

IBM System Storage N series



SnapDrive 7.0 for Windows Administration Guide for SMB 3.0 Environments

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Preface

Supported features

IBM System Storage N series storage systems are driven by NetApp Data ONTAP software. Some features described in the product software documentation are neither offered nor supported by IBM. Please contact your local IBM representative or reseller for further details.

Information about supported features can also be found on the N series support website (accessed and navigated as described in [Websites](#) on page 5).

Websites

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. The following web pages provide N series information:

- A listing of currently available N series products and features can be found at the following web page:
www.ibm.com/storage/nas/
- The IBM System Storage N series support website requires users to register in order to obtain access to N series support content on the web. To understand how the N series support web content is organized and navigated, and to access the N series support website, refer to the following publicly accessible web page:
www.ibm.com/storage/support/nseries/
This web page also provides links to AutoSupport information as well as other important N series product resources.
- IBM System Storage N series products attach to a variety of servers and operating systems. To determine the latest supported attachments, go to the IBM N series interoperability matrix at the following web page:
www.ibm.com/systems/storage/network/interophome.html
- For the latest N series hardware product documentation, including planning, installation and setup, and hardware monitoring, service and diagnostics, see the IBM N series Information Center at the following web page:
publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains

information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your IBM N series product, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure they are connected.
- Check the power switches to make sure the system is turned on.
- Use the troubleshooting information in your system documentation and use the diagnostic tools that come with your system.
- Refer to the N series support website (accessed and navigated as described in [Websites](#) on page 5) for information on known problems and limitations.

Using the documentation

The latest versions of N series software documentation, including Data ONTAP and other software products, are available on the N series support website (accessed and navigated as described in [Websites](#) on page 5).

Current N series hardware product documentation is shipped with your hardware product in printed documents or as PDF files on a documentation CD. For the latest N series hardware product documentation PDFs, go to the N series support website.

Hardware documentation, including planning, installation and setup, and hardware monitoring, service, and diagnostics, is also provided in an IBM N series Information Center at the following web page:

publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following web page for support telephone numbers:

www.ibm.com/planetwide/

Firmware updates

IBM N series product firmware is embedded in Data ONTAP. As with all devices, ensure that you run the latest level of firmware. Any firmware updates are posted to the N series support website (accessed and navigated as described in [Websites](#) on page 5).

Note: If you do not see new firmware updates on the N series support website, you are running the latest level of firmware.

Verify that the latest level of firmware is installed on your machine before contacting IBM for technical support.

How to send your comments

Your feedback helps us to provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, please send them by email to starpubs@us.ibm.com.

Be sure to include the following:

- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

SnapDrive overview

SnapDrive for Windows enables you to automate storage provisioning tasks and to manage data in Microsoft Windows environments. You can run SnapDrive on Windows hosts in either a physical or virtual environment.

What SnapDrive does

SnapDrive helps you automate storage provisioning tasks and manage data in SAN and SMB 3.0 Windows environments. You can run SnapDrive software on Windows hosts in either a physical or a virtual environment.

SnapDrive software integrates with Windows Volume Manager so that storage systems can serve as virtual storage devices for application data in Windows Server 2008 R2 and Windows Server 2012. It can also be used to provision storage for Windows virtual machines hosted on ESX hypervisors.

SnapDrive manages LUNs on a storage system, making these LUNs available as local disks on Windows hosts. This allows Windows hosts to interact with the LUNs just as if they belonged to a directly attached redundant array of independent disks (RAID).

SnapDrive PowerShell cmdlets support volume and share provisioning in SMB 3.0 environments. You can also use SnapDrive PowerShell cmdlets to create and manage Snapshot backups; manage mounting, restore, and discovery operations; and to troubleshoot.

SnapDrive provides the following additional features:

- It enables online storage configuration, LUN expansion, and streamlined management.
- It enables connection of up to 168 LUNs.
- It integrates Data ONTAP Snapshot technology, which creates point-in-time images of data stored on LUNs.
- It works in conjunction with SnapMirror software to facilitate disaster recovery from either asynchronously or synchronously mirrored destination volumes.
- It enables SnapVault updates of qtrees to a SnapVault destination.
- It enables management of SnapDrive on multiple hosts.
- It enables support on Microsoft cluster configurations.
- It enables iSCSI session management.

New features in SnapDrive 7.0 for Windows

You should be aware of new SnapDrive 7.0 for Windows features, including support for clustered Data ONTAP 8.2, PowerShell cmdlets to support SnapDrive workflows in SMB 3.0 environments,

SIS clone restore optimization, active file system cloning support for SnapManager for Hyper-V automatic recovery workflows, and SnapVault in clustered Data ONTAP.

Clustered Data ONTAP 8.2 support

SnapDrive 7.0 for Windows supports for clustered Data ONTAP 8.2 includes a number of new features:

- IPv6
- SnapVault and SnapMirror operations
- SMB 3.0 support

Restore operation performance improvements

SnapDrive 7.0 for Windows introduces support for sub-LUN cloning in restore operations.

SnapDrive computes the logical block address (LBA) used by the VHD files in your Snapshot backup. SnapDrive does this by finding the NTFS retrieval pointers and translating the logical clusters to actual physical disk offsets. Next, SnapDrive computes the LBA range for the VHD in the destination. With both the source and destination LBA ranges, SnapDrive leverages the Data ONTAP SIS-clone technology to clone the block ranges from the source VHD file from the Snapshot backup to the active file system.

Note: This feature is not available for VMDKs and disks with an allocation unit size less than 4096/4KB.

PowerShell cmdlet support

SnapDrive 7.0 introduces PowerShell cmdlet support for SnapDrive operations in SMB 3.0. The SnapDrive PowerShell cmdlet module also provides limited SAN workflow support. PowerShell cmdlets support SnapDrive provisioning, Snapshot copy management, and backup, restore, mounting, SnapMirror, and SnapVault operations.

Windows PowerShell versions 2.0 and later are supported.

For detailed information on running SnapDrive PowerShell cmdlets, see the *SnapDrive for Windows Administration Guide for SMB 3.0 Environments* and the *SnapDrive for Windows PowerShell Cmdlet Reference Guide*.

Volume and share provisioning templates

There are three sample provisioning templates available in the installation folder, that you can use for SMB provisioning. The provisioning templates have volume or share creation settings based on best practices built into them. In addition, you can also create new templates and over ride settings from the existing provisioning templates.

For more information on provisioning templates, see the *SnapDrive for Windows Administration Guide for SMB 3.0 Environments* and the *SnapDrive for Windows PowerShell Cmdlet Reference Guide*.

Additional new features

- Virtual Fibre Channel support
- group Managed Service Accounts (gMSA) support on Windows Server 2012

SnapDrive PowerShell cmdlet environment support at a glance

You can use the cmdlet environment support table to understand SnapDrive PowerShell cmdlet environment support.

