




Dell Storage Manager 2016 R3 Web UI Administrator's Guide



Notes, Cautions, and Warnings

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

Contents

About This Guide.....	9
Contacting Dell.....	9
Revision History.....	9
Audience.....	9
Part I: Introduction to Dell Storage Manager Web UI.....	11
1 Dell Storage Manager Web UI Overview.....	13
Storage Manager Components.....	13
Dell Storage Center OS Compatibility.....	13
Dell Storage Manager Web UI Web Browser Requirements.....	14
Dell Storage Manager Web UI Features.....	14
Storage Management Features.....	14
Monitoring Features.....	14
2 Getting Started.....	15
Use the Storage Manager Web UI to Connect to the Data Collector.....	15
Next Steps.....	15
Add Storage Manager Web UI Users.....	15
Add Storage Centers.....	15
Configure Storage Center Volumes.....	16
Add Servers to your Storage Centers.....	16
Configure Email Notifications.....	16
Part II: Storage Management.....	17
3 Storage Center Overview.....	19
Storage Center Hardware Components.....	19
Controllers.....	19
Switches.....	19
Enclosures.....	19
How Storage Virtualization Works.....	19
Volumes.....	20
Storage Types.....	20
Data Progression.....	21
Storage Profiles.....	22
Storage Profiles for Standard Storage Types.....	22
Storage Profiles for Flash Optimized Storage.....	23
Storage Virtualization for SCv2000 Series Controllers.....	24
User Interface for Storage Center Management.....	25
Summary Tab.....	25
Storage Tab.....	26
Performance Tab.....	27
Health Tab.....	27



4 Storage Center Administration.....	29
Adding and Organizing Storage Centers.....	29
Storage Center User Privileges and User Groups.....	29
User Privilege Levels.....	29
Adding and Removing Storage Centers.....	30
Organizing Storage Centers.....	31
Managing Volumes.....	32
Attributes That Determine Volume Behavior.....	32
Creating Volumes.....	32
Modifying Volumes.....	34
Copying Volumes.....	38
Creating and Managing Volume Folders.....	39
Creating and Managing Volume Snapshots.....	40
Mapping Volumes to Servers.....	43
Deleting Volumes and Volume Folders.....	45
Managing Data Reduction.....	46
Supported Hardware Platforms.....	46
Data Eligible for Data Reduction.....	47
Compression.....	47
Deduplication.....	48
View Amount of Space Saved by Data Reduction.....	48
Change the Default Data Reduction Profile.....	49
Pause or Resume Data Reduction.....	49
Disable Data Reduction for a Volume.....	50
Managing Snapshot Profiles.....	50
Default Snapshot Profiles.....	50
Non-Consistent and Consistent Snapshot Profiles.....	50
Creating and Applying Snapshot Profiles.....	51
Modifying Snapshot Profiles.....	53
5 Storage Center Server Administration.....	55
Managing Storage Center Server Objects.....	55
Managing Servers on a Storage Center.....	55
Creating Servers.....	55
Modifying Servers.....	57
Mapping Volumes to Servers.....	60
Creating and Managing Server Folders.....	62
Deleting Servers and Server Folders.....	62
6 Storage Center Maintenance.....	65
Managing Storage Center Settings.....	65
Viewing and Modifying Storage Center Information.....	65
Configuring Storage Center User Preferences.....	67
Configuring Storage Center Data Settings.....	69
Set Up Automated Reports for an Individual Storage Center.....	70



Set the Date and Time for a Storage Center.....	71
Configure Storage Center SMTP Server Settings.....	71
Configure SNMP Settings for a Storage Center (Storage Center 6.7 and Earlier).....	72
Configure SNMP Settings for a Storage Center (Storage Center Version 7.0 and Later).....	72
Configuring Filters to Restrict Administrative Access.....	73
Configuring Storage Center Secure Console Settings.....	75
Configuring a Storage Center to Inherit Settings.....	76
Managing Storage Center Users and Groups.....	76
User Privilege Levels.....	76
User Groups.....	77
User Account Management and Authentication.....	77
Managing Local Storage Center Users.....	77
Managing Local Storage Center User Groups.....	81
Managing Local Storage Center User Password Requirements.....	83
Enabling Directory Services Authentication.....	84
Managing Directory Service Users.....	87
Managing Directory User Groups.....	90
Managing Front-End IO Ports.....	92
Front-End Connectivity Modes.....	92
Fault Domains.....	93
Failover Behavior.....	94
Managing Front-End IO Port Hardware.....	94
Convert Front-End Ports to Virtual Port Mode.....	97
Managing Back-End IO Port Hardware.....	97
Rename a Back-End IO Port.....	97
Set Threshold Alert Definitions for a Back-End IO Port.....	97
Configure Back-End IO Ports.....	98
Grouping Fibre Channel IO Ports Using Fault Domains.....	98
Create a Fibre Channel Fault Domain.....	98
Rename a Fibre Channel Fault Domain.....	99
Grouping iSCSI IO Ports Using Fault Domains.....	99
iSCSI VLAN Tagging Support.....	99
Creating iSCSI Fault Domains.....	100
Modifying iSCSI Fault Domains.....	101
Configuring NAT Port Forwarding for iSCSI Fault Domains.....	104
Configuring CHAP for iSCSI Fault Domains.....	106
Managing Secure Data.....	108
Configure Key Server.....	108
Managing Data Redundancy.....	109
Managing Storage Types.....	109
Shutting Down and Restarting a Storage Center.....	110
Shut Down a Storage Center.....	110
Restart a Storage Center.....	110

7 Viewing Storage Center Information..... 111

Viewing Summary Information.....	111
----------------------------------	-----



Storage Center Widgets.....	111
Viewing Detailed Storage Usage Information.....	118
View Storage Usage by Tier and RAID Type.....	118
View Storage Usage by Volumes.....	118
View a Data Progression Pressure Report.....	118
Viewing Historical Performance Information.....	119
View Storage Center Performance Information.....	119
View Volume Performance Information.....	119
View Server Performance Information.....	119
View Fault Domain Performance Information.....	120
Viewing Historical Storage Usage Data.....	120
View Historical Storage Usage Data for a Volume.....	120
View Historical Storage Usage Data for a Server.....	120
Configuring Chart Options.....	121
Configuring User Settings for Charts.....	121
Configure the Storage Center Data Gathering Schedule.....	122
Part III: Storage Center Monitoring.....	123
8 Storage Manager Log Monitoring.....	125
Alerts.....	125
Status Levels for Alerts and Indications.....	125
Viewing Storage Center Alerts.....	125
Events.....	127
Storage Manager Event Types.....	127
Viewing Storage Manager Events.....	127
Configuring Email Alerts for Storage Manager Events.....	128
Logs.....	129
Sending Storage Center Logs to Storage Manager.....	129
Viewing Storage Logs.....	131
Part IV: Storage Manager Maintenance.....	133
9 Data Collector Management.....	135
Using the Storage Manager Data Collector Website.....	135
Access the Data Collector Website.....	135
Updating Data Collector Properties.....	135
Configuring Server Settings.....	135
Configuring Data Protection Settings.....	139
Configuring Health Settings.....	141
Configuring User Settings.....	143
Configuring Virtual Appliance Settings.....	144
10 Storage Manager User Management.....	147
Storage Manager User Privileges.....	147
Reporter Privileges.....	147
Volume Manager Privileges.....	147
Administrator Privileges.....	147



Authenticating Users with an External Directory Service.....	148
Configuring an External Directory Service.....	148
Grant Access to Directory Service Users and Groups.....	150
Revoke Access for Directory Service Users and Groups.....	151
Managing Local Users with the Data Collector Manager.....	152
Create a User.....	152
Configure or Modify the Email Address of a User.....	152
Change the Privileges Assigned to a User.....	152
Change the Preferred Language for a Storage Manager User.....	153
Force the User to Change the Password.....	153
Change the Password for a User.....	153
Set Storage Center Mappings for a Reporter User.....	153
Delete a User.....	154
Delete a Storage Center Mapping for a User.....	154
Unlock a Local User Account.....	154
Managing Local User Password Requirements.....	155
Configure Local Storage Manager User Password Requirements.....	155
Apply Password Requirements to Storage Center Users.....	155
Reset Password Aging Clock.....	156
Require Users to Change Passwords.....	156
Managing User Settings with the Dell Storage Manager Web UI.....	156
Change User Password.....	156
Configure Email Settings.....	157
Configure Charting Options.....	157
Configure Client Options.....	157

11 Dell SupportAssist Management..... 159

Data Types that Can Be Sent Using Dell SupportAssist.....	159
Manually Sending Diagnostic Data Using Dell SupportAssist.....	159
Manually Send Diagnostic Data for Multiple Storage Centers.....	159
Send Diagnostic Data for a Single Storage Center Using Dell SupportAssist	160
Managing Dell SupportAssist Settings.....	160
Edit Dell SupportAssist Contact Information (Storage Center 6.6 or Later Only).....	160
Configure Automatic Update Using SupportAssist.....	161
Configure a Proxy Server for Dell SupportAssist.....	161





About This Guide

This guide describes how to use Dell Storage Manager Web UI to manage and monitor your storage infrastructure.

Contacting Dell

Go to www.dell.com/support.

Revision History

Document number: 680-122-003

Revision	Date	Description
A	January 2017	Initial release

Audience

Storage administrators make up the target audience for this document. The intended reader has a working knowledge of storage and networking concepts.





Part



Introduction to Dell Storage Manager Web UI

This section provides an overview of the Dell Storage Manager Web UI and describes how to get started.





Dell Storage Manager Web UI Overview

The Dell Storage Manager Web UI is a Web application that allows you to connect to the Storage Manager Data Collector and centrally manage your Storage Centers. Storage Manager Web UI allows you to monitor, manage, and analyze Storage Centers from a centralized management console. The Storage Manager Data Collector stores data it gathers from Storage Centers in an internal or external database. Storage Manager Web UI connects to the Data Collector to perform monitoring and administrative tasks.

Storage Manager Components

Storage Manager consists of the following components.

Table 1. Storage Manager Components

Component	Description	Setup Documentation
Primary Storage Manager Data Collector	Service that gathers reporting data and alerts from Storage Center SANs	<i>Dell Storage Manager Installation Guide</i>
Dell Storage Manager Client	Windows-based application that connects to the Storage Manager Data Collector to provide a centralized management console for one or more storage devices	<i>Dell Storage Manager Installation Guide</i>
Dell Storage Manager Web UI	Web application that connects to the Storage Manager Data Collector to provide a centralized management console for one or more storage devices	<i>Dell Storage Manager Installation Guide</i>
Remote Storage Manager Data Collector	Storage Manager Data Collector that is connected to the primary Storage Manager Data Collector and can be used to activate a disaster recovery site if the primary Storage Manager Data Collector becomes unavailable	<i>Dell Storage Manager Administrator's Guide</i>
Storage Manager Server Agent	Service for Windows that allows Storage Manager to free volume storage space from expired snapshots that would otherwise remain locked by Windows	<i>Dell Storage Manager Administrator's Guide</i>

Dell Storage Center OS Compatibility

Storage Manager Web UI is compatible with Dell Storage Center OS versions 6.3 and later.

 **NOTE: Version 6.4.1 is not supported.**



Dell Storage Manager Web UI Web Browser Requirements

The following web browsers are supported for use with the Dell Storage Manager Web UI:

- Internet Explorer 10 or later
- Firefox
- Google Chrome
- Microsoft Edge

Dell Storage Manager Web UI Features

Dell Storage Manager Web UI provides the following features.

Storage Management Features

Storage Manager Web UI provides the following storage management features.

Storage Center Management

Storage Manager Web UI allows you to centrally manage your Dell Storage Centers. For each Storage Center, you can configure volumes, Snapshot Profiles, and Storage Profiles. You can also present configured storage to servers by defining server objects and mapping volumes to them.

Related links

[Storage Center Administration](#)

Servers

Storage Manager allows you to manage the storage allocated to each server and provides Storage Center integration with Windows and VMware servers. There are two ways that servers can be managed: adding them to Storage Centers and registering them to the Storage Manager Data Collector.

Related links

[Storage Center Server Administration](#)

Monitoring Features

Storage Manager Web UI provides the following monitoring features.

Threshold Alerts

The Threshold Alerts feature provides centralized administration and monitoring of threshold alert definitions. The types of usage metrics that can be monitored are IO, storage, and replication usage. Storage Manager collects the usage data from the managed Storage Centers. Storage objects on the Storage Centers are assigned to threshold definitions and each threshold definition contains one or more threshold values. When the value of a monitored metric reaches a threshold value, an alert occurs.

Log Monitoring

The Log Monitoring feature provides a centralized location to view Storage Center alerts, indications, and logs collected by the Storage Manager Data Collector and system events logged by Storage Manager.

Related links

[Storage Manager Log Monitoring](#)

Performance Monitoring

The Performance Monitoring feature provides access to summary information about the managed Storage Centers and historical/current IO performance information. Use this information to monitor the health and status of Storage Centers.

Related links

[Viewing Storage Center Information](#)



Getting Started

Start the Dell Storage Manager Web UI and connect to the Data Collector. When you are finished, consider the suggested next steps.

Use the Storage Manager Web UI to Connect to the Data Collector

Start a web browser and use it to connect to the Data Collector. By default, you can log on as a local Storage Manager user. If the Data Collector is configured to use an external directory service, you can log on as an Active Directory or OpenLDAP user. If Kerberos authentication is configured, you can log on automatically using your Windows session credentials without typing them manually. You can also connect directly to a Storage Center with the Dell Storage Manager Client. For more information, see the *Dell Storage Center Storage Client Administrator's Guide* (Storage Center 6.6 or later).

1. Open a web browser.
2. Type the address of the Data Collector in the following format:
`https://[Data Collector IP address]:3033/ui/home`
3. Type the user name and password in the **User Name** and **Password** fields.
4. Click **Log In**. The web browser connects to the Data Collector and displays the home page.

Next Steps

This section describes some basic tasks that you may want to perform after your first log on to Storage Manager. These tasks are configuration dependent and not all tasks will be required at all sites.

Add Storage Manager Web UI Users

The Data Collector controls user access to Storage Manager Web UI functions and associated Storage Centers based on the privileges assigned to users: Reporter, Volume Manager, or Administrator. New users, as well as the associated Storage Centers, are created and managed only by the Data Collector Manager. If you want to allow other members of your organization to use Storage Manager Web UI, use the Data Collector Manager to grant them access. You can grant access using either of the following methods:

- Create local Storage Manager Web UI users.
- Configure the Data Collector to authenticate users using an external Active Directory or OpenLDAP directory service, and then grant access to specific directory users and/or user groups.

Related links

[Storage Manager User Management](#)

Add Storage Centers

Add Storage Centers that you want to manage and maintain in the Dell Storage Manager Web UI.

Related links

[Adding and Organizing Storage Centers](#)



Configure Storage Center Volumes

After you have added Storage Centers to Storage Manager Web UI, you can start creating and managing volumes. You can also manage Snapshot Profiles and Storage Profiles.

Related links

[Managing Volumes](#)

[Managing Snapshot Profiles](#)

Add Servers to your Storage Centers

Use Storage Manager Web UI to add servers that use Storage Center volumes to your Storage Centers. To enable additional functionality, such as the ability to display operating system and connectivity information, and to manage the volumes or datastores mapped to the servers, register these servers to the Storage Manager Data Collector.

Related links

[Storage Center Server Administration](#)

Configure Email Notifications

Storage Manager Web UI can send emails to notify you when threshold alerts are exceeded, automated reports are ready, and Storage Manager events occur. To enable email notifications, configure SMTP settings for the Data Collector, add your email address to your Storage Manager Web UI user account, and then choose the events for which you want to be notified.

Related links

[Configuring Email Alerts for Storage Manager Events](#)



Part



Storage Management

This section describes how to use the Dell Storage Manager Web UI to administer, maintain, and monitor Storage Centers.





Storage Center Overview

Storage Center is a storage area network (SAN) that provides centralized, block-level storage that can be accessed by Fibre Channel, iSCSI, or Serial Attached SCSI (SAS).

Storage Center Hardware Components

Dell Storage Center consists of one or two controllers, switches, and may include one or more disk enclosures.

Controllers

A Storage Center controller provides the central processing capability for the Storage Center Operating System and managing RAID storage. A Storage Center can be configured with a single controller or a pair of controllers. In a dual-controller Storage Center configuration, the two controllers must be the same model.

IO cards in the controller provide communication with disk enclosures and servers that use the storage. Controllers provide two types of IO ports:

- **Front-end ports:** Hosts, servers, or Network Attached Storage (NAS) appliances access storage by connecting to controller Fibre Channel IO cards, FCoE IO cards, or iSCSI IO through one or more network switches. SAS ports, designated as front-end ports, can be connected directly to a server on SCv2000 series storage systems. Ports for these connections are located on the back of the controller, but are configured as front-end ports.
- **Back-end ports:** Enclosures, which hold the physical drives that provide back-end storage, connect directly to the controller. Fibre Channel and SAS transports are supported through ports designated as back-end ports. Back-end ports are in their own private network between the controllers and the drive enclosures.

Switches

Switches provide robust connectivity to servers, allowing for the use of multiple controllers and redundant transport paths. Cabling between controller IO cards, switches, and servers is referred to as front-end connectivity.

Enclosures

Enclosures house and control drives that provide storage. Enclosures are connected directly to controller IO cards. These connections are referred to as back-end connectivity.

Fibre Channel Switched Bunch of Disks (SBOD) and Serial Advanced Technology Attachment (SATA) enclosures are supported for existing Storage Centers and for controller migrations only.

How Storage Virtualization Works

Storage Center virtualizes storage by grouping disks into pools of storage called Storage Types, which hold small chunks (pages) of data. Block-level storage is allocated for use by defining volumes and mapping them to servers. The Storage Type and Storage Profile associated with the volume determines how a volume uses storage.

Storage Center combines the following features to provide virtualized storage.

- Volumes: Allocate storage for use.
- Storage Types: Define a datapage size and redundancy levels for the disk folder.
- Data Progression: Moves pages between tiers and drive types, as well as among multiple RAID levels within the same tier.
- Storage Profiles: Defines how data progression moves pages between tiers.



Volumes

A Storage Center volume is a logical unit of storage that can represent more logical space than is physically available on the Storage Center. Before data can be written to a volume, it must be mapped to a server, then formatted as a drive. Depending on the configuration of the server, data can be written to the volume over iSCSI or Fibre Channel.

The Storage Type and Storage Profile selected when the volume is created determines how a volume behaves. The Storage Type sets the datapage size and redundancy levels. The Storage Profile determines how Data Progression moves pages on the volume between tiers and RAID levels.

Storage Types

A Storage Type is a pool of storage with a single datapage size and specified redundancy levels. Storage Center assesses the disks available in a disk folder and presents the applicable Storage Type options. Once the determination is made, it cannot be changed without assistance from Dell Technical Support, even when disk types change.

 **NOTE: SCv2000 series controllers manage Storage Types automatically by assigning each disk class to a new Storage Type. SSD Storage Types have a 512 K datapage size and HDD Storage Types have a 2 MB datapage size.**

Disk Types

The types of disks present in Storage Center define whether a system is considered Standard or Flash Optimized. This classification further determines how Data Progression moves data between tiers.


A minimum of six SSDs are required for a Flash Optimized array. When two types of SSDs are present, the array must contain at least six of each type.

Storage Type	Disk Classes
Standard	<ul style="list-style-type: none">• Write-intensive SSDs + HDDs• HDDs (7K, 10K, 15K)
Flash Optimized	<ul style="list-style-type: none">• Write-intensive SSDs• Write-intensive SSDs + Read-intensive SSDs• Write-intensive SSDs + Read-intensive SSDs + HDDs

Datapage Size

By default, data is migrated between tiers and RAID levels in 2 MB blocks. Data can be moved in smaller or larger blocks to meet specific application requirements. These blocks are referred to as datapages.

- **2 MB:** Default datapage size, this selection is appropriate for most applications.
- **512 KB:** Appropriate for applications with high performance needs, or in environments in which snapshots are taken frequently under heavy IO. Selecting this size increases overhead and reduces the maximum available space in the Storage Type. Flash Optimized storage types use 512 KB by default.
- **4 MB:** Appropriate for systems that use a large amount of disk space with infrequent snapshots.

 **CAUTION: Before changing the datapage setting, contact Dell Technical Support to discuss the impact on performance and for advice about how to ensure that system resources remain balanced.**

Redundancy

Redundancy levels provide fault tolerance for a disk failure. Redundancy options may be restricted depending on the disk size.

- **Non-redundant:** Uses RAID 0 in all classes, in all tiers. Data is striped but provides no redundancy. If one disk fails, all data is lost. Do not use non-redundant storage for a volume unless the data has been backed up elsewhere.
- **Single-redundant:** Protects against the loss of any one drive. Single-redundant tiers can contain any of the following types of RAID storage.
 - RAID 10 (each disk is mirrored)

- RAID 5-5 (striped across 5 drives)
- RAID 5-9 (striped across 9 drives)
- **Dual-redundant:** Protects against the loss of any two drives. Disks larger than 900 GB should use dual redundancy, and in some cases it is mandated. Dual-redundant tiers can contain any of the following types of RAID storage.
 - RAID 10 Dual-Mirror (data is written simultaneously to three separate disks)
 - RAID 6-6 (4 data segments, 2 parity segments for each stripe)
 - RAID 6-10 (8 data segments, 2 parity segments for each stripe)

Redundancy Level Recommendations and Requirements

Disk size is used to determine the redundancy level used in Storage Center. If any disk in a tier surpasses a threshold size, a specific redundancy level can be applied to the tier containing that disk.

The following tables describe HDD and SSD redundancy level recommendations and requirements for Storage Center 7.1

 **NOTE: These threshold are applied when Storage Center 7.0 is installed, then disks are added.**

Table 2. HDD Redundancy Recommendations and Requirements

Disk Size	Level of Redundancy That is Recommended or Required
Maximum 966GB	No recommended redundancy level, no required redundancy level
967GB up to a maximum 1.93TB	Recommend dual redundancy for existing and new page pools
1.94TB and higher	Required dual redundancy for new page pools
2.79TB and higher	Required dual redundancy for existing page pools

Table 3. SSD Redundancy Recommendations and Requirements

Disk Size/Class	Level of Redundancy That is Recommended or Enforced
Up to 1.7TB for WI and RI	No recommended redundancy level, no required redundancy level
1.8TB up to 3.9TB for WI and RI	Recommend dual redundancy for existing and new page pools
4TB and higher for WI and RI	Required dual redundancy for new page pools

Data Progression

Storage Center uses Data Progression to move data within a virtualized storage environment. Data Progression moves data between tiers and drive types, as well as among multiple RAID levels within the same tier, for a constant balance of performance and cost.

How Data Progression Works

Once every 24 hours, Storage Center assesses disk use and moves data to disk space that is more efficient for the data usage. By default, Data Progression runs each day at 7 PM system time, but the timing of the run can be changed in the Storage Center settings. Data Progression behavior is determined by the Storage Profile applied to each volume.

 **NOTE: With SCv2000 series controllers, Data Progression moves data between RAID types and restripes RAID, but does not move data between storage tiers.**

Data Progression and Snapshots

Storage Center also uses Data Progression to move snapshots. When a snapshot is created, either as scheduled or manually, the data is frozen and moved to the tier specified by the Storage Profile to hold snapshots.



Snapshots can occur as a scheduled event according to the Snapshot Profile, manually by creating a snapshot, or on demand by Storage Center to move data off of Tier 1 in a Flash Optimized storage type.

Storage Profiles

Storage Profiles control how Storage Center manages volume data. For a given volume, the selected Storage Profile dictates which disk tier accepts initial writes, as well as how data progression moves data between tiers to balance performance and cost. Predefined Storage Profiles are the most effective way to manage data in Storage Center. The Storage Profiles available are determined by the Storage Type.

Storage Profiles for Standard Storage Types

The table below summarizes the Storage Profiles available for Standard storage types. Each profile is described in more detail following the table.

Name	Initial Write Tier	Tier (T) and RAID Levels	Progression
Recommended (All Tiers)	1	Writes: T1 RAID 10 Snapshots: RAID 5/RAID 6	Yes - to all Tiers
High Priority (Tier 1)	1	Writes: T1 RAID 10 Snapshots: T1 RAID 5/RAID 6	No
Medium Priority (Tier 2)	2	Writes: T2 RAID 10 Snapshots: T2 RAID 5/RAID 6	No
Low Priority (Tier 3)	3	Writes: T3 RAID 10 Snapshots: T3 RAID 5/RAID 6	No

 **NOTE: The Recommended, High Priority, and Medium Priority profiles are not available for the Flash Optimized Storage Type.**

Recommended (All Tiers)

The **Recommended** Storage Profile is available only when Data Progression is licensed. Cost and performance are optimized when all volumes use the **Recommended** Storage Profile. The **Recommended** profile allows automatic Data Progression between and across all storage tiers based on data type and usage.

When a volume uses the Recommended Profile, all new data is written to Tier 1 RAID level 10 storage. Data Progression moves less active data to Tier 1 RAID5/ RAID 6 or a slower tier based on how frequently the data is accessed. In this way, the most active blocks of data remain on high-performance drives, while less active blocks automatically move to lower-cost, high-capacity SAS drives.

Because SSDs are automatically assigned to Storage Tier 1, profiles that include Storage Tier 1 allow volumes to use SSD storage. If you have volumes that contain data that is not accessed frequently, and do not require the performance of Tier 1 SSDs, use a Medium or Low Priority Profile or create and apply a new profile that does not include Storage Tier 1.

High Priority (Tier 1)

The **High Priority** Storage Profile provides the highest performance by storing data on Tier 1. It is efficient in terms of using RAID 5 or 6, but it uses more expensive media to store the data. A volume created using the **High Priority** profile stores written data on Tier 1 RAID 10. Snapshot data is stored on Tier 1 RAID 5/RAID 6. Storage Center does not migrate data to lower storage tiers unless Tier 1 storage becomes full.

If Data Progression is not licensed, the default Storage Profile is **High Priority**. Without Data Progression, you must configure volumes to use a specific tier of storage, because data will not migrate between tiers.

Medium Priority (Tier 2)

The **Medium Priority** Storage Profile provides a balance between performance and cost efficiency. A volume created using the **Medium Priority** profile stores written data on Tier 2 RAID 10. Snapshot data is stored on Tier 2 RAID 5/RAID 6. Storage Center does not migrate data to other storage tiers unless Tier 2 storage becomes full.

Low Priority (Tier 3)

The **Low Priority** profile provides the most cost efficient storage. Creating a volume using the **Low Priority** profile stores written data on Tier 3 RAID 10. Snapshot data is stored on Tier 3 RAID 5/6. Storage Center does not migrate data to higher tiers of storage unless Tier 3 storage becomes full.

Storage Profiles for Flash Optimized Storage

The table below summarizes Storage Profiles available for Flash Optimized storage types. Each profile is described in more detail following the table.

Name	Initial Write Tier	Tier (T) and RAID Levels	Progression
Low Priority (Tier 3)	3	Writes: T3 RAID 10 snapshots: T3 RAID 5/6	No
Flash Optimized with Progression (Tier 1 to All Tiers)	1	Writes: T1 RAID 10 snapshots: T2/T3 RAID 5/6	Yes to all tiers
Write Intensive (Tier 1)	1	Writes: T1 RAID 10 snapshots: T1 RAID 10	No
Flash Only with Progression (Tier 1 to Tier 2)	1	Writes: T1 RAID 10 snapshots: T2 RAID 5	Yes to Tier 2 only
Low Priority with Progression (Tier 3 to Tier 2)	3	Writes: T3 RAID 10 snapshots: T3 RAID 5/6 or T2 RAID 5	Yes to Tier 2 only

Low Priority (Tier 3)

The **Low Priority** profile provides the most cost efficient storage. Creating a volume using the **Low Priority** profile stores written data on Tier 3 RAID 10. Snapshot data is stored on Tier 3 RAID 5/6. Storage Center does not migrate data to higher tiers of storage unless Tier 3 storage becomes full.

Flash Optimized with Progression (Tier 1 to All Tiers)

The **Flash Optimized with Progression** Storage Profile provides the most efficient storage for an enclosure containing both read-intensive and write-intensive SSDs. When a storage type uses this profile, all new data is written to write-intensive Tier 1 drives. Snapshot data is moved to Tier 2, and less-active data progresses to Tier 3.

If Tier 1 fills to within 95% of capacity, Storage Center creates a space management snapshot and moves it immediately to Tier 2 to free up space on Tier 1. The space management snapshot is moved immediately and does not wait for a scheduled Data Progression. Space management snapshots are marked as **Created On Demand** and cannot be modified manually or used to create View Volumes. Space management snapshots coalesce into the next scheduled or manual snapshot. Storage Center creates only one on demand snapshot per volume at a time.

Write Intensive (Tier 1)

The **Write Intensive** Storage Profile directs all initial writes to write-intensive SSDs on Tier 1 (RAID 10). The data does not progress to any other tier. This profile is useful for storing transaction logs and temporary database files.

Flash Only with Progression (Tier 1 to Tier 2)

The **Flash Only with Progression** Storage Profile performs initial writes on high-performance Tier 1 drives. Less active data progresses to Tier 2, but remains on SSDs. This profile is useful for storing volumes with data that requires optimal read performance, such as golden images, linked clones, and some databases.



Low Priority with Progression (Tier 3 to Tier 2)

The **Low Priority with Progression** Storage Profile directs initial writes to less expensive Tier 3 (RAID 10) drives, and then allows frequently accessed data to progress to Tier 2. This profile is useful for migrating large amounts of data to Storage Center without overloading Tier 1 SSDs.

Storage Virtualization for SCv2000 Series Controllers

SCv2000 series controllers manage many storage virtualization options automatically.

Disk Management on SCv2000 Series Controllers

Storage Centers with SCv2000 series controllers manage disks automatically, limiting the disk management options. After adding disks, Storage Center recognizes the new disks, creates a new disk folder if necessary, then manages the disks in the disk folder. If a disk is intentionally down for testing purposes, then is deleted, you can restore the disk to manage the disk again in a disk folder.

The following disk management options are not available with SCv2000 series controllers:

- Creating disk folders
- Adding disks to disk folders
- Managing disk spares

Storage Types for SCv2000 Series Controllers

SCv2000 series controllers create a Storage Type for each disk class, and manage Storage Types automatically.

SCv2000 series controllers manage Storage Types automatically in the following ways:

- Storage Types are created automatically for each disk class
- Storage Types have a 2MB page size
- Storage Types cannot be modified
- Non-redundant Storage Types are not allowed

RAID Tiering for SCv2000 Series Controllers

RAID Tiering for SCv2000 series controllers moves data between RAID 10 and RAID 5/6. It does not move data between Storage Tiers. RAID Tiering happens at 7 PM everyday. Data progression runs until it completes or reaches the maximum run time.

Storage Profiles for SCv2000 Series Controllers

The following table summarizes the Storage Profiles available to SCv2000 series controllers.

Name	Initial Write Tier	Tier (T) and RAID Levels	RAID Tiering
Balanced	1	Writes: T1 RAID 10 Snapshots: T1 RAID 5/6	Between RAID types only
Maximize Performance	1	Writes: T1 RAID 10 Snapshots: T1 RAID 10	No
Maximize Efficiency	1	Writes: T1 RAID 5/6 Snapshots: T1 RAID 5/6	No

Balanced

The **Balanced** Storage Profile balances efficiency and performance for any volume using that Storage Profile.

When a volume uses the **Balanced** Storage Profile, all new data is written to Tier 1. When Storage Center creates a snapshot, Data Progression moves snapshot data from RAID 10 to RAID 5/6.



Maximize Performance

Maximize Performance keeps new data and snapshot data on RAID 10 to increase performance. **Maximize Performance** is useful for volumes with important and frequently used data.

Maximize Efficiency

Maximize Efficiency writes new data to RAID 5/6 and keeps snapshot data on RAID 5/6. Use **Maximize Efficiency** for volumes with less-important data and infrequently used data.

User Interface for Storage Center Management

Most storage configuration and management for an individual Storage Center is performed from the **Storage Center** view in the Dell Storage Manager Web UI.

The following tabs appear in the **Storage Center** view:

- Summary Tab
- Storage Tab
- Performance Tab
- Health Tab

Summary Tab

The **Summary** tab displays a dashboard that summarizes Storage Center information.

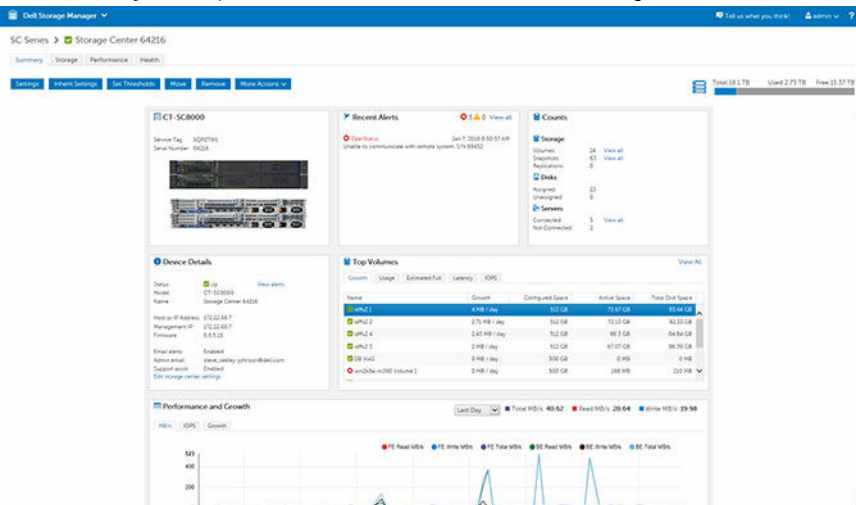


Figure 1. Summary Tab

Related links

[Managing Storage Center Settings](#)



Storage Tab

The **Storage** tab allows you to view and manage storage on the Storage Center.

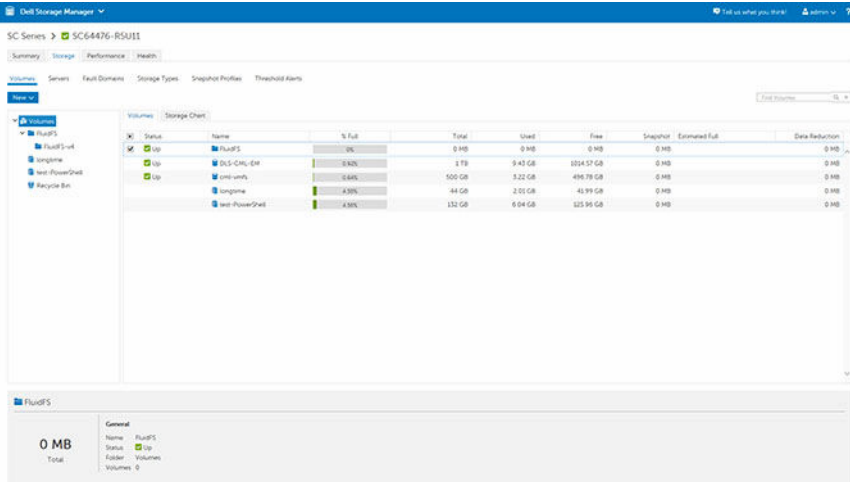


Figure 2. Storage Tab

The **Storage** tab contains the following subtabs –

- **Volumes** – Use this subtab to create and manage volumes and volume folders on the selected Storage Center, as well as create a local recovery from a volume snapshot.
- **Servers** – Use this subtab to create and manage physical and virtual servers, server clusters, and server folders on the selected Storage Center.
- **Fault Domains** – Use this subtab to create and manage fault domains on the selected Storage Center.
- **Storage Types** – Use this subtab to view, create, and edit Storage Types prepared on the selected Storage Center.
- **Snapshot Profiles** – Allows you to view, modify, and create Snapshot Profiles for the selected Storage Center, as well as apply Snapshot Profiles to one or more volumes.
- **Threshold Alerts** – Use this subtab to view and set storage and IO usage threshold alerts.

