Oracle® Enterprise Manager

System Monitoring Plug-in Metric Reference Manual for Storage Management

10*g* Release 2 (10.2.0.4)

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Oracle Enterprise Manager System Monitoring Plug-in Metric Reference Manual for Storage Management 10*g* Release 2 (10.2.0.4)

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Preface

This manual is a compilation of the plug-in metrics provided in Oracle Enterprise Manager for the following:

- System monitoring plug-in metrics for storage management
- Network Appliance Filer metrics

> **Note:** Network Appliance Filer-related metrics are not part of the System Monitoring Plug-in release. They are part of the Enterprise Manager Grid Control release.

Audience

This document is intended for Oracle Enterprise Manager users interested in the following metrics:

- System monitoring plug-in metrics for storage management
- Network Appliance Filer metrics

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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
- Background Information on Metrics, Thresholds, and Alerts

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.

Table 1–10 (Cont.) Network Statistics Metrics

Metric	Description and User Action
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.

Table 1–15 (Cont.) Volumes Metrics

Metric	Description and User Action
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.
Volume	Volumes

2

EMC CLARiiON Metrics

This chapter provides descriptions for all EMC CLARiiON metric categories and describes associated metrics for each category. The tables also provide user actions if any of the metrics for a particular category support user actions.

The plug-in can be used to monitor CLARiiON Arrays. Metrics have been provided to monitor the dynamic performance statistics and the static configuration details of the CLARiiON Array.User friendly reports have been provided to view the performance charts of the devices being monitored and the usage of the devices that have databases installed on them.

2.1 Response Metrics

The metrics in this category provide information about the UP/DOWN status of the CLARiiON Array being monitored.

Default Collection Interval — Every 2 minutes

Table 2–1 Response Metrics

Metric	Description	Target Version	Upload Frequency	Operator	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
CLARiiON Status	The metric provides the UP/DOWN Status of the CLARiiON target that is being monitored by the plug-in.	All Versions	After Every Sample	=	0	1	%target% is unreachable over the network or is down.

2.2 CLARiiON Applications Metrics

The metrics in this category provide information about the applications that are installed on the array.

Default Collection Interval — Every 10 minutes

Table 2–2 CLARiiON Applications Metrics

Metric	Description
Revision Number	The metric gives the revision number of the software.
Active State	The metric shows if the application is in active or inactive state.
Commit Required	The metric shows if the application has been committed after installation or not.

Table 2–2 (Cont.) CLARiiON Applications Metrics

Metric	Description
Revert Possible	The metric is used to know if revert is possible for the installed software or not.
Installation Complete	This metrics provides information whether the installation of the application is complete.
System Software	This metrics provides information whether the installed application is installed on System Software.

2.3 Hosts Connected Metrics

The metrics in this category provide information about the hosts connected to the CLARiiON.

Default Collection Interval — Every 5 minutes

Table 2–3 Host Connected Metrics

Metric	Description and User Action
Host Name	Hosts connected to the CLARiiON.
IP Address	IP address of the host connected to the CLARiiON.

2.4 MetaLUN Statistics Metrics

The metrics in this category provide information about the statistics of the metaLUNs configured on the CLARiiON.

Default Collection Interval — Every 15 minutes

Upload Frequency — After every sample

For these metrics, you can set different warning and critical threshold values for each "MetaLUN ID" object. If warning or critical threshold values are currently set for any "MetaLUN ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "MetaLUN ID" object, use the Edit Thresholds page.

Table 2–4 MetaLUN Statistics Metrics

Metric	Description and User Action	Operator	Consecutive Number of Occurrences Preceding Notification	Alert Text
MetaLUN Name	Name of the MetaLUNs configured in the CLARiiON.			
MetaLUN Reads Per Second(IO/s)	Reads Per Second(IO/s) of the configured MetaLUNs.	>	1	Reads Per Second of MetaLUN %meta_id% is %value%, crossed warning (%warning_ threshold%) or critical (%critical_ threshold%) threshold.
MetaLUN Writes Per Second (IO/s)	Writes Per Second (IO/s) of the configured MetaLUNs.	>	1	Writes Per Second of MetaLUN %meta_id% is %value%, crossed warning (%warning_ threshold%) or critical (%critical_ threshold%) threshold.
MetaLUN Read Throughput(KB/s)	Read Throughput(KB/s) of the configured MetaLUNs.	>	1	Read Throughput of MetaLUN %meta_id% is %value%, crossed warning (%warning_ threshold%) or critical (%critical_ threshold%) threshold.
MetaLUN Write Throughput(KB/s)	Write Throughput(KB/s) of the configured MetaLUNs.	>	1	Write Throughput of MetaLUN %meta_id% is %value%, crossed warning (%warning_ threshold%) or critical (%critical_ threshold%) threshold.
Expansion Rate	Expansion rate of the MetaLUNs.	NA	NA	NA
Percent Expanded	Percentage of the MetaLUN Expanded.	NA	NA	NA

2.5 MetaLUN Statistics Summary Metrics

The metrics in this category provide information about metaLUN statistics summary.

Default Collection Interval — Every 12 hours

Table 2–5 MetaLUN Statistics Summary Metrics

Metric	Description
Avg. MetaLUN Reads Per Second(IO/s)	Average reads per second. The average value is calculated for the collection time interval as configured in the metric.
Avg. MetaLUN Writes Per Second(IO/s)	Average writes per second. The average value is calculated for the collection time interval as configured in the metric.
Avg. MetaLUN Read Throughput(KB/s)	Average read throughput per second. The average value is calculated for the collection time interval as configured in the metric.
Avg. MetaLUN Write Throughput(KB/s)	Average write throughput per second. The average value is calculated for the collection time interval as configured in the metric.

2.6 LUN Statistics Metrics

The metrics in this category provide information about statistics summary of all the LUNs in the CLARiiON Array. Parameters like average reads/writes per second, average read/write throughput are monitored and reported.

Default Collection Interval — Every 15 minutes

For these metrics, you can set different warning and critical threshold values for each "LUN ID" object. If warning or critical threshold values are currently set for any "LUN ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "LUN ID" object, use the Edit Thresholds page.

Table 2–6 LUN Statistics Metrics

Metric	Description and User Action
LUN Read Hit Ratio	Hit Ration on a given LUN. Hit ratio is the number of time the LUN is accessed and the data required is found on the LUN.
LUN Write Hit Ratio	LUN Write Hit Ratio of the configured LUNs.
LUN Total Hard Errors	Total Hard Errors of the LUNs.
LUN Total Soft Errors	Total Soft Errors of the LUN.
LUN Reads Per Second(IO/s)	Reads Per Second(IO/s) of the configured LUNs. Operator - > The consecutive number of occurrences preceding notification - 1 Reads Per Second of LUN %Lun_ID% is %value%, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold.
LUN Writes Per Second(IO/s)	Writes Per Second(IO/s) of the configured LUNs. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Writes Per Second of LUN %Lun_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold.
LUN Read Throughput(KB/s)	Read Throughput(KB/s) of the configured LUNs. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Read Throughput of LUN %Lun_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold.

Table 2–6 (Cont.) LUN Statistics Metrics

Metric	Description and User Action
LUN Write Throughput(KB/s)	Write Throughput(KB/s) of the configured LUNs. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Write Throughput of LUN %Lun_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold.
LUN Read Cache Hit/Sec	Read Cache Hit per second of the LUNs.
LUN Write Cache Hit/Sec	Write Cache Hit per second of the LUNs.
LUN Queue Length/Sec	Queue Length per second of the LUNs.

2.7 LUN Statistics Summary Metrics

The metrics in this category provide information about the statistics of the LUNs configured on the CLARiiON. Parameters that are monitored are average read/write per second and average read/write throughput.

Default Collection Interval — Every 10 minutes

Table 2–7 LUN Statistics Summary Metrics

Metric	Description and User Action
Avg. Reads Per Second(IO/s)	Average reads per second of the LUNs. The average value is calculated for the collection time interval as configured in the metric.
Avg. Writes Per Second(IO/s)	Average writes per second of the LUNs. The average value is calculated for the collection time interval as configured in the metric.
Avg. Read Throughput(KB/s)	Average read throughput per second of the LUNs. The average value is calculated for the collection time interval as configured in the metric.
Avg. Write Throughput(KB/s)	Average write throughput per second of the LUNs. The average value is calculated for the collection time interval as configured in the metric.

2.8 Storage Processor Metrics

The metrics in this category provide information about the storage processor of a CLARiiON array.

Default Collection Interval — Every 15 minutes

Table 2–8 Storage Processor Metrics

Metric	Description
SP IP	IP of the Storage Processors of the CLARiiON (SP A, SP B).
SP Serial Number	Serial Number of the Storage Processor.
Date	Current Date on the Storage Processors.
Time	Current Time on the Storage Processors.
Day	Current Day on the Storage Processors.
SP Max Requests	Maximum number of requests serviced by the Storage Processors.
SP Average Requests	Average number of requests serviced by a Storage Processor over a time interval.

Table 2–8 (Cont.) Storage Processor Metrics

Metric	Description
SP Busy %	Time utilization of the Storage Processors. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - %sp_name% is %value%% busy, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. For this metric, you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.
SP Idle %	Percentage time for which the Storage Processor is idle.
SP Read Requests Per Second	Read requests per second serviced by the Storage Processors. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Read requests per second of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric, you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.
SP Write Requests Per Second	Write requests per second serviced by the Storage Processors. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Write requests per second of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric, you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.
SP Reads Per Second	Reads Per Second by a Storage Processor. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Reads per second of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric, you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.

