

# Replay Manager Version 8.0

## Administrator's Guide

## Notes, cautions, and warnings

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

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

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

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This guide provides information on Replay Manager.

## Revision History

**Table 1. Document revision history**

Revision	Date	Description
A	August 2019	Initial release
B	June 2020	Updated supported VMware versions
C	January 2021	Added support for Microsoft SQL Server 2019

## Related Publications

In addition to this guide, refer to the following related publications for more information on related topics.

- *Dell Storage Manager Administrator's Guide*  
Describes the Dell Storage Manager software that manages an individual Storage Centers.
- *Dell Storage Integration Tools for VMware Administrator's Guide*  
Provides instructions for deploying and configuring Dell Storage Integration Tools for VMware (DSITV).
- *Dell TechCenter*  
Dell TechCenter has moved to other locations on the Dell support site. You can find technical white papers, best practice guides, and frequently asked questions about Dell Storage products on the following sites.
  - [TechCenter Migration FAQ](#) (more information about the TechCenter content migration)
  - [Dell Support](#) (Searchable knowledge base)
  - [Dell Technical Resources](#) (migrated TechCenter topic areas such as Networking, Servers, Storage, etc.)

All Dell EMC Guides and technical tips are available at the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)).

# Overview

This section provides an overview of Replay Manager and its components, and lists the installation requirements.

## Topics:

- [Introduction to Replay Manager](#)
- [Replay Manager Requirements](#)
- [IPv6 Support](#)

## Introduction to Replay Manager

Replay Manager is a client/server application that creates and manages application-consistent Replays on a Dell Storage Center.

**NOTE: Snapshots, Shadow Copies, and Replays:** Snapshot is an industry-standard term used for a point-in-time copy; shadow copy is the term used by the Microsoft VSS for a point-in-time copy; Replay is the term used by Replay Manager for a point-in-time copy. All the terms—snapshot, shadow copy, Replay—are used interchangeably, depending on the vendor responsible for creating the point-in-time copy.

Replay Manager creates and manages Replays for the following applications:

- Microsoft Integration:
  - Microsoft Server Local Volumes
  - Microsoft Exchange Server
  - Microsoft SQL Server
  - Microsoft Hyper-V
- VMware Integration:
  - VMware datastores
  - VMware virtual machines

## Replay Manager Components

Replay Manager consists of the following components.

**NOTE:** The Replay Manager Service for Microsoft Servers and Replay Manager Management Tools can be installed and run on the same server if the host is running a server operating system.

### Replay Manager Service for Windows

The Replay Manager Service for Microsoft Servers, along with all applicable extensions for VSS-enabled applications (Microsoft Exchange Server, Microsoft SQL Server, or Microsoft Hyper-V), runs on each Microsoft Windows server protected by Replay Manager. The Replay Manager Service runs as a Microsoft Windows service to manage backup components, backup jobs, and restore points.

Install a Replay Manager Service for Windows (with extensions for the Microsoft VSS-enabled applications on the server) on each server protected by Replay Manager.

### Replay Manager Service for VMware (RMSV)

The Replay Manager Service for VMware (RMSV) is packaged and delivered as part of the Dell Storage Integration Tools for VMware (DSITV). One DSITV virtual appliance configured with RMSV connects with one VMware vCenter server.

Install and configure Replay Manager Service for VMware on a DSITV virtual appliance for each vCenter server protected by Replay Manager. For instructions, see the *Dell Storage Integration Tools for VMware Administrator's Guide*.



## Replay Manager Management Tools

The Replay Manager Management Tools consist of the following:

- Replay Manager Explorer, a graphical user interface for creating and managing Replays.
- Replay Manager Command Set, a snapin to Microsoft Windows PowerShell that provides cmdlets for scripting Replay Manager functions.

## Verification Service for Microsoft Exchange

If installed, the Verification Service provides verification for Microsoft Exchange backup and restore processes. Dell recommends installing a Verification Service on a server other than the server that is hosting Microsoft Exchange. For clustered environments, install the Verification Service on a server outside the cluster.

## Using Replay Manager as Part of a Disaster Recovery Plan

Replay Manager can be used in conjunction with Dell Storage Manager to transport snapshots to a Disaster Recovery (DR) site. As such, Replay Manager can be used as part of a site Disaster Recovery Plan (DRP).

However, because restoring application data is controlled by the application, the specific DRP and the process of activating a DR site is dependent on the site configuration and the application requirements.

## Replay Manager Requirements

The following tables list requirements for installing and using Replay Manager. Requirements are listed for each Replay Manager component and additional usage requirements are provided specific to the extension type.

### Replay Manager Service for Windows

The following table lists requirements for installing the Replay Manager Service for Microsoft Servers.

Requirement	Description
Processor	x86-64-bit (AMD64-compatible only, including Intel 64) <b>i</b> <b>NOTE:</b> The Itanium 64-bit architecture is not supported.
Operating System	<ul style="list-style-type: none"><li>• Multilingual Interface (MUI) must be installed for localized deployments.</li><li>• Microsoft Windows Server 2012 (including Server Core)</li><li>• Microsoft Windows Server 2012 R2 (including Server Core)</li><li>• Microsoft Windows Server 2016 (including Server Core)</li><li>• Microsoft Windows Server 2019 (including Server Core)</li></ul> <b>i</b> <b>NOTE:</b> Microsoft Windows Nano Server and Microsoft Hyper-V Server (all versions) are not supported.
Microsoft .NET Framework	Full .NET Framework version 4.6
Privileges	On a Windows Server, administrative privilege is required to install Replay Manager Service. To use Replay Manager Service, a user must belong to the Administrators group or Backup Operators group. In a cluster environment, a user must belong to the Administrators group or Backup Operations group on each node in the cluster.

#### Related tasks

[Install Replay Manager Service for Windows on Windows Server Core](#) on page 16

# Replay Manager Service for VMware

Replay Manager Service for VMware requires the following:

- DSITV virtual appliance version 5.0 or later.
- VMware vCenter Server version 6.5, 6.7, or 7.0.

## Replay Manager Service Extensions

The following table lists requirements for using Replay Manager to take Replays.

Requirement	Description
Volume Types	<ul style="list-style-type: none"><li>• Windows basic volumes are supported.</li><li>• Windows dynamic volumes are not supported.</li><li>• Storage Center Live Volumes are not supported.</li><li>• vVols are not supported for VMware extensions.</li></ul>
SMB File Shares	<p>The following criteria must be met to support SMB file shares:</p> <ul style="list-style-type: none"><li>• Both the application server and file server must be running Windows Server 2012, Windows Server 2012 R2, or Windows Server 2016.</li><li>• Only Microsoft SQL Server 2019, Microsoft SQL Server 2017, Microsoft SQL Server 2016, Microsoft SQL Server 2014, Microsoft SQL Server 2012 databases, or Hyper-V virtual machines on SMB 3.x (and later) file shares can be backed up.</li><li>• Replay Manager Service for Windows must run as a Windows account that has Administrators or Backup Operators privileges on both the application server and file server. Also, the Windows account must have at least read permissions on the file share data that is being backed up.</li><li>• File Server VSS Agent Service role must be enabled on the file server.</li><li>• Application server and file server must belong to the same domain in Active Directory.</li><li>• SMB file share must be valid. That is, the SMB file share must adhere to Microsoft guidelines for SMB file shares.</li></ul>
Microsoft Exchange Server	<ul style="list-style-type: none"><li>• Microsoft Exchange Server 2010</li><li>• Microsoft Exchange Server 2013</li><li>• Microsoft Exchange Server 2016</li><li>• Microsoft Exchange Server 2019</li></ul> <p>Replay Manager Service requires the following permissions:</p> <ul style="list-style-type: none"><li>• On the local machine, Administrator privilege</li><li>• Organizational Management Role</li></ul>
Microsoft Hyper-V	<ul style="list-style-type: none"><li>• Microsoft Windows Server 2012 with the Hyper-V role installed</li><li>• Microsoft Windows Server 2012 R2 with the Hyper-V role installed</li><li>• Microsoft Windows Server 2016 with the Hyper-V role installed</li><li>• Microsoft Windows Server 2019 with the Hyper-V role installed</li></ul> <p><b>NOTE:</b> To successfully back up Hyper-V guests, the Microsoft Windows Server must be configured with the auto mount feature enabled which is the default.</p> <p><b>NOTE:</b> Hyper-V Server is not supported.</p> <p><b>NOTE:</b> Virtual Fibre Channel is not supported.</p>
Microsoft iSCSI Initiator	<p>A direct iSCSI connection is required to allow Replay Manager to restore components (Local Volumes, SQL Server, or Exchange Server) running inside a Hyper-V guest using pass-through or a VMware guest using raw device mapped disks. The Microsoft iSCSI Initiator can be used to provide the required direct iSCSI connection. For virtual servers, a Storage Center virtual server object with HBAs defined via iSCSI initiator must exist in order for Replay Manager to restore with pass-through volumes.</p>
Microsoft SQL Server	<ul style="list-style-type: none"><li>• Microsoft SQL Server 2012</li><li>• Microsoft SQL Server 2014</li><li>• Microsoft SQL Server 2016</li></ul>

Requirement	Description
	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2017</li> <li>• Microsoft SQL Server 2019</li> </ul> <p><b>i</b> <b>NOTE:</b> The Replay Manager service account requires system administrator privileges in SQL Server. In Microsoft SQL Server 2019, Microsoft SQL Server 2017, Microsoft SQL Server 2016, Microsoft SQL Server 2014, and Microsoft SQL Server 2012, the Local System account does not have system administrator privileges by default. If you install Replay Manager using the Local System account, make sure it has system administrator privileges. Alternatively, install Replay Manager using a Windows account that has SQL Server sysadmin role permissions.</p> <p><b>i</b> <b>NOTE:</b> Replay Manager Service requires SQL Server Management Studio (SSMS) to be installed as part of Microsoft SQL Server 2019, Microsoft SQL Server 2017, and Microsoft SQL Server 2016.</p>
Cluster Shared Volumes (CSVs)	<p>Cluster Shared Volumes (CSVs) are supported only for the following Replay Manager extensions:</p> <ul style="list-style-type: none"> <li>• Local Volumes</li> <li>• Hyper-V Guests</li> </ul> <p><b>i</b> <b>NOTE:</b> Backup sets containing CSV and non-CSV volumes are not supported.</p>
Storage Center	<ul style="list-style-type: none"> <li>• Storage Center 7.1 or later</li> <li>• The following licenses are required to run Replay Manager: <ul style="list-style-type: none"> <li>◦ Data Instant Replay</li> <li>◦ For remote replications of Replays, Remote Instant Replay</li> <li>◦ Replay Manager</li> </ul> </li> </ul>
VMware	<p>Backing up and restoring VMware storage requires the following:</p> <ul style="list-style-type: none"> <li>• DSITV virtual appliance (version 5.0 or later) running the Replay Manager Service for VMware (RMSV)</li> <li>• VMware ESXi Server (version 6.5, 6.7, or 7.0) managed by the vCenter Server</li> <li>• Support for FE-SAS (Front End) Volumes and Virtual Machines with RMSV 2.0</li> </ul> <p><b>i</b> <b>NOTE:</b> For vApps, VMs must be in the root to be able to create a snapshot. VMs within nested vApps are not supported by RMSV.</p> <p>For information on deploying a DSITV virtual appliance with Replay Manager Service for VMware, see to the <i>Dell Storage Integration Tools for VMware Administrator's Guide</i>.</p>

### Related concepts

[Introduction to Replay Manager](#) on page 8

## Exchange Verification Service

The following table lists requirements for installing and using the optional Exchange Verification Service.

Requirement	Description
Processor	<p>x86-64-bit (AMD64-compatible only, including Intel 64)</p> <p><b>i</b> <b>NOTE:</b> The Itanium 64-bit architecture is not supported.</p>
Operating System	<p>Any of the following Microsoft Windows operating systems:</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Server 2012 (including Server Core)</li> <li>• Microsoft Windows Server 2012 R2 (including Server Core)</li> <li>• Microsoft Windows Server 2016 (including Server Core)</li> <li>• Microsoft Windows Server 2019 (including Server Core)</li> </ul>
Microsoft .NET Framework	Full .NET Framework version 4.6
Privileges	Administrative privileges are required to install Replay Manager Verification Service on a Microsoft Server.

# Replay Manager Management Tools

The following table lists requirements for installing and using the Replay Manager Management Tools.