Cmdlet	SAN environments	SMB environments
Debug-SdHost	Supported	Supported
Dismount-SdSnapshot	Unsupported	Supported
Get-SdInfo	Supported	Supported
Get-SdSMBShadowCopyEmsMessage	Supported	Supported
Get-SdSnapMirror	Supported in clustered Data ONTAP only	Supported
Get-SdSnapMirrorPolicyRule	Supported	Supported
Get-SdSnapshot	Limited SAN support	Supported
Get-SdStorage	Supported	Supported
Get-SdStorageConnectionSetting	Supported	Supported
Get-SdVM	Supported	Supported
Invoke-SdEmsAutosupportLog	Supported	Supported
Invoke-SdSnapMirrorUpdate	Supported	Supported
Mount-SdSnapshot	Unsupported	Supported
New-SdSMBShare	Supported in clustered Data ONTAP only	Supported
New-SdSnapshot	Supported	Supported
New-SdVolume	Supported in clustered Data ONTAP only	Supported
Remove-SdSMBShare	Supported in clustered Data ONTAP only	Supported

Cmdlet	SAN environments	SMB environments
Remove-SdSnapMirrorPolicyRule	Supported	Supported
Remove-SdSnapshot	Supported	Supported
Remove-SdStorageConnectionSetting	Supported	Supported
Remove-SdVolume	Supported in clustered Data ONTAP only	Supported
Rename-SdSnapshot	Supported	Supported
Restore-SdSnapshot	Supported	Supported
Set-SnapMirrorPolicyRule	Supported	Supported
Set-SdSnapshot	Supported in clustered Data ONTAP only	Supported
Set-SdStorageConnectionSetting	Supported	Supported

Understanding your SnapDrive components

Several components are integrated into the SnapDrive software and are automatically installed. These components enable you to manage LUNs, Windows volumes, or SMB shares. You can use these components together to enable SnapDrive workflows, including provisioning, Snapshot copy management, backup, restore, and mounting operations.

The following SnapDrive components are integrated in the software and are automatically installed during installation.

SnapDrive “snap-in”

This software module integrates with Microsoft Management Console (MMC) to provide a graphical interface for managing LUNs on the storage system. The module does the following:

- Resides in the Windows Server computer management storage tree
- Provides a native MMC snap-in user interface for configuring and managing LUNs
- Supports remote administration so that you can manage SnapDrive on multiple hosts
- Provides SnapMirror integration
- Provides AutoSupport integration, including event notification

SnapDrive command-line interface

The `sdcli.exe` utility enables you to manage LUNs from the command prompt of the Windows host. You can perform the following tasks with the `sdcli.exe` utility:

- Enter individual commands
- Run management scripts

PowerShell cmdlets

The SnapDrive PowerShell cmdlets enable you to perform provisioning, Snapshot copy management and backup, restore, and mounting operations in an SMB 3.0 environment.

SnapDrive supports PowerShell versions 2.0 and later.

Underlying SnapDrive service

This software interacts with software on the storage system to facilitate LUN management for the following:

- A host
- Applications running on a host

Data ONTAP Volume Shadow Copy Service (VSS) Hardware Provider on Windows Server hosts

The Data ONTAP VSS Hardware Provider is a module of the Microsoft VSS framework. The Data ONTAP Hardware Provider enables VSS Snapshot technology on the storage system when SnapDrive is installed on Windows Server hosts.

Understanding the Volume Shadow Copy Service

The Data ONTAP VSS Hardware Provider is installed with SnapDrive for Windows and can be used with Microsoft Volume Shadow Copy Service.

Understanding VSS

Volume Shadow Copy Service (VSS) is a feature of Microsoft Windows Server that coordinates data servers, backup applications, and storage management software to support the creation and management of consistent backups.

VSS coordinates Snapshot copy-based backup and restore operations and includes these components:

- | | |
|----------------------|---|
| VSS Requestor | The VSS requestor is a backup application, such as SnapManager for Microsoft Exchange or NTBackup. It initiates VSS backup and restore operations. The requestor also specifies Snapshot copy attributes for backups it initiates. |
| VSS Writer | The VSS writer owns and manages the data to be captured in the Snapshot copy. Microsoft Exchange 2003 is an example of a VSS writer. |
| VSS provider | <p>The VSS provider is responsible for creating and managing the Snapshot copy. A provider can be either a hardware provider or a software provider:</p> <ul style="list-style-type: none"> • A hardware provider integrates storage array-specific Snapshot copy and cloning functionality into the VSS framework.
The Data ONTAP VSS Hardware Provider integrates the SnapDrive service and storage systems running Data ONTAP into the VSS framework.
Note: The Data ONTAP VSS Hardware Provider is installed automatically as part of the SnapDrive software installation. • A software provider implements Snapshot copy or cloning functionality in software that is running on the Windows system.
Note: To ensure that the Data ONTAP VSS Hardware Provider works properly, do not use the VSS software provider on Data ONTAP LUNs. If you use the VSS software provider to create Snapshot copies on a Data ONTAP LUN, you cannot delete that LUN by using the VSS Hardware Provider. |

SnapDrive VSS requirements

To use VSS with SnapDrive for Windows, your storage system and SnapDrive host must meet minimum requirements.

- Your storage system must be running at least Data ONTAP 7.2.

Note: In versions of Data ONTAP prior to 7.3, Snapshot copies taken after a shadow copy are locked due to the existence of LUN clones in the previous Snapshot copies, making them impossible to delete. In Data ONTAP 7.3, this restriction is removed, so SnapDrive is able to delete any Snapshot copies.

- The Virtual Disk Service must be running on your Windows host.

Typical VSS backup process

A typical backup using SnapManager for Microsoft Exchange, Microsoft Exchange 2013, and the Data ONTAP VSS Hardware Provider is outlined in the following process.

1. SnapManager determines which LUNs it wants to capture and verifies that Exchange 2013 is present as a valid writer.
2. SnapManager initiates the shadow copy process.
3. VSS informs Exchange and the Data ONTAP VSS Hardware Provider that a shadow copy is starting. Exchange stops writing to disk.
4. VSS ensures that NTFS is in a consistent state.
5. VSS requests the Data ONTAP VSS Hardware Provider to create a shadow copy.
6. The Data ONTAP VSS Hardware Provider requests SnapDrive to create a Snapshot copy of the storage system volume that contains the specified LUN.
7. SnapDrive requests that the storage system create a Snapshot copy of the specified volume.
8. When the shadow copy is complete, VSS returns NTFS to a normal state and informs Exchange that it can resume disk writes.
9. VSS manages the shadow copy of the LUN based on the attributes specified by the requestor. For example, VSS could mount the LUN in a Snapshot copy. In a case, however, in which SnapManager is the requestor, SnapManager tells VSS to forget about the shadow copy it just created. This enables SnapManager to have complete control of the Snapshot copy.

Troubleshooting the VSS Hardware Provider

If you attempt to create a backup on a storage system running Data ONTAP, and a Snapshot copy is not created on the storage system, you can troubleshoot the VSS Hardware Provider in several ways.

About this task

There can be many providers installed on the same Windows host, including the VSS software provider, which is always installed. The provider used is determined by either the Requestor or VSS, not the provider. If the first choice provider is not available, an alternative can be silently substituted.

To make a Snapshot copy on the storage system, the Data ONTAP VSS Hardware Provider must be used. If a Snapshot copy on the storage system is not created successfully, verify that the Data ONTAP VSS Hardware Provider was used to create the Snapshot copy.

Only the Data ONTAP VSS Hardware Provider can take a Snapshot copy on a storage system. When you use a VSS requestor, such as SnapManager for Microsoft Exchange or NTBackup, to back up a LUN backed by a storage system running Data ONTAP, the Data ONTAP VSS Hardware Provider must be used for the Snapshot copy to succeed.