Related links

- [Adding and Organizing Storage Centers](#)
- [Managing Storage Center Settings](#)
- [Managing Volumes](#)
- [Managing Snapshot Profiles](#)
- [Managing Servers on a Storage Center](#)

Performance Tab

The **Performance** tab displays historical IO performance statistics for the selected Storage Center and associated storage objects.

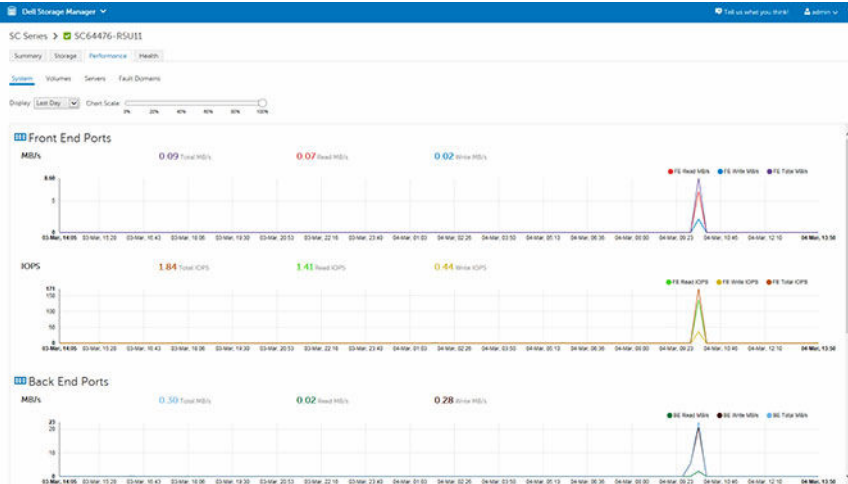


Figure 3. Performance Tab

Related links

[Viewing Historical Performance Information](#)

Health Tab

The **Health** tab displays alerts and logs for the Storage Center.

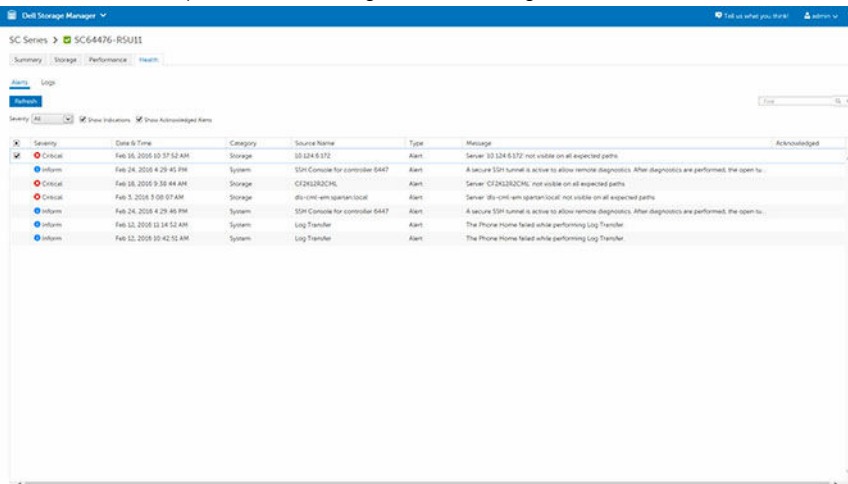


Figure 4. Health Tab





Storage Center Administration

Storage Center provides centralized, block-level storage that can be accessed by Fibre Channel, iSCSI, or SAS.

Adding and Organizing Storage Centers

An individual Storage Manager user can view and manage only the Storage Centers that have been mapped to his or her account. This restriction means that the Storage Centers that are visible to one Storage Manager user are not necessarily visible to another user.


When a Storage Manager user adds a Storage Center, he or she must provide credentials for a Storage Center user. The privilege level and user group(s) assigned to the Storage Center user determine the access that is allowed in the Storage Manager Web UI.

- The first time a Storage Center is added to Storage Manager, you must specify a Storage Center user account that has the Administrator privilege. When the Storage Center is subsequently added for other Storage Manager users, you can specify Storage Center user accounts of any privilege level.
- If your Storage Manager user account has the Reporter privilege, you must specify a Storage Center user account that has the Reporter privilege.

 **NOTE: A Storage Manager Administrator can also use the Data Collector Manager to grant Storage Center access to a Storage Manager user with the Reporter privilege.**

Storage Center User Privileges and User Groups

Storage Center groups determine which storage objects can be viewed by the Storage Center user, and the privilege level defines what the user can do.

 **NOTE: Storage Center user privileges and Storage Manager user privileges share the same names, but they are not the same. Storage Center user privileges control access to Storage Center functionality, and Storage Manager user privileges control access to Storage Manager functionality. A user may have a different role in Storage Manager than in Storage Center. This role difference affects small details of that user's access.**

Related links

[Storage Manager User Privileges](#)

User Privilege Levels

Each user is assigned a single privilege level. Storage Center has three levels of user privilege.

Privilege Level	Allowed Access
Administrator	Read and write access to the entire Storage Center (no restrictions). All Administrators have the same predefined privileges. Only Administrators can manage users and user groups.
Volume Manager	Read and write access to the folders associated with the assigned user groups. Users with this privilege level can create volumes in the allowed volume folders and map them to existing servers in the allowed server folders.
Reporter	Read-only access to the folders associated with the assigned user group(s).



Adding and Removing Storage Centers

Use the Storage Manager Web UI to add or remove Storage Centers.

 **NOTE: For user interface reference information, click Help.**

Add a Storage Center

Add a Storage Center to Storage Manager to manage and monitor the Storage Center from the Dell Storage Manager Web UI.


Prerequisites

- You must have the user name and password for a Storage Center user account.
 - The first time a Storage Center is added to Storage Manager, you must specify a Storage Center user account that has the Administrator privilege. When the Storage Center is subsequently added for other Storage Manager users, you can specify Storage Center user accounts of any privilege level.
 - If your Storage Manager user account has the Reporter privilege, you must specify a Storage Center user account that has the Reporter privilege.

 **NOTE: Storage Manager users with Reporter level privileges have limited access to Storage Manager. To grant a Reporter Storage Manager user more privileges, add Storage Center mappings to that user in Storage Manager Data Collector Manager. Only Administrator level Storage Manager users can set mapping for users.**

- The Storage Manager Data Collector must have connectivity to the Storage Center management interface.
- The Storage Center certificate must contain the host name or management IP address that is used to add the Storage Center to Storage Manager. For instructions on regenerating an SSL certificate, see the *Storage Center Administrator's Guide*.

Steps

1. Expand the Dell Storage Manager menu and then click **Storage**.
2. In the **SC Series** tab, click **Add Storage Center**. The **Add Storage Center** dialog box opens.
3. Enter Storage Center login information.
 - **Hostname or IP Address** - Enter the host name or IP address of a Storage Center controller. For a dual-controller Storage Center, enter the IP address or host name of the management controller.
 - **User Name** and **Password** - Enter the user name and password for a Storage Center user.
 -  **NOTE: If you specify a Storage Center user with the Reporter or Volume Manager privilege, access to the Storage Center from Storage Manager is restricted based on the privilege and user group(s) assigned to the Storage Center user.**
 - **Folder** - Select the parent folder for the Storage Center.
4. (Optional) Configure the Storage Center to use settings applied to another Storage Center by selecting the **Inherit settings from an existing Storage Center** check box. If this check box is selected, the **Inherit Settings** dialog box opens after the **Add Storage Center** dialog box closes.
5. Click **OK**.
 - If the **Inherit settings from existing Storage Center** check box was not selected, the Storage Center is added to Storage Manager.
 - If the **Inherit settings from existing Storage Center** check box was selected, the Inherit Settings dialog box opens.
6. (Inherit settings only) Choose the Storage Center settings to inherit.
 - a. Select the Storage Center from which you want to inherit settings.
 - b. Select the check box for each category of settings that you want to inherit.
 - c. When you are done, click **OK**.
 - If passwords are not configured for the Dell SupportAssist proxy, Secure Console proxy, or SMTP server, the dialog box closes.
 - If a password is configured for the Dell SupportAssist proxy, Secure Console proxy, or SMTP server, you are prompted to reenter the required password(s).
 - d. Enter the required password(s) to complete the dialog box.

Related links

[Set Storage Center Mappings for a Reporter User](#)

Reconnect to a Storage Center

If Storage Manager cannot communicate with or log in to a Storage Center, Storage Manager marks the Storage Center as down. Reconnect to the Storage Center to provide the updated connectivity information or credentials.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select the down Storage Center. The **Reconnect to Storage Center** dialog box opens.
3. Enter Storage Center logon information.
 - **Hostname or IP Address** - Enter the host name or IP address of a Storage Center controller. For a dual-controller Storage Center, enter the IP address or host name of the management controller.
 - **User Name** and **Password** - Enter the user name and password for a Storage Center user.



NOTE: If you specify a Storage Center user with the Reporter or Volume Manager privilege, access to the Storage Center from Storage Manager is restricted based on the privilege and user group(s) assigned to the Storage Center user.

4. Click **OK**.

Remove a Storage Center

Remove a Storage Center when you no longer want to manage it from Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select the Storage Center you want to remove.
3. Click **Remove**. A confirmation dialog box opens.
4. Click **Yes** to remove the Storage Center.

Organizing Storage Centers

Use folders to group Storage Centers in the Dell Storage Manager Web UI.

Create a Storage Center Folder

Use folders to group and organize Storage Centers.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, click **New Folder**. The **Create Folder** dialog box opens.
3. In the **Name** field, type a name for the folder.
4. In the **Parent** field, select a parent folder.
5. Click **OK**.

Move a Storage Center Into a Folder

A Storage Center can be added to a folder at any time.

1. Expand the Dell Storage Manager menu and then click **Storage**.
2. In the **SC Series** tab, select the Storage Center you want to move.
3. Click **Move**. The **Move to Folder** dialog box opens.
4. Select a parent folder.
5. Click **OK**.

Rename a Storage Center Folder

Use the **Edit** dialog box to change the name of a Storage Center folder.

1. Expand the Dell Storage Manager menu and then click **Storage**.
2. In the **SC Series** tab, select the Storage Center folder you want to rename.
3. Click **Edit**. The **Edit** dialog box opens.
4. In the **Name** field, type a name for the folder.



5. Click **OK**.

Move a Storage Center Folder

Use the **Edit** dialog box to move a Storage Center folder.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select the Storage Center folder you want to move.
3. Click **Edit**. The **Edit** dialog box opens.
4. In the Parent area, select a parent folder.
5. Click **OK**.

Delete a Storage Center Folder

Delete a Storage Center folder if it is no longer needed.

Prerequisites

The Storage Center folder must be empty.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select the Storage Center folder you want to delete.
3. Click **Delete**. The **Delete Folder** dialog box opens.
4. Click **OK**.

Managing Volumes

A Storage Center volume is a logical unit of storage that servers can access over a network. You can allocate more logical space to a volume than is physically available on the Storage Center.

Attributes That Determine Volume Behavior

When a volume is created, attributes are associated with the volume to control its behavior.

Attribute	Description
Storage Type	Specifies the disk folder, tier redundancy, and data page size of the storage used by the volume.
Storage Profile	Controls the RAID type, storage tiers, and data progression behavior for pages used by the volume.
Snapshot Profile	Describes when to take periodic snapshots (also known as point-in-time copies) for one or more volumes and the time at which snapshots are deleted (expired).
QoS Profile	Specifies a profile to apply to volumes, to potentially limit I/Os that the volumes can perform, and also defines their relative priority during times of congestion.

Related links

[Managing Snapshot Profiles](#)

Creating Volumes

Create volumes to present servers a logical unit of storage on a Storage Center.

 **NOTE: For user interface reference information, click Help.**

Create a Single Volume

Use the New Volume dialog box to create a single volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, click **New** → **Volume**. The **New Volume** dialog box opens.
5. In the **Volume Count** field, type **1** to create a single volume.
6. In the **Name** field, type a name for the volume.
7. In the **Configured Size** field, type a size for the volume in kilobytes (KB), megabytes (MB), gigabytes (GB), or terabytes (TB).
8. In the **Volume Folder** pane, select the parent folder for the volume.
9. (Optional) Configure the remaining volume attributes as needed.
 - To schedule snapshot creation and expiration for the volume, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
 - To map the volume to a server, click **Change** across from **Server**.
 - Select **Read Cache**, **Write Cache**, or **Compression** to enable those features on the volume.
 - To use specific disk tiers and RAID levels for volume data, select the appropriate Storage Profile from the **Storage Profile** drop-down menu. Using the **Recommended** Storage Profile allows the volume to take full advantage of data progression.
 - If more than one Storage Type is defined on the Storage Center, select the Storage Type to provide storage from the **Storage Type** drop-down menu.
 - To set a Volume QoS Profile, either accept the default QoS Profile or click **Change** across from **Volume QoS Profile**. Then select a Volume QoS profile from the resulting list, and click **OK**.
 - To set a Group QoS Profile, click **Change** across from **Group QoS Profile**. Then select a Group QoS profile from the resulting list, and click **OK**.
10. Click **OK**.

Create Multiple Volumes Simultaneously

If you need to create many volumes, you can streamline the process by creating multiple volumes at a time.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, click **New** → **Volume**. The **New Volume** dialog box opens.
5. In the **Volume Count** field, type the number of volumes to create.
6. In the **Name** field, type a base name for the volumes. Each volume is named with a combination of the base name and the volume number.
7. In the **Configured Size** field, type a size for the volumes in kilobytes (KB), megabytes (MB), gigabytes (GB), or terabytes (TB).
8. In the **Volume Folder** pane, select the parent folder for the volumes.
9. (Optional) Configure the remaining volume attributes as needed.
 - To schedule snapshot creation and expiration for the volumes, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
 - To map the volumes to a server, click **Change** across from **Server**.
 - Select **Read Cache**, **Write Cache**, or **Compression** to enable those features on the volumes.
 - To use specific disk tiers and RAID levels for volume data, select the appropriate Storage Profile from the **Storage Profile** drop-down menu. Using the **Recommended** Storage Profile allows the volumes to take full advantage of data progression.
 - If more than one Storage Type is defined on the Storage Center, select the Storage Type to provide storage from the **Storage Type** drop-down menu.
 - To set a Volume QoS Profile, either accept the default QoS Profile or click **Change** across from **Volume QoS Profile**. Then select a Volume QoS profile from the resulting list, and click **OK**.



- To set a Group QoS Profile, click **Change** across from **Group QoS Profile**. Then select a Group QoS profile from the resulting list, and click **OK**.

10. Click **OK**.

Modifying Volumes

You can rename, move, or expand a volume after it has been created. You can also modify advanced volume attributes if needed.

 **NOTE: For user interface reference information, click Help.**

Rename a Volume

A volume can be renamed without affecting its availability.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. In the **Name** field, type a new name for the volume.
7. When you are finished, click **OK**.

Move a Volume to a Different Volume Folder

Volumes can be organized by placing them in folders.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volume you want to move.
5. Click **Move**. The **Move to Folder** dialog box opens.
6. In the navigation pane, select a new parent volume folder.
7. When you are finished, click **OK**.

Move Multiple Volumes to a Different Volume Folder

Right-click a selection of volumes to move them to a different folder.

1. Right-click one of the selected volumes, then select **Move to Folder**. The **Move to Folder** dialog box opens.
2. Expand the Dell Storage Manager menu, and then click **Storage**.
3. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
4. Click the **Storage** tab.
5. In the **Volumes** subtab, select the volumes you want to move.
 - To select contiguous volumes, select the first volume, then hold down Shift and select the last volume.
 - To select individual volumes, hold down Control while selecting them.
6. Click **Move**. The **Move to Folder** dialog box opens.
7. In the navigation pane, select a new parent volume folder.
8. When you are finished, click **OK**.

Expand a Volume

Expand the size of a volume if more space is needed.

About this task

 **NOTE: Fluid Cache volumes cannot be expanded.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volume you want to expand.
5. Click **More Actions** → **Expand Volume**. The **Expand Volume** dialog box opens.
6. Type a new size for the volume, then click **OK**.

Enable or Disable Read/Write Caching for a Volume

Read and write caching generally improves performance. To improve performance, disable write caching on volumes that use SSD storage.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Make sure **Allow Cache Selection** is enabled for volumes in the Storage Center user preferences.
 - a. In the **Summary** tab, click **Settings**. The **Edit Settings** dialog box opens.
 - b. Click the **Preferences** tab.
 - c. Make sure the **Allow Cache Selection** check box is selected.
 - d. Click **OK**.
4. Click the **Storage** tab.
5. In the **Storage** tab navigation pane, select the volume you want to modify.
6. Click **Edit**. The **Edit Volume** dialog box opens.
7. Enable or disable the cache options as needed.
 - Select or clear the **Read Cache** check box.
For volumes using SSD storage, test applications before enabling or disabling read cache.
 - Select or clear the **Write Cache** check box.
To improve performance, disable write caching on volumes that use SSD storage for most applications.
8. When you are finished, click **OK**.

Assign Snapshot Profiles to a Volume

Assign one or more Snapshot Profiles to a volume if you want snapshots to be created on an automated schedule.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. Select the appropriate Snapshot Profiles.
 - a. Next to **Snapshot Profiles**, click **Change**. The **Select Snapshot Profiles** dialog box opens.
 - b. In the top pane of the dialog box, select the Snapshot Profiles to assign to the volume.
 - c. When you are finished, click **OK**. The **Select Snapshot Profiles** dialog box closes.
7. Click **OK** to close the **Edit Volume** dialog box.

Assign Snapshot Profiles to Multiple Volumes

Snapshot Profiles can be assigned to multiple volumes in one operation.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volumes you want to modify.
 - To select contiguous volumes, select the first volume, then hold down Shift and select the last volume.



- To select individual volumes, hold down Control while selecting them.
5. Right-click the selection, then select **More Actions** → **Set Snapshot Profiles**. The **Set Snapshot Profiles** dialog box opens.
 6. In the upper table, select the check box for each Snapshot Profile you want to assign to the volume.
 7. To remove the Snapshot Profiles that were previously assigned to the volume, select the **Replace Existing Snapshot Profiles** check box.
 8. When you are finished, click **OK**.

Assign a Different Storage Profile to a Volume

The Storage Profile determines the RAID type and storage tiers used by the volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **More Actions** → **Set Storage Profile**. The **Set Storage Profile** dialog box opens.
6. From the **Storage Profile** drop-down menu, select a Storage Profile.
7. When you are finished, click **OK**.

Assign a Different Storage Profile to Multiple Volumes

The Storage Profile determines the RAID type and storage tiers used by the volume. A Storage Profile can be assigned to multiple volumes in one operation.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volumes you want to modify.
 - To select contiguous volumes, select the first volume, then hold down Shift and select the last volume.
 - To select individual volumes, hold down Control while selecting them.
5. Right-click the selection, then select **More Actions** → **Set Storage Profile**. The **Set Storage Profile** dialog box opens.
6. From the **Storage Profile** drop-down menu, select a Storage Profile.
7. When you are finished, click **OK**.

Force Writes to the Lowest Storage Tier for a Volume

The **Import to lowest tier** option forces all data written to the volume to the lowest storage tier configured for the volume. Enabling this option decreases performance for the volume.

Prerequisites

The volume must use a Standard storage type. The **Import to lowest tier** option is not available for Flash-Optimized storage types.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box appears.
6. Click **Edit Advanced Volume Settings**. The **Edit Advanced Volume Settings** dialog box appears.
7. Select the **Import to lowest tier** check box.
8. Click **OK** to close the **Edit Advanced Volume Settings** dialog box, then click **OK** to close the **Edit Volume** dialog box.



Configure a Space Consumption Limit for a Volume

Set a space consumption limit to specify the maximum space that can be used on the volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box appears.
6. Click **Edit Advanced Volume Settings**. The **Edit Advanced Volume Settings** dialog box appears.
7. Configure the **Space Consumption Limit** options.
 - a. Select the **Space Consumption Limit** check box.
 - b. In the field, type the maximum space that can be used on the volume in kilobytes (KB), megabytes (MB), gigabytes (GB), or terabytes (TB).
8. Click **OK** to close the **Edit Advanced Volume Settings** dialog box, then click **OK** to close the **Edit Volume** dialog box.

Configure an OpenVMS Unique Disk ID for a Volume

Configure an OpenVMS Unique Disk ID to identify the volume to servers running the OpenVMS operating system. You may need to reset this value when recovering a volume from a snapshot. For example, if you map a volume to a server, create a snapshot, and then mount a new view volume to the server, the new view volume has a new disk ID. To allow the server to recognize it as the same volume, you must modify the disk ID to match the original value.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box appears.
6. Click **Edit Advanced Volume Settings**. The **Edit Advanced Volume Settings** dialog box appears.
7. In the **OpenVMS Unique Disk ID** field, type a new disk ID.
8. Click **OK** to close the **Edit Advanced Volume Settings** dialog box, then click **OK** to close the **Edit Volume** dialog box.

Configure Related View Volume Maximums for a Volume

For a given volume, you can configure the maximum number of view volumes, including the original volume, that can be created for volumes that share the same snapshot. You can also configure the maximum combined size for these volumes.

Prerequisites

Consult with Dell Technical Support before changing these limits.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box appears.
6. Click **Edit Advanced Volume Settings**. The **Edit Advanced Volume Settings** dialog box appears.
7. In the **Maximum Volume Count** field, type the maximum number of view volumes, including the original volume, that can be created for volumes that share the same snapshot history as this volume.
8. In the **Maximum Configured Volume Space**, type the maximum combined size for all view volumes, including the original volume, that share the same snapshot history as this volume in kilobytes (KB), megabytes (MB), gigabytes (GB), or terabytes (TB). To disable this limit, select the **Unlimited** check box.
9. Click **OK** to close the **Edit Advanced Volume Settings** dialog box, then click **OK** to close the **Edit Volume** dialog box.



Copying Volumes

Copy a volume to create an identical volume for back-up or reuse of the data.

The destination volume of a copy, mirror, or migrate must meet the following requirements:

- Must not be mapped to a server.
- Must be the same size or larger than the source volume.
- Cannot be active on another controller.

Copy a Volume

Copying a volume copies the data from a source volume to a destination volume. Changes made to the source volume during the copy process are also made to the destination volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **More Actions** → **Local Copy** → **Copy Volume**. The **Copy Volume** dialog box opens.
6. Select an existing volume or create a new volume for the destination volume.
 - To select an existing volume, select a volume from the **Destination Volume** table.
 - To create a new volume for the destination volume, click **Create Volume**.
7. (Optional) Select **Copy Snapshots**.
8. From the **Priority** drop-down menu, select a priority level for the copy operation.
9. (Optional) Select **Schedule Start Time** to set a time for the copy to be created.
10. Click **OK**.

Related links

[Creating Volumes](#)

Create a Mirroring Volume

A mirroring volume is a copy of a volume that also dynamically changes to match the source volume. The source and destination volumes are continuously synchronized.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **More Actions** → **Local Copy** → **Mirror Volume**. The **Mirror Volume** dialog box opens.
6. Select an existing volume or create a new volume for the destination volume.
 - To select an existing volume, select a volume from the **Destination Volume** table.
 - To create a new volume for the destination volume, click **Create Volume**.
7. (Optional) Select **Copy Snapshots**.
8. From the **Priority** drop-down menu, select a priority level for the copy operation.
9. (Optional) Select **Schedule Start Time** to set a time for the copy to be created.
10. Click **OK**.

Related links

[Creating Volumes](#)

Migrate a Volume

Migrating a volume copies a source volume with its server to volume mappings to a destination volume. After migrating the volume, the destination volume is mapped to all servers previously mapped to the source volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **More Actions** → **Local Copy** → **Migrate Volume**. The **Migrate Volume** dialog box opens.
6. Select an existing volume or create a new volume for the destination volume.
 - To select an existing volume, select a volume from the **Destination Volume** table.
 - To create a new volume for the destination volume, click **Create Volume**.
7. (Optional) Click **Copy Snapshots** to also copy the snapshots from the source volume.
8. From the **Priority** drop-down menu, select a priority level for the copy operation.
9. (Optional) Select a post-migrate action.
 - **Do Nothing** – Migrates the volume without any post-migration actions
 - **Delete Source** – Deletes the source volume after migrating
 - **Reverse Mirror** – Mirrors the destination volume to the source volume
10. (Optional) Select **Schedule Start Time** to set a time for the copy to be created.
11. Click **OK**.

Related links

[Creating Volumes](#)

View Copy/Mirror/Migrate Information

The Summary tab for a volume in a copy, mirror, or migrate relationship displays information for any copy, mirror, or migrate relationship involving the selected volume. Copy and migrate information appears in the Summary tab only during the copy or migrate operation.

Prerequisites

The volume must be in a copy, mirror, migrate relationship.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of a volume to open the **Volume** view.

The **Copy/Mirror/Migrate** area in the **Summary** tab displays information for any copy, mirror, or migrate relationship involving the selected volume.

Creating and Managing Volume Folders

Use volume folders to organize volumes or to restrict access to volumes.

 **NOTE: For user interface reference information, click Help.**

Create a Volume Folder

Create a volume folder either to organize volumes or to restrict access to volumes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, click **New** → **Folder**. The **New Volume Folder** dialog box opens.



5. In the **Name** field, type a name for the folder.
6. In the **Parent** field, select a parent folder.
7. When you are finished, click **OK**.

Rename a Volume Folder

Use the **Edit Settings** dialog box to rename a volume folder.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume folder you want to rename.
5. Click **Edit**. The **Edit Volume Folder** dialog box opens.
6. In the **Name** field, type a new name for the volume folder.
7. Click **OK**.

Move a Volume Folder

Use the **Edit Settings** dialog box to move a volume folder. Folders can be nested in other folders.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume folder you want to move.
5. Click **Edit**. The **Edit Volume Folder** dialog box opens.
6. In the **Parent** field, select the appropriate parent folder.
7. Click **OK**.

Creating and Managing Volume Snapshots

Use snapshots to create a point-in-time copy (PITC) of one or more volumes.

 **NOTE: For user interface reference information, click Help.**

Manually Create a Snapshot for a Volume

Create a manual snapshot if you need a copy of the data for this point in time and you do not want to create a snapshot schedule.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume.
5. Click **More Actions** → **New Snapshot**. The **New Snapshot** dialog box opens.
6. If a confirmation dialog box appears:
 - Click **Yes** to create snapshots for all volumes associated with the consistent Snapshot Profile.
 - Click **No** to create a snapshot for the selected volume only.
7. In the **Expire Time** field, type the number of minutes, hours, days, or weeks to keep the snapshot before deleting it. If you do not want the snapshot to expire, select **Do Not Expire**.
8. (Optional) In the **Description** field, type a description of the snapshot. The default descriptive text is "Manually Created."
9. Click **OK**.

View Snapshots on a Volume

View the **Snapshots** tab to see information about snapshots, such as Freeze Time, Expiration Time, size, and description. You can also view the snapshots on a volume in a tree view.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click the name of the volume to open the **Volume** view.
5. Click the **Snapshots** tab.

Assign Snapshot Profiles to a Volume

Assign one or more Snapshot Profiles to a volume if you want snapshots to be created on an automated schedule.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. Select the appropriate Snapshot Profiles.
 - a. Next to **Snapshot Profiles**, click **Change**. The **Select Snapshot Profiles** dialog box opens.
 - b. In the top pane of the dialog box, select the Snapshot Profiles to assign to the volume.
 - c. When you are finished, click **OK**. The **Select Snapshot Profiles** dialog box closes.
7. Click **OK** to close the **Edit Volume** dialog box.

Create a Local Recovery Volume from a Snapshot

Create a recovery volume from a snapshot if you need to access data that is contained in the snapshot. A volume created from a snapshot accesses the same data as the original volume. The volume created from the snapshot does not consume more space than the original volume. It will consume more space when new data is written to the new volume.

Prerequisites

QoS Profile options are shown only if **Allow QoS Profile Selection** has been enabled on the Storage Center **Preferences** dialog box (Storage Center version 7.0 or later).

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the name of the volume to open the **Volume** view.
5. Click the **Snapshots** tab.
6. Select the snapshot from which you want to create a local recovery volume, then click **Create Volume from Snapshot**. The **Create Volume from Snapshot** dialog box opens.
7. (Optional) Modify default settings for the recovery volume as needed.
 - To change the volume name, modify the **Name** field.
 - To change the parent folder for the volume, select a folder in the **Volume Folder** pane.
 - To schedule snapshot creation and expiration for the volume, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
 - To add a Volume QoS profile to be applied to the volume, click **Change** across from **Volume QoS Profile**. When the list of defined QoS profiles opens, select a profile, then click **OK**. You can also apply the Default QoS Profile to a volume.
 - To add a Group QoS profile to be applied to the volume, click **Change** across from **Group QoS Profile**. When the list of defined QoS profiles opens, select a profile, then click **OK**.
8. Map the recovery volume to the server from which the data will be accessed.
 - a. Click **Change** across from **Server**. The **Select Server** dialog box appears.
 - b. Select the server, then click **OK**. The **Select Server** dialog box closes.



- c. (Optional) Click **Advanced Mapping** to configure LUN settings, restrict mapping paths, or present the volume as read-only.
9. Click **OK** to create the local recovery volume.

Pause Snapshot Creation for a Volume

Pause snapshot creation for a volume to temporarily prevent Snapshot Profiles from creating automatic snapshots for the volume. When snapshot creation is paused, the **Create Snapshot** option is not available when you right-click any volume on the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. In the **Snapshot** area, select the **Pause Snapshot Creation** check box.
7. Click **OK**.

Pause Snapshot Expiration for a Volume

Pause snapshot expiration for a volume to temporarily prevent Snapshot Profiles from expiring snapshots for the volume. When snapshot expiration is paused, the **Create Snapshot** and **Delete** options are not available when you right-click any volume on the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Volumes** subtab, select the volume you want to modify.
4. Click **Edit**. The **Edit Volume** dialog box opens.
5. In the **Snapshot** area, select the **Pause Snapshot Expiration** check box.
6. Click **OK**.

Allow the Most Recent Snapshot for a Volume to be Expired

If you do not need to keep at least one snapshot for a given volume at all times, you can allow the most recent volume snapshot to be expired by a Snapshot Profile.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. Click **Edit Advanced Volume Settings**. The **Edit Advanced Volume Settings** dialog box appears.
7. Select the **Allow Snapshots to coalesce into active Snapshot** check box.
8. Click **OK** to close the **Edit Advanced Volume Settings** dialog box, then click **OK** to close the **Edit Volume** dialog box.

Expire a Snapshot Manually

If you no longer need a snapshot and you do not want to wait for it to be expired based on the Snapshot Profile, you can expire it manually.

1. Click the **Storage** tab.
2. Click the name of the volume to open the **Volume** view.
3. Click the **Snapshots** tab.
4. Select the snapshot you want to expire, then click **Expire**. The **Expire** dialog box opens.
5. Click **Yes** to expire the selected snapshot.

Related links

[Managing Snapshot Profiles](#)



Mapping Volumes to Servers

Mapping a volume to a server allows the server to access the volume.

 **NOTE:** For user interface reference information, click **Help**.

Map a Volume to a Server

Map a volume to a server to allow the server to use the volume for storage.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to map to a server.
5. Click **More Actions** → **Map Volume to Server**. The **Map Volume to Server** wizard opens.
6. Select the server to which you want to map the volume, then click **Next**. The wizard advances to the next page.
7. (Optional) Click **Advanced Mapping** to configure LUN settings, restrict mapping paths, or present the volume as read-only.
8. When you are done, click **Finish**.

Map Multiple Volumes to a Server

Multiple volumes can be mapped to a server in a single operation.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Volumes** subtab, select the volumes you want to map.
 - To select contiguous volumes, select the first volume, then hold down Shift and select the last volume.
 - To select individual volumes, hold down Control while selecting them.
5. Click **More Actions** → **Map Volume to Server**. The **Map Volume to Server** wizard opens.
6. Select the server to which you want to map the volumes, then click **Next**. The wizard advances to the next page.
7. (Optional) Click **Advanced Mapping** to restrict mapping paths or present the volumes as read-only.
8. When you are done, click **Finish**.

Unmap a Volume from a Server

Unmap a volume from a server if the server no longer needs to access the volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.
5. Click the **Mappings** tab.
6. Select the server(s) to unmap from the volume, then click **Remove Mapping**. The **Remove Mappings** dialog box opens.
7. Click **Yes** to unmap the volume from the server.

Promote a Volume Mapping from a Server to a Server Cluster

If a volume is mapped to a server that belongs to a server cluster, you can promote the mapping to the server cluster so that it is mapped on all servers in the cluster.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.



5. Click the **Mappings** tab.
6. Select the server for which you want to promote the mapping, then click **Promote to Cluster**. The **Promote to Cluster** dialog box appears.
7. Click **OK**.

Demote a Mapping from a Server Cluster to an Individual Server

If a volume is mapped to a server cluster, you can demote the mapping so that it is mapped to one of the servers that belongs to the cluster.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.
5. Click the **Mappings** tab.
6. Select the server for which you want to demote the mapping, then click **Demote from Cluster**. The **Demote from Cluster** dialog box opens.
7. Click **OK**.

Deploy a Bootable Volume Image to a New Server

Copy a bootable volume image and map it to a new server to streamline the server deployment process.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to copy.
5. Click **More Actions** → **New Boot from SAN Copy**. The **New Boot from SAN Copy** dialog box opens.
6. (Optional) Modify default settings for the volume copy as needed.
 - To change the volume name, modify the **Name** field.
 - To change the parent folder for the volume, select a folder in the **Volume Folder** pane.
 - To schedule snapshot creation and expiration for the volume, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
7. Map the recovery volume to the server that will boot from it.
 - a. Click **Change** across from **Server**. The **Select Server** dialog box appears.
 - b. Select the server, then click **OK**. The **Select Server** dialog box closes.
8. When you are finished, click **OK**.

Change the LUN Used by a Volume/Server Mapping

The logical unit number identifies the volume to the server operating system.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.
5. Click the **Mappings** tab.
6. Select the server for which you want to modify mapping settings, then click **Edit**. The **Edit Volume Mapping Settings** dialog box opens.
7. Configure the LUN settings:
 - To specify a specific LUN number, clear the **Use next available LUN** check box, then type the LUN in the **LUN to use when mapping to Volume** field.
 - To assign the next unused LUN for the server, select the **Use next available LUN** check box.
 - To make the volume bootable, select the **Map volume using LUN 0** check box.
8. When you are finished, click **OK**.