Requirement	Description
Processor	86-64-bit (AMD64-compatible only, including Intel 64) <b>i</b> <b>NOTE:</b> The Itanium 64-bit architecture is not supported.
Operating System	Any of the following Microsoft Windows operating systems: <b>i</b> <b>NOTE:</b> Replay Manager Explorer can be used only on operating systems with a graphical user interface. For operating systems without a graphical user interface, use the Replay Manager Command Set. <ul style="list-style-type: none"><li>• Microsoft Windows Server 2012</li><li>• Microsoft Windows Server 2012 R2</li><li>• Microsoft Windows Server 2016</li><li>• Microsoft Windows Server 2019</li><li>• Microsoft Windows 7</li><li>• Microsoft Windows 8.1</li><li>• Microsoft Windows 10</li></ul>
Microsoft .NET Framework	Full .NET Framework version 4.6
Windows PowerShell	Windows PowerShell version 4.0 or later

## Replay Manager Ports

This section specifies the ports required for Replay Manager.

### Inbound Ports

Replay Manager requires the following inbound ports for the Microsoft Windows server:

Port	Function
27444	Used as the listening port for the Replay Manager Service for Windows. Allows communication between the Replay Manager Explorer and Replay Manager Service, and communications between cluster nodes.
29176	Used as the listening port for the Exchange Verification Service.

**i** **NOTE:** Replay Manager Service for Windows uses port 29129 to communicate with the Replay Manager Provider. This port should not be opened on the firewall. The communication is between the local service and the local provider only.

### Outbound Ports

Replay Manager requires the following ports to be opened on the host-based firewall for traffic initiated from the Microsoft Windows server:

Port	Function
443	Used to activate a Replay Manager license using the Internet, and to communicate with the Storage Center.
3260	Used by the Microsoft iSCSI Software Initiator to make an iSCSI connection to Storage Center.

# IPv6 Support

Replay Manager supports IPv6 addresses for the following connections.

Type	Supported Connections
Windows	<ul style="list-style-type: none"><li>• Replay Manager Explorer to Replay Manager Service</li><li>• Replay Manager PowerShell snapin to Replay Manager Service Windows</li></ul>
VMware	<ul style="list-style-type: none"><li>• Replay Manager Explorer to Replay Manager Service for VMware (RMSV)</li><li>• Replay Manager PowerShell snapin to RMSV</li></ul>
Storage Center	<ul style="list-style-type: none"><li>• Replay Manager Service and Provider to Storage Center</li><li>• RMSV to Storage Center</li></ul> <p><b>NOTE:</b> Storage Center must be properly configured for IPv6. Since Storage Center does not support the discovery of IPv6 addresses, Replay Manager cannot auto discover a configured IPv6 address. You must enter the IPv6 address or DNS host name of the Storage Center.</p>

For information on configuring Storage Center for IPv6 addressing, refer to the *Dell Storage Manager Administrator's Guide*.

# Installing Replay Manager Components

This section provides the instructions for installing the Replay Manager Service and Replay Management Tools, and describes how to install and configure the Verification Service and HTTP Proxy Service.

## Topics:

- [Licensing for Replay Manager](#)
- [Install Replay Manager Service for Windows](#)
- [Installing Replay Manager Service for VMware](#)
- [Install Replay Manager Management Tools](#)
- [Install Replay Manager Service for Windows on Windows Server Core](#)
- [Installing and Configuring the Verification Service for Exchange](#)
- [Using Replay Manager Service on Clustered Servers](#)
- [Configure an HTTP Proxy Service](#)

## Licensing for Replay Manager

Replay Manager requires a license purchased from Dell, but can be evaluated for a period of time.

During the trial period, you can use all features of Replay Manager by leaving the **Product Serial Number** field in the License tab blank. The License tab in Replay Manager displays the message `Evaluation Copy. Product will expire in X days`, where X is the number of days left in the trial.


After the license is applied, the License tab message shows the license status of Replay Manager.

For Replay Manager installations that have been updated to the latest version, the license from the previous version carries over to the new version. For new Storage Centers, you must purchase a license for Replay Manager from Dell.

## Install Replay Manager Service for Windows

Install the Replay Manager Service for Windows on each Windows server containing a Microsoft Windows application storage component to be backed up, including all nodes in a clustered-server environment.


1. Download the Replay Manager version 8.0 installation package from the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)).  
The installation package includes three installers, one each for the following:
  - Replay Manager Service
  - Replay Manager Management Tools
  - Replay Manager Verification
2. Unzip the package.
3. Double-click the `DellStorageReplayManagerServiceSetup_<versionnumber>.msi`.
4. Click **Run**.  
The Replay Manager installation welcome page opens.
5. Click **Next**.  
The **License Agreement** page opens.
6. Review the terms of the license agreement. Select **I accept the terms in the license agreement**, and click **Next**.  
The **Destination Folder** page opens.
7. Click **Next** to accept the default destination folder location or click **Change** to select a different location.  
The **Feature Selection** page opens. Features that can be selected include:
  - Exchange Server Extension
  - Hyper-V Host Extension
  - SQL Server Extension
8. Select the extensions to install, and click **Next**.

 **NOTE:** The Local Volumes extension is always installed as part of the Replay Manager Services feature.

The **Change Service Account** page opens.

9. Select one of the following:

- **Local System Account:** Select this option to set the Replay Manager Service to use Local System as the service account.
- **This Account:** Select this option to set the Replay Manager Service to use a specific domain or local Windows user as the service account. Enter the user name and password. When installing Replay Manager in a clustered environment, the Replay Manager Service should use a domain user as the service account.

 **NOTE:** Run the Replay Manager Service using a domain user account that is part of the local admin group. Make sure that the account has sufficient privileges for Replay Manager to access application components. In addition, the account must have read/write permissions to any network share to which you intend to copy backup set data. The account also requires the rights to manage Windows volumes.

10. Click **Next**.

The InstallShield wizard presents a summary screen.

11. Click **Install**.

The InstallShield wizard installs Replay Manager and all selected features. When installation is complete, the **Installation Complete** page opens.

12. Click **Finish** to complete the installation.

After installing Replay Manager Service for Windows, the service automatically starts. View and manage the service with the **Microsoft Windows Services** dialog box.


## Installing Replay Manager Service for VMware

The Replay Manager Service for VMware is offered as part of the Dell Storage Integration Tools for VMware (DSITV). For step-by-step instructions for installing and configuring a DSITV virtual appliance with Replay Manager Service for VMware, refer to the Dell Storage Integration Tools for VMware Administrator's Guide.

After installing and configuring Replay Manager Service for VMware with DSITV, install the Replay Manager Management Tools on a PC or server that will manage the Replay Manager Service for VMware.

## Install Replay Manager Management Tools

Install the Replay Manager Management Tools on a PC or server that is managing the Replay Manager Service.

 **NOTE:** If you install the Replay Manager Management Tools on a server running Windows Server Core, only the Replay Manager Command Set is installed.

1. Download the Replay Manager version 8.0 installation package from the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)).

2. Unzip the package.

3. Double-click the `DellStorageReplayManagerManagementSetup_version.msi`.

The Replay Manager installation welcome page opens.

4. Click **Run**.

The Replay Manager installation welcome page opens.

5. Click **Next**.

6. Review the terms of the license agreement. If agreed, select **I accept the terms in the license agreement**, and click **Next**.

The **Destination Folder** page opens.

7. Click **Next** to accept the default destination folder location or click **Change** to select a different location.

The **Custom Setup** page opens.

8. Select the features to install, and click **Next**.

The **Ready to Install the Program** page opens.

9. Click **Install**.

The InstallShield wizard installs the selected Replay Manager Tools. When installation is complete, the **InstallShield Wizard Completed** page opens.

10. Click **Finish** to complete the installation.

After installing the Replay Manager Management Tools, use the Replay Manager Explorer to add and configure the Replay Manager Service you manage.

#### Related concepts

[Adding and Configuring Servers and Hosts](#) on page 20

## Install Replay Manager Service for Windows on Windows Server Core

Use the following procedure to install Replay Manager Service for Windows Server Core.

1. Download the Replay Manager version 8.0 installation package from the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)).
2. Unzip the package.
3. From a command prompt, run the Replay Manager Management Tools installation.
4. Follow the installation procedure described in [Install Replay Manager Service for Windows](#).

#### Related concepts

[Using Replay Manager Cmdlets](#) on page 65

## Installing and Configuring the Verification Service for Exchange

Replay Manager provides a Verification Service that can be used to verify Exchange data during backup and restore operations. Once installed, the Verification Service is listed in the Microsoft Management console under Services.

### Install the Verification Service for Exchange

Install the Verification Service on a server other than the Microsoft Exchange Server. The Verification server should be mapped to the Storage Center using iSCSI or Fibre Channel.

**NOTE:** Different Microsoft Exchange versions are not compatible. To use the Verification Service for more than one Exchange version, install one instance of the Verification Service for each Exchange version on separate machines. Once a Verification Service has been used to verify an Exchange Mailbox Database from a different version of Exchange, it cannot be used to verify an Exchange Mailbox Database from a different version of Exchange.

1. The Replay Manager Verification Service installation package is included in the Replay Manager installation package. Download the installation package from the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)) if not done already.
2. Unzip the package.
3. Double-click the file to start the installation, and follow the instructions given by the installation wizard.  
After installing the Verification Service, configure the Replay Manager to use the Verification Service during backups and restores of Exchange data.

#### Related tasks

[Configure the Verification Service](#) on page 16

### Configure the Verification Service

After installing the Replay Manager Verification Service on the server, configure the Replay Manager to use the Verification Service for backups and restores of Microsoft Exchange Servers.

1. Start the Replay Manager Explorer, and connect to the Exchange server for which you want to verify backup and restore operations.



2. Click **Configure Server**, and click the **Exchange Verification** tab.
3. Specify the following:
  - **Verification Server Host Name:** Enter the host name or IP address of the server on which the Replay Manager Verification Service is installed.
  - **Verification Server Service Port:** Enter the service port for communications between Replay Manager and the Replay Manager Verification Service. Unless a conflict would result, use the default service port value of 29176.
  - **Lower LUN Limit** and **Upper LUN Limit:** Enter a range of LUNs to use for mapping volumes to the Verification Service host. If no range is specified, Replay Manager uses all available LUNs; Windows allows an upper limit of 254 LUNs.
  - **Storage Center Server Definition:** Select the Verification Server Host Name for each Storage Center.
4. Click **Test Server**. Replay Manager attempts to locate and validate the host name. When successful, a green indicator button is displayed with **Verification server successfully tested**.
5. Click **Save**.

## Using Replay Manager Service on Clustered Servers

Although the Microsoft Volume Shadow Copy Services (VSS) is not a cluster-aware service, Replay Manager Service for Windows can be used in a Windows clustered-server environment.


For general guidelines on Windows Server 2012/2012 R2 clusters and storage, see: [technet.microsoft.com/en-us/library/hh831579.aspx](https://technet.microsoft.com/en-us/library/hh831579.aspx)

For general guidelines on Windows Server 2016 and Windows Server 2019 clusters and storage, see: <https://technet.microsoft.com/en-us/windows-server-docs/failover-clustering/whats-new-in-failover-clustering>

Follow these guidelines to install and configure Replay Manager on server nodes in a cluster:

- Run the Replay Manager Service using a domain user account that is a part of the local administrators group.
- Install a Replay Manager Service for Windows on each server node in the cluster.
- If using the Verification Service for Microsoft Exchange, install the Verification Service on a machine outside the cluster.
- When updating Replay Manager Services, first stop the backup operations, shut down the Replay Manager Service on all nodes, then update all the nodes in the cluster.

Non-transportable snapshots created on a node can be viewed and used only by the node on which the snapshot was created. Transportable snapshots can be imported to any node.

 **NOTE:** Volume-based, non-transportable snapshots can be created using Replay Manager cmdlets only.

## Configure an HTTP Proxy Service

Replay Manager uses HTTP channels for inter-process communication.

If the Replay Manager host server is configured with an HTTP proxy service, Replay Manager Explorer may issue the following error message:

```
Connection failed to Replay Manager Service. Verify Replay Manager Service availability
```

To resolve the issue, configure the Proxy server using the **Bypass proxy server for local addresses** option.

1. On the server running Replay Manager Services, open Microsoft Internet Explorer.
2. Select **Internet Options** from the **Tools** menu.
3. Click the **Connections** tab.
4. Click **LAN settings**.  
The **Local Area Network (LAN) Settings** dialog box opens.
5. In the Proxy server area, select **Use a proxy server for your LAN**, and then select **Bypass proxy server for local addresses**.
6. Click **OK** to close the **Local Area Network (LAN) Settings** dialog box.
7. Click **OK** to close the **Internet Options** dialog box.

