Oracle® Enterprise Manager

System Monitoring Plug-in Metric Reference Manual for Storage Management

10*g* Release 2 (10.2.0.2)

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Oracle Enterprise Manager System Monitoring Plug-in Metric Reference Manual for Storage Management 10*g* Release 2 (10.2.0.2)

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Preface

This manual is a compilation of the plug-ins metrics provided in Oracle Enterprise Manager for storage management.

Audience

This document is intended for Oracle Enterprise Manager users interested in plug-ins metrics for storage management.

Documentation Accessibility

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Related Documents

For more information, see the following documents in the Oracle Enterprise Manager 10*g* Release 2 documentation set:

- *Oracle Enterprise Manager System Monitoring Plug-in Installation Guide for EMC Celerra Server*
- *Oracle Enterprise Manager Concepts*
- *Oracle Enterprise Manager Grid Control Quick Installation Guide*
- *Oracle Enterprise Manager Grid Control Quick Installation Guide*
- *Oracle Enterprise Manager Grid Control Installation and Basic Configuration*
- *Oracle Enterprise Manager Configuration for Oracle Collaboration Suite*
- *Oracle Enterprise Manager Advanced Configuration*
- *Oracle Enterprise Manager Policy Reference Manual*
- *Oracle Enterprise Manager Extensibility*
- *Oracle Enterprise Manager Command Line Interface*
- *Oracle Enterprise Manager SNMP Support Reference Guide*
- *Oracle Enterprise Manager Licensing Information*

Conventions

The following text conventions are used in this document:

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

How to Use This Manual

The *System Monitoring Plug-in Metric Reference Manual for Storage Management* lists all the plug-ins metrics for storage management that Enterprise Manager monitors. This manual shows all the metric help available online, eliminating the need to have the Grid Control Console up and running.

This preface describes:

Structure of the Metric Reference Manual

This manual currently contains one chapter for the EMC Celerra Server. The metrics in this chapter appear in alphabetical order according to category.

Metric Information

The information for each metric comprises a description and user action if available:

- Description

  Provides an explanation following the metric name. This text defines the metric and, when available, provides additional information pertinent to the metric.

- User Action

  Suggests how to solve the problem causing the alert.

Definitions of Columns in Metric Summary Tables

The Metric Summary table in the Grid Control Console is part of the overall metric information. The following table provides descriptions of columns in the Enterprise Manager Metric Summary table.

Column Header	Column Definition
Target Version	Version of the target, for example, 9.0.2.x and 10.1.0.x. The x at the end of a version (for example, 9.0.2.x) represents the subsequent patchsets associated with that release.
Server Evaluation Frequency	The rate at which the metric is evaluated to determine whether it has crossed its threshold. For server-generated alerts, the evaluation frequency is determined by Oracle Database internals. For example, if the evaluation frequency is 10 minutes, then when the Average File Write Time degrades to the point an alert should trigger, it could be almost 10 minutes before Enterprise Manager receives indication of the alert. This column is present in the Metric Collection Summary table only for Oracle Database 10*g* metrics.

Column Header	Column Definition
Collection Schedule	The rate at which the Management Agent collects data. The collection frequency for a metric comes from the Enterprise Manager default collection file for that target type.
Upload Interval	The rate at which the Management Agent moves data to the Management Repository. For example, upload every n^{th} collection. The upload frequency for a metric comes from the Enterprise Manager default collection file for that target type. This column is present in the Metric Collection Summary table only when the Upload Frequency is different from the Collection Frequency.
Comparison Operator	The comparison method Enterprise Manager uses to evaluate the metric value against the threshold values.
Default Warning Threshold	Value that indicates whether a warning alert should be initiated. If the evaluation of the warning threshold value returns a result of TRUE for the specified number of consecutive occurrences defined for the metric, an alert triggers at the warning severity level.
Default Critical Threshold	Value that indicates whether a critical alert should be initiated. If the evaluation of the critical threshold value returns a result of TRUE for the specified number of consecutive occurrences defined for the metric, an alert triggers at the critical severity level.
Consecutive Number of Occurrences Preceding Notification	Consecutive number of times a metric's value reaches either the warning threshold or critical threshold before a notification is sent.
Alert Text	Message indicating why the alert was generated. Words that display between percent signs (%) denote variables. For example, `Disk Utilization for %keyValue% is %value%%` could translate to `Disk Utilization for d0 is 80%`.