Limit the Number of Paths That Can Be Used for a Volume/Server Mapping

You can specify the maximum number of paths used by servers that support multipath IO.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.
4. Click the **Mappings** tab.
5. Select the server for which you want to modify mapping settings, then click **Edit**. The **Edit Volume Mapping Settings** dialog box opens.
6. Use the arrows next to the **Maximum number of paths per Server** field to increase or decrease the path limit.
7. When you are finished, click **OK**.

Change a Volume/Server Mapping to Read-Only

To prevent a server from writing to a volume, change the volume/server mapping to read-only.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. In the **Storage** tab navigation pane, click the name of the volume you want to unmap from a server to open the **Volume** view.
4. Click the **Mappings** tab.
5. Select the server for which you want to modify mapping settings, then click **Edit**. The **Edit Volume Mapping Settings** dialog box opens.
6. Select the **The volume should be presented as read-only to the server** check box.
7. When you are finished, click **OK**.

Deleting Volumes and Volume Folders

Delete volumes and volume folders when they are no longer needed.

 **NOTE: For user interface reference information, click Help.**

Delete a Volume


By default, a deleted volume is moved to the Recycle Bin.

About this task

 **CAUTION: You can recover a volume from the Recycle Bin, but after the Recycle Bin is emptied, data on that volume cannot be recovered.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to delete.
5. Click **Delete**. The **Delete** dialog box opens.

 **CAUTION: Do not select Skip Recycle Bin and permanently delete volumes unless you want to immediately delete the volume without saving the metadata in the Recycle Bin. This option permanently deletes the volume, preventing you from recovering the data.**

6. Click **OK** to delete the volume. The volume is marked for deletion and moved to the Recycle Bin.



Restore a Volume from the Recycle Bin

Restore a volume from the Recycle Bin if you need to retain the volume instead of deleting it.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click **Recycle Bin**, then select the volume in the Recycle Bin that you want to restore.
5. Click **Restore Volume**. The volume is moved from the Recycle Bin to its previous location.

Empty the Recycle Bin

Empty the Recycle Bin if you are sure you want to delete the recycled volume(s).

About this task



CAUTION: After the Recycle Bin is emptied, data on a recycled volume(s) cannot be recovered.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select **Recycle Bin**.
5. Click **Empty Recycle Bin**. The **Empty Recycle Bin** dialog box opens.
6. Click **OK** to confirm that you want to permanently delete all volumes in the Recycle Bin.

Delete a Volume Folder

A volume folder must be empty before it can be deleted. If the deleted volumes from the folder are in the Recycle Bin, the volume folder is not considered empty and cannot be deleted.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume folder you want to move.
5. Click **Delete**. The **Delete** dialog box opens.
6. Click **OK** to delete the folder.

Managing Data Reduction

Data Reduction uses compression and deduplication to decrease the amount of disk space used by volume data. Compression reduces the amount of space 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.



NOTE: Data Reduction is available in Storage Center version 7.0 or later.

Supported Hardware Platforms

The following controller series support Data Reduction:

- SC4000
- SC8000
- SC9000

Data Eligible for Data Reduction

To reduce the impact of Data Reduction on read and write operations, a limited amount of data is eligible for compression and deduplication. Data Reduction Input limits the type of data that is eligible for Data Reduction. The following options are available for Data Reduction Input.

- **Inaccessible Snapshot Pages** – Allows Data Reduction to process data frozen by a snapshot and made inaccessible by new data written over the original data in the snapshot.
- **All Snapshot Pages** – Allows Data Reduction to process data frozen by a snapshot.

Change the Data Reduction Input

Change the Data Reduction Input for a volume to change the type of data that compression and deduplication reduces.

Prerequisites

Data Reduction must be applied to the volume.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. Click **Edit Advanced Volume Settings**.
The **Edit Advanced Volume Settings** dialog box opens.
7. From the **Data Reduction Input** drop-down menu, select a Data Reduction input.
 - **Inaccessible Snapshot Pages** – Data frozen by a snapshot that has become inaccessible because other data has been written over it
 - **All Snapshot Pages** – Data frozen by a snapshot
8. Click **OK** to close the **Edit Advanced Volume Settings** dialog box.
9. Click **OK**.

Compression

Compression reduces the amount of space used by a volume by encoding data. Compression runs daily with Data Progression. To change the time at which compression runs, reschedule Data Progression. Compression does not run with an on-demand Data Progression.

When compressed data is read, it is temporarily uncompressed in memory until the read is complete. When compression is disabled, pages are permanently uncompressed during the next compression cycle, and the original compressed page is deleted as time and resources permit. When a volume is deleted or a snapshot is coalesced, the related compressed data is also deleted.

Deleted data might create gaps in the compressed page, which can be filled with new compressed data. In addition, compressed pages are defragmented during Data Progression to remove gaps and use space more efficiently.

The Compression Savings amount is determined by comparing the total amount of space saved from all compressed pages to the total amount of used space that is eligible for compression. For example, if compression saves 1 GB on a volume with 10 GB of used space that is eligible for compression, the amount saved is 10 percent.

Apply Data Compression to a Volume

Apply Data Compression to a volume to reduce disk space usage for that volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **Edit**. The **Edit Volume** dialog box opens.



6. From the **Data Reduction Profile** drop-down list, select **Compression**.
7. Click **OK**.

Related links

- [Creating Volumes](#)
- [Modifying Volumes](#)

Deduplication

Deduplication reduces the space used by a volume by identifying and deleting duplicate pages. Deduplication requires SSD drives.


Apply Deduplication With Compression to a Volume

Apply Deduplication with Compression to reduce the size of the volume. Deduplication and compression run during daily Data Progression.

Prerequisites

Allow Data Reduction Selection must be enabled in the **Preferences** tab of the **Edit Storage Center Settings** dialog box.

About this task

 **NOTE: The amount of space saved by Data Reduction is determined by the amount of data eligible for Data Reduction on the volume compared to the total amount of space used by that data on disk after Data Reduction.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. From the **Data Reduction Profile** drop-down menu, select **Deduplication with Compression**.

View Amount of Space Saved by Data Reduction

The total amount of space saved by Data Reduction depends on the amount of data eligible for Data Reduction and the type of data being processed. Certain types of data will be reduced more effectively than others. The amount of volume data eligible for Data Reduction is determined by the size of the data frozen by snapshots, and the Data Reduction Input setting.

Data Savings Ratios

System Data Reduction Ratio and System Data Efficiency Ratio show the data savings on the Storage Center using the available disk space-saving features.

System Data Reduction Ratio

Compares the amount of space that would be used by pages that are eligible for compression and deduplication to the amount of space actually used by those pages after Storage Center applies Data Reduction.

System Data Efficiency Ratio

Indicates the efficiency of compression, deduplication, RAID, and Thin Provisioning

View Amount of Space Saved for a Storage Type

Storage Center determines the total percentage of space saved for all volumes in a Storage Type by comparing the amount of space processed by Data Reduction to the amount of space used after Data Reduction.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Storage Types** subtab. The space saved by Data Reduction is displayed at the bottom of the **Storage Types** subtab.

View Amount of Space Saved by Data Reduction on a Volume

The percentage of space saved by Data Reduction for a volume is an estimate found by comparing the total amount of space saved by compression and deduplication with the total amount of space processed by Data Reduction in the volume.

1. Expand the Dell Storage Manager menu, then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select a volume.
5. Click the **Tiering** subtab. The amount of space saved by Data Reduction on that volume is displayed at the bottom of the **Tiering** subtab.

Change the Default Data Reduction Profile

The default Data Reduction profile determines what type of Data Reduction is applied to new volumes created by that Storage Manager user. Allow Data Reduction Selection allows the Data Reduction options to appear when creating volumes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. From the **Data Reduction Profile** drop-down list, select the default Data Reduction profile.
 - Select **Compression** to apply compression to all new volumes.
 - Select **Deduplication with Compression** to apply deduplication and compression to all new volumes.

Pause or Resume Data Reduction

Pause Data Reduction on a volume to prevent deduplication and/or compression from running during Data Progression. After pausing Data Reduction, compression and deduplication stop running on new data but the existing data is not uncompressed. Pausing Data Reduction on a volume pauses deduplication and/or compression on all view volumes created from the original volume.

Pause or Resume Data Reduction for a Volume

Pausing Data Reduction for a volume prevents compression and deduplication from happening until Data Reduction is resumed.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, expand Volumes.
5. Select a volume.
6. Click **Edit**. The **Edit Volume** dialog box opens.
7. Pause or resume Data Reduction on the volume.
 - To pause Data Reduction, select the **Data Reduction Paused** checkbox.
 - To resume Data Reduction, clear the **Data Reduction Paused** checkbox.
8. Click **OK**.

Pause or Resume Data Reduction for all Volumes

Pausing Data Reduction from the Storage Center Edit Settings dialog box pauses compression and deduplication for all volumes in that Storage Center.

About this task

 **NOTE: Pause Data Reduction cannot be applied to other Storage Centers from the Storage Center Edit Settings dialog box using inherit settings.**



Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Storage** tab.
5. Pause or resume Data Reduction on all volumes.
 - To pause Data Reduction, select the **Pause Data Reduction** check box.
 - To resume Data Reduction, clear the **Pause Data Reduction** check box.
6. Click **OK**.

Disable Data Reduction for a Volume


Disabling Data Reduction on a volume permanently uncompresses the reduced data starting the next Data Progression cycle.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, select the volume you want to modify.
5. Click **Edit**. The **Edit Volume** dialog box opens.
6. From the **Data Reduction Profile** drop-down menu, select **None**.
7. Click **OK**.

Managing Snapshot Profiles

A Snapshot Profile is a collection of rules describing when to take periodic snapshots for one or more volumes and the time at which snapshots are deleted (expired).

A snapshot is a point-in-time copy (PITC) of one or more volumes. Storage Center snapshots differ from traditional snapshots/PITCs because blocks of data or pages are frozen and not copied. No user data is moved, making the process efficient in both time taken to complete the snapshot, and space used by snapshots.

 **NOTE: If two or more snapshots are scheduled to be created at the same time for a given volume, the Storage Center creates only one snapshot. The snapshot that has the longest expiration time is created, and the other scheduled snapshots are ignored.**

Default Snapshot Profiles

By default, Storage Center provides two standard Snapshot Profiles that cannot be deleted.

- **Daily:** Creates a snapshot every day at 12:01 AM, and expires the snapshot in one week.
- **Sample:** Applies three schedule rules:
 - Creates a snapshot every 12 hours between 12:05 AM and 6 PM, expiring in five days.
 - Creates a snapshot on the first day of every month at 11:30 PM, expiring in 26 weeks.
 - Creates a snapshot every Saturday at 11:30 PM, expiring in 5 weeks.

Non-Consistent and Consistent Snapshot Profiles

When a snapshot is taken for a volume, IO is halted to allow the operation to take place. A consistent Snapshot Profile halts IO to all associated volumes until a snapshot is taken for each volume, ensuring that the snapshots contain data for the same time period. A non-consistent Snapshot Profile creates snapshots for associated volumes without guaranteeing that the snapshots will finish at the same time, which is less resource intensive.

Consistent Snapshot Profile	Non-Consistent Snapshot Profile
Halts IO across all volumes as a group	Halts IO for each volume independently of other volumes.
Resource intensive	Less resource intensive — depends on the amount of data written since the previous snapshot
Number of volumes limited based on storage controller. <ul style="list-style-type: none"> SC8000, SC9000, and SC7020: 100 SCv2000: 25 SC4020: 40 	No limit to the number of volumes to which the Snapshot Profile is attached
Snapshots are taken of all volumes simultaneously	Choose between Standard (one volume at a time) or Parallel (all volumes simultaneously)
Can set an Alert if snapshots cannot be completed within a defined time. Snapshots not completed before alert is generated are not taken. (This suspension can lead to incomplete groups of snapshots across volumes.)	All snapshots are taken
Can delete incomplete group of snapshots	All snapshots are taken
Can be converted to Non-Consistent Snapshot Profile	Can be converted to Consistent Snapshot Profile

Creating and Applying Snapshot Profiles

To create and expire snapshots automatically, create a Snapshot Profile and apply it to one or more volumes or servers.

 **NOTE: For user interface reference information, click Help.**

Create a Snapshot Profile

Create a Snapshot Profile to define automated snapshot creation and expiration schedules that can be applied to volumes.

- Expand the Dell Storage Manager menu, and then click **Storage**.
- In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
- Click the **Storage** tab.
- Click the **Snapshot Profiles** subtab.
- Click **New Snapshot Profile**. The **New Snapshot Profile** dialog box opens.
- In the **Name** field, type a name for the Snapshot Profile.
- Add a rule to the Snapshot Profile.
 - Click **Add Rule**. The **Add Rule** dialog box opens.
 - From the drop-down menu, select the frequency at which the rule runs.
 - Configure the date(s) and time(s) at which you want snapshots to be created.
 - In the **Expiration** field, type the length of time to keep snapshots before deleting them.
 - Click **OK**. The **Add Rule** dialog box closes.
- (Optional) Create additional rules as necessary.
- From the **Snapshot Creation Method** drop-down menu, select an option to control how snapshots triggered by the Snapshot Profile are created.
 - Standard** – When selected, takes snapshots in series for all volumes associated with the snapshot.
 - Parallel** – When selected, takes snapshots simultaneously for all volumes associated with the snapshot.
 - Consistent** – When selected, halts IO and takes snapshots for all volumes associated with the snapshot. Provides options for timing out snapshot creation and expiring incomplete snapshots.
- When you are finished, click **OK**.



Apply a Snapshot Profile to One or More Volumes


To add snapshot creation and expiration schedules to a volume, associate a Snapshot Profile with the volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to use from the **Snapshot Profile** drop-down menu.
6. Click **Apply to Volumes**. The **Apply to Volumes** dialog box opens.
7. Select the volumes to which you want to apply the Snapshot Profile. To select individual volumes in a volume folder, expand the folder and select each volume individually.
8. (Optional) To remove existing Snapshot Profiles from the selected volumes, select **Replace existing Snapshot Profiles**.
9. Click **OK**.

Apply a Snapshot Profile to a Server

To add snapshot creation and expiration schedules to all volumes mapped to a server, associate a Snapshot Profile with the server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to use from the **Snapshot Profile** drop-down menu.
6. Click **Apply to Server**. The **Apply to Server** dialog box opens.
7. Select the server to which you want to apply the Snapshot Profile. To select individual servers in a server cluster, expand the cluster and select each server individually.

 **NOTE: If you apply a Snapshot Profile to a server cluster, the Snapshot Profile is applied only to the volumes that are mapped directly to the server cluster. Volumes that are mapped exclusively to servers that belong to the cluster are not affected.**

8. (Optional) To remove existing Snapshot Profiles from the selected server, select **Replace existing Snapshot Profiles**.
9. Click **OK**.

Create a Snapshot for all Volumes Associated with a Snapshot Profile

You can create a snapshot for all volumes associated with a Snapshot Profile instead of manually creating a snapshot for each volume.

1. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
2. Click the **Storage** tab.
3. Click the **Snapshot Profiles** subtab.
4. Select the profile to use from the **Snapshot Profile** drop-down menu.
5. Click **New Snapshot**. The **New Snapshot** dialog box opens.
6. In the **Expire Time** field, type the number of minutes, hours, days, or weeks to keep the snapshot before deleting it. If you do not want the snapshot to expire, select **Do Not Expire**.
7. (Optional) In the **Description** field, type a description of the snapshot. The default descriptive text is "Manually Created."
8. Click **OK**.

Modifying Snapshot Profiles

Modify a Snapshot Profile to change the automated snapshot creation and expiration schedules that are applied to the associated volumes. Changes to a Snapshot Profile affect only new snapshots taken with the modified Snapshot Profile. Existing snapshots are not changed.

 **NOTE: For user interface reference information, click Help.**

Rename a Snapshot Profile

Use the Edit Snapshot Profile dialog box to rename a Snapshot Profile.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to rename from the **Snapshot Profile** drop-down menu.
6. Click **Edit**. The **Edit Snapshot Profile** dialog box opens.
7. In the **Name** field, type a new name for the Snapshot Profile.
8. Click **OK**.

Modify Rules for a Snapshot Profile

Snapshot Profile rules determine when snapshots are created and expired.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to use from the **Snapshot Profile** drop-down menu.
6. (Optional) Add a rule to the Snapshot Profile.
 - a. Click **Add Rule**. The **Add Rule** dialog box appears.
 - b. From the drop-down menu, select the frequency at which the rule runs.
 - c. Configure the dates and times at which you want snapshots to be created.
 - d. In the **Expiration** field, type the length of time to keep snapshots before deleting them.
 - e. Click **OK**. The **Add Rule** dialog box closes.
7. (Optional) Modify the existing rules as needed.
 - To modify a rule, select the rule, then click **Edit Rule**.
 - To remove a rule, select the rule, then click **Remove Rule**.
8. Click **OK**.

Change the Snapshot Creation Method for a Snapshot Profile

The snapshot creation method controls how snapshots triggered by the Snapshot Profile are created.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to use from the **Snapshot Profile** drop-down menu.
6. From the **Snapshot Creation Method** drop-down menu, select an option to control how snapshots triggered by the Snapshot Profile are created.
 - **Standard** – When selected, takes snapshots in series for all volumes associated with the snapshot.
 - **Parallel** – When selected, takes snapshots simultaneously for all volumes associated with the snapshot.



- **Consistent** – When selected, halts IO and takes snapshots for all volumes associated with the snapshot. Provides options for timing out snapshot creation and expiring incomplete snapshots.

7. Click **OK**.

Delete a Snapshot Profile

A Snapshot Profile cannot be deleted if it is being used by any volumes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab.
4. Click the **Snapshot Profiles** subtab.
5. Select the profile to delete from the **Snapshot Profile** drop-down menu.
6. Make sure the Snapshot Profile is not in use by any volumes.
7. Click **Delete**. The **Delete** dialog box opens.
8. Click **OK**.



Storage Center Server Administration

Storage Manager allows you to allocate storage on each Storage Center for the servers in your environment. Servers that are connected to Storage Centers can also be registered to Storage Manager to streamline storage management and to run Space Recovery for Windows servers.

Managing Storage Center Server Objects

Storage Center server objects are managed individually for each Storage Center from the **Servers** subtab. Storage Centers have no knowledge about the servers other than the operating system, which must be manually specified.

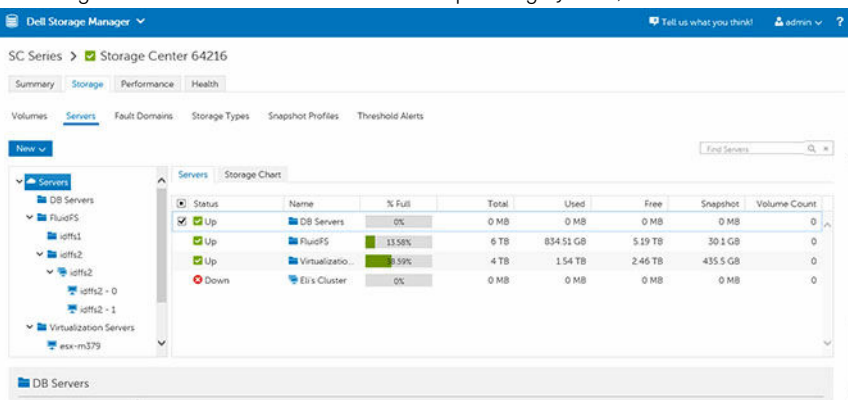


Figure 5. Storage Tab Servers Subtab

Managing Servers on a Storage Center

Use the **Servers** subtab of the **Storage** tab to create and manage server objects for each Storage Center.

NOTE: Server Agent features are not supported in Dell Storage Manager Web UI.

Related links

- [Creating Servers](#)
- [Modifying Servers](#)
- [Mapping Volumes to Servers](#)
- [Creating and Managing Server Folders](#)
- [Deleting Servers and Server Folders](#)

Creating Servers

Create a server to allow a Storage Center to pass IO through the ports on that server. After a server is created, volumes can be mapped to it.


NOTE: For user interface reference information, click Help.

Create a Physical Server

Create a physical server object to represent a physical server in your environment.

1. Make sure the server HBAs have connectivity to the Storage Center HBAs.
 - **iSCSI** – Configure the iSCSI initiator on the server to use the Storage Center HBAs as the target.



- **Fibre Channel** – Configure Fibre Channel zoning to allow the server HBAs and Storage Center HBAs to communicate.
 - **SAS** (SCv2000 series controllers only) – Directly connect the controller to a server using SAS ports configured as front-end connections.
2. Expand the Dell Storage Manager menu, and then click **Storage**.
 3. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
 4. Click the **Storage** tab.
 5. Click the **Servers** subtab.
 6. Click **New** → **Server**. The **New Server** dialog box opens.
 7. Configure the server attributes. These attributes are described in the online help.
 - a. Enter a name for the server in the **Name** field.
 - b. Select a server folder from the **Server Folder** drop-down menu.
 - c. Select the operating system for the server from the **Operating System** drop-down menu.
 - d. To generate Storage Center alerts when connectivity is lost between the Storage Center and the server, select **Alert On Lost Connectivity**.
 - e. To generate Storage Center alerts when the Storage Center only has partial connection to the server, select **Alert On Partial Connectivity**.
 - f. Select or define one or more HBAs for the server.
 - If one or more server HBAs are visible to the Storage Center, select them in the **Host Bus Adapters** table.
 - If a server HBA is not visible to the Storage Center, click **Manually Add HBA** to define it manually. For SAS front-end connections, use the SAS device name as the world wide name (WWN) to manually add the HBA.
-  **NOTE: IP addresses can be added for HBAs that will be installed on the server in the future. When the HBA that uses that IP address is installed, it will be configured and ready to use.**
8. Click **OK**.

Related links

- [Configure Front-End IO Ports \(SAS and Fibre Channel\)](#)
- [Configure Front-End IO Ports \(iSCSI\)](#)

Create a Virtual Server

Create a virtual server object to represent a virtual machine in your environment.


Prerequisites

The server that hosts the virtual server must be added as a physical server.

Steps

1. Make sure the server HBAs have connectivity to the Storage Center HBAs.
 - **iSCSI** – Configure the iSCSI initiator on the server to use the Storage Center HBAs as the target.
 - **Fibre Channel** – Configure Fibre Channel zoning to allow the server HBAs and Storage Center HBAs to communicate.
 - **SAS** (SCv2000 series controllers only) – Directly connect the controller to a server using SAS ports configured as front-end connections.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Expand the Dell Storage Manager menu, and then click **Storage**.
4. In the **SC Series** tab, select a Storage Center.
5. Click the **Storage** tab.
6. Click the **Servers** subtab.
7. Click the name of the server that will host the virtual server to open the **Server** view.
8. Click **More Actions** → **New** → **Virtual Server**. The **New Virtual Server** dialog box opens.
9. Configure the server attributes. These attributes are described in the online help.
 - a. Enter a name for the server in the **Name** field.
 - b. Select the operating system for the server from the **Operating System** drop-down menu.
 - c. To generate Storage Center alerts when connectivity is lost between the Storage Center and the server, select **Alert On Lost Connectivity**.

- d. To generate Storage Center alerts when the Storage Center only has partial connection to the server, select **Alert On Partial Connectivity**.
- e. Select or define one or more HBAs for the server.
 - If one or more server HBAs are visible to the Storage Center, select them in the **Host Bus Adapters** table.
 - If a server HBA is not visible to the Storage Center, click **Manually Add HBA** to define it manually. For SAS front-end connections, use the SAS device name as the world wide name (WWN) to manually add the HBA.

 **NOTE: IP addresses can be added for HBAs that will be installed on the server in the future. When the HBA that uses that IP address is installed, it will be configured and ready to use.**

10. Click **OK**.

Related links

[Configure Front-End IO Ports \(SAS and Fibre Channel\)](#)

[Configure Front-End IO Ports \(iSCSI\)](#)

Create a Server Cluster

Create a server cluster object to represent a cluster of servers in your environment.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Click **New** → **Server Cluster**. The **New Server Cluster** dialog box opens.
6. Configure the server cluster attributes. These attributes are described in the online help.
 - a. Enter a name for the server in the **Name** field.
 - b. Select a server folder from the **Server Folder** drop-down menu.
 - c. From the **Operating System** drop-down menu, select the operating system for the cluster.

 **NOTE: All servers in a server cluster must be running the same operating system.**

- d. To generate Storage Center alerts when connectivity is lost between the Storage Center and the server(s), select **Alert On Lost Connectivity**.
7. Add servers to the server cluster.
 - To add an existing server to the cluster, select the servers from the servers list.
 - To define a new server, click **New Server**, configure the server attributes, and then click **OK**.
8. Click **OK**.

Modifying Servers

Modify a server to change its attributes, apply a Snapshot Profile, and add or remove HBAs.

Rename a Server

A server object can be renamed at any time, and the name does not need to match the host name or IP address of the server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **Edit**. The **Edit Server** dialog box opens.
7. Enter a name for the server in the **Name** field.
8. Click **OK**.



Move a Server to a Different Server Folder

For convenience, server objects can be organized by folders.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **Edit**. The **Edit Server** dialog box opens.
7. Select the folder to which to move the server in the **Server Folder** navigation tree.
8. Click **OK**.

Change the Operating System of a Server

If you installed a new operating system or upgraded the operating system on a server, update the corresponding server object accordingly.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **Edit**. The **Edit Server** dialog box opens.
7. Select the operating system for the server from the **Operating System** drop-down menu.
8. Click **OK**.

Apply One or More Snapshot Profiles to a Server

Associate a Snapshot Profile with a server to add snapshot creation and expiration schedules to all volumes that are currently mapped to a server. Volumes that are subsequently mapped to the server do not inherit the snapshot creation and expiration schedules.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Apply Snapshot Profiles**. The **Apply to Server** dialog box opens.
7. Select the Snapshot Profiles to assign to the server from the top pane of the dialog box.
8. To remove existing Snapshot Profiles from each volume mapped to the server, select **Replace existing Snapshot Profiles**.
9. When you are finished, click **OK**.

Add a Server to a Server Cluster

You can add a server object to a server cluster at any time.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server you want to add to a cluster .
6. Click **More Actions** → **Add Servers to Cluster**. The **Add Servers to Cluster** dialog box opens.
7. Select the server cluster to which you want to add the server and click **OK**.



Remove a Server from a Server Cluster

You can remove a server object from a server cluster at any time.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server to remove from the left navigation pane.
6. Click **More Actions** → **Remove** → **From Cluster**. The **Remove Server from Cluster** dialog box opens.
7. Click **Yes**.

Convert a Physical Server to a Virtual Server

If you migrated a physical server to a virtual machine, change the physical server object to a virtual server object and select the host physical server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Convert to Virtual Server**. The **Convert to Virtual Server** dialog box opens.
7. Select the server or server cluster that hosts the virtual server, then click **OK**.

Convert a Virtual Server to a Physical Server

If you migrated a virtual machine to a physical server, modify the corresponding virtual server object accordingly.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Convert to Physical Server**. The **Convert to Physical Server** dialog box opens.
7. Click **OK**.

Add One or More HBAs to a Server

To map a volume to a server, the Storage Center must be able to communicate with at least one HBA on the server.

1. Make sure the server HBA(s) has connectivity to the Storage Center HBA(s).
 - **iSCSI** – Configure the iSCSI initiator on the server to use the Storage Center HBA(s) as the target.
 - **Fibre Channel** – Configure Fibre Channel zoning to allow the server HBA(s) and Storage Center HBA(s) to communicate.
 - **SAS** (SCv2000 series controllers only) – Directly connect the controller to a server using the SAS front-end connections.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Expand the Dell Storage Manager menu, and then click **Storage**.
4. In the **SC Series** tab, select a Storage Center.
5. Click the **Storage** tab.
6. Click the **Servers** subtab.
7. Select the server.
8. Click **More Actions** → **Add** → **HBAs**. The **Add HBAs to Server** dialog box opens.
9. Select or define one or more HBAs for the server.
 - If one or more server HBAs are visible to the Storage Center, select them in the table.



- If a server HBA is not visible to the Storage Center, click **Manually Add HBA** to define it manually.



NOTE: For SAS front-end ports, use the SAS device name as the world wide name to manually add the HBA.

10. When you are finished, click **OK**.

Related links

[Configure Front-End IO Ports \(SAS and Fibre Channel\)](#)

[Configure Front-End IO Ports \(iSCSI\)](#)

Remove One or More HBAs from a Server

If a server HBA has been repurposed and is no longer used to communicate with the Storage Center, remove it from the server object.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Remove** → **HBAs**. The **Remove HBAs from Server** dialog box opens.
7. Select the HBAs that you want to remove.
8. When you are finished, click **OK**. If the HBA is used by one or more mapped volumes, a confirmation dialog box opens.
9. If a confirmation dialog box opens:
 - Click **Cancel** to keep the HBA.
 - Click **OK** to remove the HBA, which might interfere with the mapped volume.

Mapping Volumes to Servers

Map a volume to a server to allow the server to use the volume for storage.

Map a Volume to a Server

Map an existing volume to a server to allow the server to use it.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Map Volume to Server**. The **Map Volume to Server** wizard opens.
7. In the **Volume** navigation tree, select the volume you want to map, then click **Next**. The wizard advances to the next page.
8. (Optional) Configure LUN settings, restrict mapping paths, or present the volume as read-only.
9. When you are done, click **Finish**.

Unmap One or More Volumes From a Server

If a server no longer uses a volume, you can unmap the volume from the server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server.
6. Click **More Actions** → **Remove Mappings**. The **Remove Mappings** dialog box opens.
7. Select the volumes to unmap from the server.

8. Click **OK**.

Create a Volume and Map it to a Server

If a server requires additional storage and you do not want to use an existing volume, you can create and map a volume to the server in a single operation.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Click the name of the server to open the **Servers** view.
6. Click **More Actions** → **New** → **Volume**. The **Create Volume** dialog box opens.
7. Leave the **Volume Count** field set to **1**.
8. Enter a name for the volume in the **Name** field.
9. Select a unit of storage from the drop-down menu and enter the size for the volume in the **Configured Size** field. The available storage units are kilobytes (KB), megabytes (MB), gigabytes (GB), and terabytes (TB).
10. In the **Volume Folder** pane, select the parent folder for the volume.
11. (Optional) Configure the remaining volume attributes as needed.
 - To schedule snapshot creation and expiration for the volume, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
 - To configure LUN settings, restrict mapping paths, or present the volume as read-only, click **Advanced Mapping**.
 - To disable read cache on the volume, clear the **Enabled** checkbox next to **Read Cache**.
 - To disable write cache on the volume, clear the **Enabled** checkbox next to **Write Cache**.
 - Select **Compression** from the **Data Reduction Profile** drop-down menu to enable Data Compression.
 - If more than one Storage Type is defined on the Storage Center, select the Storage Type to provide storage from the **Storage Type** drop-down menu.
12. Click **OK**. The volume is created and mapped to the server.

Related links

[Modifying Volumes](#)

Create Multiple Volumes Simultaneously and Map Them to a Server

If a server requires additional storage and you do not want to use existing volumes, you can create and map multiple volumes to the server in a single operation.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Click the name of the server to open the **Servers** view.
6. Click **More Actions** → **New** → **Volume**. The **Create Volume** dialog box opens.
7. In the **Volume Count** field, type the number of volumes to create.
8. Enter a name for the volume in the **Name** field.
9. Select a unit of storage from the drop-down menu and enter the size for the volume in the **Configured Size** field. The available storage units are kilobytes (KB), megabytes (MB), gigabytes (GB), and terabytes (TB).
10. In the **Volume Folder** pane, select the parent folder for the volume.
11. (Optional) Configure the remaining volume attributes as needed.
 - To schedule snapshot creation and expiration for the volume, apply one or more Snapshot Profiles by clicking **Change** across from **Snapshot Profiles**.
 - To configure LUN settings, restrict mapping paths, or present the volume as read-only, click **Advanced Mapping**.
 - To disable read cache on the volume, clear the **Enabled** checkbox next to **Read Cache**.



- To disable write cache on the volume, clear the **Enabled** checkbox next to **Write Cache**.
- Select **Compression** from the **Data Reduction Profile** drop-down menu to enable Data Compression.
- If more than one Storage Type is defined on the Storage Center, select the Storage Type to provide storage from the **Storage Type** drop-down menu.

12. Click **OK**.

Related links

[Modifying Volumes](#)

Creating and Managing Server Folders

Use server folders to group and organize servers defined on the Storage Center.

 **NOTE: For user interface reference information, click Help.**

Create a Server Folder

Create a server folder to group servers together.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Servers** subtab.
4. Click **New** → **Server Folder**. The **New Server Folder** dialog box opens.
5. Enter a name for the folder in the **Name** field.
6. Select a parent folder for the new folder in the **Parent** navigation tree.
7. Click **OK**.

Rename a Server Folder

Select a different name for a server folder.

1. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
2. Click the **Storage** tab, and then click the **Servers** subtab.
3. Select the server folder to rename.
4. Click **Edit**. The **Edit Server Folder** dialog box opens.
5. Enter a new name for the folder in the **Name** field.
6. Click **OK**.

Move a Server Folder

Use the **Edit Settings** dialog box to move a server folder.

1. In the **SC Series** tab, select a Storage Center.
2. Click the **Storage** tab, and then click the **Servers** subtab.
3. Select the server folder to move.
4. Click **Edit**. The **Edit Server Folder** dialog box opens.
5. Select a new parent folder in the **Parent** navigation tree.
6. Click **OK**.

Deleting Servers and Server Folders

Delete servers and server folders when they no longer utilize storage on the Storage Center.

 **NOTE: For user interface reference information, click Help.**

Delete a Server

Delete a server if it no longer utilizes storage on the Storage Center. When a server is deleted, all volume mappings to the server are also deleted.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. Click the **Servers** subtab.
5. Select the server to delete.
6. Click **Delete**. The **Delete** dialog box opens.
7. Click **OK**.

Delete a Server Folder

Delete a server folder if it is no longer needed.

Prerequisites

The server folder must be empty.

Steps

1. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
2. Click the **Storage** tab, and then click the **Servers** subtab.
3. Select the server folder to delete.
4. Click **Delete**. The **Delete Server Folder** dialog box opens.
5. Click **Yes**.





Storage Center Maintenance

Storage Manager can manage Storage Center settings, users and user groups, and apply settings to multiple Storage Centers.

Managing Storage Center Settings

Storage Manager can manage settings for individual Storage Centers and apply these settings to multiple Storage Centers.

Related links

- [Viewing and Modifying Storage Center Information](#)
- [Configuring Storage Center User Preferences](#)
- [Configuring Storage Center Data Settings](#)
- [Configuring Storage Center Secure Console Settings](#)
- [Configuring Filters to Restrict Administrative Access](#)

Viewing and Modifying Storage Center Information

Storage Manager provides options for changing default properties for each individual Storage Center that is managed by Storage Manager.