Table 2–8 (Cont.) Storage Processor Metrics

Metric	Description
SP Writes Per Second	Writes per second by a Storage Processor. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Writes per second of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric, you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.
SP Read Throughput	Read throughput of each Storage Processor. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Read throughput of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.
SP Write Throughput	Write Throughput of each Storage Processor. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Write throughput of %sp_name% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "SP Name" object. If warning or critical threshold values are currently set for any "SP Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "SP Name" object, use the Edit Thresholds page.

2.9 Disk Statistics Metrics

The metrics in this category provide information about statistics of disks on the CLARiiON. The various parameters that are monitored are reads/writes per second and read/write throughput per second.

Default Collection Interval — Every 15 minutes

Table 2–9 Disk Statistics Metrics

Metric	Description
Disk Reads Per Second(IO/s)	Reads Per Second(IO/s) of each of the Disks on the CLARiiON array. Operator - >= The consecutive number of occurrences preceding notification - 1 Error message - Reads Per Second of Disk %Disk_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk ID" object, use the Edit Thresholds page.
Disk Writes Per Second(IO/s)	Writes Per Second(IO/s) on each of the disks. Operator - >= The consecutive number of occurrences preceding notification - 1 Error message - Writes Per Second of Disk %Disk_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk ID" object, use the Edit Thresholds page.
Disk Read Throughput(KB/s)	Kilo Bytes of data read per second from the disks on the CLARiiON array. Operator - >= The consecutive number of occurrences preceding notification - 1 Error message - Read Throughput of Disk %Disk_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk ID" object, use the Edit Thresholds page.
Disk Write Throughput(KB/s)	Kilo Bytes of data written on the disks on the CLARiiON array. Operator - >= The consecutive number of occurrences preceding notification - 1 Error message - Write Throughput of Disk %Disk_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk ID" object, use the Edit Thresholds page.
Disk Utilizatiion %	Percentage utilization of disks of the CLARiiON disks. Operator - >= The consecutive number of occurrences preceding notification - 1 Error message - Utilization % of Disk %Disk_ID% is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk ID" object, use the Edit Thresholds page.

2.10 Disk Statistics Summary Metrics

The metrics in this category provide statistics summary of the CLARiiON Disks.

Default Collection Interval — Every 10 minutes

Table 2–10 Disk Statistics Summary Metrics

Metric	Description and User Action
Avg. Disk Reads Per Second(IO/s)	Average reads on a disk per second.The average value is calculated for the collection time interval as configured in the metric.
Avg. Disk Writes Per Second(IO/s)	Average writes on a disk per second.The average value is calculated for the collection time interval as configured in the metric.
Avg. Disk Read Throughput(KB/s)	Average read throughput on a disk per second.The average value is calculated for the collection time interval as configured in the metric.
Avg. Disk Write Throughput(KB/s)	Average write throughput on a disk per second.The average value is calculated for the collection time interval as configured in the metric.

2.11 Critical Event Metrics

The metrics in this category provide information about critical events.

Default Collection Interval — Every 15 minutes

Table 2–11 Critical Event Metrics

Metric	Description and User Action
Event Description	Critical events that occurred on the CLARiiON.
SP Name	Name of the Storage Processor on which the critical event occurred.

2.12 Warning Event Metrics

The metrics in this category provide information about warning events.

Default Collection Interval — Every 15 minutes

Table 2–12 Warning Event Metrics

Metric	Description and User Action
Event Description	Description of the event that occurred.
SP Name	Name of the Storage Processor on which the event occurred.

3

EMC Symmetrix Metrics

This chapter provides descriptions for all EMC CLARiiON metric categories and the associated metrics for each category.

The Symmetrix plug-in enables monitoring of the various components of the array and mapping of the various database entities such as tablespaces/datafiles, ASM disk groups, host file systems and raw devices to the various EMC Symmetrix storage components such as Hypers, Metas, Front-end directors and Disk Adapters.

3.1 Response Metrics

The metrics in this category provide information about the UP/DOWN status of the Symmetrix Array being monitored.

Default Collection Interval — Every 2 minutes

Table 3–1 Response Metrics

Metric	Description	Target Version	Upload Frequency	Operator	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
CLARiiON Status	The metric provides the UP/DOWN Status of the Symmetrix target that is being monitored by the plug-in.	All Versions	After Every Sample	=	0	1	%target% is unreachable or SYMCLI is not operational.

3.2 Write Locks Metrics

Symmetrix write locks are used by SYMAPI (locks 0 to 15) and also for applications assigned by EMC (>15) to lock access to the entire Symmetrix array during critical operations. The locks can be listed and released thereafter.

Default Collection Interval — Every 15 minutes

Table 3–2 Write Locks Metrics

Metric	Description
Director ID	Director ID on which the lock is obtained.
Attachment	Mode of attachment (Local/Remote) to the monitoring host.
Lock Number	Lock number of the lock established.

Table 3–2 (Cont.) Write Locks Metrics

Metric	Description
Lock Status	Status of the lock.
Lock Usage	Purpose of acquiring the lock.
Time Held	Time for which the lock is held.

3.3 Device WWN Metrics

The metrics in this category provide information about the World Wide Name of the device.

Default Collection Interval — Every 24 hours

Table 3–3 Device WWN Metrics

Metric	Description and User Action
Device Num	Device number assigned to the device.
Device WWN	World Wide Name of the device.

3.4 Applications Metrics

The metrics in this category provide information about the list of the applications used for monitoring Symmetrix.

Default Collection Interval — Every 24 hours

Table 3–4 Applications Metrics

Metric	Description and User Action
IP Address	IP address of the host.
Vendor	Vendor of the application.
Application Attribute	Attribute of the application.

3.5 Device Inventory Metrics

The metrics in this category provide information on metaLUN statistics summary.

Default Collection Interval — Every 24 hours

Table 3–5 Device Inventory Metrics

Metric	Description
Device Inventory	Metric used to monitor the device inventory in the array.
Count	Count of the device inventory.

3.6 Cache Properties Metrics

The metrics in this category provide information about viewing all or a specific, least-recently-used (LRU) cache management group of the Symmetrix array.

Default Collection Interval — Every 15 minutes

Table 3–6 Cache Properties Metrics

Metric	Description and User Action
LRU Name	Name of the cache.
Cache Slots	Slot of the cache board
Percentage Usage	Usage percent of the cache.

3.7 Host Capacity Metrics

This metric category lists the Symmetrix to host allocations, for the host being monitored by the agent. The data collected includes the mapping of the hyper to the Frontend Director, and the port through which the hyper is allocated to the host.

Default Collection Interval — Every 24 hours

Table 3–7 Host Capacity Metrics

Metric	Description and User Action
Mapped Std. Device Capacity (GBs)	Capacity of the standard device that is mapped to a Frontend port.
Mapped BCV Capacity (GBs)	Capacity of the BCV that is mapped to a frontend port.
Paired BCV Capacity (GBs)	Capacity of a paired BCV.

3.8 Frontend Director Statistics Metrics

The metrics in this category provide information about the frontend director statistics.

Default Collection Interval — Every 15 minutes

Table 3–8 Frontend Director Statistics Metrics

Metric	Description
Frontend Director Host I/Os Per Second	I/O rates (operations per second) for Host to Frontend Disk director to Backend director.
Frontend Director Cache Reads Per Second	Cache reads per second by the frontend director.
Frontend Director Cache Writes Per Second	Cache writes per second by the frontend director.

3.9 Frontend Director Statistics Summary Metrics

The overall performance of all the Frontend Directors can be monitored using this metric category. This metric category runs frequently and fetches the performance data. Some of the performance data monitored are IO/sec, Reads/ Writes per second. Cache hits.

Default Collection Interval — Every 15 minutes

Table 3–9 Frontend Director Statistics Summary Metrics

Metric	Description
Total Frontend Director Host I/Os Per Second	I/Os Per Second of all the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Total Frontend Director Host I/O Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Frontend Director Cache Reads Per Second	Cache reads per second of all the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Error message - Total Frontend Director Cache Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Frontend Director Cache Writes Per Second	Cache writes per second of all the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Frontend Director Cache Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Disk ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Frontend Director Cache Read-Writes Per Second	Cache read-writes per second of all the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Frontend Director Cache Read Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Frontend Director Cache Hit Percentage	Cache hit percentage of all the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Frontend Director Cache Hit Percentage is %value%%%, crossed warning (%warning_threshold%%%) or critical (%critical_threshold%%%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.

3.10 Frontend Director Statistics Details Metrics

Performance of each of the Frontend Directors can be monitored using this metric category. This metric category runs frequently and fetches the performance data. Some of the performance data monitored are IO/ sec, Reads/Writes per second and Cache hits.

Default Collection Interval — Every 15 minutes

Table 3–10 Frontend Director Statistics Details Metrics

Metric	Description and User Action
Frontend Director Host I/Os Per Second	I/O rates (operations per second) for host to frontend director. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Frontend Director %fedirector% Host I/O Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Frontend Director ID" object. If warning or critical threshold values are currently set for any "Frontend Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Frontend Director ID" object, use the Edit Thresholds page.
Frontend Director Cache Reads Per Second	Cache reads per second by the frontend director. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Frontend Director %fedirector% Cache Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Frontend Director ID" object. If warning or critical threshold values are currently set for any "Frontend Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Frontend Director ID" object, use the Edit Thresholds page.

