.
2. Verify that you removed the plug-in by following the instructions in the *Verifying Deployed Plug-Ins* topic in either the Oracle Enterprise Manager online help or the *Oracle Enterprise Manager Administration Guide 11g Release 1 (11.1.0.1).*

Log In to Oracle Enterprise Manager

Oracle Enterprise Manager Grid Control is a web application that you launch from your browser. You must log in to Oracle Enterprise Manager to use the plug-in to access the Oracle FS System.

Prerequisites:

- Server name and port for your Oracle Enterprise Manager installation
- Login credentials for Oracle Enterprise Manager.

Both can be obtained from your Oracle Enterprise Manager administrator

1. Start your web browser.
2. In the URL field, enter the server name and port for your Oracle Enterprise Manager installation.
3. Enter your Oracle Enterprise Manager user name and password, and click Login.

Administrator Accounts Overview

Oracle recommends creating a unique administrator account or accounts for the plug-in Monitoring Credential accounts for the Oracle Enterprise Manager for Flash Storage Systems. You use these accounts to monitor the Oracle FS System from the plug-in.

You can create multiple administrator accounts in an Oracle FS System. Additional accounts are not necessary but Oracle recommends you create at least one Administrator 2 account on each Oracle FS System for the plug-in.

An administrator with Administrator 1 privileges needs to create the plug-in account on the Oracle FS System. The administrator who creates the account provides the name and password for the account to the plug-in administrator. Oracle does not recommend using the Oracle FS System Primary Administrator account for the plug-in account.

Oracle recommends assigning Administrator 2 privileges for these accounts based on the administrator's role. For example, you must be logged in with an Administrator 1 account to create or modify storage resources or perform tasks other than monitor and generate reports on the Oracle FS System.

Refer to the *Oracle Flash Storage System Administrator's Guide* for details about administrator accounts and assigned privileges on the Oracle FS System.

Note: When you add a target, you create a monitoring credential account. This account uses an administrator account on the Oracle FS System to monitor and run reports about the Oracle FS System target.

Refer to the *Oracle Flash Storage System Administrator's Guide* for details about creating administrator accounts on the Oracle FS System.

Add Oracle FS System Targets

Before you can monitor or manage an Oracle FS System in Oracle Enterprise Manager, you must add the system as a target. When you add an Oracle FS System as a target, you also create a Monitoring Credential account. The Monitoring Credential account is used to monitor the Oracle FS System and generate reports.

Prerequisites:

- Host name for the Oracle FS System target
- Login credentials for the Oracle FS System target

  These credentials are for an administrator account on the Oracle FS System.

  Your Oracle FS System administrator can provide this information.

You add targets from the Targets tab at the top of the Oracle Enterprise Manager page.

1. Select Targets > All Targets.
   All available targets are listed.
2. Locate Agents in the Type column and click the corresponding fully qualified domain name link in the Name column.
   The list of existing Oracle Flash Storage Systems displays.
3. From the Add drop-down list, select Oracle Flash Storage System.
4. Click Go.
5. Enter a name for the target in the Name field.
6. Enter the fully qualified domain name (for example: **`coaxm013.us.oracle.com`**) of the Oracle Flash Storage System in the Host field.
7. Provide login credentials for the Oracle FS System administrator account in the Login and Password fields. This creates a Monitoring Credential for the target.

   Important: Take extra care when providing login credentials because the plug-in does not verify the credentials. If you enter an incorrect name or password, the system locks you out without the opportunity to re-enter the credentials and a login failure event is generated every two seconds in the Oracle FS System. The plug-in has no management capabilities; therefore, it is best practice to always use Administrator 2 privileges when performing plug-in tasks.
8. Click OK.

A target is added as well as a Monitoring Credential for that target. You can monitor and run reports for that target.

Set Up Blackout Period

Before changing your password on the Oracle FS System account you use with the Oracle Enterprise Manager, you must create a blackout period to prevent Oracle Enterprise Manager from trying to log in to the Oracle FS System while the password is being updated.

Prerequisites:

- Host name for the Oracle FS System target.
- Login credentials for the Oracle FS System target.

Your Oracle FS System system administrator can provide this information.

These credentials are for an administrator account on the Oracle FS System.

You create a blackout period from the All Targets list at the Oracle Enterprise Manager page.

1. Select Targets > All Targets.
   All available targets are listed.
2. Select an Oracle Flash Storage System from the list.
   The Details page for the selected Oracle Flash Storage system displays.
3. Click Blackouts at the bottom of the page.
4. Enter a name for the blackout period. For example, **`Oracle FS System password change`**.
5. (Optional) Enter more detail in the Comments text box.
6. From the Reason pull-down, select Apps: Application Password Change.
7. Uncheck the Run jobs during the blackout... checkbox to disable jobs from being run from OEM. You do not want any jobs running during the blackout period as any job running from OEM to the Oracle FS System can cause login issues during a password change.
8. Under Targets, select Add, and then locate theOracle Flash Storage System you are creating the blackout period for to change the administrator password.
9. Select the Select checkbox next to the Oracle Flash Storage System you selected.
10. Select Next to advance through the wizard and enter the schedule information.
11. Select Finish to create the blackout schedule.

