

Dell Storage vSphere Client Plugin

Version 6.1 Administrator's Guide

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

The *Dell Storage vSphere Client Plugin Administrator's Guide* provides instructions for installing, configuring, and using the Dell Storage vSphere Client Plugin. The plugin provides management of Dell storage with the VMware vSphere Client.

Revision History

Revision	Date	Description
A	June 2021	Initial release

Audience

The intended audience of this guide is information technology professionals who have intermediate to expert knowledge of both Dell Storage Centers and Dell Storage Manager. This guide also assumes administrative working knowledge of VMware vSphere Client, VMware vCenter, and VMware ESXi.

Related Publications

In addition to this guide, the following documentation is available for client applications used with Dell Storage products:

- *Dell Storage vSphere Client Plugin Release Notes*
Describes new enhancements and known issues for the Dell Storage vSphere Client Plugin.
- *Dell Storage Integration Tools for VMware Administrator's Guide*
Provides instructions for deploying and configuring the Dell Storage vSphere Client Plugin.
- *Dell Storage Integration Tools for VMware Release Notes*
Describes the new features and enhancements in the latest version of DSITV.
- *Storage Manager Administrator's Guide*
Provides instructions for using the Storage Manager software.
- *Unisphere and Unisphere Central Administrator's Guide*
Provides instructions and information for managing storage systems using Unisphere and Unisphere Central.

Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services might not be available in your area.

To contact Dell for sales, technical support, or customer service issues, go to Dell.com/support.


- For customized support, type your system service tag on the support page and click **Submit**.
- For general support, browse the product list on the support page and select your product.

Chapter 1: Getting Started.....	6
Key Features.....	6
Requirements for the vSphere Client Plugin.....	6
Software Requirements.....	6
Replication Requirements for VMFS Datastores.....	7
Configuring Dell Storage vSphere Client Plugin.....	7
VASA Provider.....	8
Registering VASA provider.....	8
Unregistering VASA provider.....	9
Managing the vSphere Client Plugin.....	9
Changing vCenter and Dell Storage Manager Credentials.....	9
Displaying Storage Center Information.....	10
Disabling and Enabling the vSphere Client Plugin.....	11
Chapter 2: Working With Dell Storage.....	12
Introduction to Dell Storage.....	12
Creating and Managing VMFS Datastores on Storage Centers.....	13
Adding a VMFS Datastore	13
Editing Volume Settings.....	15
Expanding a Datastore.....	16
Removing a Datastore.....	16
Configuring, Creating, and Recovering Snapshots.....	17
Applying a Snapshot Profile for a Datastore.....	17
Taking a Snapshot of a Datastore.....	17
Deleting Snapshots for a Datastore.....	17
Recovering a Datastore From a Storage Center Snapshot.....	18
Create and Manage Replications and Live Volumes.....	18
Replication Operations.....	19
Live Volume Operations.....	21
Chapter 3: Working With Virtual Machines.....	25
Deploy Virtual Machines to an Existing VMFS Datastore.....	25
Deploy Virtual Machines to a New VMFS Datastore.....	26
Chapter 4: Viewing Dell Storage Information.....	28
Viewing the Host Settings.....	28
Connectivity Legend.....	28
Adapter Details.....	29
Storage Details.....	29
Configuring Storage Center Connections.....	29
Using Dell Storage Views.....	30
Viewing General Information.....	30
Viewing Usage Statistics.....	32
Viewing Connectivity Information.....	33

Viewing Volume Snapshots.....	34
Viewing Protocol Endpoints.....	35
Viewing Replications and Live Volumes.....	36
Viewing Dell Storage Charts.....	38
Dell Storage-Charts View.....	38

Getting Started

The Dell Storage vSphere Client Plugin provides management of Dell Storage

 **NOTE:** Use the VMware vSphere Client to perform all procedures in this guide, unless instructed otherwise.

Topics:

- [Key Features](#)
- [Requirements for the vSphere Client Plugin](#)
- [Configuring Dell Storage vSphere Client Plugin](#)
- [VASA Provider](#)
- [Managing the vSphere Client Plugin](#)

Key Features

The Dell Storage vSphere Client Plugin provides these functions:

- Adding and removing VMFS storage, such as datastores on Storage Centers
- Provisioning virtual machines on Dell Storage
- Configuring VMware ESXi hosts on Dell Storage
- Creating and managing Storage Center Replays for VMFS datastores
- Replicating VMFS datastores between Storage Centers
- Adding and managing Live Volumes
- Recovering VMFS datastores from VMFS datastore Replays

In addition, the vSphere Client Plugin displays information tabs within the VMware vSphere Client inventory views.

Requirements for the vSphere Client Plugin

Hardware and software requirements must be met before installing the Dell Storage vSphere Client Plugin. Also, Storage Center requirements must be met to replicate data.

Software Requirements

Dell Storage vSphere Client Plugin is compatible with the products that are listed in the following table:

Product	Versions
Dell Storage Manager	2018 R1, 2019 R1, 2020 R1
Storage Center	7.3.x, 7.4.x, 7.5.x
VMware ESXi	6.5, 6.7, 7.0
VMware vCenter Server (vCSA)	6.5, 6.7, 7.0

 **NOTE:** Microsoft Windows vCenter Server is not supported.

Replication Requirements for VMFS Datastores

To replicate data from one Storage Center to another, ensure that the following requirements are met:

- **Storage Center:** Both the source and destination Storage Centers must be configured in Dell Storage Manager or Unisphere. They must be configured for the Dell Storage Manager or Unisphere user credentials that are supplied to the vSphere Client Plugin.
- **QoS Definition:** A Quality of Service (QoS) definition must be set up on the source Storage Center for replication. See the *Dell Storage Manager Administrator's Guide* for instructions on creating QoS definitions.

If you are using iSCSI connections for replications:

- The destination Storage Center must be defined as an iSCSI Remote System on the source Storage Center.
- The source Storage Center must be defined as an iSCSI Remote Connection on the destination Storage Center.


See the *Dell Storage Manager Administrator's Guide* or *Unisphere and Unisphere Central Administrator's Guide* for instructions on configuring iSCSI connections between Storage Centers.

Configuring Dell Storage vSphere Client Plugin


Configure the Dell Storage vSphere Client Plugin to communicate with a Dell Storage Manager server.

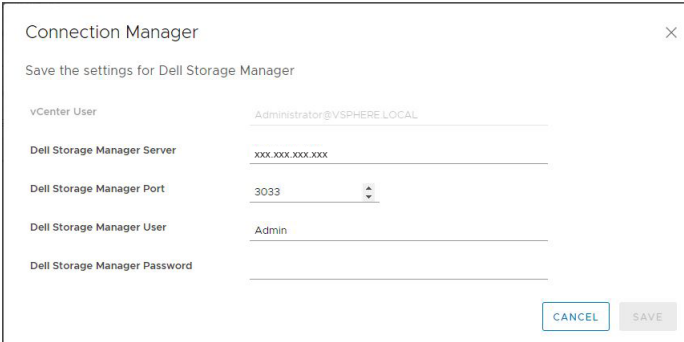
Prerequisites

Install the Dell Storage Integration Tools for VMware (DSITV), and register the Dell Storage vSphere Client Plugin with a vCenter server as described in the *Dell Storage Integration Tools for VMware Administrator's Guide*.

 **NOTE:** This version of vSphere Client Plugin supports only VMware vCenter Server Appliance. Microsoft Windows vCenter Server is not supported.

Steps

1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Manage** tab.
5. Click **Update**.
The Connection Manager dialog box opens.




The Connection Manager dialog box is titled "Connection Manager" and has a close button (X) in the top right corner. Below the title bar, it says "Save the settings for Dell Storage Manager". The dialog contains several input fields with labels on the left and values on the right:

Field Label	Value
vCenter User	Administrator@VSPHERE.LOCAL
Dell Storage Manager Server	xxx.xxx.xxx.xxx
Dell Storage Manager Port	3033
Dell Storage Manager User	Admin
Dell Storage Manager Password	

At the bottom right of the dialog, there are two buttons: "CANCEL" and "SAVE".

Figure 1. Connection Manager Dialog Box


6. Enter the requested information:
 - **vCenter User** (not editable) – The field displays the user that was used to log in to the vSphere Client. To configure the vSphere Client Plugin for a different vCenter user, log out of the vSphere Client and log back in with that user.
 -  **NOTE:** The Dell Storage vSphere Client Plugin uses the vCenter user credentials to continue running the tasks after the vSphere Client Plugin is closed.
 - **Dell Storage Manager Server** – Type the hostname or IP address of the Dell Storage Manager server.
 - **Dell Storage Manager Port** – Type the port number for the Dell Storage Manager in the field.

- **Dell Storage Manager User and Password** – Type the username and password of a Dell Storage Manager user with administrator privileges. The Dell Storage Manager user credentials control which Storage Centers can be managed in the vSphere Client Plugin.

To add a Storage Center to the vSphere Client Plugin, log in to the Dell Storage Manager client using the same user credentials. Add the Storage Center to manage. See the *Storage Manager Administrator's Guide* for instructions on adding a Storage Center to Storage Manager.

7. Click **Save**.

- The vSphere Client Plugin validates the vCenter and Dell Storage Manager credentials.
- If the credentials are correct, the vSphere Client Plugin retrieves Storage Center information from the Dell Storage Manager server.

 **NOTE:** The more Storage Centers and volumes that are managed by the Dell Storage Manager user, the longer it takes to display the **Dell Storage** page.

If the credentials are incorrect, a **Connection Manager** error dialog box opens.

VASA Provider

The Dell VASA Provider gathers information about the available storage topologies, capabilities, and status of Storage Centers, as well as Storage Center events and alerts. The VASA provider passes this information to VMware vCenter, making it accessible to vSphere clients. This information allows VMware vCenter administrators to make informed decisions when selecting the datastore on which to place new virtual machines.