Table 3–10 (Cont.) Frontend Director Statistics Details Metrics

Metric	Description and User Action
Frontend Director Cache Writes Per Second	Cache writes per second by the frontend director. Operator - > The consecutive number of occurrences preceding notification - 1 Frontend Director %fedirector% Cache Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Frontend Director ID" object. If warning or critical threshold values are currently set for any "Frontend Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Frontend Director ID" object, use the Edit Thresholds page.
Frontend Director Cache Read-Writes Per Second	Cache read-writes per second by the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Frontend Director %fedirector% Cache Read Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Frontend Director ID" object. If warning or critical threshold values are currently set for any "Frontend Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Frontend Director ID" object, use the Edit Thresholds page.
Frontend Director Cache Hit Percentage	Cache hit percentage by the frontend directors. Operator - > The consecutive number of occurrences preceding notification - 1 Frontend Director %fedirector% Cache Read Writes Per Second is %value%%%, crossed warning (%warning_threshold%%%) or critical (%critical_threshold%%%) threshold. For this metric you can set different warning and critical threshold values for each "Frontend Director ID" object. If warning or critical threshold values are currently set for any "Frontend Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Frontend Director ID" object, use the Edit Thresholds page.

3.11 Disk Director Statistics Metrics

Performance of the Disk Directors can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are IO/sec, Reads/Writes per second, and Cache hits.

Default Collection Interval — Every 15 minutes

Table 3–11 Disk Director Statistics Metrics

Metric	Description and User Action
Disk Director Disk I/Os Per Second	I/Os per second of the Disk Directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Disk Director Disk I/O Per Second is %value%, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Director Cache Reads Per Second	Cumulative cache reads per second of all the Disk directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Disk Director Cache Reads Per Second is %value%, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Director Cache Writes Per Second	Cumulative writes per second of all the disk directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Disk Director Cache Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Director Cache Read-Writes Per Second	Total cache read-writes of all the disk directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Disk Director Cache Read Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Director Cache Hit Percentage	Total cache hit percentage of all the disk directors. Operator - > The consecutive number of occurrences preceding notification - 1 Total Disk Director Cache Hit Percentage is %value%, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.

3.12 Disk Director Statistics Details Metrics

Performance of the Disk Directors can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are IO/sec, Reads/Writes per second, and Cache hits.

Default Collection Interval — Every 15 minutes

Table 3–12 Disk Director Statistics Details Metrics

Metric	Description and User Action
Disk Director Disk I/Os Per Second	I/Os per second of the Disk Directors. Operator - > The consecutive number of occurrences preceding notification - 1 Disk Director %bedirector% Disk I/O Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Director ID" object. If warning or critical threshold values are currently set for any "Disk Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Director ID" object, use the Edit Thresholds page.
Disk Director Cache Reads Per Second	Cache reads per second by the Disk directors. Operator - > The consecutive number of occurrences preceding notification - 1 Disk Director %bedirector% Cache Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Director ID" object. If warning or critical threshold values are currently set for any "Disk Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Director ID" object, use the Edit Thresholds page.

Table 3–12 (Cont.) Disk Director Statistics Details Metrics

Metric	Description and User Action
Disk Director Cache Writes Per Second	Cache writes per second by the disk directors. Operator - >= The consecutive number of occurrences preceding notification - 1 Disk Director %bedirector% Cache Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Director ID" object. If warning or critical threshold values are currently set for any "Disk Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Director ID" object, use the Edit Thresholds page.
Disk Director Cache Read-Writes Per Second	Cache read-writes per second by the disk directors. Operator - >= The consecutive number of occurrences preceding notification - 1 Disk Director %bedirector% Cache Read Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Director ID" object. If warning or critical threshold values are currently set for any "Disk Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Director ID" object, use the Edit Thresholds page.
Disk Director Cache Hit Percentage	Cache hit percentage by the disk directors. Operator - >= The consecutive number of occurrences preceding notification - 1 Disk Director %bedirector% Cache Hit Percentage is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Director ID" object. If warning or critical threshold values are currently set for any "Disk Director ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Director ID" object, use the Edit Thresholds page.

3.13 Hyper Statistics Metrics

The performance of the hypers can be monitored using this metric. This metric runs once in 30 seconds to fetch the data. Some of the performance data monitored are reads/writes per second, read/write throughput, and so on.

Default Collection Interval — Every 15 minutes

Table 3–13 Hyper Statistics Metrics

Metric	Description and User Action
Hyper Reads Per Second	Number of reads per second on the hyper.
Hyper Writes Per Second	Number of writes per second on the hyper.
Hyper Read Throughput (KB/Sec)	Read Throughput of the hyper.
Hyper Write Throughput (KB/Sec)	Write Throughput of the hyper.
Hyper Read Cache Hits Percentage	Read cache hit percentage of the hypes.

Table 3–13 (Cont.) Hyper Statistics Metrics

Metric	Description and User Action
Hyper Write Cache Hits Percentage	Write Cache hits percent on the hyper.
Hyper Sequential Read Percentage	Sequential reads percentage of the hyper.
Hyper Write Pending Tracks	Write pending tracks for the hyper.

3.14 Hyper Statistics Summary Metrics

Overall performance of all the hypers can be monitored using this metric. This metric runs once in 30 seconds to fetch the data. Some of the performance data monitored are reads/ writes per second, read/write throughput, and so on.

Default Collection Interval — Every 15 minutes

Table 3–14 Hyper Statistics Summary Metrics

Metric	Description and User Action
Total Hyper Reads Per Second	Reads per second of all the hypers. Operator - > The consecutive number of occurrences preceding notification - 1 Total Hyper Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Hyper Writes Per Second	Writes per second of all the hypers. Operator - > The consecutive number of occurrences preceding notification - 1 Total Hyper Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Hyper Read Throughput (KB/Sec)	Read throughput of all the hypers. Operator - > The consecutive number of occurrences preceding notification - 1 Total Hyper Read Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.

Table 3–14 (Cont.) Hyper Statistics Summary Metrics

Metric	Description and User Action
Total Hyper Write Throughput (KB/Sec)	Write throughput of all the hypers. Operator - >= The consecutive number of occurrences preceding notification - 1 Total Hyper Write Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Hyper Read Cache Hits Percentage	Read cache hit percentage of all the hypers.
Total Hyper Write Cache Hits Percentage	Write cache hit percentage of all the hypers.
Total Hyper Sequential Read Percentage	Sequential read percentage of all the hypers.
Total Hyper Write Pending Tracks	Hyper write pending tracks of all the hypers.

3.15 Hyper Statistics Details Metrics

The performance of the hypers can be monitored using this metric. This metric runs once in 30 seconds to fetch the data. Some of the performance data monitored are reads/ writes per second, read/write throughput, and so on.

Default Collection Interval — Every 15 minutes

Table 3–15 Hyper Statistics Details Metrics

Metric	Description and User Action
Hyper Reads Per Second	Number of reads per second on the hyper. Operator - >= The consecutive number of occurrences preceding notification - 1 Hyper %dev_name% Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Device Name" object. If warning or critical threshold values are currently set for any "Device Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Device Name" object, use the Edit Thresholds page.
Total Hyper Writes Per Second	Writes per second of all the hypers. Operator - >= The consecutive number of occurrences preceding notification - 1 Hyper %dev_name% Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Device Name" object. If warning or critical threshold values are currently set for any "Device Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Device Name" object, use the Edit Thresholds page.
Hyper Read Throughput (KB/Sec)	Read Throughput of the hyper. Operator - >= The consecutive number of occurrences preceding notification - 1 Hyper %dev_name% Read Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Device Name" object. If warning or critical threshold values are currently set for any "Device Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Device Name" object, use the Edit Thresholds page.
Hyper Write Throughput (KB/Sec)	Write Throughput of the hyper. Operator - >= The consecutive number of occurrences preceding notification - 1 Hyper %dev_name% Write Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Device Name" object. If warning or critical threshold values are currently set for any "Device Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Device Name" object, use the Edit Thresholds page.
Hyper Read Cache Hits Percentage	Read cache hits percent on the hyper.
Hyper Write Cache Hits Percentage	Write cache hits percent on the hyper.
Hyper Sequential Read Percentage	Sequential reads percent on the hyper.
Hyper Write Pending Tracks	Write pending tracks for the hyper.

3.16 Memory I/O Statistics Metrics

Memory IO performance can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are write pending tracks, % of dev write pending, and so on.

Default Collection Interval — Every 15 minutes

Table 3–16 Memory I/O Statistics Metrics

Metric	Description and User Action
Write Pending Tracks	Write pending track count not yet destaged to disk.
Prefetch Tracks	Track Prefetch rate (tracks per second).
Destaged Tracks	Number of tracks that have been destaged to the hypers.
Write Pending Max Percentage	Percentage of write pending tracks.

3.17 Memory I/O Statistics Summary Metrics

Overall Memory IO performance can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are write pending tracks and % of dev write pending.

Default Collection Interval — Every 15 minutes

Table 3–17 Memory I/O Statistics Summary Metrics

Metric	Description and User Action
Write Pending Tracks	Total write pending track count, not yet destaged to disk.
Prefetch Tracks	Total prefetched tracks.
Destaged Tracks	Total number of destage tracks.
Write Pending Max Percentage	Total number of write pending tracks.