Steps

1. View the installed providers and verify that the Data ONTAP VSS Hardware Provider is installed.
2. Verify that the Data ONTAP VSS Hardware Provider was used to create the Snapshot copy and that it was completed successfully.
3. Verify your VSS configuration.

Viewing installed VSS providers

You can view the VSS providers installed on your host.

Steps

1. Select **Start > Run** and enter the following command to open a Windows command prompt:
cmd
2. At the prompt, enter the following command:
vssadmin list providers

The output should be similar to the following:

```
Provider name: 'Data ONTAP VSS Hardware Provider'
Provider type: Hardware
Provider ID: {ddd3d232-a96f-4ac5-8f7b-250fd91fd102}
Version: 7.0.0.xxxx
```

Verifying that the VSS Hardware Provider was used successfully

You can verify that the Data ONTAP VSS Hardware Provider was used successfully after a Snapshot copy was made.

Step

1. Navigate to **System Tools > Event Viewer > Application** in MMC and look for an event with the following values:

Source	Event ID	Description
Navssprv	4089	The VSS provider has successfully completed CommitSnapshots for SnapshotSetId <i>id</i> in <i>n</i> milliseconds.

Note: VSS requires that the provider commit a Snapshot copy within 10 seconds. If this time limit is exceeded, the Data ONTAP VSS Hardware Provider logs Event ID 4364. This limit could be exceeded due to a transient problem. If this event is logged for a failed backup, retry the backup.

Verifying your VSS configuration

If the Data ONTAP VSS Hardware Provider failed to run or did not successfully create a Snapshot copy, you must take steps to ensure that VSS is configured correctly.

Steps

1. Verify that SnapDrive is installed and running and can communicate with the storage system by performing the following steps:
 - a) Under SnapDrive in the left MMC pane, expand the instance of SanpDrive you want to manage, and then click **Disks**.
 - b) From the menu choices at the top of MMC, navigate to **Action > Refresh**.
No error messages should be displayed.
2. Verify that the `lun.inquiry.mode` option is set to `legacy` and not `standard` on the storage system.

This setting applies if you are using Data ONTAP 7.2 and Exchange or SQL Server for VSS-based backups. By default, the mode is set to `legacy`.

Attention: To change or set this option, you must first stop FC and iSCSI services on your storage system, which might temporarily disrupt any operations currently in progress. Use `fc stop` and `iscsi stop` to stop the services. Use `fc start` and `iscsi start` to restart the services after setting the mode.

- a) To verify the setting, at the storage system prompt, enter the following command:

options lun.inquiry.mode

- b) To change the setting, enter the following command:

options lun.inquiry.mode legacy.

3. Verify that the drives for which the Data ONTAP VSS Hardware Provider failed are backed by a LUN on a storage system running Data ONTAP.

To do this, open MMC and verify that the drives appear under the Disks icon under SnapDrive.

4. Verify that the account used by the Data ONTAP VSS Hardware Provider is the same as the account used by SnapDrive by performing the following steps:
 - a) In the left MMC pane, select **Services and Applications > Services**.
 - b) Double-click the **SnapDrive** service in the main pane and click the **Log On** tab.
 - c) Note the account listed in the **This Account** field, and then click **OK** to close the **SnapDrive Properties** window.
 - d) Double-click the **Data ONTAP VSS Hardware Provider** service in the main pane and click the **Log On** tab.
 - e) Verify that the **This Account** field is selected and that it contains the same account as the SnapDrive service.

Virtual storage server configuration considerations

Before you use the SnapDrive PowerShell cmdlet capabilities, you must configure your virtual storage server credentials, which requires you to be familiar with some of the conditions for doing so.

- You can configure mixed LIFs (data combined with management) in SMB 3.0 environments only.
- In clustered Data ONTAP 8.2 and later, you are not required to have cluster credentials before configuring or using SnapDrive.
- You can configure your virtual storage server credentials using SnapDrive PowerShell cmdlets, the SnapDrive MMC, SDCLI, or SnapManager for Hyper-V MMC.
- When you are configuring virtual storage server credentials in clustered Data ONTAP, the credentials are pushed to all the nodes of the cluster.

Managing storage system access for SnapDrive

You can use `Set-SdStorageConnectionSetting` and `Remove-SdStorageConnectionSetting` to manage SnapDrive access to Data ONTAP storage systems.

Setting up storage system access for SnapDrive

Use `Set-SdStorageConnectionSetting` to set the credentials, protocol, and port with which you access Data ONTAP storage systems.

About this task

When you run `Set-SdStorageConnectionSetting` in a cluster Data ONTAP environment, you need to configure your storage connection settings only once, rather than on each node of the cluster.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Set-SdStorageConnectionSetting  
-StorageSystem "storagesystem_name"  
-Credential "user_name" "password"  
-Protocol "connection_protocol"  
-Port "port_number"
```

Parameters specified have the following values:

-StorageSystem

Specifies the name of the storage system for which you want to set connection settings.

-Credential

Designates the user name and password you want to use to authenticate your connection to the storage system.

-Protocol

Specifies the protocol type you want to use. Possible values are HTTP, HTTPS, and RPC. By default, connections are attempted with a secure HTTPS connection to the storage controller. If that connection is unsuccessful, the connection is made with HTTP. Specify HTTPS, or HTTP to only use those protocols without any fallback to another protocol.

Note: RPC is supported in 7-Mode Data ONTAP version 8.0 and 8.1 storage systems only.

-Port

Specifies the port on which you want to connect to the storage controller. If you do not set this value, the default is 80 for HTTP and 443 for HTTPS. This parameter only applies to HTTP and HTTPS protocols.

2. If you want to overwrite existing storage system connection settings, use `-Force`.
3. In clustered Data ONTAP environments, if you want to set storage system connections only on a specific cluster node, use `-HostOnly`.

Setting up named storage system connection settings

This example saves the specified storage system connection settings into the configuration repository. These settings are later used to connect to the `vmStorageServer` virtual storage server storage system. You are prompted for the password using the given login of **vsadmin**.

```
Set-SdStorageConnectionSetting
-Name 'VmStorageServer'
-Protocol https
-Credential vsadmin
-Port 443
```

Setting and using default storage system connection settings

You can use `Set-SdStorageConnectionSetting` parameters to set and use default storage systems connection settings.

Step

1. From a PowerShell command prompt, enter the following syntax:

```
Set-SdStorageConnectionSetting
-DefaultSetting
-StorageSystem "storage_system"
-Protocol "protocol"
-Port "port_number"
-Credential "name" "password"
```

Parameters specified have the following values:

-DefaultSetting

Indicates that the credentials, protocol, and port number you are setting up for the storage system should be used as default settings.

-StorageSystem

Specifies the name of the storage system for which you want to set connection settings.

-Credential

Designates the user name and password you want to use to authenticate your connection to the storage system.

-Protocol

Specifies the protocol type you want to use. Possible values are HTTP, HTTPS, and RPC. By default, connections are attempted by using a secure HTTPS connection to the storage controller, but if the HTTPS connection is unsuccessful, the connection is made in HTTP. Specify a protocol to use only that protocols without any fallback to another protocol.

RPC is supported in 7-Mode Data ONTAP version 8.0 and 8.1 storage systems only.

-Port

Specifies the port you want to connect to the storage controller. If you do not set this value, the default is 80 for HTTP and 443 for HTTPS. This parameter applies only to HTTP and HTTPS protocols.

Result

After you have configured your default storage system connection settings, you can specify -UseDefaultSetting to connect to your storage system without having to enter all your storage system connection information.

Using default settings to access the storage system

```
Set-StorageConnectionSetting  
-UseDefaultSetting  
-StorageSystem "storage_system_name"
```

Removing storage system connection settings

Use Remove-SdStorageConnectionSetting to delete user credentials, protocol, and port connection settings from your storage system.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Remove-SdStorageConnectionSetting  
-StorageSystem "storage_system_name"
```

2. Optionally, you can use either -All or -DefaultSetting to indicate that you want to remove all the storage system connection settings or just the default settings.