Registering VASA provider

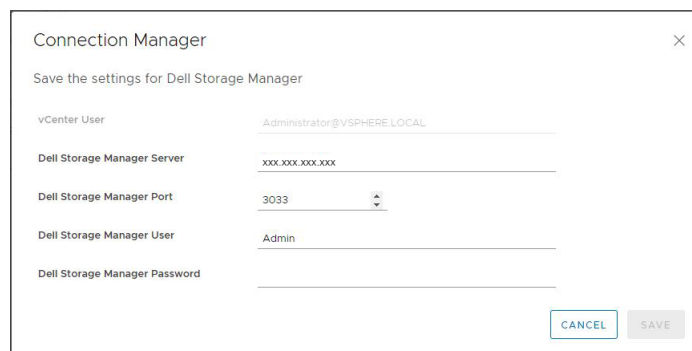
Follow these steps to register the VASA provider.

Prerequisites

Ensure that vSphere Client is added to Dell Storage Manager.

Steps

1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Manage** tab.
5. Click **Update**.
The Connection Manager dialog box opens.



The Connection Manager dialog box is titled "Connection Manager" and has a close button (X) in the top right corner. Below the title bar, it says "Save the settings for Dell Storage Manager". The dialog contains several input fields with labels on the left and values on the right:

- vCenter User:** Administrator@VSPHERE.LOCAL
- Dell Storage Manager Server:** xxx.xxx.xxx.xxx
- Dell Storage Manager Port:** 3033 (with a dropdown arrow)
- Dell Storage Manager User:** Admin
- Dell Storage Manager Password:** (empty field)

At the bottom right of the dialog, there are two buttons: "CANCEL" and "SAVE".

Figure 2. Connection Manager Dialog Box


6. In **vCenter Password**, type the password of the vCenter user.
7. In **Dell Storage Manager Password**, type the password of a Storage Manager user with administrator privileges.
8. Click **Save**.
9. In the **Manage** tab, select **Register VASA Provider**.

The vSphere Client Plugin reviews the settings and registers the VASA provider, or displays an error message if it cannot be registered.

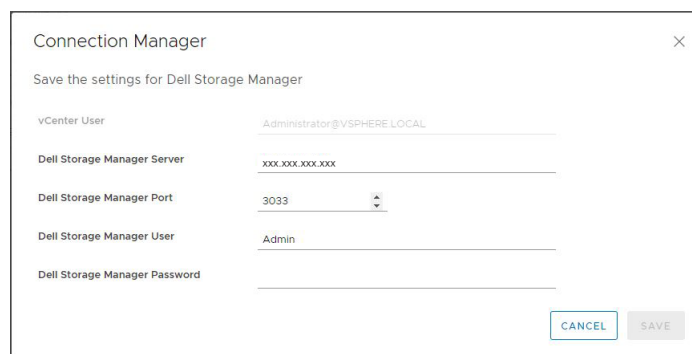
Unregistering VASA provider

Follow these steps to unregister a VASA provider.

Steps

1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Manage** tab.
5. Click **Update**.

The Connection Manager dialog box opens.



The Connection Manager dialog box is titled "Connection Manager" and has a close button (X) in the top right corner. Below the title, it says "Save the settings for Dell Storage Manager". The dialog contains several input fields with labels on the left and values on the right:

- vCenter User**: Administrator@VSPHERE.LOCAL
- Dell Storage Manager Server**: xxx.xxx.xxx.xxx
- Dell Storage Manager Port**: 3033 (with a dropdown arrow)
- Dell Storage Manager User**: Admin
- Dell Storage Manager Password**: (empty field)

At the bottom right, there are two buttons: "CANCEL" and "SAVE".

Figure 3. Connection Manager Dialog Box

6. In **vCenter Password**, type the password of the vCenter user.
7. In **Dell Storage Manager Password**, type the password of a Storage Manager user with administrator privileges.
8. Click **Save**.
9. In the **Manage** tab, clear the **Register VASA Provider** setting.

Managing the vSphere Client Plugin

The following sections describe how to manage vCenter and Dell Storage Manager credentials, display Storage Center information, and disable or enable the vSphere Client Plugin.


Changing vCenter and Dell Storage Manager Credentials

If the credentials change for the Dell Storage Manager user defined in the vSphere Client Plugin, update the credentials on the **Manage** tab of the **Dell Storage** page.

Prerequisites

A Data Collector must be installed and running before you can configure the vSphere Client Plugin. See the *Dell Storage Manager Installation Guide* for information about installing the Data Collector.

Steps

1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Manage** tab.

5. Click **Update**.
The Connection Manager dialog box opens.

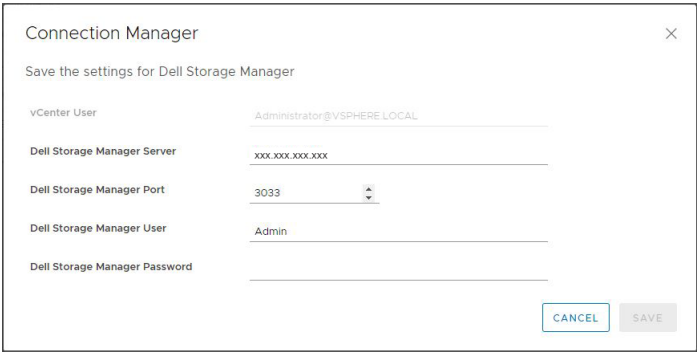


Figure 4. Connection Manager Dialog Box

6. Modify the vCenter and Dell Storage Manager credentials as needed and click **Save**.


Displaying Storage Center Information

The **Summary** tab on the Dell Storage page displays summary information for Storage Center. The **Monitor** tab displays performance and usage charts for Storage Center.

Display Storage Center Information

The **Summary** tab displays Storage Center controller information and storage type information.

Steps


1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Summary** tab.
5. Select the Storage Center to display.
The bottom pane displays information about the selected Storage Center.

Label	Description
Controller Information	Displays network and status information about each Storage Center controller.
Storage Type Information	Displays the Storage Types defined on the Storage Center.

Monitor Storage Performance and Disk Usage


Display performance and usage information for Storage Center on the **Monitor** tab.

Steps

1. Log in to the vSphere Client.
2. In the vSphere Client window, select **Menu** and click  **Administration**.
3. In the Administration pane, click **Dell Storage**.
4. Click the **Monitor** tab.
5. Select the Storage Center to display.
The bottom pane displays performance and usage data for the selected Storage Center.


Charts

The **Charts** tab displays performance information for the selected Storage Center.

Label/Option	Description
KB/sec Chart	Read KB/sec —Transfer rate of read operations in kilobytes per second
	Total KB/sec — Combined transfer rate of read and write operations in kilobytes per second
	Write KB/sec —Transfer rate of write operations in kilobytes per second
IO/sec Chart	Read IO/sec — Transfer rate of read operations in I/O operations per second
	Total IO/sec — Combined transfer rate of read and write operations in I/O operations per second
	Write IO/sec —Transfer rate of write operations in I/O operations per second
	Enables you to download an image of the chart in .png format

Usage

The **Usage** tab displays free versus used disk space information for the selected Storage Center.

Label/Option	Description
Available Space	Total amount of disk space available on the disks of the Storage Center
Allocated space	Amount of disk space allocated on the disks of the Storage Center for volume use
Used space	Amount of disk space used by volumes on the Storage Center
Free space	Amount of disk space available for use by the Storage Center
Space reserved by system	Space consumed by Replays and RAID overhead
Savings vs. RAID 10	Amount of disk space saved by using Dell Dynamic Block Architecture instead of RAID 10 storage
	Enables you to download an image of the chart in .png format

Disabling and Enabling the vSphere Client Plugin

After installing the vSphere Client Plugin, enable it by registering the plugin with VMware vCenter.

All plugins can also be enabled or disabled using vSphere. The procedures for enabling and disabling plugins vary depending on the version of the vSphere Client. For instructions on managing plugins, see the vSphere documentation.

Working With Dell Storage

The Dell Storage vSphere Client Plugin communicates with Dell Storage Manager and enables the management of Dell Storage.

Topics:

- [Introduction to Dell Storage](#)
- [Creating and Managing VMFS Datastores on Storage Centers](#)
- [Configuring, Creating, and Recovering Snapshots](#)
- [Create and Manage Replications and Live Volumes](#)

Introduction to Dell Storage

An administrator can use the Dell Storage vSphere Client Plugin to manage Dell storage on a Storage Center.


A Storage Center configures and uses storage based on the following settings.

Storage Term	Description
Storage Tier (physical media classes)	Storage tiers represent the classification of all physical storage media in the Storage Center. Storage Center automatically populates storage tiers with the available media in the Assigned disk folder. <ul style="list-style-type: none"> • Tier 1: Contains the fastest media appropriate for frequently used, mission-critical data. Tier 1 media is typically the most expensive media. • Tier 2: Contains medium-quality media appropriate for medium-priority data. • Tier 3: Contains slower, inexpensive media appropriate for backup copies, Replays, and low-priority, rarely used data.
Storage Type (RAID level and page size)	Within each tier, the following storage types are available. <ul style="list-style-type: none"> • Non-redundant: RAID 0 with 2-MB page size • Single Redundant: RAID 10, RAID 5-5, RAID 5-9 with 512 KB, 2 MB, or 4 MB page size • Dual redundant: RAID 10, RAID 6-6, RAID 6-10 with 2 MB page size • The default and recommended setting for storage type is dual redundant, and for drive 18 TB or larger, dual redundant is required and enforced.
Volume (a logical unit of storage)	A volume is a logical unit of storage on the Storage Center. When you add a datastore within the vSphere Client, you create and map a new Dell volume as a datastore, or map an existing Dell volume as a datastore. When mapping an existing Dell volume as a datastore, the volume must have been a previously-formatted VMFS volume that was used as a datastore and unmapped.
Live Volume (keeps applications online and data accessible during planned or unplanned downtime)	A Live Volume is a replicating volume that can be mapped and active on a source and destination Storage Center at the same time.
Data Type (writeable or Snapshot)	Volume data can be either of the following types: <ul style="list-style-type: none"> • Writeable: Data written to storage dynamically • Snapshot: Point-in-time copy data
Storage Profiles (applied to a volume to determine how data is migrated on the Storage Center)	Storage Profiles determine how volume data is stored and migrated on the Storage Center. The following Storage Profiles are defined by the system: <ul style="list-style-type: none"> • Recommended: Available only on Storage Center with Licensed Data Progression. Use the Recommended profile to optimize Data Progression and performance on the Storage Center. The Recommended profile allows the