3.18 Memory I/O Statistics Details Metrics

Memory IO performance can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are write pending tracks and % of dev write pending.

Default Collection Interval — Every 15 minutes

Table 3–18 Memory I/O Statistics Details Metrics

Metric	Description and User Action
Write Pending Tracks	Tracks that are not yet written to the hypers.
Prefetch Tracks	Tracks that have been prefethced from the hypers.
Destaged Tracks	Tracks that have been destaged to the disks.
Write Pending Max Percentage	Percentage of write pending tracks.

3.19 Cache Statistics Metrics

This metric is used to monitor the cache statistics.

Default Collection Interval — Every 15 minutes

Table 3–19 Cache Statistics Metrics

Metric	Description and User Action
Read Misses	Performance of the Cache can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are Cache hits/misses, Disconnects per second.
System Write Pending Disconnects	System/Device disconnect rate (disconnects per second) due to write pending limit.
Device Write Pending Disconnects	System/Device disconnect rate (disconnects per second) due to write pending limit.

3.20 Port Statistics Metrics

This metric provides information to monitor port statistics.

Default Collection Interval — Every 15 minutes

Table 3–20 Port Statistics Metrics

Metric	Description and User Action
I/Os Per Second	Performance of the Frontend Ports can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are Director no. Port Number, I/O sec, KBs Per sec. Operator - > The consecutive number of occurrences preceding notification - 1 For this metric you can set different warning and critical threshold values for each unique combination of "Front End Director" and "Port Number" objects. If warning or critical threshold values are currently set for any unique combination of "Front End Director" and "Port Number" objects, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each unique combination of "Front End Director" and "Port Number" objects, use the Edit Thresholds page.
IO Throughput(KB/Sec)	I/Os per second on the port. Operator - > The consecutive number of occurrences preceding notification - 1 For this metric you can set different warning and critical threshold values for each unique combination of "Front End Director" and "Port Number" objects. If warning or critical threshold values are currently set for any unique combination of "Front End Director" and "Port Number" objects, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each unique combination of "Front End Director" and "Port Number" objects, use the Edit Thresholds page.

3.21 Disk Statistics Details Metrics

Performance of all the disks can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are Disk Name, I/O Reads/Writes Per Sec, and KB Read/Write Per sec.

Default Collection Interval — Every 15 minutes

Table 3–21 Disk Statistics Details Metrics

Metric	Description and User Action
Disk Reads Per Second	I/O Reads per second on the disk.
Disk Writes Per Second	I/O Writes per second on the disk.
Disk Read Throughput (KB/Sec)	Reads Per Second on the disk.
Disk Write Throughput (KB/Sec)	Writes Per Second on the disk.

3.22 Disk Statistics Summary Metrics

Overall performance of all the disks can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are Disk Name, I/O Reads/Writes Per Sec, and KB Read/Write Per sec.

Default Collection Interval — Every 15 minutes

Table 3–22 Disk Statistics Summary Metrics

Metric	Description and User Action
Total Disk Reads Per Second	Total reads per second on all the disks. Operator - >\ The consecutive number of occurrences preceding notification - 1 Error message - Total Disk Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.

Table 3–22 (Cont.) Disk Statistics Summary Metrics

Metric	Description and User Action
Total Disk Writes Per Second	Total writes per second on all the disks. Operator - >\n The consecutive number of occurrences preceding notification - 1 Error message - Total Disk Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Read Throughput (KB/Sec)	Total reads per second on all the disks. Operator - >\n The consecutive number of occurrences preceding notification - 1 Error message - Total Disk Read Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.
Total Disk Write Throughput (KB/Sec)	Total writes per second on all the disks. Operator - >\n The consecutive number of occurrences preceding notification - 1 Error message - Total Disk Write Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Symmetrix ID" object. If warning or critical threshold values are currently set for any "Symmetrix ID" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Symmetrix ID" object, use the Edit Thresholds page.

3.23 Disk Statistics Details Metrics

Performance of all the disks can be monitored using this metric. The metric runs frequently and fetches the performance data. Some of the performance data monitored are Disk Name, I/O Reads/Writes Per Sec, and KB Read/Write Per sec.

Default Collection Interval — Every 15 minutes

Table 3–23 Disk Statistics Details Metrics

Metric	Description and User Action
Disk Reads Per Second	Reads per second on the disk. Operator - >| The consecutive number of occurrences preceding notification - 1 Error message - Disk %disk_name% Reads Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Name" object. If warning or critical threshold values are currently set for any "Disk Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Name" object, use the Edit Thresholds page.
Disk Writes Per Second	Writes per second on the disk. Operator - >| The consecutive number of occurrences preceding notification - 1 Error message - Disk %disk_name% Writes Per Second is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Name" object. If warning or critical threshold values are currently set for any "Disk Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Name" object, use the Edit Thresholds page.
Disk Read Throughput (KB/Sec)	Read throughput of the disk. Operator - >| The consecutive number of occurrences preceding notification - 1 Error message - Disk %disk_name% Read Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Name" object. If warning or critical threshold values are currently set for any "Disk Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Name" object, use the Edit Thresholds page.
Disk Write Throughput (KB/Sec)	Write throughput of the disk. Operator - >| The consecutive number of occurrences preceding notification - 1 Error message - Disk %disk_name% Write Throughput (KB/Sec) is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. For this metric you can set different warning and critical threshold values for each "Disk Name" object. If warning or critical threshold values are currently set for any "Disk Name" object, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Name" object, use the Edit Thresholds page.

3.24 Events Metrics

This metric provides information about the events occurring on the Symmetrix Array.

Default Collection Interval — Every 5 minutes

Table 3–24 Events Metrics

Metric	Description and User Action
Detected Date/Time	Date and time of the occurrence of the event.
Symmetrix Event	The Symmetrix events are collected by the script. Events like director dead, port inactive, disk pulled out are reported by the metric, between the time intervals specified. Operator - = The consecutive number of occurrences preceding notification - 1 Default Warning Threshold - Warning Default Critical Threshold - Error Error message - Director: %director% Source: %source% %category% - %description% (Error Code: %numeric_code%) detected at %date_time%. Alert Text - Once an alert is triggered for this metric, it must be manually cleared. For this metric you can set different warning and critical threshold values for each unique combination of "Director", "Source", "Category", and "Error Code" objects. If warning or critical threshold values are currently set for any unique combination of "Director", "Source", "Category", and "Error Code" objects, those thresholds can be viewed on the Metric Detail page for this metric. To specify or change warning or critical threshold values for each "Disk Name" object, use the Edit Thresholds page.
Description	Description of the event that occurred.

3.25 Frontend Director LUN Mapping Metrics

This metric provides information about the hyper to frontend director mapping details. Some of the other details that are collected are port number, device name, symbolic ID of the hyper, and physical device name of the hyper.

Default Collection Interval — Every 24 hours

Table 3–25 Frontend Director LUN Mapping Metrics

Metric	Description and User Action
Symbolic ID	Symbolic ID of the hyper.
VBus ID	Vbus ID of the hyper.
Target ID	Target ID of the hyper.
LUN ID	LUN ID of the hyper.
Physical Device Name	Physical device name of the hyper.

4

Network Appliance Filer

Note: Network Appliance Filer-related metrics are not part of the System Monitoring Plug-in release. They are part of the Enterprise Manager Grid Control release.

You can use the All Metrics page for a Network Appliance Filer target in the Enterprise Manager Grid Control to view the metrics that have been collected for that target by the Oracle Management Agent.

The Network Appliance Filer metrics provide description, summary, multiple threshold (where applicable), data source, and user action information for each metric.

The following abbreviations are used in this chapter:

- SNMP (Simple Network Management Protocol)
- MIB (Management Information Base)

4.1 10 Megabit Network Cards Statistics

Network interface statistics give a good indication of a network level performance and health of the Network Appliance Filer.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–1 10 Megabit Network Cards Statistics

Metric	Description	Data Source (SNMP MIB Object)[1]
Network Received Rate (Kilobits/second)	Rate of data received on the interface, in kilobits/sec	Rate of ifInOctets (1.3.6.1.2.1.2.2.1.10)
Network Sent Rate (Kilobits/second)	Rate of data transmitted on the interface, in kilobits/sec	Rate of ifOutOctets (1.3.6.1.2.1.2.2.1.16)

[1] These objects return inbound traffic as bytes, rates of which will be computed as kilobits/second.

4.2 100 Megabit Network Cards Statistics

Network interface statistics give a good indication of the network level performance and health of the Network Appliance Filer.

Note: For all target versions, the collection frequency for each metric is every 5 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–2 100 Megabit Network Cards Statistics

Metric	Description	Data Source (SNMP MIB Object)[1]
Network Received Rate (Kilobits/second)	Rate of data received on the interface, in kilobits/sec	Rate of ifInOctets (1.3.6.1.2.1.2.2.1.10)
Network Sent Rate (Kilobits/second)	Rate of data transmitted on the interface, in kilobits/sec	Rate of ifOutOctets (1.3.6.1.2.1.2.2.1.16)

[1] These objects return inbound traffic as bytes, rates of which will be computed as kilobits/second.