Removing all connection settings from a storage system

This example syntax removes all the connection settings from the configuration repository, including the default connection settings.

```
Remove-SdStorageConnectionSetting  
-All  
-PassThru
```

```
Name       : vmStorageServer  
Port       : 80  
Protocol   : Http
```

```
Name       : vmStorageServer  
Port       : 443  
Protocol   : Https
```

Provisioning volumes and shares

You can use SnapDrive PowerShell cmdlets to provision new volumes and SMB shares for your applications. You can use provisioning templates from the Templates to automate much of the provisioning process. The templates are created with best provisioning practices for your application.

Understanding your provisioning options

There are three sample provisioning templates, available in the installation folder, that you can use for SMB provisioning. The provisioning templates have volume or share creation settings based on best practices built into them. In addition, you can also create new templates from and override settings in the existing provisioning templates.

Sample provisioning template

You can review the sample SnapManager for Hyper-V provisioning template to understand the provisioning settings.

```
<?xml version="1.0"?>
<ProvisioningTemplate xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <TemplateName>HyperVProvisioningTemplate</TemplateName>
  <Description>for HyperV provisioning</Description>
  <CreationTime>2012-06-18T12:12:53.1726005-07:00</CreationTime>
  <ModificationTime xsi:nil="true" />
  <Settings>
    <ProvisioningSettings xsi:type="CIFSShareProvisioningSettings">
      <SettingsName>cifs settings</SettingsName>
      <TargetType>share</TargetType>
      <CIFSShareSettings>
        <Name>SampleHyperVShare</Name>
        <Path>/SampleJunctionPath</Path>
        <ShareProperties>
          <string>browsable,continuously-available</string>
        </ShareProperties>
        <SymlinkProperties>
          <string>enable</string>
        </SymlinkProperties>
        <FileUmask>1</FileUmask>
        <DirUmask>1</DirUmask>
        <Comment>Hyper-V SMB share</Comment>
        <AttributeCacheTtl>1</AttributeCacheTtl>
        <CIFSServer>SampleCIFSServer</CIFSServer>
      </CIFSShareSettings>
    </ProvisioningSettings>
    <ProvisioningSettings xsi:type="VolumeProvisioningSettings">
      <SettingsName>volume settings</SettingsName>
      <TargetType>volume</TargetType>
      <VolumeSettings>
```

```

    <Size>10GB</Size>
    <Name>SampleVolume</Name>
    <Aggregate>SampleAggregate</Aggregate>
    <JunctionPath>/SampleJunctionPath</JunctionPath>
    <StorageSystem>SampleStorageSystem</StorageSystem>
    <GroupId xsi:nil="true" />
    <IndexDirectoryFormat xsi:nil="true" />
    <JunctionActive xsi:nil="true" />
    <MaxDirectorySize xsi:nil="true" />
    <NvFailEnabled xsi:nil="true" />
    <UserId xsi:nil="true" />
    <VserverRoot xsi:nil="true" />
    <SnapshotCloneDependency xsi:nil="true" />
    <EnableSnapdiff xsi:nil="true" />
    <SpaceGuarantee>volume</SpaceGuarantee>
    <SnapReserve>5</SnapReserve>
    <FractionalReserve>100</FractionalReserve>
    <SpaceMgmtTryFirst>snap_delete</SpaceMgmtTryFirst>
    <SpaceNearlyFullThresholdPercent xsi:nil="true" />
    <SpaceFullThresholdPercent xsi:nil="true" />
    <Files xsi:nil="true" />
    <FilesysSizeFixed xsi:nil="true" />
    <AutosizeIncrementPercent xsi:nil="true" />
    <AutosizeGrowThresholdPercent xsi:nil="true" />
    <AutosizeShrinkThresholdPercent xsi:nil="true" />
    <AutoDeleteEnabled>true</AutoDeleteEnabled>
    <TargetFreeSpace xsi:nil="true" />
  </VolumeSettings>
</ProvisioningSettings>
</Settings>
</ProvisioningTemplate>

```

Provisioning an SMB share

You can use `New-SdSMBShare` to provision a new SMB share in clustered Data ONTAP 8.2 environments. Provisioning templates are available, and contain the best practices for provisioning a share for your application.

Before you begin

- You are running SnapDrive in a clustered Data ONTAP 8.2 environment or later.
- If you want to provision an SMB share from a template, ensure that you have selected the appropriate template from the `Templates` folder in your installation directory.

About this task

You can use the available provisioning templates available in the `Templates` folder in your installation directory. You can use individual parameters to override individual provisioning template values. Alternately, you can manually provision a new share with the `New-SdSMBShare` parameters.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
New-SdSMBShare
-Path "path_name"
-Name "new_share_name"
-CIFSServer "CIFS_server_name"
-TemplateName "template_path"
```

Parameters specified have the following values:

-Path

Designates the file system path that is shared through your SMB share. This is a required parameter.

-Name

Specifies the name of the SMB share you want to provision. The SMB share name must be a UTF-8 string. This is a required parameter.

You cannot use control characters from 0x00 through 0x1F, 0x22 (double quotes), and the following special characters:

\ / [] : | < > + = ; , ?

-CIFSServer

Specifies the SMB server you want to use for provisioning the share. This is a required parameter.

-TemplateName

Specifies the provisioning template name. You should also include the path to the template, if the template resides in a folder other than the Templates folder.

2. Optionally, you can use additional `New-SdSMBShare` parameters to customize your new volume.

For full `New-SdSMBShare` syntax, see *SnapDrive for Windows PowerShell Cmdlet Reference Guide*.

Sample New-SdSMBShare output

```
Acl : {Everyone / Full Control}
AttributeCacheTtl : 1
CifsServer : HypervFileServer
VServer : HypervVirtualStorageServer
Comment : Hyper-V SMB share
DirUmask : 1
FileUmask : 1
Path : /
Volume : HypervVolume
ShareName : HypervShare
ShareProperties : {browsable, continuously_available}
SymlinkProperties : {enable}
UNCPathType : SMBShare
```

```

IsMountedToDrive : False
MountedDrive     :
ResourceType     : SDSMBShare
ResourceName     : \\HyperVFileServer\HyperVShare
Ranges           :

```

Provisioning a volume

You can use `New-SdVolume` to provision a new volume in clustered Data ONTAP 8.2 environments or later. Provisioning templates are available, and contain the best practices for provisioning a share for your application.

Before you begin

- You are running SnapDrive in a clustered Data ONTAP 8.2 environment or later.
- You have selected the appropriate template from the `Templates` folder in your installation directory.

About this task

You can use the available provisioning templates available in the `Templates` folder in your installation directory. You can use individual parameters to override individual provisioning template values. Alternately, you can manually provision a new share with the `New-SdVolume` parameters.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```

New-SdVolume
-Name "vol_name"
-Aggregate "aggregate_name"
-JunctionPath "vol_junction_path"
-TemplateName "template_path"
-Size "vol_size"
-StorageSystem "storage_system_name"

```

Parameters specified have the following values:

-Name

Indicates the name of the new volume. This is a required parameter.