Storage Term	Description
	<p>system to automatically progress data between storage types and across all storage tiers based on data type and usage.</p> <ul style="list-style-type: none"> • High Priority: Use the High Priority profile only for volumes that contain data you want to keep in tier 1 storage. That is, applying the High Priority profile to a volume prevents the volume data from migrating to another tier. • Medium Priority: Use the Medium Priority profile only for volumes that contain data you want to keep in tier 2 storage. That is, applying the Medium Priority profile to a volume prevents the volume data from migrating to another tier. • Low Priority: Use the Low Priority profile only for volumes that contain data you want to keep in tier 3 storage. That is, applying the Low Priority profile to a volume prevents the volume data from migrating to another tier. <p>You can create and modify Storage Profiles within a Storage Center, if you have licensed Data Progression software.</p>
Snapshots and Snapshot Profiles (applied to a volume to determine how often snapshots are taken)	<p>A Storage Center snapshot is a point-in-time copy of data. As such, a snapshot can be exposed and mapped to allow recovery of a datastore or virtual machine. Snapshot Profiles determine a schedule for volume snapshots. System-defined Snapshot Profiles include commonly used schedules for daily and weekly snapshots. Custom Snapshot profiles can be created to schedule snapshots appropriate to the data that you want to back up.</p>
View Volume (an Exposed (mapped) snapshot)	<p>An exposed (mapped) snapshot used to recover data from a point-in-time copy of data (snapshot).</p>
Data Progression (automatically migrates volume data based on the Storage Profile settings)	<p>Based on the Storage Profile applied to the volume and the Data Progression licensing, volume data automatically progresses on the Storage Center.</p> <p>On a Storage Center with licensed Data Progression, data can automatically migrate to different Storage Types within a storage tier, and also across storage tiers.</p>

Creating and Managing VMFS Datastores on Storage Centers

The vSphere Client Plugin enables you to create and manage volumes that are mapped as VMFS datastores to ESXi hosts or clusters on a Storage Center.

 **NOTE:** The options that appear when creating and managing datastores change depending on the Storage Center user preferences of the Storage Manager user that is defined in the vSphere Client Plugin.


Adding a VMFS Datastore

Use the **Add Datastore** wizard to add Dell storage as a VMFS datastore.

When you add a VMFS datastore, you create and/or map a Dell volume on the Storage Center. See [Introduction to Dell Storage](#) on page 12 for details about Dell volumes.

To add a VMFS datastore, use these options:

- **Create New Dell Volume** – Create and map a new Dell volume as a VMFS datastore.
- **Map Existing Dell Volume** – Select an existing Dell volume to map as a datastore.

 **NOTE:** The existing volume must be a formatted VMFS datastore.

Adding a Datastore Using a New Dell Volume

Create one or more datastores using the **Add Datastore** wizard.

Prerequisites

- The SAS mapping protocol selection is only available on Storage Centers that support Front-end SAS: SCv2000 Series and SC4020 Storage Centers.
- On the **Volumes** page, the values for Storage Profile and Disk Folder can be modified only if the preferences for the Storage Center have been set to **Allow**. For information about managing the preferences, see the *Dell Storage Manager Administrator's Guide* or *Unisphere for SC Series Administrator's Guide*.

Steps

1. Select an object in inventory that can be a parent of a datastore:
 - Datacenter
 - Host
 - Cluster
2. Select **Actions > All Dell Storage Actions > Add Datastore**.
The **Add Datastore** wizard opens.
3. Select whether to create a single datastore or multiple datastores, and click **Next**.
4. Select one or more hosts to which to map the new volume, and click **Next**.
5. Select the Storage Center, and click **Next**.
6. Select **Create New Dell Volume**, and click **Next**.
7. Type the name and size for the new volume, select the volume folder, and click **Next**.
8. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
9. Click **Next**.
10. Select a Snapshot Profile for the volume, and click **Next**.
11. Select the LUN for mapping the volume, and click **Next**.
12. Select the VMFS version, and click **Next**.
13. Select the I/O protocol to use for this volume, and click **Next**.
14. Review the Datastore Properties.
 - a. When creating a single datastore, you can change the name or location.
 - b. When creating multiple datastores, specify the number of datastores to create and the number of the first datastore. Subsequent datastores are numbered consecutively.
15. (Optional) Select **Create Replication/Live Volume** if you want to replicate the volume data to a second Storage Center and allow both Storage Centers to process I/O requests for the volume. For more information, see [Create and Manage Replications and Live Volumes](#) on page 18.
 - a. Select a Target Storage Center, and click **Next**.
 - b. Select the **Target Volume Settings**, and click **Next**.

- c. Select the **Replication Options**, and click **Next**.
16. Click **Next**.
The **Ready to Complete** page opens.
17. Review the settings and click **Finish** to create the datastore.

Map an Existing Dell Volume as a Datastore


An existing Dell volume can be mapped as a datastore using the vSphere Client Plugin.

Prerequisites

- The SAS mapping protocol selection is available only on Storage Centers that support Front-end SAS: SCv2000 series and SC4020 Storage Centers.
- The volume must be formatted with VMFS file system.

Steps

1. Select an object in inventory that can be a parent of a datastore:
 - Datacenter
 - Host
 - Cluster
2. Select **Actions > All Dell Storage Actions > Add Datastore**.
The **Add Datastore** wizard opens.
3. Select **Create single Datastore**, and click **Next**.
4. Select one or more hosts to which to map the new volume, and click **Next**.
5. Select the Storage Center for volume creation. Click **Next**.
6. Select **Map existing Dell Volume**, and click **Next**.
 - a. Find and select an existing Dell volume to map as a datastore, and click **Next**.

 **NOTE:** The Dell volume must be a VMFS volume.
 - b. Specify the LUN for mapping the volume, and click **Next**.
7. Select the I/O protocol to use for this volume, and click **Next**.
8. Specify the name for the datastore. The Dell volume name is used by default.
9. (Optional) Select **Create Replication/Live Volume** if you want to replicate the volume data to a second Storage Center and allow both Storage Centers to process I/O requests for the volume. For more information, see [Create and Manage Replications and Live Volumes](#) on page 18.
 - a. Select a **Target Storage Center** and click **Next**.
 - b. Select the **Target Volume Settings** and click **Next**.
 - c. Select the **Replication Options** and click **Next**.
10. Click **Next**.
The **Ready to Complete** page opens.
11. Review the settings and click **Finish** to create the datastore.

Editing Volume Settings

Edit the datastore settings to expand the datastore, change the volume Storage Profile or to select a different QoS Profile for the datastore.

Prerequisites

QoS Profiles are created and managed in Storage Manager. For information about managing QoS Profiles, see the *Dell Storage Manager Administrator's Guide* or the *Unisphere for SC Series Administrator's Guide*.

Steps

1. Select a datastore.

2. Select **Actions > All Dell Storage Actions > Edit Datastore**.
The **Edit Datastore** wizard opens to the **Expand Datastore** page.
3. Select a new size for the datastore, and click **Next**.
The **Volume Settings** page opens.
4. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
5. Select a Snapshot Profile for the volume, and click **Next**.
6. Click **Next**.
The **Ready to Complete** page opens.
7. Review the settings and click **Finish** to apply the new settings.

Expanding a Datastore

Use the **Edit Settings** wizard to increase the capacity of a datastore.

Steps

1. Select a datastore.
2. Select **Actions > All Dell Storage Actions > Edit Datastore**.
The **Edit Datastore** wizard opens to the **Expand Datastore** page.
3. Select a new size for the datastore, and click **Next**.
The **Volume Settings** page opens.
4. Select a Snapshot Profile for the volume, and click **Next**.
5. Review the volume settings, and then click **Next**.
The **Ready to Complete** page opens.
6. Review the settings, and then click **Finish** to apply the new settings.

Removing a Datastore

Use the Remove Storage wizard to remove a datastore.


Steps

1. Select a datastore.
2. Select **Actions > All Dell Storage Actions > Remove Datastore**.
The **Remove Datastore** wizard opens.
3. Select one or more datastores to remove.
4. Select a retention option:
 - **Unmap Volume**—deletes the mappings between the datastore and the server.
 - **Place in Recycle Bin**—moves the datastore to the recycle bin.
 - **Permanently Delete**—skips the recycle bin and permanently deletes the datastore.

5. Click **Next** to advance the wizard.
The **Ready to Complete** page opens.
6. Review the settings and click **Finish** to apply the new settings.

Configuring, Creating, and Recovering Snapshots

The Dell Storage vSphere Client Plugin allows you to create, configure, and expire snapshots, and recover data from snapshots.

 **NOTE:** The options that appear when configuring, creating, and recovering snapshots change depending on the volume preferences of the Dell Storage Manager user defined in the Dell Storage vSphere Client Plugin.

Applying a Snapshot Profile for a Datastore

Apply a Snapshot Profile to a datastore (Dell volume) or to all volumes associated with a virtual machine to establish a schedule for automatically taking snapshots. Only Snapshot Profiles already defined on the Storage Center are available for selection.

Steps

1. Select a datastore in inventory.
2. Select **Actions > All Dell Storage Actions > Snapshot > Set Snapshot Profile**.
The **Set Snapshot Profile** wizard starts.
3. Select one or more Snapshot Profiles to apply to the datastore.
4. Click **Next**.
The **Ready to Complete** page opens.
5. Click **Finish**.

Taking a Snapshot of a Datastore

Besides scheduled snapshots that are taken automatically based on a Snapshot Profile, you can also take an immediate (unscheduled) snapshot. During snapshot creation, you can specify an expiration time for the snapshots. If you create a snapshot with the **Never Expire** option, the snapshot remains on the Storage Center until it is manually expired.