4.3 Appliance Health

Network Appliance Filer health is directly proportional to the file system usage and environmental parameters being within acceptable limits. The metrics in the Appliance Health category report on these parameters.

4.3.1 Fans Failed

This metric indicates how many main unit fans, if any, have failed.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–3 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 5 Minutes	After Every 288 Samples	>	Not Defined	0	1	%value% chassis fans failed, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. Additional info - %FansFailedMessage%

Data Source

SNMP MIB object: envFailedFanCount (1.3.6.1.4.1.789.1.2.4.2)

4.3.2 Fans Failed Message

This metric is a text message that describes the change in the working status of the main unit backplane fans.

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 5 Minutes

Data Source

SNMP MIB object: envFailedFanMessage (1.3.6.1.4.1.789.1.2.4.3)

4.3.3 NVRAM Battery Status

This metric indicates the current status of the Non-Volatile Random Access Memory (NVRAM) batteries.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–4 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 5 Minutes	After Every 288 Samples	>	1	2	1	Charge in the NVRAM battery is low. Status is %value%, crossed warning (%warning_threshold%) or critical (%critical_ threshold%) threshold.

Data Source

SNMP MIB object: nvramBatteryStatus (1.3.6.1.4.1.789.1.2.5.1)

4.3.4 Power Supplies Failed

This metric indicates the number of failed power supplies and power rails, if any.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–5 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 5 Minutes	After Every 288 Samples	>	Not Defined	0	1	%value% power supplies or power rails failed, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold. Additional info - %PowerSuppliesFailedMessage%

Data Source

SNMP MIB object: envFailedPowerSupplyCount (1.3.6.1.4.1.789.1.2.4.4)

4.3.5 Power Supplies Failed Message

This metric is a text message that describes the change in the working status of the power supply and the power rails.

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 5 Minutes

Data Source

SNMP MIB object: endFailedPowerSupplyMessage (1.3.6.1.4.1.789.1.2.4.5)

4.3.6 Temperature Exceeded

This metric indicates whether the hardware is currently operating above its maximum rated temperature.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–6 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 5 Minutes	After Every 288 Samples	>	Not Defined	1	1	System is operating above its maximum rated temperature.

Data Source

SNMP MIB object: envOverTemperature (1.3.6.1.4.1.789.1.2.4.1)

4.4 CIFS Operations

Common Internet File System (CIFS) protocol is used by Windows clients to access data on this Network Appliance Filer.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–7 10 Megabit Network Cards Statistics

Metric	Description	Data Source (SNMP MIB Object)
CIFS Bad Calls)	See Section 4.4.1, "CIFS Bad Calls (%)"	See Section 4.4.1, "CIFS Bad Calls (%)"
CIFS Bad Calls Rate	Number of Common Internet File System (CIFS) calls that were rejected	Rate of cifsBadCalls (1.3.6.1.4.1.789.1.7.3.1.1.3)
CIFS Calls per Second	Rate per second of Common Internet File System (CIFS) operations performed by this Network Appliance Filer	Rate of cifsTotalOps (1.3.6.1.4.1.789.1.7.3.1.1.1)
CIFS Enabled?	Indicates whether Common Internet File System (CIFS) protocol is enabled on this Network Appliance Filer. The possible values are True or False	cifsIsEnabled (1.3.6.1.4.1.789.1.7.1.1)

4.4.1 CIFS Bad Calls (%)

This metric represents the percentage of Common Internet File System (CIFS) calls that were rejected.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–8 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every Sample	>	5	10	3	CIFS Bad Calls are %value%%%, crossed warning (%warning_ threshold%%%) or critical (%critical_threshold%%%) threshold.

Data Source

SNMP MIB object: Rate of cifsBadCalls (1.3.6.1.4.1.789.1.7.3.1.1.3)

4.5 Cluster

A cluster consists of a pair of Network Appliance Filers that are connected and configured in a special way to provide fault tolerance.

This information is available only if 'Cluster Configuration Setting' is not equal to 1 (Not Licensed).

> **Note:** For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–9 Cluster Metrics

Metric	Description	Data Source (SNMP MIB Object)
Cluster Interconnect Status	Section 4.5.1, "Cluster Interconnect Status"	Section 4.5.1, "Cluster Interconnect Status"
Cluster Partner Status	Section 4.5.2, "Cluster Partner Status"	Section 4.5.2, "Cluster Partner Status"
Partner Name	Host name of the cluster partner	cfPartnerName (1.3.6.1.4.1.789.1.2.3.6)
Partner System ID	System ID of the cluster partner	cfPartnerSysid (1.3.6.1.4.1.789.1.2.3.7)
Reason Can't Takeover	If the State is equal to 3 (Network Appliance Filer Cannot Takeover), then this metric elaborates about the reason.	cfCannotTakeoverCause (1.3.6.1.4.1.789.1.2.3.3)
State	Network Appliance Filers Cluster state	cfState (1.3.6.1.4.1.789.1.2.3.2)

4.5.1 Cluster Interconnect Status

This metric represents the current status of the interconnect hardware.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–10 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	<	4	3	1	Cluster interconnect hardware with partner %PartnerName% may be down. Status is %value%, crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold.

Data Source

SNMP MIB object: cfInterconnectStatus (1.3.6.1.4.1.789.1.2.3.8)

4.5.2 Cluster Partner Status

This metric represents the status of the cluster partner, as returned by the cluster partner.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–11 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	<	Not Defined	2	1	Cluster partner %PartnerName% may be down.

Data Source

SNMP MIB object: cfPartnerStatus (1.3.6.1.4.1.789.1.2.3.4)

4.6 CPU

This metric category defines the metrics for CPU monitoring.

Monitoring how the CPUs are being utilized in the system provides good feedback of the system's health. Keeping certain headroom through at least 10% idle time is a good practice. Therefore it is better to set warnings at around 90% rather than 100%.

Note: For all target versions, the collection frequency for each metric is every 5 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–12 CPU Metrics

Metric	Description	Data Source (SNMP MIB Object)
CPU Up Time (Seconds)	Time (in seconds) that the CPU has been up since the last initialization of the computer system	cpuUpTime (1.3.6.1.4.1.789.1.2.1.1) **Note:** This object returns CPU Up Time as hundredths of a second, which is converted into seconds.
CPU Utilization (%)	See Section 4.6.1, "CPU Utilization (%)"	See Section 4.6.1, "CPU Utilization (%)"
No. of CPUs	Number of CPUs in the Network Appliance Filer	cpuCount (1.3.6.1.4.1.789.1.2.1.6)

4.6.1 CPU Utilization (%)

This metric indicates the percentage of time that the CPU has been working since the last time a client requested the CPU Utilization (%) metric, for example, on the All Metrics page.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–13 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 5 Minutes	After Every Sample	>	80	95	6	CPU Utilization is %value%%%, crossed warning (%warning_ threshold%) or critical (%critical_ threshold%) threshold.

Data Source

SNMP MIB object: cpuBusyTimePerCent (1.3.6.1.4.1.789.1.2.1.3)

4.7 Disk Summary

This metric category includes the metrics for the failed and spare disks.

4.7.1 Disk Failed Message

This metric represents the message associated with the failed disk.

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 15 Minutes

Data Source

SNMP MIB object: diskFailedMessage(1.3.6.1.4.1.789.1.6.4.10)

4.7.2 Disks Failed

This metric represents the number of disks that are currently broken.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–14 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	0	Not Defined	3	Appliance has at least %value% failed disk(s), crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold. Additional info - %DiskFailedMessage%

Data Source

SNMP MIB object: diskFailedCount (1.3.6.1.4.1.789.1.6.4.7)

4.7.3 Spare Disks

This metric represents the number of available spare disks.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–15 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	<	2	1	3	Appliance has %value% spare disk(s), crossed warning (%warning_threshold%) or critical (%critical_threshold%) threshold.

Data Source

SNMP MIB object: diskSpareCount (1.3.6.1.4.1.789.1.6.4.8)

4.8 Filer Capacity

This metric category includes the Filer Capacity metrics for all the volumes.

Note: For all target versions, the collection frequency for each metric is every hour.

The following table lists the metrics, their descriptions, and data sources.