# Getting Started

After installing the Replay Manager Service and Management Tools, use the Replay Manager Explorer to add and configure the servers for which you will be creating and managing Replays.

## Topics:

- [Starting and Stopping the Replay Manager Explorer](#)
- [Stopping and Restarting the Replay Manager Service](#)
- [Viewing Replay Manager Explorer](#)
- [Adding and Configuring Servers and Hosts](#)

## Starting and Stopping the Replay Manager Explorer

This section provides the procedures for starting and stopping the Replay Manager Explorer.

### Start Replay Manager Explorer

Use the following method to start the Replay Manager Explorer. The method for starting the Replay Manager Explorer differs slightly between Windows Server versions.

Double click on the Replay Manager Explorer icon.  
The Replay Manager Explorer opens.

### Stop Replay Manager Explorer

Use the following method to stop the Replay Manager Explorer.


Stop the Replay Manager Explorer by either of these methods:

- Close the application windows by clicking on the red "x."
- Click the Dell logo and select **Exit**.

The Replay Manager Explorer closes.

## Stopping and Restarting the Replay Manager Service

This section provides the procedures for stopping and restarting the Replay Manager Service.

 **CAUTION: If any operations such as backup, restore, or expose are in progress, those operations are terminated when you stop Replay Manager Service. Make sure no operations are in progress before stopping Replay Manager Service.**

### Stop or Restart the Replay Manager Service

Stop or restart the Replay Manager Service using the method appropriate to the Windows server version.

1. Open the Services Microsoft Management Console (MMC) Computer Management tool. Hover the mouse over the lower right-hand corner of the desktop and select **Start** → **Administrative Tools** → **Services**.
2. Right-click the **Dell Storage Replay Manager Service**, and click **Stop** to stop the service or **Restart** to restart the service.

# Stop or Restart the Replay Manager Service for VMware

For information on stopping and restarting Replay Manager Service for VMware, see the Dell Storage Integration Tools for VMware Administrator's Guide.

## Viewing Replay Manager Explorer

Use the Replay Manager Explorer to add and configure servers, and then select components on the server(s) to back up and restore.

### Navigation Pane

The navigation pane provides controls to select and configure servers and backup sets.

Navigation Area	Description
Server Connections	Displays the servers and hosts already added to the Replay Manager Explorer. To add a new server or host, click <b>Add Server</b> .
Configuration	Configures the server currently connected to the Replay Manager Explorer.
Backup Sets	Displays Jobs, Reports, and Queued Items for all backup sets.
Backup Extensions	Displays the Replay Manager backup extensions (Local Volumes, SQL Databases, Exchange Stores, Hyper-V Guests, VMware Datastores and VMware Virtual Machines) available on the server currently connected to the Replay Manager Explorer.

#### Related concepts

[Adding and Configuring Servers and Hosts](#) on page 20






[Working with Backup Set Jobs](#) on page 49

[Viewing Backup Job Reports](#) on page 52

[Viewing Queued Items](#) on page 51

### Toolbar

The toolbar buttons provide quick access to Replay Manager options.

Button	Description
	Displays the Replay Manager options menu. (Right-click  to display the same menu.)
	Refreshes data in the Replay Manager Explorer.
	Displays application version information.
	Sets the location of the toolbar and displays the Replay Manager options as a menu: <ul style="list-style-type: none"><li>• Click to change the location of the toolbar to above or below the ribbon.</li><li>• Right-click to display the Replay Manager <b>Options</b> menu.</li></ul>

### Explorer Pane

The explorer pane content changes depending on the selection in the navigation pane:

- When a **Backup Extension** is selected, it displays storage components and the restore points available, as well as details for a selected storage component or restore point.

- When **Jobs** is selected, it displays all backup jobs for all backup extensions.
- When **Reports** is selected, it displays General and Detailed reports for all backup jobs.
- When **Queued Items** is selected, it displays all the jobs waiting to run, and the currently running job.
- When the icon in the top left corner inside the component pane is clicked, a drop-down menu opens. It allows users to select all items, deselect all items, and invert selection. Double-clicking the icon toggles between select all and deselect all.

### Related concepts

[Working with Backup Set Jobs](#) on page 49


[Viewing Backup Job Reports](#) on page 52

## Action Pane

Displays the options available based on the content in the explorer. For example, in the Backup/Restore Points explorer, the action pane displays backup and restore actions; in the Jobs explorer, it displays job actions; and in the Queued Items explorer, it displays options for filtering the Queued Items list.

## Adding and Configuring Servers and Hosts

After installing the Replay Manager Explorer, add and configure the Windows servers or DSITV hosts that contain Replays to manage. Before adding and configuring a server or host:

- Make sure Replay Manager for Windows—with applicable extensions—is installed on the servers to which you want to connect.
  - Make sure Replay Manager for VMware is configured on the DSITV virtual appliance to which you want to connect.
-  **NOTE:** A direct connection to a Storage Center required to create backup sets and expose view volumes successfully on a server.

## Adding and Organizing Servers and Server Folders

Create folders to logically organize server and host connections. The folder structure can be modified before or after adding servers or hosts. Folders can be renamed and removed after creation using the context menu options.

## Add a Windows Server or DSITV Virtual Appliance to the Replay Manager Explorer

Use the **Connect To Server** dialog box to specify the Name/IP Address of the server or DSITV virtual appliance to add.

1. In the **Server Connections** area of the navigation pane, click **Add Server**.  
The **Connect To Server** dialog box opens.
2. Enter the server connection information, and click **Connect**.
  - **Name/IP Address:** (Required) Enter the name or IP address of the target server.
  - **Server Alias:** (Optional) Enter an alias for the server. If specified, the **Server Alias** is displayed in the list of server connections.
3. Either:
  - Click the host.
  - Right-click the host icon to display the connect option in the menu.
4. When prompted for logon information:
  - For Windows servers: provide an administrator user name and password for the server.
  - For a DSITV virtual appliance: provide the user name and password with administrator role for the VMware vCenter server configured in the DSITV Appliance (not the DSITV user name and password). For example, administrator@vsphere.local.
5. Click **OK**.

The Replay Manager Explorer connects to the named Windows server or DSITV virtual appliance, and displays the **Configure Server** and **License** tab in the right pane.

## Related tasks

[Configure Servers](#) on page 22

## Rename a Server or Host

Use the **Rename Server** dialog box to change the server alias of a server or host.

1. In the **Server Connections** area of the navigation pane, right-click the server and select **Rename [server]**. The **Rename Server** dialog box opens.
2. Enter a new **Server Alias**, and click **Rename**.

## Disconnect from a Server or Host

Follow these steps to disconnect from a server or host.

In the **Server Connections** area of the navigation pane, right-click the server and select **Disconnect from [server]**. Replay Manager disconnects the server.

## Test a Server or Host Connection

In the **Server Connections** area of the navigation pane, right-click the server and select **Test Connection to [server]**.

Replay Manager pings the server:

- If the server responds, Replay Manager displays an informational message indicating the connection success and the server response time.
- If the connection fails, Replay Manager displays an error message indicating that the server did not respond.

## Remove a Server or Host

Remove a server or host if it is no longer needed.

1. In the **Server Connections** area of the navigation pane, right-click the server to remove and select **Remove [server]**.
2. Click **Yes** to remove the server.

## Add a Server Folder

Add folders to reorganize servers. The Replay Manager Explorer maintains the added servers in alphabetical order.

1. In the **Server Connections** area of the navigation pane, right-click **Add Server**, and click **Create Folder**. The **Add Folder** dialog box opens.
2. Enter a folder name and click **Add**.

## Move a Server or Host into a Folder

Click and drag a server to a folder (a yellow arrow marks the target folder).

## Rename a Server Folder

Use the **Rename Folder** dialog box to change the name of a folder.

1. In the **Server Connections** area of the navigation pane, right-click the server folder to rename and select **Rename [folder]**. The **Rename Folder** dialog box opens.
2. Enter a new folder name and click **Rename**.

## Remove a Server Folder

The **Remove Folder** option removes a server folder and all objects within the folder.

1. Right-click the server folder to remove and click **Remove [folder]**.
2. Click **Yes** to permanently delete the server folder and all contained objects.

## Configure Servers

Once a server is added, configure the server using the **Configure Server** dialog box. Server configuration includes activating a license key, associating Storage Centers with the server, enabling email notifications, and setting options.

## Activate a Product Serial Number for a Server

Use the following procedure to activate the product license by phone or Internet. The functionality can be evaluated for 30 days by leaving the **Product Serial Number** field blank.

1. In the **Server Connections** area of the navigation pane, connect to the server to configure.
2. In the **Configuration** area of the navigation pane, click **Configure Server**.
3. Click the **License** tab.

**NOTE:** Activating a connection to a DSITV virtual appliance configured with Replay Manager Service for VMware requires an Enterprise-level Replay Manager License. An Enterprise-level Replay Manager License has a format of CVSSP-999-xxxx-xxxxxxxxxxxxx.

4. Activate the product license.
  - **Activate by Internet:**
    - a. Enter the Product Serial Number, and select **Activate via Internet**.
    - b. Click **Request Confirmation**. The system requests confirmation from Dell and then displays a message indicating that the license has been activated for this product.
  - **Activate by Phone:**
    - a. Enter the Product Serial Number, and select **Activate via Phone**. The **Host ID** and **Confirmation Number** fields are displayed.
    - b. Go to the Dell EMC support site ([dell.com/support](http://dell.com/support)) to locate a support telephone number for your region. Call Dell support and provide the product serial number and server host ID for the installation. Dell support provides a confirmation number.
    - c. Enter the Confirmation Number, and click **Activate**.
  - **Activate for Evaluation**

Leave the **Product Serial Number** field blank. The system displays a warning to obtain a valid license number within 30 days. During those 30 days, Replay Manager is fully functional. When the evaluation license expires, existing backups are retained, but no new backups can be created. In addition, existing backups are not automatically expired by Replay Manager.

## Add or Modify Storage Centers for a Server or Host

Servers are not available for management until they are defined in the **System Configuration** tab.

**NOTE:** The procedure for adding a Storage Center must be completed for each Storage Center used by the server.

1. In the **Server Connections** area of the navigation pane, connect to the server to configure.
2. In the **Configuration** area of the navigation pane, click **Configure Server**.
3. Click the **System Configuration** tab.
4. To add a Storage Center:
  - a. Select an existing Storage Center in the **Discovered Systems** list or click **Add New System** to add a Storage Center.
    - NOTE:** Replay Manager Service cannot auto discover IPv6 addresses. To add a new Storage Center entry that uses an IPv6 address, enter the IPv6 address or DNS host name of the Storage Center in the **Host** field.

- b. Enter the host name or IP address in the **Host** field, **User Name**, and **Password** for the Storage Center. The user must have Administrator or Volume Manager privileges for the Storage Center.

**CAUTION:** If reconfiguring a Storage Center user from an Administrator to a Volume Manager user, restores may fail if the new Storage Center user does not have access to the view volumes previously created by Replay Manager on the Storage Center. To ensure the Volume Manager user can access the view volumes, either add the Replay Manager VSS subfolders to the Volume Manger's user group, or move the view volumes into a folder associated with that user group in Storage Center.

- c. Select the Replay Manager server from the drop-down menu.

**NOTE:** The field **"This Server"** is needed only for Microsoft servers.

- d. Click the appropriate button. The button is labeled as either **Add** or **Update**, depending on whether the Storage Center is being added for the first time or the Storage Center is already configured.

5. To remove a Storage Center:

- a. In the **Defined Systems** list, select the Storage Center you want to remove.
- b. Click **Remove**.

## Set Up Notifications for a Server or Host

Configure notification services to send an email to designated recipients when snapshot creation is completed, or failed, or both. Anti-spam filters may require adjustment to ensure notification emails are not blocked by the email server.

**NOTE:** For servers that are members of a cluster, the notification configuration is common for all servers in the cluster. Any server notification information updated by one node will be passed to all nodes in the cluster. When notifications are received, the individual node name for which the notification was generated is automatically included in the subject line of the email.

1. In the **Server Connections** area of the navigation pane, connect to the server to configure.
2. In the **Configuration** area of the navigation pane, click **Configure Server**.
3. Click the **Notifications** tab.
4. Set up notifications:
  - **SMTP Server:** Enter the Simple Mail Transfer Protocol (SMTP) server host name or IP address.
  - **From:** Enter the email address to use as the sender.
  - **To:** Enter one or more email addresses that will be sent notifications. Separate addresses using commas (,).
  - **Subject:** Enter subject text to use for notifications. If a subject is specified, the node that generated the notification is included in the body of the email only, preceded by `Creation Host:` If no subject is specified, the subject text is automatically generated based on the backup set name, and includes the node name of the server that generated the notification.
  - **Notify on success:** If selected, sends an email notification for each successful snapshot.
  - **Notify on verification failure (Available only for Exchange Stores extensions):** If selected, sends an email notification for each Exchange verification failure.
  - **Notify on failure:** If selected, sends an email notification for each failed snapshot.
5. To send an email to test the notification settings, click **Send a Test Email**.