Steps

1. Select the datastore for which you want to take a snapshot.
2. Select **Actions > All Dell Storage Actions > Snapshot > Create Datastore Snapshot**.
The **Create Snapshot** wizard starts.
3. Specify a time after which you want the snapshot to expire. To set the snapshot to never expire, select the **Never Expire** option.
4. (Optional) Enter a description of the snapshot.
5. Click **Next**.
The **Ready to Complete** page opens.
6. Click **Finish**.

Deleting Snapshots for a Datastore

When a snapshot is created, an expiration time is assigned to the snapshot. However, you can override the expiration time by explicitly deleting a snapshot. Deleting a snapshot removes the snapshot from the Storage Center.

Steps

1. Select the datastore for which you want to delete snapshots.
2. Select **Actions > All Dell Storage Actions > Snapshot > Delete Datastore Snapshot**.
The **Expire Storage Center Snapshot** wizard starts.
3. Select the snapshots that you want to delete.
4. Click **Next**.

The **Ready to Complete** page opens.

5. Click **Finish**.

Recovering a Datastore From a Storage Center Snapshot


Use the Storage Center Snapshot Recovery wizard to recover data from a Storage Center snapshot. The wizard allows you to select the snapshot from which you want to recover data and then exposes and maps the snapshot to allow you to copy data for recovery.

Prerequisites

A snapshot of the datastore must exist.

Steps

1. Select the datastore for which you want to recover data.
2. Select **Actions > All Dell Storage Actions > Snapshot > Recover Datastore from Snapshot**.
The **Storage Center Snapshot Recovery** wizard starts.
3. Select a snapshot from which to recover data.

 **NOTE:** Only one snapshot per volume can be selected.

4. Click **Next**.
The **Host Selection** page opens.
5. Select the host for accessing the recovered datastore.
6. Click **Next**.
The **Datastore Name** page opens.
7. Specify a name and location for the recovered datastore.
8. Click **Next**.
The **Mapping LUN** page opens.
9. Select the LUN for mapping the recovered datastore.
10. Click **Next**.
The **Ready to Complete** page opens.
11. Click **Finish**.

Create and Manage Replications and Live Volumes

Use the plugin to add and manage replications and Live Volumes to VMFS datastores on Dell storage. You can use the plugin to convert a replication to a Live Volume and vice versa.

The Dell Storage vSphere Client Plugin supports two basic models for migrating data between Storage Centers:

- Replications
- Live Volumes

A replication copies volume data from one Storage Center to another Storage Center to safeguard data. A Live Volume is a replicating volume that can be mapped and active on a source and destination Storage Center at the same time.

Replications can be synchronous or asynchronous:

- Asynchronous replication—Copies snapshots from the source volume to the destination volume. If the local Storage Center or site fails before the write is delivered, it is possible that writes will not be delivered to the destination volume
- Synchronous replications—Keeps the source and destination volume fully synchronized at all times by making sure that each write is successfully written to both the source volume and the destination volume before responding to the server.

Synchronous replications can be further defined by the mode:

- High Availability Mode—Accepts IO requests to the source volume when the destination volume is unavailable (or when latency is too high) to avoid interrupting service. However, if writes are accepted to the source volume, the destination volume data becomes stale.

- **High Consistency Mode**—Prevents IO requests to the source volume when the destination volume is unavailable to make sure that the volumes remain identical. However, the source volume cannot be modified during this time, which can interrupt operations.

For information about replications and Live Volumes, see the *Dell Storage Manager Administrator's Guide*.

Replication Operations

Use the vSphere Client Plugin to add, modify, and remove datastore replications.

Replicating a Datastore

Follow this procedure to replicate a datastore.

Prerequisites

If you are using iSCSI connections for replications, the following conditions must be met:

- The destination Storage Center must be defined as an iSCSI Remote System on the source Storage Center.
- The source Storage Center must be defined as an iSCSI Remote Connection on the destination Storage Center.

See the *Dell Storage Manager Administrator's Guide* for instructions on configuring iSCSI connections between Storage Center.

- At least one Quality of Service (QoS) definition must be set up on the source Storage Center for replication.

See the *Dell Storage Manager Administrator's Guide* for instructions on creating QoS definitions.

Steps

1. Select a datastore to replicate.
2. Select **Actions > Dell Storage Actions > Replications/Live Volume > Add**.
The **Add Replica/Live Volume** wizard starts.
3. Select the target (destination) Storage Center.
4. Click **Next**.
The **Volume Settings** page opens.
5. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
6. Click **Next**.
The **Replication Options** page opens.
7. Select the replication settings:
 - **Replication Type:**
 - Replication, Asynchronous
 - Replication, Synchronous—High Availability

- Replication, Synchronous—High Consistency
 - QoS definition—Select a predefined QoS definition for the replication.
 - **Replicate Active Snapshot**—Select this option to copy all writes from the active snapshot area of the volume. This option cannot be disabled for synchronous replication.
 - **Deduplication**—Select this option to copy only the changed portions of the snapshot history on the source volume, rather than all data captured in each snapshot. Deduplication saves bandwidth but is more resource intensive for the Storage Center.
 - Select the **Replication Target Location**.
8. Click **Next**.
The **Ready to Complete** page opens.
 9. Click **Finish**.

Modify a Datastore Replication

Modify the settings of an existing datastore replication.

Steps

1. Select the datastore that is being replicated.
2. Select **Actions > Dell Storage Actions > Replications/Live Volume > Edit Settings/Convert**.
The **Modify Replication or Live Volume** wizard starts.
3. Select a replication to modify.
4. Click **Next**.
The **Volume Settings** page opens.
5. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
6. Click **Next**.
The **Snapshot Profile** page opens.
7. Select a Snapshot Profile to use for the volume and click **Next**.
The **Replication Options** page opens.
8. Select the replication settings:
 - **Replication Type:**
 - Replication, Asynchronous
 - Replication, Synchronous—High Availability
 - Replication, Synchronous—High Consistency
 - QoS definition—Select a predefined QoS definition for the replication.
 - **Replicate Active Snapshot**—Select this option to copy all writes from the active snapshot area of the volume. This option cannot be disabled for synchronous replication.
 - **Deduplication**—Select this option to copy only the changed portions of the snapshot history on the source volume, rather than all data captured in each snapshot. Deduplication saves bandwidth but is more resource intensive for the Storage Center.
 - Select the **Replication Target Location**.

9.  **NOTE:** If you choose to change the replication type from a replication to a Live Volume, a warning dialog box opens.

Select the check box to confirm that you want to make the conversion, and then click **OK**.

If you confirmed that you want to convert the replica to a Live Volume, the **Live Volume Options** page opens.


10. Set the Live Volume options:
- Select a **Secondary GoS Definition** from the drop-down list.
 - Select or clear the Storage Center swap options. If you choose to **Automatically Swap Primary Storage Center**, click **Show advanced settings** for more options for determining when to swap:
 - Min. data written to secondary before swap
 - Min. % of I/O on secondary before swap
 - Min. time as primary before swap
 - For synchronous replications, select **Failover Automatically** to configure Live Volumes to automatically fail over when service is disrupted. By default, **Restore Automatically** is also selected.
 - Specify a **Live Volume Secondary Mapping** target location.
11. Click **Next**.
The **Ready to Complete** page opens.
12. Click **Finish**.

Remove a Datastore Replication

Remove a datastore replication after the replication is no longer needed.

Steps

1. Select the datastore for which you want to remove a replication.
2. Select **Actions > All Dell Storage Actions > Replications/Live Volume > Remove**.
The **Remove Replication or Live Volume** wizard starts.
3. Select the replications to remove.
4. Click **Next**.
The **Delete Options** page opens.
5. Select the removal options for the replications:
 - **Delete Restore Point**—Select this option if you want to delete the restore point for the replication.
 - **Recycle Destination Volume**—Select this option if you want to move the destination volume to the Recycle Bin on the destination Storage Center.
 - **Delete Destination Volume**—Select this option if you do not want to retain the deleted destination volume in the Recycle Bin—not recommended.

 **CAUTION:** If you delete the destination volume, you cannot recover the volume on the destination (target) Storage Center. The volume is permanently deleted.
6. Click **Next**.
The **Ready to Complete** page opens.
7. Click **Finish**.

Live Volume Operations

The Dell Storage vSphere Client Plugin enables you to add, modify, and remove Live Volumes for datastores. You can also configure automatic failover and restore features.

Adding a Live Volume to a Datastore

Use the Dell Storage vSphere Client Plugin to add Live Volumes to datastore.

Steps

1. Select a datastore to replicate.
2. Select **Actions > Dell Storage Actions > Replications/Live Volume > Add**.
The **Add Replica or Live Volume** wizard starts.

3. Select the target (destination) Storage Center.
4. Click **Next**.
The **Volume Settings** page opens.
5. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
6. Click **Next**.
The **Replication Options** page opens.
7. Select the replication settings:
 - **Replication Type:**
 - Live Volume, Asynchronous
 - Live Volume, Synchronous—High Availability
 - Live Volume, Synchronous—High Consistency
 - **QoS definition**—Select a predefined QoS definition for the replication.
 - **Replicate Active Snapshot**—Select this option to copy all writes from the active snapshot area of the volume. This option cannot be disabled for synchronous replication.
 - **Deduplication**—Select this option to copy only the changed portions of the snapshot history on the source volume, rather than all data captured in each snapshot. Deduplication saves bandwidth but is more resource intensive for the Storage Center.
 - Select the **Replication Target Location**.
8. Click **Next**.
The **Live Volume Settings** page opens.
9. Set the Live Volume options:
 - Select a **Secondary QoS Definition** from the drop-down list.
 - Select or clear the Storage Center swap options. If you choose to **Automatically Swap Primary Storage Center**, click **Show advanced settings** for more options for determining when to swap:
 - Min. data written to secondary before swap
 - Min. % of I/O on secondary before swap
 - Min. time as primary before swap
 - For synchronous replications, select **Failover Automatically** to configure Live Volumes to automatically fail over when service is disrupted. By default, **Restore Automatically** is also selected.
 - Specify a **Live Volume Secondary Mapping** target location.
10. Click **Next**.
The **Ready to Complete** page opens with a summary of the selections that you made.
11. Click **Finish**.

Modifying a Live Volume Datastore

Modify the settings of an existing Live Volume datastore.