Table 4–16 Filer Capacity Metrics

Metric	Description	Data Source (SNMP MIB Object)
Aggregate Capacity Allocated (%)	Percentage of the capacity allocated, for all the aggregates	Derived using the following: ■ 1.3.6.1.4.1.789.1.5.4.1.16(dfHighUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.17(dfLowUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.14(dfHighTotalKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.15(dfLowTotalKBytes)
Aggregate Capacity Allocated (GB)	Capacity allocated, in gigabytes, for all the aggregates	Derived using the following: ■ 1.3.6.1.4.1.789.1.5.4.1.16(dfHighUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.17(dfLowUsedKBytes)
Aggregate Capacity Total (GB)	Total capacity, in gigabytes, for all the aggregates	Derived using the following ■ 1.3.6.1.4.1.789.1.5.4.1.14(dfHighTotalKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.15(dfLowTotalKBytes)
Flexible Volumes Capacity Allocated (%)	Percentage of the capacity used, for all the flexible volumes	Derived using the following ■ 1.3.6.1.4.1.789.1.5.4.1.16(dfHighUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.17(dfLowUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.14(dfHighTotalKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.15(dfLowTotalKBytes)
Flexible Volumes Capacity Allocated (GB)	Allocated capacity, in gigabytes, for all the flexible volumes	Derived using the following ■ 1.3.6.1.4.1.789.1.5.4.1.16(dfHighUsedKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.17(dfLowUsedKBytes)
Flexible Volumes Capacity Total (GB)	Total capacity, in gigabytes, for all the aggregates	Derived using the following: ■ 1.3.6.1.4.1.789.1.5.4.1.14(dfHighTotalKBytes) ■ 1.3.6.1.4.1.789.1.5.4.1.15(dfLowTotalKBytes)
Qtree Capacity Limit (GB)	Limit, in gigabytes, for all the Qtrees	Sum for all Qtrees. Derived using SNMP MIB object qrVKBytesLimit (1.3.6.1.4.1.789.1.4.5.1.5)
Qtree Capacity Used (%)	Percentage of capacity used, in gigabytes, for all the Qtrees	Derived using (qtreecapacityusedgb / qtreecapacitylimitgb) * 100
Qtree Capacity Used (GB)	Capacity used, in gigabytes, for all the Qtrees	Sum of all Qtrees. Derived using SNMP MIB object qrVKBytesUsed (1.3.6.1.4.1.789.1.4.5.1.4)
Traditional Volume Capacity Total (GB)	Total capacity, in gigabytes, for all the volumes	Sum of volumetotalgb for the volumes
Traditional Volume Capacity Used (%)	Percentage of the capacity used, in gigabytes, for all the volumes	SNMP MIB objects: ■ dfKBytesTotal (1.3.6.1.4.1.789.1.5.4.1.3) ■ dfKBytesUsed (1.3.6.1.4.1.789.1.5.4.1.4)
Traditional Volume Capacity Used (GB)	Capacity used, in gigabytes, for all the volumes	Sum of volumeallocgb for the volumes

4.9 Gigabit Network Cards Statistics

Network interface statistics give a good indication of the network level performance and health of the Network Appliance Filer.

Note: For all target versions, the collection frequency for each metric is every 5 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–17 Gigabit NEtwork Cards Statistics Metrics

Metric	Description	Data Source (SNMP MIB Object)
Network Received Rate (Kilobits/second)	Rate of data received on the interface, in kilobits/sec	Rate of ifInOctets (1.3.6.1.2.1.2.2.1.10) **Note:** This object returns inbound traffic as bytes, rate of which will be computed as kilobits/second.
Network Sent Rate (Kilobits/second)	Rate of data transmitted on the interface, in kilobits/sec	Rate of ifOutOctets (1.3.6.1.2.1.2.2.1.16) **Note:** This object returns outbound traffic as bytes, rate of which will be computed as kilobits/second.

4.10 Network Interfaces

Network interface statistics give a good indication of the network level performance and health of this Network Appliance Filer.

Note: For all target versions, the collection frequency for each metric is every hour.

The following table lists the metrics, their descriptions, and data sources.

Table 4–18 Network Interfaces Metrics

Metric	Description	Data Source (SNMP MIB Object)
Actual Status	Current state of the interface	ifOperStatus (1.3.6.1.2.1.2.2.1.8)
Bandwidth (Mbits/second)	Estimate of the interface's current bandwidth in megabits/second	ifSpeed (1.3.6.1.2.1.2.2.1.5) **Note:** This object returns Bandwidth as bits/second, which will be converted to Mbits/second
Desired Status	Desired state of the interface	ifAdminStatus (1.3.6.1.2.1.2.2.1.7)
IP Address	Internet Protocol (IP) address of the interface	ipAdEntAddr (1.3.6.1.2.1.4.20.1.1)
MAC Address	Interface's address at the protocol layer immediately 'below' the network layer in the protocol stack. MAC stands for Media Access Control.	ifPhyAddress (1.3.6.1.2.1.2.2.1.6)
Name	Name of the interface	ifDescr (1.3.6.1.2.1.2.2.1.2)

Table 4–18 (Cont.) Network Interfaces Metrics

Metric	Description	Data Source (SNMP MIB Object)
Network Discards (%)	See Section 4.10.1, "Network Discards (%)"	See Section 4.10.1, "Network Discards (%)"
Network Errors (%)	See Section 4.10.2, "Network Errors (%)"	See Section 4.10.2, "Network Errors (%)"
Network Interface (Actual Status-Desired Status)	See Section 4.10.3, "Network Interface (Actual Status-Desired Status)"	See Section 4.10.3, "Network Interface (Actual Status-Desired Status)"
Type	Type of the interface	ifType (1.3.6.1.2.1.2.2.1.3)
Unknown Protocol Packets (%)	See Section 4.10.4, "Unknown Protocol Packets (%)"	See Section 4.10.4, "Unknown Protocol Packets (%)"

4.10.1 Network Discards (%)

This metric represents the percentage of total packets which were discarded because of the lack of buffer space.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–19 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every Hour	After Every Sample	>	15	25	3	Packets discarded at Network Interface %keyValue% are %value%%%, crossed warning (%warning_threshold%%%) or critical (%critical_ threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Network Interface Index" object.

If warning or critical threshold values are currently set for any "Network Interface Index" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Network Interface Index" object, use the Edit Thresholds page.

Data Source

SNMP MIB objects:

- ifInDiscards (1.3.6.1.2.1.2.2.1.13)
- ifOutDiscards (1.3.6.1.2.1.2.2.1.19)

4.10.2 Network Errors (%)

This metric represents the percentage of total packets that contained errors and hence, had to be discarded. (There may be a problem with the interface card or cable.)

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–20 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every Hour	After Every Sample	>	15	25	3	Errors at Network Interface %keyValue% are %value%%%, crossed warning (%warning_threshold%%%) or critical (%critical_threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Network Interface Index" object.

If warning or critical threshold values are currently set for any "Network Interface Index" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Network Interface Index" object, use the Edit Thresholds page.

Data Source

SNMP MIB objects:

- ifInErrors (1.3.6.1.2.1.2.2.1.14)
- ifOutErrors (1.3.6.1.2.1.2.2.1.20)

4.10.3 Network Interface (Actual Status-Desired Status)

This metric represents the difference in the actual status of the interface and the desired state. This metric is equal to zero if both the states are equal, that is, `Actual State = Desired State`.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–21 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every Hour	After Every Sample	>	Not Defined	0	1	Network Interface %Index% failed.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Network Interface Index" object.

If warning or critical threshold values are currently set for any "Network Interface Index" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Network Interface Index" object, use the Edit Thresholds page.

Data Source

Derived as "ActualStatus-DesiredStatus" or (ifOperStatus - ifAdminStatus)

SNMP MIB objects:

- ifAdminStatus (1.3.6.1.2.1.2.2.1.7)
- IfOperStatus (1.3.6.1.2.1.2.2.1.8)

4.10.4 Unknown Protocol Packets (%)

This metric represents the percentage of total packets discarded because of an unknown or unsupported protocol. (Network Appliance Filer may be under a security attack.)

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–22 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every Hour	After Every Sample	>	20	30	3	Unknown or unsupported protocol packets received at Network Interface %keyValue% are %value%%%, crossed warning (%warning_ threshold%%%) or critical (%critical_threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Network Interface Index" object.

If warning or critical threshold values are currently set for any "Network Interface Index" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Network Interface Index" object, use the Edit Thresholds page.

Data Source

SNMP MIB object: ifInUnknownProtos (1.3.6.1.2.1.2.2.1.15)

4.11 NFS Operations

Network File System (NFS) protocol is used by UNIX clients to access data on a Network Appliance Filer. Clients send Remote Procedure Calls (RPC) to communicate with the Network Appliance Filer.

4.11.1 NFS Bad Calls (v2 and v3) (%)

This metric represents the rate of total number of received NFS calls (v2 and v3) rejected.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–23 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every Sample	>	5	10	3	NFS Bad Calls are %value%%%, crossed warning (%warning_threshold%%%) or critical (%critical_ threshold%%%) threshold.

Data Source

SNMP MIB object: Rate of nfsServBadCalls (1.3.6.1.4.1.789.1.3.1.2.2)

4.11.2 NFS Calls per Second (v2 and v3)

This metric represents the rate of total number of NFS calls (v2 and v3) received.

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 15 Minutes

Data Source

SNMP MIB object: Rate of nfsCalls (1.3.6.1.4.1.789.1.3.1.2.1)

4.12 Product Information

This metric category defines the metrics for Product Information monitoring. There are no default thresholds for the metrics in this category.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–24 Product Information Metrics

Metric	Description	Data Source (SNMP MIB Object)
Firmware Version	Version string for the Firmware running on this platform	productFirmwareVersion (1.3.6.1.4.1.789.1.1.6)
Model	Model name of this Network Appliance Filer	productModel (1.3.6.1.4.1.789.1.1.5)
Product Category	Type of Network Appliance product. The possible types are: Filer, Clustered Filer, or NetCache	sysObjectID (1.3.6.1.2.1.1.2)
Product ID	System ID (serial number) of the Network Appliance Filer	productId (1.3.6.1.4.1.789.1.1.3)
Vendor	Vendor who supplied this Network Appliance Filer	productVendor (1.3.6.1.4.1.789.1.1.4)
Version	Version of the Network Appliance Filer. The version changes for any patch update or product update to the Network Appliance Filer.	productVersion (1.3.6.1.4.1.789.1.1.2)

4.13 Qtrees

The metrics in this category are for Qtree monitoring. This information is available only if quotas are turned ON. For our purposes, Quota Type equals qtree.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–25 Qtrees Metrics

Metric	Description	Data Source (SNMP MIB Object)
Name	Name of the Qtree	qrVTree (1.3.6.1.4.1.789.1.4.5.1.10)
Qtree Used (%)	See Section 4.13.1, "Qtree Used (%)"	See Section 4.13.1, "Qtree Used (%)"
Quota Type	Identifies the kind of quota for this entry. Quota Type equals three, which indicates Qtree	qrVType (1.3.6.1.4.1.789.1.4.5.1.2)

Table 4–25 (Cont.) Qtrees Metrics

Metric	Description	Data Source (SNMP MIB Object)
Total GB	Limit in gigabytes for this Qtree	qrVKBytesLimit (1.3.6.1.4.1.789.1.4.5.1.5) **Note:** This object returns Total in kilobytes, which is converted into gigabytes.
Used GB	Current number of gigabytes used for this Qtree	qrVKBytesUsed (1.3.6.1.4.1.789.1.4.5.1.4) **Note:** This object returns Used in kilobytes, which is converted into gigabytes.