 **NOTE: For user interface reference information, click Help.**

Rename a Storage Center

Rename a Storage Center when the purpose of the Storage Center has changed or the name no longer applies.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **General** tab.
5. In the **Name** field, type a new name.
6. Click **OK**.

Change the Operation Mode of a Storage Center

Change the operation mode of a Storage Center before performing maintenance or install software updates to isolate alerts from those events.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **General** tab.
5. In the **Operation Mode** field select **Normal**, **Maintenance**, or **Install**. Selecting Install or Maintenance isolates alerts from those that would occur during normal operation.
6. Click **OK**.



Modify the Storage Center Shared Management IP Address(es)

In a dual-controller Storage Center, the shared management IP address is hosted by the leader under normal circumstances. If the leader fails, the peer takes over the management IP, allowing management access when the normal leader is down.

About this task

 **NOTE: A single-controller Storage Center does not have a shared management IP address by default, but it can be configured to facilitate a future transition to dual controllers.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **General** tab.
5. In the **Management IPv4 Address** field, type an IPv4 address to use as the management IP.
6. Click **OK**.

View Storage Center License Information

Storage Manager displays Storage Center license information but does not allow you to modify it.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **License** tab to display license information.
5. Click **OK**.

Apply a New License to a Storage Center

If you add applications, or increase the number of disks licensed for your Storage Center, you may need to apply a new license. Storage Manager supports submitting multiple licenses in a zip file.

Prerequisites

- The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.
- You must be able to access a Storage Center license file from the computer from which you are running the Dell Storage Manager Web UI.

About this task

 **NOTE: Applying the Flex Port license requires the Storage Center to restart. After the restart, Storage Center creates a fault domain for the flex port.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **License** tab.
5. Click **Submit License File**. A dialog box appears.
6. Browse to and select a Storage Center license file, then click **Open**. The dialog box closes.
7. Click **Apply**.
8. After the license is applied, click **OK**.

Configuring Storage Center User Preferences

Storage Center user preferences establish defaults for the Storage Center user account that was used to add the Storage Center to Storage Manager. Storage Manager honors these preferences.

 **NOTE: For user interface reference information, click Help.**

Set the Default Size for New Volumes

The default volume size is used when a new volume is created unless the user specifies a different value.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. In the **Volume Size** field, type a default size for new volumes in kilobytes (KB), megabytes (MB), gigabytes (GB), or terabytes (TB).
6. Click **OK**.

Set the Default Base Volume Name for New Volumes

The default base name is used as the name for a new volume unless the user specifies a different name. If one or volumes with the base name already exist, a number is appended to the base name to create the new volume name.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. In the **Base Volume Name** field, type a name to use as a base for new volumes. The default base is **New Volume**.
6. Click **OK**.

Set Default Data Reduction Settings for New Volumes

The default data reduction settings are used when a new volume is created unless the user changes them. You can prevent the default data reduction settings from being changed during volume creation by clearing the **Allow Data Reduction Selection** check box.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. Configure data reduction defaults.
 - In the **Data Reduction Profile** drop-down menu, set the data reduction profile default for new volumes.
 - Select the **Allow Data Reduction Selection** check box to allow users to enable or disable data reduction when creating volumes.
6. Click **OK**.

Set Default Cache Settings for New Volumes

The default cache settings are used when a new volume is created unless the user changes them. You can prevent the default cache settings from being changed during volume creation by clearing the **Allow Cache Selection** check box.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. Select or clear the **Read Cache** and **Write Cache** check boxes to set the default cache settings for new volumes.



6. Select or clear the **Allow Cache Selection** check box to allow or prevent users from configuring cache settings when creating volumes.
7. Click **OK**.

Set the Default Snapshot Options for New Volumes

The default snapshot options are used when a new volume is created unless the user changes them.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. Choose default Snapshot Profiles.
 - a. In the Snapshot area, click **Change**. The **Select Snapshot Profiles** dialog box appears.
 - b. In the top pane, select the Snapshot Profiles to assign to new volumes by default.
 - c. Click **OK**. The **Select Snapshot Profiles** dialog box closes.
6. In the **Minimum Snapshot Interval** field, the number of minutes that must pass after a snapshot is taken before a subsequent snapshot can be taken.
7. Click **OK**.

Allow or Disallow Advanced Volume Mapping Settings

Advanced volume mapping options include LUN configuration, mapping path options, and making the volume read-only.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. Select or clear the **Allow Advanced Mapping** check box to enable or disable advanced volume mapping options.
6. Click **OK**.

Set the Default Operating System for New Servers

The default operating system is used for new servers unless the user selects a different option. For convenience, choose the operating system that is most common in your environment.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. From the **Operating System** drop-down menu, select the default operating system for new servers.
6. Click **OK**.

Set the Default Storage Profile for New Volumes

The default Storage Profile is used when a new volume is created unless the user selects a different Storage Profile. You can prevent the Storage Profile from being changed during volume creation by clearing the **Allow Storage Profile Selection** check box.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. From the **Storage Profile** drop-down menu, select the Storage Profile to use as the default for new volumes.
6. To allow users to select a Storage Profile when creating a volume, select **Allow Storage Profile Selection**.
7. Click **OK**.



Set the Default Storage Type for New Volumes

The default Storage Type is used when a new volume is created unless the user selects a different Storage Type. You can prevent the Storage Type from being changed during volume creation by clearing the **Allow Storage Type Selection** check box.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. From the **Storage Type** drop-down menu, select the Storage Type to use as the default for new volumes.
6. To allow users to select a Storage Type when creating a volume, select **Allow Storage Type selection**.
7. Click **OK**.

Set Default Volume QoS Profile

Specify the default Volume QoS Profiles to be used for new volumes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. Click **Change** next to **Quality of Service Profile** section.
The **Select Volume QoS Profile** dialog box opens, which shows all QoS profiles that have been defined.
6. Select one of the profiles by clicking its name.
7. Click **OK**.

Allow QoS Profile Selection

To enable users to select QoS Profiles, set the option to enabled.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Preferences** tab.
5. In the **Quality of Service Profile** section, select the **Allow QoS Profile Selection** checkbox.
6. Click **OK**.

Configuring Storage Center Data Settings

You can configure cache, Data Progression, snapshot, and RAID stripe width settings for the Storage Center.

 **NOTE: For user interface reference information, click Help.**

Set Storage Center Cache Options

Global Storage Center cache settings override cache settings for individual volumes. Read cache improves read performance by anticipating the next read and holding it in volatile memory. Write cache increases write performance by holding written data in volatile memory until it can be safely stored on disk.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Storage** tab.
5. Select or clear the **Read Cache Enabled** and **Write Cache Enabled** check boxes.
6. Click **OK**.



Schedule or Limit Data Progression

Schedule when Data Progression runs and limit how long it is allowed to run.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Storage** tab.
5. In the **Data Progression Start Time** field, select or type the time at which Data Progression starts running daily.
6. From the **Data Progression Max Run Time** drop-down menu, select the maximum time period that Data Progression is allowed to run.
7. Click **OK**.

Set RAID Stripe Width

The RAID stripe width controls the number of disks across which RAID data is striped. The stripe widths for RAID 5 and RAID 6 are independently configured.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Storage** tab.
5. From the **RAID 5 Stripe Width** drop-down menu, select a stripe width of 5 or 9 disks.
6. From the **RAID 6 Stripe Width** drop-down menu, select a stripe width of 6 or 10 disks.
7. Click **OK**.

Configure an iSNS Server

Set the host name or IP address of the Internet Storage Name Service (iSNS) server on your network.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Storage** tab.
5. In the **iSNS Server Host or IP Address** field, type the host name or IP address of an iSNS server that provides name services for initiators and targets on your network.
6. Click **OK**.

Set Up Automated Reports for an Individual Storage Center

By default, Storage Centers are configured to use the global automated report settings that are specified for the Data Collector. If you want to use different report settings for a Storage Center, you can configure the automated report settings in the Storage Center properties.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Automated Reports** tab.



5. Deselect the **Use global settings** check box.
6. Select the check boxes in the **Automated Report Settings** area to specify how often to generate the following reports:
 - **Storage Center Summary** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Disk Class** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Disk Power On Time** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Alerts** – Select the **Daily** and/or **Weekly** check boxes.
 - **Volume Storage** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
 - **Replications** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
7. Select the check boxes in the **Automated Table Report Settings** area to specify how often to generate reports and the types of reports to generate.
 - **IO Reports** – IO usage reports for volumes, servers, and disks.
 - **Frequency** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
 - **Report Types** – Select the **Most Active Volumes**, **Most Active Servers**, and/or **Most Active Disks** check boxes.
 - **Storage Reports** – Storage reports for volumes, servers, and disks.
 - **Frequency** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
 - **Volume Report Types** – Select the **Volume**, **Volume Folder**, and/or **Volume Growth** check boxes.
 - **Server Report Types** – Select the **Server** and/or **Server Folder** check boxes.
 - **Disk Report Types** – Select the **Disk**, **Disk Folder**, **Disk Class**, and/or **Disk Tier** check boxes.
8. Click **OK**.

Set the Date and Time for a Storage Center

Select the time zone, then set the date and time or configure the Storage Center to synchronize with an NTP server.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Time Settings** tab.
5. From the **Region** drop-down menu, select the region where the Storage Center is located.
6. From the **Time Zone** drop-down menu, select the time zone where the Storage Center is located.
7. Set the date and time.
 - To set the date and time manually, make sure the **Use NTP Server** check box is cleared, then set the date and time in the **Current Time** fields.
 - To configure the Storage Center to synchronize the date and time with a Network Time Protocol server, select the **Use NTP Server** check box, then type the host name or IP address of an NTP server in the **Server Host or IP Address** field.
8. Click **OK**.

Configure Storage Center SMTP Server Settings

Configure SMTP settings to allow the Storage Center to send alert message emails to users who have specified a recipient address in their contact properties.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **SMTP Server** tab.
5. Configure the SMTP server settings.



- a. Select the **Enable SMTP Email** check box.
 - b. In the **SMTP Mail Server** field, enter the IP address or fully qualified domain name of the SMTP email server. Click **Test Server** to verify connectivity to the SMTP server.
 - c. (Optional) In the **Backup SMTP Server** field, enter the IP address or fully qualified domain name of a backup SMTP email server. Click **Test Server** to verify connectivity to the SMTP server.
 - d. If the SMTP server requires emails to contain a MAIL FROM address, specify an email address in the **Sender Email Address** field.
 - e. (Optional) In the **Common Subject Line** field, enter a subject line to use for all emails sent by the Storage Center.
 - f. Configure how the Storage Center identifies itself to the SMTP server:
 - To use SMTP, type the Storage Center fully qualified domain name in the **Hello Message (HELO)** field.
 - To use ESMTP, select the **Send Extended Hello (EHLO)** check box, then type the Storage Center fully qualified domain name in the **Extended Hello Message (EHLO)** field.
 - g. If the SMTP server requires clients to authenticate before sending email, select the **Use Authorized Login (AUTH LOGIN)** check box, then type a user name and password in the **Login ID** and **Password** fields.
6. Click **OK**.

Configure SNMP Settings for a Storage Center (Storage Center 6.7 and Earlier)

Configure SNMP if you want to monitor the Storage Center with a network management system.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **SNMP Server** tab.
5. Set the community strings that allow access to the Storage Center SNMP agent.
 - a. In the **Read Only Community String** field, type a password for allowing network management systems to read from the Storage Center SNMP agent.
 - b. In the **Read Write Community String** field, type a password for allowing network management systems to read from or write to the Storage Center SNMP agent.
6. If the **Agent Running** status is `Not Running`, click **Start Agent**.
7. If the Storage Center supports SNMP v1 or v2, specify settings for the network management system to which Storage Center will send SNMP traps.
 - a. In the **Trap Community String** field, type a password used to allow the Storage Center SNMP agent to communicate with the Network Management System.
 - b. In the **Trap Destination** field, type host name or IP address of the Network Management System that is collecting trap information.
 - c. From the **Trap Type** drop-down menu, select the trap type to use.
 - d. Click **Start Trap**.
8. When you are finished, click **OK**.

Configure SNMP Settings for a Storage Center (Storage Center Version 7.0 and Later)

Configure SNMP if you want to monitor the Storage Center with a network management system.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **SNMP Server** tab.
5. From the **SNMP Version** drop-down menu, select the version of SNMP to be configured.
The contents of the dialog box change depending on the version selected.
6. If you selected SNMP v1 or v2, set the community strings that allow access to the Storage Center SNMP agent.
 - a. In the **Read Only Community String** field, type a password for allowing network management systems to read from the Storage Center SNMP agent.
 - b. In the **Read Write Community String** field, type a password for allowing network management systems to read from or write to the Storage Center SNMP agent.



7. If you selected SNMP v3, specify the users of SNMP v3 by selecting an existing user or creating a new one.
To create a new user:
 - a. Click **Create SNMP v3 User**.
The Create SNMP v3 User window opens.
 - b. In the **Name** field, type a user name.
 - c. In the **Password** field, type a password.
 - d. Select an authentication method from the **Authentication Type** drop-down menu.
 - e. Select an encryption type from the **Encryption Type** drop-down menu.
 - f. Click **OK**.
 - g. Select the user from the SNMP v3 Settings table.
8. Specify settings for the network management system to which Storage Center will send SNMP traps.
 - a. Click **Create Trap Destination**.
The **Create SNMP Trap Destination** dialog box opens.
 - b. In the **Trap Destination** field, type the host name or IP address of the network management system that is collecting trap information
 - c. From the **Type** drop-down menu, select the notification type and the SNMP version of the trap or inform to be sent.
 - d. In the **Port** field, type the port number of the network management system.
 - e. To create an SNMP v1 or v2 trap, in the **Community String** field, type a password used to allow the Storage Center SNMP agent to communicate with the network management system.
 - f. To create an SNMP v3 trap, select a user from the **SNMP v3 User** drop-down menu.
 - g. If you selected SNMP v1 or v2, to apply the changes to SNMP settings to other Storage Centers, check **Apply these settings to other** Storage Centers.
 - h. Click **OK**.
9. If the **SNMP Running** status is **No**, click **Start SNMP**.
10. When you are finished, click **OK**.

Configuring Filters to Restrict Administrative Access

Access filters can be created to selectively allow administrative access to a Storage Center based on IP address, user privilege level, or user name. When one or more access filters are defined, administrative connections that do not match an access filter are denied.

- Storage Manager does not allow you to create an access filter policy that would reject your current administrative connection.
- Access filters apply to new administrative connections only; existing administrative connections are not affected.

 **NOTE: For user interface reference information, click Help.**

Create an Access Filter for a Storage Center

Create an access filter to explicitly allow administrative connections from a user privilege level, specific user, IP address, or range of IP addresses.


Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **IP Filtering** tab.
5. Click **Create Filter**. The **Create IP Filter** dialog box opens.
6. Select the Storage Center user or user privilege level to allow.
 - To allow access to a Storage Center user privilege level, select **User Privilege Level**, then select a privilege level from the drop-down menu.



- To allow access to an individual Storage Center user, select **Specific User**, then select a user from the drop-down menu.
7. Specify which source IP addresses to allow.
 -  **NOTE: If network address translation (NAT) is enabled in your network environment, be sure to specify the IP address(es) visible to the Storage Center.**
 - To allow all source IP addresses, select **All Hosts**.
 - To allow access to a specific IP address, select **Single IP Address**, then type the IP address in the field.
 - To allow access to a range of IP addresses, select **Range of IP Addresses**, then type the first and last IP addresses in the fields.
 8. When you are finished, click **OK**.

Modify an Access Filter for a Storage Center

Modify an access filter to change the users or IP addresses it allows.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **IP Filtering** tab.
5. Select the access filter that you want to modify, then click **Modify Filter**. The **Modify IP Filter** dialog box appears.
6. Modify the access filter settings as needed. For user interface reference information, click **Help**.
7. (Optional) Modify the allowed Storage Center user or user privilege level.
 - To allow access to a Storage Center user privilege level, select **User Privilege Level**, then select a privilege level from the drop-down menu.
 - To allow access to an individual Storage Center user, select **Specific User**, then select a user from the drop-down menu.
8. (Optional) Modify the allowed source IP addresses.

 **NOTE: If network address translation (NAT) is enabled in your network environment, be sure to specify the IP address(es) visible to the Storage Center.**

- To allow all source IP addresses, select **All Hosts**.
 - To allow access to a specific IP address, select **Single IP Address**, then type the IP address in the field.
 - To allow access to a range of IP addresses, select **Range of IP Addresses**, then type the first and last IP addresses in the fields.
9. When you are finished, click **OK**.

Delete an Access Filter for a Storage Center

Delete an access filter if it is no longer needed or you want to revoke administrative access to the users and IP addresses that the filter matches.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **IP Filtering** tab.
5. Select the access filter that you want to delete, then click **Delete Filter**. The **Delete IP Filter** dialog box opens.
6. Click **OK** to confirm deletion, then click **OK** to close the **Edit Settings** dialog box.

View and Delete Access Violations for a Storage Center

View access violations to determine who has unsuccessfully attempted to log in. A maximum of 100 access violations are recorded and displayed for a Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **IP Filtering** tab.
5. Click **Show Access Violations**. The **Show Access Violations** dialog box appears.
6. (Optional) Delete access violations.
 - a. Select the corresponding check box for each violation that you want to delete.
 - b. Click **Delete Selected Violations**. A confirmation dialog box opens.
 - c. Click **Yes** to close the confirmation dialog box, then click **Close** to close the Show Access Violations dialog box.
7. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Configuring Storage Center Secure Console Settings

The secure console allows support personnel to access the Storage Center console without connecting through the serial port.

 **NOTE: Do not modify the secure console configuration without the assistance of Dell Technical Support.**

Enable Secure Console Access

Enable the secure console to allow support personnel to access the Storage Center console without connecting through the serial port.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Secure Console** tab.
5. Select the **Enable secure console access** check box.
6. In the **Reservation Server Host or IP Address** (Storage Center 6.6 or later) or **Secure Console Server Host or IP Address** field (Storage Center 6.5 or earlier), type the host name or IP address of a secure console server provided by Dell Technical Support.
7. In the **Session Time to Live** field (Storage Center 6.6 or later), enter the time, in minutes, hours, or days, to keep the session active.

 **NOTE: The maximum time to live is 72 hours.**

8. If a SOCKS proxy is required to allow the Storage Center to communicate with the secure console server specified in the previous step, configure the **Proxy Settings**.
 - a. From the **Proxy Type** drop-down menu, select **SOCKS4** or **SOCKS5**.
 - b. In the **IP Address** field, type the IP address of the proxy server.
 - c. In the **Port** field, type the port used by the proxy server.
 - d. If the proxy server requires authentication, complete the **User Name** and **Password** fields.
9. Click **OK**.



Restart the Storage Center Secure Console Server

Troubleshooting an issue may require restarting the secure console server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Secure Console** tab.
5. Click **Restart Server**. A confirmation dialog box appears.
6. Click **OK** to confirm.
7. Click **OK**.

Configuring a Storage Center to Inherit Settings

A Storage Center can be configured to inherit settings from another Storage Center to save time and ensure that Storage Centers are configured consistently.

About this task

 **NOTE:** For user interface reference information, click **Help**.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click **Inherit Settings**. The **Inherit Settings** dialog box opens.
4. Select the Storage Center from which you want to inherit settings, then select the check box for each category of settings that you want to inherit.
5. When you are done, click **OK**.
 - If you modified passwords for the Dell SupportAssist proxy, Secure Console proxy, or SMTP server (or if passwords are not configured), the dialog box closes.
 - If a password for the Dell SupportAssist proxy, Secure Console proxy, or SMTP server was configured previously and not modified, you are prompted to reenter the required passwords.
6. Enter the required password(s) to complete the wizard.

Managing Storage Center Users and Groups

Storage Center users have access to folders, volumes, views, and commands depending on their privilege level and the user groups to which they belong. User accounts can be created locally and/or exist externally in a directory service.

User Privilege Levels

Each user is assigned a single privilege level. Storage Center has three levels of user privilege.

Privilege Level	Allowed Access
Administrator	Read and write access to the entire Storage Center (no restrictions). All Administrators have the same predefined privileges. Only Administrators can manage users and user groups.
Volume Manager	Read and write access to the folders associated with the assigned user groups. Users with this privilege level can create volumes in the allowed volume folders and map them to existing servers in the allowed server folders.
Reporter	Read-only access to the folders associated with the assigned user group(s).

User Groups

User groups grant access to volume, server, and disk folders.

- Users with the Administrator privilege have access to all folders and cannot be added to user groups.
- Users with the Volume Manager or Reporter privilege must be associated with one or more user groups, and can access only the volume, server, and disk folders made available to them.

User Account Management and Authentication

Storage Center access is granted using either of the following methods:

- **Local users and user groups:** User accounts can be created and maintained on the Storage Center.
- **External directory service:** In environments that use Active Directory or OpenLDAP, Storage Center can authenticate directory users. Access can be granted to individual directory users and directory user groups. These users access the Storage Center using their domain credentials.

Managing Local Storage Center Users

Storage Manager can create, manage, and delete local Storage Center users.

 **NOTE: For user interface reference information, click Help.**

Create a Local Storage Center User

Create a local Storage Center user to assign privileges to a new user.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, click **New User**. The **Create Local User** dialog box opens.
6. In the **Name** field, type a name for the user.

 **NOTE: To avoid user name conflicts with directory service users, do not use the @ or \ characters in local user names.**

7. From the **Privilege** drop-down menu, select the privilege level to assign to the user.
 - **Administrator:** When selected, the local user has full access to the Storage Center.
 - **Volume Manager:** When selected, the local user has read and write access to volumes, servers, and disks in the folders associated with the assigned user groups.
 - **Reporter:** When selected, the local user has read-only access to volumes, servers, and disks in the folders associated with the assigned user groups.
8. (Storage Center 6.7 and below) From the **Session Timeout** drop-down menu, select the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.
9. From the **Preferred Language** drop-down menu, select a language. That language will be used for email alerts.
10. (Volume Manager and Reporter only) Add one or more local user groups to the local user.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box opens.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
11. Specify and confirm a password for the user in the **Password** and **Confirm Password** fields.



12. (Optional) Specify more information about the user in the **Details** area.
13. When you are finished, click **OK**. The **Create Local User** dialog box closes.
14. Click **OK** to close the **Edit Settings** dialog box.

Configure the Default User Preferences for New Storage Center Users

The default user preferences are applied to new Storage Center users. The preferences can be individually customized further after the user is created.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, click **More Actions** → **Default User Preferences**. The **Configure Default User Preferences** dialog box opens.
6. Modify the user preferences as needed, then click **OK**.

 **NOTE: For user interface reference information, click Help.**

7. When you are finished, click **OK**. The **Configure Default User Preferences** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Related links

[Configure Preferences for a Local Storage Center User](#)

Increase the Privilege Level for a Local Storage Center User

The privilege level can be increased for local users that have the Volume Manager or Reporter privilege. The privilege level for a user cannot be decreased.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. From the **Privilege** drop-down menu, select the privilege level to assign to the user.
 - **Administrator** – When selected, the local user has full access to the Storage Center.
 - **Volume Manager** – When selected, the local user has read and write access to the folders associated with the assigned user groups.
 - **Reporter** – When selected, the local user has read-only access to the folders associated with the assigned user groups.
7. When you are finished, click **OK**. The local user **Edit Local User Settings** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Change the Preferred Language for a Storage Center User

The preferred language for a Storage Center user determines the languages used in email alerts from the Storage Center.

Prerequisites

The Storage Center must support the preferred language.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. From the **Preferred Language** drop-down menu, select a language.
7. Click **OK**.

Change the Session Timeout for a Local Storage Center User

The session timeout controls the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.

Prerequisites

- The Storage Center must be running Storage Center OS version 6.7 or below.
- The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. From the **Session Timeout** drop-down menu, select the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Enable or Disable Access for a Local Storage Center User

When a local Storage Center user is disabled, the user is not allowed to log in.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. Enable or disable access for the local user.
 - To enable access, select the **Enabled** check box.
 - To disable access, clear the **Enabled** check box.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Modify Local Group Membership for a Local Storage Center User

User groups grant access to volume, server, and disk folders for users with the Volume Manager or Reporter privilege level.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. Modify local group membership for the user.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box opens.
 - b. (Optional) To create a new local user group, click **New Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. To remove the local user from a local group, clear the check box for the group.



- e. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
7. When you are finished, click **OK**. The **Edit Local User Settings** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Configure Preferences for a Local Storage Center User

By default, each Storage Center user inherits the default user preferences. If necessary, the preferences can be individually customized for a user.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. Click **Configure User Preferences**. The **Configure User Preferences** dialog box opens.
7. Modify the user preferences as needed, then click **OK**.

 **NOTE: For user interface reference information, click Help.**

8. When you are finished, click **OK**. The **Edit Local User Settings** dialog box closes.
9. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Related links

[Configure the Default User Preferences for New Storage Center Users](#)

Modify Descriptive Information About a Local Storage Center User

The descriptive information about a local user includes his or her real name, department, title, location, telephone numbers, email address(es), and notes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Settings**. The **Edit Local User Settings** dialog box opens.
6. Modify the **Real Name** field as necessary.
7. Modify the fields in the **Details** area as necessary, then click **OK**.

 **NOTE: For user interface reference information, click Help.**

8. When you are finished, click **OK**. The **Edit Local User Settings** dialog box closes.
9. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Change the Password for a Local Storage Center User

Changing the password for a local Storage Center user through Storage Manager automatically updates any Storage Center mappings that were made using the user's credentials.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Change Password**. The **Change Password** dialog box opens.
6. Enter the old password.

7. Enter and confirm a new password for the local user, then click **OK**.

Delete a Local Storage Center User

Delete a Storage Center user if he or she no longer requires access. The local user that was used to add the Storage Center to Storage Manager cannot be deleted. The last user with the Administrator privilege cannot be deleted because Storage Center requires at least one Administrator.

Prerequisites


The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, select the user, then click **Delete**. The **Delete** dialog box opens.
6. Click **OK** to confirm, then click **OK** to close the **Edit Storage Center Settings** dialog box.

Restore a Deleted Local Storage Center User

A new password must be provided when restoring a deleted user. If you are restoring a deleted user with the Volume Manager or Reporter privilege, the user must be added to one or more local user groups.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local Users** subtab, click **More Actions** → **Restore User**. The **Restore Deleted User** wizard opens.
6. Select the local user that you want to restore, then click **Next**. The wizard advances to the next page.
7. (Volume Manager and Reporter only) Add the local user to one or more local user groups.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box opens.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
8. Enter and confirm a new password for the local user in the **New Password** and **Confirm Password** fields.
9. Modify the remaining user settings as needed.
 **NOTE: For user interface reference information, click Help.**
10. When you are finished, click **Finish** to close the wizard, then click **OK** to close the **Edit Storage Center Settings** dialog box.

Managing Local Storage Center User Groups

User groups grant access to volume, server, and disk folders.

 **NOTE: For user interface reference information, click Help.**

Create a Local User Group

Create a local Storage Center user group to grant access to specific volume, server, and disk folders.

About this task

To create a user group:

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.



3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local User Groups** subtab, click **New Group**. The **Create Local User Group** wizard opens.
6. Add volume folders to the local user group.
 - a. If you need to create a volume folder, click **Create Volume Folder**, then complete the fields in the **Create Volume Folder** dialog box.
 - b. In the upper table, select the volume folder(s) you want to add to the local user group, then click **Add Volume Folders**. The volume folders move from the upper table to the lower table.
 - c. When you are finished, click **Next**. The wizard advances to the next page.
7. Add server folders to the local user group.
 - a. If you need to create a server folder, click **Create Server Folder**, then complete the fields in the **Create Server Folder** dialog box.
 - b. In the upper table, select the server folder(s) you want to add to the local user group, then click **Add Server Folders**. The server folders move from the upper table to the lower table.
 - c. When you are finished, click **Next**. The wizard advances to the next page.
8. Add disk folders to the local user group.
 - a. In the upper table, select the disk folder(s) you want to add to the local user group, then click **Add Disk Folders**. The disk folders move from the upper table to the lower table.
 - b. When you are finished, click **Next**. The wizard advances to the next page.
9. In the **Name** field, type a name for the local user group, then click **Finish**.
10. Click **OK** to close the **Edit Settings** dialog box.

Manage User Membership for a Local Storage Center User Group

Local Storage Center users and directory users that have been individually granted access can be added to local Storage Center user groups.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local User Groups** subtab, select the local user group, then click **Edit** → **Users**. The **Manage Users** dialog box opens.
6. Manage user membership for the user group.
 - Place a check next to the names of users you want to add.
 - Remove the check next to the names of users you want to remove.
7. When you are finished, click **OK** to close the **Manage Users** dialog box.
8. Click **OK** to close the **Edit Settings** dialog box.

Manage Folder Access Granted by a Local Storage Center User Group

The folders that are associated with a local Storage Center user group determine the access that is granted by the user group.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local User Groups** subtab, select the local user group, then click **Edit** → **Folders**. The **Manage Folders** dialog box opens.
6. Manage volume folders for the local user group.
 - a. If you need to create a volume folder, click **Create Volume Folder**, then complete the fields in the **Create Volume Folder** dialog box.
 - b. To add a volume folder, select the volume folder(s) you want to add in the upper table, then click **Add Volume Folders**. The volume folders move from the upper table to the lower table.
 - c. To remove a volume folder, select the volume folder(s) you want to remove from the local user group in the lower table, then click **Remove Volume Folders**. The volume folders move from the lower table to the upper table.



- d. When you are finished, click **Next**. The wizard advances to the next page.
7. Manage server folders for the local user group.
 - a. If you need to create a server folder, click **Create Server Folder**, then complete the fields in the **Create Server Folder** dialog box.
 - b. To add a server folder, select the server folder(s) you want to add in the upper table, then click **Add Server Folders**. The server folders move from the upper table to the lower table.
 - c. To remove a server folder, select the server folder(s) you want to remove from the local user group in the lower table, then click **Remove Server Folders**. The server folders move from the lower table to the upper table.
 - d. When you are finished, click **Next**. The wizard advances to the next page.
8. Manage disk folders for the local user group.
 - a. Add or remove a disk folder.
 - To add a disk folder, select the disk folder(s) you want to add in the upper table, then click **Add Disk Folders**. The disk folders move from the upper table to the lower table.
 - To remove a disk folder, select the disk folder(s) you want to remove from the local user group in the lower table, then click **Remove Disk Folders**. The disk folders move from the lower table to the upper table.
 - b. When you are done, click **Finish**. The wizard closes.
9. Click **OK** to close the **Edit Settings** dialog box.

Delete a Local Storage Center User Group

Delete a local Storage Center user group if it is no longer needed.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Local User Groups** subtab, select the local user group, then click **Delete**. The **Delete** dialog box opens.
6. Click **Yes** to confirm deletion, then click **OK** to close the **Edit Settings** dialog box.

Managing Local Storage Center User Password Requirements

Setting password requirements for local Storage Center users increases the password security for all Storage Center local users.

Configure Local Storage Center User Password Requirements

Set local user password requirements to increase the complexity of local user passwords and improve the security of the Storage Center.

About this task

 **NOTE: For user interface reference information, click Help.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click . The **Edit Storage Center Settings** dialog box opens.
4. Click the **Password Configuration** tab.
5. Select the **Enabled** check box.
6. Configure the password requirements as necessary.
 - To set the number of previous passwords that Storage Center checks against when validating a password, type a value in the **History Retained** field. To disable previous password validation, type 0.
 - To set the minimum number of characters in a new password, type a value in the **Minimum Length** field. To match the Storage Center minimum password length, set the value to 1.
 - To set the number of login failures that lock out an account, type a number in the **Account Lockout Threshold** field. To disable the account lockout threshold, type 0.





NOTE: Only administrator-level accounts can unlock other Storage Center accounts. Have more than one Storage Center administrator-level account so that other Storage Center accounts can be unlocked.

- To require new passwords to follow complexity standards, select the **Complexity Enabled** checkbox. To disable the password complexity requirement, clear the **Complexity Enabled** checkbox.
- To set the number of days before a user can change his or her password, type a value in the **Minimum Age** field. To disable the minimum age requirement, type 0.
- To set the number of days after which a password expires, type a value in the **Maximum Age** field. To disable the maximum age requirement, type 0.
- To set the number of days before a password expires when the expiration warning message is issued, type a value in the **Expiration Warning Time** field. To disable the expiration warning message, type 0.
- To specify the password expiration warning message that a user receives, type a warning message in the **Expiration Warning Message**. The expiration warning message is blank if this field is left empty.

7. Click **OK**.

Reset the Password Aging Clock

The password aging clock determines when a password expires based on the minimum and maximum age requirements. Reset the password aging clock to start the password aging clock from the current date and time.

Prerequisites

Password Configuration must be enabled.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Password Configuration** tab.
5. Select the **Reset Aging Clock** check box.
6. Click **OK**.

Require Users to Change Passwords

The new password requirements apply to new user passwords only. Require users to change passwords at next login so the password complies with the new password requirements.

Prerequisites

Password Configuration must be enabled.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Password Configuration** tab.
5. Select the **Requires Password Change** check box.
6. Click **OK**.

Enabling Directory Services Authentication

Before you can grant Storage Center access to directory users and directory user groups, you must first configure Storage Center to communicate with one or more Active Directory/OpenLDAP servers. If you use Kerberos authentication, you must also configure Storage Center to communicate with the Kerberos Key Distribution Center (KDC).

- An Active Directory or OpenLDAP directory service must be deployed in your environment.
- Storage Center must have network connectivity to the directory service.
- You must be familiar with the Active Directory/OpenLDAP configuration of the directory service.
- Storage Center requires credentials from a directory service user that is allowed to query the directory service and who has sufficient privileges to perform a bind operation.



- (Active Directory only) Joining the controller to the domain requires credentials from a directory service user who is an administrator and who has sufficient privileges to create a computer record in the directory.
- (Active Directory only) To join the controller to the domain, forward and reverse DNS records for the Storage Center must be created in the domain. For a single-controller Storage Center system, create DNS records for the controller IP address. For a dual-controller Storage Center system, create DNS records for the management IP address.
- (OpenLDAP only) To use password authentication with OpenLDAP, an SSL certificate is required to communicate with the directory service using SSL/TLS.

Discover Directory Service Settings Automatically (Storage Center 6.6 or Later Only)

Use the Configure Directory Service Automatic Discovery wizard to allow the Storage Center to discover available directory services automatically.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Directory Services** tab.
5. Click **Configure Directory Services Automatic Discovery**.

The Storage Center automatically discovers directory server settings and displays the settings in the **Configure Directory Service Automatic Discovery** wizard.

6. Type a new value into the field of any setting you want to change.
 - In the **URI** field, type the uniform resource identifier (URI) for one or more servers to which Storage Center connects.


