Monitoring Dell EMC VNX

EMC: VNX PowerPack version 102

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Chapter 1

Introduction

Overview

This manual describes how to monitor Dell EMC VNX devices in SL1 using the *EMC: VNX* PowerPack.

The following sections provide an overview of Dell EMC VNX and the *EMC: VNX* PowerPack:

This chapter covers the following topics:

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What is Dell EMC VNX?

The Dell EMC VNX series is a family of unified hybrid flash storage arrays that combine block-based and file-based storage solutions in a single platform. VNX arrays use the EMC SMI-S Provider open storage management interface.

What Does the EMC: VNX PowerPack Monitor?

To monitor Dell EMC VNX systems using SL1, you must install the *EMC: VNX* PowerPack, which enables you to discover, model, and collect data about VNX storage arrays and file systems.

NOTE: The *EMC: VNX* PowerPack requires EMC SMI-S Provider version 4.6.2 and higher, but less than version 8.0.

NOTE: Monitoring VNX file systems is optional. If you choose to monitor file systems in addition to storage arrays, you must run a second discovery session to discover and model the file systems. For more information, see the section on ***Discovering Dell EMC VNX Devices***.

The *EMC: VNX* PowerPack includes:

- An example credential you can use to create Basic/Snippet credentials to connect to Dell EMC VNX devices
- Dynamic Applications to discover and monitor VNX devices
- Device Classes for each type of VNX device monitored by SL1
- Event Policies and corresponding alerts that are triggered when VNX devices exceed thresholds for file system utilization.
- Dashboards that present summary information for VNX component devices

Installing the EMC: VNX PowerPack

Before completing the steps in this manual, you must import and install the latest version of the *EMC: VNX* PowerPack.

TIP: By default, installing a new version of a PowerPack overwrites all content from a previous version of that PowerPack that has already been installed on the target system. You can use the ***Enable Selective PowerPack Field Protection*** setting in the **Behavior Settings** page (System > Settings > Behavior) to prevent new PowerPacks from overwriting local changes for some commonly customized fields. For more information, see the section on ***Global Settings***.

NOTE: For details on upgrading SL1, see the relevant ***SL1 Platform Release Notes***.

To download and install the PowerPack:

1. Search for and download the PowerPack from the **PowerPacks** page (Product Downloads > PowerPacks & SyncPacks) at the ScienceLogic Support Site.

2. In SL1, go to the **PowerPacks** page (System > Manage > PowerPacks).
3. Click the **[Actions]** button and choose *Import PowerPack*. The **Import PowerPack** dialog box appears.
4. Click **[Browse]** and navigate to the PowerPack file from step 1.
5. Select the PowerPack file and click **[Import]**. The **PowerPack Installer** modal displays a list of the PowerPack contents.
6. Click **[Install]**. The PowerPack is added to the **PowerPacks** page.

NOTE: If you exit the **PowerPack Installer** modal without installing the imported PowerPack, the imported PowerPack will not appear in the **PowerPacks** page. However, the imported PowerPack will appear in the **Imported PowerPacks** modal. This page appears when you click the **[Actions]** menu and select *Install PowerPack*.

Chapter 2

Configuration and Discovery

Overview

The following sections describe how to configure and discover Dell EMC VNX systems for monitoring by SL1 using the *EMC: VNX* PowerPack:

This chapter covers the following topics:

Prerequisites for Monitoring Dell EMC VNX

Before you can monitor Dell EMC VNX storage systems using the *EMC: VNX* PowerPack, you must have the following information about an EMC SMI-S Provider that has already been properly installed and configured:

- Username and password for a user with access to the SMI-S Provider
- IP address and port for the SMI-S Provider

Additionally, statistics logging must be enabled on each Dell EMC VNX storage system that will be monitored. To do so:

1. Log in to Unisphere.
2. Select a Dell EMC VNX storage array from the list, and then click the **[System]** tab.
3. In the **System Management** menu, click **System Properties**.

4. On the **Storage System Properties** dialog box, click the **[General]** tab.
5. Select the *Statistics Logging* checkbox, and then click **[OK]**.