-Aggregate

Specifies the name of the containing aggregate. This is a required parameter.

-JunctionPath

Specifies the junction path at which this volume is to be mounted. This is a required parameter.

-TemplateName

Indicates the name of the provisioning template. You should qualify path the to the template if the template resides in a folder other than `SnapDrive Templates` folder.

-Size

Designates the size of the new volume. This is a required parameter.

-StorageSystem

Specifies the virtual storage server for provisioning the SMB share. The virtual storage server should already have an SMB server configured. This parameter does not have to be specified if the SMB server is already qualified.

2. Optionally, you can use additional `New-SdVolume` parameters to customize your new volume.

For full `New-SdVolume` syntax, see *SnapDrive for Windows PowerShell Cmdlet Reference Guide*.

Sample New-SdVolume output

```
Name           : sqldbvolume
Vserver        : sqlvirtualstorageserver
FullPath       : sqlvirtualstorageserver:/vol/sqldbvolume
JunctionPath   : /sqldbvolume
JunctionParentName :
SizeTotal      :
SizeUsed       :
SnapMirrorSource :
SnapMirrorDest  :
SnapVaultPrimary :
SnapVaultSecondary :
FlexCloneEnabled :
IsFlexClone     :
ResourceType    : SDStorageVolume
ResourceName    : sqlvirtualstorageserver:/vol/sqldbvolume
Ranges         :
```

Creating and managing Snapshot backups

You can use SnapDrive PowerShell cmdlets to create, delete, rename, and manage Snapshot backup copies. PowerShell cmdlets support Snapshot backup management in SMB 3.0 environments.

Creating new Snapshot backup copies

You can use `New-SdSnapshot` to create Snapshot backup copies of specified Windows disks or SMB shares.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
New-SdSnapshot  
-Path "SnapshotPath"  
-Snapshot "NewSnapshotName"
```

Parameters specified have the following values:

-Path

Provides the path to the Windows disk or SMB shares of which you want to make Snapshot backup copies. You cannot mix a logical disk or mount point with SMB shares in the same input path.

-Snapshot

Designates the name of the new Snapshot copy. You cannot use special characters in a Snapshot backup copy name. If you do not specify a Snapshot backup copy name, a GUID appended with a timestamp is generated and used as the Snapshot backup copy name.

2. (Optional) You can use `-NoCleanUpOnError` to indicate that you want to delete the new Snapshot copy, if you encounter an error backing up your Windows disk or SMB share.
3. (Optional) You can use `-UpdateMirror` to initiate a vault or mirror update after your new Snapshot copy operation finishes.

Updating SnapMirror relationships

You can use `Invoke-SdSnapMirrorUpdate` to update the SnapMirror relationships for Windows disks, SMB shares, or clustered Data ONTAP storage system volumes.

About this task

For the specified resources, you can determine the underlying storage layout and issue SnapMirror updates on the corresponding storage volumes, provided that the SnapMirror relationship is already created and initialized. SnapMirror updates and returns are executed immediately.

Step

1. From the PowerShell command prompt, enter the following syntax:

```
Invoke-SdSnapMirrorUpdate  
-Path "resource_path"
```

Sample Invoke-SdSnapMirrorUpdate output

```
HostResource:  \\fileserver\sqlshare  
Source:        [cluster_prod:]\sqlvserver1\vol1  
Destination:   [cluster_dr:]\sqlvserver2\vol1  
State:         Transferring  
TransferRate:  1024
```

Updating SnapVault relationships

After creating a new Snapshot backup copy, you can update your SnapVault relationships using `Invoke-SdSnapMirrorUpdate`.

About this task

For the specified resources, you can determine the underlying storage layout and issue SnapVault updates on the corresponding storage volumes, if the SnapVault relationship is already created and initialized. SnapVault updates and returns are executed immediately.

Step

1. From the PowerShell command prompt, enter the following syntax:

```
Invoke-SdSnapMirrorUpdate  
-Path "resource_path"  
-Snapshot "snapshot_name"
```

Parameters specified have the following values:

-Path

Provides a volume, logical disk, and SMB share for which you want SnapVault updates.

You cannot mix a logical disk or mount point with SMB shares in the same input path.

When you update a SnapMirror relationship, you can specify a share, storage system volume, or Windows disk. When you update a SnapVault relationship, you can specify a share or storage system volume.

-Snapshot

Specifies the Snapshot copy you want to transfer. This cmdlet is processed only for SnapVault relationships; in the case of SnapMirror relationships, this parameter is ignored if specified.

Updating your SnapVault relationship for a single share

In this example syntax, you determine the underlying storage footprint for `\\fileserver\sqlshare` and initiate a SnapVault update on the underlying volume:

```
Invoke-SdSnapMirrorUpdate
-Path "\\fileserver\sqlshare"
-Snapshot "weeklybackup"

HostResource:  \\fileserver\sqlshare
Source:        [cluster_prod:]\sqlvserver1/vol1
Destination:   [cluster_dr:]\sqlvserver2/vol1
State:         Transferring
TransferRate:  1024
```

Renaming Snapshot backup copies

You can use `Rename-SdSnapshot` to rename Snapshot backup copies created on a Windows disk or SMB share.

About this task

You can rename a single Snapshot backup copy, a Snapshot backup copy that resides on multiple SMB shares, a Snapshot backup copy on a specified storage system and volume, or a single Snapshot backup copy on a disk.

Step

1. From the PowerShell command prompt, enter the following syntax:

Rename-SdSnapshot -Path *PathName* -Snapshot *OldSnapshotName* -NewName *MyNewSnap*

```
Rename-SdSnapshot
-Path "path_name"
-Snapshot "old_snapshot_name"
-NewName "new_snapshot_name"
```

Parameters specified have the following values:

-Path

Specifies a list of SMB shares or Windows volumes. You cannot mix a logical disk or mount point with SMB shares in the same input path.

-Snapshot

Specifies the name of the Snapshot backup copy you want to rename.

-NewName

Indicates the new name of the Snapshot copy.

Renaming a single Snapshot backup copy

This example renames a Snapshot backup copy from MySnap to MyNewSnap:

```
Rename-SdSnapshot
-Path \\SQLCIFSServer\SalesDBShare
-Snapshot MySnap
-NewName MyNewSnap
```

SnapshotName Volume	AccessPoint	StorageSystemName
-----	-----	-----
MyNewSnap vol1	\\SQLCIFSServer\SalesDBShare	MyStorageSystem1

Deleting Snapshot copies for SMB shares

You can use **Remove-SdSnapshot** to delete Snapshot copies created on Windows disks, SMB shares, or storage system volumes.

Step

1. From the PowerShell command prompt, enter the following syntax:

Remove-SdSnapshot -Path "*SnapshotLocation*" -Snapshot "*SnapshotName*"

```
Remove-SdSnapshot
-Path "snapshot_location"
-Snapshot "snapshot_name"
```

Parameters specified have the following values:

-Snapshot

Lists the Snapshot backup copies you want to delete.

-Path

Lists the SMB shares, volumes, or logical disks for the Snapshot copies you want to delete. You cannot mix a logical disk or mount point with SMB shares in the same input path.

Removing specified Snapshot backup copies on multiple SMB shares

This example removes Snapshot copies snapshot_1 and snapshot_2 created on SMB shares \\172.17.12.101\share1 and \\172.17.12.101\share2.