 **NOTE: Use the fully qualified domain name (FQDN) of the servers.**

Example URIs for two servers:

ldap://server1.example.com ldap://server2.example.com:1234

 **NOTE: Adding multiple servers ensures continued authorization of users in the event of a resource outage. If Storage Center cannot establish contact with the first server, Storage Center attempts to connect to the remaining servers in the order listed.**

- In the **Directory Server Connection Timeout** field, enter the maximum time (in minutes) that Storage Center waits while attempting to connect to an Active Directory server. This value must be greater than zero.
 - In the **Base DN** field, type the base distinguished name for the LDAP server. The Base DN is the starting point when searching for users.
 - In the **Storage Center Hostname** field, type the fully qualified domain name (FQDN) of the Storage Center.
 - For a single-controller Storage Center system, this is the fully qualified host name for the controller IP address.
 - For a dual-controller Storage Center system, this is the fully qualified host name for the management IP address.
 - In the **LDAP Domain** field, type the LDAP domain to search.
7. (Optional) Click **Test Server** to verify that the Storage Center can communicate with the specified directory servers using the selected protocol.
 8. (Optional) If Transport Layer Security (TLS) is enabled, upload a Certificate Authority PEM file.
 - a. Click **Upload Certificate Authority PEM**.
 - b. Browse to the location of the PEM file, select the file, and click **Open**. The **Upload TLS Certificate** dialog box opens.

 **NOTE: If you select the wrong PEM file, click Upload Certificate in the Upload TLS Certificate dialog box to select a new file.**
 - c. Click **OK** to upload the certificate.
 9. Click **Next**. The **Kerberos Settings** page opens.
 10. (Optional) Select the **Enabled** check box to enable Kerberos authentication.
 11. To change any of the Kerberos settings, clear the **Auto-Discover** check box, and then type a new value into that field.
 - **Kerberos Domain Realm:** Kerberos domain realm to authenticate against. In Windows networks, this is the domain name in uppercase characters.



- **KDC Hostname or IP Address:** Fully qualified domain name (FQDN) or IP address of the Key Distribution Center (KDC) to which Storage Center will connect.
 - **Password Renew Rate (Days):** Number of days before the keytab is regenerated. The default value is 0, which equates to a password renew rate of 14 days.
12. Click **Next**. The **Join Domain** page opens.
 13. Enter the user name and password of a domain administrator.
 14. If you want to change any setting, click **Back** to return to the previous page. When all settings are correct, click **Finish**.

Configure Directory Services Manually (Storage Center 6.6 or Later Only)


Use the Directory Service Manual Configuration wizard to enter directory service settings manually. Use manual configuration for OpenLDAP or special Active Directory sites.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Directory Services** tab.
5. Click **Configure Directory Services Manually**.
The **Directory Service Manual Configuration** wizard opens.
6. From the **Directory Type** drop-down menu, select **Active Directory** or **OpenLDAP**.
7. Enter the settings for the directory server.
 - In the **URI** field, type the uniform resource identifier (URI) for one or more servers to which Storage Center connects.

 **NOTE: Use the fully qualified domain name (FQDN) of the servers.**

Example URIs for two servers:

ldap://server1.example.com ldap://server2.example.com:1234

 **NOTE: Adding multiple servers ensures continued authorization of users in the event of a resource outage. If Storage Center cannot establish contact with the first server, Storage Center attempts to connect to the remaining servers in the order listed.**

- In the **Base DN** field, type the base distinguished name for the LDAP server. The Base DN is the starting point when searching for users.
- In the **Relative Base** field, type the Relative Base information. A Relative Base is a list of Relative Distinguished Names (RDN) prepended to the Base DN, indicating where the controller should be joined to the domain. An RDN contains an attribute and a value, such as:

OU=SAN Controllers

OU is the attribute, and **SAN Controllers** is the value.

The following special characters used within an RDN value must be escaped using a backslash:

, + " \ < > ; = / CR and LF

For example:

Relative Base: OU=SAN Controllers

(No escapes necessary)

Relative Base: OU=SAN\+Controllers

(The plus character is escaped)

Relative Base: OU=Buildings A\,B\C,OU=SAN \+Controllers

(Commas and plus sign are escaped *except* for the comma separating the RDNs.)

- In the **Storage Center Hostname** field, type the fully qualified domain name (FQDN) of the Storage Center.
 - For a single-controller Storage Center system, this is the fully qualified host name for the controller IP address.
 - For a dual-controller Storage Center system, this is the fully qualified host name for the management IP address.
 - In the **LDAP Domain** field, type the LDAP domain to search.
 - In the **Authentication Bind DN** field, type the Distinguished Name or User Principal Name of the user that the Storage Center uses to connect to and search the LDAP server.
 - In the **Authentication Bind Password** field, type the password for the authentication bind Distinguished Name.
8. (Optional) Click **Test Server** to verify that the Storage Center can communicate with the specified directory server(s) using the selected protocol.
 9. (Optional) If Transport Layer Security (TLS) is enabled, upload a Certificate Authority PEM file.
 - a. Click **Upload Certificate**.
 - b. Click **Choose File**.
 - c. Browse to the location of the PEM file, select the file, and click **Open**. The **Upload TLS Certificate** dialog box opens.
 - d. Click **OK** to upload the certificate.
 10. Click **Next**. The **Join Domain** page opens.
 11. Enter the user name and password of a domain administrator.
 12. If you want to change any setting, click **Back** to return to the previous page. When all settings are correct, click **Finish**.

Managing Directory Service Users

Directory service users can be individually granted access to a Storage Center.

 **NOTE: For user interface reference information, click Help.**

Grant Access to a Directory User

Grant access to a directory user to allow the user to log in to the Storage Center using his or her directory credentials.

Prerequisites

- The Storage Center must be configured to authenticate users with an external directory service.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, click **More Actions** → **Grant Access to Directory User**. The **Grant Access to Directory User** dialog box opens.
6. In the **Name** field, type the directory user name assigned to the user. The following formats are supported:
 - *username@domain*
 - *domain\username*
7. In the **Distinguished Name** field, type the distinguished name for the user.
Example: CN=Firstname Lastname,CN=Users,DC=example,DC=com
8. From the **Privilege** drop-down menu, select the privilege level to assign to the user.
 - **Administrator**: When selected, the local user has full access to the Storage Center.
 - **Volume Manager**: When selected, the local user has read and write access to the folders associated with the assigned user groups.
 - **Reporter**: When selected, the local user has read-only access to the folders associated with the assigned user groups.
9. (Storage Center version 6.7 and below) From the **Session Timeout** drop-down menu, select the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.



10. (Volume Manager and Reporter only) Add one or more local user groups to the local user.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box appears.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
11. (Optional) Specify more information about the user in the **Details** area. For user interface reference information, click **Help**.
12. When you are finished, click **OK**. The **Grant Access to Directory User** dialog box closes.
13. Click **OK** to close the **Edit Settings** dialog box.

Increase the Privilege Level for a Directory Service User

The privilege level can be increased for directory service users that have the Volume Manager or Reporter privilege. The privilege level for a user cannot be decreased.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Settings**. The **Edit Settings** dialog box opens.
6. From the **Privilege** drop-down menu, select the privilege level to assign to the user.
 - **Administrator** – When selected, the local user has full access to the Storage Center.
 - **Volume Manager** – When selected, the local user has read and write access to the folders associated with the assigned user groups.
 - **Reporter** – When selected, the local user has read-only access to the folders associated with the assigned user groups.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
8. Click **OK** to close the Storage Center **Edit Settings** dialog box.

Change the Session Timeout for a Directory Service User

The session timeout controls the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Settings**. The **Edit Settings** dialog box opens.
6. From the **Session Timeout** drop-down menu, select the maximum length of time that the local user can be idle while logged in to the Storage Center System Manager before the connection is terminated.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
8. Click **OK** to close the Storage Center **Edit Settings** dialog box.

Enable or Disable Access for a Directory Service User

When a directory service user is disabled, the user is not allowed to log in.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Edit Settings**. The **Edit Settings** dialog box appears.
6. Enable or disable access for the directory service user.
 - To enable access, select the **Enabled** check box.



- To disable access, clear the **Enabled** check box.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
 8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Modify Local Group Membership for a Directory Service User

User groups grant access to volume, server, and disk folders for users with the Volume Manager or Reporter privilege level.

Prerequisites

- The directory service user must have been individually granted access to the Storage Center. Users that have been granted access based on a directory group inherit local group membership from the directory group settings.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Settings**. The **Edit Settings** dialog box opens.
6. Modify local group membership for the user.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box opens.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. To remove the local user from a local group, clear the check box for the group.
 - e. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
7. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
8. Click **OK** to close the Storage Center **Edit Settings** dialog box.

Configure Preferences for a Directory Service User

By default, each Storage Center user inherits the default user preferences. If necessary, the preferences can be individually customized for a user.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Settings**. The **Edit Settings** dialog box opens.
6. Click **Configure User Preferences**. The **Configure User Preferences** dialog box opens.
7. Modify the user preferences as needed, then click **OK**.

 **NOTE: For user interface reference information, click Help.**


8. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
9. Click **OK** to close the Storage Center **Edit Settings** dialog box.

Modify Descriptive Information About a Directory Service User

The descriptive information about a local user includes his or her real name, department, title, location, telephone numbers, email address(es), and notes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Settings**. The **Edit Settings** dialog box opens.
6. Click **Configure User Preferences**. The **Configure User Preferences** dialog box opens.



7. Modify the **Real Name** field as necessary.
8. Modify the fields in the **Details** area as necessary, then click **OK**.
 -  **NOTE: For user interface reference information, click Help.**
9. When you are finished, click **OK**. The local user **Edit Settings** dialog box closes.
10. Click **OK** to close the Storage Center **Edit Settings** dialog box.

Delete a Directory Service User

Delete a directory service user if he or she no longer requires access. The user that was used to add the Storage Center to Storage Manager cannot be deleted. The last user with the Administrator privilege cannot be deleted because Storage Center requires at least one Administrator.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, select the user, then click **Delete**. The **Delete** dialog box opens.
6. Click **Yes** to confirm, then click **OK** to close the **Edit Settings** dialog box.

Restore a Deleted Directory Service User

If you are restoring a deleted user with the Volume Manager or Reporter privilege, the user must be added to one or more local user groups.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory Users** subtab, click **More Actions** → **Restore User**. The **Restore Deleted User** wizard opens.
6. Select the directory service user that you want to restore, then click **Next**. The wizard advances to the next page.
7. (Volume Manager and Reporter only) Add the local user to one or more local user groups.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box opens.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the local user.
 - d. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
8. Modify the remaining user settings as needed.

 **NOTE: For user interface reference information, click Help.**

9. When you are finished, click **Finish** to close the wizard, then click **OK** to close the **Edit Settings** dialog box.

Managing Directory User Groups

Granting access to a directory user group grants access to all directory users that belong to the group.

 **NOTE: For user interface reference information, click Help.**

Grant Access to a Directory User Group

Grant access to a directory user group to allow directory users in the group to log in to the Storage Center.

Prerequisites

- The Storage Center must be configured to authenticate users with an external directory service.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.

3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. Click **Add Group**. The **Grant Access to Directory User Groups** dialog box opens.
6. In the **Display Name** field, type a name to identify the directory user group.
7. In the **Distinguished Name** field, type the distinguished name for the directory user group.
Example: CN=Groupname,CN=Users,DC=example,DC=com
8. From the **Privilege** drop-down menu, select the privilege level to assign to the user group.
 - **Administrator:** When selected, directory users in the group have full access to the Storage Center.
 - **Volume Manager:** When selected, directory users in the group have read and write access to the folders associated with the assigned user groups.
 - **Reporter:** When selected, directory users in the group have read-only access to the folders associated with the assigned user groups.
9. (Volume Manager and Reporter only) Add one or more local user groups to the directory user group.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box appears.
 - b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the directory user group.
 - d. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
10. When you are finished, click **OK**. The **Grant Access to Directory User Groups** dialog box closes.
11. Click **OK** to close the **Edit Settings** dialog box.

Increase the Privilege Level for a Directory User Group

The privilege level can be increased for directory service groups that have the Volume Manager or Reporter privilege. The privilege level for a directory service group cannot be decreased.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory User Groups** subtab, select the directory user group, then click **Edit Settings**. The **Edit Settings** dialog box opens.
6. From the **Privilege** drop-down menu, select the privilege level to assign to the user group.
 - **Administrator** – When selected, directory users in the group have full access to the Storage Center.
 - **Volume Manager** – When selected, directory users in the group have read and write access to the folders associated with the assigned user groups.
 - **Reporter** – When selected, directory users in the group have read-only access to the folders associated with the assigned user groups.
7. When you are finished, click **OK**. The **Edit Settings** dialog box closes.
8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Modify Local Group Membership for a Directory User Group

Local user groups grant access to volume, server, and disk folders for directory user groups with the Volume Manager or Reporter privilege level.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory User Groups** subtab, select the directory user group, then click **Edit Settings**. The **Edit Settings** dialog box appears.
6. Modify local group membership for the directory user group.
 - a. In the **Local User Groups** area, click **Change**. The **Select Local User Groups** dialog box appears.



- b. (Optional) To create a new local user group, click **Create Local User Group**, then complete the **Create Local User Group** wizard. For user interface reference information, click **Help**.
 - c. Select the check box for each local user group you want to associate with the directory user group.
 - d. To remove the directory user group from a local group, clear the check box for the local group.
 - e. When you are finished, click **OK**. The **Select Local User Groups** dialog box closes.
7. When you are finished, click **OK**. The **Edit Settings** dialog box closes.
 8. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Delete a Directory User Group

Delete a directory user group if you no longer want to allow access to the directory users that belong to the group.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Users and User Groups** tab.
5. On the **Directory User Groups** subtab, select the directory user group, then click **Delete**. The **Delete** dialog box opens.
6. Click **OK** to confirm.
7. Click **OK** to close the **Edit Storage Center Settings** dialog box.

Managing Front-End IO Ports

Front-end ports connect an Storage Center directly to a server using SAS connections or to the Ethernet networks and Fibre Channel (FC) fabrics that contain servers that use storage. iSCSI, FC, or SAS IO ports can be designated for use as front-end ports.

 **NOTE: For Storage Manager clients connected to an SCv2000 series controller with a Data Collector: If an SCv2000 series controller is connected to a server with a SAS front end, nothing related to that SAS connection will be visible in the servers view of Storage Manager.**

Front-End Connectivity Modes

Storage Center uses either legacy mode, virtual port mode, or ALUA port mode to transport data to servers that use SAN storage. In legacy mode, front-end IO ports are configured in pairs of primary and reserved ports. In virtual port mode, all ports are active, and if one port fails the load is distributed between the remaining ports within the same fault domain. In ALUA port mode, volumes are mapped using two paths, active and passive.

 **NOTE: In Legacy mode, reserve ports and primary ports reside on separate controllers, providing controller-level failover only. Legacy mode does not provide port-level failover.**

The front-end connectivity mode is configured independently for Fibre Channel and iSCSI. Both transport types can be configured to use the same mode or different modes to meet the needs of the network infrastructure. For example, a Storage Center can be configured to use virtual port mode for iSCSI and legacy mode for FC.

- The front-end connectivity mode for FC and iSCSI ports is initially selected during Storage Center deployment.
- After deployment, the front-end FC and/or iSCSI ports can be changed from legacy mode to virtual port mode.
 - After FC and/or iSCSI ports are configured for virtual port mode, they cannot be changed back to legacy mode.

 **NOTE: Dell strongly recommends using virtual port mode unless the network environment does not meet the requirements for virtual port mode.**

- The front-end connectivity mode for SAS front-end is always ALUA port mode and cannot be changed.

Virtual Port Mode

Virtual port mode provides port and controller redundancy by connecting multiple active ports to each Fibre Channel or Ethernet switch.

In virtual port mode, each physical port has a WWN (World Wide Name), and is also assigned an additional virtual WWN. Servers target only the virtual WWNs. During normal conditions, all ports process IO. In the event of a port or controller failure, a virtual WWN will move to another physical WWN in the same fault domain. When the failure is resolved and ports are rebalanced, the virtual port returns to the preferred physical port.

Virtual port mode provides the following advantages over legacy mode:

- **Increased performance:** Because all ports are active, additional front-end bandwidth is available without sacrificing redundancy.
- **Improved redundancy:** Ports can fail over individually instead of by controller.
- **Simplified iSCSI configuration:** Each fault domain has an iSCSI control port that coordinates discovery of the iSCSI ports in the domain. When a server targets the iSCSI port IP address, it automatically discovers all ports in the fault domain.

ALUA Port Mode

Asymmetric Logical Unit Access (ALUA) provides port and controller redundancy for SAS front-end connections.

Volumes mapped to a server using SAS front-end also have port and controller redundancy. Volumes mapped over SAS are mapped to both controllers. The volume mapping is Active/Optimized on one controller and Standby on the other controller. If the port or controller fails on the active controller, the paths to the other controller become Active/Optimized. The mapping on the first controller switches to Standby. When the port or controller recovers, the mapping to the first controller returns to Active/Optimized and the mapping to the second controller returns to Standby status.

Legacy Mode

Legacy mode provides controller redundancy for a dual-controller Storage Center by connecting multiple primary and reserved ports to each Fibre Channel or Ethernet switch.

In legacy mode, each primary port on a controller is paired with a corresponding reserved port on the other controller. During normal conditions, the primary ports process IO and the reserved ports are in standby mode. If a controller fails, the primary ports fail over to the corresponding reserved ports on the other controller. This approach ensures that servers connected to the switch do not lose connectivity if one of the controllers fails. For optimal performance, the primary ports should be evenly distributed across both controllers. When possible, front-end connections should be made to separate controller IO cards to improve redundancy.

Fault Domains

Front-end ports are categorized into fault domains that identify allowed port movement when a controller reboots or a port fails. Failure modes and port activity depend on whether the Storage Center is configured for Legacy mode, ALUA port mode, or Virtual port mode.

Fault Domains for SCv2000 Series Controllers

When used on SCv2000 series controllers, Storage Center handles all fault domain creation and modification.

Fault domain behavior on SCv2000 series controllers:

- Fault domains are automatically generated.
- There are always two fault domains for IO in Fibre Channel and iSCSI configurations, not including replication-only domains.
- Fault domains are automatically created for Flex/Embedded Ethernet ports.
- Four fault domains are created for front-end SAS ports.

 **NOTE: Fault domains cannot be modified by users with SCv2000 series controllers.**




Fault Domains in Virtual Port Mode

In virtual port mode, fault domains group front-end ports that are connected to the same Fibre Channel fabric or Ethernet network. All ports in a fault domain are available for IO. If a port fails, IO is routed to another port in the fault domain.

The following requirements apply to fault domains in virtual port mode:

- Fault domains are created for each front-end Fibre Channel fabric or Ethernet network.
- A fault domain must contain a single type of transport media (FC or iSCSI, but not both).

 **CAUTION: For iSCSI only, servers initiate IO to iSCSI ports through the control port of the fault domain. If an iSCSI port moves to a different fault domain, its control port changes. This change disrupts any service initiated through the previous control port. If an iSCSI port moves to a different fault domain, you must reconfigure the server-side iSCSI initiators before service can be resumed.**

- For each fault domain, it is a best practice to connect at least two cables from each controller to the Fibre Channel fabric or Ethernet network.

Fault Domains in Legacy Mode

In Legacy Mode, each pair of primary and reserved ports are grouped into a fault domain. The fault domain determines which ports are allowed to fail over to each other.

The following requirements apply to fault domains in legacy mode on a dual-controller Storage Center:

- A fault domain must contain one type of transport media (FC or iSCSI, but not both).
- A fault domain must contain one primary port and one reserved port.
- The reserved port must be located on a different controller than the primary port.

 **NOTE: For a single-controller Storage Center, only one fault domain is required for each transport type (FC or iSCSI) because there are no reserved ports.**

Failover Behavior

Legacy mode, ALUA port mode, and virtual port mode behave differently during failure conditions because they use different mechanisms to provide fault tolerance.

Scenario	Virtual Port Mode	Legacy Mode	ALUA Port Mode
Normal operating conditions	All ports are active and pass IO.	<ul style="list-style-type: none">• Primary ports pass IO.• Reserved ports remain in a standby mode until a controller failure.	<ul style="list-style-type: none">• Active/Optimized ports pass IO.• Standby ports remain in a standby mode until a controller or port failure.
A controller fails in a dual-controller Storage Center	Virtual ports on the failed controller move to physical ports on the functioning controller.	Primary ports on the failed controller fail over to reserved ports on the functioning controller.	Active/Optimized ports on the failed controller fail over to Standby ports on the functioning controller.
A single port fails (single- or dual-controller Storage Center)	An individual port fails over to another port in the fault domain.	The port does not fail over because there was no controller failure. If a second path is available, MPIO software on the server provides fault tolerance.	The port fails over to the Standby port on the functioning controller.

Managing Front-End IO Port Hardware

Front-end FC and iSCSI ports can be renamed and monitored with threshold definitions. iSCSI ports can be assigned network configuration and tested for network connectivity.

 **NOTE: For user interface reference information, click Help.**

Rename a Front-End IO Port

Set a display name for a physical or virtual IO port to make it more identifiable.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Front End Ports** tab.
5. Select the IO port, then click **Edit**. The **Edit Port** dialog box opens.
6. In the **Name** field, type a descriptive name for the IO port.
7. Click **OK**.

Set or Modify the IP Address for a Single iSCSI Port

Servers target the iSCSI port IP address to initiate iSCSI connections to the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Front End Ports** tab.
5. Select the IO port, then click **Edit**. The **Edit Port** dialog box opens.
6. In the **IPv4 Address** field, type the new IPv4 address for the iSCSI I/O port.
7. Click **OK**.


Test Network Connectivity for an iSCSI Port

Test connectivity for an iSCSI I/O port by pinging a port or host on the network.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Front End Ports** tab.
5. Select the IO port, then click **Ping Address**. The **Ping Address** dialog box opens.
6. If the port uses an IPv4 address, in the **IPv4 Address** field, type the IP address of the host to which you want to test connectivity.
7. From the **Ping Size** drop-down menu, select a size in bytes for the ping packets, not including overhead. If you select **Other**, type a value between 1 and 17000 bytes in the field below the menu.

 **NOTE: The Ping Size drop-down menu might not appear depending on the hardware I/O cards used by the Storage Center.**

8. Click **OK**. A message displays the results of the test.

 **NOTE: If the physical or virtual port is located on a Chelsio iSCSI card, the first ping test to a specific IP address fails and displays the error `SendPing: No ARP entry for nn.nn.nn.nn, sending ARP now. Try again later`. Run the ping test again to verify connectivity.**

9. Click **OK** to close the message.

Related links

[Test Network Connectivity for an iSCSI Port in a Fault Domain](#)

Set Threshold Alert Definitions for a Front-End IO Port

Configure one or more Threshold Alert Definitions for an IO port if you want to be notified when an IO port reaches specific bandwidth or latency thresholds.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.



3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Front End Ports** tab.
5. Select the IO port.
6. Click **Set Thresholds**. The **Set Threshold Alert Definitions** dialog box opens.
7. Click **New Threshold Definition**. The **New Threshold Definition** dialog box opens.
8. Configure the threshold definition attributes as needed, then click **OK**. These attributes are described in the online help.
9. From the **Available Alert Definitions** table, select the new Threshold Alert Definition.
10. Click **Set Definition**.
11. Click **OK** to close the **Set Threshold Alert Definitions** dialog box.

Configure Front-End IO Ports (SAS and Fibre Channel)

On SCv2000 series controllers, ports must be configured before they can be used as front-end ports. After Storage Manager configures the port, it is also added to a fault domain.

Prerequisites

- The Storage Center must be a SCv2000 series storage system.
- The port cannot be already configured.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Unconfigured Ports** tab.
5. Select an unconfigured SAS or Fibre Channel IO port.
6. Click **Configure Port**.
Storage Manager configures the port as a front-end port.

Configure Front-End IO Ports (iSCSI)

On SCv2000 series controllers, ports must be configured before they can be used as front-end ports. After Storage Manager configures the port, it is also added to a fault domain.

Prerequisites

- The Storage Center must be a SCv2000 series storage system.
- The port cannot be already configured.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Unconfigured Ports** tab.
5. Select an unconfigured iSCSI IO port.
6. Click **Configure Port**. The **Configure Port** dialog box opens.
7. In the **IPv4 Address** field, type a new IP address for the iSCSI IO port.
8. Click **OK**.
Storage Manager configures the IO port and adds it to the iSCSI fault domain.

Unconfigure Front-End IO Ports

On SCv2000 series controllers, when a port is down and will not be used, unconfigure the port.

Prerequisites

- The Storage Center must be a SCv2000 series storage system.
- The port must be down.



Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Front End Ports** tab.
5. Select a down IO port.
6. Click **Unconfigure Port**. The **Unconfigure Port** confirmation dialog box opens.
7. Click **OK**.
Storage Manager unconfigures the port.

Convert Front-End Ports to Virtual Port Mode

Use Dell Storage Manager to convert all front-end iSCSI or Fibre Channel IO ports to virtual port mode. After the conversion is complete, the ports cannot be converted back to legacy mode.

Prerequisites

The ports must be in legacy port mode.

 **NOTE: This operation cannot be undone. After the ports are converted to virtual port mode, they cannot be converted back.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. In the **Fault Domains** tab, click **Convert** → **iSCSI to Virtual Port Mode** or **Convert** → **Fibre Channel to Virtual Port Mode**. The **Convert to Virtual Port Mode** confirmation dialog box opens.
5. If converting an iSCSI port that is currently in a fault domain, type a new IP address to be used for the primary port of each iSCSI fault domain.
6. Click **OK**.

Managing Back-End IO Port Hardware

Back-end SAS ports can be renamed and monitored with threshold definitions.

Rename a Back-End IO Port

Set a display name for an IO port to make it more identifiable.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Back End Ports** tab.
5. Select the IO port, then click **Edit**. The **Edit Port** dialog box opens.
6. In the **Name** field, type a descriptive name for the IO port.
7. Click **OK**.

Set Threshold Alert Definitions for a Back-End IO Port

Configure one or more Threshold Alert Definitions for an IO port if you want to be notified when an IO port reaches specific bandwidth or latency thresholds.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.



4. Click the **Back End Ports** tab.
5. Select the IO port.
6. Click **Set Thresholds**. The **Set Threshold Alert Definitions** dialog box opens.
7. Click **New Threshold Definition**. The **New Threshold Definition** dialog box opens.
8. Configure the threshold definition attributes as needed, then click **OK**.
9. From the **Available Alert Definitions** table, select the new Threshold Alert Definition.
10. Click **Set Definition**.
11. Click **OK** to close the **Set Threshold Alert Definitions** dialog box.

Configure Back-End IO Ports

On SCv2000 series controllers, ports must be configured before they can be used as back-end ports. After Storage Manager configures the port, it is also added to a fault domain.

Prerequisites

- The Storage Center must be a SCv2000 series storage system.
- The port cannot be already configured.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Click the **Unconfigured Ports** tab.
5. Select an unconfigured SAS IO port.
6. Click **Configure as Back-End**.

Storage Manager configures the port as a back-end port.

Grouping Fibre Channel IO Ports Using Fault Domains

Front-end ports are categorized into fault domains that identify allowed port movement when a controller reboots or a port fails. Ports that belong to the same fault domain can fail over to each other because they have connectivity to the same resources.

 **NOTE: For user interface reference information, click Help.**

Create a Fibre Channel Fault Domain

Create a Fibre Channel fault domain to group FC ports for failover purposes.

Prerequisites

The FC ports that will be added to the fault domain must be unconfigured. Ports that are already added to a fault domain or designated as back-end ports cannot be added to a new fault domain.

- In virtual port mode, all FC ports that are connected to the same FC fabric should be added to the same fault domain.
- In legacy mode, each pair of primary and reserved ports connected to the same FC fabric should be added to a unique fault domain. The primary port should be located on a different controller than the secondary port.

About this task

 **NOTE: Fibre Channel ports must be configured in Virtual Port Mode when using SCv2000 series controllers. Legacy Mode is not supported.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. In the **Fault Domains** subtab, click **New** → **Fibre Channel Fault Domain**. The **Create Fibre Channel Fault Domain** dialog box opens.

5. In the **Name** field, type a name for the fault domain.
6. In the **Ports** table, select the Fibre Channel ports to add to the fault domain. All FC ports in the fault domain should be connected to the same FC fabric.
7. Click **OK**.

Rename a Fibre Channel Fault Domain

The fault domain name allows administrators to identify the fault domain.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. In the **Fault Domains** subtab, select the fault domain, then click **Edit**. The **Edit Fibre Channel Fault Domain** dialog box opens.
5. In the **Name** field, type a name for the fault domain.
6. Click **OK**.

Grouping iSCSI IO Ports Using Fault Domains

Front-end ports are categorized into fault domains that identify allowed port movement when a controller reboots or a port fails. Ports that belong to the same fault domain can fail over to each other because they have connectivity to the same resources.

 **NOTE: For SC4020 storage controllers, the 10Gb Ethernet iSCSI port on each storage controller module is used only for replication to another Storage Center. Front-end connectivity to servers is not supported for these ports.**

iSCSI VLAN Tagging Support

iSCSI ports in a fault domain can be configured to use a VLAN ID. For each Storage Center, one of two levels of VLAN functionality is available depending on the Storage Center OS version, Storage Center controller model, and iSCSI hardware. Basic VLAN functionality is referred to as single-VLAN tagging, and enhanced VLAN functionality is referred to as multi-VLAN tagging.

Single-VLAN Tagging

If a Storage Center supports single-VLAN tagging, a maximum of 1 VLAN ID can be configured for each iSCSI IO port. An iSCSI IO port can belong to only one fault domain, and all ports in the same fault domain use the same VLAN ID.

Single VLAN tagging is supported by all Storage Center versions compatible with Storage Manager.

Multi-VLAN Tagging

If a Storage Center supports multi-VLAN tagging, a maximum of 64 VLAN IDs can be configured for each iSCSI IO port. An iSCSI IO port can belong to up to 64 fault domains—one for each VLAN.

Multi-VLAN tagging is supported by Storage Centers that meet the multi-VLAN tagging requirements.

Multi-VLAN Tagging Requirements

The following table lists the requirements that a Storage Center must meet to support multi-VLAN tagging.

Requirement	Description
Storage Center OS	Version 6.5 or later must be installed on the Storage Center.
Storage Center controller model	The Storage Center must have SC8000, SC4020, or CT-SC040 model controllers.
Storage Center iSCSI IO card hardware	Chelsio T3/T5 10G iSCSI cards must be installed in the Storage Center.
Storage Center front-end connectivity mode	The Storage Center iSCSI ports must be configured for virtual port mode. Legacy mode is not supported.



Types of iSCSI Fault Domains

When a Storage Center meets the multi-VLAN tagging requirements, two types of iSCSI fault domains can be created.

- **Physical** – The first fault domain configured for a given set of iSCSI ports.
 - Physical fault domains do not require a VLAN ID, but can be configured to use a VLAN ID.
 - Physical fault domains support iSCSI replication to and from remote Storage Centers.
- **Virtual** – Subsequent VLAN fault domains configured for the same set of iSCSI ports are referred to as virtual fault domains.
 - Virtual fault domains must be assigned a VLAN ID.
 - Virtual fault domains do not support iSCSI replication.
 - Virtual fault domains do not support IPv6.

Creating iSCSI Fault Domains

Create an iSCSI fault domain to group ports that can fail over to each other because they have connectivity to the same resources.

 **NOTE: For user interface reference information, click Help.**

Create an iSCSI Fault Domain

Create an iSCSI fault domain to group physical ports for failover purposes.

Prerequisites

- In virtual port mode, all iSCSI ports that are connected to the same iSCSI network should be added to the same fault domain.
- In legacy mode, each pair of primary and reserved ports that are connected to the same iSCSI network should be added to a unique fault domain. The primary port should be located on a different controller than the secondary port.
- Physical ports cannot be selected and added to a fault domain if they are already added to another fault domain.
- Each iSCSI port that you want to add to the fault domain must be assigned an IP address, subnet mask, and gateway in the same network as the iSCSI control port for the fault domain.

About this task

 **NOTE: iSCSI ports must be configured in virtual port mode when using SCv2000 series controllers. Legacy mode is not supported.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. In the **Fault Domains** subtab, click **New** → **iSCSI Fault Domain**. The **Create iSCSI Fault Domain** dialog box opens.
5. In the **Name** field, type a name for the fault domain.
6. Configure an IP address and gateway for the iSCSI control port in the fault domain. Servers target this IP address using iSCSI initiators, and the Storage Center redirects individual iSCSI connections to the appropriate virtual port.
 - a. In the **Target IPv4 Address** field, type an IP address to assign to the iSCSI control port.
 - b. In the **Subnet Mask** field, type the subnet mask for the well-known IP address.
 - c. In the **Gateway IPv4 Address** field, type the IP address for the iSCSI network default gateway.
7. In the **Ports** table, select the iSCSI ports to add to the fault domain. All iSCSI ports in the fault domain should be connected to the same Ethernet network.

If creating a physical fault domain, physical ports appear in the list only if they are not assigned to any fault domain yet.
8. Click **OK**.

Related links

[Set or Modify the IP Address for a Single iSCSI Port](#)

[Add a VLAN ID to a Physical iSCSI Fault Domain](#)

[iSCSI VLAN Tagging Support](#)

Create a VLAN Copy of an iSCSI Fault Domain

To add a VLAN ID to iSCSI ports that are already in use, use an existing iSCSI fault domain as the basis for a new VLAN iSCSI fault domain.

Prerequisites

- The Storage Center must meet the multi-VLAN tagging requirements.
- Virtual fault domains do not support IPv6.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. In the **Fault Domains** subtab, click **More Actions** → **Create VLAN Copy**. The **Create VLAN Copy** dialog box opens.
5. In the **Name** field, type a name for the fault domain.
6. Configure an IP address and gateway for the iSCSI control port in the fault domain. Servers target this IP address using iSCSI initiators, and the Storage Center redirects individual iSCSI connections to the appropriate virtual port.
 - a. In the **Target IPv4 Address** field, type an IP address to assign to the iSCSI control port.
 - b. In the **Subnet Mask** field, type the subnet mask for the well-known IP address.
 - c. In the **Gateway IPv4 Address** field, type the IP address for the iSCSI network default gateway.
7. Configure VLAN tagging.
 - a. In the **VLAN ID** field, type the VLAN ID for the fault domain. Allowed values are 1–4096.
 - b. To assign a priority level to the VLAN, type a value from 0–7 in the **Class of Service Priority** field. 0 is best effort, 1 is the lowest priority, and 7 is the highest priority.
8. Click **OK**.

Modifying iSCSI Fault Domains

Modify an iSCSI fault domain to change its name, modify network settings for iSCSI ports in the domain, add or remove iSCSI ports, or delete the fault domain.

 **NOTE:** For user interface reference information, click **Help**.

Rename an iSCSI Fault Domain

The fault domain name allows administrators to identify the fault domain.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. In the **Name** field, type a name for the fault domain.
6. Click **OK**.

Modify iSCSI Fault Domain Control Port Network Settings

Configure an IP address and gateway for the iSCSI control port in the fault domain. Servers target this IP address using iSCSI initiators, and the Storage Center redirects individual iSCSI connections to the appropriate virtual port.

Prerequisites

The Storage Center iSCSI ports must be configured for virtual port mode.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.