Steps

1. Select the datastore that is being replicated.


2. Select **Actions > Dell Storage Actions > Replications/Live Volume > Edit Settings/Convert**.
The **Modify Replication or Live Volume** wizard starts.
3. From the list of replications, select one to modify.
4. Click **Next**.
The **Volume Settings** page opens.
5. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
6. Click **Next**.
The **Snapshot Profile** page opens.
7. Select the Snapshot Profile to use, and click **Next**.
The **Replication Options** page opens.
8. Select the replication settings:
 - **Replication Type:**
 - Live Volume, Asynchronous
 - Live Volume, Synchronous—High Availability
 - Live Volume, Synchronous—High Consistency
 - QoS definition—Select a predefined QoS definition for the replication.
 - **Replicate Active Snapshot**—Select this option to copy all writes from the active snapshot area of the volume. This option cannot be disabled for synchronous replication.
 - **Deduplication**—Select this option to copy only the changed portions of the snapshot history on the source volume, rather than all data captured in each snapshot. Deduplication saves bandwidth but is more resource intensive for the Storage Center.
 - Select the **Replication Target Location**.
9. Click **Next**.
If you did not choose to convert from a Live Volume to a replication, the **Live Volumes Options** page opens.
10. Set the Live Volume options:
 - Select a **Secondary QoS Definition** from the drop-down list.
 - Select or clear the Storage Center swap options. If you choose to **Automatically Swap Primary Storage Center**, click **Show advanced settings** for more options for determining when to swap:
 - Min. data written to secondary before swap
 - Min. % of I/O on secondary before swap
 - Min. time as primary before swap
 - For synchronous replications, select **Failover Automatically** to configure Live Volumes to automatically fail over when service is disrupted. By default, **Restore Automatically** is also selected.
 - Specify a **Live Volume Secondary Mapping** target location.
11. Click **Next**.
The **Ready to Complete** page opens.
12. Click **Finish**.

Removing a Live Volume Datastore

Remove a Live Volume datastore after the replication is no longer needed.

Steps

1. Select the datastore for which you want to remove a replication.
2. Select **Actions > All Dell Storage Actions > Replications/Live Volume > Remove**.
The **Remove Replication or Live Volume** wizard starts.
3. Select one or more replications to remove.
4. Click **Next**.
The **Delete Options** page opens.
5. Select the removal options for the replications:
 - **Delete Restore Point**—Select this option if you want to delete the restore point for the replication.
 - **Recycle Destination Volume**—Select this option if you want to move the destination volume to the Recycle Bin on the destination Storage Center.
 - **Delete Destination Volume**—Select this option if you do not want to retain the deleted destination volume in the Recycle Bin—not recommended.

 **CAUTION: If you delete the destination volume, you cannot recover the volume on the destination (target) Storage Center. The volume is permanently deleted.**
6. Click **Next**.
The **Ready to Complete** page opens.
7. Click **Finish**.

Configure Live Volume Automatic Failover and Restore

You can enable Storage Center Automatic Failover and Automatic Restore from the vSphere Client Plugin on Live Volumes that meet certain criteria. When Automatic Failover is enabled, the secondary Live Volume will automatically be promoted to primary in the event of a failure. After the primary Live Volume comes back online, Automatic Restore, configured by default, restores the Live Volume relationship.

Prerequisites

Configure a datastore Live Volume with the following attributes:

- Synchronous
- High Availability
- Protected

Steps

1. Select a datastore in the inventory for which you have configured Live Volume synchronous replication with high availability. The vSphere Client Plugin wizard loads information for the selected datastore.
2. Select **Actions > All Dell Storage Actions > Replication/Live Volume > Edit Settings/Convert**.
The **Modify Replication or Live Volume** wizard starts.
3. Make sure the replication to modify is selected and click **Next**.
The **Volume Settings** page opens.
4. Verify that the volume settings are correct and click **Next**.
The **Snapshot Profile** page opens.
5. Verify that the correct Snapshot profile is selected and click **Next**.
The **Replication Options** page opens.
6. Make sure that the replication type selected is **Live Volume, Synchronous - High Availability**, and click **Next**.
The **Live Volume Options** page opens.
7. Under **Live Volume Settings**, select **Failover Automatically**. By default, **Restore Automatically** is also selected.
8. Click **Next**.
The **Ready to Complete** page opens.
9. Click **Finish** to accept the configuration, and exit the wizard.

Working With Virtual Machines

The Dell Storage vSphere Client Plugin provides the ability to provision virtual machines and recover virtual machine data from a snapshot. You can provision (create) virtual machines and deploy them to an existing VMS datastore or to a new VMFS datastore.

Topics:

- [Deploy Virtual Machines to an Existing VMFS Datastore](#)
- [Deploy Virtual Machines to a New VMFS Datastore](#)

Deploy Virtual Machines to an Existing VMFS Datastore

Use the Provision Virtual Machines wizard to deploy one or more virtual machines to an existing VMFS datastore.

Prerequisites

A virtual machine template must be created from which new virtual machines can be deployed. For information about creating or updating a virtual machine template, see the vSphere help topics on virtual machine templates.

Steps


1. Select an object that can be the parent of a virtual machine:
 - Datacenter
 - Host
2. Select **Actions > All Dell Storage Actions > Provision Virtual Machine**.
The **Provision Virtual Machine** wizard starts.
3. On the **Template Selection** page, select the virtual machine template to use for the new VM.
Details of the selected template are shown on the page.
4. Click **Next**.
The **Name and Location** page opens.
5. Specify a base name for the VMs, the number of VMs to create, and an inventory location for new virtual machines, and click **Next**.
The **Host and Clusters** page opens.
6. Select the host or cluster on which to run virtual machines, and click **Next**.
The **Resource Pool** page opens.
7. Specify the resource pool within which to run virtual machines, and click **Next**.
The **Datastore Options** page opens.
8. Select **Lookup for Existing Datastore**, and click **Next**.
The **Datastore Lookup** page opens.
9. Select the datastore in which to store virtual machine files, and click **Next**.
10. Customize the settings for each virtual machine.
 - **Name**—Type a name for the virtual machine.
 - **CPU**—Select the number of CPUs for the virtual machine.
 - **Memory**—Select the memory capacity for the virtual machine.
 - **Network**—Select the virtual networks to which to connect this virtual machine.
11. Click **Update**, and click **Next**.
The **Ready to Complete** page opens.
12. Click **Finish**.

Deploy Virtual Machines to a New VMFS Datastore

Use the Create Virtual Machines wizard to deploy one or more virtual machines to a new datastore.

Prerequisites

A virtual machine template must be created from which new virtual machines can be deployed. For information about creating or updating a virtual machine template, see the vSphere help topics on virtual machine templates.

 **NOTE:** The options that appear when deploying a virtual machine change depending on the volume preferences of the Storage Manager user-defined in the vSphere Client Plugin.

Steps

1. Select an object that can be the parent of a virtual machine:
 - Datacenter
 - Host
 - Cluster
2. Select **Actions > All Dell Storage Actions > Provision Virtual Machine**.
The **Provision Virtual Machine** wizard starts.
3. On the **Template Selection** page, select the virtual machine template to use for the new VM.
Details of the selected template are shown on the page.
4. Click **Next**.
The **Name and Location** page opens.
5. Specify a base name for the VMs, the number of VMs to create, and an inventory location for new virtual machines, and click **Next**.
The **Host and Clusters** page opens.
6. Select the host or cluster on which to run virtual machines, and click **Next**.
The **Resource Pool** page opens.
7. Specify the resource pool within which to run virtual machines, and click **Next**.
The **Datastore Options** page opens.
8. Select **Create VMFS Datastore**, and click **Next**.
The **Storage Center** page opens.
9. Select the Storage Center on which to create the volume, and click **Next**.
The **Volume** page opens.
10. Enter the name and size for the new volume, select the volume folder, and click **Next**.
11. Select the volume settings:
 - **Storage Type**—A Storage Type is a pool of storage with a single datapage size. The Storage Type is set at the disk folder level, and once set it cannot be changed without assistance from technical support. (This entry appears only if the preferences are set in Storage Center).
 - **Storage Profile**—A Storage Profile controls how the Storage Center manages volume data.
 - **Recommended (All Tiers)**—Select this option for most volumes. The Recommended profile allows the system to automatically progress data between and across all storage tiers based on the type of data and usage.
 - **High Priority (Tier 1)**—Select this option to force volume data to remain in tier 1 storage.
 - **Medium Priority (Tier 2)**—Select this option to force volume data to remain in tier 2 storage.
 - **Low Priority (Tier 3)**—Select this option to force volume data to remain in tier 3 storage.
 - **Data Reduction Profile**—Data Reduction uses compression and deduplication to decrease the amount of disk space that is used by volume data. Compression reduces the amount of space that is used by a volume by encoding data. Deduplication finds duplicate pages and removes them, conserving the disk space that would be used by additional copies. When deduplication is used, compression is also applied to a volume.
 - **Cache Settings**—Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes to set the default cache settings for the new volume.
 - **Selected Volume QoS Profile**—Accept the **Volume QoS Profile Default** or click **Change it** to select a different QoS Profile.
12. Click **Next**.
The **Snapshot Profile** page opens.
13. Select a Snapshot Profile for the Volume and click **Next**.

14. Select the LUN for mapping the volume, and click **Next**.
15. Select the VMFS version, and click **Next**.
16. Select the I/O protocol to use for this volume, and click **Next**.
17. Confirm the Datastore Properties, or change the datastore name, and click **Next**.
18. (Optional) Select **Create Replication/Live Volume** if you want to replicate the volume data to a second Storage Center and allow both Storage Centers to process I/O requests for the volume. For more information, see [Create and Manage Replications and Live Volumes](#) on page 18.
 - a. Select a **Target Storage Center**, and click **Next**.
 - b. Select the **Target Volume Settings** and click **Next**.
 - c. Select the **Replication Options** and click **Next**.
19. Customize the settings as needed for each virtual machine.
 - **Name**—Type a name for the virtual machine.
 - **CPU**—Select the number of CPUs for the virtual machine.
 - **Memory**—Select the memory capacity for the virtual machine.
 - **Network**—Select the virtual networks to which to connect this virtual machine.
20. Click **Next**.
The **Ready to Complete** page opens.
21. Click **Finish**.

