Monitor Dell EMC VxFlex OS

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DELL EMC

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Preface

As part of an effort to improve its product lines, Dell EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact your Dell EMC technical support professional if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. Go to Dell EMC Online Support (https://support.emc.com) to ensure that you are using the latest version of this document.

Previous versions of Dell EMC VxFlex OS were marketed under the name Dell EMC ScaleIO.

Similarly, previous versions of Dell EMC VxFlex Ready Node were marketed under the name Dell EMC ScaleIO Ready Node.

References to the old names in the product, documentation, or software, etc. will change over time.

Note: Software and technical aspects apply equally, regardless of the branding of the product.

Related documentation

The release notes for your version includes the latest information for your product.

The following Dell EMC publication sets provide information about your VxFlex OS or VxFlex Ready Node product:

- VxFlex OS software (downloadable as VxFlex OS Software <version> Documentation set)
- VxFlex Ready Node with AMS (downloadable as VxFlex Ready Node with AMS Documentation set)
- VxFlex Ready Node no AMS (downloadable as VxFlex Ready Node no AMS Documentation set)
- VxRack Node 100 Series (downloadable as VxRack Node 100 Series Documentation set)

You can download the release notes, the document sets, and other related documentation from Dell EMC Online Support.

Typographical conventions

Dell EMC uses the following type style conventions in this document:

Bold	Used for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
Italic	Used for full titles of publications referenced in text
`Monospace`	Used for: • System code • System output, such as an error message or script • Pathnames, filenames, prompts, and syntax • Commands and options
Monospace italic	Used for variables

`Monospace bold`	Used for user input
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections - the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Where to get help

Dell EMC support, product, and licensing information can be obtained as follows:

Product information

For documentation, release notes, software updates, or information about Dell EMC products, go to Dell EMC Online Support at https://support.emc.com.

Technical support

Go to Dell EMC Online Support and click Service Center. You will see several options for contacting Dell EMC Technical Support. Note that to open a service request, you must have a valid support agreement. Contact your Dell EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your opinions of this document to techpubcomments@emc.com.

CHAPTER 1

Opening the VxFlex OS GUI and Logging In

The following topics describe how to open the VxFlex OS GUI, and log in procedures.

- Log in to the VxFlex OS GUI 12

Log in to the VxFlex OS GUI

Open and log in to the VxFlex OS GUI.

Before you begin

Ensure that:

- The VxFlex OS GUI software is installed on the workstation. To install the VxFlex OS GUI, see "Install the VxFlex OS GUI."
- You have these credentials (available from the administrator):
  - MDM management IP address or hostname
  - Username (the admin user exists by default)
  - Password (defined during deployment)

Procedure

1. Open the VxFlex OS GUI:
   - Linux: Run the script `/opt/emc/scaleio/gui/run.sh`.
   - Windows: Click **Start** > **All Programs** > **EMC** > **VxFlex OS GUI**
   - MacOS: From the command line, run `/Applications/VxFlexOS-gui-3.0-x.x.app/Contents/MacOS/VxFlexOS-gui-3.x.x.x`

   The initial login screen is displayed.
2. Type the IP address or hostname and click **Connect**.

   If a certificate notice is displayed, review and accept the certificate.

   If a login banner is displayed, confirm it to continue.
3. In the login screen, type the username and password, and click **Login**.

Results

The VxFlex OS GUI is displayed.

After you finish

Users and passwords are configured with the VxFlex OS CLI. For more information, see the "Security" chapter of the *VxFlex OS User Guide*.

CHAPTER 2

Monitoring VxFlex OS Components Using the VxFlex OS GUI

View object properties, license information, and connection information using the VxFlex OS GUI.

This guide includes information about how to monitor VxFlex OS and also includes an overview of the VxFlex OS GUI.

- View object properties in Backend and Frontend views — GUI 14
- View license information — GUI 14
- Connection and disconnection information 14

View object properties in Backend and Frontend views — GUI

Use the **Backend** and **Frontend** views in the VxFlex OS GUI to see detailed object properties.

About this task

The **Backend** view provides detailed information about backend objects in the system, including the devices that belong to each SDS server, and the Storage Pools from which they are comprised. The **Frontend** view provides detailed information about the volumes, SDCs, and snapshots that your applications use. These are created from the Storage Pools in the Backend.

Procedure

1. In **Backend** or **Frontend** view, use the filter to display one or more objects.

   You can select the corresponding check boxes of the objects you want.
2. Navigate to the object in the table.
3. Display the required information, using the table view options.
4. Select the required object's row in the table, and then, on the expandable Property Sheet on the right side of the window, click the blue arrow buttons beside the headings to expand them and view specific status information.

   Note: Contents of the Property Sheet are dynamic, and differ, depending on the row selected in the table. For more information about Property Sheets, see Property sheets on page 38.

View license information — GUI

About this task

Before a permanent license is installed, a banner is displayed at the top of the VxFlex OS GUI window that provides links for purchasing a license, and for registering for VxFlex OS newsletters.

Information that is required for licensing purposes is located in the **About** window, as described in the following steps:

Procedure

1. From the **System Settings** menu, select the **About** option.

   The **About** window is displayed.
2. In the **About** window, note the Installation ID, which is required for electronic licensing purposes.

   Additional information pertaining to your license is also displayed in this window.

Connection and disconnection information

You can check at any time to which IP address your VxFlex OS GUI is connected.

Use the following methods:

- View the IP address displayed in the top left corner of the VxFlex OS GUI window.
- Hover your mouse over the **Management** tile on the Dashboard. A tooltip displays connection information for the nodes in the MDM cluster, and the management IP addresses

If the VxFlex OS GUI loses its connection with the MDM, the window display is dimmed, and a notification dialog box is displayed.

CHAPTER 3

VxFlex OS GUI Features

The following topics describe VxFlex OS GUI features.

- VxFlex OS GUI overview 18
- VxFlex OS GUI conventions 18
- Dashboard view 20
- Frontend views 27
- Backend views 30
- Monitor Alerts view 36
- Property sheets 38
- Connection and disconnection information 40

VxFlex OS GUI overview

Use the VxFlex OS GUI to monitor and configure VxFlex OS.

The various windows display different views and data that are beneficial to the storage administrator. You can review the overall status of the system, drill down to the object level, and monitor these objects. You can use the VxFlex OS GUI to provision and modify many of the objects.

The following sections describe the available windows, and how to use them. These topics provide detailed information about the objects and their properties that are displayed in the VxFlex OS GUI. For information on configuring the system using the GUI, see the *Configure and Customize VxFlex OS Guide*. Your user privileges control the features that are displayed by the VxFlex OS GUI. If you cannot access certain commands, check whether you have the appropriate user permissions, and if necessary, contact your system administrator for assistance.

VxFlex OS GUI conventions

This section describes conventions used in the VxFlex OS GUI, including alert indicators and color codes.

Alert indicators

The Alert indicators show the overall error state of the system. When lit, the indicators show the number of active alerts of each severity. Similar indicators are displayed in some views of the Backend table, and also on Property Sheets (in some cases, an additional blue indicator for information only is included). You can view details about the alerts active in the system in the **Monitor** > **Alerts** view. For more information about Alerts, see Monitor Alerts view on page 36 and VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS on page 64.

Figure 1 Alert indicators

Color codes

Color codes provide quick visual feedback on the status of various objects in the system. The following tables summarize the colors used in the system, and their meaning. The color codes are used in a variety of elements and views in the user interface.

Table 1 VxFlex OS GUIcolor codes

Color	Meaning	Dashboard View	Backend View
LIGHT GREEN (protected)	Available protected, healthy storage	✓	✓
GREEN (in maintenance)	One or more SDSs are in Maintenance Mode, and part of those SDSs' capacity is temporarily protected on other SDSs	✓	✓
YELLOW	Snapshot capacity (yellow outline)	✓	✓

Table 1 VxFlex OS GUIcolor codes (continued)

Color	Meaning	Dashboard View	Backend View
	Capacity-related statuses		
ORANGE (degraded)	Data is not protected Rebuild or Rebalance in progress	✓ ✓	✓
RED (failed)	Data is unavailable	✓	✓
DARK GRAY	Unused capacity No activity or zero values	✓	 ✓
DARK GRAY striped with RED	System is unable to determine if capacity is Unavailable or Unused	✓	✓
PALE GRAY	Decreased capacity. This capacity exists physically, but has been disabled (typically to allow maintenance tasks on devices).	✓	
BLUE (spare)	Capacity reserved for recovery purposes	✓	
BRONZE	Volume capacity	✓	
DARK BLUE	Indicates selected items in the filter		✓

Table 2 Alert symbols and color codes

Color	Meaning	Dashboard View	Backend View	Alert View
YELLOW	Low alert status	✓	✓	✓
ORANGE	Medium alert status	✓	✓	✓
RED	High alert status	✓	✓	✓
LIGHT BLUE	Information message (no faults)		✓	✓

Dashboard view

The **Dashboard** displays the overall system status. Each tile displays a certain aspect of the storage system. Various controls let you customize the information displayed on the Dashboard. The following figure shows the Dashboard controls.

Figure 2 Dashboard controls

1 **Navigation toggle**—Displays navigation tree

2 **Current view**—Displays object currently being applied to the dashboard

3 **Dashboard**—Displays the **Dashboard** view, currently selected

4 Other tabs—Display various views in the VxFlex OS GUI; some tabs provide further options when clicked

5 **Username**—name of user currently logged in to the VxFlex OS GUI. To the right of the username is the **Logout** menu.

7 **Capacity Utilization toggle**—Displays the physical, allocated, and provisioned capacity, and several compression ratios

8 **Color code legend**—Displays the legend

9 **I/O Workload toggles**—control the information displayed in this tile. For more information, see "Customizing system preferences" in the Configure and Customize VxFlex OS Guide.

10 **Dimmer toggle**—Enables\disables the dimmer

11 **Widget toggle**—Minimizes the display to a widget

6 **System Settings** menu—System Settings, User Preferences

Navigation tree

The **Dashboard**'s navigation button toggles the display of the navigation tree.

The navigation tree is hierarchical, and controls the **Dashboard** display. You can display information on the **Dashboard** according to:

- Entire system (default)
- Protection Domain
- Storage Pool

Click the **Navigation toggle** at the top left of the screen to display the navigation tree. You can change the **Dashboard** display by selecting the desired navigation tree node. Some tiles on the **Dashboard** may be dimmed if they are not relevant for the node that you have selected.

System Settings and Logout menus

The **System Settings** menu lets you do the following:

- Open the **System Settings** window, where you can configure and view license and certificate information.
- Open the **User Preferences** window, where system preferences can be set. For more information, see "Customizing system preferences" in the *Configure and Customize VxFlex OS Guide*.
- Display information about your system, including information required for licensing (**About** option).

The **Logout** menu lets you do the following:

- View the username of the user currently logged in to the system (default)
- Log out of the system

Dimmer

The **Dimmer** button toggles the dimmer feature on and off. When you use the dimmer, only tiles that are essential for real-time monitoring are lit. You can temporarily light up the dimmed tiles by hovering the mouse pointer over them.

Widget

The **Widget** button reduces the dashboard size to a widget containing a condensed display of the storage system. The widget floats on your desktop, allowing you to visually monitor your system while using other applications. The widget displays the **Capacity** tile, Workload activity, Rebuild/Rebalance activity, and Alerts indicators.

When the dashboard is minimized to a widget, the **Full-Screen** button is displayed in the top-right-corner, as shown in the following figure. This button toggles the display back to full dashboard mode.

Figure 3 Widget, showing Return to Full-Screen button

Dashboard tiles

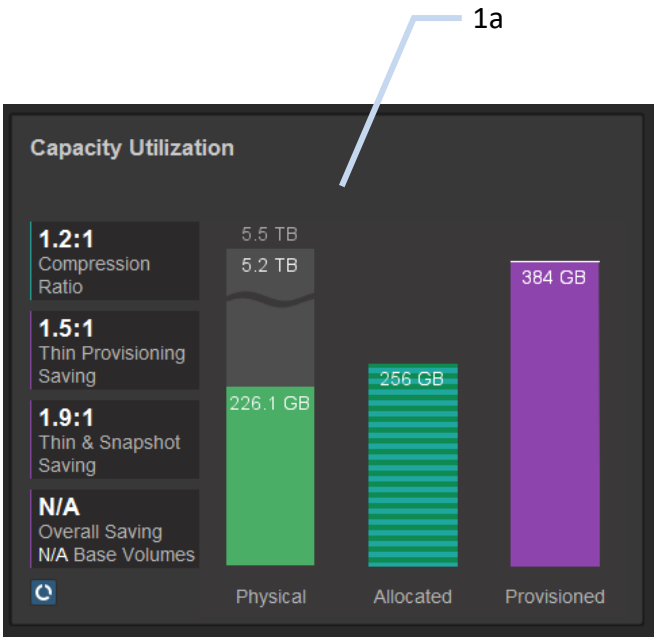
The **Dashboard** tiles provide a visual overview of storage system status. The tiles are dynamic, and contents are refreshed at the interval set in the system preferences (default: 10 second intervals). System preferences can also be used to set the display to basic or advanced reporting. For more information, see the *Configure and Customize VxFlex OS Guide*.

Some of the tiles' contents differ, depending on the navigation filter in use. When the dimmer feature is enabled, non-essential tiles are dimmed, unless the mouse pointer is positioned over them.

Active alert statuses relevant for specific tiles are indicated by red, orange or yellow symbols on those tiles. These indicators show that one or more alerts are active, but not the number of alerts.

Note: The filter used in the **Backend** view does not influence the **Dashboard** display.

Figure 4 Dashboard tiles



The following table describes the tiles displayed on the Dashboard.

Table 3 Dashboard tiles

Tile	Description
1 - Physical Capacity	Displays the raw capacity of the system, rounded off to multiples of 8 GB. The available raw capacity is represented by concentric rings outwards from the center: **Outer Ring** Displays the storage usage using the color codes described in the legend. The actual values are written next to the colored segments. The icon in the bottom right corner of the tile displays the color code legend. The outer ring is divided as follows: • *Protected* • *In Maintenance* • *Degraded* • *Failed* • *Unused*—Shows how much further the raw capacity can be expanded; if this capacity is not accessible, it will be marked as Unavailable Unused. • *Spare*—Shows spare capacity reserved for system operation; • *Decreased*—Shows decreased capacity that was deducted from devices (using the `Set Device Capacity Limit` command), and cannot be used. A miniature version of the outer Capacity ring is shown in some Backend table views and Property Sheets. **Inner Ring** Displays the volume capacity and snapshot capacity. The arc displays the total amount of available data. The filled (bronze) part represents the capacity used by original data volumes, and the hollow (outlined) part represents the capacity used for snapshot volumes. This displays the ratio of snapshot usage. To get a more accurate idea of snapshot usage, see the Backend Capacity Usage view. **Center circle** Displays the total amount of available raw storage. **Note:** Total available raw storage does not represent the total amount of capacity available for volume allocation.
1a - Capacity Utilization	To see this tile, click the **Capacity Utilization toggle** at the bottom left corner of the **Physical Capacity** tile. This tile displays the capacity use in the VxFlex OS system. In addition to displaying the physical, allocated, and provisioned capacity, it indicates the ratio of compression in the system, as well as the capacity savings due to thin provisioning. To return the Dashboard to the **Physical Capacity** view, click the **Physical Capacity toggle** at the bottom left corner of the tile.
2 - I/O Workload	Displays the performance statistics of the system (IOPS, bandwidth and I/O size). More details about I/O can be viewed in the Backend table views: **Application I/O**, **Overall I/O**, and **I/O Bandwidth**. In Advanced Dashboard view (controlled by User Preferences) aggregated values of bandwidth and IOPS are displayed. The table in this tile summarizes the Reads, Writes and Totals of IOPS, and throughput and the average size of an I/O.
3 - Internal I/O	The tile displays the system's internal I/O. Clicking on the arrow icon cycles through total internal I/O, internal I/O due to migration, and internal I/O due to rebalance operations.