4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. In the **Target IPv4 Address** field, type an IP address to assign to the iSCSI control port.
6. In the **Subnet Mask** field, type the subnet mask for the well-known IP address.
7. In the **Gateway IPv4 Address** field, type the IP address for the iSCSI network default gateway.
8. (Optional) If IPv6 is supported, in the **Target IPv6 Address** field, type an IP address to assign to the iSCSI control port.
9. Click **OK**.

Add a VLAN ID to a Physical iSCSI Fault Domain

Add a VLAN ID to an existing iSCSI fault domain if the ports in the fault domain are connected to a tagged network.

Prerequisites

The Storage Center iSCSI ports must be configured for virtual port mode.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. Select the **VLAN Tagged** check box.
6. In the **VLAN ID** field, type a VLAN ID for the fault domain. Allowed values are 1–4096.
7. (Optional) To assign a priority level to the VLAN, type a value from 0-7 in the **Class of Service Priority** field. 0 is best effort, 1 is the lowest priority, and 7 is the highest priority.
8. Click **OK**.

Related links

[iSCSI VLAN Tagging Support](#)

Modify the MTU for an iSCSI Fault Domain

The Maximum Transmission Unit (MTU) specifies the largest packet size supported by the iSCSI network.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. From the **MTU** drop-down menu, select the largest packet size supported by the iSCSI network.
6. Click **OK**.

Modify the TCP Port for an iSCSI Fault Domain

By default, iSCSI ports accept iSCSI connections on TCP port 3260. Modify the port as needed to integrate with iSCSI network infrastructure.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Expand the Dell Storage Manager menu, and then click **Storage**.
5. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
6. Click the **Storage** tab, and then click the **Fault Domains** subtab.
7. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
8. Expand the **Advanced Port Settings** area.
9. In the **Port Number** field, type the TCP port to use for iSCSI traffic.
10. Click **OK**.



Modify the iSCSI Window Size for an iSCSI Fault Domain

The window size specifies the amount of data that can be in transit at any given time.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. Expand the **Advanced Port Settings** area.
6. In the **Window Size** field, type a value for the window size.
 - Allowed values are 16 KB to 32 MB.
 - The window size must be divisible by 16 KB.
7. Click **OK** to close the **Edit Port Settings** dialog box, then click **OK** to close the **Edit Settings** dialog box.

Modify Digest Settings for an iSCSI Fault Domain

The iSCSI digest settings determine whether iSCSI error detection processing is performed.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. Expand the **Advanced Port Settings** area.
6. In the **Ports** area, enable or disable iSCSI digest settings as needed. These options are described in the online help.
7. Click **OK**.

Modify Timeout Settings for an iSCSI Fault Domain

iSCSI timeout settings determine how the Storage Center handles idle connections.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. Expand the **Advanced Port Settings** area.
6. In the **Timeout Settings** area, modify the timeout values as needed. These options are described in the online help.
7. Click **OK**.

Add Ports to an iSCSI Fault Domain

After you connect additional iSCSI ports to an existing iSCSI network, add the iSCSI ports to the fault domain that corresponds to the network.

Prerequisites

- If the fault domain is physical, the iSCSI ports that will be added to the fault domain must not belong to a fault domain.
- If the fault domain is physical, each iSCSI port that you want to add to the fault domain must be assigned an IP address, subnet mask, and gateway in the same network as the iSCSI control port for the fault domain.
- If the fault domain is virtual, the iSCSI ports you want to add to the fault domain must support the Multi-VLAN Tagging feature.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. In the **Ports** table, select the iSCSI port to add to the fault domain. All iSCSI ports in the fault domain should be connected to the same Ethernet network.



6. Click **Edit Settings**. The **Edit Port** dialog box opens.
7. Select the **Include** check box.
8. Click **OK**.


Test Network Connectivity for an iSCSI Port in a Fault Domain

Test connectivity for an iSCSI physical or virtual I/O port by pinging a port or host on the network.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. In the **Ports** table, select the physical port for which you want to test connectivity.
6. Type the IP address of the host to which you want to test connectivity.
 - If the host uses either IPv4 or IPv6 addressing, type the IP address of the host to which you want to test connectivity in the **IP Address** field.
 - If the host uses IPv4 addressing only, type the IPv4 address in the **IPv4 Address** field.
7. From the **Ping Size** drop-down menu, select a size in bytes for the ping packets, not including overhead. If you select **Other**, type a value between 1 and 17000 bytes in the field below the menu.

 **NOTE: The Ping Size drop-down menu might not appear depending on the hardware I/O cards used by the Storage Center.**

8. Click **OK**. A message displays the results of the test.

 **NOTE: If the physical port is located on a Chelsio iSCSI card, the first ping test to a specific IP address fails and displays the error SendPing: No ARP entry for nn.nn.nn.nn, sending ARP now. Try again later. Run the ping test again to verify connectivity.**

9. Click **OK** to close the message.

Related links

[Test Network Connectivity for an iSCSI Port](#)

Remove Ports from an iSCSI Fault Domain

Before you repurpose one or more front-end iSCSI ports, remove them from the fault domains to which they belong.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the fault domain, then click **Edit**. The **Edit iSCSI Fault Domain** dialog box opens.
5. In the **Ports** table, select the iSCSI port to remove from the fault domain.
6. Click **Edit Settings**. The **Edit Port** dialog box opens.
7. Clear the **Include** check box. Then click **OK**.

Configuring NAT Port Forwarding for iSCSI Fault Domains

Port forwarding allows iSCSI initiators (servers or remote Storage Centers) located on a public network or different private network to communicate with Storage Center iSCSI ports on a private network behind a router that performs Network Address Translation (NAT).

For each Storage Center iSCSI control port and physical port, the router performing NAT must be configured to forward connections destined for a unique public IP address and TCP port pair to the private IP address and TCP port for the iSCSI port. These port forwarding rules must also be configured in parallel on the Storage Center fault domains to make sure that iSCSI target control port redirection functions correctly. Fault domains can only be modified by administrators.

 **NOTE: If Storage Center iSCSI ports are configured for legacy mode, the port forwarding rules do not need to be defined on the Storage Center because there is no control port redirection.**

iSCSI NAT Port Forwarding Requirements for Virtual Port Mode

The following requirements must be met to configure NAT port forwarding for an iSCSI fault domain in virtual port mode.

- For each Storage Center iSCSI control port and virtual port, a unique public IP address and TCP port pair must be reserved on the router that performs NAT.
- The router that performs NAT between the Storage Center and the public network must be configured to forward connections destined for each public IP address and port pair to the appropriate Storage Center private target iSCSI IP address and private port (by default, TCP port 3260).

iSCSI NAT Port Forwarding Example Configuration

In this example, a router separates the Storage Center on a private network (192.168.1.0/24) from a server (iSCSI initiator) on the public network (1.1.1.60). To communicate with Storage Center iSCSI target ports on the private network, the server connects to a public IP address owned by the router (1.1.1.1) on ports 9000 and 9001. The router forwards these connections to the appropriate private IP addresses (192.168.1.50 and 192.168.1.51) on TCP port 3260.

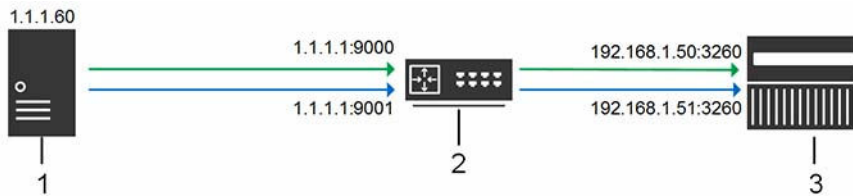


Figure 6. iSCSI NAT Port Forwarding Diagram

- | | |
|---|---|
| 1 | iSCSI initiator (server or remote Storage Center) |
| 2 | Router performing NAT/port forwarding |
| 3 | Storage Center |

Configure NAT Port Forwarding for an iSCSI Fault Domain

Configure NAT port forwarding for a fault domain to make sure that control port redirection works correctly.

Prerequisites

When the router that performs NAT and port forwarding receives inbound iSCSI connections destined for the specified public IP and public port, it forwards the connections to the private Storage Center iSCSI IP address and private port (by default, TCP port 3260).

- The Storage Center iSCSI ports must be configured for virtual port mode.
- For each Storage Center iSCSI control port and virtual port, a unique public IP address and TCP port pair must be reserved on the router that performs NAT.
- The router that performs NAT between the Storage Center and the public network must be configured to forward connections destined for each public IP address and port pair to the appropriate Storage Center private iSCSI IP address and appropriate port (by default, TCP 3260).

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure NAT Port Forwarding**. The **Configure NAT Port Forwarding** dialog box opens.
6. In the **Port Forwarding Configuration** area, configure port forwarding information for a Storage Center iSCSI port.
 - a. Click **Add**. The **Create iSCSI NAT Port Forward** dialog box opens.
 - b. From the **Name** drop-down menu, select the iSCSI control port or a physical port.
 - Control ports are labeled with the name of the fault domain.
 - Physical ports are labeled with a WWN.
 - c. In the **Public IPv4 Address** field, type the IPv4 address that iSCSI initiators (servers and remote Storage Centers) communicate with on the public network to reach the Storage Center iSCSI port.



- d. In the **Public Port** field, type the TCP port that iSCSI initiators communicate with on the public network to reach the Storage Center iSCSI port.
- e. Click **OK**. The **Create iSCSI NAT Port Forward** dialog box closes.
7. Repeat the preceding steps for each additional iSCSI control port and physical port in the fault domain.
8. In the **Public Networks/Initiators** area, define an iSCSI initiator IP address or subnet that requires port forwarding to reach the Storage Center because it is separated from the Storage Center by a router performing NAT.
 - a. Click **Add**. The **Create iSCSI NAT Initiator Configuration** dialog box opens.
 - b. In the **Public IPv4 Address** field, type the IPv4 address for the iSCSI initiator or subnet for which NAT port forwarding is required.
 - c. In the **Subnet Mask** field, type the subnet mask for the iSCSI initiator IP address or subnet.
9. Repeat the preceding steps for each additional iSCSI initiator IP address or subnet that requires port forwarding.
10. Click **OK**. The **Configure NAT Port Forwarding** dialog box closes.

Modify NAT Port Forwarding for an iSCSI Fault Domain

Modify NAT port forwarding to change the port forwarding configuration or change the iSCSI initiators and subnets that require port forwarding.

Prerequisites


- The Storage Center iSCSI ports must be configured for virtual port mode.
- For each Storage Center iSCSI control port and virtual port, a unique public IP address and TCP port pair must be reserved on the router that performs NAT.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure NAT Port Forwarding**. The **Configure NAT Port Forwarding** dialog box opens.
6. In the **Port Forwarding Configuration** area, modify port forwarding information for a Storage Center iSCSI port.
 - To add port forwarding information for an iSCSI port, click **Add**.
 - To modify port forwarding information for an iSCSI port, select the port, then click **Edit**.
 - To delete port forwarding information for an iSCSI port, select the port, then click **Remove**.
7. In the **Public Networks/Initiators** area, add or modify iSCSI initiator IP addresses or subnets that require port forwarding to reach the Storage Center because it is separated from the Storage Center by a router performing NAT.
 - To add an iSCSI initiator IP address or subnet, click **Add**.
 - To modify an iSCSI initiator IP address or subnet, select it, then click **Edit**.
 - To delete an iSCSI initiator IP address or subnet, select it, then click **Remove**.
8. Click **OK**. The **Configure NAT Port Forwarding** dialog box closes.

Configuring CHAP for iSCSI Fault Domains

When Challenge Handshake Authentication Protocol (CHAP) authentication is enabled, the Storage Center challenges each iSCSI initiator in the fault domain for a shared secret (password). When CHAP is enabled it applies to all servers and remote Storage Centers that connect to the fault domain.

 **NOTE: When CHAP is enabled for an iSCSI fault domain, all iSCSI initiators in the fault domain (servers and Storage Centers) must be configured to use CHAP. All iSCSI initiators that are not configured to use CHAP are no longer able to communicate with the Storage Center iSCSI ports in the fault domain.**

Configure CHAP for Servers in an iSCSI Fault Domain

When Challenge Handshake Authentication Protocol (CHAP) authentication is enabled, the Storage Center challenges each iSCSI initiator for a shared secret (password). Servers must provide the correct shared secret to access Storage Center volumes.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure CHAP**. The **Configure CHAP** dialog box opens.
6. Select the **CHAP Enabled** check box.
7. Define the CHAP configuration for each server in the fault domain that initiates iSCSI connections to the Storage Center.
 - a. Click **Add**. The **Add Remote CHAP Initiator** dialog box opens.
 - b. In the **iSCSI Name** field, type the iSCSI name of the remote initiator.
 - c. In the **Remote CHAP Name** field, type the CHAP name of the remote initiator.
 - d. (Bidirectional CHAP only) In the **Local CHAP Secret** field, type the shared secret that the Storage Center (target) must provide when challenged by the remote initiator. This secret is required if bidirectional CHAP is enabled on the remote iSCSI initiator.
 - e. In the **Remote CHAP Secret** field, type the shared secret that the remote initiator must provide when challenged by the Storage Center (target).
 - f. Click **OK** to close the **Add Remote CHAP Initiator** dialog box.
8. Click **OK** to close the **Configure CHAP** dialog box.
9. Configure each remote iSCSI initiator to use the shared secrets that you defined.

Modify CHAP Settings for a Server in an iSCSI Fault Domain

Modify CHAP settings for a server to change one or more shared secrets for the server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure CHAP**. The **Configure CHAP** dialog box opens.
6. In the **Remote CHAP Configuration** table, select a CHAP configuration, then click **Edit**. The **Edit Remote CHAP Initiator** dialog box appears.
7. Modify the options as needed, then click **OK**. The **Edit Remote CHAP Initiator** dialog box closes.
8. Click **OK** to close the **Configure CHAP** dialog box.

Remove CHAP Settings for a Server in an iSCSI Fault Domain

Remove CHAP settings for a server to prevent it from targeting the Storage Center while CHAP is enabled for the fault domain.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure CHAP**. The **Configure CHAP** dialog box opens.
6. In the **Remote CHAP Configuration** table, select a CHAP configuration, then click **Remove**. The CHAP configuration is removed from the table.
7. Click **OK** to close the **Configure CHAP** dialog box.



Enable Bidirectional CHAP for iSCSI Replication in a Fault Domain

When bidirectional CHAP is enabled for iSCSI replication, the source Storage Center (initiator) challenges the destination Storage Center (target) for a shared secret.

Prerequisites

CHAP must be enabled for the fault domain.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Fault Domains** subtab.
4. Select the iSCSI fault domain.
5. Click **More Actions** → **Configure CHAP**. The **Configure CHAP** dialog box opens.
6. Type a shared secret in the **Bidirectional CHAP Secret** field.
7. Click **OK**.

Managing Secure Data

Secure Data provides data-at-rest encryption with key management for self-encrypting drives (SED). The Self-Encrypting Drives feature must be licensed to use Secure Data.

Configure Key Server

Before managing SEDs in a Secure Data folder, configure communication between Storage Center and the key management server.

Prerequisites

The Storage Center must have the Self-Encrypting Drives license.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Secure Data** tab.
5. In the **Hostname** field, type the host name or IP address of the key management server.
6. In the **Port** field, type the number of a port with open communication with the key management server.
7. In the **Timeout** field, type the amount of time in seconds after which Storage Center should stop attempting to reconnect to the key management server after a failure.
8. To add alternate key management servers, type the host name or IP address of another key management server in the **Alternate Hostnames** area. Then click **Add**.
9. If the key management server requires a user name to validate the Storage Center certificate, type the name in the **Username** field.
10. If the key management server requires a password to validate the Storage Center certificate, type the password in the **Password** field.
11. Configure the key management server certificates.
 - a. Click **Configure Key Management Server Certificates**. The **Configure Key Management Server Certificates** dialog box opens.
 - b. Click **Choose File** next to the **Root CA Certificate**. Navigate to the location of the root CA certificate on your computer and select it.
 - c. Click **Choose File** next to the certificate fields for the controller(s). Navigate to the location of the controller certificates on your computer and select them.
 - d. Click **OK**.
12. Click **OK**.



After you configure the key server, the **Server Connectivity** status is shown as **Up** on the **Edit Storage Center Settings** dialog box.

Managing Data Redundancy

Manage data redundancy by modifying tier redundancy or creating Storage Types.

Managing Storage Types


Storage Types determine how Data Progression moves data within a disk folder. Each disk folder has a corresponding Storage Type.

 **NOTE: Modifying tier redundancy requires a RAID rebalance to be completed, and should not be performed unless sufficient free disk space is available within the disk folder.**

Redundancy Requirements

Redundancy requirements for each disk tier are based on the size of disks in the tier.

- By default, disks of 900 GB are set to dual redundancy. This setting can be changed to single-redundant for disks under 1.8 TB.
- In a Storage Center with a new disk pool, disks 1.8 TB or larger require dual redundancy, and the single redundancy option is disabled.
- When adding 2.6 TB or larger disks to an existing Storage Center, dual redundancy is mandatory, and the single redundancy option is disabled.

 **NOTE: Dual redundancy is implemented using RAID 6, which requires a minimum of seven disks to configure RAID 6 with a single spare. If a tier does not contain seven disks, the default setting is single-redundant for any disk drive size.**

Create a Storage Type

Creating a Storage Type sets the redundancy level for each tier and assigns the Storage Type to a disk folder.

Prerequisites

Storage Center must be using one of the following controllers:

- SC9000
- SC8000
- SC4000 series
- CT-SC040

About this task

 **NOTE: Do not assign multiple Storage Types to one disk folder. Data Progression may not perform as intended with multiple Storage Types assigned to one disk folder.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Storage Types** subtab.
4. Click **New**. The **New Storage Type** dialog box opens.
5. Select a disk folder from the **Disk Folder** drop-down menu.
6. Select a redundancy type.
 - To create a redundant Storage Type, select **Redundant**.
 - To create a non-redundant Storage Type, select **Non-Redundant**.
7. For redundant Storage Types, modify the redundancy for each tier as needed.
 - For single-redundant RAID levels, select **Redundant**.
 - For dual-redundant RAID levels, select **Dual Redundant**.
8. Select a **Datapage Size**.



9. Click **OK**.

Modify Tier Redundancy

Modify tier redundancy to change the redundancy level for each tier in a Storage Type. After modifying tier redundancy, a RAID rebalance is required to move data to the new RAID levels.

About this task

 **NOTE: Do not modify tier redundancy if there is insufficient space in the tier for a RAID rebalance.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Storage Types** subtab.
4. Select the Storage Type to modify.
5. Click **Edit**. The **Edit** dialog box opens.
6. Modify the redundancy for each tier as needed.
 - For single-redundant RAID levels, select **Redundant**.
 - For dual-redundant RAID levels, select **Dual Redundant**.
7. Click **OK**. A RAID rebalance starts.

Shutting Down and Restarting a Storage Center

Shutting down or restarting a Storage Center affects all controllers.

Shut Down a Storage Center

Shutting down a Storage Center creates a system outage, during which time no IO is processed. Use this process only as directed, for example to replace hardware, to move the Storage Center to another location, or to shut down for data center power maintenance.

Prerequisites

- An outage must be scheduled so that halting IO does not impact your network.
- IO to the controllers must be halted.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. In the **Summary** tab, click **More Actions** → **System** → **Shutdown/Restart**. The **Shutdown/Restart** dialog box opens.
4. From the first drop-down menu, select **Shutdown Controller**.
5. Click **OK**.

Restart a Storage Center

If the Storage Center has dual-controllers, the controllers can be restarted in sequence or simultaneously.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. In the **Summary** tab, click **More Actions** → **System** → **Shutdown/Restart**. The **Shutdown/Restart** dialog box opens.
4. From the first drop-down menu, select **Restart Controller**.
5. (Dual-controller only) From the **Restart options** drop-down menu, choose how you want the controllers to restart.
 - To restart the controllers one after the other, avoiding an outage, select **Restart in Sequence**.
 - To restart the controllers at the same time, causing an outage, select **Restart Simultaneously**.
6. Click **OK**.

Viewing Storage Center Information

Storage Manager provides access to summary information about managed Storage Centers, including historical IO performance and hardware status. Use this information to monitor the health and status of a Storage Center.

Viewing Summary Information

Dell Storage Manager widgets provide summary information for all of the Storage Centers managed by Storage Manager.

Related links

[Using the Storage Summary Widget](#)

[Using the Storage Centers Widget](#)

[Using the Alerts Widget](#)

[Using the Growth Widget](#)

[Using the Top Volumes Widget](#)

[Using the Unmapped Volumes Widget](#)

[Using the Performance Widget](#)

Storage Center Widgets

The following widgets can be configured to appear on the Home page of the Dell Storage Manager Web UI.

Widget	Description
Storage Summary	Displays a bar chart that shows the disk space on the Storage Centers and lists the total number of Storage Centers, volumes, and servers managed by the Dell Storage Manager Web UI.
Storage Centers	Displays basic health, storage, and performance information for the Storage Centers.
Alerts	Displays a table that shows the most recent alerts for all Storage Centers managed by the Data Collector.
Growth	Displays a graph that shows historical storage usage statistics.
Top Volumes	Displays a table that shows the top volumes based on growth, usage, estimated full date, latency, and IOPS.
Unmapped Volumes	Displays a table that shows the volumes that are unmapped.
Performance	Displays a graph that shows IO performance statistics.

Add a Widget to the Dashboard

Add a widget to the dashboard to view its summary information from the home page. Multiple widgets of the same type may be added and configured to keep summary information organized.

1. On the home page of the Dell Storage Manager Web UI, click **Customize Dashboard**.
2. Select a widget to add from the **Customize Dashboard** drop-down menu.
The selected widget is added to the dashboard.



Remove a Widget from the Dashboard

Remove a widget you do not want to see on the home page.

1. On the home page of the Dell Storage Manager Web UI, locate the widget to remove.
2. Click the **X** in the corner of the widget.
The widget is removed from the dashboard.

Resize a Widget

Resize a widget to arrange the home page in a way that better fits the content you want to see.

1. On the home page of the Dell Storage Manager Web UI, locate the widget to resize.
2. Move the mouse cursor to the lower right corner of the widget until the pointer appears as a double-sided arrow, and then left-click to select the widget.
3. Move the mouse cursor to resize the widget.

Rearrange Widgets on the Home Page

Rearrange the widgets on the home page to view the widgets in the order you want.

1. On the home page of the Dell Storage Manager Web UI, locate a widget to move.
2. Move the mouse cursor to the top of the widget until the pointer appears as a four-sided arrow, and then left-click to select the widget.
3. Move the widget to the new location.
4. Repeat these steps with any other widgets you want to move.

Using the Storage Summary Widget



The Storage Summary widget displays total, used, and free space, as well as the total number of managed Storage Centers, volumes, and servers.

Using the Storage Centers Widget

The Storage Centers widget provides health, storage, and performance information for all of the Storage Centers managed by Dell Storage Manager.

Viewing Health Information for All Storage Centers

The **Health** tab of the Storage Centers widget displays information about the number of Storage Center alerts. The tab also displays the number of disks, volumes, and servers on each Storage Center.

Field/Option	Description
Storage Center	The name of the Storage Center
Model	The model of the Storage Center
# Alerts	The number of unacknowledged alerts for each Storage Center. <ul style="list-style-type: none">•  – Indicates the number of Error alerts.•  – Indicates the number of Warning alerts.
# Disks	The number of disks present on each Storage Center.
# Volumes	The number of volumes present on each Storage Center.
# Servers	The number of servers connected to each Storage Center.



Viewing Storage Information for All Storage Centers

The **Storage** tab of the Storage Centers widget displays information about disk space usage.

Field/Option	Description
Storage Center	The name of the Storage Center
Model	The model of the Storage Center
% Full	The disk space used by a Storage Center, displayed in percentage of Available Space
Est. Full	The date and time when the Storage Center disk space is estimated to be full
Available Space	Total amount of disk space available on all of the disks of a Storage Center
Used Space	Amount of disk space used by a Storage Center, displayed in units of data

Viewing Performance Information for All Storage Centers

The **Performance** tab of the Storage Centers widget displays information about the average IOPS.

Field/Option	Description
Storage Center	The name of the Storage Center
Model	The model of the Storage Center
Avg. Total IOPS	The average total Input/Output operations per second for each Storage Center.
Avg. Read IOPS	The average read Input/Output operations per second for each Storage Center.
Avg. Write IOPS	The average write Input/Output operations per second for each Storage Center.

Using the Alerts Widget

The Alerts widget displays a table that lists the most recent alerts for all of the Storage Centers managed by the Data Collector.

Related links

[Viewing Storage Center Alerts](#)

Acknowledge a Storage Center Alert

Select an alert in the **Alerts** widget to open the **Health** tab for the Storage Center and acknowledge the alert.

1. Click the text of an alert in the **Alerts** widget. The **Health** tab for the Storage Center opens, with the alert selected.
2. Click **Acknowledge**. The **Acknowledge** dialog box opens.
3. Click **Yes** to acknowledge the Storage Center alert.

View All Storage Center Alerts

Click **View all** in the Alerts widget to open the **Alerts** tab and view all Storage Center alerts.

Rename the Alerts Widget

Use the **Widget Configuration** dialog box to change the name of the **Alerts** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the **Widget Title** field, type a new name for the **Alerts** widget.
3. Click **OK**. The widget name is updated.



Select the Storage Centers to Display in the Alerts Widget

Use the **Widget Configuration** dialog box to select the Storage Centers to display.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the Storage Centers table, place a check next to the Storage Centers to display.
3. (Optional) Remove the check next to the Storage Centers you do not want to display.
4. Click **OK**.

Using the Growth Widget

The Growth widget displays a graph that shows historical usage data. You can modify the time frame and storage forecast for the graph.

Rename the Growth Widget

Use the **Widget Configuration** dialog box to change the name of the **Growth** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the **Widget Title** field, type a new name for the **Growth** widget.
3. Click **OK**. The widget name is updated.

Change the Timeframe Displayed on the Growth Widget

Change the period of storage usage data to display on the **Growth** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. Select the period of the storage usage data to display from the **Timeframe** drop-down menu.
 - **Last Day** – Displays the past 24 hours of storage usage data.
 - **Last Week** – Displays the past 168 hours of storage usage data.
 - **Last Month** – Displays storage usage data for the past month.
 - **Last Year** – Displays storage usage data for the past year.
3. Click **OK**.

Display a Storage Forecast on the Growth Widget

Use the **Storage Forecast** feature to view forecasted storage usage for the next week, month, or year.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. Select the period of the storage usage data to forecast from the **Storage Forecast** drop-down menu.
 - **None** – No storage forecast is displayed.
 - **One Week** – Displays the next 168 hours of forecasted storage usage.
 - **One Month** – Displays forecasted storage usage for the next month.
 - **One Year** – Displays forecasted storage usage for the next year.
3. Click **OK**.

Select the Storage Centers to Display in the Growth Widget

Use the **Widget Configuration** dialog box to select the Storage Centers to display.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the Storage Centers table, place a check next to the Storage Centers to display.
3. (Optional) Remove the check next to the Storage Centers you do not want to display.
4. Click **OK**.



Using the Top Volumes Widget

The Top Volumes widget displays a table that shows the top volumes based on growth, usage, estimated full level, latency, and IOPS.

Viewing the Fastest Growing Volumes

The **Growth** tab of the **Top Volumes** widget displays the top volumes by growth per day.

 **NOTE: Click the name of any column to sort the fastest growing volumes based on that field.**

Field/Option	Description
Name	The name of the volume.
Storage Center	The name of the Storage Center
Growth	The amount of storage usage growth per day
Configured Space	The amount of space allocated to the volume
Active Space	The amount of volume data that is accessible to a server

Viewing the Most Full Volumes

The **Usage** tab of the **Top Volumes** widget displays the top volumes by percent full.

 **NOTE: Click the name of any column to sort the most full volumes based on that field.**

Field/Option	Description
Name	The name of the volume.
Storage Center	The name of the Storage Center
% Full	The disk space used by a volume, displayed in percentage of Available Space
Configured Space	The amount of space allocated to the volume
Active Space	The amount of volume data that is accessible to a server

Viewing the Soonest Full Volumes

The **Estimated Full** tab of the **Top Volumes** widget displays the top volumes by date when estimated to be full.

 **NOTE: Click the name of any column to sort the soonest full volumes based on that field.**

Field/Option	Description
Name	The name of the volume
Storage Center	The name of the Storage Center
Est. Full	The date and time when the volume is estimated to be full
Configured Space	The amount of space allocated to the volume
Active Space	The amount of volume data that is accessible to a server

Viewing the Volumes with Most Latency

The **Latency** tab of the **Top Volumes** widget displays the top volumes by total latency.

 **NOTE: Click the name of any column to sort the volumes with most latency based on that field.**

Field/Option	Description
Name	The name of the volume
Storage Center	The name of the Storage Center



Field/Option	Description
Total Latency	Latency of all read/write operations in ms
Read Latency	Latency of read operations in ms
Write Latency	Latency of write operations in ms

Viewing the Volumes with Most IOPS

The **IOPS** tab of the **Top Volumes** widget displays the top volumes by total IOPS.

 **NOTE:** Click the name of any column to sort the volumes with most IOPS based on that field.


Field/Option	Description
Name	The name of the volume
Storage Center	The name of the Storage Center
Total Latency	Combined transfer rate of the read and write operations in IO operations per second
Read Latency	Transfer rate of read operations in IO operations per second
Write Latency	Transfer rate of write operations in IO operations per second

Viewing All Volumes

Click **View all** in the **Top Volumes** widget to open the **Volumes** tab and view all Storage Center volumes.

Rename the Top Volumes Widget

Use the **Widget Configuration** dialog box to change the name of the **Top Volumes** widget.

1. Click the **Configure** () icon. The **Widget Configuration** dialog box opens.
2. In the **Widget Title** field, type a new name for the **Top Volumes** widget.
3. Click **OK**. The widget name is updated.

Set the Number of Volumes to Display on the Top Volumes Widget

Change the number of volumes displayed in the **Top Volumes** widget.

1. Click the **Configure** () icon. The **Widget Configuration** dialog box opens.
2. Type the number of volumes to display in the **Number to Display** field.
3. Click **OK**.


Select the Storage Centers to Display in the Top Volumes Widget

Use the **Widget Configuration** dialog box to select the Storage Centers to display.

1. Click the **Configure** () icon. The **Widget Configuration** dialog box opens.
2. In the Storage Centers table, place a check next to the Storage Centers to display.
3. (Optional) Remove the check next to the Storage Centers you do not want to display.

Select the Tabs to Display in the Top Volumes Widget

Select the tabs that are displayed in the **Top Volumes** widget.

1. Click the **Configure** () icon. The **Widget Configuration** dialog box opens.
2. Remove the check next to any tab you do not want to display in the **Top Volumes** widget.
3. Click **OK**.

Using the Unmapped Volumes Widget

The Unmapped Volumes widget displays a table that shows the volumes that are unmapped.

Rename the Unmapped Volumes Widget

Use the **Widget Configuration** dialog box to change the name of the **Unmapped Volumes** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the **Widget Title** field, type a new name for the **Unmapped Volumes** widget.
3. Click **OK**. The widget name is updated.

Select the Storage Centers to Display in the Unmapped Volumes Widget

Use the **Widget Configuration** dialog box to select the Storage Centers to display.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the Storage Centers table, place a check next to the Storage Centers to display.
3. (Optional) Remove the check next to the Storage Centers you do not want to display.
4. Click **OK**.

Using the Performance Widget

The Performance widget displays a graph that shows historical IO performance statistics.

Rename the Performance Widget

Use the **Widget Configuration** dialog box to change the name of the **Performance** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the **Widget Title** field, type a new name for the **Performance** widget.
3. Click **OK**. The widget name is updated.

Change the Units Displayed on the Performance Widget

The **Performance** widget displays IO performance data by displaying a graph showing the transfer rate of the read and write operations in either IO operations per second or megabytes per second.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. Select a unit to display from the **Units** area.
 - **Total IOPS** – Displays performance data based on the combined transfer rate of the read and write operations in IO operations per second.
 - **Total MB/s** – Displays performance data based on the combined transfer rate of the read and write operations in megabytes per second.
3. Click **OK**.

Change the Timeframe Displayed on the Performance Widget

Change the period of IO performance data to display on the **Performance** widget.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. Select the period of the storage usage data to display from the **Timeframe** drop-down menu.
 - **Last Day** – Displays the past 24 hours of IO performance data.
 - **Last Week** – Displays the past 168 hours of IO performance data.
 - **Last Month** – Displays IO performance data for the past month.
3. Click **OK**.



Select the Storage Centers to Display in the Performance Widget

Use the **Widget Configuration** dialog box to select the Storage Centers to display.

1. Click the **Configure** (⚙️) icon. The **Widget Configuration** dialog box opens.
2. In the Storage Centers table, place a check next to the Storage Centers to display.
3. (Optional) Remove the check next to the Storage Centers you do not want to display.
4. Click **OK**.

Viewing Detailed Storage Usage Information

Detailed storage usage information is available for each Storage Type that is configured for a Storage Center.

View Storage Usage by Tier and RAID Type

Storage usage by tier and RAID type is displayed for each Storage Type.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Storage Types** subtab. Use the **Tiers** tab to view storage usage by tier and RAID type.

View Storage Usage by Volumes

Storage usage by volume is displayed for each Storage Type.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Storage Types** subtab.
4. Click the **Volumes** tab to view storage usage by volume.

View a Data Progression Pressure Report

For each storage type, the data progression pressure report displays how space is allocated, consumed, and scheduled to move across different RAID types and storage tiers. Use the data progression pressure report to make decisions about the types of disks to add to a Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Storage Types** subtab.
4. Click the **Pressure Report** tab to view the data progression pressure report. By default, the most recent data gathered from the Storage Center is displayed..
5. (Optional) To view a previously generated data progression report, select a report from the drop-down menu. Reports are identified by the date and time at which they were generated.

Viewing Historical Performance Information

Use the **Performance** tab to view and monitor historical IO performance statistics for a Storage Center and associated storage objects.

View Storage Center Performance Information

Use the **Performance** tab to view historical IO usage data for a Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Performance** tab. The **System** subtab displays a chart that shows the IO usage data for the Storage Center.
4. (Optional) Select the period of the IO usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of IO usage data.
 - **Last 3 Days** – Displays the past 72 hours of IO usage data.
 - **Last 5 Days** – Displays the past 120 hours of IO usage data.
 - **Last Week** – Displays the past 168 hours of IO usage data.
 - **Last Month** – Displays IO usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the IO usage data to display.

View Volume Performance Information

Use the **Performance** tab to view historical IO usage data for a Storage Center volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Performance** tab.
4. Click the **Volumes** subtab. The **Charts** tab displays a chart that shows the IO usage data for all Storage Center volumes.
5. (Optional) Select the period of the IO usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of IO usage data.
 - **Last 3 Days** – Displays the past 72 hours of IO usage data.
 - **Last 5 Days** – Displays the past 120 hours of IO usage data.
 - **Last Week** – Displays the past 168 hours of IO usage data.
 - **Last Month** – Displays IO usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the IO usage data to display.
6. (Optional) Click the **Most Active** tab to view a table that shows the minimum, maximum, average, and standard deviation values of the historical IO usage data.
7. Select a volume or volume folder to view IO usage data specific to that volume or folder.