```
Remove-SdSnapshot  
-Path "\\172.17.12.101\share1", "\\172.17.12.101\share2"  
-Snapshot "snapshot_1", "snapshot_2"
```

Managing mount operations

You can use PowerShell cmdlets to perform mount and unmount operations for Snapshot backup verification.

Mounting shares from a primary Snapshot backup

You can use `Mount-SdSnapshot` when mounting a Windows disk or SMB shares from the specified Snapshot copy as a different set of shares. You can use this mounting operation to perform backup operation verification.

Before you begin

- You are working in an SMB 3.0 environment.
- The aggregate of the volume that is the source of the FlexClone operation is assigned to the virtual storage server aggregates list.

About this task

You can mount the database and log shares from the Snapshot copy and perform your verification operations. The mounted share names are automatically appended with a unique identifier. The ACLs on the mounted share are same as the original share.

Steps

1. To mount shares from a primary Snapshot copy, from the PowerShell command prompt, enter the following syntax:

```
Mount-SdSnapshot  
-Path "snapshot_location"  
-Snapshot "snapshot_name"
```

Parameters specified have the following values:

-Path

Specifies the location of the Windows disk or SMB shares you want to mount.

-Snapshot

Specifies the name of the Snapshot copy you want to use for mounting the SMB shares or Windows volumes. You must use a Snapshot copy that is valid for all the shares in your list.

2. Optionally, if you are working on a system with name length restrictions, you can specify `-PrefixForVolumeClone` to set a short name for the share on which you are mounting your Snapshot backup.

Sample Mount -SdSnapshot output when you are mounting a primary Snapshot backup

OriginalResource =====	MountedResource =====
\\SQLFileserver\DBShare	\\SQLFileserver\DBShare-
A470FF3A-5107-4B6A-B0C1-FB3D8744F14C	
\\SQLFileserver\LogShare	\\SQLFileserver\DBShare-
E6980DF6-3E64-45BD-965A-7F7A9B02156A	

Mounting shares from a secondary Snapshot backup

You can use Mount -SdSnapshot mounting a Windows disk or SMB shares from the secondary Snapshot copy as a different set of shares. You can use this mounting operation to perform backup operation verification.

Before you begin

- You are working in an SMB 3.0 environment.
- The aggregate of the volume that is the source of the FlexClone operation is assigned to the virtual storage server aggregates list.

About this task

You can mount the database and log shares from the Snapshot copy and perform your verification operations. The mounted share names are automatically appended with a unique identifier. The ACLs on the mounted share are same as the original share.

To mount the shares from a secondary Snapshot copy, you must specify the storage system and volume.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Mount-SdSnapshot
-Path "share_location"
-Snapshot "snapshot_name"
-StorageSystem "mirror_vserver"
-VolumeName "dbmirror_volume"
```

Parameters specified have the following values:

-Path

Specifies the location of the Windows disk or SMB shares you want to mount.

-Snapshot

Specifies the name of the Snapshot copy you want to use for mounting the SMB shares or Windows volumes. You must use a Snapshot copy that is valid for all the shares in your list.

-StorageSystem

Indicates the name of the storage system in which the Snapshot copy you want to mount is located.

-VolumeName

Indicates the name of the storage system volume in which the Snapshot copy you want to mount is located.

2. Optionally, if you are working on a system with name length restrictions, you can specify -PrefixForVolumeClone to set a short name for the share on which you are mounting your Snapshot backup.

Sample Mount-SdSnapshot output after mounting from a secondary Snapshot backup

OriginalResource	MountedResource
=====	=====
\\SQLFileserver\DBShare	\\DRSQLFileServer\DBShare-
A470FF3A-5107-4B6A-B0C1-FB3D8744F14C	
\\SQLFileserver\LogShare	\\DRSQLFileServer\LogShare-
E6980DF6-3E64-45BD-965A-7F7A9B02156A	

Unmounting shares that have Snapshot backup copies

You can use `Dismount-SdSnapshot` to unmount a volume, a logical disk, or a list of SMB shares that is mounted from the specified Snapshot backup copy as a different set of shares.

About this task

You can use this cmdlet during backup verification operations. First, you can use `Mount-SdSnapshot` to mount database and log shares from the Snapshot backup copy. Next, you perform verification operations. When you have completed your backup verification, you can use this cmdlet to unmount your shares.

Step

1. To unmount shares, from the PowerShell command prompt, enter the following syntax:

```
Dismount-SdSnapshot
-Path "share_name"
```

The parameter specified have the following values:

-Path

Specifies a logical disk, mount point, or a comma-separated list of SMB shares you want to dismount. You cannot mix a logical disk or mount point with SMB shares in the same input path.

Unmounting multiple shares that were mounted from a Snapshot copy

You can use this example syntax to dismount your Snapshot copies mounted on the specified shares.

```
Dismount-SdSnapshot  
-Path "\\SQLFileserver  
\DBShareSdClone607fb343_2b3c_41f6_8912_8762a1800290", "\  
\SQLFileserver\DBShareSdClone6bcf3df5_3384_4ba4_9b33_25bb9636a486"
```

Managing restore operations

You can use PowerShell cmdlets to restore files and directories from Snapshot copies.

Considerations before performing restore operations

You should be aware of some requirements and limitations when you are restoring files and directories.

- Domain of CIFS server has to be the same as the domain of your local host, or there must be a trust relationship between the two domains.
- When you are restoring from a Snapshot copy on a share, you can restore everything from that Snapshot copy.
- When you are restoring from a Snapshot copy in a SAN environment, you can restore disks only.
- In SAN environments, you can perform one restore operation at a time.
- When you are restoring from the secondary Snapshot copy, you must have a CIFS server on the secondary server.
- When you are restoring multiple files or directories under the same SMB share from your SnapVault secondary, you cannot specify the CIFS server name in the path by referring to IP/Name/Fully qualified domain name (FQDN.) You must specify the CIFS server name using only IP or Name or FQDN.
- You cannot perform file-level restore operations using `Restore-SdSnapshot` in SAN environments.

Restoring files and directories from a primary Snapshot copy

You can use `Restore-SdSnapshot` to restore files and directories from a primary Snapshot copy.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Restore-SdSnapshot  
-Path "file_location"  
-Snapshot "snapshot_name"
```

Parameters specified have the following values:

-Path

Specifies the a list of files, directories, and disks for the Snapshot backup you want to restore. You cannot mix a logical disk or mount point with SMB shares in the same input path.

-Snapshot

Specifies the Snapshot copy name you want to restored.

2. You can also use the following parameters to customize your restore operation:

-ForceRestore

Indicates that you want to forcibly restore your Snapshot copy.

-Host

Specifies the name or IP address of the host on which you execute the operation. The default is your local machine.

Restore multiple files and directories under a SMB share from a Snapshot copy

This example restores a file named `file0.txt` under the root of the SMB share, a named `file1.txt` under directory `dir1`, directory named `dir2` and `dir3` and their contents, from the Snapshot copy named `snapshot_1`.