Table 3 Dashboard tiles (continued)

Tile	Description
4 - Rebuild	Indicates if VxFlex OS is currently rebuilding RAID 1 data. A rebuild is usually a result of a recovery due to failure of a server or a storage device. The tile displays the rate in which the data is rebuilt, using a large orange font and icon. Capacity that is still pending rebuild is displayed in small white fonts. In Advanced Dashboard view (controlled by system User Preferences) more details are displayed on this tile. Hovering over the title displays a tooltip listing the events that triggered the rebuild operation. Click **More details...** to open the **Monitor** view.
5 - Alert Indicators	Displays the number of active alerts in the system, using the system-wide color codes.
6 - SDCs	Displays the number of SDCs (clients) in the system. The large number in the center is the number of SDCs connected to the MDM. The defined number includes all SDCs defined in the system (some of which may be disconnected from the MDM).
7 - Volumes	Displays the number of volumes defined across the system, the free available capacity, and the used capacity. The amount of free capacity shown on this tile is the maximum amount that can be used for creating a new volume. This amount takes into account how much raw data is needed for maintaining RAID 1 and system spares. Note that the number of volumes and the total capacity include snapshots. If there are V-Trees undergoing migration, the green migration icon is visible in the top right corner of the tile. Click the icon to open the **V-Tree Capacity Utilization** view.
8 - Protection Domains	Displays the number and status of all Protection Domains defined in the system. The large number in the center is the number of Protection Domains. This tile is displayed when the dashboard is filtering information according to cluster.
8 - Storage Pools	Displays the number and status of all Storage Pools defined in the Protection Domain. The large number in the center is the number of Storage Pools. This tile is displayed when the dashboard is filtering information according to Protection Domain.
9 - SDSs	Displays the number and status of all SDSs (servers) in the system. The large number in the center is the number of SDSs defined in the MDM. This tile is displayed when the dashboard is filtering according to cluster or Protection Domain. If any SDSs are currently in Maintenance Mode, the orange maintenance icon is displayed on this tile. The specific SDSs currently in Maintenance Mode can be identified using the Backend and Alerts views.
9 - Devices	Displays the number and status of all storage devices defined in the Storage Pool. The large number in the center is the number of devices defined in the MDM. This tile is displayed when the dashboard is filtering according to Storage Pool.
10 - Management	Displays the status of the MDM cluster, or of an MDM operating in Single Mode (one node). The status is displayed graphically as a combination of the MDM cluster elements, and an alert icon if active alerts exist. For more information, see Management (MDM) cluster status on page 25. When you hover your mouse pointer over this tile, a tooltip displays the IP addresses, including the Virtual IP address, used by the MDM cluster or node.

Management (MDM) cluster status

Different icons are used to represent various MDM states.

A tooltip displays the IP addresses used by the MDM cluster or node.

The following figure shows how management nodes are displayed on the Dashboard.

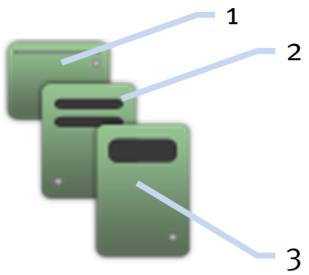


Table 4 Legend

1	Tie Breaker	2	Slave	3	Master

The following tables show how management clusters are displayed on the Dashboard.

Table 5 Management node icons with normal operational status (green)

Icon	Description
	5-node cluster
	3-node cluster
	single node

Table 6 Management node status indications and color codes

Example	Description
	Green—Normal operation
	Gold—Degraded state: data is not consistent; system is synchronizing (the node is still operational)
	Gray—Degraded state: a Slave or Tie-Breaker is down
	Blue arrow—An upgrade is in progress
	There is no communication with the Master MDM

Frontend views

The **Frontend** views provides detailed information about frontend objects in the system, including volumes, SDCs and snapshots, and lets you perform various configuration operations. You can access the following views from the **Frontend** menu: **Volumes** and **SDCs**.

The main areas of the Frontend views are:

- **Filter**—lets you filter the information displayed in the table and Property Sheets. For more information, see Adding Frontend objects to the filter on page 29.

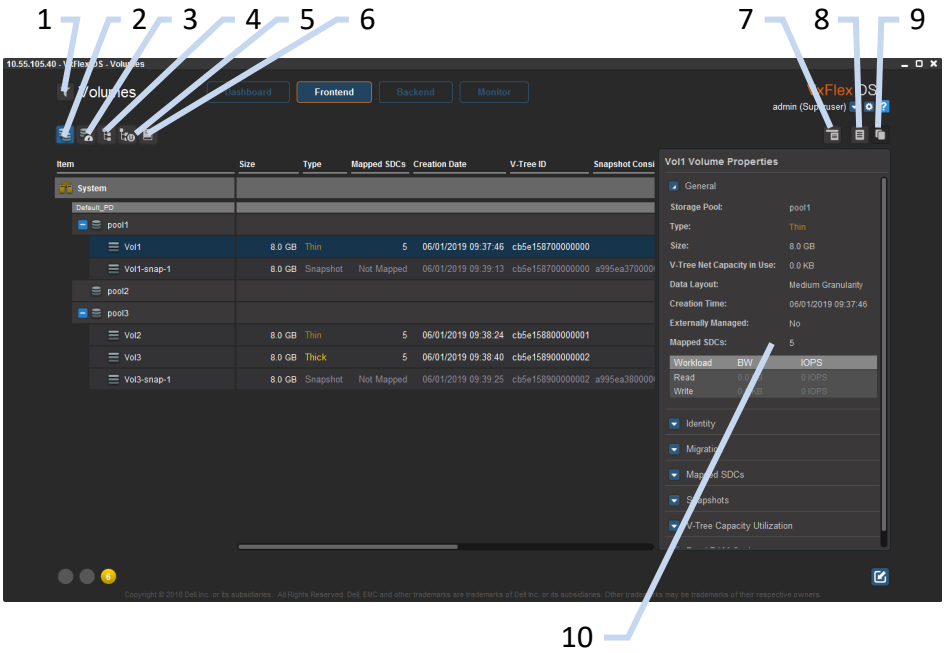
- **Toolbar buttons**—let you perform commands on the selected row in the table (add, remove, configuration), or toggle the display of Property Sheets, by clicking the appropriate button
- **Table**—displays detailed information about system objects. The table displays a wide range of information, which can be filtered. Certain commands can be performed on objects, using the context-sensitive menu for the desired row in the table, or the **Command menu** on the toolbar.
- **Property Sheets**—display very detailed read-only information about the object selected in the table. For more information, see Property sheets on page 38. For more information about the terminology used in the Property Sheets, see the Glossary at the end of this publication.

  Note: Some objects in the system can be identified by ID numbers. The ID numbers displayed in the GUI can be used in CLI commands to specify these objects.

Frontend > Volumes

The **Frontend** > **Volumes** view displays information relating to volumes, V-Trees, capacity utilization, snapshots, and snapshot policies.

Figure 5 Frontend > Volumes view



1 **Filter toggle**—controls display of the filter

2 **Volumes** view—displays volume details, including size, mapped SDCs, V-Tree ID, snapshot consistency group, and free net capacity.

3 **Volume Monitor** view—displays I/O details for each volume, including read and write IOPS.

6 **Snapshot Policy** view— enables you to define new snapshot policies and source volumes to the policy.

7 **Command menu**—contains a list of commands which you can perform on the row selected in the table.

8 **Show Property Sheet**—controls display of the Property Sheet. The Property Sheet displays information about the object selected in the table.

4 **V-Tree Migration** view—displays V-Trees (volumes and their snapshots) and their migration status and enables you to initiate, pause, or roll back V-Tree migrations.

5 **V-Tree Capacity Utilization** view—displays volume capacity information including provisioned and allocated capacity, compression ratio, and free capacity.

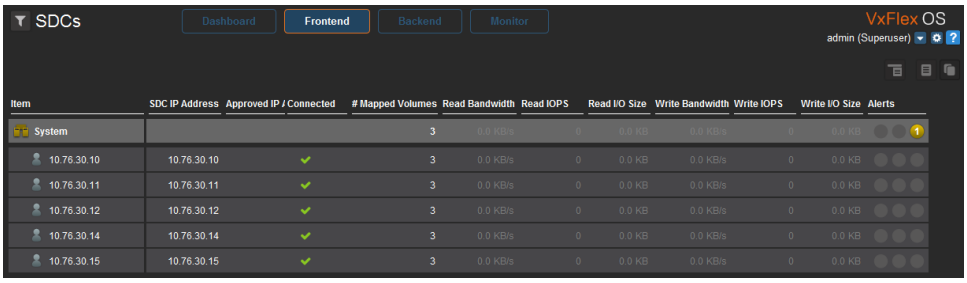
9 **Duplicate Property Sheet**—Opens and floats the Property Sheet in a new window, which can be kept open while you display the **Table**properties of a different object, for comparison or other purposes

10 **Property Sheet**—The Property Sheets provide detailed read-only information about the object selected in the table

SDCs

The **Frontend** > **SDCs** view displays the SDC connection status and number of mapped volumes for each SDC, as well as additional I/O details.

Figure 6 Frontend > SDCs view



Adding Frontend objects to the filter

About this task

Add Frontend objects such as volumes, SDCs, and consistency groups to the Frontend filter. The filter simplifies the display in the main window, by showing only required objects, and hiding the rest.

Note: Toggle the filter display on and off by clicking the filter icon at the top left corner of the window. When the filter is on, only items added to the filter will be visible in the table.

To add objects to the filter, perform these steps:

Procedure

1. In any of the **Frontend** views, navigate to the objects that you want to add to the filter, and select them.
2. Right-click and select **Filter by**.

   Depending on the object, there may be further options, such as:

   - **Filter by** > **Consistency Group**
   - **Filter by** > **Volume**

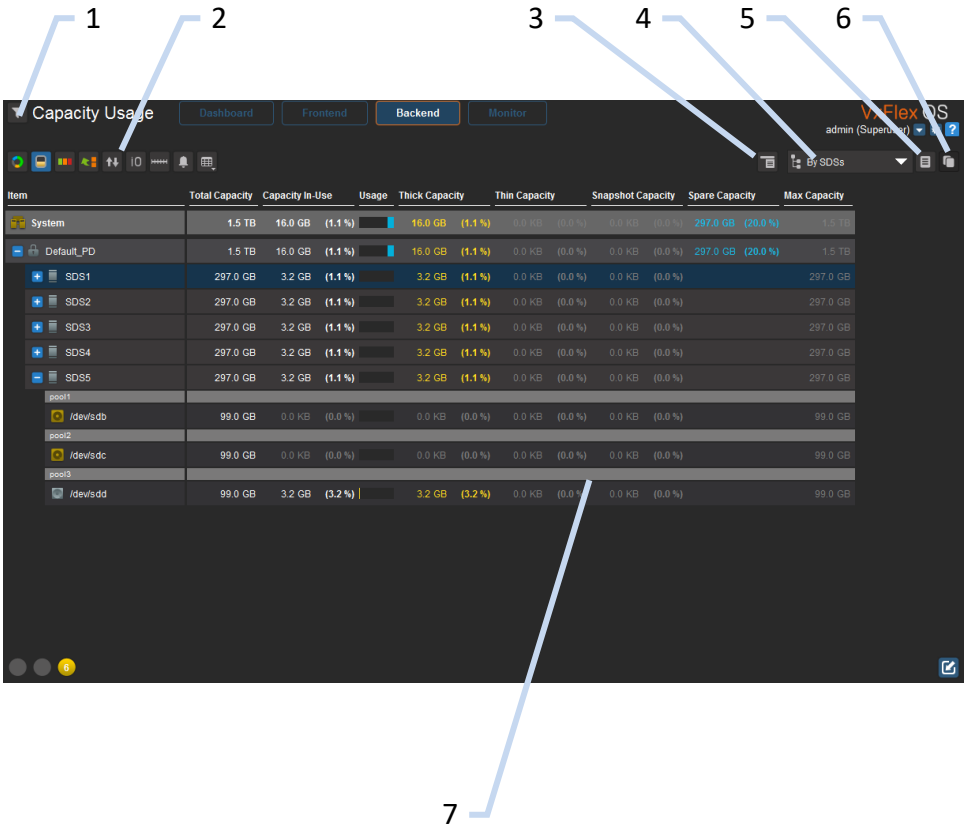
Backend views

The **Backend** views provide detailed information about backend objects in the system, and lets you perform various configuration operations. You can access the following views from the **Backend** menu: **Storage** and **Devices**.

Backend > Storage

The **Backend** > **Storage** view provides information related to storage. The main areas of the **Backend** > **Storage** view are:

Figure 7 Backend > Storage view



1 **Filter** toggle—controls display of the filter. For more information, see Filter on page 32.

2 Table view options—each button provides a different combination of properties which can be displayed together in the table. Additional views are available from the **More Table Views** button. For more information, see Table on page 33.

5 **Show Property Sheet**—controls display of the Property Sheet. The Property Sheet displays detailed read-only information about the object selected in the table. For more information, see Property sheets on page 38.

6 **Duplicate Property Sheet**—Opens and floats the Property Sheet in a new window, which can be kept open while you display the properties of a different object, for comparison or other purposes

3 Command menu—contains a list of commands which you can perform on the row selected in the table. For more information, see Command menu on page 33.

4 **Storage Pools\SDS** toggle—toggles display of the table rows grouped according to either Storage Pools, or SDSs. Some table views are only available when sorted by either SDSs or Storage Pools. For example, Fault Sets are only displayed when sorting by SDSs, and Rebuild I/O Priority is only displayed when sorting by Storage Pools.

7 **Table**—displays a summary of properties for the objects selected in the filter, according to the selected table view option

Note: Irrelevant, mostly zero values, are "dimmed" in the **Backend** > **Storage** view. The only exception is when the Max Capacity is the same as the Total Capacity. In this case, Max Capacity would be dimmed (if decreased capacity exists, Max = [Total + decreased] in the **Backend** > **Storage** table). Similarly, arrows and icons are unavailable in the same circumstances.

Note: Some objects in the system can be identified by ID numbers. The ID numbers displayed in the GUI can be used in CLI commands to specify these objects.

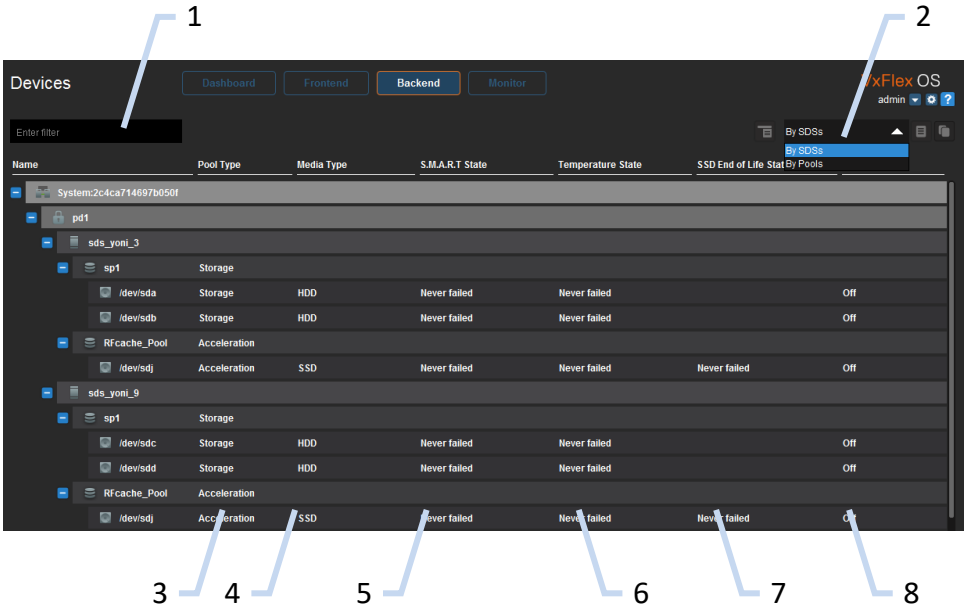
Backend > Devices

The **Backend** > **Devices** view provides acceleration status at a glance, and lets you drill down to specific SDSs and acceleration devices. This view is also used to configure acceleration in your system, including:

- Adding acceleration pools and acceleration devices
- Setting Read Flash Cache
- Configuring Read RAM Cache

The view also displays S.M.A.R.T. information about the devices installed in your system. From this view, you can turn a device's LED on, in order to physically locate it in a server chassis.

Figure 8 Backend > Device view



1 **Filter**—filters the table according to text typed in the search field .

2 **Pools/SDS toggle**—toggles display of the table rows grouped according to either Storage Pools/Acceleration Pools, or SDSs.

3 **Pool Type**—displays the type of pool to which the device belongs: Storage or Acceleration

4 **Media Type**—displays the device media type: SSD, HDD.

5 **S.M.A.R.T. State**—displays the S.M.A.R.T. state of the devices including possible imminent drive failure.

6 **Temperature State**—displays the device's temperature state.

7 **SSD End of Life State**—displays the endurance state of an SSD device.