4.13.1 Qtree Used (%)

This metric represents the percentage of space limit used for this Qtree.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–26 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	95	98	1	Qtree %QtreeName% is %value%% full, crossed warning (%warning_threshold%%) or critical (%critical_threshold%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Path Name" object.

If warning or critical threshold values are currently set for any "Path Name" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Path Name" object, use the Edit Thresholds page.

Data Source

SNMP MIB object: Not Applicable

4.14 RAID Configuration

Redundant Array of Independent Disks (RAID) enables file access even if one disk in a RAID group is damaged. The metrics in this category report on the health of the RAID configuration.

The following table lists the metrics, their descriptions, and data sources.

Table 4–27 RAID Configuration Metrics

Metric	Description	Data Source (SNMP MIB Object)
Bay	Number identifying the disk bay within the shelf where the disk is located	raidVBay (1.3.6.1.4.1.789.1.6.2.1.20
Disk Status	Status of this disk drive	raidVStatus (1.3.6.1.4.1.789.1.6.2.1.3)
RAID Group	Number that identifies the RAID group within the given volume to which this disk belongs. A RAID group consists of a parity disk, up to 28 data disks, and optional spare disks.	raidVGroup (1.3.6.1.4.1.789.1.6.2.1.13)
Shelf	Number identifying the shelf where the disk is located	raidVShelf (1.3.6.1.4.1.789.1.6.2.1.19)
Total (GB)	Total size of this disk, in gigabytes	raidVTotalMb (1.3.6.1.4.1.789.1.6.2.1.9) **Note:** This object returns Total in megabytes, which is converted into gigabytes.
Used (GB)	Space currently in use, in gigabytes	raidVUsedMb (1.3.6.1.4.1.789.1.6.2.1.7) **Note:** This object returns Used in megabytes, which is converted into gigabytes.

4.15 Response

This metric category represents the Internet Control Message Protocol (ICMP) ping response of the Network Appliance Filer.

4.15.1 Status

This metric indicates whether the Network Appliance Filer Host is alive and accessible.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–28 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 2 Minutes	After Every Sample	=	Not Defined	0	1	%target% is unreachable over the network or is down.Status is %value%, same as warning (%warning_threshold%) or critical (%critical_threshold%) threshold.

Data Source

Checks for the TCP ping to the Network Filer Appliance host.

4.15.2 TCP Ping, Milliseconds

This metric gives the Mean time taken to return a ping.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–29 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 2 Minutes	After Every Sample	>	Not Defined	Not Defined	6	TCP Ping response is %value% miliseconds, crossed warning (%warning_threshold%) or critical (%critical_ threshold%) threshold.

4.16 SnapMirror

The Network Appliance Filer Snapmirror technology provides asynchronous mirroring of data between filer volumes. Data on the source volume is periodically replicated to the target at a user definable time interval, with the range being from one minute to one month.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

4.16.1 SnapMirror Time Lag (Min)

This metric represents how far, in minutes, the destination trails behind the source.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–30 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 4 Samples	>	Not Defined	Not Defined	1	SnapMirror Time lag between Source:%SMSource% and Destination:%SMDestination% is %value% minutes, crossed warning (%warning_ threshold%) or critical (%critical_threshold%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each unique combination of "Index", "Source", and "Destination" objects.

If warning or critical threshold values are currently set for any unique combination of "Index", "Source", and "Destination" objects, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each unique combination of "Index", "Source", and "Destination" objects, use the Edit Thresholds page.

Data Source

Derived using SNMP MIB object snapmirrorLag (1.3.6.1.4.1.789.1.9.20.1.6)

The snapmirrorLag object gives the lag in 'hundredths of a second'. Smtimelag (in minutes) is derived using ((snapmirrorLag / 100.0) / 60.0)

4.16.2 State

This metric represents the current state of the snapmirror. The possible values are:

1. uninitialized
2. snapmirrored
3. broken-off
4. quiesced
5. source
6. unknown

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 15 Minutes

Data Source

SNMP MIB object: 1.3.6.1.4.1.789.1.9.20.1.5

4.16.3 Status

This metric represents the current transfer status of the snapmirror. The possible values are:

1. idle
2. transferring
3. pending
4. aborting
5. migrating
6. quiescing
7. resyncing
8. waiting

Metric Summary

The following table shows how often the metric's value is collected.

Target Version	Collection Frequency
All Versions	Every 15 Minutes

Data Source

SNMP MIB object: snapmirrorStatus (1.3.6.1.4.1.789.1.9.20.1.4)

4.17 SnapMirror Load

Network Appliance Filer SnapMirror software delivers the disaster recovery and data distribution solution by replicating data at high speeds over a Local Area Network (LAN) or a Wide Area Network (WAN).

SnapMirror software provides the highest possible data availability and fastest recovery for mission-critical applications. SnapMirror technology mirrors data to one or more network filers. It continually updates the mirrored data to keep it current and available for disaster recovery, offloading tape backup, read-only data distribution, testing on non production filers, online data migration, and more.

The metrics in this category report on the SnapMirror read and write rates.

Note: For all target versions, the collection frequency for each metric is every 6 hours.

The following table lists the metrics, their descriptions, and data sources.

Table 4–31 SnapMirror Load Metrics

Metric	Description	Data Source (SNMP MIB Object)
SnapMirror Read Rate (Kbytes/second)	Number of kilobytes per second read by SnapMirror. This metric is reset on reboot.	snapmirrorReadBytes (1.3.6.1.4.1.789.1.9.11) Computed by calculating the difference over a collection interval.
SnapMirror Write Rate (Kbytes/second)	Number of kilobytes per second written by SnapMirror. This metric is reset on reboot.	snapmirrorWrittenBytes (1.3.6.1.4.1.789.1.9.10)

4.18 Snapshots

A snapshot is a point-in-time, read-only image of the entire file system. The metrics in the Snapshots category report on the snapshot metrics.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–32 Snapshots Metrics

Metric	Description	Data Source (SNMP MIB Object)
Reserve Available (GB)	Space available (in gigabytes)	dfKBytesAvail (1.3.6.1.4.1.789.1.5.4.1.5) **Note:** This object returns Available in kilobytes, which is converted into gigabytes.
Reserve Total (GB)	Total allocated capacity, in gigabytes, for this snapshot	dfKBytesTotal (1.3.6.1.4.1.789.1.5.4.1.3) **Note:** This object returns Total in kilobytes, which is converted into gigabytes.
Reserve Used (GB)	Space (in gigabytes) in use	dfKBytesUsed (1.3.6.1.4.1.789.1.5.4.1.4) **Note:** This object returns Used in kilobytes, which is converted into gigabytes.
Snapshot Reserve Used (%)	See Section 4.18.1, "Snapshot Reserve Used (%)"	See Section 4.18.1, "Snapshot Reserve Used (%)"
Volume Type	Type of container (traditionalVolume, flexibleVolume, or an aggregate)	SNMP MIB object: 1.3.6.1.4.1.789.1.5.4.1.23 (dfType) Derived as: ■ traditionalVolume (1) ■ flexibleVolume(2) ■ aggregate(3)

4.18.1 Snapshot Reserve Used (%)

This metric represents the percentage of space used.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–33 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	95	Not Defined	1	Snapshot %keyValue% is %value%% full, crossed warning (%warning_ threshold%%) or critical (%critical_threshold%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Volume" object.

If warning or critical threshold values are currently set for any "Volume" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Volume" object, use the Edit Thresholds page.

Data Source

SNMP MIB object: dfPerCentKBytesCapacity (1.3.6.1.4.1.789.1.5.4.1.6)

4.19 Spare Disks

This metric category represents the statistics related to the spare disks in a RAID (Redundant Array of Independent Disks) group. A RAID group consists of a parity disk, up to 28 data disks, and optional spare disks.

A spare disk in an auxiliary disk used to replace other disks should they become corrupted or full. When a disk in a RAID group fails, a spare disk automatically replaces it. Spare disks are all the disks in the systems that have not been assigned to a volume.

The following table lists the metrics, their descriptions, and data sources.