```
Restore-SdSnapshot
-Path "\\172.17.12.101\share\file0.txt", "\\172.17.12.101\share
\dir1\file1.txt", "\\172.17.12.101\share\dir2\*", "\
172.17.12.101\share\dir3\*" -Snapshot snapshot_1
```

Restoring files and directories from a secondary Snapshot copy

You can use `Restore-SdSnapshot` to restore files and directories from a secondary Snapshot copy.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Restore-SdSnapshot
-Path "file_location"
-Snapshot "snapshot_name"
-StorageSystem "storage_system"
-VolumeName "volume_name"
```

Parameters specified have the following values:

-Path

Specifies the location of the files, directories, and disks for the Snapshot copies you want to restore. You cannot mix a logical disk or mount point with SMB shares in the same input path.

-Snapshot

Specifies the name of the Snapshot copy you want to restore.

-StorageSystem

Specifies the name of the storage system in which the Snapshot copy specified for the restore operation is located.

-VolumeName

Specifies the name of the storage system volume in which the Snapshot copy specified for the restore operation is located.

2. To indicate that you want to force restore files or directories from a secondary Snapshot backup copy, -use -ForceRestore.

Restoring a file on a SMB share from a Snapshot copy on a secondary SnapVault storage system

This example restores a file named `file1.txt` under directory `dir1` from the Snapshot copy named `snapshot_1` on the secondary SnapVault storage system:

```
Restore-SdSnapshot  
-Path "\\172.17.12.101\share\dir1\file1.txt"  
-Snapshot "snapshot_1"  
-StorageSystem 172.17.165.29  
-VolumeName vaultdest_vol
```

Performing discovery operations

You can use several PowerShell cmdlets to perform discovery operations to get information about your storage system, Snapshot backup copies, available VMs, SnapMirror relationship status, and SnapDrive.

The following cmdlets support discovery operations:

- `Get-SdInfo`
- `Get-SdSMBShadowCopyEMSMMessage`
- `Get-SdSnapMirror`
- `Get-SdSnapMirrorPolicyRule`
- `Get-SdSnapshot`
- `Get-SdStorage`
- `Get-SdStorageConnectionSetting`
- `Get-SdVM`

Getting information about VMs

Use `Get-SdVM` to retrieve information about a single VM and its attributes, to retrieve information about the Snapshot backup copies and virtual disks, or to enumerate available VMs.

Retrieving attributes for a VM

To get information about a specific VM, from the PowerShell command prompt, enter the following syntax:

```
Get-SdVM  
-Name "vm_name"
```

Retrieving all virtual disks on a VM

To enumerate virtual disks on a VM, from the PowerShell command prompt, enter the following syntax:

```
(Get-SdVM "vm_name").VirtualDisks
```

Retrieving all virtual disks and Snapshot backups on a VM

To enumerate virtual disks and Snapshot backups on a VM, from the PowerShell command prompt, enter the following syntax:

```
(Get-SdVm -GetHyperVSnapshot "vm_name").VirtualDisks
```

Enumerating available Hyper-V VMs

To list all available Hyper-V VMs, from the PowerShell command prompt, enter the following syntax:

```
Get-SdVM
```

To list all available Hyper-V VMs on a specific Hyper-V server, from the PowerShell command prompt, enter the following syntax:

```
Get-SdVM -ComputerName "Hyper-V_server_name"
```

Getting information about SnapDrive

Use Get-SdInfo to retrieve information about the SnapDrive instance you are running.

To get detailed information about the SnapDrive instance you are running, from the PowerShell command prompt, enter the following syntax:

```
Get-SdInfo -Details
```

Sample Get-SdInfo output

```
Version: 7.0.0.5702

Snapshot Service
InterfaceName:          SDSnapshot_v1_1
Version:                7.0.0.5702
URLForInterface:        net.tcp://localhost:808/SnapDrive/Snapshot
URLForWSDL:

Discovery Service
InterfaceName:          SDDiscovery_v10
Version:                7.0.0.5702
URLForInterface:        net.tcp://localhost:808/SnapDrive/Discovery
URLForWSDL:

Virtualization Service
InterfaceName:          SnapDrive.Nsf.Interfaces.Virtualization.IVirtualMachineManagement
Version:                7.0.0.5702
URLForInterface:        net.tcp://localhost:808/SnapDrive/
```

```

Virtualization
URLForWSDL:

Configuration Service
InterfaceName:
SnapDrive.Nsf.Interfaces.SDConfiguraiton
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/
Configuration
URLForWSDL:

StorageResolution Service
InterfaceName:
SnapDrive.Nsf.Interfaces.SDStorageResolution
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/
StorageResolution
URLForWSDL:

CIFS ShadowCopy Service
InterfaceName:
SnapDrive.Nsf.Interfaces.SDCIFSShadowCopyManagement
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/
CIFSShadowCopyManagement
URLForWSDL:

SnapRemote Service
InterfaceName: SDSnapRemote_v1_3
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/
SnapshotRemote
URLForWSDL:

Administration Service
InterfaceName: SDAdmin_v10
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/SDAdminNext
URLForWSDL:

InterfaceName: SDAdmin
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/SDAdminInfo
URLForWSDL:

Provisioning Service
InterfaceName:
SnapDrive.Nsf.Interfaces.SDProvisioningManagement
Version: 7.0.0.5702
URLForInterface: net.tcp://localhost:808/SnapDrive/
ProvisioningManagement
URLForWSDL:

```

Getting SnapMirror relationship status information

In clustered Data ONTAP 8.2 environments, use `Get-SdSnapMirror` to retrieve information about the SnapMirror relationship status for the volumes you specify.

From the PowerShell command prompt, enter the following syntax:

```
Get-SdSnapMirror  
-StorageSystem "storage_system_name"  
-Volume "volume_name"
```

Parameters specified have the following values:

- StorageSystem** Specifies the primary storage system name or IP address containing the volumes for which you want to retrieve the SnapMirror relationship status.
- Volume** Indicates a comma-separated list of storage system volumes for which you want to retrieve the SnapMirror relationship status. If you do not specify any volumes, you retrieve SnapMirror relationships for all registered virtual storage servers.

Example Get-SdSnapMirror output

```
Get-SdSnapMirror  
-StorageSystem "storage_system_name"  
-Volume "volume_name"  
  
Source:    //prodvserver/voldb  
Destination: //prodvserver/voldr  
Source virtual storage server: prodvserver  
Source Volume : voldb  
Destination virtual storage server: drvserver  
Destination Volume : voldr  
State: Transferring  
TransferRate: 1024
```

Getting information about Snapshot backup copies

You can use `Get-SdSnapshot` to retrieve a variety of information about Snapshot backup copies. You retrieve limited information when you run `Get-SdSnapshot` on a LUN in a 7-Mode environment.