Viewing Dell Storage Information

Use the Dell Storage vSphere Client Plugin to display information about Dell Storage including HBA to Storage Center connectivity, datastore information, and performance charts.

Topics:

- [Viewing the Host Settings](#)
- [Configuring Storage Center Connections](#)
- [Using Dell Storage Views](#)
- [Viewing Dell Storage Charts](#)

Viewing the Host Settings







Use the **Dell Storage Settings** tab to display information about the Fibre Channel, iSCSI, and SAS connections between the ESXi host and the Storage Center. The **Dell Storage Settings** page is accessible from the **Configure** tab of an ESXi host.

Steps

1. In the left navigation pane, select a host.
2. Click the **Configure** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage Settings**. The HBAs associated with the host are displayed.
4. In the **HBAs** area, select an HBA to display the **Adapter Details**
5. Expand the HBA to view the Storage Centers that are connected to the HBA.
6. Select a Storage Center to display details about the Storage Center.

Connectivity Legend

Table 1. Description of Connectivity Icons

Icon	Label	Description
	Connected HBA	A connection between the HBA and Storage Center exists.
	Disconnected HBA	A connection between the HBA and Storage Center does not exist.
	Connected Storage Center	The Storage Center is connected to the ESXi host.
	Partially Connected Storage Center	The Storage Center is partially connected to the ESXi host.
	Not Connected Storage Center	The Storage Center is not connected to the ESXi host.
	Storage Center Ready to Configure	The Storage Center is ready to be configured to connect to the ESXi host.

Adapter Details

Table 2. Description of Reported Adapter Information

Label	Description
Model	Adapter model name
WWN	World Wide Name (WWN) for Fibre Channel and the iSCSI Qualified Name (IQN) for iSCSI
Device	Name of the adapter
Type	Storage adapter type (FC or iSCSI)
Node Name	Fibre Channel node name
Alias	iSCSI alias name
Status	Status of the adapter

Storage Details

Table 3. Description of Storage Details

Label	Description
Storage Center	Name of the Storage Center
Storage Center SN	Serial number of the Storage Center
Storage Server	Server to which the device is connected
Status	Configuration status of the Storage Center (Configured, Configurable, Not Visible)
Connectivity	Status of the Storage Center connection (Up, Down, or Not Connected)

Configuring Storage Center Connections


Use the **Dell Storage Settings** tab to configure a connection between an HBA and a Storage Center.

Steps

1. In the left navigation pane, select a host.
2. Click the **Configure** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage Settings**.
The HBAs associated with the host are displayed.
4. In the **HBAs** area, select an HBA to display the **Adapter Details**
5. Expand the HBA to view the Storage Centers that are connected to the HBA.
6. Select a Storage Center connection that is unconfigured and shows the **Storage Center Ready to Configure** icon.
7. Click **Configure**.

The configure operation performs the following tasks for a Fibre Channel or a SAS connection:


- Creates a server definition on the Storage Center if it does not exist.
- Creates corresponding HBA definition that is associated with this server.

 **NOTE:** If the host is in a cluster that does not exist on the Storage Center, the cluster definition is created on the Storage Center.

The configure operation performs the following tasks for an iSCSI connection:

- If necessary, enables the iSCSI software initiator on the ESXi host side.
- Sets the ESXi host firewall rules to enable iSCSI connections
- Configures iSCSI software initiators with Storage Center IP (IQN) targets (the targets are added to a list of iSCSI static targets on the ESXi host)

- Creates a server definition on the Storage Center if it does not exist and creates a corresponding HBA definition that is associated with this server.

 **NOTE:** If the host is in a cluster that does not exist on the Storage Center, the cluster definition is created on the Storage Center.

Using Dell Storage Views

Use **Dell Storage** views to display information about a Dell datastore or RDM. The **Dell Storage** view is accessible from the **Monitor** tab of a host, cluster, datastore, datastore cluster, virtual machine, or datacenter.

Viewing General Information

The **General** tab in the **Dell Storage Monitor** view displays information about a Storage Center object and the Storage Center to which it is connected.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **General** tab.

Dell Storage General Tab

The following figure shows an example of information in the **General** tab for the selected object:

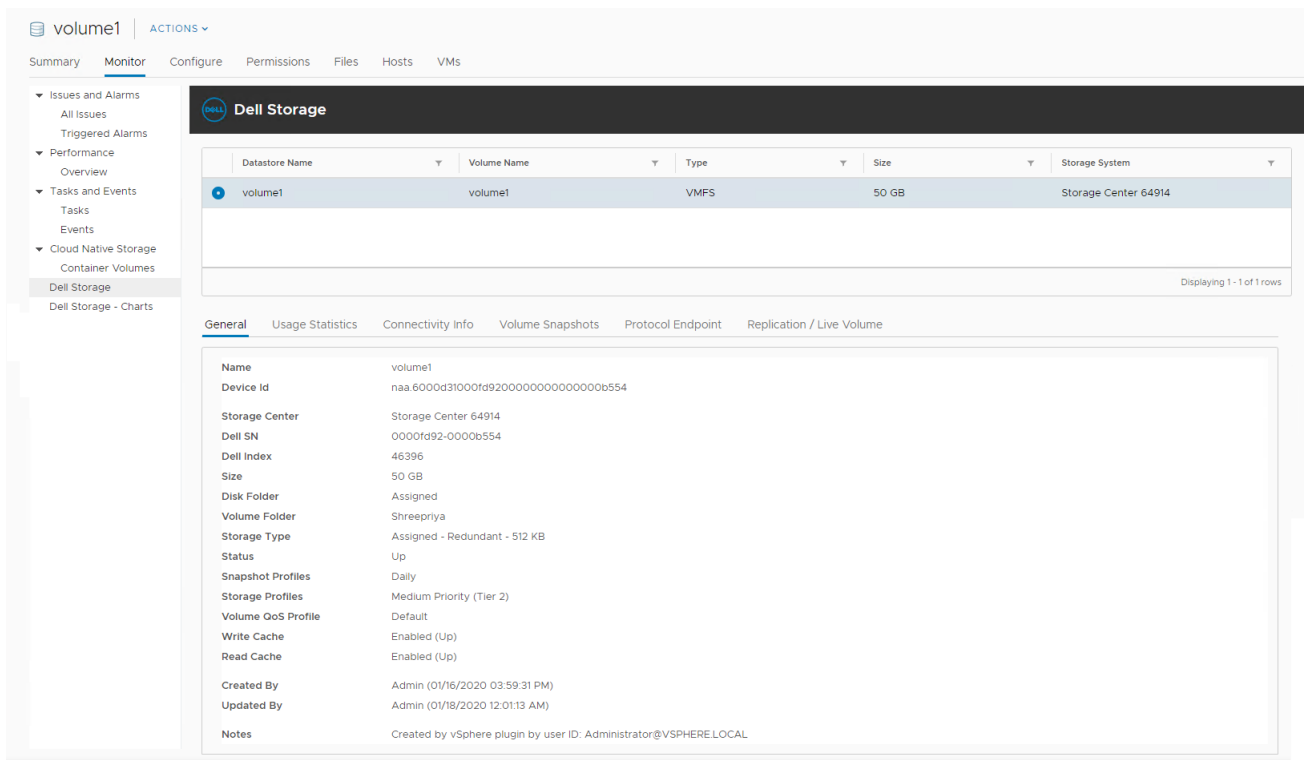


Figure 5. General Information for a Datastore

Label	Description
Name	Name of the volume
Device ID	Volume identifier assigned by Dell Storage vSphere Client Plugin
Storage Center	Storage Center on which the volume resides
Dell SN	Dell serial number of the volume
Dell Index	Object index for the volume
Size	Size of the volume
Disk Folder	Storage Center disk folder location
Volume Folder	Folder location of the volume
Storage Type	Storage type of the volume
Status	Current status for the volume, as well as the controller on which the volume is active
Snapshot Profiles	Snapshot Profiles applied to the volume
Storage Profiles	Storage profile for the volume
Volume QoS Profile	QoS profile for the volume
Write Cache	Indicates whether write cache is enabled for the volume
Read Cache	Indicates whether read cache is enabled for the volume
Created By	User that created the volume and time and date of creation
Updated By	User that updated the volume and time and date of the update
Notes	Descriptive notes for the volume

Viewing Usage Statistics

The **Usage Statistics** tab in the **Dell Storage Monitor** view displays usage information about a selected datastore.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **Usage Statistics** tab.