View Server Performance Information

Use the **Performance** tab to view historical IO usage data for a server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Performance** tab.
4. Click the **Servers** subtab. The **Charts** tab displays a chart that shows the IO usage data for all servers.
5. (Optional) Select the period of the IO usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of IO usage data.
 - **Last 3 Days** – Displays the past 72 hours of IO usage data.
 - **Last 5 Days** – Displays the past 120 hours of IO usage data.



- **Last Week** – Displays the past 168 hours of IO usage data.
 - **Last Month** – Displays IO usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the IO usage data to display.
6. (Optional) Click the **Most Active** tab to view a table that shows the minimum, maximum, average, and standard deviation values of the historical IO usage data.
 7. Select a server or server cluster to view IO usage data specific to that server or cluster.

View Fault Domain Performance Information

Use the **Performance** tab to view historical IO usage data for a fault domain.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Performance** tab.
4. Click the **Fault Domains** subtab. The **Charts** tab displays a chart that shows the IO usage data for all fault domains.
5. (Optional) Select the period of the IO usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of IO usage data.
 - **Last 3 Days** – Displays the past 72 hours of IO usage data.
 - **Last 5 Days** – Displays the past 120 hours of IO usage data.
 - **Last Week** – Displays the past 168 hours of IO usage data.
 - **Last Month** – Displays IO usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the IO usage data to display.
6. Select a fault domain to view IO usage data specific to that fault domain.

Viewing Historical Storage Usage Data

Use the **Growth** tab to view and monitor historical usage statistics for a volume or server.

View Historical Storage Usage Data for a Volume

Use the **Growth** tab in the **Volume** view to view historical storage usage data for a volume.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.
4. In the **Storage** tab navigation pane, click the name of a volume to open the **Volume** view.
5. Click the **Growth** tab. The historical storage usage data for the volume is displayed.
6. (Optional) Select the period of the storage usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of storage usage data.
 - **Last 3 Days** – Displays the past 72 hours of storage usage data.
 - **Last 5 Days** – Displays the past 120 hours of storage usage data.
 - **Last Week** – Displays the past 168 hours of storage usage data.
 - **Last Month** – Displays storage usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the storage usage data to display.

View Historical Storage Usage Data for a Server

Use the **Growth** tab in the **Server** view to view historical storage usage data for a server.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab.

4. In the **Storage** tab navigation pane, click the name of a server to open the **Server** view.
5. Click the **Growth** tab. The historical storage usage data for the server is displayed.
6. (Optional) Select the period of the storage usage data to display from the **Display** drop-down menu.
 - **Last Day** – Displays the past 24 hours of storage usage data.
 - **Last 3 Days** – Displays the past 72 hours of storage usage data.
 - **Last 5 Days** – Displays the past 120 hours of storage usage data.
 - **Last Week** – Displays the past 168 hours of storage usage data.
 - **Last Month** – Displays storage usage data for the past month.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the storage usage data to display.

Configuring Chart Options

User Settings affect the charts on the **Summary**, **IO Usage**, and **Charting** tabs, and the Chart Settings affect the charts on the **IO Usage** and **Charting** tabs.

Related links

[Configuring User Settings for Charts](#)

Configuring User Settings for Charts

Modify the User Settings for your user account to display alerts on the charts and change the chart colors.

 **NOTE: For user interface reference information, click Help.**

Display Alerts on Charts

Configure charts to display the relationships between the reported data and the configured threshold alerts and Storage Center alerts.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. Click the **Charting Options** tab.
3. Select the check boxes of the alerts to display on charts:
 - **Show threshold alert levels on charts** – Displays a horizontal line parallel to the X axis that shows the relationship between the reported data and the threshold level. The default is to hide threshold alerts.
 - **Show Storage Center alerts on charts** – Displays a vertical line parallel to the Y axis that shows the relationship between the reported data and Storage Center alerts. The default is to hide Storage Center alerts.

 **NOTE: Charts display only alerts relating to controller failures or remote Storage Center failures.**

4. Click **OK**.

Customize Chart Colors

You can choose the background color and gridline color for charts.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. Click the **Charting Options** tab.
3. Click the arrow next to **Background Color** or **Gridline Color** to open the color selector.
4. Use the selector to choose a new color for the background or gridline.
5. Click **Apply**. The customized color settings will appear the next time a chart is updated.

Display Data Point Sliders on Charts

Chart sliders display specific data for a selected data point. When chart sliders are enabled, a table displays the specific data values for the selected data point.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. Click the **Charting Options** tab.
3. Select the **Show sliders on charts** check box.



4. Click **OK**.

Configure the Storage Center Data Gathering Schedule

You can configure the intervals at which Storage Manager gathers IO Usage, Replication Usage, and Storage Usage data from managed Storage Centers.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Data Protection** tab.
3. Click the **Schedules** tab.
4. Click **Edit**. The **Schedules** dialog box opens.
5. Configure the data collection schedules, in the **Storage Center Report Gathering Settings** area, by performing the following steps:
 - To change how often IO usage data is collected, select a different period of time from the **IO Usage** drop-down menu.
 - To change how often replication usage data is collected, select a different period of time from the **Replication Usage** drop-down menu.
 - To change how often storage usage data is collected, select a different period of time from the **Storage Usage** drop-down menu.
If **Daily** is selected from the Storage Usage drop-down menu, the time of day that storage usage data is collected can be selected from the **Storage Usage Time** drop-down menu.
6. Click **OK**.



Part



Storage Center Monitoring

This section describes using Threshold Alerts to create custom alerts, monitoring logs, and monitoring performance.





Storage Manager Log Monitoring

Storage Manager provides a centralized location to view Storage Center alerts, indications, and logs collected by the Storage Manager Data Collector. System events logged by Storage Manager can also be viewed.

Alerts

Storage alerts and indications warn you when a storage system requires attention.

Alerts represent current issues present on the storage system, which clear themselves automatically if the situation that caused them is corrected. Indications warn you about a condition on the storage system that may require direct user intervention to correct.

Status Levels for Alerts and Indications

Status levels indicate the severity of storage system alerts and indications.

Table 4. Alert and Indication Status Levels

Status	Description
Okay/Inform	Provide information regarding some operation that is occurring or has occurred on the Storage Center.
Degraded	Indicates an item on the Storage Center is currently operating in a degraded mode. Items in this condition may operate in degraded mode indefinitely, but are not functioning to their full capability.
Down	Indicates an item on the Storage Center is down and not currently operational.
Critical	Indicates an item on the Storage Center is in a critical state and may be nearing failure.
Complete	Indicates that an operation on the Storage Center has completed.
Emergency	Indicates an item on the Storage Center requires immediate attention in order to remain operational.
Deleting	Indicates that an item on the Storage Center has been deleted.
Unavailable	Indicates that an item on the Storage Center that is expected to be present cannot currently be found for use.
Undefined	Indicates a condition on the Storage Center that is not defined by one of the other categories.
Warning	Indicates a condition on the Storage Center that decreases performance or can become critical if it is not corrected.

Viewing Storage Center Alerts

Use the Alerts tab in the Health view to display and search storage system alerts.

Alerts represent current issues present on the storage system, which clear themselves automatically if the situation that caused them is corrected.



Display Alerts for Multiple Storage Centers

Alerts for managed storage systems can be displayed on the **Alerts** tab of the **Health** view.

1. Expand the Dell Storage Manager menu, and then click **Alerts**.
2. Select the check boxes of the storage systems to display and clear the check boxes of the storage systems to hide. The **Alerts** tab displays alerts for the selected storage systems.
3. To display indications, select the **Show Indications** check box.
4. To display acknowledged alerts, select the **Show Acknowledged Alerts** check box.
5. To refresh the alert data, click **Refresh**.

Display Alerts for a Single Storage Center

Alerts for a single storage system can be displayed on the **Alerts** tab of the **Health** view for that Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Health** tab. The **Alerts** tab displays alerts for the selected Storage Center.
4. To display indications, select the **Show Indications** check box.
5. To display acknowledged alerts, select the **Show Acknowledged Alerts** check box.
6. To refresh the alert data, click **Refresh**.

Select the Status Level of Storage Alerts to Display

By default, storage alerts are displayed for all status levels. Use the **Severity** drop-down menu to display alerts of one status level only.

1. Expand the Dell Storage Manager menu, and then click **Alerts**.
2. Select the check boxes of the storage systems to display and clear the check boxes of the storage systems to hide.
3. Select an alert status level from the **Severity** drop-down menu. The **Alerts** tab displays alerts for the selected status level.

Search for Storage Alerts

Use the **Find** field to find text in the list of storage alerts.

1. Expand the Dell Storage Manager menu, and then click **Alerts**.
2. Enter the text to search for in the **Find** field.
3. Press Enter or click the **Find** icon.
The **Alerts** tab displays all alerts that matched the searched text.

Acknowledge Storage Center Alerts

Acknowledge alerts to indicate to the Storage Center that you have read the alert message and are aware of the problem.

1. Expand the Dell Storage Manager menu, and then click **Alerts**.
2. Select the Storage Center alerts to acknowledge, then click **Acknowledge**. The **Acknowledge** dialog box opens.

 **NOTE: The option to acknowledge an alert will not appear if an alert has already been acknowledged.**

3. Click **Yes** to acknowledge the Storage Center alerts displayed in the **Acknowledge** dialog box.

Send Storage Center Alerts and Indications to the Data Collector Immediately

By default, the Data Collector retrieves alerts and indications from a Storage Center at a regular interval. However, if you want alerts and indications to appear in Storage Manager immediately when they are triggered, configure a Storage Center to send them to the Data Collector.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.

4. Click the **Alerts and Logs** tab.
5. Select the **Send Alerts to Data Collector** check box.
6. Click **OK**.

Events

Events are messages that have been generated by an event in Storage Manager. You can view events on the **Events** tab or configure Storage Manager to email you when events occur.

Storage Manager Event Types

Storage Manager events are categorized by severity.

Table 5. Storage Manager Event Types

Status	Description
Inform	Provides information regarding an event that is occurring or has occurred on the Storage Center.
Warning	Indicates a condition on the Storage Center that decreases performance or can become critical if it is not corrected.
Error	Indicates an error has occurred on the Storage Center.
Exception	Indicates an exception occurred on the Storage Center.

Viewing Storage Manager Events

Use the **Events** tab to display and search Storage Manager events.

Display Storage Manager Events

View Storage Manager events on the **Events** tab.

1. Expand the Dell Storage Manager menu, and then click **Events**.
2. Select the check boxes of the storage systems to display and clear the check boxes of the storage systems to hide. The **Events** tab displays events for the selected storage systems.
3. To display duplicate events, select the **Display Duplicates** check box.
4. To refresh the event data, click **Refresh**.

Select the Date Range of Storage Manager Events to Display

You can view Storage Manager events for the last day, last 3 days, last 5 days, last week, last month, or specify a custom time period.

1. Expand the Dell Storage Manager menu, and then click **Events**.
2. Select the date range of the Storage Manager events to display by clicking one of the following options:
 - **Last Day** – Displays the past 24 hours of event log data.
 - **Last 3 Days** – Displays the past 72 hours of event log data.
 - **Last 5 Days** – Displays the past 120 hours of event log data.
 - **Last Week** – Displays the past 168 hours of event log data.
 - **Last Month** – Displays the past month of event log data.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the event log data to display.
3. If you clicked **Custom**, perform the following tasks to specify the start time and end time of the event log data to display.

To specify the start time:

 - a. Select the start date of the time period to display from the date drop-down menu calendar.
 - b. Specify the start time of the time period in the time field.



- c. Click **Update** to display the event log data using the specified start time.

To specify the end time:

- a. Select the stop date of the time period to display from the date drop-down menu calendar.
- b. Specify the stop time of the time period in the time field.
- c. Click **Update** to display the event log data using the specified end time.

Search for Storage Manager Events

Use the **Find Events** field to find text in the list of Storage Manager events.

1. Expand the Dell Storage Manager menu, and then click **Events**.
2. Enter the text to search for in the **Find Events** field.
3. Press Enter or click the **Find** icon.
The **Events** tab displays all events that matched the searched text.

Configuring Email Alerts for Storage Manager Events

To receive email notifications for Storage Manager events, configure SMTP server settings for the Data Collector, add an email address to your user account, and enable notification emails for the events.

Configure SMTP Server Settings

The SMTP server settings must be configured to allow Storage Manager to send notification emails.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, and then select the **SMTP Server** subtab.
3. Click **Edit**. The **SMTP Server Configuration** dialog box opens.
4. Configure the SMTP server settings by performing the following steps:
 - a. In the **From Email Address** field, enter the email address to display as the sender of emails from the Data Collector.
 - b. In the **Host or IP Address** field, enter the host name or IP address of the SMTP server.
 - c. If the port number of the SMTP server is not 25, enter the correct port number in the **Port** field.
 - d. If the SMTP server requires authentication, select the **Authentication** check box, then enter the user name and password in the **SMTP User Name** and **SMTP User Password** fields.
5. Click **OK**.

Configure an Email Address for Your User Account

To receive email notifications, you must specify an email address for your account.

Prerequisites

The SMTP server settings must be configured for the Data Collector. If these settings are not configured, the Data Collector is not able to send emails.

Steps

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. Click the **Email Settings** tab.
3. Enter the email address of the current user in the **Email Address** field.
4. Select the format for emails to the current user from the **Email Format** drop-down menu.
5. To send a test message to the email address, click **Test Email** and click **OK**.
Verify that the test message is sent to the specified email address.
6. Click **OK**.

Related links

[Configure SMTP Server Settings](#)



Configure Email Notification Settings for Your User Account

Make sure that Storage Manager is configured to send email notifications to your account for the events that you want to monitor.

Prerequisites

- The SMTP server settings must be configured for the Data Collector. If these settings are not configured, the Data Collector is not able to send emails.
- An email address must be configured for your user account.

Steps

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. Click the **Manage Events** tab.
3. Select the check box for each event you want to be notified about.
4. Click **OK**.

Related links

[Configure SMTP Server Settings](#)

[Configure an Email Address for Your User Account](#)

Logs

Logs are records of event activity on the managed Storage Centers.

You can use the **Logs** tab to display and search for events in storage system logs.

 **NOTE: To view Storage Center logs in the Logs tab, the Storage Center must be configured to send logs to the Storage Manager Data Collector.**

Sending Storage Center Logs to Storage Manager

To view Storage Center logs in Storage Manager, the Storage Center must be configured to send logs to the Storage Manager Data Collector. You can also configure the Storage Center to send logs to one or more syslog servers.

When a Storage Center is configured to send logs to the Data Collector, Storage Manager overwrites the syslog server settings for the Storage Center. If you want to send the logs to the Data Collector and one or more syslog servers, configure the Data Collector to forward the log messages to the appropriate servers.

Send Storage Center Logs to the Data Collector

Modify the Storage Center to forward logs to Storage Manager.

Prerequisites

- UDP port 514 must be open on the Storage Manager Data Collector server to receive logs from Storage Centers.
- The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Alerts and Logs** tab.
5. Select **Send Logs to Data Collector**.
6. Click **OK**.

Send Storage Center Logs to a Syslog Server

Modify the Storage Center to forward logs to a syslog server.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.



Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Alerts and Logs** tab.
5. Select **Send Logs Directly to Syslog Server**.
6. In the **Host or IP Address** field, type the host name or IP address of the syslog server.
7. Click **OK**.

Send Storage Center Logs to the Data Collector and a Syslog Server

If you want to send the logs to the Data Collector and one or more syslog servers, configure the Data Collector to forward the log messages to the appropriate servers.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Alerts and Logs** tab.
5. Select **Send Logs to Data Collector**.
6. Define a syslog server to which log messages should be forwarded.
 - a. Click **Add Server**. The **Add Server** dialog box opens.
 - b. In the **Host or IP Address** field, type the host name or IP address of the syslog server.
 - c. From the **Facility** drop-down menu, select the syslog facility to assign to log messages.
 - d. Click **OK**. The Syslog server is added and the **Add Server** dialog box closes.
7. Repeat the previous step as necessary to define additional syslog servers.
8. When you are finished, click **OK** to close the **Edit Storage Center Settings** dialog box.

Send a Test Message to a Syslog Server

Send a test message to confirm that the syslog server can receive syslog messages from the Data Collector.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Alerts and Logs** tab.
5. Select **Send Logs to Data Collector**.
6. Select the Syslog server/facility to which to send the test message.
7. Click **Send Test Message**. A **Message** dialog box opens that indicates the message was sent to the Syslog server.
8. Click **OK** to close the **Message** dialog box.
9. Connect to the Syslog server to make sure the test message was successfully sent to the server.

Remove a Syslog Server

Remove a syslog server if you no longer want the Data Collector to forward syslog messages to it.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Alerts and Logs** tab.
5. Select the Syslog server to remove.
6. Click **Remove Server**. The **Remove Server** dialog box opens.
7. Click **OK**. The selected Syslog server is removed and the **Remove Server** dialog box closes.

Viewing Storage Logs

To display and search for events in the Storage Center logs, use the **Logs** tab

Display Storage Logs for Multiple Storage Centers

Storage logs represent event activity on the selected storage systems. Storage logs for managed storage systems can be displayed on the **Logs** tab of the **Health** view.

1. Expand the Dell Storage Manager menu, and then click **Logs**.
2. Select the check boxes of the storage systems to display and clear the check boxes of the storage systems to hide. The **Logs** tab displays event log data for the selected storage systems.
3. To refresh the alert data, click **Refresh**.

Display Storage Logs for a Single Storage Center

Storage logs represent event activity on the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center.
3. Click the **Health** tab.
4. Click the **Logs** subtab. The **Logs** subtab displays event log data for the selected Storage Center.
5. To refresh the alert data, click **Refresh**.

Select the Date Range of Log Events to Display

You can view log events for the last day, last 3 days, last 5 days, last week, or specify a custom time period.

1. Expand the Dell Storage Manager menu, and then click **Logs**.
2. Select the date range of the event log data to display by clicking one of the following options:
 - **Last Day** – Displays the past 24 hours of event log data.
 - **Last 3 Days** – Displays the past 72 hours of event log data.
 - **Last 5 Days** – Displays the past 120 hours of event log data.
 - **Last Week** – Displays the past 168 hours of event log data.
 - **Last Month** – Displays the past month of event log data.
 - **Custom** – Displays options that allow you to specify the start time and the end time of the event log data to display.
3. If you clicked **Custom**, perform the following tasks to specify the start time and end time of the event log data to display.

To specify the start time:

- a. Select the start date of the time period to display from the date drop-down menu calendar.
- b. Specify the start time of the time period in the time field.
- c. Click **Update** to display the event log data using the specified start time.

To specify the end time:

- a. Select the stop date of the time period to display from the date drop-down menu calendar.
- b. Specify the stop time of the time period in the time field.
- c. Click **Update** to display the event log data using the specified end time.



Search for Events in the Storage Logs

Use the **Find Logs** field to search the list of log events.

1. Expand the Dell Storage Manager menu, and then click **Logs**.
2. Enter the text to search for in the **Find Logs** field.
3. Press Enter or click the **Find** icon.
The **Logs** tab displays all events that match the searched text.



Storage Manager Maintenance

This section describes how to manage the Data Collector, manage Storage Manager users, and configure settings for Dell SupportAssist.





Data Collector Management

The Storage Manager Data Collector is a Windows service that collects reporting data and alerts from managed Storage Centers. The Data Collector service is managed by the Data Collector Manager.

Using the Storage Manager Data Collector Website

The Storage Manager Data Collector website is set up automatically when a primary Data Collector is installed on a server. The Data Collector website allows you to perform the following actions:

- Update Dell Storage Manager Clients to the same software version as the installed Data Collector.
- Update Storage Manager server agents to the same software version as the installed Data Collector.
- View Storage Manager documentation in PDF and HTML format.

Access the Data Collector Website

Dell Storage Manager contains a shortcut to the Data Collector website.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. On the **Summary** tab, click the website address to go to the Data Collector website.
3. If a certificate warning appears, acknowledge the warning to continue to the Data Collector website.

Updating Data Collector Properties

Use the Storage Manager to update Data Collector properties and settings.

Configuring Server Settings

Use the **Server** tab to configure SMTP server, server agent, database, license, security, and Directory Service settings.

Configure SMTP Server Settings

The SMTP server settings must be configured to allow Storage Manager to send notification emails.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, and then select the **SMTP Server** subtab.
3. Click **Edit**. The **SMTP Server Configuration** dialog box opens.
4. Configure the SMTP server settings by performing the following steps:
 - a. In the **From Email Address** field, enter the email address to display as the sender of emails from the Data Collector.
 - b. In the **Host or IP Address** field, enter the host name or IP address of the SMTP server.
 - c. If the port number of the SMTP server is not 25, enter the correct port number in the **Port** field.
 - d. If the SMTP server requires authentication, select the **Authentication** check box, then enter the user name and password in the **SMTP User Name** and **SMTP User Password** fields.
5. Click **OK**.



Automatically Retrieve Information for All Registered Servers

If automated updating is enabled, information is updated every 30 minutes.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Server Agent** subtab.
3. Click **Edit**. The **Server Agent** dialog box opens.
4. Select the **Allow Automated Update Information** check box.
When the **Allow Automated Update Information** check box is selected, the information displayed for all of the registered servers is updated every 30 minutes.
5. Click **OK**.

Configure Reporting Settings for All Registered Servers

You can specify the number of days for which data is gathered for all servers.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Server Agent** subtab.
3. Click **Edit**. The **Server Agent** dialog box opens.
4. In the **Days For Reporting** field, enter the number of days of data to gather from registered servers.
5. Click **OK**.

Globally Enable Automated Space Recovery




To allow Automated Space Recovery to run, it must be enabled globally.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Server Agent** subtab.
3. Click **Edit**. The **Server Agent** dialog box opens.
4. Select the **Automated Space Recovery** check box.
5. In the **Space Recovery Time of Day** field, enter the time of day to perform automated Space Recovery.
6. Click **OK**.

Change Data Collector Data Source

Change the data source if you want to use a different database to store Storage Manager data.

About this task

-  **NOTE:** The **Change Data Source** option re-configures an existing primary Data Collector to use a new database.
-  **CAUTION:** To prevent data corruption, make sure that another Data Collector is not using the new database already.
-  **NOTE:** Dell Storage Manager Web UI can change the data source only if the Dell Storage Manager Web UI is connected to the Storage Manager Virtual Appliance.

Steps

1. Install and configure the database software for the new database before changing the data source.
2. Expand the Dell Storage Manager menu, and then click **Data Collector**.
3. Click the **Server** tab, then click the **Database** subtab.
4. Click **Change Data Source**. The **Change Data Source** dialog box opens.
5. Select the new data source from the **Database Type** drop-down menu.
6. Enter the host name or IP address of the database server in the **Database Server** field.
7. Enter the user name and password of a user account that has database administrator rights in the **Username** and **Password** fields.
8. (Optional) To specify a password for the database user named compmsauser created by Storage Manager, select the **Use Custom Password** check box and enter the password in the **Use Custom Password** field.

If the **Use Custom Password** check box is not selected, the password defaults to R3p0r!cty4sgs.

9. To migrate historical data from the current database to the new database, clear the **Do not migrate any data from previous data source** check box.
 - To migrate IO usage data, select the **Migrate IO Usage Data** check box, then select either **Days** or **Weeks** from the drop-down menu and specify the number of days or weeks of IO usage data to move in the **Migrate Last** field.
 - To migrate storage data, select the **Migrate Storage Usage Data** check box, then select either **Days** or **Weeks** from the drop-down menu and specify the number of days or weeks of storage data to move in the **Migrate Last** field.
 - To migrate replication data, select the **Migrate Replication Usage Data** check box, then select either **Days** or **Weeks** from the drop-down menu and specify the number of days or weeks of replication data to move in the **Migrate Last** field.
10. Click **OK**.

Submit a License

If you add applications, or increase the number of disks licensed for your Storage Center, you may need to apply a new license.

Prerequisites

- The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.
- You must be able to access a Storage Center license file from the computer from which you are running the Storage Manager Web UI.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **License** subtab.
3. Click **Edit**. The **Submit License** dialog box opens.
4. Click **Browse**. Navigate to the location of the new license file, select it, and click **Open**.
5. Click **OK**.

Configure a Custom SSL Certificate

Configure a custom SSL certificate to avoid certificate errors when connecting to the Data Collector website. An SSL certificate is also required to communicate with a directory service using LDAP with the StartTLS extension or the LDAPS protocol.

Prerequisites

- The custom certificate must be signed by a Certificate Authority (CA) that is trusted by the hosts in your network.
- The certificate public key file must use DER or PEM encoding.
- The certificate private key file must be in PKCS#12 format.
- You must know the alias and password for the private key.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Security** subtab.
3. In the Registered Certificate area, click **Edit**. The **Register Certificate** dialog box opens.
4. Upload the public key file.
 - a. Next to the **Public Key** field, click **Browse**.
 - b. Browse to the location of the public key file, and then select it.
 - c. Click **Open**. The **Public Key** field is populated with the path to the public key file.
5. Upload the private key file.
 - a. Next to the **Public Key** field, click **Browse**.
 - b. Browse to the location of the private key file, and then select it.
 - c. Click **Open**. The **Private Key** field is populated with the path to the private key file.
6. In the **Alias** field, type the name of the entry in the PKCS #12 private key file to use as the private key.
7. In the **Password** field, type the password for the private key file.
8. Click **OK**. The **Register Certificate** dialog box closes.



Configure a Login Banner Message

Set a login banner to display a message to users before they log in to the Dell Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Security** subtab.
3. In the Login Message area, click **Edit**. The **Login Message** dialog box opens.
4. In the **Login Banner Message** field, type a message to display on the login screen.
5. Click **OK**.


Configure the Data Collector to Use a Directory Service

Use the Data Collector Manager to configure the Data Collector to use an Active Directory or OpenLDAP directory service.

Prerequisites

- An Active Directory or OpenLDAP directory service must be deployed in your network environment.
- The directory service must meet specific configuration requirements.
 - **Active Directory:** The directory service must be configured to use Kerberos authentication.
 - **OpenLDAP:** The directory service must be configured to use LDAP with the StartTLS extension or LDAPS (LDAP over SSL).
- If the directory service is OpenLDAP, the SSL certificate public key file (DER or PEM encoding) for the directory server must be exported and transferred to the server that hosts the Data Collector.
- The Data Collector must have network connectivity to the directory service.
- DNS SRV records must be correctly configured in your environment to allow the Data Collector to determine how to interact with the directory service. If SRV records are not defined or are improperly configured, you must configure the directory service settings manually.
- The Data Collector requires a user that has permission to query the directory service. For Active Directory, this user must also have a User Principal Name attribute (*username@example.com*) on his or her entry in the directory.
- To use Kerberos authentication, you must provide the user name and password for a directory service user who has Administrator privileges or use an existing service account.
- If a directory service is configured and you want to reconfigure the Data Collector to use a directory service in a different domain, the directory services configuration must be disabled and applied before you continue.
- To authenticate Active Directory users that belong to domains in a different forest, a one-way or two-way trust must be configured between the local forest and remote forest.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Directory Service** subtab.
3. Click **Edit**. The **Server Agent** dialog box opens.
4. Configure LDAP settings.
 - a. Select the **Enable Directory Services** check box.
 - b. In the **Domain** field, type the name of the domain to search.
 -  **NOTE: If the server that hosts the Data Collector belongs to a domain, the Domain field is automatically populated.**
 - c. In the **Authentication Bind DN** field, type the Distinguished Name or User Principal Name of the user that the Data Collector uses to connect to and search the LDAP server. The user name Administrator is not allowed.
 - *Example Distinguished Name:* CN=Firstname Lastname,CN=users,DC=corp,DC=Company,DC=COM
 - *Example User Principal Name:* username@example.com
 - d. In the **Authentication Bind Password** field, type the password for the auth bind Distinguished Name.
 - e. If you modified the **Domain** field, click **Discover** to locate the directory service for the specified domain.
5. (Optional) Manually configure the directory service settings.
 - a. From the **Type** drop-down menu, select **Active Directory** or **OpenLDAP**.
 - b. In the **Directory Servers** field, type the fully qualified domain name (FQDN) of each directory server on a separate line.



NOTE: To verify that the Data Collector can communicate with the specified directory server(s) using the selected protocol, click Test.

- c. In the **Base DN** field, type the base Distinguished Name for the LDAP server. This name is the starting point when searching for users.
6. (Optional) Configure Kerberos authentication. To allow users to log in with the Client automatically using his or her Windows session credentials, Kerberos authentication must be configured.
 - a. Select the **Kerberos Enabled** check box.
 - b. In the **Kerberos Domain Realm** field, type the Kerberos realm to authenticate against. In Windows networks, this realm is usually the Windows domain name in uppercase characters.
 - c. (OpenLDAP only) Type the host name or IP address of the Key Distribution Center (KDC) in the **KDC Host Name or IP Address** field.
 - d. In the **Data Collector Host Name** field, type the fully qualified domain name (FQDN) of the server that hosts the Data Collector.
7. (Optional) In the **Connection Timeout** field, type the maximum time (in minutes) that the Data Collector will wait while attempting to connect to an LDAP server.
8. To register the Data Collector on the domain, select **Register the Data Collector on the domain**.
 - a. Type the user name and password of a domain administrator.
The user name Administrator is not allowed. These credentials are used only to register the Data Collector and are not saved.
 - b. Click **OK**.
9. To use an existing service account, select **Use an existing service account for joining the domain**.
 - a. Type the user name and password for the service account.



NOTE: The existing service account must include a *servicePrincipalName* attribute with the following values in the form:

HTTP/<host name>dc.<domain>@<realm>

HTTP/<host name>dc.<domain>

These values can be set using the Microsoft setspn.exe tool or the equivalent.

- b. Click **OK**.

Related links

[Troubleshoot Directory Service Discovery](#)

Configuring Data Protection Settings

Use the **Data Protection** tab to edit schedules and configure replication settings.

Configure Data Collection Schedules

Configure the interval at which the Data Collector collects monitoring data from Storage Centers.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Schedules** subtab.
3. Click **Edit**. The **Schedules** dialog box opens.
4. Configure the data collection schedules by performing the following steps:
 - a. To change how often IO usage data is collected, select a period of time from the **IO Usage** drop-down menu.
 - b. To change how often replication usage data is collected, select a period of time from the **Replication Usage** drop-down menu.
 - c. To change how often storage usage data is collected, select a period of time from the **Storage Usage** drop-down menu.
If **Daily** is selected from the Storage Usage drop-down menu, the time of the day that storage usage data is collected can be selected from the **Storage Usage Time** drop-down menu.
5. Click **OK**.



Set a Schedule for Automatically Saving and Validating Restore Points

Set a schedule for automatically saving and validating restore points to make sure that good restore points are always available to perform DR.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Schedules** subtab.
3. Click **Edit**. The **Schedules** dialog box opens.
4. Select the **Automatically save and validate restore points** check box.
5. From the **Frequency** drop-down menu, select how often you want restore points to be automatically saved and validated.
6. (Conditional) If you selected **Daily** in the previous step, select the time of day to save and validate restore points from the **Time** drop-down menu.
7. Click **OK**.

Allow Replicate Storage to Lowest Tier Selection During Initial Replication Configuration

By default, the **Replicate Storage To Lowest Tier** option is only available when modifying an existing replication. To allow this option to be configured when replications are being created, modify the Data Collector settings.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Replication Settings** subtab.
3. Click **Edit**. The **Replication Settings** dialog box opens.
4. Select the **Allow Select to Lowest Tier on Replication Create** check box.
5. Click **OK**.

Allow Replicate Storage to Lowest Tier Selection During Initial Live Volume Configuration

By default, the **Replicate Storage To Lowest Tier** option is only available when modifying an existing Live Volume. To allow this option to be configured when Live Volumes are being created, modify the Data Collector settings.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Replication Settings** subtab.
3. Click **Edit**. The **Replication Settings** dialog box opens.
4. Select the **Allow Select to Lowest Tier on Live Volume Create** check box.
5. Click **OK**.

Change the Snapshot Type Used for SRM Volume Failover

Modify the **SRM Selectable Snapshot** option to change the snapshot type used for SRM volume failover.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Replication Settings** subtab.
3. Click **Edit**. The **Replication Settings** dialog box opens.
4. From the **SRM Selectable Snapshot** drop-down menu, select one of the following options:
 - **Always use Active Snapshot**: When selected, uses the current, unfrozen state of the data transferred to the destination (Active Snapshot). This option is the default.
 - **Use Active Snapshot if Replicating Active Snapshot**: When selected, uses the current, unfrozen state of the data (Active Snapshot) only if **Replicate Active Snapshot** is enabled for the replication. If **Replicate Active Snapshot** is disabled, the last frozen snapshot is used.
 - **Always use Last Frozen Snapshot**: When selected, uses the most current snapshot that has been transferred to the destination.
 - **Use Restore Point Settings**: When selected, uses the settings that are configured for the restore point that corresponds to the volume. If **Use Active Snapshot** is not selected within the restore point, the last frozen snapshot is used.
5. Click **OK**.



Configuring Health Settings

Use the **Health** tab to configure Dell SupportAssist, automated reports, limits, and support settings.

Configure Dell SupportAssist Settings for All Managed Storage Centers

Modify the Data Collector settings for all Storage Centers.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Dell SupportAssist** subtab.
3. Click **Edit**. The **Dell SupportAssist** dialog box opens.
4. Select how often Storage Center Dell SupportAssist data is sent from the **Frequency** drop-down menu.
 - **4 Hours** – Sends usage statistics every 4 hours.
 - **12 Hours** – Sends usage statistics every 12 hours.
 - **1 Day** – Sends usage statistics every 24 hours.

 **NOTE: The default collection schedule for Storage Usage data is daily at midnight. Therefore, the default Frequency setting of 4 Hours is ignored for Storage Usage reports. Instead, Storage Usage reports are sent to Dell Technical Support on a daily basis by default.**

5. Select the check boxes of the Storage Center usage reports to send.
6. Click **OK**.

Set Up Automated Reports for All Storage Centers (Global Settings)

Configure automated report settings for the Data Collector if you want to use the same report settings for all managed Storage Centers. Configure the global settings first, and then customize report settings for individual Storage Centers as needed.


1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Automated Reports** subtab.
3. Click **Edit**. The **Automated Reports** dialog box opens.
4. Select the check boxes in the **Automated Report Settings** area to specify how often to generate the following reports:
 - **Storage Center Summary** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Disk Class** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Disk Power On Time** – Select the **Weekly** and/or **Monthly** check boxes.
 - **Alerts** – Select the **Daily** and/or **Weekly** check boxes.
 - **Volume Storage** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
 - **Replications** – Select the **Daily**, **Weekly**, and/or **Monthly** check boxes.
5. Select the check boxes in the **Automated Table Report Settings** area to specify which reports to generate and how often to generate them.