Abbreviations and Acronyms

To reduce the page count in this document, the following abbreviations and acronyms are used:

Abbreviation/Acronym	Name
Agent	Oracle Management Agent
Database	Oracle Database
OMS	Oracle Management Service
Repository	Oracle Management Repository

Background Information on Metrics, Thresholds, and Alerts

A metric is a unit of measurement used to determine the health of a target. It is through the use of metrics and associated thresholds that Enterprise Manager sends out alerts notifying you of problems with the target.

Thresholds are boundary values against which monitored metric values are compared. For example, for each disk device associated with the Disk Utilization (%) metric, you can define a different warning and critical threshold. Some of the thresholds are predefined by Oracle, others are not.

Once a threshold is reached, an alert is generated. An alert is an indicator signifying that a particular condition has been encountered and is triggered when one of the following conditions is true:

- A threshold is reached.
- An alert has been cleared.

- The availability of a monitored service changes. For example, the availability of an application server changes from up to down.
- A specific condition occurs. For example, an alert is triggered whenever an error message is written to a database alert log file.

Alerts are detected through a polling-based mechanism by checking for the monitored condition from a separate process at regular, predefined intervals.

> **See Also:** See the *Oracle Enterprise Manager Concepts* manual and the Enterprise Manager online help for additional information about metrics, thresholds, and alerts

Editing

Out of the box, Enterprise Manager comes with thresholds for critical metrics. Warning and critical thresholds are used to generate an alert, letting you know of impending problems so that you can address them in a timely manner.

To better suit the monitoring needs of your organization, you can edit the thresholds provided by Enterprise Manager and define new thresholds. When defining thresholds, the key is to choose acceptable values to avoid unnecessary alerts, while still being notified of issues in a timely manner.

You can establish thresholds that will provide pertinent information in a timely manner by defining metric baselines that reflect how your system runs for a normal period of time.

The metrics listed on the Edit Thresholds page are either default metrics provided by Oracle or metrics whose thresholds you can change.

Specifying Multiple Thresholds

The Specifying Multiple Thresholds functionality allows you to define various subsets of data that can have different thresholds. By specifying multiple thresholds, you can refine the data used to trigger alerts, which are one of the key benefits of using Enterprise Manager.

The key in specifying multiple thresholds is to determine how the comparison relates to the metric threshold as a whole. What benefit will be realized by defining a more stringent or lax threshold for that particular device, mount point, and so on?

For example, using the Average Disk I/O Service Time metric, you can define warning and critical thresholds to be applied to all disks (sd0 and sd1), or you can define different warning and critical thresholds for a specific disk (sd0). This allows you to adjust the thresholds for sd0 to be more stringent or lax for that particular disk.

Accessing Metrics Using the Grid Control Console

To access metrics in the Grid Control Console, use the All Metrics page associated with a particular target by doing the following:

1. From the Grid Control Console, choose the target.
2. On the target's home page, click All Metrics in the Related Links section.
3. On the All Metrics page, choose the metric of interest and click Help. The help for that metric appears.

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EMC Celerra NAS Server Metrics

This chapter provides descriptions for all EMC Celerra NAS Server metric categories, and tables list and describe associated metrics for each category. The tables also provide user actions if any of the metrics for a particular category support user actions.

1.1 Check Points Metrics

The metrics in this category provide information about existing SnapSure Checkpoints for all mounted production file systems on all data movers in the Celerra Server.

Default Collection Interval — Every 15 minutes

Table 1–1 Check Points Metrics

Metric	Description and User Action
Backup Timestamp	Timestamp of SnapSure Checkpoint creation or last refresh.
Checkpoint Volume Available Space (GB)	Available space in the Checkpoint SaveVol.
Checkpoint Volume Size (GB)	Total size of the Checkpoint SaveVol.
Checkpoint Volume Used Space (GB)	Used space of the Checkpoint SaveVol.
Checkpoint Volume Used (%)	Percent used of the Checkpoint SaveVol. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Is Inactive	State of the SnapSure Checkpoint. Possible status values are: ■ Active — Checkpoint is normal and functioning properly. ■ Inactive — Contents were deleted because the system ran out of space to store Checkpoints. For this status, either refresh or delete SnapSure Checkpoint and take corrective action using EMC administrative tools. ■ Restoring — The production file system is currently being restored from this checkpoint.
Name	SnapSure Checkpoint name.
Production File System	File system of which this Checkpoint is an image.
VPFS	Name of the SaveVol where the Checkpoint is stored.