**NOTE:** If the test email is not successful, make sure the SMTP server has the correct relay permissions. This is especially important when sending email to an external email address.

## Set Replay Manager Options for a Server or Host

Use the following procedure to configure the LUN mappings and the Storage Center connection timeout for the server or host.

1. In the **Server Connections** area of the navigation pane, connect to the server to configure.
2. In the **Configuration** area of the navigation pane, click **Configure Server**.
3. Click the **Options** tab.
4. Set the following options:
  - **Backup Set Copy Path:** Use this option to make a copy of the Replay Manager backup set data (XML and other files) at another location. The copy can be used to restore the data if the original volume containing the backup set data

becomes lost. Moreover, if the copy is placed on a Storage Center volume, the Storage Center can be used to replicate the volume to a remote Disaster Recovery (DR) site for additional safekeeping. By default, backup set information is not copied to another location.

- **Mapping LUN Range (Low/High):** Use these fields to specify a range of LUNs to be used by Replay Manager to map volumes back to a server. Default is 1 through 254.
- **Storage Center Connection Timeout (sec):** Use this option to set a timeout value in seconds for the Replay Manager connection time to the Storage Center. The default is 300 seconds.

**i NOTE:** Replay Manager first attempts to expire Replays without mapping the Replay to a server. If Replay Manager cannot expire the unmapped Replay, it maps the Replay back to the server to expire the Replay. In this case, the number of available LUNs must be equal to or greater than the total number of unexpired Replays managed by Replay Manager. If no LUNs are available, backups will fail and Replay Manager will be unable to expire transportable snapshots.



# Backing Up and Restoring Data

This section provides an overview of the backup types, describes how to create and run backups, and identifies the steps for restoring data.

## Topics:

- [Using the Replay Manager Explorer](#)
- [Understanding Backup Types](#)
- [Summary of Backup Set Actions](#)
- [Summary of Backup Set Options](#)
- [Creating and Running Backups](#)
- [Managing Existing Backup Sets](#)
- [Managing Restore Points and Restoring Data](#)
- [Restoring Data](#)
- [Advanced Recovery Scenarios for SQL Server](#)
- [Locating Replays on a Storage Center](#)

## Using the Replay Manager Explorer

Use the Replay Manager Explorer to define backup sets, create and run backups, view and manage available restore points, and restore component data from an available restore point.

## Display Storage Components and Restore Points

Replay Manager Explorer displays storage components and restore points for selected data sources.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, click the backup extension to view its storage components and restore points.



## View Component Details

Replay Manager Explorer presents the details of the selected components in tabular format on the **Component Details** tab.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, click the backup extension to view its storage components and restore points.
3. In the center pane, check the box to the left of one or more components.
4. In the details pane, click the **Component Details** tab. Component details display.

The following table describes the content in the **Component Details** tab.

Replay Manager Extension	Details
Local Volumes	For each volume selected for backup in the Local Volumes area, Replay Manager displays the following: <ul style="list-style-type: none"> <li>• Drive/mount point</li> <li>• OS disk label</li> <li>• Storage Center volume serial number</li> <li>• Disk ID</li> </ul>
Exchange Stores	For each selected mailbox database, Replay Manager lists the following:

Replay Manager Extension	Details
	<ul style="list-style-type: none"> <li>• Server/path location</li> <li>• Affected volume mount point and volume label</li> <li>• Disk serial number and product ID</li> </ul>
SQL Databases	<p>For each selected database, Replay Manager lists the following:</p> <ul style="list-style-type: none"> <li>• Server/path location</li> <li>• Affected volume mount point and volume label</li> <li>• Disk serial number and product ID</li> </ul> <p> <b>NOTE:</b> Only the server/path location is displayed for components stored on SMB file shares.</p>
Hyper-V Guests	<p>For each selected VM, Replay Manager lists the following:</p> <ul style="list-style-type: none"> <li>• Server/path location</li> <li>• Affected volume mount point and volume label</li> <li>• Disk serial number and product ID</li> </ul> <p> <b>NOTE:</b> Only the server/path location is displayed for components stored on SMB file shares.</p>
VMware Datastores	<p>For each selected datacenter inventory path, Replay Manager lists the following:</p> <ul style="list-style-type: none"> <li>• Host name</li> <li>• Label</li> <li>• Disk serial number and product ID</li> </ul>
VMware Virtual Machines	<p>For each selected virtual machine, Replay Manager lists the following:</p> <ul style="list-style-type: none"> <li>• Affected Datastore inventory path</li> <li>• Label or raw device mapping (RDM) name</li> <li>• Disk serial number and product ID</li> </ul>

## View Restore Point Details

The **Restore Point Details** tab provides the details for the restore point, including the scheduling information, backup type and backup extension selected, and the status.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, click the backup extension to view its storage components and restore points.
3. Select one or more volumes or storage components to display restore points.
4. Click the restore point to display details.
5. In the bottom of the display, click the **Restore Point Details** tab.

The following table describes the restore point details.

Item	Description
Name	Name of the backup set to which the restore point belongs.
Backup Set ID	Unique ID for the backup set.
Snapshot Set ID	Unique ID for the backup job.
Created	Date and time the backup set job was created.
Completed	Date and time the backup set job was completed.
Time Taken	Amount of time taken to complete the backup job.
Options	Lists options used for the backup job.
Notes	Displays the text of the restore point note if a user added notes. The field is not displayed if the restore point does not have a note.
Components	Lists components included in the restore point.
Extension	Lists the backup extension by which the restore point was created.

Item	Description
Backup Type	Shows the backup type: Copy (the default) or Full.
Retention Policy	Shows the retention policy for the restore point.
Status	Shows the status of the restore point: <ul style="list-style-type: none"> <li>● <b>Available:</b> Restore point is available for restore operations, including transporting the restore point to another server. For Exchange components that were backed up with the <b>Verify Data</b> option enabled, shows the verification status in parentheses. For example, (Verified) or (Not Verified).</li> <li>● <b>Imported:</b> Restore point has been accessed. When the status is Imported, the restore point cannot be transported to another server.</li> <li>● <b>Imported and Exposed:</b> Restore point is exposed as a local drive or mount point on the server.</li> <li>● <b>Failed:</b> Restore point has not been created because of an error.</li> </ul>
Backup State	Shows the state of the backup job: Successful or Failed.
Snapshot Type	Shows <code>Legacy - NonTransportable</code> when target VM is created on SMB share.
Schedule	If scheduled, shows a brief description of the schedule.

### Related tasks

[Add a Note to a Restore Point](#) on page 42

[Edit a Note for a Restore Point](#) on page 42

## View a Restore Point Report

The Restore Point Report shows the run time messages for the backup job that created the restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, click a backup extension to view its storage components and restore points.
3. Click the restore point to display a report.
4. In the bottom of the display, click the **Restore Point Report** tab.

## Understanding Backup Types

A Replay Manager backup can be either a Windows VSS backup or a VMware backup.

### Windows Backup Types

For Windows applications (Exchange, SQL Server, and Hyper-V), Replay Manager creates backups using the Microsoft Volume Shadow Copy Services (VSS).

There are two types of VSS backups:

- **Copy backup**—Backs up all files, including all application and log files on the selected volumes. All information on which files were changed or deleted is preserved; therefore, copy backups do not affect the sequence of incremental and differential backups that might happen independent of the copy backup.
- **Full backup**—Might truncate transactional log files after the backup finishes depending on the application. Once all transactions from a log are applied to the database, the database sets a checkpoint (or a marker) to the last committed transaction. Once the checkpoint is set, the logs that have been applied may be truncated or deleted.

By default, Replay Manager Service for Windows takes VSS copy backups. SQL Server transaction logs are not truncated with either a copy or full backup.

**NOTE:** If backing up Exchange data and using a third-party backup application such as Windows Backup, NetBackup, or BackupExec, it is important to understand which application handles the transaction logs: Replay Manager, or the third party backup application. If you currently use any type of incremental schedule within your backup application, remember

that the backup application relies upon the transaction logs to create a successful backup. If Replay Manager is truncating logs in a full backup, then the transaction logs would not be available to the third party application.

### Related references

[Summary of Backup Set Options](#) on page 31

## VMware Backup Types

During backups of VMware datastores and virtual machines, Replay Manager Service for VMware takes a temporary VMware snapshot.

Backup set options specific to VMware include the following:

- If the **Include virtual machine memory in vSphere snapshot** option is selected in the backup set definition, the backup includes the internal state of the virtual machine.
- If the **Create Storage center Replay of Physical RDMs** option is selected in the backup set definition, the backup includes the physical mode raw device mappings (pRDMs).

**i** **NOTE:** Because vSphere cannot create a VMware snapshot of physical RDMs, the physical RDM Replays are unlikely to be consistent with the Replay containing the .vmdk file for the same virtual machine.

**i** **NOTE:** Windows guest virtual machines that store data for VSS aware applications (like SQL Server or Exchange) on physical RDMs, or iSCSI volumes mapped directly to the guest, may fail to create snapshots when using the VMware Virtual Machines backup extension. This is a known issue with Windows VSS snapshot integration and VMware snapshot creation. If a failure occurs, use the vSphere Client to change the value of the `disk.EnableUUID` parameter to `FALSE`. For further instructions, see: <https://kb.vmware.com/KB/1031298>

**i** **NOTE:** Including virtual machine memory can significantly increase the time it required to create a snapshot and may cause the backup creation to take longer than expected.

### Related references

[Summary of Backup Set Actions](#) on page 30

## Guidelines for Creating Backup Sets

Replay Manager creates a Replay based on a backup set.

A backup set is assigned a unique ID. It defines:

- Backup Data: One or more volumes or application components included in the backup.
- Backup Set Options: Options for the backup, such as the backup type and expiration settings.

## Guidelines for Backup Sets in VMware Datacenters

Modifying components or options, moving or deleting components, and renaming source components requires the creation of a new backup set.

To avoid needing to frequently re-create backup sets to account for component changes, create a separate backup set for VMware components that are likely to be deleted, moved, or renamed.

- Renaming source components breaks the association between source data and backup set.

If a source component included in the backup set is renamed, and one of them is moved/deleted or renamed in vCenter, the backup set will fail. For this reason, when source components are renamed in any way (renamed server or datastore, renamed database, renamed VM, and so on), modify the backup set to remove the old components and add in the renamed components.

- Moving components between VMware datacenters causes backups to fail.


If a component included in a backup set is moved between VMware datacenters, the backup set is unable to backup data at the original location and the backup job fails. Moving source components within a VMware datacenter does not cause failures.

- The existence of VMs with non-unique names within the same datacenter cause backups to fail.  
If two or more source components included in a backup set have the same name, the backup set fails. For this reason, make sure all source components in each datacenter have unique names.

## Guidelines for Backup Jobs

Follow these guidelines when working with backup jobs.

- Replay Manager queues a maximum of one scheduled job per backup set at a time.
- If a scheduled backup job is running, it does not count towards this limit.
- Manually triggered backup jobs do not count towards this limit.
- Manually triggered jobs take priority over scheduled jobs.

 **NOTE:** Tasks do not have a limit. However, jobs (taking a Replay) have a limit.

In addition, follow these guidelines when creating schedules for backup jobs:

- Although a backup snapshot completes in seconds, the entire backup snapshot process—from temporarily freezing all application IO, taking the snapshot, and then releasing all application IO—can take significant time to process depending on the applications in use. It also takes time to apply a retention policy. For this reason, make sure that a scheduled backup can finish before another backup is scheduled to start.
- For large volumes and components, Dell recommends scheduling backups during off hours.
- At present, Replay Manager does not support backups for Storage Center Live Volumes.

### Related tasks

[View Queued Items](#) on page 51

[Display the Backup Schedule Run Time Report](#) on page 49

## Backing Up a Boot Volume (LUN 0)

In some instances, backing up a boot volume may fail because the Virtual Shadow Copy Service (VSS) cannot suspend all IO on the volume. Therefore, do not use Replay Manager to back up boot volumes. To back up boot volumes, create a Storage Center Replay of the boot volume.

## Guidelines for Scheduling and Expiring Replays

Replays allow a site to restore data from a specific point-in-time. When planning schedules and expiration settings for Replays, take care to balance the point-in-time restore requirements with the amount of resources consumed by unexpired Replays. That is, do not create Replay schedules and expiration settings that allow unexpired Replays to consume a disproportionate amount of Storage Center resources.