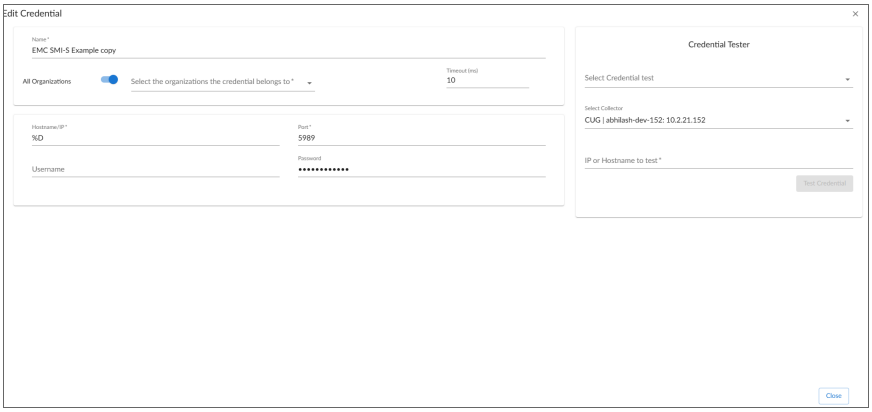
Creating a Basic/Snippet Credential for Dell EMC VNX

To configure SL1 to monitor a Dell EMC VNX system, you must first create a Basic/Snippet credential. This credential allows the Dynamic Applications in the "Dell EMC VNX" PowerPack to communicate with your Dell EMC VNX system.

The PowerPack includes an example Basic/Snippet credential that you can edit and save for your own use.

To create a Basic/Snippet credential:

1. Go to the **Credentials** page (Manage > Credentials).
2. Locate the "EMC SMI-S Example" credential, then click its **[Actions]** icon (⋮) and select *Duplicate* from the drop-down field. The "EMC SMI-S Example copy" credential appears.
3. Click the **[Action]** icon (⋮) for the "EMC SMI-S Example copy" credential, then select *Edit*. The **Edit Credential** page appears.



4. Enter values in the following fields:
   - ***Name***. Enter a new name for the credential. This field is required.
   - ***All Organizations***. Toggle on (blue) to align the credential to all organizations, or toggle off (gray) and then select one or more specific organizations from the ***Select the organizations the credential belongs to*** drop-down field to align the credential with those specific organizations.
   - ***Timeout***. Enter the time, in milliseconds, after which SL1 will stop trying to communicate with the Dell EMC VNX device. The default value is *10*. This field is required.
   - ***Hostname/IP***. Enter the Dell EMC VNX url. The default is http://%D.
   - ***Port***. Keep the default. The default value is "5989".
   - ***Username***. Enter the username associated with the EMC: VNX administrator account.
   - ***Password***. Enter the password associated with the EMC: VNX administrator account.
5. Click **[Save & Close]**.

Creating a Credential for EMC: VNX in the SL1 Classic User Interface

To configure SL1 to monitor Dell EMC VNX systems in the SL1 classic user interface, you must first create a Basic/Snippet credential. This credential allows the Dynamic Applications in the *EMC: VNX* PowerPack to connect with an EMC SMI-S Provider. An example Basic/Snippet credential that you can edit for your own use is included in the *EMC: VNX* PowerPack.

To create a Basic/Snippet credential to access an EMC SMI-S Provider in the classic user interface:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. Locate the **EMC SMI-S Example** credential, and then click its wrench icon (). The **Edit Basic/Snippet Credential** modal page appears.
3. Enter values in the following fields:
    - ***Credential Name***. Type a new name for the Dell EMC VNX credential.
    - ***Hostname/IP***. Type the IP address of the SMI-S Provider.
    - ***Port***. Type "5988" for an HTTP connection or "5989" for an HTTPS connection.
    - ***Timeout***. Type "30".
    - ***Username***. Type the username for a user with access to the SMI-S Provider.
    - ***Password***. Type the password for the SMI-S Provider account username.
4. Click the **[Save As]** button.
5. When the confirmation message appears, click **[OK]**.