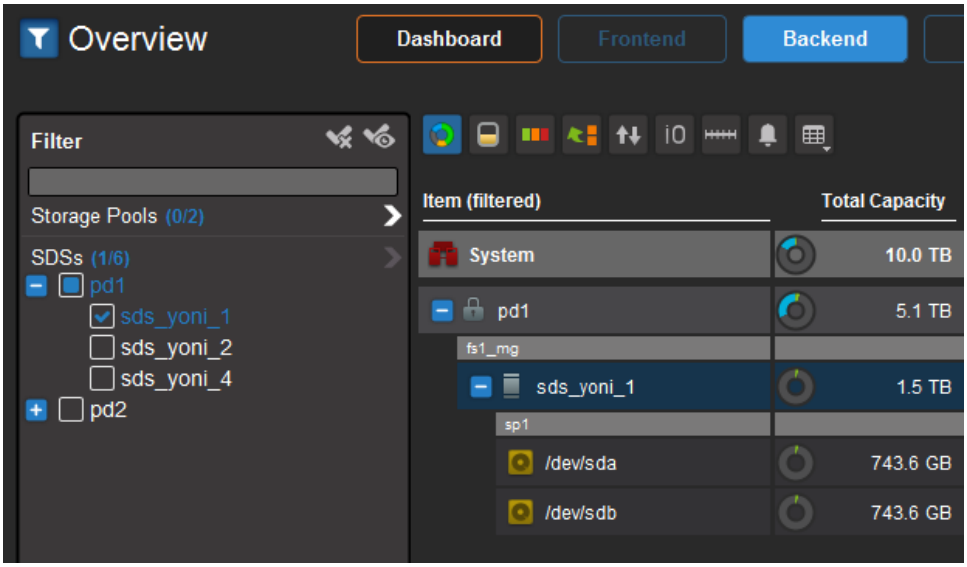
8 **LED Settings**—displays current LED state of the device. Change the LED state by right-clicking the device and using the LED Settings command. (LED settings are not supported on NVDIMM devices.)

Filter

The filter lets you filter out the information shown in the table, so that only the objects related to the items selected in the filter are visible. Items colored dark blue in the filter are displayed. The buttons at the top of the filter panel control the items hidden, displayed, selected or cleared in the filter. Below these buttons, a search field lets you type free text to search for a object by name. The filter below shows a filter being used to show specific devices in the Backend table. In the Backend, you can filter information according to Storage Pools, SDSs, Volumes, Protection Domains, and Devices.

Your filtering choice would depend on your current problem or management needs. You can also add a specific object to the filter, using the **Filter By** command from the **Command** menu or context-sensitive menu.

Figure 9 Backend filter



Command menu

The **Command menu** button displays a list of commands which you can perform on rows selected in the table. The contents of the **Command menu** differ, depending on the object selected in the table. Many of the commands can also be accessed from the context-sensitive menu when table rows are right-clicked.

Table

The table displays object statuses, and allows configuration of some objects. The contents of a Property Sheet for a specific object are determined by the row selected in the table. The color codes described in "Color codes" in the *Monitor Guide* also apply to the items displayed in the table.

The information displayed in the table is controlled by the filter and the table view options. Selected objects (rows in the table) can be created, configured and removed using context-sensitive menu options, or commands from the **Command** menu. The columns in the table can be resized, by dragging the borders in the heading row of the table. The scrollbar at the bottom of the table lets you scroll through the columns in the table. The following table describes the available table views:

Note: Clock icons in the cells indicate stale/aging data.

Table 7 Table view options

Name of view	Contents of view	Suggested use, comments
Overview	Total Capacity, Capacity In-Use, I/O Bandwidth, IOPS, Rebuild, Rebalance, Migration, Alerts	Provides a general overview the capacity and health of system objects. If you find that there are active alerts, you can switch to **State Summary** table view, or the **Monitor > Alerts** view to see more details about the alerts.

Table 7 Table view options (continued)

Name of view	Contents of view	Suggested use, comments
		While this view is similar to the **Dashboard**, the main difference is that here, you can simultaneously monitor many objects within their hierarchy. You can then filter the table for specific objects or sets of objects, in contrast to the **Dashboard**, where you can only drill-down to objects. In addition, commands and Property Sheets are available to you from this view. **Note:** The miniature Capacity ring shown here represents the outer Capacity ring on the Dashboard. For more information, see "Dashboard tiles" .
Capacity Usage	Total Capacity, In-Use Capacity, Usage, Thick Capacity, Thin Capacity, Snapshot Capacity, Spare Capacity, Max Capacity Related Property Sheet section: **Capacity**	Provides a breakdown of capacity usage per use type. You can use this to check whether more capacity needs to be added to your system, and where.
Capacity Health	Capacity In-Use, Protected, In Maintenance, Degraded, Failed, Health, Rebuild, Rebalance Related Property Sheet sections: **Capacity**, **Alerts**, **Rebuild/Rebalance**	Provides information about the health of the objects in the system, per object.
Internal I/O	Health, Backward Rebuild, Forward Rebuild, Rebalance, Migration Related Property Sheet sections: **Alerts**, **Rebuild/Rebalance**	Provides a summary of rebuild, rebalance, and migration health, status, and workload per object.
Application I/O	IOPS and I/O Size for: Total, Read, Write, and 2nd Write Related Property Sheet section: **Workload**	Displays workload information for applications reading/writing to storage in the system. 2nd Writes refer to the protection copy of data being written to storage.
Overall I/O	IOPS and I/O Size for: Total, Total Read, Total Write Related Property Sheet section: **Workload**	Provides workload information for all I/Os in the system, including both application I/Os, and I/Os for internal processes.
I/O Bandwidth	Read, Write, Backward Rebuild, Forward Rebuild, Rebalance, Migration, Total, Total Read, Total Write Related Property Sheet section: **Network Throttling**	Shows the bandwidth being used for various jobs in the system.
State Summary	Summary Related Property Sheet section: **Alerts**	Can be used to identify items in the system which have open alert states, and to view the alert messages, including information statuses of various objects. If there are pending security certificates, and if an SDS is in Maintenance Mode, this is also indicated here. Alerts marked blue are for information purposes only, and do not require that any action be taken.

Table 7 Table view options (continued)

Name of view	Contents of view	Suggested use, comments
Acceleration	Acceleration Type, Accelerated On, Acceleration Status Related Property Sheet sections: **Fine Granularity**, **Read Flash Cache**	Displays an overview of acceleration in the system, including the type of acceleration being used and its status.
Configuration	Total Capacity, SDSs, Devices, Storage Pools, Volumes, Free Net Capacity, Volume Allocation Limit, Alerts Related Property Sheet sections: **Identity**, **Related Objects**	Provides an overview of the number of objects per type in your system and their capacity, and lets you determine the amount of free capacity available for creating an additional volume. This table view is a convenient location from which to perform Add, Remove, Activate and Inactivate commands. For more information, see the *Configure and Customize VxFlex OS Guide*. The **Related Objects** section of the Property Sheet helps you to identify related objects to the one selected in the table.
Device Latency	Average Read Latency, Average Write latency, Average Read Size, Average Write Size, Scanned Capacity, Resolved Errors, Data Conflicts Related Property Sheet sections: **Device Latency** , **Background Device Scanner**	Displays an overview of performance information and Background Device Scanner results, per device. When the table is sorted by SDSs, the Down arrow in each SDS row reveals all the devices in the SDS. **Note:** Information is shown only at Device level, and there is no aggregation of information at higher levels. If the background device scanner is enabled, several device read statistics are dramatically affected.
Read RAM Cache	State, Size, Used, Hit Rate, Write Mode Related Property Sheet section: **Read RAM Cache**	Lets you check which SDSs have Read RAM Cache enabled, view associated counters, and check which Storage Pool is set to use the cache for its devices. Advanced feature; modify with caution.
Read RAM Cache (Internal)		For support purposes only. Visible only if Backend Internals are enabled in the **User Preferences** window.
Read Flash Cache	State, Size, Used, Read Hit Rate, Total Errors, Alerts Related Property Sheet sections: **Read Flash Cache** and **Related Objects**	Lets you check which SDSs and Storage Pools have Read Flash Cache enabled, view associated counters. The **Related Objects** section of the corresponding Property Sheet shows the names/paths of the devices used for caching.

Table 7 Table view options (continued)

Name of view	Contents of view	Suggested use, comments
Rebuild and Rebalance (Advanced)	Health, Backward Rebuild, Forward Rebuild, Rebalance Related Property Sheet section: **Rebuild/ Rebalance**	Shows workload and active rebuild and rebalance jobs, as well as pending jobs to be processed. Credited incoming and outgoing information is displayed for each process (Backward Rebuild, Forward Rebuild and Rebalance).
Planned Rebuilds (Advanced)	Degraded, Distribution, Backward and Forward Rebuilds Related Property Sheet section: **Rebuild/ Rebalance**	Shows amount of unprotected data, a visual breakdown of rebuild progress (Distribution), bandwidth, direction and status (Active/ Pending) of jobs. You can monitor how the degraded capacity is planned to be rebuilt: How failed degraded capacity is expected to be rebuilt, then how the system will pool it for the rebuild processes (backward and forward,) and which of it is actively being rebuilt. **Note:** Overall Degraded capacity includes both healthy and failed copies of the data, while the processed capacity includes only the failed copies. Advanced feature; modify with caution.
Planned Rebalance(Advanced)	Protected, Distribution, Rebalance Related Property Sheet section: **Rebuild/ Rebalance**	Shows amount of protected data, a visual breakdown of rebalance progress (Distribution), bandwidth, direction and status (Active/Pending) of jobs. Advanced feature; modify with caution.
Rebuild I/O Priority (Advanced)	Policy, Concurrent I/O limit, Bandwidth Limit, Application Threshold, Quiet Period Related Property Sheet section: **I/O Priority**	Displays bandwidth settings currently configured for Rebuild jobs. These I/O Priority settings apply only to Storage Pools. These settings control system performance. Advanced feature; modify with caution.
Rebalance I/O Priority (Advanced)	Policy, Concurrent I/O limit, Bandwidth Limit, Application Threshold, Quiet Period Related Property Sheet section: **I/O Priority**	Displays I/O priority settings currently configured for Rebalance jobs. These I/O Priority settings apply only to Storage Pools. These settings control system performance. Advanced feature; modify with caution.
Network Throttling (Advanced)	Overall I/O Limit, Rebuild I/O Limit, Rebalance I/O Limit, Rebuild Incoming Limit, Rebalance Incoming Limit, Rebuild Queue Length, Rebalance Queue Length, Rebuild Outgoing Jobs, Rebalance Outgoing Jobs Related Property Sheet section: **Network Throttling**	Displays Network Throttling settings currently configured in the system. These settings control system performance. Advanced feature; modify with caution.

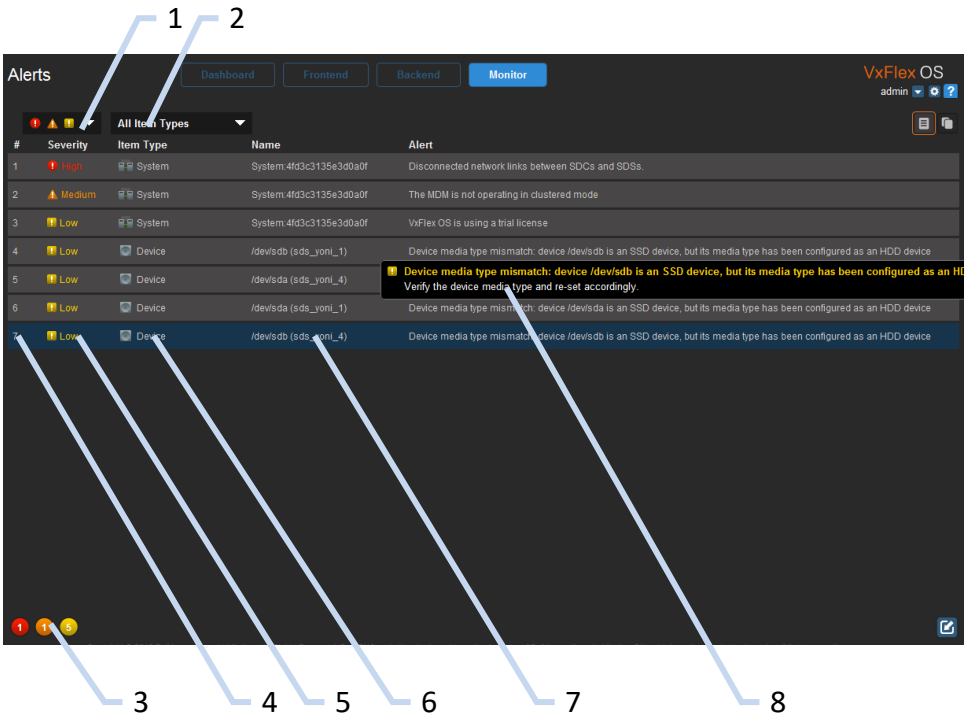
Monitor Alerts view

Alerts

The **Alerts** view, accessed from the **Monitor** menu, provides a list of the alert messages currently active in the system, in table format. You can filter the table rows according to alert severity, and according to object types in the system. For a list of alerts generated by the system, see "System events".

To view a Property Sheet for a specific alert, select the corresponding row in the table, and click the **Show Property Sheet** button. For more information about Property Sheets, see "Property sheets".

Figure 10 Alerts view



1 Severity filter—filters the table contents according to alert severity:
All alerts

Medium—alerts which are Medium or High severity

High—only alerts which are High severity

2 Item Types filter—filters the table contents according to:
System, Protection Domain, Storage Pool, V-Tree, SDS, Device, SDC, Snapshot Policy, Physical Drive, Node, Appliance, NIC, NIC Port, PSU, Battery, RAM, Storage Controller, Fan, CPU, CPU Cache, Boot Drive, Bmc

5 **Severity**—the alert severity: High, Medium or Low

6 **Item Type**—System, Protection Domain, Storage Pool, V-Tree, SDS, Device, SDC, Snapshot Policy, Physical Drive, Node, Appliance, NIC, NIC Port, PSU, Battery, RAM, Storage Controller, Fan, CPU, CPU Cache, Boot Drive, Bmc

3 Alert indicators—summarize the total amount of each alert type (from left to right: High, Medium, Low)

4 **#**—the line number in the Alerts table

7 **Name**—the user-defined name of the item, if one has been defined

8 **Alert**—the alert message generated by the system.
To view more details and troubleshooting suggestions, hover the mouse over the alert message.

Property sheets

The property sheets provide detailed read-only information about the object selected in most **Frontend** tables, **Backend** tables, **Monitor** tables.

The contents of the property sheets differ, depending on the object selected in the table. Property sheets help you to monitor specific objects in the system by displaying the following, using the blue collapse and expand arrows next to each section of the property sheet:

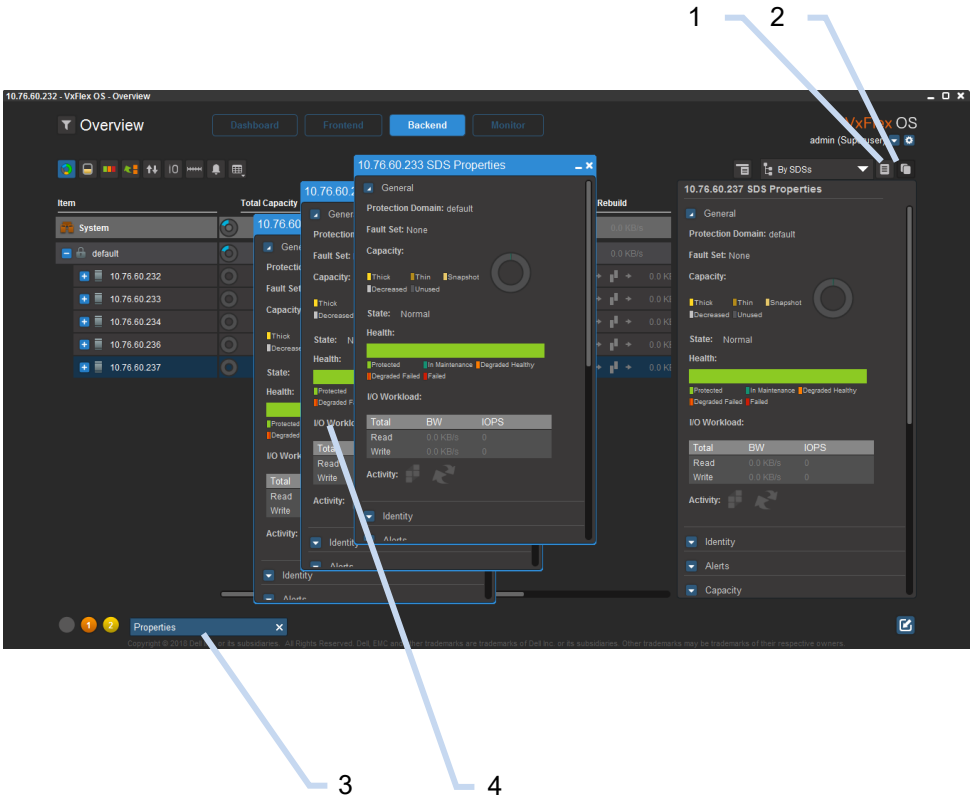
- **General** and **Health** information about the object.
- **Identity**—identifying information, such as an object's ID number, name, IP addresses, port usage, VM usage, GUID.
- **Migration**—the migration status of the selected volume.
- **Mapped SDCs** for the selected volume, including the SDC name/IP address, and bandwidth limit and IOPS limit per volume.
- **Mapped Volumes** for the selected SDC, including the volume name, and bandwidth limit and IOPS limit per volume.
- **Snapshots**—details about net capacity in use, and a snapshot tree including the volume name, and date and time of creation of the parent volume and each snapshot.
- **V-Tree Capacity Utilization**—details about capacity use for the selected V-Tree, including base volume capacity, snapshot capacity, and total trimmed capacity.
- **MDM Cluster** details, such as cluster mode and state, IP addresses and ports (including the Virtual IP address) used for management and MDM functions, and SSL version being used for secure communication. The Virtual IP addresses and the Virtual IP interfaces are displayed together in table format, to indicate the mapping between them.
- **Alerts**—alert status per selected object, including SDS Maintenance Mode (if active).
- **User Data**— a breakdown of user data, including how much is compressed and how much is snapshots and metadata.
- **Capacity** usage per selected object.
- **Workload** information (bandwidth usage and IOPS) per selected object.
- **Rebuild/Rebalance** information about the selected object(s), for forward and backward rebuilds, rebalancing, data at rest, and job status (active\pending). The type of information displayed depends on the type of object selected in the table.
- **Device Latency** averages for Read and Write, and average I/O size, for the device selected in the table.
  Note: If the background device scanner is enabled, several device read statistics are dramatically affected.
- **Consistency Group** for the related volumes, including a list of the volumes, and the Consistency Group name.