## Extension-Specific Best Practices

Before using Replay Manager to create backup sets, schedule backups, and restore data, see the best practice guidelines. These guidelines are specific to each available Replay Manager backup extension.

### Related concepts

[Replay Manager Best Practices](#) on page 55

# Summary of Backup Set Actions

This table lists actions available for creating and managing backup sets.

## Backup Set Actions

Action	Description
<b>Components</b>	
Refresh Components	Refreshes the component pane display.
<b>Scheduling</b>	
Suspend Schedule	Suspends the schedule for the selected backup set.
Resume Schedule	Resumes a backup set schedule that is suspended.
Modify Schedule	Modifies an existing backup set schedule.
Delete Schedule	Deletes a backup set schedule.
<b>Backup Set</b>	
Create Backup Set	Opens the Create Backup Set dialog with the selected components added.
Run Now	Immediately submits a job for the selected backup set.
Modify Settings	Modifies settings and components for an existing backup set.
Delete Backup Set	Deletes the selected backup set.
Prepare for Script	Creates a sample set of PowerShell cmdlets for submitting the selected backup set for execution. Copy and paste the cmdlets into a script.
<b>Restore Points</b>	
Restore	Restores the data in a restore point. Not available for the Local Volumes extension, the VMware Datastore extension, or for physical RDMs for VMware.
Resync	<p>Allows for a fast recovery for a restore point. Not available for Hyper-V, or for restore points containing SQL system databases or Cluster Shared Volumes (CSVs).</p> <p>If the resync fails with the message <code>VSS restore completed with failure</code> and the disk appears offline:</p> <ol style="list-style-type: none"><li>1. Open <b>Server Manager</b> and select <b>Disk Management</b>.</li><li>2. Right-click on the disk that is offline and select <b>Online</b>.</li><li>3. From a command-line interface type the following commands:</li></ol> <pre>DISKPART&gt; select disk &lt;DISK NUMBER&gt; DISKPART&gt; attributes disk clear readonly DISKPART&gt; online Disk</pre> <p><b>NOTE:</b> For a resync failure with Exchange databases or volumes having an Exchange database, mount the Exchange database from Exchange Admin Center.</p>
Expose	Exposes the selected restore point to the specified target and mount path.
Unexpose	Removes the mount points (access paths) from the server.
Unimport	Unmaps the view volumes related to that restore point from the Storage Center to the server.
Delete Restore Point	Removes the selected restore points from Replay Manager and the corresponding Replays from Storage Center.
Force Keep	Ensures that the selected restore points are not deleted automatically, regardless of the backup set's retention policy.
Add Notes	Adds a note to a restore point. The note text is displayed on the Restore Point Details tab. This field is limited to 256 or fewer characters.
<b>Transfer Restore Points</b>	

Action	Description
Transport to Server	Moves the restore point and its metadata to a compatible Replay Manager server.

## Summary of Backup Set Options

This table lists the backup options displayed when you create a backup set.

### Summary of Backup Set Options

Backup Option	Description
User Defined Name	Enter a name for the backup set, or accept the default. The user-defined name is displayed as the Replay description in Storage Center. However, on the Storage Center, the name is truncated to 31 characters in length. In Replay Manager Explorer, the name is truncated and limited to 256 characters.
Selected Items	Available inside the Modify Settings dialog box. Displays components included in the backup set. By highlighting the components, the remove option becomes available.
Delete Old Restore Points	Select this option to determine when old restore points are deleted. Restore points can be deleted based on the number of restore points to retain or the number of days to retain a restore point. Old restore points are deleted when the backup set is run based on the selected criteria. <i>i</i> <b>NOTE:</b> Because Replays (old backup sets) may consume LUNs and storage, make sure you set the <b>Delete Old Restore Points</b> option such that Replays are removed from the Storage Center.
VSS Full Backup	When available, select this option to create a VSS full backup. During a VSS full backup, transaction logs may be truncated and may be deleted after the backup completes depending on the application. The default is to create a VSS copy backup. <i>i</i> <b>NOTE:</b> <ul style="list-style-type: none"> <li>For SQL Server: Transaction logs are not flushed.</li> <li>For SQL Server: You cannot take a full backup of a read-only database such as a replica database. Microsoft SQL Server only supports copy-only backups of read-only databases.</li> </ul>
Run Exchange Verification	Select this option only when using the Exchange Server data verification service. Then select from the following: <ul style="list-style-type: none"> <li><b>Verify Mailbox Databases and Transaction Logs:</b> Select this option to verify mailbox databases and transaction logs.</li> <li><b>Verify Transaction Logs Only:</b> Select this option to verify only the mailbox transaction logs. If the component to be verified is not a Storage Center volume, the verification and corresponding backup operation will fail.</li> <li><b>Throttling IO for Database Verification:</b> Select this option to specify the number of IOs at which to throttle (one-second pause) IO.</li> </ul>
Include virtual machine memory in vSphere snapshot	For VMware backup extensions only. Select this option to include a dump of the internal state of the virtual machine in the backup. <i>i</i> <b>NOTE:</b> Opting to include virtual machine memory in the backup can cause backups to take more time to complete.
Create Storage Center Replay of physical RDMs	For VMware virtual machines only. Select this option to include physical mode raw device mappings (pRDMs) in the backup. <i>i</i> <b>NOTE:</b> Because vSphere cannot create a VMware snapshot of physical RDMs, the physical RDM Replays are unlikely to be consistent with the Replay containing the .vmdk file for the same virtual machine. <i>i</i> <b>NOTE:</b> Windows guest virtual machines that store data for VSS aware applications (like SQL Server or Exchange) on physical RDMs, or iSCSI volumes mapped directly to the guest, may fail to create snapshots when using the VMware Virtual Machines backup

Backup Option	Description
Backup Type	<p>extension. This is a known issue with Windows VSS snapshot integration and VMware snapshot creation. If a failure occurs, use the vSphere Client to change the value of the <code>disk.EnableUUID</code> parameter to <code>FALSE</code>. For further instructions, see: <a href="http://KB.vmware.com/KB/1031298">HTTP://KB.vmware.com/KB/1031298</a></p> <p>Select from the following:</p> <ul style="list-style-type: none"> <li>• <b>Run now:</b> Creates a backup set without a schedule and immediately submits a backup job.</li> <li>• <b>Schedule for later:</b> Creates a backup set and allows you to schedule the backup for a later time. Click <b>Modify</b> to define a schedule for the backup set.</li> <li>• <b>Not Scheduled:</b> Creates a backup set without a schedule. This option can be used to create a placeholder backup set to be configured later.</li> </ul>

### Related concepts

[Guidelines for Scheduling and Expiring Replays](#) on page 29

## Creating and Running Backups

This section provides the procedures for creating and scheduling backup sets, and running backup jobs. Backups can be set to run once, scheduled for recurrence at the frequency specified during backup set creation, or using the Not Scheduled option, can be created as a place holder for future scheduling.

### Related concepts

[Guidelines for Backup Jobs](#) on page 29

## Create and Run a Backup Now

Follow these instructions to create the backup set and immediately submit the backup job for execution. Running a backup job outside its normal window impacts a retention policy if the backup set is set to only keep some restore points.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select components to include in the backup set. Right-click the name of a server and select **Select All** to select all components listed for a server or **Select All Children** to select all components that are children of the selected item. Verify backup selections by viewing the Component Details.
4. In the **Backup** area of the action pane, click **Create Backup Set**. The **Create Backup Set** dialog box opens.
5. In the **User Defined Name** field, type in a name or use the name suggested.
6. Select backup job options.
7. In the **Backup Type** area, select **Run Now**.
8. Click **Submit**.

The job is listed in the **Backup Sets** navigation area. Click the **Jobs** icon. When the backup completes, a summary report is listed in the **Reports**. The same information is provided when you selected each restore point. Click **Restore Point Report** tab.

### Related references

[Summary of Backup Set Options](#) on page 31

## Create and Schedule a Backup

Follow these instructions to create a backup set and submit the backup job for execution at the scheduled times. For recurring schedules, you can also configure the frequency and interval at which backups jobs are run.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.



3. Select the components to include in the backup set. Right-click the name of a server and select **Select All** to select all components listed for a server or **Select All Children** to select all components that are children of the selected item. Verify backup selections by viewing the Component Details.
4. In the **Backup** area of the action pane, click **Create Backup Set**. The **Create Backup Set** dialog box opens.
5. In the **User Defined Name** field, type in a name or use the name suggested.
6. Select backup set options.
7. In the **Backup Type** area, select **Schedule for later**, and click **Modify** to set up the schedule. The **Backup Schedule** dialog box opens.
8. Set up a schedule. The time scheduled for a backup is based on server time, which is shown in the upper right of the dialog box. In the **Schedule Type** area, specify the schedule type:
  - **One Time**: Select this option to schedule one occurrence of the backup job, and then specify the date and time for the backup job in the **One-Time Occurrence** area.
  - **Recurring**: Select this option to set up a recurring schedule for the backup job. For recurring backups, select the frequency options for the backup schedule.
9. When you have finished setting up the schedule, click **OK**.
10. Click **Submit**.

The job is listed in the Backup Sets navigation area, under **Jobs**. When the backup is finished, a summary report is listed in the **Reports** display.

**NOTE:** To set up overnight schedules, click **Exclude Time Range** and then specify the range of time to exclude from the schedule. For example, to create an overnight schedule that runs from 5 PM to 8 AM, click **Exclude Time Range** and then specify 8 AM as the Starting at time and specify 5 PM as the Ending at time. The backup schedule begins at 5 PM of the current day and stops at 8 AM the following day.

#### Related references

[Summary of Backup Set Options](#) on page 31

## Managing Existing Backup Sets

After a backup set is created, Replay Manager lists it in the Replay Manager Explorer main display and the Replay Manager Jobs display. The backup set settings and schedules can be managed from either display.

#### Related concepts

[Working with Backup Set Jobs](#) on page 49

## Run an Existing Backup Set Now

Use this procedure to immediately run a backup set job.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the explorer pane, select an existing backup set to run.
4. In the **Backup Set** area of the action pane, click **Run Now**. If warned that the action will execute the current backup outside of a schedule, click **Yes**.  
A backup set job is created and immediately submitted to the queue for execution.

## Modify Settings for an Existing Backup Set

Use the **Modify Backup Set** dialog box to modify the options for a selected backup set.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select an existing backup set to modify.
4. In the **Backup Set** area of the action pane, click **Modify Settings**.

The **Modify Backup Set** dialog box opens.

5. Modify options for the backup set.
  - To add a component, select the component and click **Add Component**.
  - To remove a component, select the component and click **Remove Component**.

### Related references

[Summary of Backup Set Options](#) on page 31

## Modify Schedules for an Existing Backup Set

Use the Modify Backup Set dialog box to change the schedule for an existing backup set.

1. When the **Modify Backup Set** dialog box is displayed, select **Schedule for later** in the **Backup Type** area, and click **Modify**.
2. Set up a schedule. The time scheduled for a backup is based on server time, which is shown in the upper right of the dialog box. Specify the schedule type:
  - **One Time**: Select this option to schedule one occurrence of the backup job, and then specify the date and time for the backup job in the **One-Time Occurrence** area.
  - **Recurring**: Select this option to set up a recurring schedule for the backup job. For recurring backups, select the frequency options for the backup schedule.
3. When you have finished setting up the schedule, click **OK**.
4. Click **Submit**.

Replay Manager creates and schedules the backup job. The job is listed in the **Backup Jobs** display. When the backup is finished, a summary report is listed in the **Reports** display.

**NOTE:** To set up overnight schedules, click Exclude Time Range and then specify the range of time to exclude from the schedule. For example, to create an overnight schedule that runs from 5 PM to 8 AM, click Exclude Time Range and then specify 8 AM as the Starting at time and specify 5 PM as the Ending at time. The backup schedule will begin at 5 PM of the current day and stop at 8 AM the following day.

## Delete a Backup Set

Deleting a backup set deletes all restore points for the backup set and any corresponding Storage Center Replays.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select an existing backup set.
4. In the **Backup Set** area of the action pane, click **Delete Backup Set**.
5. Click **Yes** to delete the backup set.

## Prepare an Existing Backup Set for a Script

The **Backup Script** dialog box creates a sample set of PowerShell cmdlets for submitting the selected backup set for execution. Copy and paste the cmdlets into a script.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select an existing backup set.
4. In the **Backup Set** area of the action pane, click **Prepare for Script**. The **Backup Script** dialog box opens.
5. Click **Copy** to copy the sample cmdlets to the clipboard.
6. Click **Close**.