Getting Snapshot backup copy information about a list of SMB shares

From the PowerShell command prompt, enter the following syntax to get information about Snapshot backup copies on a list of SMB shares:

```
Get-SdSnapshot  
-Path "SMBShare1_path", "SMBShare2_path"
```

Getting information about a specific Snapshot backup copy

From the PowerShell command prompt, enter the following syntax to get information about a specific Snapshot backup copy:

```
Get-SdSnapshot  
-Path "snapshot_location"  
-Snapshot "snapshot_name"
```

Getting the latest Snapshot backup copy for an SMB share

From the PowerShell command prompt, enter the following syntax to get the latest Snapshot backup copy for an SMB share:

```
Get-SdSnapshot  
-Path "SMBShare_path" | sort-object AccessTimeDT -ascending | select-  
object -last 1
```

Getting secondary Snapshot backup copies for a list of SMB shares

From the PowerShell command prompt, enter the following syntax to get secondary Snapshot backup copies for a list of SMB shares:

```
Get-SdSnapshot  
-Path "SMBShare1_path", "SMBShare2_path"  
-GetSecondarySnapshots
```

Getting information about a specific version of a Snapshot backup copy

From the PowerShell command prompt, enter the following syntax to get information about a specific version of a Snapshot backup copy:

```
Get-SdSnapshot  
-Path "SMBShare_path"  
-SnapshotVersionUuid "Uuid"
```

Getting information about a Snapshot backup copy on a LUN

From the PowerShell command prompt, enter the following syntax to get information about a Snapshot backup copy on a LUN:

```
Get-SdSnapshot  
-Path "drive_letter"
```

Getting information about your storage system

Use `Get-SdStorage` to retrieve a information about your storage system, storage system resources, SMB shares on your storage system, and storage system volume mirror information.

Retrieving the storage system path for SMB shares

To retrieve the storage system path a list of SMB shares, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorage  
-Path "SMBShare1_path", "SMBShare2_path"
```

Getting detailed information about host and storage system resources

To get detailed information about host and storage system resources, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorage  
-Path "SMBShare_path" | %{$_.HostResource, $_.StorageSystemResource}
```

Enumerating SMB shares on specified storage systems

To enumerate SMB shares on specified storage systems, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorage  
-StorageSystem "storage_system1", "storage_system2"
```

Note: When you are working in 7-Mode environments, you can specify the storage system name only by using -StorageSystem. Do not use the IP address.

Getting volume mirror information for a specified storage system

To get volume mirror information for a specified storage system, enter the following syntax from the PowerShell command prompt:

```
(Get-SdStorage  
-StorageSystem "storage_system"  
-GetMirrorInfo).StorageSystemResource.Volume
```

Getting information about your storage system connection settings

Use Get-SdStorageConnectionSetting to retrieve storage system transport protocol and credential settings. These settings include the storage system server name (virtual storage server name or IP,) port, transport type, user login, and password.

Getting connection setting information about a specific storage system

To get connection setting information about a specific storage system, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorageConnectionSetting  
-Name "storage_system_name"
```

Getting connection setting information for all available storage systems

To get connection setting information for all available storage systems, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorageConnectionSetting
```

Getting default storage system connection settings

To get default storage system connection settings, enter the following syntax from the PowerShell command prompt:

```
Get-SdStorageConnectionSetting  
-DefaultSetting
```

Troubleshooting SnapDrive in an SMB 3.0 environment

You have some troubleshooting options available to you when you are running SnapDrive in an SMB 3.0 environment. `Debug-SdHost` is available to help you debug your host system setup. `Get-SdSMBShadowCopyEmsMessage` allows you to view SMB shadow copy EMS messages from the event log, so that you can find backup failure details.

Debugging your host system

You can use `Debug-SdHost` to troubleshoot your SnapDrive host system setup. Run this cmdlet to check your system for compliance with various rules and best practices.

About this task

You can use `Debug-SdHost` to check your host system setup for compliance with these rules and best practices:

Storage connections rule	The storage connection rule verifies that the storage connection settings on your host system are valid and active.
Export-policy rule	The export-policy rule verifies that the client trying to access the data objects is doing so using the SMB protocol.
SMB share ACL setup rule	This rule verifies that the share ACL has host permissions, and if your host is a part of a cluster, this rule verifies that the share has cluster permissions.
SMB share continuously available property rule	This rule verifies that your SMB share contains the continuously available property. The continuously available property is mandatory for installing a VM.

If you are running `Debug-SdHost` in a clustered Data ONTAP environment, run the cmdlet on each node of your cluster.

Steps

1. To specify the host system you want to debug, enter the following syntax from the PowerShell command prompt:

```
Debug-SdHost
-Host
```

2. If you want to troubleshoot a specific area only, use `-RuleCategory`.
You can select from the following available categories:

- General
- SMB
- Hyper_V

Using Debug-SdHost to troubleshoot your host system

Running Debug-SdHost returns information that looks similar to this:

Debug-SdHost

Rule: Storage Connections

Description: The storage connection rule verifies that the storage connection settings on your host system are valid and active.

Category: General

Source: CLAB-A13-10

Severity: Info

Problem: All your storage connection settings are valid and active.

Impact: N/A

Resolution: N/A

Message: Success.

Rule: Export-Policy Rule

Description: The export-policy rule verifies that the client trying to access the data objects through is doing so using the SMB protocol.

Category: SMB

Source: CLAB-A13-10

Severity: Error

Problem: The virtual storage servers export-policy rule is not using the SMB protocol.

Impact: The SMB share access fails.

Resolution: Make sure that your export policy rule includes the SMB protocol.

Message: Error: The virtual storage servers sdw_jenkins_vserver export-policy rule is not using the SMB protocol.

Rule: SMB Share ACL Setup

Description: This rule verifies that the share ACL has host permissions, and if your host is a part of a cluster it verifies that the share has cluster permissions.

Category: Hyper_V

Source: CLAB-A13-10

Severity: Error

Problem: Your shares do not have access control set for the host or the cluster.

Impact: You cannot access these shares from your host.

Resolution: Add the host or the cluster to your share's ACL.

Message: Error. The following shares do not have host or clusters set in the ACLs: \\DATASERVER\admin\$, \\DATASERVER\ipc\$, \\JENKINS-CIFS\ipc\$, \\JENKINS-CIFS\admin\$

Rule: SMB Share "continuously-available" Property

Description: This rule verifies that your SMB share

```
contains the continuously-available property. The continuously-
available property is mandatory for installing a Virtual Machine.
Category:          Hyper_V
Source:            CLAB-A13-10
Severity:          Error
Problem:           Some of the shares do not contain continuously-
available property.
Impact:            You cannot install a Virtual Machine on the share.
Resolution:        Set the share property to continuously-
available.
Message:           Error. The following shares do not have
continuously-available property set: \\DATASERVER1\admin$, \
\\DATASERVER1\jenkinsvm, \\DATASERVER1\ipc$, \\DATASERVER1\dbshare, \
\\DATASERVER1\logshare
```

Retrieving shadow copy EMS messages from the event log

You can use `Get -SdSMBShadowCopyEMSMessage` to view shadow copy EMS messages from the event log, so that you can view backup failure details.

About this task

- You can retrieve information for one SMB share at a time.
- You cannot mix a logical disk or mount point with SMB shares in the same SMB share path.

Steps

1. From the PowerShell command prompt, enter the following syntax:

```
Get -SdSMBShadowCopyEmsMessage
-Path
```

-Path

Specifies the SMB share path for shadow copy EMS messages. Enter one path only. If you enter more than one path value, the search is performed only on the first path. You cannot mix a logical disk or mount point with SMB shares in the same input path.

2. If you want to search for a particular message ID, use `-SearchPattern`.

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NA 210-06161_A0, Printed in USA

SC27-5981-00