Table 4–34 Spare Disks Metrics

Metric	Description	Data Source (SNMP MIB Object)
Disk Name	Name of this spare disk drive	spareDiskName (1.3.6.1.4.1.789.1.6.3.1.2)
Spare Bay	Number identifying the disk bay within the shelf where the disk is located	spareBay (1.3.6.1.4.1.789.1.6.3.1.13)
Spare Shelf	Number identifying the shelf where the disk is located	spareShelf (1.3.6.1.4.1.789.1.6.3.1.12
Spare Status	Status of this spare drive. Examples of spare status are: spare, adding spare, bypassed, and unknown.	spareStatus (1.3.6.1.4.1.789.1.6.3.1.3)
Total (GB)	Total size of this spare disk, in gigabytes	spareTotalMb (1.3.6.1.4.1.789.1.6.3.1.7) **Note:** This object returns Total in megabytes, which is converted into gigabytes.

4.20 System Load

This metric category includes the metrics that indicate the network traffic and the I/O activities of the Network Appliance Filer.

> **Note:** For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–35 System Load Metrics

Metric	Description	Data Source (SNMP MIB Object)
Cache Age (Minutes	Age, in minutes, of the oldest read-only blocks in the buffer cache. This indicates how fast read operations are cycling through system memory. When the Network Appliance Filer is reading very large files (larger than the machine's memory size), buffer cache age will be very low	miscCacheAge (1.3.6.1.4.1.789.1.2.2.23)

Table 4–35 (Cont.) System Load Metrics

Metric	Description	Data Source (SNMP MIB Object)
Total Disk I/O Rate (KBytes/second)	Total (read and write) bytes, to and from the disk, in Kilobytes per second	miscHighDiskReadBytes (1.3.6.1.4.1.789.1.2.2.15) miscLowDiskReadBytes (1.3.6.1.4.1.789.1.2.2.16) miscHighDiskWriteBytes (1.3.6.1.4.1.789.1.2.2.17) miscLowDiskWriteBytes (1.3.6.1.4.1.789.1.2.2.18)
Total Disk Read Rate (KBytes/second)	Rate of bytes read from disk since the last boot	miscHighDiskReadBytes (1.3.6.1.4.1.789.1.2.2.15) miscLowDiskReadBytes (1.3.6.1.4.1.789.1.2.2.16)
Total Disk Written Rate (KBytes/second)	Rate of bytes (Kilobytes/s) written to disk since the last reboot	miscHighDiskWriteBytes (1.3.6.1.4.1.789.1.2.2.17) miscLowDiskWriteBytes (1.3.6.1.4.1.789.1.2.2.18)
Total Http Operations Received Rate (Ops/second)	Rate of HTTP operations received since the last reboot	miscHighHttpOps (1.3.6.1.4.1.789.1.2.2.9) miscLowHttpOps (1.3.6.1.4.1.789.1.2.2.10)
Total Network I/O Rate (KBytes/second)	Rate of bytes received and transmitted on all the network interfaces, since the last boot	miscHighNetRcvdBytes (1.3.6.1.4.1.789.1.2.2.11) miscLowNetRcvdBytes (1.3.6.1.4.1.789.1.2.2.12) miscHighNetSentBytes (1.3.6.1.4.1.789.1.2.2.13) miscLowNetSentBytes (1.3.6.1.4.1.789.1.2.2.14)
Total Network Received Rate (KBytes/second)	Rate of bytes received on all the network interfaces, since the last boot	miscHighNetRcvdBytes (1.3.6.1.4.1.789.1.2.2.11) miscLowNetRcvdBytes (1.3.6.1.4.1.789.1.2.2.12)
Total Network Sent Rate (KBytes/second)	Rate of bytes transmitted on all the network interfaces, since the last boot	miscHighNetSentBytes (1.3.6.1.4.1.789.1.2.2.13) miscLowNetSentBytes (1.3.6.1.4.1.789.1.2.2.14)

4.21 Volume Allocation

This metric category includes the metrics representing the allocated space for each volume.

Note: For all target versions, the collection frequency for each metric is every 15 minutes.

The following table lists the metrics, their descriptions, and data sources.

Table 4–36 Volume Allocation Metrics

Metric	Description	Data Source (SNMP MIB Object)
Allocated (GB)	Allocated space, in gigabytes, for each volume	dfKBytesUsed (1.3.6.1.4.1.789.1.5.4.1.4) Derived as (dfKBytesUsedl / (1024.0 * 1024.0))
Total (GB)	Total capacity, in gigabytes, for each volume	dfKBytesTotal (1.3.6.1.4.1.789.1.5.4.1.3) Derived as (dfKBytesTotal / (1024.0 * 1024.0))
Unallocated (GB)	Unallocated space, in gigabytes, for each volume	dfKBytesAvail (1.3.6.1.4.1.789.1.5.4.1.5) Derived as (dfKBytesAvail / (1024.0 * 1024.0))
Volume Allocated (%)	See Section 4.21.1, "Volume Allocated (%)"	See Section 4.21.1, "Volume Allocated (%)"
Volume Type	Type of container (traditionalVolume, flexibleVolume, or an aggregate)	1.3.6.1.4.1.789.1.5.4.1.23 (dfType) Derived as: ■ traditionalVolume (1) ■ flexibleVolume(2) ■ aggregate(3)

4.21.1 Volume Allocated (%)

This metric represents the percentage of allocated space for each volume.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–37 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	100	Not Defined	3	%VolumeTypeString% %keyValue% has been over allocated by %value%%%, crossed warning (%warning_ threshold%%%) or critical (%critical_threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Volume" object.

If warning or critical threshold values are currently set for any "Volume" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Volume" object, use the Edit Thresholds page.

Data Source

Derived as (volumeallocgb / volumetotalgb) * 100

4.22 Volumes

A volume is a physical file system on a Network Appliance Filer comprising multiple disks that store client data. A Network Appliance Filer can have from one to 23 volumes. This metric category defines the metrics for Volume Monitoring.

> **Note:** For all target versions, the collection frequency for each metric is every 15 minutes.

The following lists the metrics, their descriptions, and data sources.

Table 4–38 Volumes Metrics

Metric	Description	Data Source (SNMP MIB Object)
Available (GB)	Space available, in gigabytes, on this volume	dfKBytesAvail (1.3.6.1.4.1.789.1.5.4.1.5) **Note:** This object returns the value in kilobytes, which is converted into gigabytes.
Files Available	Number of files (inodes) available for use	dfInodesFree (1.3.6.1.4.1.789.1.5.4.1.8)
Files Used	Number of files currently in use	dfMaxFilesUsed (1.3.6.1.4.1.789.1.5.4.1.12
Files Used (%)	See Section 4.22.1, "Files Used (%)"	See Section 4.22.1, "Files Used (%)"
Max Files	Maximum number of files allowed on this volume	dfMaxFilesAvail (1.3.6.1.4.1.789.1.5.4.1.11)
Total (GB)	Total capacity, in gigabytes, of this volume	dfKBytesTotal (1.3.6.1.4.1.789.1.5.4.1.3) **Note:** This object returns the Total in kilobytes, which is converted into gigabytes.
Used (GB)	Space, in gigabytes, in use by this volume	dfKBytesUsed (1.3.6.1.4.1.789.1.5.4.1.4) **Note:** This object returns the Used metric in kilobytes, which is converted into gigabytes.
Volume Type	Type of container (traditionalVolume, flexibleVolume, or an aggregate)	1.3.6.1.4.1.789.1.5.4.1.23 (dfType) Derived as: ▪ traditionalVolume (1) ▪ flexibleVolume(2) ▪ aggregate(3)
Volume Used (%)	See Section 4.22.2, "Volume Used (%)"	See Section 4.22.2, "Volume Used (%)"

4.22.1 Files Used (%)

This metric represents the percentage of maximum inodes in use on this volume.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–39 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	95	98	1	%VolumeTypeString% %keyValue% has used %value%%% files of its limit, crossed warning (%warning_ threshold%%%) or critical (%critical_threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Volume" object.

If warning or critical threshold values are currently set for any "Volume" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Volume" object, use the Edit Thresholds page.

Data Source

SNMP MIB object: dfPerCentInodeCapacity (1.3.6.1.4.1.789.1.5.4.1.9)

4.22.2 Volume Used (%)

This metric represents the percentage of space used on this Network Appliance Filer.

Metric Summary

The following table shows how often the metric's value is collected and compared against the default thresholds. The 'Consecutive Number of Occurrences Preceding Notification' column indicates the consecutive number of times the comparison against thresholds should hold TRUE before an alert is generated.

Table 4–40 Metric Summary Table

Target Version	Evaluation and Collection Frequency	Upload Frequency	Operator	Default Warning Threshold	Default Critical Threshold	Consecutive Number of Occurrences Preceding Notification	Alert Text
All Versions	Every 15 Minutes	After Every 96 Samples	>	95	98	1	%VolumeTypeString% %keyValue% is %value%%% full, crossed warning (%warning_ threshold%%%) or critical (%critical_threshold%%%) threshold.

Multiple Thresholds

For this metric you can set different warning and critical threshold values for each "Volume" object.

If warning or critical threshold values are currently set for any "Volume" object, those thresholds can be viewed on the Metric Detail page for this metric.

To specify or change warning or critical threshold values for each "Volume" object, use the Edit Thresholds page.

Data Source

SNMP MIB object: dfPerCentKBytesCapacity (1.3.6.1.4.1.789.1.5.4.1.6)