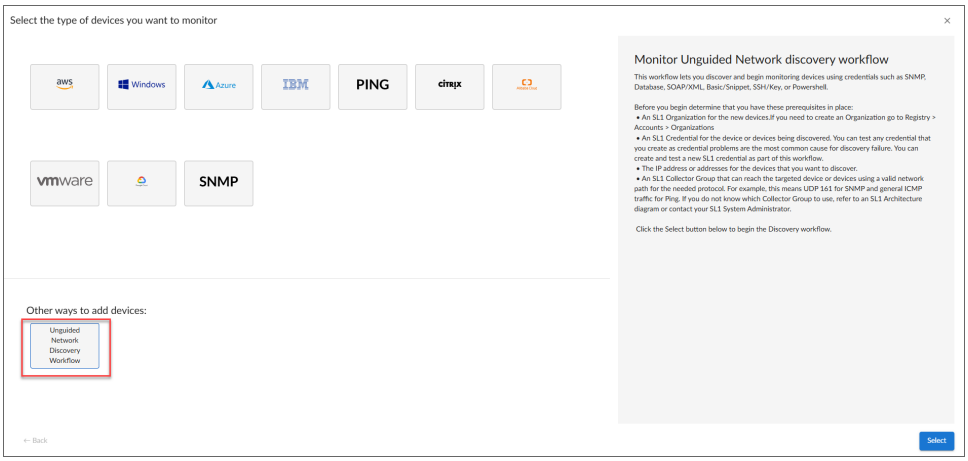
NOTE: To monitor VNX arrays and file systems that have different login credentials, create a separate Basic/Snippet credential for each.

Discovering Dell EMC VNX Devices

To monitor your Dell EMC VNX system, you must run a discovery session to discover the server on which Dell EMC VNX is installed.

To create and run a discovery session that will discover an Dell EMC VNX appliance:

1. Go to the **Devices** page () or the **Discovery Sessions** page (Devices > Discovery Sessions) and click the **[Add Devices]** button.
2. Click the **[Unguided Network Discovery Workflow]** button. Additional information about that requirements for discovery appears in the **General Information** pane to the right.



3. Click **[Select]**. The three-step wizard appears starting with the **[Step 1 Basic Information]** tab.
4. Complete the following fields:
    - ***Discovery Session Name***. Type a unique name for this discovery session. This name is displayed in the list of discovery sessions on the **[Discovery Sessions]** tab.
    - ***Description***.Optional. Type a short description of the discovery session. You can use the text in this description to search for the discovery session on the **[Discovery Sessions]** tab.
    - ***Select the organization to add discovered devices to***. Select the name of the organization to which you want to add the discovered devices.
5. Click **[Next]**. The **[Step 2 Credential Selection]** tab of the wizard appears.
6. On the **[Credential Selection]** tab, locate and select the Basic/Snippet credential you created for Dell EMC VNX appliances.
7. Click **[Next]**. The **[Step 3 Discovery Session Details]** tab of the wizard appears.
8. Complete the following fields:
    - ***List of IP/Hostnames***. Type the IP address for the Dell EMC VNX appliance.
    - ***Which collector will discover these devices?***. Required. Select an existing collector to monitor the discovered devices.
    - ***Run after save***. Toggle on (blue) to run this discovery session as soon as you save the session.
    - ***Advanced options***. Click the down arrow (⌄) to complete the following fields:
        - ***Discover Non-SNMP***. Toggle on (blue) to enable this setting.
        - ***Model Devices***. Toggle on (blue) to enable this setting.
        - ***Select Device Template***. If you configured an Dell EMC VNX device template, select it here. Otherwise, leave the default selection.
9. If you enabled the ***Run after save*** option, click the**[Save and Run]** button. The discovery session will run and the **Discovery Logs** page will display any relevant log messages. If the discovery session locates and adds any devices, the **Discovery Logs** page will include a link to the **Device Investigator** page for the discovered device.

10. If you did not enable the ***Run after save*** option, click the **[Save and Close]** button. The **Discovery Sessions** page (Devices > Discovery Sessions) will display the new discovery session.

Discovering Dell EMC VNX Devices in the SL1 Classic User Interface

To model and monitor your Dell EMC VNX system in the SL1 classic user interface, you must run a discovery session to discover the EMC SMI-S Provider that SL1 will use as the root device for monitoring the VNX system.

The discovery session will discover the SMI-S Provider as a pingable device using ***the Basic/Snippet credential that you created***. Several minutes after the discovery session has completed, the Dynamic Applications in the *EMC: VNX* PowerPack should automatically align to the SMI-S Provider root device to discover, model, and monitor the remaining component devices in your VNX system.