 **NOTE: Automated table reports can be saved in a public directory or attached to automated emails but they do not appear in the Reports view.**

- a. In the **IO Reports** area, select **Frequency** check boxes to determine how often the reports are generated, then select **Report Types** check boxes to determine which reports are generated.
 - b. In the **Storage Reports** area, select **Frequency** check boxes to determine how often the reports are generated, then select any of the **Volume Report Types**, **Server Report Types**, and **Disk Report Types** check boxes to determine which reports are generated.
6. Select the check boxes in the **Chargeback Automated Report Settings** area to specify the types of Chargeback reports to generate.
 - **Chargeback** – Select this check box to generate a Chargeback report at the end of every day.
 - **Chargeback Savings** – Select this check box to generate a Chargeback Savings report at the end of every day.
 7. To export the reports to a public directory, select the **Store report in public directory** check box and enter the full path to the directory in the **Directory** field.

 **NOTE: The directory must be located on the same server as the Data Collector.**




8. To configure the Data Collector to email the reports when they are generated:
 - Select the **Attach Automated Reports to email** check box to email the reports in the **Automated Reports Settings** area.
 - Select the **Attach Table Reports to email** check box to email the reports in the **Automated Table Reports Settings** area.
-  **NOTE: Storage Manager sends emails to the email address specified in the User Properties.**
9. To specify the file format for exported and emailed reports in the **Automated Table Reports Settings** area, select the radio button of the file format to use.
 10. Click **OK**.

Testing Automated Reports Settings

You can manually generate reports to test the configured automated report settings without waiting for the reports to be generated automatically. By default, Storage Manager generates reports into a folder named for the day when the report was generated.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Automated Reports** subtab.
3. Click **Edit**. The **Automated Reports** dialog box opens.
4. Scroll to the bottom of the pane and click **Generate Reports Now**. The **Generate Reports** dialog box opens.
5. Select the check boxes of the reports to generate.
 - To generate daily reports, select the **Generate Daily Reports** check box.
 - To generate weekly reports, select the **Generate Weekly Reports** check box.
 - To generate monthly reports, select the **Generate Monthly Reports** check box.
6. If you made configuration changes to the **Automated Reports** tab before you clicked **Generate Reports Now**, make sure the **Save current report settings before generating reports** check box is selected.
7. Click **OK**. The reports are generated and the **Generate Reports** dialog box closes.

 **NOTE: Generating a report overwrites previously generated reports in the folder for that day. To prevent these reports from being overwritten, select a different directory from the Automated Report Options area in the Automated Reports tab.**

8. Click **OK**.

Configuring Reporting Limit Settings

Use the **Limits** subtab to configure reporting limit settings.

About this task

The maximum size and number of Data Collector debug logs can be modified in the **Log Limits** area. The number of days that log, alert, and reporting data is kept can be modified in the **Reporting Information Limits** area.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Limits** subtab.
3. Click **Edit**. The **Limits** dialog box opens.
4. To modify the maximum file size for Data Collector debug logs, change the value in the **Maximum Log File Size** field.
5. To modify the maximum number of log files for each Data Collector debug log type, change the value in the **Maximum Log Files** field.
6. To modify the number of days after which a log is expired, change the value in the **Log Lifetime** field.
7. To modify the number of days after which an alert is expired, change the value in the **Alert Lifetime** field.
8. To modify the number of days after which reporting data is expired, change the value in the **Reporting Data Lifetime** field.
9. Click **OK**.

Gathering and Exporting Troubleshooting Information

Use the **Support** subtab to set debug log options and to export configuration and log data for troubleshooting purposes.

Enable Debug Logs

Enable debug logs to gather additional information for troubleshooting purposes. Do not set debug log options unless instructed to do so by Dell Technical Support.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Support** subtab.
3. Click **Edit**. The **Debug Loggers** dialog box opens.
4. Select the check boxes of the debug logs to enable.
5. Click **OK**.

Clear Debug Logs

Clear the debug log files to delete all Storage Manager debug log files.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Support** subtab.
3. Click **Clear All Debug Logfiles**. A confirmation dialog box opens.
4. Click **Yes**.

Export Configuration and Log Data for Troubleshooting

Export configuration and log data as a compressed file if it is requested by Dell Technical Support.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Support** subtab.
3. Click **Gather Support Data**.
4. Save the support data file. Configuration and log data is exported to the specified file.

Export the Database Schema from an SQL Database

If you are using an SQL database to store Storage Manager data, you can export the database schema.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Support** subtab.
3. Click **Export Database Schema**, and then click **Export as plain text** or **Export as plain XML**.
4. Specify the location to save the schema file.
5. Enter a name for the schema file in the **File name** field.
6. Click **Save**.
A dialog box appears after the schema file is saved.
7. Click **OK**.

Configuring User Settings

Use the **Users** tab to configure Storage Center settings, manage users and user groups, and set password configuration.

Managing Available Storage Centers

Use the **Storage Centers** subtab to manage available Storage Centers that have been mapped to one or more Storage Manager users.

Related links

[Storage Center Administration](#)

Delete an Available Storage Center

Remove a Storage Center when you no longer want to manage it from Storage Manager. If a Storage Center is removed from all Storage Manager user accounts, historical data for the Storage Center is also removed.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, and then select the **Storage Centers** subtab.



3. Select the Storage Center to delete.
4. Click **Delete Storage Center**.
A warning message is displayed.
5. Click **Yes**.

Clear All Data for a Storage Center

Clear data for a Storage Center to remove historical data from Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, and then select the **Storage Centers** subtab.
3. Select the Storage Center for which you want to clear all data.
4. Click **Clear Storage Center Data**.
A warning message is displayed.
5. Click **Yes**.

Remove a Storage Center from a Storage Manager User Account

Remove a Storage Center from a user account to prevent the user from viewing and managing the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, and then select the **Storage Centers** subtab.
3. Select the Storage Center on which you want to delete a User/Storage Center map.
4. In the **User/Storage Center Maps** pane, select the user to unmap from the Storage Center.
5. Click **Delete User/Storage Center Map**.
A warning message is displayed.
6. Click **Yes**.

Managing Users

Use the **Users & User Groups** subtab to manage Storage Manager users and mappings to Storage Centers.

Related links

[Storage Manager User Management](#)

Managing Password Requirements

Use the **Password Configuration** subtab to configure password requirements for Storage Manager and Storage Center users.

Related links

[Managing Local User Password Requirements](#)

Configuring Virtual Appliance Settings

Use the **Virtual Appliance** tab to configure network, proxy server, and time settings for a Virtual Appliance.

Configure Network Settings for a Virtual Appliance

Use the **Network Configuration** dialog box to configure network settings and enable or disable SSH on the Virtual Appliance.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Virtual Appliance** tab, then click the **Network** subtab.
3. Click **Edit**. The **Network Configuration** dialog box opens.
4. In the **Hostname** field, enter the host name of the Virtual Appliance.
5. In the **Domain** field, enter the domain name of the Virtual Appliance.
6. Place a check next to **Enable SSH** to enable Secure Shell (SSH).
7. Select a configuration type (**Static** or **DHCP**) from the **Configuration** drop-down menu.
8. Select **IPv4** to configure IPv4 settings.



NOTE: You can configure IPv4 settings only if the configuration is set to Static.

9. Select **IPv6** to configure IPv6 settings.

 **NOTE: You can configure IPv6 settings only if the configuration is set to Static.**

Configure Proxy Server Settings for a Virtual Appliance

Configure the proxy server settings to allow the Virtual Appliance to use a proxy server when sending diagnostic data using Dell SupportAssist.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Virtual Appliance** tab, then click the **Proxy Server** subtab.
3. Click **Edit**. The **Network Proxy Configuration** dialog box opens.
4. Enable or disable the proxy server from the **Proxy Server** drop-down menu.

 **NOTE: The proxy server must be enabled to configure the server settings.**

5. In the **Host or IP Address** field, type the host name or IP address of the proxy server.
6. Type the port number in the **Port** field.
7. If the proxy server requires a user name and password to connect, type a user name and password in the **User Name** and **Password** fields.
8. Click **OK** to save the proxy server settings.

Configure Time Settings for a Virtual Appliance

Configure the time settings to set the time zone and NTP servers for a Virtual Appliance. By default, the time zone is set to UTC or the time zone set in the ESXi host. It is recommended to set the time zone to the local time zone where the Virtual Appliance is located.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Virtual Appliance** tab, then click the **Time** subtab.
3. Click **Edit**. The **Time Configuration** dialog box opens.
4. Select a time zone from the **Timezone** drop-down menu.
5. Type the name of one or more Network Time Protocol (NTP) servers in the **NTP Servers** field.
6. Click **OK** to save the time settings.





Storage Manager User Management

Use the Data Collector Manager to add new users and manage existing users. To change preferences for your user account, use the Dell Storage Manager Web UI.

Storage Manager User Privileges

The Data Collector controls user access to Storage Manager functions and associated Storage Centers based on the privileges assigned to users: Reporter, Volume Manager, or Administrator. The following tables define Storage Manager user level privileges with the following categories.

- View: Users can view and monitor objects.
- Manage: Users can modify existing objects.
- Add/Create: Users can create new objects or add external objects.

 **NOTE: Storage Manager user privileges and Storage Center user privileges share the same names but they are not the same. Storage Center user privileges control access to Storage Centers, and Storage Manager users control access to Storage Manager functionality.**

Reporter Privileges

The Reporter privilege level is the most limited type of user in Storage Manager.

A Reporter can view most features of Storage Manager. Reporters cannot view SupportAssist properties, Data Collector properties, or Storage Profiles. Reporters are not able to manage, create, or edit any feature.

 **NOTE: Storage Manager Reporter users can map Storage Centers to other reporters if they have Storage Manager Reporter credentials.**

Volume Manager Privileges

The Volume Manager privilege level is similar to the Administrator level, but has more restrictions.

The Volume Manager user role is able to view, manage, and add/create most features of Storage Manager. This role cannot add/create Threshold Definitions, replications, Portable Volumes, or Storage Types, and has no access to SupportAssist properties or data collector properties.

 **NOTE: A Volume Manager Storage Manager user can add objects to an existing threshold definition but cannot create new threshold definitions.**

Administrator Privileges

The Administrator privilege level is the most powerful user profile in Storage Manager.

The Administrator role has full access to Storage Manager features. The only exceptions are SupportAssist properties and Data Collector properties. The Administrator can view and manage these features, but cannot add new properties.



Authenticating Users with an External Directory Service

The Data Collector can be configured to authenticate Storage Manager users with an Active Directory or OpenLDAP directory service. If Kerberos authentication is also configured, users can log in with the Client automatically using their Windows session credentials.

Storage Manager access can be granted to directory service users and groups that belong to the domain to which the Data Collector is joined. For Active Directory, access can also be granted to users and groups that belong to domains in the same forest, as well as domains that belong to forests for which one-way or two-way trusts are configured.

Configuring an External Directory Service

Before users can be authenticated with an external directory service, the Data Collector must be configured to use the directory service.

Configure the Data Collector to Use a Directory Service

Use the Data Collector Manager to configure the Data Collector to use an Active Directory or OpenLDAP directory service.

Prerequisites

- An Active Directory or OpenLDAP directory service must be deployed in your network environment.
- The directory service must meet specific configuration requirements.
 - **Active Directory:** The directory service must be configured to use Kerberos authentication.
 - **OpenLDAP:** The directory service must be configured to use LDAP with the StartTLS extension or LDAPS (LDAP over SSL).
- If the directory service is OpenLDAP, the SSL certificate public key file (DER or PEM encoding) for the directory server must be exported and transferred to the server that hosts the Data Collector.
- The Data Collector must have network connectivity to the directory service.
- DNS SRV records must be correctly configured in your environment to allow the Data Collector to determine how to interact with the directory service. If SRV records are not defined or are improperly configured, you must configure the directory service settings manually.
- The Data Collector requires a user that has permission to query the directory service. For Active Directory, this user must also have a User Principal Name attribute (*username@example.com*) on his or her entry in the directory.
- To use Kerberos authentication, you must provide the user name and password for a directory service user who has Administrator privileges or use an existing service account.
- If a directory service is configured and you want to reconfigure the Data Collector to use a directory service in a different domain, the directory services configuration must be disabled and applied before you continue.
- To authenticate Active Directory users that belong to domains in a different forest, a one-way or two-way trust must be configured between the local forest and remote forest.

Steps


1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Directory Service** subtab.
3. Click **Edit**. The **Server Agent** dialog box opens.
4. Configure LDAP settings.
 - a. Select the **Enable Directory Services** check box.
 - b. In the **Domain** field, type the name of the domain to search.




NOTE: If the server that hosts the Data Collector belongs to a domain, the Domain field is automatically populated.

- c. In the **Authentication Bind DN** field, type the Distinguished Name or User Principal Name of the user that the Data Collector uses to connect to and search the LDAP server. The user name Administrator is not allowed.
 - *Example Distinguished Name:* CN=Firstname Lastname,CN=users,DC=corp,DC=Company,DC=COM
 - *Example User Principal Name:* username@example.com
- d. In the **Authentication Bind Password** field, type the password for the auth bind Distinguished Name.

- e. If you modified the **Domain** field, click **Discover** to locate the directory service for the specified domain.
5. (Optional) Manually configure the directory service settings.
 - a. From the **Type** drop-down menu, select **Active Directory** or **OpenLDAP**.
 - b. In the **Directory Servers** field, type the fully qualified domain name (FQDN) of each directory server on a separate line.

 **NOTE: To verify that the Data Collector can communicate with the specified directory server(s) using the selected protocol, click Test.**
 - c. In the **Base DN** field, type the base Distinguished Name for the LDAP server. This name is the starting point when searching for users.
6. (Optional) Configure Kerberos authentication. To allow users to log in with the Client automatically using his or her Windows session credentials, Kerberos authentication must be configured.
 - a. Select the **Kerberos Enabled** check box.
 - b. In the **Kerberos Domain Realm** field, type the Kerberos realm to authenticate against. In Windows networks, this realm is usually the Windows domain name in uppercase characters.
 - c. (OpenLDAP only) Type the host name or IP address of the Key Distribution Center (KDC) in the **KDC Host Name or IP Address** field.
 - d. In the **Data Collector Host Name** field, type the fully qualified domain name (FQDN) of the server that hosts the Data Collector.
7. (Optional) In the **Connection Timeout** field, type the maximum time (in minutes) that the Data Collector will wait while attempting to connect to an LDAP server.
8. To register the Data Collector on the domain, select **Register the Data Collector on the domain**.
 - a. Type the user name and password of a domain administrator.
The user name Administrator is not allowed. These credentials are used only to register the Data Collector and are not saved.
 - b. Click **OK**.
9. To use an existing service account, select **Use an existing service account for joining the domain**.
 - a. Type the user name and password for the service account.

 **NOTE: The existing service account must include a *servicePrincipalName* attribute with the following values in the form:**

HTTP/<host name>dc.<domain>@<realm>

HTTP/<host name>dc.<domain>

These values can be set using the Microsoft setspn.exe tool or the equivalent.
 - b. Click **OK**.

Related links

[Troubleshoot Directory Service Discovery](#)

Troubleshoot Directory Service Discovery

The Data Collector attempts to automatically discover the closest directory service based on the network environment configuration. Discovered settings are written to a text file for troubleshooting purposes. If discovery fails, confirm that the text file contains values that are correct for the network environment.

1. On the server that hosts the Data Collector, use a text editor to open the file **C:\Program Files (x86)\Compellent Technologies\Compellent Enterprise Manager\msaservice\directory_settings.txt**.
2. Confirm that the values listed in the **directory_settings.txt** file match the network environment.
3. If the file contains incorrect values, make configuration changes to correct the issue.
 - a. Confirm that the server that hosts the Data Collector is joined to the correct Domain.
 - b. Make sure that DNS SRV records are correctly configured.
 - c. Use Data Collector Manager to discover the directory service again.
4. If the previous step did not correct the issue, select the **Enable Manual Configuration** check box and manually configure directory service settings. If necessary, contact Dell Technical Support for assistance.



Scan for Domains in Local and Trusted Forests

If domains are added or removed from the local forest, or if two-way forest trusts between the local forest and one or more remote forests are added or removed, use the Data Collector Manager to scan for domains.

Prerequisites

The Data Collector must be configured to authenticate users with an Active Directory directory service and Kerberos.

 **NOTE: Authentication attempts for Active Directory users may fail while a rescan operation is in progress.**

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Server** tab, then click the **Server Agent** subtab.
3. Click **Rescan**. A message appears to inform you that scanning succeeded or failed.
4. Click **OK**.

Related links

[Troubleshoot Directory Service Discovery](#)

Grant Access to Directory Service Users and Groups

To allow directory users to log in to Storage Manager, add directory service users and/or user groups to Storage Manager user groups.

Add Directory Groups to a Storage Manager User Group

Add a directory group to a Storage Manager user group to allow all users in the directory group to access Storage Manager. Access can be granted to groups that belong to the domain to which the Data Collector is joined, domains in the same forest, and domains that belong to forests for which two-way forest trusts are configured. Directory service groups are not supported for one-way trust domains.

Prerequisites

The Data Collector must be configured to authenticate users with an external directory service.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Click the **User Groups** tab.
4. Select the Storage Manager user group to which you want to add directory groups.
5. Click **Add Directory Groups**. The **Add Directory User Groups** dialog box opens.
6. (Multi-domain environments only) From the **Domain** drop-down menu, select the domain that contains the directory groups to which you want to grant access.
7. Select each directory group that you want to add to the Storage Manager user group.
8. When you are finished, click **OK**. The directory groups that are associated with the Storage Manager group appear on the **User Groups** subtab.

Add a Directory User to a Storage Manager User Group

Add a directory user to a Storage Manager user group to allow the directory user to access Storage Manager. Access can be granted to users that belong to the domain to which the Data Collector is joined, domains in the same forest, and domains that belong to forests for which one-way or two-way trusts are configured.

Prerequisites

The Data Collector must be configured to authenticate users with an external directory service.


Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.

3. Click the **User Groups** tab.
4. Select the Storage Manager user group to which you want to add a directory user.
5. Click **Add Directory Users**. The **Add Directory Users** dialog box opens.
6. In the **Directory Users** field, type the name of each directory user that you want to add.
 - For OpenLDAP, the user name format is supported (example: *user*).
 - For Active Directory, the following user name formats are supported:
 - User name (example: *user*)
 - User Principal Name (example: *user@domain*)

 **NOTE: To add users that belong to a domain other than the domain for which the Data Collector is configured, use the User Principal Name format.**

7. Click **Check Names** to verify that the specified users exist in the directory service. A message appears.

 **NOTE: Checking names is not supported on domains for which a one-way trust is configured.**
8. Click **OK** to close the message.
9. If any of the specified directory user names could not be verified, correct the names and then click **Check Names** again.
10. When you are finished, click **OK**. The **Add Directory Users** dialog box closes, and the directory users that are associated with the selected Storage Manager user group appear on the **User Groups** subtab.

Revoke Access for Directory Service Users and Groups

To revoke access to Storage Manager for a directory service user or group, remove the directory group or user from Storage Manager user groups.

Remove a Directory Service Group from a Storage Manager User Group

Remove a directory service group from a Storage Manager user group to prevent directory users in the group from accessing Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Click the **User Groups** tab.
4. Select the Storage Manager user group to which the directory group is added.
5. Click the **Directory Groups** subtab.
6. Right-click the directory service group for which you want to revoke access, then select **Delete**. The **Delete Directory User Group** dialog box opens.
7. Click **Yes**.

Remove a Directory Service User from a Storage Manager User Group

Remove a directory service user from a Storage Manager user group to prevent the directory user from accessing Storage Manager.


1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Click the **User Groups** tab.
4. Select the Storage Manager user group to which the directory group is added.
5. Click the **Users** subtab.
6. Right-click the directory service group user for which you want to revoke access, then select **Delete User**. The **Delete Directory User** dialog box opens.
7. Click **Yes**.



Disable External Directory Service Authentication

Disable external directory service authentication to prevent directory users from authenticating.

About this task

 **CAUTION:** Disabling directory service authentication removes all directory service users and groups from Storage Manager. If you choose to reenable directory service authentication at a later time, all directory users and user groups must be granted access again.

Steps

1. In Data Collector Manager, click the **Directory Service** tab.
2. Click the **Server** tab, and then select the **Directory Service** subtab.
3. Click **Edit**. The **Service Settings** dialog box opens.
4. Clear the **Enabled** check box.
5. Click **OK**.

Managing Local Users with the Data Collector Manager

Storage Manager users and mappings to Storage Center can be configured on the **Users** tab of the Data Collector Manager.

Create a User

Create a user account to allow a person access to Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Click **Create User**. The **Create User** dialog box opens.
4. Enter information for the new user.
 - a. Type the user name of the user in the **User Name** field.
 - b. (Optional) Type the email address of the user in the **Email Address** field.
 - c. Select the privilege level to assign to the user from the **Privilege** drop-down menu.
 - d. Select a language from the **Preferred Language** drop-down menu.
 - e. Enter a password for the user in the **Password** and **Confirm Password** fields.
 - f. To force the user to change the password after the first login, select the **Requires Password Change** check box.
5. Click **OK**.

Related links

[Storage Manager User Privileges](#)

Configure or Modify the Email Address of a User

An email address must be configured if you want Storage Manager to send email notifications to the user.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the user to modify and click **Edit Settings**. The **User Settings** dialog box opens.
4. Enter the email address of the user in the **Email Address** field.
5. Click **OK**.

Change the Privileges Assigned to a User

You can increase or decrease the privilege level for a user account.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.

3. Select the user to modify and click **Edit Settings**. The **User Settings** dialog box opens.
4. Select the privilege level to assign to the user from the **Privilege** drop-down menu.
5. Click **OK**.

Related links

[Storage Manager User Privileges](#)

Change the Preferred Language for a Storage Manager User

The preferred language for a Storage Manager user determines the language displayed in automated reports and email alerts from the Data Collector. Reports displayed in the UI and generated by a user request will not use the preferred language.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Click **Create User**. The **User Settings** dialog box opens.
4. From the **Preferred Language** drop-down menu, select a language.
5. Click **OK**.

Force the User to Change the Password

You can force a user to change the password the next time he or she logs in.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the user to modify and click **Edit Settings**. The **User Settings** dialog box opens.
4. Select the **Requires Password Change** check box.
5. Click **OK**.

Change the Password for a User

The Data Collector Manager can change the password for any user account.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the user to modify and click **Change User Password**. The **Change Password** dialog box opens.
4. Enter a new password for the user in the **New Password** and **Confirm Password** fields.
5. Click **OK**.

Set Storage Center Mappings for a Reporter User

Storage Center mappings can be set only for users that have Reporter privileges. Users that have Administrator or Volume Manager privileges manage their own Storage Center mappings using the Dell Storage Manager Web UI.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the Reporter user to modify.
4. Click **Select Storage Center Mappings**. The **Select Storage Center Mappings** dialog box opens.
5. Select the check box of each Storage Center to map to the user.
Clear the check box of each Storage Center to unmap from the user.
6. Click **OK**.



Delete a User

Delete a user account to prevent the user from viewing and managing the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the user you want to delete.
4. Click **Delete User**. A confirmation dialog box opens.
5. Click **Yes**.

Delete a Storage Center Mapping for a User

Remove a Storage Center map from a user account to prevent the user from viewing and managing the Storage Center.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the user for which you want to delete a Storage Center mapping.
4. Select the Storage Center to unmap from the user on the **User/Storage Center Maps** pane.
5. Click **Delete User/Storage Center Map**. A confirmation dialog box opens.
6. Click **OK**.

Unlock a Local User Account

After a user enters an incorrect password beyond the Account Lockout threshold, that user account is locked. Unlock the user from the Data Collector Manager.

Prerequisites

- Password Configuration is enabled.
- A user account is locked.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Users & User Groups** subtab.
3. Select the locked user account.
4. Click **Unlock User**. A confirmation dialog box opens.
5. Click **Yes**.

Create a Server Folder

Create a server folder to group servers together.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. Click the **Storage** tab, and then click the **Servers** subtab.
4. Click **New** → **Server Folder**. The **New Server Folder** dialog box opens.
5. Enter a name for the folder in the **Name** field.
6. Select a parent folder for the new folder in the **Parent** navigation tree.
7. Click **OK**.



Managing Local User Password Requirements

Manage the password expiration and complexity requirements for Storage Manager from the Data Collector Manager.

Configure Local Storage Manager User Password Requirements

Set local user password requirements to increase the complexity of local user passwords and improve the security of Storage Manager.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Password Configuration** subtab.
3. Click **Edit**. The **Password Configuration** dialog box opens.
4. Select **Enabled**.
5. Set the following password requirements.
 - To set the number of previous passwords Storage Manager checks against when validating a password, type a value in the **History Retained** field. To disable previous password validation, type 0.
 - To set the minimum number of characters in a new password, type a value in the **Minimum Length** field. The minimum password length is four characters.
 - To set the number of login failures that will lock out an account, type a number in the **Account Lockout Threshold** field. To disable the Account Lockout Threshold, type 0.

 **NOTE: Only administrator level accounts can unlock other Storage Manager accounts. Have more than one Storage Manager administrator level account to unlock other Storage Manager accounts.**

- To require new passwords to follow complexity standards, select the **Complexity Enabled** check box. To disable the password complexity requirement, clear the **Complexity Enabled** check box.
 - To set the number of days before a user can change his or her password, type a value in the **Minimum Age** field. To disable the minimum age requirement, type 0.
 - To set the number of days after which a password expires, type a value in the **Maximum Age** field. To disable the maximum age requirement, type 0.
 - To set the number of days before a password expires when the Expiration Warning Message is issued, type a value in the **Expiration Warning Time** field. To disable the Expiration Warning Message, type 0.
 - To specify the body of the password expiration email a user receives, type a warning message in the **Expiration Warning Message** field. The body of the password expiration email is blank if this field is empty.
6. Click **OK**.

Apply Password Requirements to Storage Center Users

Storage Manager local user password requirements can be applied to Storage Center users.

Prerequisites

Password Configuration must be enabled.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Password Configuration** subtab.
3. Click **Edit**. The **Password Configuration** dialog box opens.
4. Select the Storage Centers to which to apply the password requirements.
5. Click **OK**.

Related links

[Configure Local Storage Manager User Password Requirements](#)



Reset Password Aging Clock

The password aging clock determines when a password expires based on the minimum and maximum age requirements. Reset the password aging clock to start the password aging clock from the current date and time.

Prerequisites

Password Configuration must be enabled.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Password Configuration** subtab.
3. Click **Edit**. The **Password Configuration** dialog box opens.
4. Select the **Reset Aging Clock** check box.
5. Click **OK**.

Related links

[Configure Local Storage Manager User Password Requirements](#)

Require Users to Change Passwords

The new password requirements apply to new user passwords only. Existing user passwords may not follow the password requirements. Require users to change passwords at next login so that the password complies with the password requirements.

Prerequisites

Password Configuration must be enabled.

Steps

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Users** tab, then select the **Password Configuration** subtab.
3. Click **Edit**. The **Password Configuration** dialog box opens.
4. Select the **Requires Password Change** check box.
5. Click **OK**.

Related links

[Configure Local Storage Manager User Password Requirements](#)

Managing User Settings with the Dell Storage Manager Web UI

Use the Dell Storage Manager Web UI to change preferences for your user account.

Change User Password

The username and privileges of the current user are displayed on the **User Information** section of the **General** tab. In addition, the **User Information** section provides the ability to change the password of the current user.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. On the **User Information** tab, click **Change Password**. The **Change Password** dialog box opens.
3. Type the current password of the user in the **Current Password** field.
4. Type a new password in the **New Password** and **Confirm Password** fields.
5. Click **OK** to save changes to the password and close the **Change Password** dialog box.
6. Click **OK** to close the **Edit User Settings** dialog box.



Configure Email Settings

The email address of the current user and the format of the emails can be selected on the **Email Settings** tab.

Related links

[Configuring Email Alerts for Storage Manager Events](#)

Configure Charting Options

Threshold alert levels and Storage Center alerts can be configured to appear on charts for the current user, and chart colors can be changed for the current user on the **Charting Options** tab.

Related links

[Configuring User Settings for Charts](#)

Configure Client Options

The default view, storage units formatting, and warning/error threshold percentages can be configured for the current user on the **Client Options** tab.

Specify the Default View to Display in the Dell Storage Manager Web UI

You can choose the view that is first displayed after you log in to the Client.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. On the **Client Options** tab, select the view to display by default from the **Default View** drop-down.
3. Click **OK** to save changes and close the **Edit User Settings** dialog box.

Specify How to Display Storage Units

Storage units can be shown in megabytes, gigabytes, terabytes, or an automatically chosen unit of measure that best fits the data.

1. On the **Client Options** tab, select how to display the storage units from the **Storage Units Formatting** drop-down menu:
 - **Automatic** – The units that are most appropriate for the displayed values are automatically selected.
 - **Always show in MB** – All storage units are displayed in megabytes.
 - **Always show in GB** – All storage units are displayed in gigabytes.
 - **Always show in TB** – All storage units are displayed in terabytes.
2. Click **OK** to save changes and close the **Edit User Settings** dialog box.

Change the Warning Percentage Threshold

The warning percentage threshold specifies the utilization percentage at which storage objects indicate a warning.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. On the **Client Options** tab, enter a new utilization percentage at which storage objects indicate a warning in the **Warning Percentage Threshold** field.
3. Click **OK** to save changes and close the **Edit User Settings** dialog box.

Change the Error Percentage Threshold

The error percentage threshold specifies the utilization percentage at which storage objects indicate an error.

1. In the top pane of the Dell Storage Manager Web UI, click your user name, then select **User Preferences**.
2. On the **Client Options** tab, enter a new utilization percentage at which storage objects indicate an error in the **Error Percentage Threshold** field.
3. Click **OK** to save changes and close the **Edit User Settings** dialog box.





Dell SupportAssist Management

The Storage Manager Dell SupportAssist feature sends data to Dell Technical Support for monitoring and troubleshooting purposes. You can configure Dell SupportAssist to send diagnostic data automatically, or you can send diagnostic data manually using Dell SupportAssist when needed. Dell SupportAssist settings can be configured for all managed Storage Centers or individually for each Storage Center.

Data Types that Can Be Sent Using Dell SupportAssist

Storage Manager can send reports, Storage Center data, and FluidFS cluster data to Dell Technical Support.

The following table summarizes the types of data that can be sent using Dell SupportAssist.

Dell SupportAssist Data Type	Description	Dell SupportAssist Method
Storage Manager IO Usage report	Summarizes read and write IO performance for one or more Storage Centers	Automatic or manual
Storage Manager Storage Usage report	Summarizes storage use and growth for one or more Storage Centers	Automatic or manual
Storage Manager Replication report	Summarizes the status of replications	Automatic or manual
Storage Center configuration	Sends all Storage Center configuration information	Manual
Storage Center logs	Sends Storage Center logs	Manual
FluidFS cluster summary	Summarizes all FluidFS cluster configuration information	Automatic
FluidFS cluster events	Sends FluidFS cluster events	Automatic
FluidFS cluster diagnostics	Sends full system diagnostics, including summary information for the FluidFS cluster configuration, services, and logs	Automatically triggered on critical events Manually triggered when an administrator runs the FluidFS cluster diagnostics

Manually Sending Diagnostic Data Using Dell SupportAssist

You can send diagnostic data manually using Dell SupportAssist for multiple Storage Centers or for a specific Storage Center.

Manually Send Diagnostic Data for Multiple Storage Centers

You can send diagnostic data for multiple Storage Centers from the Data Collector settings.

1. Expand the Dell Storage Manager menu, and then click **Data Collector**.
2. Click the **Health** tab, and then select the **Dell SupportAssist** subtab.
3. Click **Edit**. The **Dell SupportAssist** dialog box opens.
4. Click **Send SupportAssist Data Now**. The **Send Dell SupportAssist Data Now** dialog box opens.
5. In the **Storage Centers** area, select the check boxes of the Storage Centers for which you want to send data to Dell Technical Support.
6. In the **Reports** area, select the check boxes of the Storage Center usage reports to send to Dell Technical Support.
7. In the **Time Range** area, choose the time period for which you want to send report data to Dell Technical Support.



- a. In the **Start Date** fields, specify the start date and time.
 - b. In the **End Date** fields, specify the end date and time. To use the current date and time as the end date, select the **Use Current Time For End Date** check box.
8. Click **OK**. The **Send Dell SupportAssist Data Now** dialog box displays Dell SupportAssist progress and closes when the process is complete.
 9. Click **OK** to close the **Data Collector Settings** dialog box.

Send Diagnostic Data for a Single Storage Center Using Dell SupportAssist

You can send Storage Center diagnostic data using Dell SupportAssist from the Storage Center settings.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Dell SupportAssist** tab.
5. Click **Send SupportAssist Data Now**. The **Send SupportAssist Data Now** dialog box opens.
6. In the **Reports** area, select the check boxes of the Storage Center usage reports to send to Dell Technical Support.
7. In the **Time Range** area, choose the time period for which you want to send report data to Dell Technical Support.
 - a. In the **Start Date** fields, specify the start date and time.
 - b. In the **End Date** fields, specify the end date and time. To use the current date and time as the end date, select the **Use Current Time For End Date** check box.
8. In the **Storage Center** area, select the check boxes for the types of data to send to Dell Technical Support.
9. Click **OK**. The **Send SupportAssist Data Now** dialog box displays Dell SupportAssist progress and closes when the process is complete.
10. Click **OK** to close the **Edit Settings** dialog box.

Managing Dell SupportAssist Settings

Dell SupportAssist settings can be configured individually for each Storage Center or applied to multiple Storage Centers.

Edit Dell SupportAssist Contact Information (Storage Center 6.6 or Later Only)

Use the Storage Center settings to edit Dell SupportAssist contact information..

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Dell SupportAssist** tab.
5. Click **Edit Dell SupportAssist Contact Information**. The **Edit Dell SupportAssist Contact Information** dialog box opens.
6. Enter the name, phone number, and email information for the Dell SupportAssist contact representative.
7. Select the **Receive email notification...** check box to be notified whenever a support alert is sent to Dell Technical Support.
8. Enter the address information for the Dell SupportAssist contact representative.
9. Select contact preferences.
 - Preferred Contact Method



- Preferred Email Language
- Hours when the Dell SupportAssist contact representative is available
- Preferred Contact Time Zone

10. Click **OK**.

Configure Automatic Update Using SupportAssist

Configure Storage Center to apply updates to the Storage Center operating system when they are made available.

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Dell SupportAssist** tab.
5. In the Server Settings section, select the update option from the drop-down menu.
6. Click **OK**.

Configure a Proxy Server for Dell SupportAssist

Use the Storage Center settings to configure a proxy server for Dell SupportAssist.

Prerequisites

The Storage Center must be added to Storage Manager using a Storage Center user with the Administrator privilege.

Steps

1. Expand the Dell Storage Manager menu, and then click **Storage**.
2. In the **SC Series** tab, select a Storage Center to open the **Storage Center** view.
3. In the **Summary** tab, click **Settings**. The **Edit Storage Center Settings** dialog box opens.
4. Click the **Dell SupportAssist** tab.
5. Select the **Use Web Proxy** check box.
6. Select the check boxes of the Storage Center usage reports to send to Dell Technical Support.
7. Specify the IP address and port for the proxy server.
8. If the proxy server requires authentication, type valid credentials in the **User Name** and **Password** fields.
9. Click **OK**.