# Managing Restore Points and Restoring Data

When a backup job is successfully finished, a new restore point is listed for the backup set in the Replay Manager Explorer. A restore point is an instance of a backup. It is a point in time from which data can be exposed or restored.



**NOTE:** Storage Center controls access to volumes based on user groups and corresponding volume folders. When restoring a volume or component, make sure to restore it to a location that maintains data security.

## Summary of Restore Point Actions

This table lists actions for managing restore points and restoring data from a restore point.

### Summary of Restore Point Actions

Restore Point Action	Description
Restore	<p>Restores a component to its original location.</p> <ul style="list-style-type: none"> <li><b>Rename and relocate database:</b> For SQL Server databases only, the Restore action includes an option to rename and relocate database components. If the database component is stored on an SMB file share, it can be renamed within the original SMB file share location, but cannot be relocated.</li> <li><b>Do Not Recover Database:</b> For SQL Server databases only, the Restore action includes an option to restore without recovering the database.</li> </ul> <p><b>NOTE:</b> Restore is not available for restore points for Local Volumes, VMware Datastores, or Physical RDMs for VMware.</p> <p><b>NOTE:</b> Each time the Restore action restores backup set data, Replay Manager maps the backup data to the number of LUNs required for the restore. When the restore is completed, the volumes remain mapped until the Replays expire or the restore point is unimported.</p> <p><b>NOTE:</b> (VMware Virtual Machines restore points only) Under some conditions, restore operations do not retain the thin-provisioned state of the component; that is, a restore operation may allocate all virtual disk space, resulting in greater than expected space consumption.</p>
Resync	Allows for a faster recovery from a restore point by resetting the Storage Center volumes to the appropriate Replay.
Make Writable	For Windows extensions only. Makes an exposed restore point writable. Making a restore point writable removes it from Replay Manager control. Replays corresponding to restore points that have been made writable must be managed using Storage Center.
Unmanage	For VMware extensions only. Removes an exposed restore point from management by Replay Manager Explorer. Unmanaged Replays must be managed by Storage Center.
Expose	<ul style="list-style-type: none"> <li><b>For Windows:</b> Exposes the restore point to the specified drive or mount path. If the component is stored on an SMB file share, the SMB expose path is automatically generated by Replay Manager and cannot be changed.</li> <li><b>For VMware:</b> Exposes the restore point to the specified datacenter, host, and name.</li> </ul>
Unexpose	<ul style="list-style-type: none"> <li><b>For Windows:</b> Unexposes a non-writable exposed restore point.</li> <li><b>For VMware:</b> Unexposes a restore point that has not been removed from management.</li> </ul>
Add Notes	Add a note to a restore point. The note text is displayed on the <b>Restore Point Details</b> tab.
Edit Notes	Edit a note for a restore point. The note text is displayed on the <b>Restore Point Details</b> tab.
Unimport	Removes the import of a previously Restored or Exposed transportable restore point. The restore point can then be restored or exposed to the same server or transported to another server.
Delete Restore Point	Deletes the selected restore point and removes the corresponding Replays from the Storage Center.

Restore Point Action	Description
	<p> <b>NOTE:</b> Because a backup set may have multiple volumes, there may be more than one Replay for a given restore point.</p>
Force Keep / Allow Auto-Deletion	<p>Toggles between Force Keep and Allow Auto-Deletion.</p> <ul style="list-style-type: none"> <li>• <b>Force Keep:</b> Sets the retention flag of a restore point to Never Expire. These restore points will not be automatically deleted based on the backup set's retention policy.</li> <li>• <b>Allow Auto-Deletion:</b> Removes the <b>Force Keep</b> flag from a Replay, allowing the Replay to be automatically deleted based on the backup set's retention policy.</li> </ul>
Transport to Server	<p>For Windows extensions only: Transports a restore point to another server. Once a restore point is transported, it is removed from the source server. On the target server, the transported restore point is available under the Local Volumes extension, regardless of its source extension. Restore points can be transferred only to a server compatible with the operating system of the source server.</p> <p> <b>NOTE: Transport to Server</b> is not available for components stored on SMB file shares or VMware extensions.</p>

## Related references

[Transport-to-Server Scenarios](#) on page 36

## Related tasks

- [Rename and Restore SQL Server Components Stored on a Volume](#) on page 39
- [Rename and Restore SQL Server Components Stored on an SMB File Share](#) on page 39
- [Restore SQL Server Components without Recovering the Database](#) on page 38
- [Make an Exposed Restore Point Writable \(Windows Extensions Only\)](#) on page 41
- [Unmanage an Exposed Restore Point \(VMware Extensions Only\)](#) on page 42
- [Expose a Restore Point \(Windows Extensions Only\)](#) on page 40
- [Expose a Restore Point \(VMware Extensions Only\)](#) on page 40
- [Add a Note to a Restore Point](#) on page 42
- [Edit a Note for a Restore Point](#) on page 42

# Transport-to-Server Scenarios

Transporting a restore point across different operating system versions is possible only when the file system features of the source server are compatible with the target server.

When possible, Replay Manager Explorer prevents an administrator from transporting a restore point to an incompatible target server by graying out incompatible servers in the **Choose Target Server** dialog box. However, if Replay Manager Explorer does not have operating system information for a server, it may list a server as available when the server is not compatible with the source server. Replay Manager Explorer can include incompatible target servers in the **Choose Target Server** dialog box.

If an administrator attempts to transport a restore point to an incompatible server (either using the Replay Manager Explorer or the **Move-RMRestorePoint** cmdlet) the transport fails and a warning message is issued. The following sections define the allowable scenarios for Windows Server.

## Windows Server 2019 Source

The following table defines the allowable **Transport to Server** scenarios for Windows Server 2019 source.

	Windows Server 2019	Windows Server 2016	Windows Server 2012 R2	Windows Server 2012
CSVFS	Allowed	Allowed	Allowed	Allowed
NTFS	Allowed	Allowed	Allowed	Allowed
ReFS	Allowed	Allowed	Not Allowed	Not Allowed

	Windows Server 2019	Windows Server 2016	Windows Server 2012 R2	Windows Server 2012
NTFS with data deduplication	Allowed	Allowed	Not Allowed	Not Allowed

## Windows Server 2016 Source

The following table defines the allowable **Transport to Server** scenarios for Windows Server 2016 source.

	Windows Server 2019	Windows Server 2016	Windows Server 2012 R2	Windows Server 2012
CSVFS	Allowed	Allowed	Allowed	Allowed
NTFS	Allowed	Allowed	Allowed	Allowed
ReFS	Allowed	Allowed	Not Allowed	Not Allowed
NTFS with data deduplication	Allowed	Allowed	Not Allowed	Not Allowed

## Windows Server 2012 R2 Source

The following table defines the allowable **Transport to Server** scenarios for Windows Server 2012 R2 source.

	Windows Server 2019	Windows Server 2016	Windows Server 2012 R2	Windows Server 2012
CSVFS	Allowed	Allowed	Allowed	Allowed
NTFS	Allowed	Allowed	Allowed	Allowed
ReFS	Allowed	Allowed	Allowed	Allowed
NTFS with data deduplication	Allowed	Allowed	Allowed	Not Allowed


## Windows Server 2012 Source

The following table defines the allowable **Transport to Server** scenarios for Windows Server 2012 source.

	Windows Server 2019	Windows Server 2016	Windows Server 2012 R2	Windows Server 2012
CSVFS	Allowed	Allowed	Allowed	Allowed
NTFS	Allowed	Allowed	Allowed	Allowed
ReFS	Allowed	Allowed	Allowed	Allowed
NTFS with data deduplication	Allowed	Allowed	Allowed	Allowed

# Restoring Data

This section provides the procedures for restoring data.

 **NOTE:** The **Restore** action is not available for the Local Volumes and VMware Datastores backup extensions.

### Related concepts

[Replay Manager Best Practices](#) on page 55

## Display Restore Points for a Component

When components are selected, the available restore points are displayed on the right side of the explorer.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select a component. Right-click the name of a server or host and click **Select All** to select all listed components or **Select All Children** to select all its components.

Restore point details are displayed in the **Restore Point Details** and **Restore Point Report** tabs in the bottom pane of the display.

## Restore Data to its Original Location

Use the **Restore Snapshot** dialog box to recover (overwrite) the original data with the selected restore point data.

The **Restore** action restores data to its original location, overwriting existing data with the restore point data. To prevent losing any data at the original location, make sure to take a backup after all changes are made to a database before using **Restore** or use **Expose** (rather than **Restore**) and then manually merge Replay data with the existing data.

**NOTE:** For VMware Virtual Machines restore points only: Under some conditions, restore operations do not retain the thin-provisioned state of the original component; that is, a restore operation may allocate all virtual disk space, resulting in greater than expected space consumption.

**NOTE:** The **Restore** action is not available for the Local Volumes backup extension. This action includes all restore points that have been transported to another server.

**NOTE:** The **Restore** action is not available for the VMware Datastores backup extension.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the explorer pane, select a component. Restore points for the component are displayed in the right side of the explorer.
4. Select a restore point.
5. In the **Restore Points** area of the action pane, click **Restore**.  
The **Restore Snapshot** dialog box opens.
6. In the **Components** area, select the components to restore.
7. For Microsoft SQL Server components only: To restore a database component so that you can then apply transaction logs or differential database backups to the restored database, click **Do Not Recover Databases**.
8. Review the restore point details, and click **Restore**.

**NOTE:** When restoring a live Hyper-V virtual machine, the following message is displayed in Hyper-V Manager:

```
The virtual machine [name] has been deleted. Click Exit to exit Virtual Machine Connection.
```

During a restore operation, the Hyper-V VSS writer deletes virtual machines before restoring them. This message does not indicate a problem. Click **Exit** to acknowledge the message.

## Restore SQL Server Components without Recovering the Database




Use the **Do Not Recover Databases** option if you want to apply transaction logs or differential backups to the restored database.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the SQL Server Databases backup extension.
3. Select a component. Restore points for the component are displayed in the right side of the explorer.
4. Select a restore point.
5. In the **Restore Points** area of the action pane, click **Restore**.  
The **Restore Snapshot** dialog box opens.
6. In the **Components** area, select or clear the check boxes next to the components to choose which components to restore.

7. Select **Do Not Recover Databases**.
8. Review the restore point details, and click **Restore**.



## Rename and Restore SQL Server Components Stored on a Volume

Use the Restore Snapshot dialog box to rename and restore SQL Server components on a volume.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the SQL Server Databases backup extension.
3. In the left side of the explorer pane, select a component. Restore points for the component are displayed in the right side of the explorer.
4. Select a restore point.
5. In the **Restore Points** area of the action pane, click **Restore**.  
The **Restore Snapshot** dialog box opens.
6. Click  in the row containing the database to be renamed and relocated. The **Rename Database** dialog box opens.  
Depending on how the Database Administrator (DBA) configured the file groups for the database, the mdf and ldf may share the same location or (more commonly) be split between multiple server locations resulting in multiple rows.
7. Enter a new name in the **New Database Name** field.  
A database must be relocated to be renamed.
8. Enter a new path in the **New Path** column of each appearing row.  
The new path cannot be the same as the current path and must be able to be created on the target system.  
When adding a new path, the complete path (drive letter and all subdirectories) must be entered. For example, if the new path is the SQL2 directory on the I: drive, then **I:\SQL2** is entered. If the new path is the SQL2\Data directory on the I: drive, then **I:\SQL2\Data** is entered.
9. Click **OK**.
10. The Restore Snapshot dialog box now displays the new database name.
  - The name or path can be changed by clicking  again.
  - Or click  and delete the new name to cancel the name change.
11. To begin the restore, click **Restore**.  
File names are not changed when the database is renamed.

## Rename and Restore SQL Server Components Stored on an SMB File Share

Use the Restore Snapshot dialog box to rename and restore SQL Server components on an SMB file share.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the SQL Server Databases backup extension.
3. In the left side of the explorer pane, select a component. Restore points for the component are displayed in the right side of the explorer.
4. Select a restore point.
5. In the **Restore Points** area of the action pane, click **Restore**. The **Restore Snapshot** dialog box opens.
6. Click  in the row containing the database to be renamed and relocated. The **Rename Database** dialog box opens.  
Depending on how the Database Administrator (DBA) configured the file groups for the database, the mdf and ldf may share the same location or (more commonly) be split between multiple server locations resulting in multiple rows.
7. Enter a new name in the **New Database Name** field.
8. Enter a new path in the **New Path** column of each appearing row.  
The new path must be within the original SMB file share and must be able to be created on the target system.  
For FILESTREAM data only, omit the last subdirectory from the path.
9. Click **OK**.
10. The Restore Snapshot dialog box now displays the new database name.
  - The name or path can be changed by clicking  again.