To discover the SMI-S Provider for the Dell EMC VNX system that you want to monitor in the classic user interface, perform the following steps:

1. Go to the **Discovery Control Panel** page (System > Manage > Classic Discovery or System > Manage > Discovery in the classic user interface).
2. In the **Discovery Control Panel**, click the **[Create]** button.
3. The **Discovery Session Editor** page appears. In the **Discovery Session Editor** page, define values in the following fields:
    - ***IP Address Discovery List***. Enter the IP address for the SMI-S Provider.
    - ***SNMP Credentials***. Do not select any credentials in this field.
    - ***Other Credentials***. Select the Basic/Snippet credential you created for the SMI-S Provider.
    - ***Initial Scan Level***. Select *5. Deep Discovery*. The *EMC: VNX* PowerPack includes non-SNMP device classes that are aligned only during deep discovery. If you do not select *5. Deep Discovery* in this field, the SMI-S Provider will be discovered and assigned a device class for a pingable device.
    - ***Discover Non-SNMP***. You must select this checkbox.
    - ***Model Devices***. You must select this checkbox.
4. Optionally, you can enter values in the other fields on this page. For more information about the other fields on this page, see the ***Discovery & Credentials*** manual.
5. Click the **[Save]** button to save the discovery session and then close the **Discovery Session Editor** window.
6. The discovery session you created will display at the top of the **Discovery Control Panel** page. Click its lightning-bolt icon ( ) to run the discovery session.
7. The **Discovery Session** window will appear. When the SMI-S Provider is discovered, click its device icon ( ) to view the **Device Properties** page for the SMI-S Provider.

NOTE: To monitor VNX storage arrays and file systems that have different IP addresses and/or credentials, create and run a separate discovery session for each.

Manually Aligning Dynamic Applications

> **NOTE:** It can take several minutes after discovery for Dynamic Applications to display on the **Dynamic Application Collections** page. If the listed Dynamic Applications do not display on this page, try clicking the **[Reset]** button.

To verify that SL1 has automatically aligned the correct Dynamic Applications during discovery:

1. From the **Device Properties** page (Devices > Classic Devices > wrench icon( )) for the SMI-S Provider, click the **[Collections]** tab. The **Dynamic Application Collections** page appears.
2. If the SMI-S Provider that you are monitoring is a storage area network (SAN) device, then the following Dynamic Applications should display in the list of aligned Dynamic Applications:
   - EMC: VNX Array Discovery
   - EMC: VNX Components Configuration
   - EMC: VNX LUN Cache

   If the SMI-S Provider that you are monitoring is a network-attached storage (NAS) device, then the following Dynamic Application should display in the list of aligned Dynamic Applications:
   - EMC: VNX File Discovery

If the listed Dynamic Applications have not been automatically aligned, you can align them manually. To do so, perform the following steps:

1. For the "EMC: VNX Array Discovery" Dynamic Application, click the **[Action]** button on the **Dynamic Application Collections** page of the SMI-S Provider device and then select *Add Dynamic Application* from the menu. The **Dynamic Application Alignment** page appears.
2. In the ***Dynamic Applications*** field, select *EMC: VNX Array Discovery*.
3. In the ***Credentials*** field, select the Basic/Snippet credential you configured for the SMI-S Provider.
4. Click the **[Save]** button.
5. Repeat steps 1–4 for the other Dynamic Applications, as needed.
6. After aligning the Dynamic Applications, click the **[Reset]** button and then click the plus icon (+) for the Dynamic Applications. If collection for the Dynamic Applications was successful, the graph icons ( ) for the Dynamic Applications are enabled.
7. Click the graph icon ( ) for the "EMC: VNX Components Configuration" Dynamic Application to view the collected data. The **Configuration Report** page will display the number of components of each type and the total number of components managed by the device.

Viewing Dell EMC VNX Devices

When SL1 discovers your Dell EMC VNX system, SL1 will create component devices that represent each component in your VNX system.

NOTE: Dell EMC VNX storage pools are identified by the pool name. If a storage pool is renamed, a new component device will be created and the old component device will remain until it is vanished or purged.

NOTE: Dell EMC VNX storage arrays and file systems use different root IP addresses. Therefore, if you are monitoring both arrays and file systems, each will have its own set of component views on the **Device View**, **Device Components**, and **Device Component Map** pages.