- **Read RAM Cache** configuration, state, and statistics for the selected object. The type of information displayed depends on the type of object selected in the table.
- **Read Flash Cache** configuration, state, and statistics for the selected object. The type of information displayed depends on the type of object selected in the table.
- **Device Test Results** for the device selected in the table, if any tests have been performed.
- **Background Device Scanner** results for the device selected in the table, if the scanner is enabled.
- **Network Throttling** configuration for the selected SDS, including bandwidth limit per job, and queue length, for both Rebuilding and Rebalancing.
- **Fine Granularity**—the number of the concurrent I/Os
- **I/O Priority** configured for the selected Storage Pool, including Rebuild and Rebalance states, number of parallel jobs, I/O prioritization policy, concurrent I/Os and bandwidth limit
- Miscellaneous items, such as DRL mode, zero padding, checksum mode
- **Performance** profile currently assigned to the selected object: Default, High or Custom. “Custom” is displayed whenever performance-related parameters have been configured manually, instead of via a performance profile.
- **Oscillating Failure Counters** are shown for SDSs and devices selected in the Backend view, for SDCs selected in the Frontend view, and for Alert messages.
- **Oscillating Failure Parameters** currently configured in the system are shown for the entire system, for the selected Storage Pool or Protection Domain, and for Alert messages. The counters shown depend on the object selected in the table.
  - **Window:** the sliding time-window for each interval (Short, Medium and Long)
  - **Threshold:** the number of errors that may occur before error reporting commences
  - **Period:** the time interval of each Window, in seconds
- **Maintenance Mode** state of the selected SDS is shown here. States include: No Maintenance and In Maintenance Mode.
- **Certificate Info** is shown for security certificates
- **Related objects**, which can be very useful for troubleshooting problems, or for planning purposes, when you need to make changes to your system.

You can view properties for multiple objects by using the **Duplicate property sheet to a new window** button, and then navigating to a different object’s row in the table. When more than one property sheet is open, a floating widget that controls them is displayed in the bottom part of the main window, as shown in the following figure.

Note: You can open property sheets, duplicate them, and then simultaneously work on other unrelated objects in the system.

Figure 11 Multiple floating Property Sheets



1 **Display\Hide property sheet** button

2 **Duplicate property sheet to a new window** button

3 **Duplicated property sheets** toggle

4 Multiple property sheets opened using the **Duplicate property sheet to a new window** button

Connection and disconnection information

You can check at any time to which IP address your VxFlex OS GUI is connected.

Use the following methods:

- View the IP address displayed in the top left corner of the VxFlex OS GUI window.
- Hover your mouse over the **Management** tile on the Dashboard. A tooltip displays connection information for the nodes in the MDM cluster, and the management IP addresses
  If the VxFlex OS GUI loses its connection with the MDM, the window display is dimmed, and a notification dialog box is displayed.

CHAPTER 4

Using the VMware Plug-in

The following topics describe how to use the VMware plug-in (the “plug-in”) to view and provision VxFlex OS components.

- Using the VxFlex OS plug-in 42
- View components 42

Using the VxFlex OS plug-in

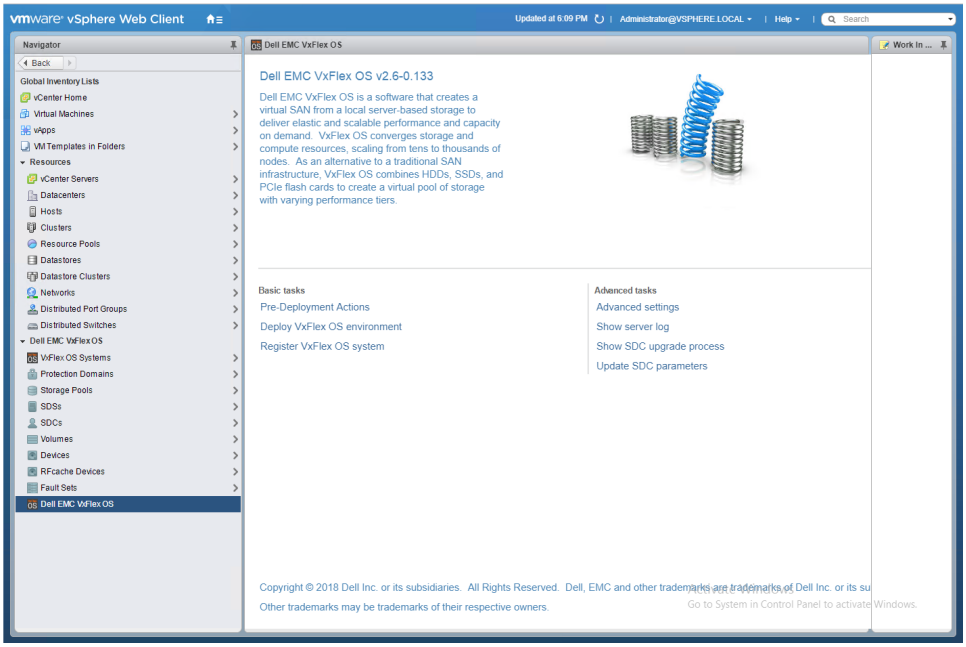
The VxFlex OS plug-in in the vSphere Web Client communicates with the MDM and the vSphere server, enabling you to view components and perform many configuration and provisioning tasks from within vSphere.

To use the VxFlex OS, it must be registered in your vCenter. For more information, see *Deploying VxFlex OS*.

To open the VxFlex OS plug-in, in the vSphere Web Client click

.

The Dell EMC VxFlex OS screen is displayed with an overview of the configured components.



You can use the VxFlex OS plug-in to configure and view VxFlex OS components.

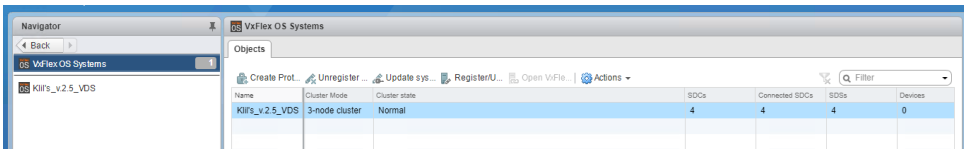
View components

About this task

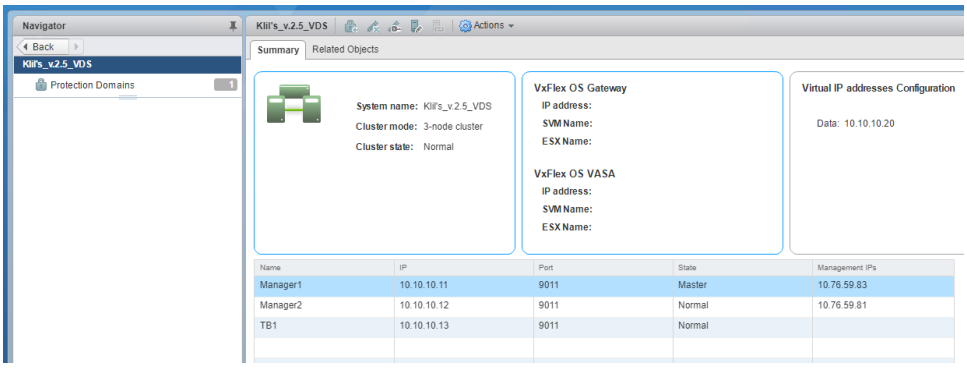
To view an installed component, click it from the VxFlex OS list.

Every component shows details that are relevant to the selected component.

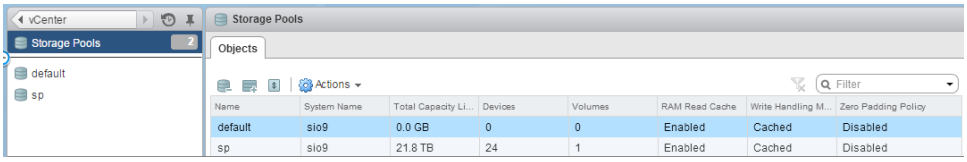
For example, when you select **VxFlex OS systems**, the following system details are displayed:



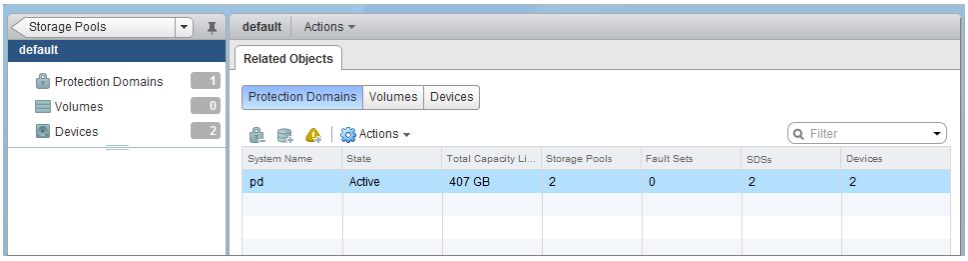
To see more details, double-click the displayed details:



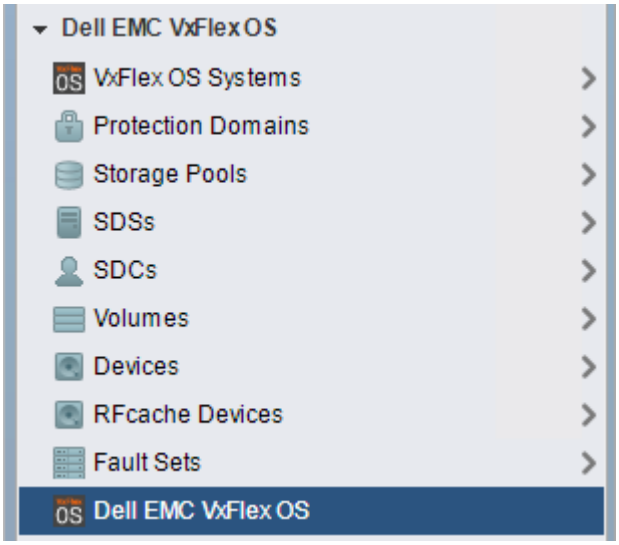
When you select **Storage Pools**, the following details are displayed:



When you drill-down on this screen, the following details are displayed:



You can view the properties of all the VxFlex OS components in the menu:



CHAPTER 5

System events

The following topics describe VxFlex OS system events and alerts.

- System events overview 46
- Event format 46
- Viewing events 47
- Event list 50

System events overview

An event message is generated as a response to changes that have occurred while the system is running. Event messages notify you of changes in case your intervention is needed.

Event entries are documented as follows:

Name
The name associated with the event

Message
The message that will appear

Severity
The severity level

Description
A description of the reasons that triggered the event notification

Action
Possible actions that can resolve the reported event (if relevant)

Each event message is associated with a severity level. The severity indicates the risk (if any) to the system, in relation to the changes that generated the event message. The severity levels are as follows:

Severity level	Explanation	Example
Info	Informs you of events that one should be aware of, but that do not put the system at risk (no urgency).	`CLI_COMMAND_RECEIVED`
Warning	Indicates a failure that may result from an acceptable condition (e.g. user error), but can also indicate a possible failure.	`SDC_DISCONNECTED`
Error	An error alarm was raised by the system. This error requires your attention. The system is stable, but could be degraded.	`MDM_DATA_DEGRADED`
Critical	A major error alarm was raised by system. The system requires immediate attention. Some data is unavailable.	`MDM_DATA_FAILED`

Event format

All event messages received are in a parsable structured format, containing the following fields:

ID
A sequential number attached to all events

Date
The local time set in the server

Format
YYYY-MM-DD hh:mm:ss.ssssss

Name

The unique name of the event

Severity

One of the predefined severity levels

Message

Message describing the event. Some event notification message verbosity may be expanded by using the full switch (see Viewing events locally).

The following is an example of a possible event notification:

```
139  2013-07-22 17:21:11.694571 CLI_COMMAND_RECEIVED
INFO     Command MAP_VOL_TO_SCSI_INITIATOR Received
```

This event has the option of extended verbosity. When requested, the event notification will be displayed as follows:

```
139  2013-07-22 17:21:11.694571 CLI_COMMAND_RECEIVED
INFO     Command MAP_VOL_TO_SCSI_INITIATOR Received Vol
Name: snap_raw; SCSI Initiator Name: ini-21
bAllocateLunNum: 1 lunNum: 0
```

The following is a breakdown of the event according to the fields in the event record (as described above):

Parameter	Description
ID	139
Date	2013-07-22 17:21:11.694571
Name	CLI_COMMAND_RECEIVED
Severity	INFO
Message	Command MAP_VOL_TO_SCSI_INITIATOR Received
Extended	Command MAP_VOL_TO_SCSI_INITIATOR Received Vol Name: snap_raw; iSCSI Initiator Name: ini-21 bAllocateLunNum: 1 lunNum: 0

Viewing events

You can view events in the following ways:

- on a local server
- via Syslog
- via email

To configure events via email, see the *EMC Secure Remote Services Installation and Operations Guide*.

Viewing events locally

Events can be viewed by running the following command, and by using switches to filter the data.

Command:

showevents.py

Syntax

```
/opt/emc/scaleio/mdm/bin/showevents.py [Options]
```

Actual command syntax is operating-system dependent. For more information, see "CLI basics" in the *VxFlex OS CLI Reference Guide*.

Description/Notes

Displays events, which can be filtered by optional switches.

Parameters

Parameter	Description
Options:	
--min_severity *<SEVERITY>*	Displays events with at least the specified minimum severity
--severity *<SEVERITY>*	Displays events with the specified severity
--from_id *<ID>*	Displays all events starting from the given ID
--to_id *<ID>*	Displays all events ending at the given ID
--from_date *<ID>*	Displays all events starting from the given date
--to_date *<ID>*	Displays all events ending at the given date
--grep *<TEXT>*	Displays events containing the specified text
--full	Extends message verbosity

Example

```
/opt/emc/scaleio/mdm/bin/showevents.py --severity ERROR --full
```

Viewing events in Syslog

The MDM syslog service can send VxFlex OS events, via TCP/IP, to RFC 6587-compliant remote (or local) Syslog servers. Messages are sent with facility `local0`, by default.

Once the syslog service is started, all events will be sent until the service is stopped.

This section describes how to use the CLI to start, stop, and configure the facility field of the syslog events.

start_remote_syslog

Start posting events to a remote syslog server.

Syntax

```
scli --start_remote_syslog --remote_syslog_server_ip <IP>
  [--remote_syslog_server_port <PORT>]
```

```
  [--syslog_facility <FACILITY>]
  [--attach_event_code]
```

Parameters

--remote_syslog_server_ip *<IP>*

Comma-separated list of IP addresses or hostnames of syslog servers. Omit the space after each comma.

--remote_syslog_server_port *<PORT>*

Syslog server port. Default is 1468.

--syslog_facility *<FACILITY>*

Control the facility field of the event. Default is 16.

--attach_event_code

Add the posted event code to the event message. This parameter is disabled by default.

Example

```
scli --start_remote_syslog --remote_syslog_server_ip 192.168.1.201 --
syslog_facility 16
```

stop_remote_syslog

Stop posting events to a remote syslog server.

Syntax

```
scli --stop_remote_syslog (--remote_syslog_server_ip <IP> | --
all_remote_syslog_servers)
```

Parameters

--remote_syslog_server_ip *<IP>*

Comma-separated list of IP addresses or hostnames of syslog servers. Omit the space after each comma.

--all_remote_syslog_servers

Stop posting events to all remote syslog servers.

Example

```
scli --stop_remote_syslog --remote_syslog_server_ip 192.168.1.201
```

set_syslog_facility

Set the facility field of the syslog events. Legal values are 0 to 23.

Syntax

```
scli --set_syslog_facility --remote_syslog_server_ip <IP> --syslog_facility
<FACILITY>
```

Parameters

`--remote_syslog_server_ip <IP>`

Comma-separated list of IP addresses or hostnames of syslog servers. Omit the space after each comma.