A blackout is created and begins based on the schedule you created. For more information on blackout periods, review the Oracle Enterprise Manager online help for additional information.

After the blackout schedule is created, go to the Oracle FS System and change the administrator password during the blackout period.

Change Monitoring Configuration

When you add a target, you create a monitoring configuration. After you add the target, you can change the monitoring configuration including the user ID and password. You can also delete the monitoring configuration.

Prerequisites:

- Host name for the Oracle FS System target
- Login credentials for the Oracle FS System target

  These credentials are for an administrator account on the Oracle FS System.

  Your Oracle FS System system administrator can provide this information.

You access Monitoring Credentials the from the Setup menu at the top of the Oracle Enterprise Manager page.

1. Select Targets > All Targets.
   All available targets are listed.
2. Select an Oracle Flash Storage System from the list.
   The Details page for the selected Oracle Flash Storage System displays.
3. Select **Monitoring Configuration** at the bottom of the page.
4. Change the login credentials for the Oracle FS System in the Login and Password fields.
5. Click OK.

The credentials are changed. Make sure the changes you make to this account are made to the account on the Oracle FS System.

CHAPTER 3

Monitor Oracle FS Systems

Oracle FS System Configuration and Metrics Overview

Oracle Enterprise Manager collects configuration and metric data for the Oracle FS System and SAN Hosts added as targets. A pre-defined set of configuration and metrics is collected for each Oracle FS System target.

Oracle Enterprise Manager collects configuration and metric data for these components of an Oracle FS System:

- Controllers
- Disk Drives
- Drive Enclosures
- LUNs
- Oracle FS System (overall system)
- Pilots
- SAN Hosts.

You can view Oracle FS System configuration data and metrics in Oracle Enterprise Manager. You can change the collection schedule and edit thresholds and collection settings for the configuration data and metrics. The majority of the metrics are accessed from Monitoring > All Metrics and configuration data is accessed from **Configuration** > **Latest Configuration**.

Note: Some metrics displayed under Monitoring > All Metrics may not contain data as the metric is not implemented in this product release.

View Oracle FS Configuration Data and Metrics

One or more Oracle FS Systems added as an Oracle Enterprise Manager target

The Oracle FS System for which you want to view configuration data or metrics must be selected as the target.

1. Select Oracle Flash Storage System > Monitoring > All Metrics for metrics.
   A list of the categories of all configuration data or metrics collected for the target Oracle Flash Storage System displays in the navigation pane.
2. Select a category of configuration data or metrics.

A table of specific configuration data or metrics available for that category displays in the content pane.

Update Metrics Collection Schedule

You can change the collection schedule for metrics. The collection schedule defines how often data, such as LUN statistics is collected.

1. Select Targets > All Targets.
   All available targets are listed.
2. Click the Oracle FS System for which you want to view and change metrics.
   The Details page for the selected Oracle FS System displays.
3. Click **Metric and Policy Settings** at the bottom of the page.
   A list of the categories of configuration data or metrics collected for the target Oracle FS System displays.
4. To change threshold settings for this category of configuration data, click the Edit icon.
   The Advanced Threshold Settings page displays. Here, you can modify the Warning Threshold, the Critical Threshold, the number of occurrences, and the collection schedule.
5. After you have finished modifying the collection schedule, click Continue.
6. Select OK to save your changes.
   The updated collection schedule is implemented.

CHAPTER 4

Manage Oracle FS System Reports

Generating Oracle FS System Reports Overview

The Oracle Enterprise Manager for Flash Storage Systems provides pre-defined hardware, I/O, and storage usage reports that you can generate for the Oracle FS System.

Hardware reports include an Oracle FS System summary report, a report of the disk drives in the Drive Enclosures associated with the Oracle FS System, and a hardware status report.

The I/O Access for LUNs report charts input and output statistics for the 10 most active LUNs on the Oracle FS System.

The Storage Usage reports show storage use per LUN associated with the Oracle FS System, and how much storage is used for the different priority, data access, and I/O bias Quality of Service categories.

Generate Reports

You can generate pre-defined reports for any Oracle FS System system previously added as a target.

One or more Oracle FS Systems added as an Oracle Enterprise Manager target

If the Oracle FS System for which you want to generate the report is not already selected as the target, you can specify the Oracle FS System to serve as the target for the report.

1. Click the Reports tab.
2. On the Report Definitions page, if not expanded, click Expand All.
3. Provide a title for the report search.
4. Select Oracle Flash Storage System from the dropdown list.
5. Click Go.
6. Locate and click the report you want to view.
   The Specify Target for Report dialog displays.
7. Verify the name of the target in the Target field.
   If no target is specified, click the magnifying glass icon to search for a target Oracle Flash Storage System to include in the report.
8. Click Continue.

The selected report displays in a new window.

9 (Optional) To capture the output of the report, do either of the following:

- Click Printable Page and use the web browser print function to print the report.
- Click the comma icon in the top right corner of a report to open the report or save it as a comma-separated value (CSV) file.