- Or click  and delete the new name to cancel the name change.


11. To begin the restore, click **Restore**.

File names are not changed when the database is renamed.

## Expose a Restore Point (Windows Extensions Only)

Exposing a restore point allows it to be mapped to a local drive or mount point and provides the option of making the volume writable.


1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select a restore point.
4. In the **Restore Points** area of the action pane, click **Expose**.  
The **Expose** dialog box opens.
5. (Optional) To make exposed volumes writable, select **Make exposed volumes writable**. After an exposed backup set is writable, it is no longer managed by Replay Manager. That is, the restore point is no longer included in the list of available restore points.
6. Perform the following for each restore point to be exposed:
  - a. Click the cell in the **Expose Path** column next to the restore point to be exposed.
  - b. Assign a drive letter or specify an NTFS mount point relative to the server (for example, C:\MountPoint\Volume).  
Click **Create and Verify** to create the folder or click **Verify Path** to verify an existing mount point.
  - c. Click **Submit**.
7. Click **Expose**.

 **NOTE:** A partial expose is not supported. You must specify `Expose Path` to all components in the backup set.

## Expose a Restore Point (VMware Extensions Only)

Exposing a restore point for VMware involves selecting the datacenter, host, and providing a name for the exposed component.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select a restore point.  
You can make exposed VMware restore points unmanaged to attach virtual machines or use as raw device mappings.
4. In the **Restore Points** area of the action pane, click **Expose**.  
The **Expose Restore Point Volumes** dialog box opens.
5. For each component:
  - **Datacenter:** Select the datacenter in which to expose the component.
  - **Host:** Select the host or cluster on which to expose the component.
  - **Exposed Name:** Enter a name for the exposed component.
6. (Optional) To remove the exposed restore point from the management of Replay Manager, select **Unmanage Restore Point**. A restore point that has been removed from the management of Replay Manager must be managed by the Storage Center.  
If you use vCenter to add an exposed/unmanaged VM to the Inventory, the restored VM includes both the original VM backup and a temporary snapshot of the VM. Use vCenter Snapshot Manager to either delete the temporary snapshot or use the temporary snapshot to revert the restored VM.
7. Click **Expose**.

 **NOTE:** A partial expose is not supported. You must specify `Expose Path` to all components in the backup set.


## Expose a Restore Point Stored on an SMB File Share

Use the Expose Restore Point Volumes dialog box to expose a restore point on an SMB file share.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.



- In the **Backup Extensions** area of the navigation pane, select a data source.
- Select a restore point.
- In the **Restore Points** area of the action pane, click **Expose**.  
The **Expose Restore Point Volumes** dialog box opens. The **Expose Path** column displays the SMB path where the data is exposed. This path is automatically generated by Replay Manager and cannot be changed.
- (Optional) To make the exposed restore point writable, select **Make exposed volumes writable**. Once an exposed restore point is writable, it is no longer managed by Replay Manager. That is, the restore point is no longer included in the list of available restore points.


 **NOTE:** Volumes must be writable to attach SQL Server databases from exposed volumes.

- Click **Expose**.

## Resync a Restore Point (Windows Extensions Only)

Use the following procedure to resync a restore point.

 **CAUTION:** To increase the speed of this action, Replay Manager does not perform a check to determine whether any data on the data source has changed. Any changes that occur after the restore point was created will be lost.


 **NOTE:** Resync is not available on Hyper-V, restore points containing SQL system databases, or restore points containing Cluster Shared Volumes (CSVs).

- In the **Server Connections** area of the navigation pane, connect to a server or host.
- In the **Backup Extensions** area of the navigation pane, select a data source.
- Select a restore point to resync.
- In the **Restore Points** area of the action pane, click **Resync**.
- Recovery options:
  - Select Fast Recovery Options:** This option is selected by default. By leaving this option checked, the disk signature of the resynchronized volume will revert back to the disk signature of the target volume.
  - Do Not Recover Databases:** When checked, the resync operation will not recover the databases in the restore point before executing.
- Click **OK** to resync the restore point.

If the resync fails with the message `VSS restore completed with failure` and the disk appears offline:

- Open **Server Manager** and select **Disk Management**.
- Right-click on the disk that is offline and select **Online**.
- From a command-line interface type the following commands:


```
DISKPART> select disk <DISK NUMBER>
DISKPART> attributes disk clear readonly
DISKPART> online Disk
```

 **NOTE:** For a resync failure with Exchange databases or volumes having an Exchange database, mount the Exchange database from Exchange Admin Center.

## Make an Exposed Restore Point Writable (Windows Extensions Only)

Use the following procedure to make an exposed restore point writable. Making a restore point writable removes the restore point from the control of Replay Manager. Exposed, writable restore points must be managed by Storage Center.

- In the **Server Connections** area of the navigation pane, connect to a server or host.
- In the **Backup Extensions** area of the navigation pane, select a data source.
- Select an exposed restore point. (Restore point status is **Imported and Exposed**.)
- In the **Restore Points** area of the action pane, click **Make Writable**.  
The **Expose Restore Point Volumes** dialog box opens.
- Select **Make exposed volumes writable**, and click **Expose**.

 **NOTE:** Once an exposed restore point has been made writable, the operation cannot be undone. Attempting to undo the operation will sever the connection.

## Unmanage an Exposed Restore Point (VMware Extensions Only)

Remove an exposed VMware restore point from management by Replay Manager if you want to attach virtual machines or use raw device mappings. Unmanaged restore points must be managed by Storage Center.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select an exposed restore point. (Restore point status is **Imported and Exposed**.)
4. In the **Restore Points** area of the action pane, click **Unmanage**.  
The **VMware Virtual Machine Expose** dialog box opens.
5. Select **Unmanage Restore Point**, and click **Expose**.

## Unexpose an Exposed Restore Point

Use the following procedure to unexpose a non-writable, exposed restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select an exposed restore point. (Restore point status is **Imported and Exposed**.)
4. In the **Restore Points** area of the action pane, click **Unexpose**.
5. Click **Yes** to complete the action.

## Add a Note to a Restore Point

Adding a note to a restore point makes it easier to identify the significance of the restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select the restore point you want to modify.
4. In the **Restore Points** area of the action pane, click **Add Notes**.  
The **Restore Point Notes** dialog box opens.
5. Type the note into the text box. Click **Clear** to clear the text box. Click **Revert** to undo any modifications you have made to the note.
6. Click **OK** to add the note to the restore point.  
The note is displayed on the **Restore Point Details** tab.


## Edit a Note for a Restore Point

Use this procedure to edit an existing note for a restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select the restore point you want to modify.
4. In the **Restore Points** area of the action pane, click **Edit Notes**.  
The **Restore Point Notes** dialog box opens.
5. Edit the note text in the text box, or click **Clear** to clear the text box and start over. Click **Revert** to undo any modifications made to the note.
6. Click **OK** to save the changes.  
The revised note is displayed on the **Restore Point Details** tab.

## Unimport a Restore Point

Use this procedure to unimport a transportable restore point that has been previously restored or exposed.

 **NOTE:** For VMware restore points, use the **Unexpose** action.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select a restore point that has been restored or exposed by a prior action. (Restore point status is **Imported** or **Imported and Exposed**.)
4. In the **Restore Points** area of the action pane, click **Unimport**.
5. Click **Yes** to unimport the restore point or **No** to cancel the operation.


## Delete a Restore Point

Use this procedure to delete a restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select the restore point you want to delete.
4. In the **Restore Points** area of the action pane, click **Delete Restore Point**.
5. Click **OK** to delete the restore point.

## Prevent a Restore Point from Expiring (Force Keep)

The Force Keep option puts a lock on a restore point to prevent it from being automatically deleted.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select the restore point you want to keep from expiring. These restore points are displayed with the Force Keep icon ()
4. In the **Restore Points** area of the action pane, click **Force Keep**. The restore point cannot be automatically deleted.


## Allow a Restore Point to be Automatically Expired (Allow Auto-Deletion)

Use the following procedure to remove the Force Keep flag from a restore point, allowing the restore point to be automatically deleted based on the retention policy for the backup set.


1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select a restore point that was previously set to never expire using the **Force Keep** action. (These restore points are displayed with the Force Keep icon.)
4. In the **Restore Points** area of the action pane, click **Allow Auto-Deletion**.

## Transport a Restore Point

Use the following procedure to transport a restore point to another server.

 **NOTE:** Metadata is removed from the backup set, but still remains on the Storage Center. On the target server, the transported restore point is available under the Local Volumes extension, regardless of its source extension.

Restore points can be transported only to a server compatible with the operating system of the source server.

 **NOTE:** The Transfer Restore Points option is not available for VMware restore points or for any restore points with components stored on SMB file shares.

**i** **NOTE:** In a clustered-server environment, transporting a restore point to a node in the same cluster is not supported.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. Select the restore point you want to transfer to another server.
4. In the **Transfer Restore Points** area of the action pane, click **Transport to Server**. The **Choose Target Server** dialog box opens.
5. Select the server to transfer the restore point to, and click **OK**. The restore point is transferred to the target server.
  - i** **NOTE:** When the restore point is transported to another server, it is only available on that server even if the server is a member of a cluster.
  - i** **NOTE:** After restore points are transported, the **Restore** option is not available in the **Restore Points** pane. In addition, the **Run Now** option in the **Backup Set** pane is available only if the restore point was originally part of the Local Volumes extension.
6. To view the transferred restore point:
  - a. In the **Server Connections** area of the navigation pane, connect to the server to which you transferred the restore point.
  - b. In the **Backup Extensions** area of the navigation pane, click **Local Volumes**. The Restore point is displayed with [Transported] added to the original backup set name.

#### Related concepts

[Adding and Configuring Servers and Hosts](#) on page 20

#### Related references

[Transport-to-Server Scenarios](#) on page 36

## Advanced Recovery Scenarios for SQL Server

The following sections describe advanced recovery scenarios for Microsoft SQL Server databases.

### Recover a Database Using Replay Manager and Transaction Log Backups

Replay Manager Replays can be used with transaction log backups to recover a Microsoft SQL Server database to a specific point in time. Replay Manager provides a Do Not Recover Databases option to restore a database and leave the database in an unrecovered state. You can then apply transaction log backups to the restored database.

1. Restore a database, and leave the database in an unrecovered state. Follow the instructions described in [Restore SQL Server Components without Recovering the Database](#). You can also rename and relocate the databases.
2. Restore transaction log backups for each recovered database.
  - a. Open the SQL Server Management Studio, and connect to the SQL Server instance.
  - b. Open a query window and use the following T-SQL command to restore transaction logs to each database:

```
RESTORE LOG [ [database_name] ] FROM DISK = ' [log_backup_file] ' WITH NORECOVERY;
```

In addition, the following optional clauses can be used:

- To recover the database to a point in time between transaction log backups, use the `STOPAT` clause.
- To recover the database to a specific log sequence number (LSN), use the `STOPATMARK` or `STOPBEFOREMARK` clause.

**i** **NOTE:** Transaction log backups must be restored in order.

For more information on restoring transaction log backups, see the Microsoft SQL Server documentation.

- c. Complete the recovery process for each database using the following T-SQL command:

```
RESTORE DATABASE [ [database_name] ] WITH RECOVERY;
```

### Related tasks

[Restore SQL Server Components without Recovering the Database](#) on page 38

## Recover System Databases

The Expose action in Replay Manager can be used as part of a recovery plan for the following system databases: master, model, and msdb. Use Replay Manager to recover these system databases by manually copying system database files from exposed volumes back to their original location.

**NOTE:** This method will recover the system databases back to the point in time that the restore point was created. Any modifications to the system databases (such as adding or removing users) performed after the restore point was created will need to be manually repeated. In addition, any databases created after the restore point will be missing. You can reattach these databases.

1. Expose a restore point that contains the system databases to recover.

**NOTE:** Do not select the `Make exposed volumes writable` option.

2. Shut down the SQL Server service.
3. Using the Windows Explorer, copy the files from the exposed volumes or SMB file shares containing the system database files to the original location, replacing any existing files.
4. Start the SQL Server service.

### Related tasks

[Expose a Restore Point \(Windows Extensions Only\)](#) on page 40

[Expose a Restore Point Stored on an SMB File Share](#) on page 40

## Recovering Databases in a Clustered Instance of SQL Server

Replay Manager can be used to recover databases that are part of a clustered instance of SQL Server. When using Replay Manager in a cluster, recovery must be performed on the node that owns the instance of SQL Server.