`--syslog_facility <FACILITY>`

Control the facility field of the event. Default is 16.

Example

```
scli --set_syslog_facility --remote_syslog_server_ip 192.168.1.201 --
syslog_facility 16
```

Event list

This section lists all VxFlex OS events, grouped by the following categories:

- Authentication
- CLI commands
- License and installation
- MDM
- SDC
- SDS
- Rebuild

Authentication

Authentication Failed

Parameter	Description
Name	AUTHENTICATION_FAILED
Message	Authentication failed for user U
Severity	Warning
Description	User entered the wrong password
Action	If you see this event multiple times, someone may be trying to gain unauthorized access to the system.

CLI commands

CLI Command Received

Parameter	Description
Name	CLI_COMMAND_RECEIVED

Parameter	Description
Message	Command X Received
Severity	Info
Description	CLI command X was entered by a user
Action	None

CLI Command Succeeded

Parameter	Description
Name	CLI_COMMAND_ SUCCEEDED
Message	Command X ended successfully
Severity	Info
Description	CLI command X was executed successfully
Action	None

CLI Command Failed

Parameter	Description
Name	CLI_COMMAND_FAILED
Message	Command X failed with error E
Severity	Warning
Description	The CLI command X entered by user failed with error E
Action	Look up error E and address the issue accordingly

Snapshot volumes could not be found, by ID

Parameter	Description
Name	SNAPSHOT_VOLUMES_FAILED_BY_ID
Message	Could not snapshot volumes, because a volume ID was not found. ID: "MOS_OBJID__FORMAT"."
Severity	Error
Description	This message is posted if a snapshot_volume command contains an invalid volume ID (out of many). The CLI will only get an error code, but in the event, you can see which volume ID is invalid.

Parameter	Description
Action	Verify the parameters entered for the snapshot_volume command

Snapshot volumes could not be found, by name

Parameter	Description
Name	SNAPSHOT_VOLUMES_FAILED_BY_NAME
Message	Could not snapshot volumes, because a volume was not found: Name: %s.
Severity	Error
Description	This message is posted if a snapshot_volume command contains an invalid volume name (out of many). The CLI will only get an error code, but in the event, you can see which volume name is invalid.
Action	Verify the parameters entered for the snapshot_volume command

License and installation

License Expiration Warning

Parameter	Description
Name	LICENSE_EXPIRATION_WARNING
Message	License will expire in X days
Severity	Warning
Description	System license will expire in 30 days or less
Action	Contact EMC Support for license renewal, and then reinstall.

License Expiration Error

Parameter	Description
Name	LICENSE_EXPIRATION_ERROR
Message	License will expire in X days
Severity	Error
Description	System license will expire in 7 days or less

Parameter	Description
Action	Contact EMC Support for license renewal. If you have already renewed your license, install it.

License Expiration Critical

Parameter	Description
Name	LICENSE_EXPIRATION_CRITICAL
Message	License will expire in X days
Severity	Critical
Description	System license will expire in 2 days or less
Action	Contact EMC Support for license renewal. If you have already renewed your license, install it.

License Expired

Parameter	Description
Name	LICENSE_EXPIRED
Message	License has expired
Severity	Critical
Description	The system's license has expired
Action	To resume operational mode, contact EMC Support for license renewal. If you have already renewed your license, install it.

Upgrade has started

Parameter	Description
Name	UPGRADE_STARTED
Message	Upgrade to version %s has started.
Severity	Info
Description	An upgrade procedure has been initiated
Action	Not needed

Upgrade has finished

Parameter	Description
Name	UPGRADE_FINISHED
Message	Upgrade completed successfully.
Severity	Info
Description	An upgrade procedure completed successfully
Action	Not needed

Upgrade has failed

Parameter	Description
Name	UPGRADE_FAILED
Message	Upgrade was not successful. Reason: %s
Severity	Error
Description	An upgrade procedure was not able to complete
Action	Fix the error and retry the upgrade

MDM

MDM Started

Parameter	Description
Name	MDM_STARTED
Message	MDM Process started
Severity	Info
Description	MDM process has started running
Action	None

MDM Data Degraded

Parameter	Description
Name	MDM_DATA_DEGRADED
Message	Some of the Storage Pool data is now in Degraded state
Severity	Error

Parameter	Description
Description	Some of the Storage Pool data is in Degraded state. This data is not protected against another failure.
Action	The system is rebuilding the Degraded data to return to Normal (protected) state. Check if any hardware is malfunctioning and requires replacement.

MDM Data Failed

Parameter	Description
Name	MDM_DATA_FAILED
Message	Some Storage Pool data is now unavailable
Severity	Critical
Description	Multiple failures have occurred. Some Storage Pool data is now unavailable. This data cannot be accessed.
Action	Locate and fix the failed hardware. If the problem is not resolved, contact EMC Support.

MDM Data Normal

Parameter	Description
Name	MDM_DATA_NORMAL
Message	All of the Storage Pool data has returned to Normal state
Severity	Info
Description	All Storage Pool data previously in Degraded or Failed state has returned back to Normal state. User data is fully accessible and protected.
Action	None

SDC

New SDC Connected

Parameter	Description
Name	NEW_SDC_CONNECTED

Parameter	Description
Message	New SDC (IP: X; ID: Y; GUID: Z) connected
Severity	Warning
Description	A new SDC (IP: X; ID: Y; GUID: Z) has connected to the MDM
Action	A new SDC has just connected to the MDM. Validate that this is a valid SDC.

SDC Connected

Parameter	Description
Name	SDC_CONNECTED
Message	SDC (IP: X; ID: Y; GUID: Z) reconnected
Severity	Info
Description	An existing SDC (IP: X; ID: Y; GUID: Z) has reconnected to the MDM
Action	None

SDC Disconnected

Parameter	Description
Name	SDC_DISCONNECTED
Message	SDC (IP: X; ID: Y; GUID: Z) disconnected
Severity	Warning
Description	SDC (IP: X; ID: Y; GUID: Z) has disconnected from the MDM.
Action	Make sure it is expected otherwise this might be a hardware malfunction

SDS

SDS Disconnected

Parameter	Description
Name	SDS_DISCONNECTED
Message	SDS X (IP:Y; ID: Z) disconnected
Severity	Error

Parameter	Description
Description	SDS X (IP: Y; ID Z) has disconnected from the MDM
Action	Make sure that this is an expected event, because otherwise this might be caused by a hardware malfunction.

SDS Reconnected

Parameter	Description
Name	SDS_RECONNECTED
Message	SDS X (IP:Y; ID: Z) reconnected
Severity	Info
Description	SDS X (IP: Y; ID Z) has reconnected to the MDM. If this event appears multiple times subsequently for the same SDS (and not directly after SDS_DISCONNECTED), it can indicate a bad network connection.
Action:	Check network connections.

SDS Remove Done

Parameter	Description
Name	SDS_REMOVE_DONE
Message	SDS X (IP:Y; ID: Z) was removed successfully
Severity	Info
Description	The asynchronous process of removing an SDS has completed.
Action	None

Open SDS Device Failed

Parameter	Description
Name	OPEN_SDS_DEVICE_FAILED
Message	Failed to open a device D on SDS X (IP:Y; ID: Z) with error message E
Severity	Error
Description	Failed to open storage device D on SDS X (IP:Y; ID: Z) with error message E

Parameter	Description
Action	Check the cause of the error, and identify if it's a human error or a system malfunction. Check hardware if needed.

SDS Device Error Report

Parameter	Description
Name	SDS_DEV_ERROR_REPORT
Message	Device error reported device D on SDS X (IP:Y; ID: Z)
Severity	Error
Description	Error reported on storage device D on SDS X (IP:Y; ID: Z)
Action	Check the storage device on the server

Device capacity is high

Parameter	Description
Name	DEV_CAPACITY_USAGE_HIGH
Message	Capacity usage on %s is HIGH.")
Severity	Warning
Description	Capacity is high, due to capacity used by snapshots/thin volumes
Action	Remove unnecessary snapshots or add more storage

Device capacity is critical

Parameter	Description
Name	DEV_CAPACITY_USAGE_CRITICAL
Message	Capacity usage on %s is CRITICAL.")
Severity	Error
Description	Capacity is critical, due to capacity used by snapshots/thin volumes
Action	Remove unnecessary snapshots or add more storage

Device capacity has returned to normal

Parameter	Description
Name	DEV_CAPACITY_USAGE_NORMAL
Message	Capacity usage on %s is normal.")
Severity	Info
Description	Capacity usage is back to normal
Action	Not needed

SDS configuration has become invalid

Parameter	Description
Name	SDS_CONFIG_INVALID
Message	CLI_TARGET_NAME_CAP" %s (ID "MOS_OBJID__FORMAT ") configuration is invalid.
Severity	Critical
Description	The SDS cannot access its configuration files.
Action	Contact EMC Support

SDS disk errors were fixed

Parameter	Description
Name	SDS_FIX_DISK_ERROR
Message	CLI_TARGET_NAME_CAP" %s (ID "MOS_OBJID__FORMAT ") device %s fixed %d disk errors via reads.
Severity	Warning
Description	There were read errors on this device that were fixed by reading the data from secondary and re-writing it. This may be a sign of impending device hardware malfunction.
Action	Check for hardware malfunction

Background device scanner comparison error

Parameter	Description
Name	SCANNER_COMPARE_REPORT

Parameter	Description
Message	Background device scanner on device ID 2301536800030001 reported compare error (Device Path: <device path>, SDS: <SDS name and ID>, Peer Device Path: <peer device path>, Peer SDS: <peer SDS name and ID>, Volume name: <volume name>, Volume offset: <volume offset>)
Severity	Error
Description	Background device scanner error report, which provides details about comparison errors found during comparison of two copies of data on different devices.
Action	Check storage device for hardware malfunction

Rebuild

No Rebuild Progress Warning

Parameter	Description
Name	NO_REBUILD_PROGRESS _WARNING
Message	No rebuild progress for 30 minutes
Severity	Warning
Description	Rebuild did not progress for 30 minutes during the current recovery
Action	Contact EMC Support

No Rebuild Progress Error

Parameter	Description
Name	NO_REBUILD_PROGRESS _ERROR
Message	No rebuild progress for 60 minutes
Severity	Error
Description	Rebuild did not progress for 60 minutes during the current recovery
Action	Contact EMC Support

No Rebuild Progress Critical

Parameter	Description
Name	NO_REBUILD_PROGRESS _CRITICAL
Message	No rebuild progress for 180 minutes
Severity	Critical
Description	Rebuild did not progress for 180 minutes during the current recovery
Action	Contact EMC Support

Rebuild Progress Resumed

Parameter	Description
Name	REBUILD_PROGRESS_RESUMED
Message	Rebuild progress resumed
Severity	Info
Description	Following a detection of a rebuild not progressing, the system has now detected that the rebuild progress has resumed. The system is currently recovering.
Action	None

CHAPTER 6

VxFlex OS Alerts

The following alerts can be sent as SNMP traps by VxFlex OS.

- Supported alerts and event numbering conventions 64

Supported alerts and event numbering conventions

The following alerts can be sent as SNMP traps by VxFlex OS. All events are numbered in the following format: SIO<CLASS>.<TYPE>.<ISSUE>. The issue number is a running counter for all issues in a specific type.

For SRS, opening and closing alerts will consist of the same code and issue number, with the exception of the first digit (0 or 1) in the <ISSUE> section. For example:

- SIOXX.XX.0XXXXXX indicates that the alert is active
- SIOXX.XX.1XXXXXX indicates that the alert has been closed

CLASS/TYPE:

System = 1

- Capacity = 1
- License = 2

MDM = 2

- MDM_Cluster = 1
- Protection_Domain = 2
- Fault_Set = 3
- Storage_Pool = 4

SDS = 3

- SDS = 1
- Device = 2

SDC = 4

- SDC = 1

Volume = 5

SRS = 10

- SRS = 1

Note:
Each alert has a corresponding Closed state, represented by the code SIOXX.XX.1XXXXXX. For example Open state: SIO02.01.0000003, Closed state: SIO02.01.1000003

VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS

This table summarizes alerts generated by VxFlex OS systems.

When using email notification, the same fields that are sent as JSON in SRS notifications are sent in XML formal in the email.

Note: The ESRS_NOT_REGISTERED alert is not reported by the VxFlex OS GUI. You can monitor the SRS registration using SNMP or the REST API.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
License expired	LICENSE_EXPIRED	System.License.License_Expired	SIO01.02.0000001	5 (Critical)	To resume operational mode, contact EMC Support for license renewal. If you have already renewed your license, install it.
The system's license will expire in n days	LICENSE_ABOUT_TO_EXPIRE	System.License.License_Is_About_To_Expire	SIO01.02.0000002	3 (Error) 2 (Warning) according to time left and limits	Contact EMC Support for license renewal. If you have already renewed your license, install it.
VxFlex OS is using a trial license	TRIAL_LICENSE_USED	System.License.Trial_License_Used	SIO01.02.0000003	2 (Warning)	Purchase a license and install it.
Oscillating failures reported	OBJECT_HAS_OSCILLATING_FAILURES	System.Oscillating_Failures.Object_has_oscillating_failures	SIO01.03.0000001	2 (Warning)	Check oscillating failures of the component and take action accordingly. If the oscillating failure does not indicate a problem, change the settings of the oscillating failure window to supress this alert
There are oscillating network failures. Download network counters for detailed information	OBJECT_HAS_OSCILLATING_NETWORK_FAILURES	System.Oscillating_Failures.OBJECT_HAS_OSCILLATING_NETWORK_FAILURES	SIO01.03.0000002	2 (Warning)	Check the oscillating failure report, that can be accessed from one of the management interfaces. Check whether there is a problem with network links, fix, and restart the counters.
No valid MDM credentials are configured in	GW_CONFIGURATION_INVALID_	System.Credentials.GW_CONFI	SIO01.04.0000001	5 (Critical)	Configure the MDM credentials in the VxFlex OS Gateway

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
VxFlex OS Gateway	MDM_CREDENTIALS	GURATION_INVALID_MDM_CREDENTIALS			using the FOSGWTool.
MDM credentials are not configured in the VxFlex OS Gateway	MDM_CREDENTIALS_ARE_NOT_CONFIGURED	System.Credentials.MDM_CREDENTIALS_ARE_NOT_CONFIGURED	SIO01.04.0000002	5 (Critical)	Configure MDM credentials on the VxFlex OS Gateway using theFOSGWTool
The MDM user configured in VxFlex OS Gateway requires a password change	GW_REQUIRES_MDM_USER_PW_CHANGE	System.Credentials.GW_REQUIRES_MDM_USER_PW_CHANGE	SIO01.04.0000004	5 (Critical)	Configure MDM credentials on the VxFlex OS Gateway using the FOSGWTool
System upgrade is in progress	UPGRADE_IN_PROGRESS	System.Upgrade.UPGRADE_IN_PROGRESS	SIO01.05.0000001	3 (Error)	Monitor the upgrade process, and check that it is completed successfully.
VxFlex OS Gateway version is too old	GW_TOO_OLD	System.Upgrade.GW_TOO_OLD	SIO01.05.0000002	5 (Critical)	Upgrade the VxFlex OS Gateway to the same version as the rest of your system.
The MDM is not operating in clustered mode	MDM_NOT_CLUSTERED	MDM.MDM_Cluster.MDM_Not_Clustered	SIO02.01.0000001	5 (Critical)	MDM cluster was manually set to SINGLE mode. Confirm that this is an expected operation. Working in SINGLE mode is not recommended. Prepare the cluster modules (if needed), and return to CLUSTER mode.
MDM fails over frequently	MDM_FAILS_OVER_FREQUENTLY	MDM.MDM_Cluster.MDM_Fails_Over_Frequently	SIO02.01.0000003	5 (Critical) 3 (Error) 2 (Warning)	The MDMs frequently swap ownership. No action required.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
				according to disconnect count and hardcoded values (2/3/10)	
Forward rebuild cannot proceed	FWD_REBUILD_STUCK	MDM.MDM_Cluster.FWD_REBUILD_STUCK	SIO02.01.0000004	2 (Warning)-5 (Critical)	Check the system for lack of spare capacity and/or failed capacity, and either fix the problem or add capacity if necessary.
Backward rebuild cannot proceed	BKWD_REBUILD_STUCK	MDM.MDM_Cluster.BKWD_REBUILD_STUCK	SIO02.01.0000005	2 (Warning)-5 (Critical)	Check the system for lack of spare capacity and/or failed capacity, and either fix the problem or add capacity if necessary.
Rebalance cannot proceed	REBALANCE_STUCK	MDM.MDM_Cluster.REBALANCE_STUCK	SIO02.01.0000006	5 (Critical) 3 (Error) 2 (Warning)	Add a physical disk; if this is not possible, reduce the spare policy while maintaining enough spare to sustain a rebuild, if necessary.
The MDM cluster is degraded, and data is not protected	CLUSTER_DEGRADED	MDM.MDM_Cluster.CLUSTER_DEGRADED	SIO02.01.0000007	3 (Error)-5 (Critical)	Check that all MDM cluster nodes are functioning correctly, and fix and replace faulty nodes, if necessary, in order to return to full protection.
Cannot connect to the MDM cluster, but the cluster itself is operational	MDM_CONNECTION_LOST	MDM.MDM_Cluster.MDM_CONNECTION_LOST	SIO02.01.0000008	3 (Error)	Check the connection to the MDM