Dell Storage Usage Statistics Tab

The following figure shows an example of usage statistics for the selected datastore:

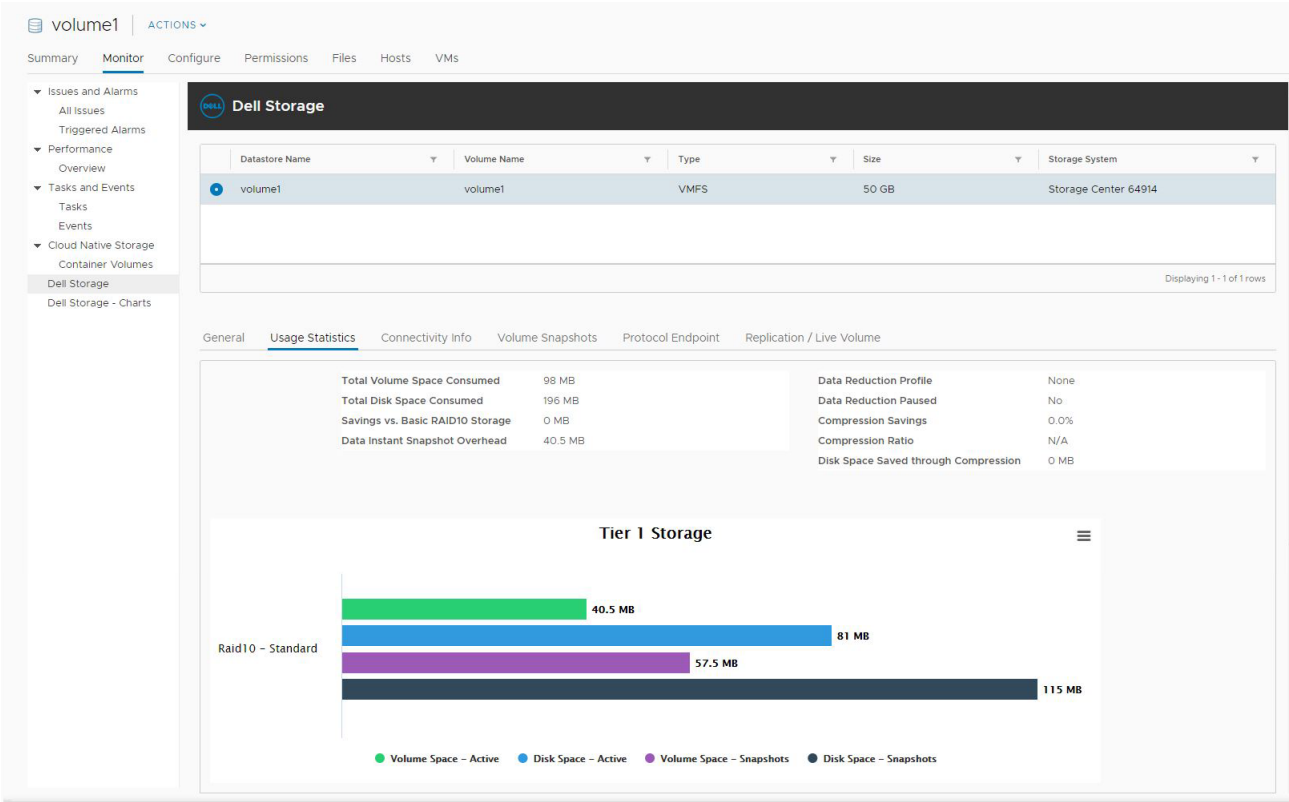



Figure 6. Usage Statics for a Datastore

Label	Description
Total volume space consumed	Total space used on the volume
Total disk space consumed	Total disk space consumed by the volume
Savings vs. basic RAID 10 storage	Estimate of storage space saved using Dell Dynamic Block Architecture compared to basic RAID storage
Data Instant Snapshotoverhead	Total space consumed by volume snapshots

Label	Description
Data Reduction Profile	Indicates either Compress or None, depending on the Data Reduction option selected
Data Reduction Paused	Indicates whether Data Compression is currently running on the volume
Compression Savings	Percentage of volume space saved by using Compression
Compression Ratio	Indicates the volume efficiency of using Compression
Disk Space Saved Through Compression	Amount of volume space saved by using Compression
Tier 1 Storage	Active volume space, active disk space, and Snapshot space for the volume on tier 1
Tier 2 Storage	Active volume space, active disk space, and Snapshot space for the volume on tier 2
Tier 3 Storage	Active volume space, active disk space, and Snapshot space for the volume on tier 3
	Enables you to download an image of the chart in .png format

Viewing Connectivity Information

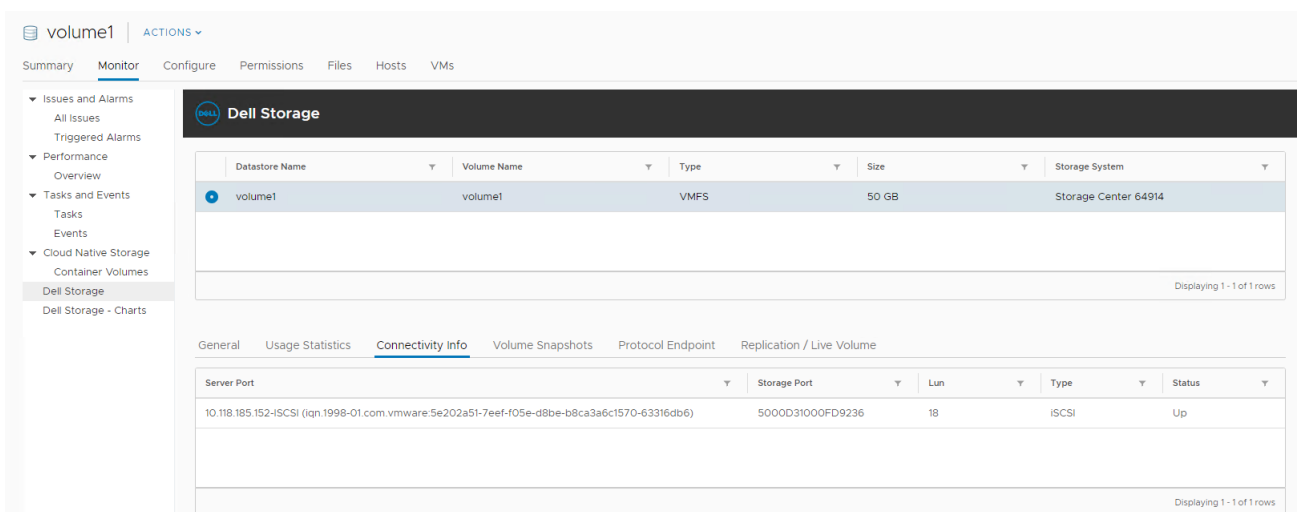
The **Connectivity Info** tab in the **Dell Storage Monitor** view displays connectivity information about the selected Dell volume.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **Connectivity Info** tab.

Dell Storage Connectivity Info Tab

The following figure shows an example of usage statistics for a datastore:



The screenshot shows the Dell Storage Monitor interface. The left navigation pane has 'Dell Storage' selected. The main area is divided into two sections. The top section, titled 'Dell Storage', contains a table with columns: Datastore Name, Volume Name, Type, Size, and Storage System. It shows one entry: 'volume1' with a size of '50 GB' and 'Storage Center 64914'. The bottom section, titled 'Connectivity Info', contains a table with columns: Server Port, Storage Port, Lun, Type, and Status. It shows one entry: '10.118.185.152-iSCSI (iqn.1998-01.com.vmware:5e202a51-7eef-105e-d8be-b8ca3a6c1570-63316db6)' with storage port '5000031000FD9236', lun '18', type 'iSCSI', and status 'Up'.

Datastore Name	Volume Name	Type	Size	Storage System
volume1	volume1	VMFS	50 GB	Storage Center 64914

Server Port	Storage Port	Lun	Type	Status
10.118.185.152-iSCSI (iqn.1998-01.com.vmware:5e202a51-7eef-105e-d8be-b8ca3a6c1570-63316db6)	5000031000FD9236	18	iSCSI	Up

Figure 7. Connectivity Information for a Datastore

Label	Description
Server Port	Server name and port
Storage Port	Storage port on the Storage Center
LUN	Mapping LUN
Type	Protocol (Fibre Channe, iSCSI, or SAS)
Status	Status for the path

Viewing Volume Snapshots

The **Volume Snapshots** tab in the **Dell Storage Monitor** view displays information about the snapshots take for the selected datastore.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **Volume Snapshots** tab.

Volume Snapshots Tab

The **Volume Snapshots** tab displays information about the snapshots for the selected Dell volume.

The following figure shows an example of information that is shown on the Volume Snapshots tab:

The screenshot shows the Dell Storage Monitor interface. On the left is a navigation pane with a tree view containing 'Issues and Alarms', 'Performance', 'Tasks and Events', 'Cloud Native Storage', and 'Dell Storage'. The 'Dell Storage' section is expanded, showing 'Dell Storage - Charts'. The main area has a top bar with 'volume1' and 'ACTIONS'. Below this is a 'Dell Storage' header. A table lists storage details:

Datastore Name	Volume Name	Type	Size	Storage System
volume1	volume1	VMFS	50 GB	Storage Center 64914

Below this table is a 'Volume Snapshots' tab. It has sub-tabs: 'General', 'Usage Statistics', 'Connectivity Info', 'Volume Snapshots' (selected), 'Protocol Endpoint', and 'Replication / Live Volume'. The 'Volume Snapshots' sub-tab shows a table of snapshots:

Freeze Time	Expire Time	Snapshot Size	Description	Marked For Expiration
Active		34 MB		X
Sat Jan 18 00:01:13 GMT+0530 2020	Sat Jan 25 00:01:13 GMT+0530 2020	40.5 MB	Daily at 12:01 AM	X
Fri Jan 17 00:01:13 GMT+0530 2020	Fri Jan 24 00:01:13 GMT+0530 2020	57.5 MB	Daily at 12:01 AM	X

Figure 8. Volume Snapshots Tab

Label	Description
Freeze Time	Time at which the snapshot was taken.
Expire Time	Time at which the snapshot automatically expires.
Snapshot Size	Total space used by the snapshot

Label	Description
Description	Name of the Snapshot Profile that automatically created the snapshot.

Viewing Protocol Endpoints

The **Protocol Endpoint** tab in the **Dell Storage Monitor** view displays details about the protocol endpoints used by the server for VVol operations.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **Protocol Endpoint** tab.

Protocol Endpoint Tab

The following figure shows an example of the information that is displayed about a VVol protocol endpoint

The screenshot shows the Dell Storage Monitor interface. The left navigation pane has a tree view with 'Dell Storage' selected. The main area is titled 'Dell Storage' and shows a table with columns: Datastore Name, Volume Name, Type, Size, and Storage System. The table contains one row: volume1, volume1, VMFS, 50 GB, Storage Center 64914. Below this table is a tabbed interface with tabs: General, Usage Statistics, Connectivity Info, Volume Snapshots, Protocol Endpoint (selected), and Replication / Live Volume. The Protocol Endpoint tab shows a table with columns: Server Port, Storage Port, Lun, Type, Status, Server HBA, Read Only, and Operational State. The table contains one row: 10.118.185.152-iSCSI, 5000D31000FD9236, 18, iSCSI, Up, iqn.1998-01.com.vmware:5e202a51-7eef-f05e-d8be-b8ca3a6c1570-63316db6, No, ActiveOptimized.