1.2 Data Mover Network Throughput Metrics

The metrics in this category provide information about the average network throughput of all network interfaces for each Data Mover in the Celerra server.

Default Collection Interval — Every 10 minutes

Table 1–2 Data Mover Network Throughput Metrics

Metric	Description
Data Mover	Data Mover name.
Network Throughput (KB/sec)	Average network throughput on all network interfaces.

1.3 Data Mover Status Metrics

The metrics in this category provide information on Data Movers and their status properties.

Default Collection Interval — Every 5 minutes

Table 1–3 Data Mover Status Metrics

Metric	Description and User Action
Data Mover CPU (%)	Data Mover CPU utilization. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Data Mover Memory (%)	Data Mover memory utilization. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Data Mover Status	Status of the Data Mover (enabled or disabled). This determines whether the Data Mover is up. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Name	Data Mover name.
Status Actual	■ Online, active — Online and has mounted file systems. ■ Online, ready — Online but does not have any mounted file systems (standby mode).
Up Time	Elapsed time since the last Data Mover reboot.

1.4 File Systems Metrics

The metrics in this category provide information about the list of existing uxfs file systems.

Default Collection Interval — Every 15 minutes

Table 1–4 File Systems Metrics

Metric	Description and User Action
Available Space (GB)	Available space in the file system.
File System	Name of the file system.
File System Used (%)	Percentage of used space. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Max Files	Maximum number of files (inode count) in the file system.
Size (GB)	Size of the file system.
Storage Pool Name	Storage pool on which the file system is created.
Used Space (GB)	Used space in the file system.
Volume Name	Volume on which the file system is created.

1.5 NFS Exports Metrics

The metrics in this category provide information on all NFS exports and access hosts of the Celerra Server.

Default Collection Interval — Every 12 hours

Table 1–5 NFS Exports Metrics

Metric	Description
Access Hosts	All hosts, IP addresses, or subnets that are granted mount access to the export.
Data Mover	Data Mover from which the file system is exported.
Export	Complete path to the directory from its mount point.
Read-Only Hosts	All hosts, IP addresses, or subnets that are granted read-only access to the export.
Read-Write Hosts	All hosts, IP addresses, or subnets that are granted read-write mount access to the export.
Root Hosts	All hosts, IP addresses, or subnets that are granted root access to the export.

1.6 NFS Operations Metrics

The metrics in this category provide information about average call time and NFS operations per second.

Default Collection Interval — Every 10 minutes

Table 1–6 NFS Operations Metrics

Metric	Description and User Action
Average Call Time	Triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Data Mover	Data Mover on which the statistics are reported.
NFS Bad Calls (v2 and v3) (%)	NFS bad calls percentage. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
NFS Calls per Second (v2 and v3) (%)	Operations per second. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.

1.7 NFS Statistics Metrics

The metrics in this category provide information about nfsstat information.

Default Collection Interval — Every 10 minutes

Table 1–7 NFS Statistics Metrics

Metric	Description and User Action
Data Mover	Data Mover on which the statistics are reported.
Failures	Bad calls due to packet drops, which can be used to tune NFS configuration attributes.
ms/call	Milliseconds per call, which can be used to tune NFS configuration attributes.
Name	NFS call type, such as null, setattr, getattr, and so forth.
ncalls	Total number of calls of this type, which can be used to tune NFS configuration attributes.
% Total Calls	Percentage of total calls, which can be used to tune NFS configuration attributes.
Version	NFS version (V2 or V3).

1.8 Network Devices Metrics

The metrics in this category provide information about existing network devices on the system. By default, each physical port on a Network Interface Card (NIC) is a device unless the port is added to a virtual device.

Default Collection Interval — Every 12 hours

Table 1–8 Network Devices Metrics

Metric	Description
Data Mover	Data Mover on which the device is configured.
Name	Port of virtual device name.
Speed/Duplex	Current speed and duplex setting of the device.
Type	Type of network device, which could be a port, Ethernet channel, fail-safe network, or link aggregation.

1.9 Network Interfaces Metrics

The metrics in this category provide information about network interfaces on Data Movers.

Default Collection Interval — Every 12 hours

Table 1–9 Network Interfaces Metrics

Metric	Description
Address	IP address of the interface.
Broadcast Address	IP address used for broadcasting to all stations.
Data Mover	Data Mover on which the interface is configured.
Device	Port or virtual device on which the interface is configured.
MTU	Maximum Transmission Unit (MTU) size for packets using this interface.
Name	Name of the database.
Netmask	Network address mask of the interface.
Network Interface Status	Interface status, which is Up or Down.
VLAN ID	Virtual LAN identifier. A value of zero (0) means that there is no VLAN ID, and VLAN tagging is not enabled.