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
The MDM is not operating in Clustered mode	MDM_NOT_CLUSTERED_VOLUMES_EXIST	MDM.MDM_Cluster.MDM_Not_Clustered_Volume_Exist	SIO02.01.0000009	5 (Critical)	The MDM cluster was manually set to SINGLE mode. Working in SINGLE mode is not recommended. Single mode means that there is only one copy of the MDM repository. If you lose this copy, all System configurations and all the data on all the existing volumes will be lost. Please verify that this is an expected operation. Prepare the cluster modules (if needed), and return to CLUSTERED mode as soon as possible.
Inactive Protection Domain	PD_INACTIVE	MDM.Protection_Domain.Protection_Inactive	SIO02.02.0000001	2 (Warning)	Protection Domain was inactivated by a user command. Confirm that this is an expected operation. This is usually done for maintenance. When maintenance is complete, reactivate the Protection Domain.
Storage Pool has failed capacity	STORAGE_POOL_HAS_FAILED_CAPACITY	MDM.Storage_Pool.Storage_Pool_has_Failed_Capacity	SIO02.04.0000001	5 (Critical)	For the given Storage Pool, for some blocks, both primary and secondary copies are inaccessible. Check and fix the state of all devices in the Storage Pool and all the server's holding devices in the Storage Pool.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Storage Pool has degraded capacity	STORAGE_POOL_HAS_DEGRADED_CAPACITY	MDM.Storage_Pool.Storage_Pool_has_Degraded_Capacity	SIO02.04.0000002	3 (Error)	For the given Storage Pool, for some blocks, one of the two copies is inaccessble. Check if a server is offline or if there is another server hardware-related issue. Check if a storage device is down.
Capacity utilization above critical threshold	CAPACITY_UTILIZATION_ABOVE_CRITICAL_THRESHOLD	MDM.Storage_Pool.Capacity_Utilization_Above_Critical_Threshold	SIO02.04.0000003	5 (Critical)	The capacity utilization of the Storage Pool is reaching a critical threshold. Remove unneeded volumes and snapshots, if possible, or add physical storage.
Capacity utilization above high threshold	CAPACITY_UTILIZATION_ABOVE_HIGH_THRESHOLD	MDM.Storage_Pool.Capacity_Utilization_Above_High_Threshold	SIO02.04.0000004	2 (Warning) 3 (Error)	The capacity utilization of the Storage Pool is reaching a high threshold. Remove unneeded volumes and snapshots, if possible, or add physical storage.
Failure recovery capacity is below the threshold	FAILURE_RECOVERY_CAPACITY_BELOW_THRESHOLD	MDM.Storage_Pool.Failure_Recovery_Capacity_Below_Threshold	SIO02.04.0000005	3 (Error)	The capacity available for recovery in a degraded storage event is lower than the predefined threshold. Replace failed hardware or add more physical storage.
Background device scanning has found data conflicts	BACKGROUND_SCANNER_COMPARE_ERROR	MDM.Storage_Pool.Background_Scanner_Compare_Error	SIO02.04.0000007	5 (Critical)	Primary and secondary data copies do not match. Check the volumes running on the Storage Pool for any consistency

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					issues. Contact Customer Support for assistance.
Configured spare capacity is smaller than the size of the largest Fault Set	CONFIGURED_SPARE_CAPACITY_SMALLER_THAN_LARGEST_FAULT_UNIT	MDM.Storage_Pool.Configured_Spare_Capacity_Smaller_Than_Largest_Fault_Unit	SIO02.04.0000008	2 (Warning)	Increase the "spare percentage", configured in the Storage Pool and reserved for failure recovery, so that it is larger than the largest Fault Unit in the Storage Pool.
The Storage Pool relies too heavily (over 50%) on capacity from a single SDS or Fault Set. Balance capacity over other SDSs or Fault Sets.	STORAGE_POOL_UNBALANCED	MDM.Storage_Pool.STORAGE_POOL_UNBALANCED	SIO02.04.0000009	3 (Error)	Move some physical disks from the large SDS to the others, or add disks to the smaller SDS in order to approximate the capacity of the large SDS as much as possible.
Storage Pool does not meet the minimum requirement of 3 fault units	NOT_ENOUGH_FAULT_UNITS_IN_SP	MDM.Storage_Pool.Not_Enough_Fault_Units	SIO02.04.0000010	3 (Error)	Add more SDSs to the Storage Pool to meet the minimum requirement of 3 hosts.
There are cluster certificates pending approval. For more information, open System Settings > Connection.	UNTRUSTED_CERTIFICATE	MDM.CERTIFICATE.UNTRUSTED_CERTIFICATE	SIO02.05.0000001	3 (Error)	Pending for approval certificates can be viewed and approved via System Settings > Connection.
Master MDM Certificate is about to expire	CERTIFICATE_ABOUT_TO_EXPIRE	MDM.CERTIFICATE.CERTIFICATE_ABOUT_TO_EXPIRE	SIO02.05.0000002	5 (Critical)	Install a valid SSL certificate on the MDM before the old one expires

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Master MDM Certificate has expired	MDM_CERTIFICATE_EXPIRED	MDM.CERTIFICATE.MDM_CERTIFICATE_EXPIRED	SIO02.05.0000003	5 (Critical)	Install a valid SSL certificate on the host
Secure connection disabled on MDM	MDM_SECURE_CONNECTION_DISABLED	MDM.CERTIFICATE.MDM_SECURE_CONNECTION_DISABLED	SIO02.05.0000004	5 (Critical)	Enable secure connections on the MDM in order to protect your login information
The self-signed certificate presented by the Master MDM is not trusted	MDM_SELF_SIGNED_CERTIFICATE_NOT_TRUSTED	MDM.CERTIFICATE.MDM_SELF_SIGNED_CERTIFICATE_NOT_TRUSTED	SIO02.05.0000005	5 (Critical)	Check the certificate, and trust it if you see fit to do so
MDM does not support secure connections	MDM_SECURE_CONNECTION_NOT_SUPPORTED	MDM.CERTIFICATE.MDM_SECURE_CONNECTION_NOT_SUPPORTED	SIO02.05.0000006	5 (Critical)	Check MDM cluster nodes
The validity period of the certificate presented by the Master MDM starts in the future	MDM_CERTIFICATE_NOT_YET_VALID	MDM.CERTIFICATE.MDM_CERTIFICATE_NOT_YET_VALID	SIO02.05.0000007	5 (Critical)	The time and date on the computer where the certificate was created is not consistent with the time and date set in the VxFlex OS system. Replace the certificate or fix the system time.
The Certificate Authority that signed the Master MDM's certificate is not trusted	MDM_CA_SIGNED_CERTIFICATE_CA_NOT_TRUSTED	MDM.CERTIFICATE.MDM_CA_SIGNED_CERTIFICATE_CA_NOT_TRUSTED	SIO02.05.0000008	5 (Critical)	Trust the CA certificate if you see fit

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
SDS is disconnected	SDS_DISCONNECTED	SDS.SDS.SDS_Disconnected	SIO03.01.0000001	3 (Error)	The SDS service may be down or unreachable over the network. Verify that the SDS service is up and running and that the network is properly connected.
SDS disconnects frequently	SDS_DISCONNECTS_FREQUENTLY	SDS.SDS.SDS_Disconnected_Frequently	SIO03.01.0000002	3 (Error) 2 (Warning) according to disconnect count and hard-coded	The SDS connection is fluctuating due to an unstable network connection. Check the SDS data network connection for Packet Drops, and try to disconnect one of the ports to see if the SDS disconnection issue is resolved by using only one port. If this does not resolve the issue, switch to the other port. If there is still an issue, it may be due to a Faulty NIC, Faulty Switch ports, or a faulty switch. If there is no issue with another switch, the issue was switch-related. Otherwise, the issue may be due to a faulty NIC, which requires NIC replacement.
Memory allocation for RAM Read Cache failed on SDS	SDS_RMCACHE_MEMORY_ALLOCATION_FAILED	SDS.SDS.SDS_Rmcache_Memory_allocation_Failed	SIO03.01.0000003	2 (Warning)	The system failed to allocate memory to the SDS RAM Read-Cache. For 32 GB RAM or less, up to 50% of the memory can be allocated for

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					caching. From 32 GB or more, up to 75% of the memory can be allocated for caching. Reduce the configured RAM Read-Cache memory to match the allocation conditions.
DRL mode: Hardened	DRL_MODE_NON_VOLATILE	SDS.SDS.DRL_MODE_NON_VOLATILE	SIO03.01.0000004	1 (Info)	DRL Mode is configured to "Hardened" instead of "Volatile". Both modes are configurable.
RFcache card I/O error	RFCACHE_CARD_IO_ERROR	SDS.SDS.RFCACHE_CARD_IO_ERROR	SIO03.01.0000005	2 (Warning)	Disable caching on the device and check the health of the device, because it may be faulty. If necessary, replace the device.
RFcache skipped due to heavy load	RFCACHE_CACHE_SKIP_DUE_TO_HEAVY_LOAD	SDS.SDS.RFCACHE_CACHE_SKIP_DUE_TO_HEAVY_LOAD	SIO03.01.0000006	2 (Warning)	Read Flash Cache is working under a heavy load, and therefore has skipped some IOs. This is a temporary error which should resolve itself. If it persists, try to balance the Storage Pool contents across more SDSs, or add more cache cards.
RFcache IO stack error	RFCACHE_IO_STUCK_ERROR	SDS.SDS.RFCACHE_IO_STUCK_ERROR	SIO03.01.0000007	2 (Warning)	IO has become stuck on the cache device. Disable caching on the device and check the health of the device, because it may be faulty. If

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					necessary, replace the device.
RFcache resources are low	RFCACHE_LOW_RESOURCES	SDS.SDS.RFCACHE_LOW_RESOURCES	SIO03.01.0000008	2 (Warning)	There is not enough RAM available on the server for Read Flash Cache optimal operation. Increase the amount of available RAM.
RFcache source configuration is not consistent	RFCACHE_INCONSISTENT_SOURCE_CONFIGURATION	SDS.SDS.RFCACHE_INCONSISTENT_SOURCE_CONFIGURATION	SIO03.01.0000010	2 (Warning)	Check RFcache state of all disks in the pool and adjust them so that all disks have the same caching state.
RFcache cache configuration is not consistent	RFCACHE_INCONSISTENT_CACHE_CONFIGURATION	SDS.SDS.RFCACHE_INCONSISTENT_CACHE_CONFIGURATION	SIO03.01.0000011	2 (Warning)	Query the system to determine what is not consistent in the configurations of the Read Flash cache driver and the SDS where the cache device is located.
RFcache device does not exist	RFCACHE_DEVICE_DOES_NOT_EXIST	SDS.SDS.RFCACHE_DEVICE_DOES_NOT_EXIST	SIO03.01.0000012	2 (Warning)	You tried to add a cache device that does not exist. Check and fix Read Flash Cache configuration.
RFcache API mismatch	RFCACHE_API_ERROR_MISMATCH	SDS.SDS.RFCACHE_API_ERROR_MISMATCH	SIO03.01.0000013	2 (Warning)	The Read Flash Cache (xcache) driver version and SDS version do not match. Try to upgrade them to the same version. If the problem persists, contact Customer Support.
SDS is in Maintenance Mode	SDS_IN_MAINTENANCE	SDS.SDS.SDS_IN_MAINTENANCE	SIO03.01.0000014	2 (Warning)	The SDS is currently in Maintenance Mode. Exit Maintenance Mode

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					once maintenance is complete. If an NDU is in progress, ignore this warning.
Device failed	DEVICE_FAILED	SDS.Device.Device_Failed	SIO03.02.0000001	3 (Error)	The SDS device could not be opened, read from or written to. Validate the device state. Check the cause of the error, and determine if it is a human error or a system malfunction. Check hardware if needed.
Device test is done and device is pending activation	DEVICE_PENDING_ACTIVATION	SDS.Device.Device_Pending_Activation	SIO03.02.0000002	2 (Warning)	The SDS device has been added and tested. Activate the SDS device.
Device has fixed read errors	FIXED_READ_ERROR_COUNT_ABOVE_WARNING_THRESHOLD	SDS.Device.FIXED_READ_ERROR_COUNT_ABOVE_WARNING_THRESHOLD	SIO03.02.0000003	3 (Error) if counter > 0	Read from the SDS device failed. Data was corrected from the other copy. No action is required, but note that the device might be faulty.
Device has fixed read errors	FIXED_READ_ERROR_COUNT_ABOVE_CRITICAL_THRESHOLD	SDS.Device.FIXED_READ_ERROR_COUNT_ABOVE_CRITICAL_THRESHOLD	SIO03.02.0000004	5 (Critical) if counter >= 5	SDS device read failed more than 5 times. Replace the physical device.
Device failed: All IO to the device will be stopped, and data will be relocated to another device.	DEVICE_ERROR_ERROR	SDS.Device.Device_ErrorError	SIO03.02.0000005	5 (Critical)	Check the device, and if necessary, replace it

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Device failed: All IO to the device will be stopped, and data will be relocated to another device.	DEVICE_ERROR_WARNING	SDS.Device.Device_ErrorWarning	SIO03.02.0000006	3 (Error)	Check the device, and if necessary, replace it
Device malfunction has been detected.	DEVICE_ERROR_NOTICE	SDS.Device.Device_ErrorNotice	SIO03.02.0000007	2 (Warning)	Check the device, and if necessary, replace it
Minor failures have been detected in device performance.	DEVICE_ERROR_INFO	SDS.Device.Device_ErrorInfo	SIO03.02.0000008	2 (Warning)	Check the device, and if necessary, replace it
Disk temperature is above the configured threshold, and may fail soon if no action is taken.	SMART_TEMPERATURE_STATE_FAILED_NOW	SDS.Device.SMART_Temperature_State_failed.Now	SIO03.02.0000009	3 (Error)	Check the temperature in the server and at the data center. Check if a fan alert is raised in the node.
The disk is near the end of its working life, and should be replaced.	SMART_END_OF_LIFE_STATE_FAILED_NOW	SDS.Device.SMART_End_Of_Life_State_Failed_Now	SIO03.02.0000011	3 (Error)	Replace the disk.
The disk may be about to fail, or may be operating with reduced performance.	SMART_AGGREGATED_STATE_FAILED_NOW	SDS.Device.SMART_Aggregated_State_Failed_Now	SIO03.02.0000013	3 (Error)	Consider replacing the disk.
The SDC is either down or unreachable over the network	SDC_DISCONNECTED	SDC.SDC.SDC_DISCONNECTED	SIO04.01.0000001	3 (Error)	Verify that the SDC service is up and running and that the network is properly configured and connected.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
No more SDCs can be defined on this system; the maximum has been reached	SDC_MAX_COUNT	SDC.SDC.SDC_Max_Count	SIO04.01.0000002	3 (Error)	The maximum number of SDCs in the system has been reached (1024^2).
Errors have been detected on the Physical Disk	PHYSICAL_DRIVE_BAD_STATE	Storage_Controller.Physical_Drive.BAD_STATE	SIO06.01.0000001	5 (Critical)	Replace the Physical Disk.
Physical Disk state is erroneous (Hot Spare)	PHYSICAL_DRIVE_HOT_SPARE	Storage_Controller.Physical_Drive.HOT_SPARE	SIO06.01.0000002	3 (Error)	Errors have been detected on a spare Physical Disk. Replace the Physical Disk.
The Physical Disk is not being used by the system	PHYSICAL_DRIVE_NOT_IN_USE	Storage_Controller.Physical_Drive.NOT_IN_USE	SIO06.01.0000003	3 (Error)	Access the storage controller and configure the disk.
SSD lifespan is over endurance threshold	PHYSICAL_DRIVE_ENDURANCE_USED_ABOVE_THRESHOLD	Storage_Controller.Physical_Drive.Endurance_Used_Above_Threshold	SIO06.01.0000004	5 (Critical)	Replace the SSD device.
The Physical Disk temperature has exceeded the configured threshold	PHYSICAL_DRIVE_INVALID_TEMPERATURE	Storage_Controller.Physical_Drive.INVALID_TEMPERATURE	SIO06.01.0000005	5 (Critical) 3 (Error)	Ensure that the server and its environment are properly cooled. Ensure that the internal chassis fans are working, and that there is adequate airflow.
The Physical Drive's cache is not disabled	PHYSICAL_DRIVE_INVALID_PD_CACHE_POLICY	Storage_Controller.Physical_Drive.INVALID_PD_CACHE_POLICY	SIO06.01.0000006	3 (Error)	Disable the Physical Drive physical cache. Note: This may cause DI issues in power cycle scenarios.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Device was requested to use as DAS Cache but it is not	DEVICE_SHOULD_USE_AS_DAS_CACHE_BUT_IT_IS_NOT	Storage_Controller.Physical_Drive.Device_Should_Use_As_Das_Cache_But_It_Is_Not	SIO06.01.0000007	3 (Error)	
The Logical Disk read policy is not set to "Read-Ahead"	LOGICAL_DISK_INVALID_READ_AHEAD_POLICY	Storage_Controller.Logical_Disk.INVALID_READ_AHEAD_POLICY	SIO06.02.0000001	3 (Error)	Access the storage controller and change the Logical Disk's read policy to "Read Ahead".
The Logical Disk IO policy is not Configured properly (Write-Back)	LOGICAL_DISK_INVALID_WRITE_BACK_POLICY	Storage_Controller.Logical_Disk.INVALID_WRITE_BACK_POLICY	SIO06.02.0000002	3 (Error)	Check the Raid controller battery status, a fault in the battery will impact the Write-Back functionality.
Logical Disk access mode is not set to "Read-Write"	LOGICAL_DISK_INVALID_ACCESS_MODE	Storage_Controller.Logical_Disk.INVALID_ACCESS_MODE	SIO06.02.0000003	5 (Critical)	Access the storage controller and change the logical disk's access mode to "Read-Write".
The Logical Disk RAID level is not set to RAID0	LOGICAL_DISK_INVALID_RAID_LEVEL	Storage_Controller.Logical_Disk.INVALID_RAID_LEVEL	SIO06.02.0000004	3 (Error)	The RAID type is set in the storage controller is incorrect. Access the storage controller, verify that the Logical Disk does not contain any data that is not backed-up, destroy the Logical Disk, and re-create the logical disk as RAID0.
Logical Disk caching policy is not set to "DirectIO"	LOGICAL_DISK_INVALID_CACHE_POLICY	Storage_Controller.Logical_Disk.INVALID_CACHE_POLICY	SIO06.02.0000005	3 (Error)	Access the storage controller, and change the RAID0 caching policy for the Logical Disk to "DirectIO".