Figure 9. Protocol Endpoint Tab

Label	Description
Server Port	Server name and port
Storage Port	Storage port on the Storage Center
Lun	Mapping LUN
Type	Protocol (Fibre Channel, iSCSI, or SAS)
Status	Status for the path
Server HBA	HBA port used for the path
Read-Only	Indicates whether the endpoint is read-only
Operational State	Current state of the endpoint path

Viewing Replications and Live Volumes

The **Replications and Live Volumes** tab in the **Dell Storage Monitor** view displays replication or Live Volume information about the selected Dell volume.

Steps

1. In the left navigation pane, select a Storage Center datastore or volume that is configured for replication or Live Volume.
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage**.
4. In the top pane of the view, select a datastore.
5. In the lower pane of the view, click the **Replications and Live Volumes** tab.

Replications/Live Volume Tab

The **Replications/Live Volume** tab displays information about the replications for the selected Dell volume.

The following figure shows an example of information in the Replications/Live Volume tab.

LV1
ACTIONS ▾

Summary
Monitor
Configure
Permissions
Files
Hosts
VMs

- ▼ Issues and Alarms
 - All Issues
 - Triggered Alarms
- ▼ Performance
 - Overview
- ▼ Tasks and Events
 - Tasks
 - Events
- ▼ Cloud Native Storage
 - Container Volumes
- Dell Storage
- Dell Storage - Charts

Dell Storage

	Datastore Name ▾	Volume Name ▾	Type ▾	Size ▾	Storage System ▾
•	LV1	LV1	VMFS	6 GB	Storage Center 65221

Displaying 1 - 1 of 1 rows

General
Usage Statistics
Connectivity Info
Volume Snapshots
Protocol Endpoint
Replication / Live Volume

	Replication Type ▾	State ▾	Destination Storage Center ▾	Synced ▾	Remaining ▾
•	Replication, Asynchronous	Up	Storage Center 64914	100%	0 MB

Displaying 1 - 1 of 1 rows

General Options

Replicate Active Snapshot	No
Deduplicate	No
Replicate to Lowest Tier	No
Sync Status	Not Applicable
QoS Definition	65221-qos

Live Volume Options

Not Applicable

Source Details

Storage Center	Storage Center 65221
Volume	LV1
Volume Size	6 GB
Volume Storage Profile	High Priority (Tier 1)
Volume Data Reduction Profile	Compression
Volume Snapshot Profile	FluidFS Profile
Read Cache	Disabled (Down)
Write Cache	Disabled (Down)

Destination Details

Storage Center	Storage Center 64914
Volume	LV of LV1
Volume Size	6 GB
Volume Storage Profile	Low Priority (Tier 3)
Volume Data Reduction Profile	Compression
Volume Snapshot Profile	Snapshot Profile Custom
Read Cache	Enabled (Up)
Write Cache	Enabled (Up)

Source Snapshots

Snapshot ▾	Size ▾
Active	40.5 MB
Tue Feb 25 02:00:03 GMT+0530 2020	41 MB
Mon Feb 24 02:00:04 GMT+0530 2020	57.5 MB

Displaying 1 - 3 of 3 rows

Destination Snapshots

Snapshot ▾	Size ▾
Active	0 MB
Tue Feb 25 02:00:03 GMT+0530 2020	57.5 MB

Displaying 1 - 2 of 2 rows

Label	Description
Destination Snapshots	Current snapshots for the destination volume

Viewing Dell Storage Charts

Use **Dell Storage-Charts** to display Storage Center performance information for an ESXi host. The **Dell Storage- Charts** view is accessible from the **Monitor** tab of a host, cluster, datastore, datastore cluster, virtual machine, or datacenter.

Steps

1. In the left navigation pane, select a Storage Center object such as one of the following:
 - Host
 - Datacenter
 - Datastore
 - Datastore cluster
 - Virtual machine
2. Click the **Monitor** tab.
3. In the middle navigation pane, scroll down and select **Dell Storage-Charts**.
4. Select a Storage Center.

The charts view displays performance, I/O size, and latency graphs.

Dell Storage-Charts View

The following figures show the charts displayed for a Storage Center

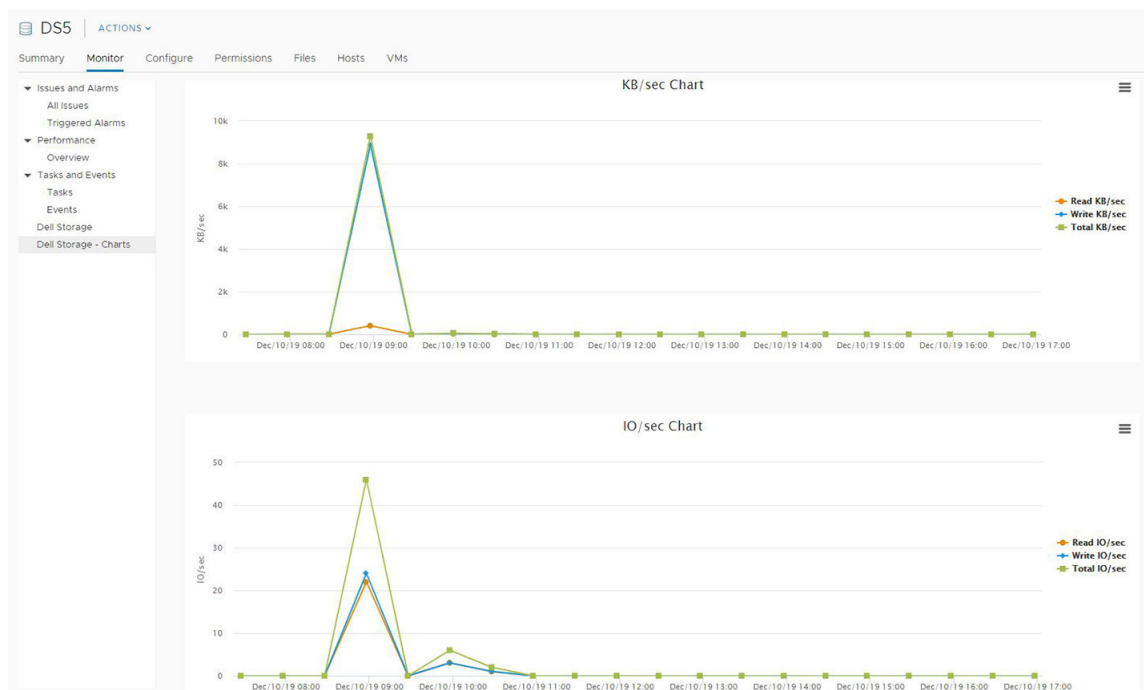


Figure 10. Performance Graphs

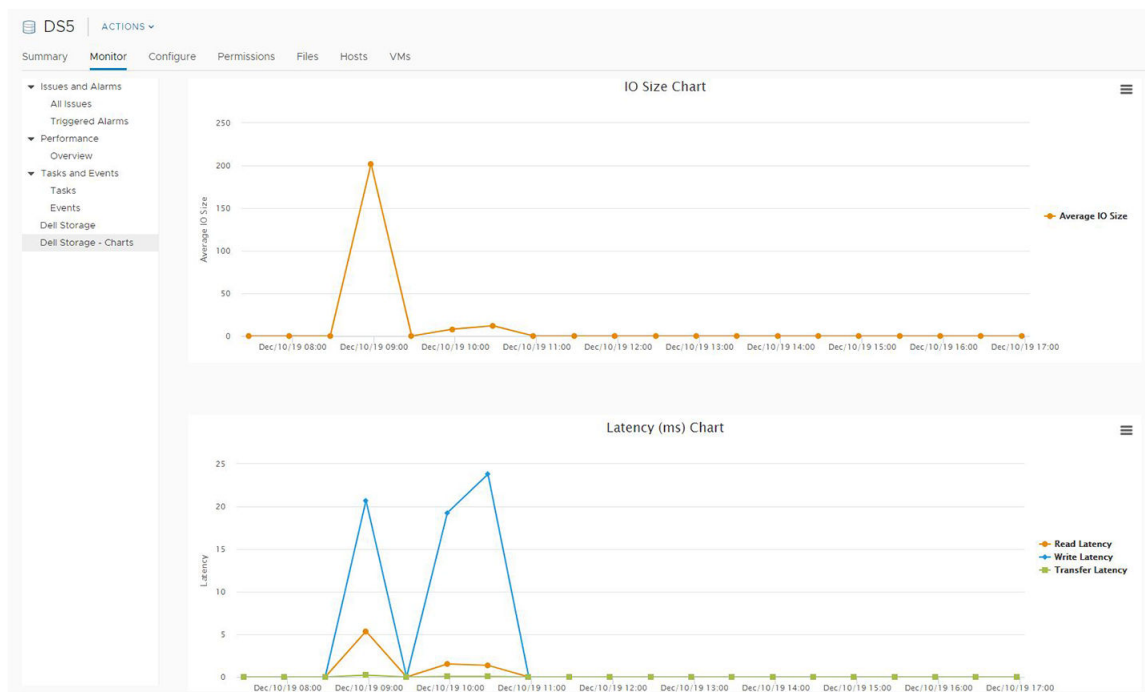


Figure 11. IO Size and Latency Charts

Charts

The following table describes the type of Storage Center performance data displayed in charts.

Label	Description
KB/sec Chart	<p>Read KB/sec – Transfer rate of read operations in kilobytes per second</p> <p>Total KB/sec – Combined transfer rate of read and write operations in kilobytes per second</p> <p>Write KB/sec – Transfer rate of write operations in kilobytes per second</p>
IO/sec Chart	<p>Read IO/sec – Transfer rate of read operations in I/O operations per second</p> <p>Total IO/sec – Combined transfer rate of read and write operations in I/O operations per second</p> <p>Write IO/sec – Transfer rate of write operations in I/O operations per second</p>
IO Size Chart	<p>Average IO Size – Average size of I/O operations in kilobytes</p>
Latency (ms) Chart	<p>Read Latency – Latency of read operations in milliseconds</p> <p>Write Latency – Latency of write operations in milliseconds</p> <p>Transfer Latency – Latency of data transfer operations in milliseconds</p>