For detailed information or definitions about the displayed data, review the *Oracle Flash Storage System Administrator's Guide*.

APPENDIX A

Oracle FS System Configuration Data and Metrics

Oracle Enterprise Manager collects a pre-defined set of configuration data and metrics for each Oracle FS System added as a target.

The following table identifies the categories of metrics collected. You can modify the values associated with these metrics by navigating either Oracle Flash Storage System > Monitoring > **Metric and Collection Settings** or Oracle Flash Storage System > Monitoring > All Metrics.

Note: For detailed information or definitions about the displayed data, review the *Oracle Flash Storage System Administrator's Guide*.

Table 6: Metrics collected for Oracle FS Systems

Category	Collected metrics
Controller Details	• Serial Number • Name • Operational Status • Type
Disk Drives	• Serial Number • Capacity (GB) • Drive Enclosure Name • Drive Number • Operational Status

Table 6: Metrics collected for Oracle FS Systems (continued)

Category	Collected metrics
Drive Enclosure Details	• FQN • Model • Name • Operational Status • Serial Number • Temperature Status • WWN
Event Details	• Timestamp • Category • Component Name • Component GUID • Contact Name • Contact Phone Number • Description • Name • Severity • Type

Table 6: Metrics collected for Oracle FS Systems (continued)

Category	Collected metrics
LUN Details	• LUID (LUN unique identifier) • Access Bias • Active • Addressable Capacity (Bytes) • Addressable Capacity (GB) • Allocated Capacity (Bytes) • Allocated Capacity (GB) • Allocated Clone Capacity (Bytes) • Allocated Clone Capacity (GB) • Assigned Controller FQN • Clone • Current Controller FQN • AutoTier • IO Bias • ID • Logical Maximum Clone Capacity (Bytes) • Logical Maximum Clone Capacity (GB) • Management State • Name • Priority • Redundancy • Remaining Capacity • Remaining Clone Capacity (%) • Remaining Clone Capacity (GB) • Source LUN FQN • Source LUN Name • Status • Storage Class • Storage Domain FQN • TierReallocationEnabled • Used Clone Capacity (Bytes)

Table 6: Metrics collected for Oracle FS Systems (continued)

Category	Collected metrics
	• Used Clone Capacity (GB) • Volume Group
LUN Statistics	• Serial Number • Cache Flushes each Second • Cache Hit Ratio • LUN FQN • LUN ID • LUN Name • Non-Optimized I/O each Second • Read Block Size • Read Bytes Per Second • Read I/Os Per Second • Read Latency • Read Queue Depth • Total Block Size • Total Bytes Each Second • Total I/Os Each Second • Total Latency • Total Queue Depth • Write Block Size • Write Bytes Each Second • Write I/Os Each Second • Write Latency • Write Queue Depth
Pilot Details	• Name • Mode • Operational Status • Serial Number • Version String • Build Version • Release Version

Table 6: Metrics collected for Oracle FS Systems (continued)

Category	Collected metrics
Response **Note:** The Response category represents the communication between Oracle Enterprise Manager and the Oracle FS System. It does not necessarily relate to the system's status or the system's health.	• Status
SAN Host Details	• Status • SAN Host Name • SAN Host FQN • SAN Host ID • FSPM Version • IP Address • SAN Host Operating System
System Details	• Serial Number • Allocated Space (%) • Allocated Space (GB) • Contact Name • Contact Phone Number • IP Address • Model Name • Operational Status • Remaining Space (%) • Remaining Space (GB) • System Name • Total Space (GB)
Other Collected Items	• System Details_Config • Drive Enclosures Software_Config • Pilot Software_Config • Controller Software_Config

APPENDIX B

Oracle FS System Reports

Hardware Reports

Hardware reports provide an overview of the system, and details about the drives, and status of all hardware components.

Oracle FS System Summary

The Oracle FS System Summary report provides an overview of the system properties, storage usage, and software installed on the components of the selected Oracle FS System.

Disk Drives

The Oracle FS System Disk Drives report lists the properties and status of all drives on each Drive Enclosure associated with the selected Oracle FS System.

Hardware Status

The Hardware Status report provides the status of each component of the selected Oracle FS System.

Oracle FS System I/O Reports

The Oracle Enterprise Manager for Flash Storage Systems provides one I/O report: the I/O Access for LUNs report.

The I/O Access for LUNs report charts input and output statistics for the ten 10 most active LUNs on the Oracle FS System.

The top portion of the report is a pie chart that shows the percentage of I/O that has occurred on each LUN during the collection period.

The bottom portion of the report is a bar graph that shows the amount of I/O that has occurred on each of the 10 most active LUNs on the selected Oracle FS System.

Oracle FS System Storage Usage Reports

The Oracle Enterprise Manager for Flash Storage Systems provides two storage usage reports: a Storage Usage by LUN report, and a Storage Usage for LUN by QoS report.

A graph of the top 10 LUNs show the percentage of total space and the percentage of allocated space on the selected Oracle FS System.

The Storage Usage for LUN by QoS report consists of three pie charts that show the percentage of storage usage by LUNs that have priority, data access, or I/O bias Quality of Service (QoS) attributes.

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