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Logical disk is no longer being cached	LOGICAL_DISK_NO_LONGER_CACHED	Storage_Controller.Logical_Disk.LOGICAL_DISK_NO_LONGER_CACHED	SIO06.02.0000006	3 (Error)	Disable the Physical Drive physical cache. Note: This may cause DI issues in power cycle scenarios.
The state of the backup battery in the storage controller is not optimal	BATTERY_INVALID_STATE	Storage_Controller.Battery.Invalid_State	SIO06.03.0000001	5 (Critical) 3 (Error)	The backup battery is not fully charged, but it will recharge itself while the storage controller is powered on.
The backup battery in the storage controller needs to be replaced	BATTERY_REPLACEMENT_REQUIRED	Storage_Controller.Battery.REPLACEMENT_REQUIRED	SIO06.03.0000002	5 (Critical)	The backup battery in the storage controller may be nearing the end of its working life. Replace the battery.
The storage controller battery temperature is not within the configured threshold	BATTERY_INVALID_TEMPERATURE	Storage_Controller.Battery.INVALID_TEMPERATURE	SIO06.03.0000003	3 (Error)	Check the temperature in the server and at the data center. Check if a fan alert is raised in the node. Check the battery and the RAID controller and replace faulty items.
There is no backup battery installed in the storage controller	BATTERY_NOT_PRESENT	Storage_Controller.Battery.NOT_PRESENT	SIO06.03.0000004	5 (Critical)	Install a backup battery in the storage controller.
The storage controller contains an incompatible battery pack	BATTERY_INVALID_PACK_ENERGY	Storage_Controller.Battery.Invalid_Pack_Energy	SIO06.03.0000005	3 (Error)	Replace the storage controller battery with one that is compatible with your controller's model.
RAID controller's battery has invalid voltage state	BATTERY_INVALID_VOLTAGE	Storage_Controller.Battery.Invalid_Voltage	SIO06.03.0000006	3 (Error)	Check the RAID controller's battery. It may need to be replaced.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Hypervisor boot drive state is not OK	BOOT_DRIVE_INVALID_STATE	Node.Boot_Drive.Invalid_State	SIO07.01.0000001	3 (Error)	The drive on which the ESXi hypervisor is installed has reported an error. Replace the drive and reinstall the ESXi on the new drive.
The storage controller is not operating optimally	STORAGE_CONTROLLER_INVALID_STATE	Node.Storage_Controller.Invalid_State	SIO07.02.0000001	5 (Critical)	The storage controller may be faulty, and should be replaced.
The storage controller temperature has exceeded the configured threshold	STORAGE_CONTROLLER_INVALID_TEMPERATURE	Node.Storage_Controller.Invalid_Temperature	SIO07.02.0000002	5 (Critical) 3 (Error)	Ensure that the server and its environment are properly cooled and that all the chassis fans are functional.
CacheCade license is not installed	STORAGE_CONTROLLER_CACHECADE_NOT_LICENSED	Node.Storage_Controller.Cachecade_Not_Licensed	SIO07.02.0000003	3 (Error)	Install a CacheCade license on the storage controller.
Some of the disk slots in the storage controller are empty	STORAGE_CONTROLLER_NOT_ALL_SLOTS_FULL	Node.Storage_Controller.Not_All_Slots_Full	SIO07.02.0000004	3 (Error)	Add more disks if needed. If a disk was removed during a FRU (Field Replacement Unit) operation, insert the new disk into the chassis.
The BOSS storage controller is in an Error state	STORAGE_CONTROLLER_BOSS_ERROR_STATE	Node.Storage_Controller.Boss_Error_State	SIO07.02.0000006	5 (Critical) 3 (Error)	The BOSS storage controller is faulty, and should be replaced.
The BOSS storage controller is in a Degraded state	STORAGE_CONTROLLER_BOSS_DEGRADED_STATE	Node.Storage_Controller.Boss_Degraded_State	SIO07.02.0000007	5 (Critical)	The BOSS storage controller may be faulty, and should be replaced.
The physical CPU socket is not enabled	SOCKET_DISABLED	Node.Cpu_Socket.Disabled	SIO07.03.0000001	3 (Error)	Enable the CPU socket in the server BIOS.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Not all CPU cores are enabled	SOCKET_NOT_ALL_CORES_ENABLED	Node.Cpu_Socket.NOT_ALL_CORES_ENABLED	SIO07.03.0000002	3 (Error)	Change the physical CPU core configuration in the server BIOS.
CPU is not operating at full speed	SOCKET_SPEED_IS_NOT_MAX_SPEED	Node.Cpu_Socket.SPEED_IS_NOT_MAX_SPEED	SIO07.03.0000003	3 (Error)	Set the CPU clock speed in the server's BIOS to its maximum speed.
CPU temperature is not within threshold	CPU_SOCKET_INVALID_TEMPERATURE	Node.Cpu_Socket.INVALID_TEMPERATURE	SIO07.03.0000004	5 (Critical) 3 (Error)	The server's CPU temperature has exceeded the configured threshold. Make sure that the server is properly cooled and that the CPU and internal chassis fans are active.
The CPU Voltage Regulator's temperature is higher than the configured threshold	CPU_SOCKET_INVALID_VR_TEMPERATURE	Node.Cpu_Socket.INVALID_VR_TEMPERATURE	SIO07.03.0000005	5 (Critical) 3 (Error)	Make sure that the server is properly cooled and that the CPU and internal chassis fans are active.
The CPU Voltage Regulator's voltage is not within the configured threshold	CPU_SOCKET_INVALID_VR_VOLTAGE	Node.Cpu_Socket.INVALID_VR_VOLTAGE	SIO07.03.0000006	5 (Critical) 3 (Error)	1. Verify that the power supply is functioning correctly. 2. Try to replace a port in the Power Distribution Unit, or supply an external power source to check it. 3. Replace the power cable. 4. Replace the Power Supply Unit module.
CPU has invalid voltage state state	CPU_SOCKET_INVALID_VOLTAGE	Node.Cpu_Socket.Invalid_Voltage	SIO07.03.0000007	5 (Critical)	Check the chassis power supply

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
RAM temperature is not within threshold	RAM_INVALID_TEMPERATURE	Node.Ram.Invalid_Temperature	SIO07.04.0000001	5 (Critical) 3 (Error)	The temperature of one or more Server RAM modules exceeds the configured threshold. Ensure that the server and its environment are properly cooled and that all the chassis fans are functional.
RAM voltage regulator's temperature is not within threshold	RAM_INVALID_VR_TEMPERATURE	Node.Ram.INVALID_VR_TEMPERATURE	SIO07.04.0000002	5 (Critical) 3 (Error)	Ensure that the server and its environment are properly cooled and that all the chassis fans are functional.
RAM voltage regulator's voltage is not within threshold	RAM_INVALID_VR_VOLTAGE	Node.Ram.INVALID_VR_VOLTAGE	SIO07.04.0000003	5 (Critical) 3 (Error)	Ensure that the server and its environment are properly cooled and that all the chassis fans are functional. If the system still issues an alert, the DIMM may be faulty, and may have to be replaced.
The node temperature has exceeded the configured threshold	NODE_INVALID_TEMPERATURE	Node.Node.INVALID_TEMPERATURE	SIO07.05.0000001	5 (Critical) 3 (Error)	Ensure that the server and its environment are properly cooled and that all the chassis fans are functional.
The voltage values on the node are not within the configured threshold	NODE_INVALID_VOLTAGE	Node.Node.INVALID_VOLTAGE	SIO07.05.0000002	5 (Critical) 3 (Error)	1. Verify that the power supply is functioning correctly, and then try to replace a port in the Power Distribution Unit or check with external power. 2. Replace the power cable. 3. Replace the Power Supply Module.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
SDC is not installed on this node	NODE_WITH_NO_SDC	Node.Node.NODE_WITH_NO_SDC	SIO07.05.0000005	3 (Error)	Consider installing an SDC on this node, so that it can use VxFlex OS volumes
Unable to connect to monitoring agent (VCenter)	NODE_FAILED_TO_CONNECT_TO_VCENTER	Node.Node.FAILED_TO_CONNECT_TOVCENTER	SIO07.05.0000008	5 (Critical)	Ensure that the vCenter configuration is correct, and ensure that the node's Mgmt port is routable to the vCenter IP address
RFcache pool state is "Not Started"	XTREMCACHE_INVALID_STATE	Node.Node.XTREMCACHE_INVALID_STATE	SIO07.05.0000010	3 (Error)	Check the Read Flash Cache pool state. The cache device might be misconfigured. In this case, remove the cache device from the cache pool and add it back again.
CMOS battery state is invalid	NODE_INVALID_CMOS_BATTERY	Node.Node.Invalid_Cmos_Battery	SIO07.05.0000015	3 (Error)	Check the node's CMOS battery. It may need to be replaced.
Fan is disabled or removed from chassis	NODE_FAN_DISABLED	Node.Node.Fan_Disabled_or_Removed	SIO07.05.0000024	2 (Warning)	The fan is disabled or missing. Check the server's chassis fans and make sure they are inserted and working properly.
CPU cache is not enabled	SOCKET_CACHE_DISABLED	Cpu_Socket.Socket_Cache.Disabled	SIO08.01.0000001	3 (Error)	Enable the CPU cache in the server BIOS.
CPU cache size is not optimal	SOCKET_CACHE_SIZE_NOT_MAX_SIZE	Cpu_Socket.Socket_Cache.SIZE_NOT_MAX_SIZE	SIO08.01.0000002	3 (Error)	Check the CPU cache in the server BIOS, and set it to maximum size.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Fan speed is not within threshold	FAN_INVALID_SPEED	Chassis.Fan.Invalid_Speed	SIO09.01.0000001	5 (Critical) 3 (Error)	Ensure that the server is properly cooled and that the chassis fans are functional.
The power supply input wattage is not within the configured threshold	PSU_INVALID_INPUT	Chassis.Psu.Invalid_Input	SIO09.02.0000001	5 (Critical) 3 (Error)	1. Verify that the power supply is functioning correctly. 2. Try to replace a port in the Power Distribution Unit, or supply an external power source to check. 3. Replace the power cable. 4. Replace the Power Supply Unit module.
Power supply is missing	PSU_NOT_AVAILABLE	Chassis.Psu.Not_Available	SIO09.02.0000002	3 (Error)	Install a new Power Supply Unit, or if there is an existing PSU, verify that it is properly connected.
Power supply power loss	PSU_POWER_LOST	Chassis.Psu.Power_Lost	SIO09.02.0000003	5 (Error)	Check the power outlet/ power feed to the server.
Unable to connect to ESRS Gateway	ESRS_CONNECTIVITY_ERROR	Esrs.Esrs.CONNECTIVITY_ERROR	SIO10.01.0000001	5 (Critical)	Check the network's connectivity to the ESRS Gateway.
The system is not registered to ESRS	ESRS_NOT_REGISTERED	Esrs.Esrs.NOT_REGISTERED	SIO10.01.0000004	2 (Warning)	The system is not registered to ESRS and will not send Alerts to EMC for monitoring. Contact your Support \ Sales representative to get an EMC ESRS support package.
ESRS number of messages received has been reached. No more	ESRS_REACHED_CAPACITY_LIMIT	Esrs.Esrs.REACHED_CAPACITY_LIMIT	SIO10.01.0000005	5 (Critical)	ESRS has a limit of receiving up to 200 alerts per 8 hours. The limit has been reached, so no

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
messages will be sent in the next 8 hours					ESRS messages will be sent in the following 8 hours.
Network Adapter Link is down	NIC_PORT_DOWN	Nic.Nic_Port.Nic_Port_Down	SIO11.01.0000001	5 (Critical)	The network link is down in the network adapter. Verify that the network adapter is enabled in the operating system, and verify that the network cable is connected properly at both ends.
Device media type mismatch: device %s is an %s device, but its media type has been configured as an %s device	DEVICE_MEDIA_TYPE_MISMATCH	Device.MediaType.Mismatch	SIO12.01.0000002	2 (Warning)	Verify the device media type and re-set accordingly.
The automatic log collection directory is full	AUTOMATIC_LOGS_COLLECT_DIRECTORY_ABOVE_HIGH_THRESHOLD	System.Automatic_Collect_Logs.REACHED_CAPACITY_LIMIT	SIO12.01.0000003	2 (Warning)	Delete some files from the directory: (Linux) /opt/emc/scaleio/gateway/temp/scaleio-auto-collect-logs/ or (Windows) C:\Program Files\EMC\ScaleIO\Gateway\Temp\scaleio-auto-collect-logs\
There is not enough disk space to run automatic log collection	AUTOMATIC_LOGS_COLLECT_NOT_ENOUGH_DISK_SPACE	System.Automatic_Collect_Logs.NOT_ENOUGH_DISK_SPACE	SIO12.01.0000004	5 (Critical)	Delete some files from your disk
Auto Collect logs started working, while cluster contains 1 or	AUTOMATIC_LOGS_COLLECT_MISSING_ESX_CREDENTIALS	System.Automatic_Collect_Logs.MISSING_	SIO12.01.0000005	2 (Warning)	Configure ESX credentials in lockbox, or by using the IM option.