In addition to the **Device Manager** page, you can view the VNX system and all associated component devices in the following places in the user interface:

- The **Device View** modal page (click the bar-graph icon []for a device, then click the **Topology** tab) displays a map of the selected device and all of the devices with which it has parent-child relationships. Double-clicking any of the devices listed reloads the page to make the selected device the primary device:
- The **Device Components** page (Devices > Device Components) displays a list of all root devices and component devices discovered by SL1 in an indented view, so you can easily view the hierarchy and relationships between child devices, parent devices, and root devices. To view the component devices associated with your VNX system, find the SMI-S Provider and click its plus icon (+):
- The **Device Component Map** page (Classic Maps > Device Maps > Components) allows you to view devices by root node and view the relationships between root nodes, parent components, and child components in a map. This makes it easy to visualize and manage root nodes and their components. SL1 automatically updates the **Device Component Map** page as new component devices are discovered. SL1 also updates each map with the latest status and event information. To view the map for your VNX system, go to the **Device Component Map** page and select the map from the list in the left NavBar. To learn more about the **Device Component Map** page, see the ***Views*** manual.

Relationships with Other Types of Component Devices

SL1 can automatically build relationships between Dell EMC VNX component devices and other associated devices. If you discover a vCenter device using the Dynamic Applications in the *VMware: vSphere Base Pack* PowerPack and/or a UCS device using the Dynamic Applications in the *Cisco: UCS* PowerPack, SL1 will automatically create relationships between the following types of component devices, where appropriate:

- Dell EMC VNX LUNs and VMware Datastores
- Dell EMC VNX LUNs and UCS Service Profiles

Available Metrics for Dell EMC VNX Component Devices

The EMC SMI-S provider does not expose all metrics for every type of Dell EMC VNX device. Because of this, some metrics are not available on all VNX component devices in SL1. The following table indicates the available metrics on each type of VNX component device.

	VNX Storage System	VNX Storage Processor	VNX Storage Pool	VNX RAID Group	VNX SnapView Pool	VNX Storage Pool LUN	VNX RAID Group LUN
Capacity Total	X		X	X	X		
Capacity Used			X	X	X		
Capacity Free	X		X	X	X		
Cache Read Hits							X
Cache Write Hits							X
Cache Read Hit Ratio							X
Cache Write Hit Ratio							X
Capacity Utilization	X		X	X	X		
Processor (CPU) Utilization		X					
IO Total	X	X				X	X
IO Read	X	X				X	X
IO Write	X	X				X	X
LUN Utilizatio n						X	X
Port IO		X					
Port Throughput		X					
Service Time						X	X
Throughput Total	X	X				X	X
Throughput Read	X	X				X	X
Throughput Write	X	X				X	X

Chapter 3

Dashboards

Overview

The following sections describe the device dashboards that are included in the *EMC: VNX* PowerPack:

This chapter covers the following topics:

Device Dashboards

The *EMC: VNX* PowerPack includes device dashboards that provide summary information for VNX component devices. Each of the device dashboards in the *EMC: VNX* PowerPack are set as the default device dashboard for the equivalent device class.

EMC VNX RAID Group LUN

The EMC VNX RAID Group LUN device dashboard displays the following information:

- Input/output operations over a specified period of time
- Service time over a specified period of time
- Cache hit ratio over a specified period of time
- Device logs

EMC VNX Storage Pool LUN

The EMC VNX Storage Pool LUN device dashboard displays the following information:

- Input/output operations over a specified period of time
- Service time over a specified period of time
- LUN utilization over a specified period of time
- Device logs

EMC VNX RAID Group

The EMC VNX RAID Group device dashboard displays the following information:

- Current utilization of usable capacity
- Usable capacity over the past 30-day period
- Device logs

EMC VNX Storage Pool

The EMC VNX Storage Pool device dashboard displays the following information:

- Current utilization of usable capacity
- Usable capacity over the past 30-day period
- Device logs

EMC VNX Storage Processor Dashboard

The EMC VNX Storage Processor device dashboard displays the following information:

- Input/output operations over a specified period of time
- Top 10 fibre channel ports for input/output traffic
- Top 10 iSCSI ports for input/output traffic
- Device logs

EMC VNX Storage System Dashboard

The EMC VNX Storage System device dashboard displays the following information:

- Input/output operations over a specified period of time
- Current utilization of raw capacity for the array
- Current raw storage capacity for the array
- Device logs

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