1.10 Network Statistics Metrics

The metrics in this category provide netstat information on different network interfaces of data movers in the Celerra system.

Default Collection Interval — Every 10 minutes

Table 1–10 Network Statistics Metrics

Metric	Description and User Action
Data Mover	Data Mover on which the statistics are reported.
Ibytes	Total bytes received on this device. Use this metric to tune network configuration attributes.
MTU	Means Maximum Transfer Unit.
Name	Network device name.
Network Throughput (KB/sec)	Network throughput of this device. Use this metric to tune network configuration attributes.
Obytes	Total bytes sent on this device. Use this metric to tune network configuration attributes.
Receive Rate (bytes/sec)	Throughput - Bytes received per second. Use this metric to tune network configuration attributes.
Send Rate (bytes/sec)	Throughput -Bytes sent per second. Use this metric to tune network configuration attributes.
Total Network Receive Errors	Total network receive errors on this device. Use this metric to tune network configuration attributes.
Total Network Send Errors	Total network send errors on this device. Use this metric to tune network configuration attributes.

1.11 Pools Metrics

The metrics in this category provide information about the list of Automatic Volume Management (AVM) storage pools and detailed information about each storage pool.

Default Collection Interval — Every 15 minutes

Table 1–11 Pools Metrics

Metric	Description and User Action
Clients	List of file systems or SavVols using the storage pool.
Description	Description of the storage pool, such as CLARiiON RAID5 4plus1 and CLARiiON RAID5 on S-ATA.
Disk Type	Disk type used by the storage pool.
Is Dynamic?	Applies only to system-defined storage pools. Indicates if the storage pool can extend automatically. (True/False)
Is User Defined?	Indicates whether system-defined or user-defined. (True/False)
Members	List of member volumes in the storage pool.
Name	Name of the storage pool.
Size (GB)	Total capacity of the storage pool.
Storage Pool Used (%)	Total allocated space. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Used (GB)	Percentage of allocated space.

1.12 Response Metrics

Based on the Control Station TCP ping status, the metrics in this category determine whether the Celerra Server target is up.

Default Collection Interval — Every 2 minutes

Table 1–12 Response Metrics

Metric	Description
Status	Indicates up or down by the pinging control station. If down, check the control station to determine why it is not reachable.
TCP Ping, Milliseconds	Time required to complete the ping operation. This triggers an alert based on threshold settings.

1.13 Routing Metrics

The metrics in this category provide information about static routes defined for a Data Mover.

Default Collection Interval — Every 12 hours

Table 1–13 Routing Metrics

Metric	Description
Data Mover	Data Mover on which the route is defined.
Destination	IP address of the route destination.
Gateway	IP address of the gateway used to reach the destination addresses.
Interface	Interface associated with the route.
Netmask	Subnet mask of the interface.

1.14 Storage System Status Metrics

The metrics in this category provide the status of the back-end storage system.

Default Collection Interval — Every 5 minutes

Table 1–14 Storage System Status Metrics

Metric	Description and User Action
ClariionID/SymmID	Clariion or Symmetrix ID of the system.
Is Captive	Is the storage system captive?
Is Connected	Is the component currently connected? Determines if the storage system is up or not. If not connected, check the error condition of the storage system.
Is Storage System FailedOver	Is the component presently failed over? This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Name	Model and serial number of the storage system.

1.15 Volumes Metrics

The metrics in this category provide information about the list of existing volumes and detailed information about each volume and how it is used.

Default Collection Interval — Every 15 minutes

Table 1–15 Volumes Metrics

Metric	Description and User Action
Client Type	Client - Volume type (slice, strip, disk, pool) or file system.
Clients	Volumes of file systems that use this volume.
Disk Type	Disk volume type, such as CLSTD, CLATA, and so forth.
InUse	Is in use by other volumes or file systems.
Name	Name of the volume.
Size (GB)	Total capacity of the volume.
Type	Type of the volume: disk, slice, stripe, meta, or pool.
Used Capacity (GB)	Space used in gigabytes.
Type	Percentage of space used. This triggers an alert based on threshold settings. Take corrective action using EMC administrative tools.
Volumes	Volumes that are part of this volume.