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
more ESX ips, with no credentials configured		ESX_CREDENTIALS			
One SDC is disconnected from one SDS	ONE_SDC_DISCONNECTED_FROM_ONE_SDS	System.SDC.One_Sdc_Disconnected_From_One_Sds	SIO01.07.0000001	5 (Critical)	Check the network links between the affected SDS and SDC
One SDC is disconnected from one SDS IP address	ONE_SDC_DISCONNECTED_FROM_ONE_SDS_IP	System.SDC.One_Sdc_Disconnected_From_One_Sds_Ip	SIO01.07.0000002	2 (Warning)	Check the network links between the affected SDC and SDS IP addresses.
One SDC is disconnected from all SDSs	ONE_SDC_DISCONNECTED_FROM_ALL_SDS	System.SDC.One_Sdc_Disconnected_From_All_Sds	SIO01.07.0000003	5 (Critical)	Check the network links between the affected SDC and all SDSs.
All SDCs are disconnected from one SDS	ALL_SDC_DISCONNECTED_FROM_ONE_SDS	System.SDC.All_Sdc_Disconnected_From_One_Sds	SIO01.07.0000004	5 (Critical)	Check the network links between all SDCs and the affected SDS.
All SDCs are disconnected from one SDS IP address	ALL_SDC_DISCONNECTED_FROM_ONE_SDS_IP	System.SDC.All_Sdc_Disconnected_From_One_Sds_Ip	SIO01.07.0000005	2 (Warning)	Check the network links between all SDCs and the affected SDS IP address.
All SDCs are disconnected from all SDSs	ALL_SDC_DISCONNECTED_FROM_ALL_SDS	System.SDC.All_Sdc_Disconnected_From_All_Sds	SIO01.07.0000006	5 (Critical)	Check the network links between all SDCs and SDSs.
Disconnected network links between SDCs and SDSs.	SDC_MULTIPLE_DISCONNECTIONS_FROM_SDS	System.SDC.Sdc_Multiple_Disconnections_From_Sds	SIO01.07.0000007	5 (Critical)	Check the network links between all SDCs and SDSs.
This SDC has not been approved	SDC_NOT_APPROVED	System.SDC.Sdc_Not_Approved	SIO01.07.0000008	2 (Warning)	Add the IP address for this SDC to the

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					list of approved IP addresses.
This SDC does not have an approved IP address	SDC_DOES_NOT_HAVE_APPROVED_IPS	System.SDC.Sdc_Does_Not_Have_Approved_Ips	SIO01.07.0000009	2 (Warning)	Update the list of approved IP addresses for this SDC.
Policy has been paused	SNAPSHOT_POLICY_PAUSED	SnapshotPolicy.Snapshot_Policy_Paused	SIO13.01.0000001	2 (Warning)	Policy has been paused. You can resume policy.
Auto snapshot creation failed	SNAPSHOT_POLICY_LAST_AUTO_SNAPSHOT_FAILURE_IN_FIRST_LEVEL	Snapshotpolicy.lastAutoSnapshotFailureInFirstLevel	SIO13.01.0000002	2 (Warning)	
Drive is ready to be removed	PHYSICAL_DRIVE_REMOVED_FROM_OS	Node.Physical_Drive.Ready_For_Removal	SIO07.06.0000001	2(Warning)	The drive is ready to be removed from the node.
BOSS is not configured with expected Raid Level 1	STORAGE_CONTROLLER_INVALID_BOSS_RAID_LEVEL	Node.Boot_Drive.Invalid_Boss_Raid_Level	SIO07.01.0000002	5 (Critical)	Check the BOSS setup configuration
Interleave must be disabled in BIOS when NVDIMM devices are present	NVDIMM_INTERLEAVE_ENABLED	Node.Ram.Invalid_Interleave_Bios_setting	SIO07.04.0000004	5 (Critical)	Disable NVDIMM interleave in BIOS settings.
Persistent Memory must be enabled in BIOS when NVDIMM devices are present	NVDIMM_PERSISTENT_MEMORY_DISABLED	Node.Ram.Invalid_Persistent_Memory_Bios_setting	SIO07.04.0000005	5 (Critical)	Enable Persistent Memory in BIOS settings
NVDIMM battery state is low.	NVDIMM_BATTERY_INVALID_STATE	Node.Ram.NVDIMM_Battery.Invalid_State	SIO07.04.0000006	5 (Critical) 3 (Error)	Check the NVDIMM battery status. A fault in the battery will impact the NVDIMM persistent memory. Persistent

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
					memory will not function if battery is faulty.
Install or check GPU drivers	GPUCARD_MONITORING_ERROR	Node.Gpu.Monitoring_Error	SIO07.06.0000001	2(Warning)	Check that the GPU drivers are properly installed on the node.
Replace DIMM	DIMM_IN_ERROR_STATE	Node.Ram.Error_State	SIO07.04.0000007	3 (Error)	Replace DIMM
DIMM reports Degraded state	DIMM_IN_DEGRADED_STATE	Node.Ram.Degraded_State	SIO07.04.0000008	2(Warning)	Replace DIMM as soon as possible
SDC has an IP address that is not approved by the MDM	SDC_HAS_UNAPPROVED_IP	System.SDC.Sdc_Has_Unapproved_Ips	SIO01.07.0000010	3 (Error)	Add the IP address for this SDC to the list of approved IP addresses.
The V-Tree migration is paused due to internal error	VTREE_PAUSED_MIGRATION_ERROR	Storage_Pool.Volume.VTree_Paused_Migration_Error	SIO14.01.0000001	3 (Error)	
The V-Tree migration is paused as either the source or destination Protection Domain is inactive	VTREE_PAUSED_INACTIVE_PROTECTION_DOMAIN	Storage_Pool.Volume.VTree_Paused_Inactive_Protection_Domain	SIO14.01.0000002	2(Warning)	Activate the Protection Domain to resume the migration
The V-Tree migration is paused as either the source or destination Protection Domain has degraded capacity	VTREE_PAUSED_DEGRADED_CAPACITY_IN_PROTECTION_DOMAIN	Storage_Pool.Volume.VTree_Paused_Degraded_Capacity_In_Protection_Domain	SIO14.01.0000003	3 (Error)	Resolve the issue causing the degraded capacity to resume the migration
The V-Tree migration is paused as	VTREE_PAUSED_NO_SPACE_IN_	Storage_Pool.Volume.VTree_Pau	SIO14.01.0000004	3 (Error)	Add capacity or remove volume to

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
there is not enough space in the destination Storage Pool	DESTINATION_STORAGE_POOL	sed_No_Space_In_Destination_Storage_Pool			resume the migration
The V-Tree migration is paused as there is unavailable capacity in the source Storage Pool	VTREE_PAUSED_UNAVAILABLE_CAPACITY_IN_SOURCE_STORAGE_POOL	Storage_Pool.Volume.VTree_Paused_Unavailable_Capacity_In_Source_Storage_Pool	SIO14.01.0000005	3 (Error)	Resolve the issue causing the unavailable capacity to resume the migration
Multiple V-Tree migrations are paused due to internal error	VTREES_PAUSED_MIGRATION_ERROR	MDM.Storage_Pool.VTrees_Paused_Migration_Error	SIO02.04.0000015	3 (Error)	
Multiple V-Tree migrations are paused as either the source or destination Protection Domain is inactive	VTREES_PAUSED_INACTIVE_PROTECTION_DOMAIN	MDM.Protection_Domain.VTrees_Paused_Inactive_Protection_Domain	SIO02.02.0000002	2(Warning)	Activate the Protection Domain to resume the migration
Multiple V-Tree migrations are paused as the Protection Domain has degraded capacity	VTREES_PAUSED_DEGRADED_CAPACITY_IN_PROTECTION_DOMAIN	MDM.Protection_Domain.VTrees_Paused_Degraded_Capacity_In_Protection_Domain	SIO02.02.0000003	3 (Error)	Resolve the issue causing the degraded capacity to resume the migration
Multiple V-Tree migrations are paused as there is not enough space in this destination Storage Pool	VTREES_PAUSED_NO_SPACE_IN_DESTINATION_STORAGE_POOL	MDM.Storage_Pool.VTrees_Paused_No_Space_In_Destination_Storage_Pool	SIO02.04.0000016	3 (Error)	Add capacity or remove volume to resume the migration

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Multiple V-Tree migrations are paused as there is unavailable capacity in the this source Storage Pool	VTREES_PAUSED_UNAVAILABLE_CAPACITY_IN_SOURCE_STORAGE_POOL	MDM.Storage_Pool.VTrees_Paused_Unavailable_Capacity_In_Source_Storage_Pool	SIO02.04.0000017	3 (Error)	Resolve the issue causing the unavailable capacity to resume the migration
The Storage Pool has reached a high threshold for device capacity utilization	NET_CAPACITY_HIGH_USAGE	MDM.Storage_Pool.Net_Capacity_High_Usage	SIO02.04.0000018	3 (Error)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool
The Storage Pool has reached a critical threshold for device capacity utilization	NET_CAPACITY_CRITICAL_USAGE	MDM.Storage_Pool.Net_Capacity_Critical_Usage	SIO02.04.0000019	5 (Critical)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool
The Storage Pool physical capacity is full and cannot serve new write requests	NET_CAPACITY_FULL_USAGE	MDM.Storage_Pool.Net_Capacity_Full_Usage	SIO02.04.0000020	5 (Critical)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool
The Storage Pool has reached a high threshold for user data capacity utilization	USER_DATA_HIGH_USAGE	MDM.Storage_Pool.User_Data_High_Usage	SIO02.04.0000021	3 (Error)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool
The Storage Pool has reached a critical threshold for user data capacity utilization	USER_DATA_CRITICAL_USAGE	MDM.Storage_Pool.User_Data_Critical_Usage	SIO02.04.0000022	5 (Critical)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
The Storage Pool user data capacity is full and cannot serve new write requests	USER_DATA_FULL_USAGE	MDM.Storage_Pool.User_Data_Full_Usage	SIO02.04.0000023	5 (Critical)	Remove unneeded volumes and snapshots, if possible, or add devices to the Storage Pool
The V-Tree address space allocated for this Storage Pool is almost full. You may not be able to create new volumes in this Storage Pool.	VTAS_CRITICAL_USAGE_CAPACITY_LIMIT	MDM.Storage_Pool.VTAS_Critical_Usage_Capacity_Limit	SIO02.04.0000025	2(Warning)	Consider adding capacity to the Storage Pool or removing some V-Trees from the Storage Pool
The V-Tree address space allocated for this Storage Pool is full. You cannot create new volumes, or enlarge volumes capacity in this Storage Pool.	VTAS_FULL_USAGE_CAPACITY_LIMIT	MDM.Storage_Pool.VTAS_Full_Usage_Capacity_Limit	SIO02.04.0000026	2(Warning)	Consider adding capacity to the Storage Pool or removing some V-Trees from the Storage Pool
The V-Tree address space allocated for this Storage Pool is almost full. You may not be able to create new volumes in this Storage Pool.	VTAS_CRITICAL_USAGE_STORAGE_POOL_LIMIT	MDM.Storage_Pool.VTAS_Critical_Usage_Storage_Pool_Limit	SIO02.04.0000027	2(Warning)	Consider removing some V-Trees from the Storage Pool
The V-Tree address space allocated for this Storage Pool is full. You cannot create new volumes, or enlarge volumes	VTAS_FULL_USAGE_STORAGE_POOL_LIMIT	MDM.Storage_Pool.VTAS_Full_Usage_Storage_Pool_Limit	SIO02.04.0000028	2(Warning)	Consider removing some V-Trees from the Storage Pool

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
capacity in this Storage Pool.					
The V-Tree address space allocated in the system is almost full. You may not be able to create new volumes in the system.	SYSTEM_VTAS_CRITICAL_USAGE	System.VTAS.System_VTAS_Critical_Usage	SIO01.07.0000001	2(Warning)	Consider removing some V-Trees from the system
The V-Tree address space allocated for the system is full. You cannot create new volumes, or enlarge volume capacity in the system.	SYSTEM_VTAS_FULL_USAGE	System.VTAS.System_VTAS_Full_Usage	SIO01.07.0000002	3 (Error)	Consider removing some V-Trees from the system
The Storage Pool contains one or more devices with unexpected media types	SP_DEVICE_MEDIA_TYPE_MISMATCH	MDM.Storage_Pool.Device_Media_Type_Mismatch	SIO02.04.0000029	2(Warning)	Update the Storage Pool media type or replace the mismatched devices
The Storage Pool has external acceleration configured without DAS Cache enabled	SP_EXTERNAL_ACCELERATION_WITHOUT_DAS_CACHE	MDM.Storage_Pool.External_Acceleration_without_Das_Cache	SIO02.04.0000030	2(Warning)	Update the Storage Pool cache settings
The Storage Pool has DAS Cache enabled without external acceleration defined	SP_DAS_CACHE_WITHOUT_EXTERNAL_ACCELERATION	MDM.Storage_Pool.Das_Cache_without_External_Acceleration	SIO02.04.0000031	2(Warning)	Update the Storage Pool cache settings
The Protection Domain has unbalanced	PROTECTION_DOMAIN_HAS_UN	MDM.Protection_Domain.Prote	SIO02.02.0000004	2(Warning)	Verify consistent Data Path configurations for all

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
data path support	BALANCED_DATA_IPS	ction_Unbalanced			Host SDSs that support this Protection Domain
The network interface %s is down in the SVM	NODE_SVM_NIC_PORT_DOWN	Node.Node.SVM_NIC_Port_Down	SIO07.05.0000028	5(Critical)	A network interface is down in the SVM. Verify that the network interface is configured and enabled in the SVM operating system.
System needs SVM Replacement	SYSTEM_REPLACE_SVM_NEEDED	System.Node.ReplaceSVM_Needed	SIO01.07.0000012	2(Warning)	System node VMs are of an outdated OS version. Perform SVM Replacement
Node needs SVM Replacement	NODE_REPLACE_SVM_NEEDED	Node.Node.ReplaceSVM_Needed	SIO07.05.0000023	2(Warning)	This node has not yet undergone SVM Replacement procedure
Inconsistent Read Flash Cache configuration	INCONSISTENT_RFCACHE_CONFIGURATION	MDM.Storage_Pool.Inconsistent_Rfcache_configuration	SIO02.04.0000032	2(Warning)	One or more of the Storage Pool devices belong to an SDS that does not have Read Flash Cache devices. Make sure all SDSs with devices belonging to this Storage Pool have Read Flash Cache devices.
System log collection is in progress	LOG_COLLECTION_IN_PROGRESS	System.Log_Collection.LOG_COLLECTION_IN_PROGRESS	SIO01.08.0000001	2 (Warning)	Monitor the log collection process. You should not start another one before this one is completed.
An unrecoverable state has been reported on the device: All I/O to the device will be stopped, and the data will be	DEVICE_ERROR_UNRECOVERABLE	SDS.Device.Device_ErrorUNRecoverable	SIO03.02.0000016	5 (Critical)	An unrecoverable state has been reported on the device: All I/O to the device will be stopped, and the data will be relocated to another device. The SDS

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
relocated to another device. The SDS does not recognize the internal signature on the device.					does not recognize the internal signature on the device.
The V-Tree migration is paused because either the source or destination Protection Domain has at least one SDS in Maintenance Mode	VTREE_PAUSED_SDS_IN_MAINTENANCE_IN_PROTECTION_DOMAIN	Storage_Pool.Volume.VTree_Paused_Sds_In_Maintenance_In_Protection_Domain	SIO14.01.0000006	2(Warning)	Exit the relevant SDSs from Maintenance Mode
Multiple V-Tree migrations are paused because either the source or destination Protection Domain has at least one SDS in Maintenance Mode	VTREES_PAUSED_SDS_IN_MAINTENANCE_IN_PROTECTION_DOMAIN	MDM.Protection_Domain.VTrees_Paused_Sds_In_Maintenance_In_Protection_Domain	SIO02.02.0000005	2(Warning)	Exit the relevant SDSs from Maintenance Mode
The V-Tree migration is paused because of a connectivity error	VTREE_PAUSED_CONNECTIVITY_ERROR	Storage_Pool.Volume.VTree_Paused_Connectivity_Error	SIO14.01.0000007	2(Warning)	Fix connectivity issue
Multiple V-Tree migrations are paused because because of connectivity error	VTREES_PAUSED_CONNECTIVITY_ERROR	MDM.Protection_Domain.VTrees_Paused_Connectivity_Error	SIO02.02.0000008	2(Warning)	Fix connectivity issue

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Media type mismatch: HDD media type is not supported in storage pools with fine granularity data layout	DEVICE_ERROR_MISMATCH	SDS.Device.Device_ErrorTypeMismatch	SIO03.02.0000017	5 (Critical)	Media type mismatch: HDD media type is not supported in storage pools with fine granularity data layout
Invalid SMTP configuration for email notification	EMAIL_NOTIFICATIONS_BAD_SMTP_CONFIGURATION	Esrs.Esrs.EMAIL_NOTIFICATIONS_BAD_SMTP_CONFIGURATION	SIO10.01.0000006	3 (Error)	Check SMTP configuration of email notifications
SMTP authentication failed	EMAIL_NOTIFICATIONS_AUTHENTICATION_FAILED	Esrs.Esrs.EMAIL_NOTIFICATIONS_AUTHENTICATION_FAILED	SIO10.01.0000007	3 (Error)	Check SMTP credentials for email notifications
Error on sending notification email	EMAIL_NOTIFICATIONS_ERROR_SENDING_EMAIL	Esrs.Esrs.EMAIL_NOTIFICATIONS_ERROR_SENDING_EMAIL	SIO10.01.0000008	3 (Error)	Check connectivity with SMTP server
Your system has insufficient NVDIMM capacity on %s to support future version upgrades. Required NVDIMM capacity for the upgrade is %s MB. Contact your account manager for more information.	NVDIM_OVERBOOKING	SDS.Device.NVDIM_OVERBOOKING	SIO03.02.0000015	3 (Error)	Increase the NVDIMM capacity or reduce the SDS FG capacity before you upgrade

Table 8 VxFlex OS Alerts in SNMP, VxFlex OS GUI, REST, and SRS (continued)

Alert Message in VxFlex OS GUI	Alert Message in REST	Alert Message in SNMP Trap	Alert Code (for SRS)	Severity	Recommended Action
Not all VASA providers are healthy	VASA_PROVIDER_MONITOR_NOT_HEALTHY	System.VASA_Monitor.Not_All_Vasa_Providers_Are_Healthy	SIO15.01.0000001	3 (Error)	Check that all VASA providers are up and running, and that there are no errors

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