There are two ways to recover databases in a clustered instance of SQL Server:

- **Restore:** The Restore action functions the same in clustered and non-clustered environments. However, if the rename and relocate functionality is used, the new paths must reside on the SQL Server instance's clustered disks.
- **Expose:** The Expose action functions the same in clustered and non-clustered environments. However, in a clustered environment, there are additional manual steps required before databases can be attached from the exposed volumes. To attach a database in a clustered instance of SQL Server, the database files must reside on clustered disks that the SQL Server instance is dependent on. Because the disks created by the Expose action are local disks, they must be manually converted to clustered disks and a dependency on those disks must be added to the SQL Server application before databases can be attached.

## Use Restore to Recover Databases in a Clustered Instance of SQL Server

A clustered instance of SQL Server uses the restore action to recover databases.

**NOTE:** The new paths must reside on the SQL Server instance's clustered disks.

### Related tasks

[Restore Data to its Original Location](#) on page 38

## Use Expose to Recover Databases in a Clustered Instance of SQL Server

Expose the restore point containing the databases to be recovered.

1. On the Expose dialog box:
  - a. Select **Make exposed volumes writable**.

- b. If assigning drive letters, choose drive letters that are available on all nodes of the cluster.
2. Map the exposed volumes to all nodes of the cluster.

**NOTE:** Ensure that all servers (nodes) of the cluster are added in Storage Center under a cluster object.

- a. Connect to the Storage Center and locate the exposed volumes.
  - b. Right-click each exposed volume and select **Promote Mappings to Server Cluster**. The **Promote Mappings to Cluster** dialog box opens.
  - c. Click **Promote Now**.
  - d. On each node of the cluster, open the Disk Management utility and verify that all of the exposed volumes are displayed. If the exposed volumes are not displayed, re-scan the disks until the exposed volumes appear. Each node must be able to see all of the exposed volumes.
3. Make sure the **Available Storage** cluster resource group is on the node that owns the SQL Server instance.

On a Windows Server 2012 cluster, run the following PowerShell script on the node that owns the instance to ensure the Available Storage group is on that node:

```
Import-Module FailoverClusters

$OwnerNode = ( Get-ClusterGroup -Name "Available Storage" ).OwnerNode.NodeName

$WindowsServerName = ( Get-WmiObject win32_computersystem
).Name

If ( $OwnerNode -ne $WindowsServerName )

{

Move-ClusterGroup -Name "Available Storage" -Node $WindowsServerName

}
```

4. Add the disks for the exposed volumes to the cluster. Using the Failover Cluster Manager, complete these actions:
  - a. Right-click **Storage** and select **Add a disk**. The **Add Disks to a Cluster** dialog box opens.
  - b. Verify that all of the disks for all exposed volumes are selected.
  - c. Click **OK**.
5. Add the cluster disks for the exposed volumes to the SQL Server application group. Using the Failover Cluster Manager, complete these actions:
  - a. Under Services and Applications, right-click the SQL Server application and select **Add storage**. The **Add Storage** dialog box opens.
  - b. Select all of the cluster disks for the exposed volumes and click **OK**.
  - c. Under **Services and Applications**, select the SQL Server application.
6. Add dependencies on the cluster disks for the exposed volumes to the SQL Server cluster resource. Using the Failover Cluster Manager, complete these actions:
  - a. Under **Other Resources**, double-click the SQL Server cluster resource. The **SQL Server Properties** dialog box opens.
  - b. Click the **Dependencies** tab, and add a dependency on each of the disks for the exposed volumes. For each disk, click **Insert** and select the disk using the drop-down list under **Resource**.
  - c. Click **OK**.
7. Attach the desired databases from the exposed volumes.

For information about how to attach SQL Server databases, see the Microsoft SQL Server books online documentation.

### Related concepts

[Advanced Recovery Scenarios for SQL Server](#) on page 44


### Related tasks

[Expose a Restore Point \(Windows Extensions Only\)](#) on page 40

## Use a Replay to Manually Recover a Database

Dell recommends using Replay Manager to manage Replays. However, databases can be recovered using Storage Center rather than Replay Manager during disaster recovery. This manual process provides the same functionality as the Expose action in Replay Manager.

1. Create a view volume on the desired Replay for each database volume and map it to the database server. Make sure all Replays are from the same restore point. For each database volume, do the following:
  - a. In the Storage Center, right-click the desired Replay and select **Create Volume from Replay**. The **Create Volume from Replay** dialog box opens.
  - b. Select the folder for the view volume.
  - c. Set the name for the view volume.
  - d. Click **Create Now**. The **Map Volume to Server** dialog box opens.
  - e. Select the server to which the view volume should be mapped.
  - f. Click **Continue**.
  - g. Click **Create Now**.
2. On the database server, bring the disks for the new view volumes online and assign a drive letter or NTFS mount point.
  - a. Open **Server Manager** and select **Disk Management**.
  - b. Verify all disks for the new view volumes are displayed. If any disks are not displayed, re-scan the disks until they appear. To re-scan the disks, right-click **Disk Management** and select **Rescan Disks**.
  - c. Bring each new disk online. To bring a disk online, right-click the box containing the disk number and select **Online**.
  - d. Assign a drive letter or mount point to each new disk. Right-click the partition and select **Change Drive Letter and Paths**. The **Change Drive Letter and Paths** dialog box opens.
  - e. Click **Add**. The **Add Drive Letter or Path** dialog box opens.
  - f. Select an available drive letter or mount point and click **OK**.
3. On the database server, clear the VSS attributes from each volume.
  - a. Open a Command Prompt window.
  - b. Start the disk part utility by typing `diskpart` and pressing **Enter**.
  - c. For each volume, type the following commands, pressing **Enter** after each command.

 **NOTE:** To see a list of all available volumes, type: `list vol`

Select the volume using the volume number or drive letter with one of the following commands:

```
select vol number
```

```
select vol letter :
```

Clear the read-only attribute:

```
attrib vol  
clear readonly
```

Clear the hidden attribute:

```
attrib vol clear hidden
```

Clear the shadow copy attribute:

```
attrib vol clear shadowcopy
```

When the attributes have been cleared, the output will look like this:

```
Read-only           : No  
Hidden              : No  
No Default Drive Letter: Yes  
Shadow Copy        : No
```

- d. Exit the diskpart utility by typing `exit` and pressing **Enter**.

- e. Close the Command Prompt window by typing `exit` and pressing **Enter**.
4. Attach the desired databases from the new volumes.

For information about how to attach SQL Server databases, see the Microsoft SQL Server documentation.

## Locating Replays on a Storage Center


Recover any Replay stored on a Storage Center with the Data Instant Replay feature of Storage Center.

 **NOTE:** Use Replay Manager to expire Replays. Do not use Storage Center to perform that action for the volumes managed by Replay Manager.

### Locate a Replay on a Storage Center

Storage Manager displays Replays for a volume in the **Snapshots** tab of a volume display.

1. On the Storage Manager navigation tree, navigate to a volume to see associated Replays.
2. Click the **Snapshots** tab for the volume. All Replays for the volume are displayed.

A Replay created by an external application, such as Replay Manager, is marked by this icon: 

The user-defined name specified within Replay Manager for the backup set is listed in the **Description** field. For information on using the Dell Storage Manager, see the *Dell Storage Manager Administrator's Guide*.

### Locate Replay View Volumes on a Storage Center

Dell Storage Manager displays view volumes created from Replay Manager Replays.

1. On the Dell Storage Manager navigation tree, navigate to the volume associated with view volumes.
2. Locate the view volumes:
  - If Replay Manager connects to Storage Center with an Administrator account, view volumes are located in a subfolder of the folder that contains the original volume. The subfolder is named **VSS (original\_volume\_name)** and the view volumes are named **VSS (backup\_set\_name)**.
  - If Replay Manager connects to Storage Center with a Volume Manager user, the view volumes are located in the same folder that contains the original volume. The view volumes are named **VSS (backup\_set\_name)**.

Exposed restore point volumes for VMware are named using the name entered for the exposed datastore or RDM name.



# Working with Backup Set Jobs

This section provides information on how to work with backup sets to create and manage schedules and view the status of queued jobs.

## Topics:

- [View the Backup Jobs Display](#)
- [Summary of Backup Job Actions](#)
- [Display the Backup Schedule Run Time Report](#)
- [Managing Job Schedules](#)
- [Viewing Queued Items](#)

## View the Backup Jobs Display

To view Jobs, select a server or a host. From the **Backup Sets** pane of Replay Manager, select **Jobs**. For each backup set, the **Backup Jobs** display shows: Extension, Backup Sets Scheduler, and the Schedule State.

## Summary of Backup Job Actions

The following table lists **Backup Jobs** actions.

Action	Description
<b>Schedule Reports</b>	
Schedule Run Time	Displays a graph of the selected job schedule.
<b>Scheduling</b>	
Suspend Schedule	Suspends the schedule for the selected backup set job.
Resume Schedule	Resumes the schedule for the selected backup set job.
Modify Schedule	Modifies the schedule for the selected backup set job.
Delete Schedule	Deletes the schedule for the selected backup set job.
<b>Backup Set</b>	
Run Now	Immediately runs the selected backup job.
Modify Settings	Modifies the settings for the selected backup set.
Delete Backup Set	Deletes the selected backup set.
Prepare for Script	Creates a sample Submit-RMBackupSet cmdlet for the selected backup set which can be copied and pasted into a script.

## Display the Backup Schedule Run Time Report

This section describes how to generate the Schedule Run Time report.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the **Backup Sets** area of the navigation pane, click **Jobs**.  
The **Backup Jobs** display opens, showing all backup jobs for the server or host.

4. Click **Schedule Run Time**.  
The **Backup Schedule Run Time Report** dialog box opens.

#### Related concepts

[Managing Existing Backup Sets](#) on page 33

## Managing Job Schedules

This section describes how to manage backup set schedules.

### Suspend a Schedule

Use the following procedure to pause a schedule. Restart the schedule at any time by clicking **Resume Schedule**.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the data source.
3. In the **Backup Sets** area of the navigation pane, click **Jobs**.  
The **Backup Jobs** display opens, showing all backup jobs for the server.
4. Select a backup job, and click **Suspend Schedule**. The schedule for the backup job is suspended.

### Resume a Suspended Schedule

A resumed schedule runs at the next scheduled time for the backup set.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the data source.
3. In the **Backup Sets** area of the navigation pane, click **Jobs**.  
The **Backup Jobs** display opens, showing all backup jobs for the server.
4. Select a suspended backup job, and click **Resume Schedule**.  
The schedule for the backup job is resumed.

### Modify a Schedule

Use the **Modify Backup Schedule** dialog box to make changes to when and how often a backup job is run.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
  2. In the **Backup Extensions** area of the navigation pane, select a data source.
  3. In the **Backup Sets** area of the navigation pane, click **Jobs**.  
The **Backup Jobs** display opens, showing all backup jobs for the server.
  4. Select the backup job you want to modify.
  5. In the **Scheduling** area of the action pane, click **Modify Schedule**.  
The **Modify Backup Schedule** dialog box opens.
  6. Modify the schedule. The time scheduled for a backup is based on server time, which is shown in the upper right of the dialog box.
    - In the Schedule Type area, specify the schedule type.
      - **One Time:** Select this option to schedule one occurrence of the backup job, and then specify the date and time for the backup job in the **One-Time Occurrence** area.
      - **Recurring:** Select this option to set up a recurring schedule for the backup job. For recurring backups, select the frequency options for the backup schedule.
    - For recurring backups, select the frequency options for the backup schedule.
- i** **NOTE:** To set up overnight schedules, click **Exclude Time Range** and then specify the range of time to exclude from the schedule. For example, to create an overnight schedule that runs from 5 PM to 8 AM, click **Exclude Time Range** and then specify 8 AM as the **Starting at** time and specify 5 PM as the **Ending at** time. The backup schedule begins at 5 PM of the current day and stop at 8 AM the following day.

7. When you have finished modifying the schedule, click **OK**.

## Delete a Schedule

Deleting a schedule does not delete restore points already created based upon the schedule.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select data source.
3. In the **Backup Sets** area of the navigation pane, click **Jobs**.
4. Select the backup job to delete.  
The **Backup Jobs** display opens, showing all backup jobs for the server.
5. In the **Scheduling** area of the action pane, click **Delete Schedule**.
6. Click **Yes** to delete the schedule.

## Viewing Queued Items

Replay Manager can display the active backup job, the jobs waiting to execute, the queued tasks and a list of the results.

### View Queued Items

Use the following steps to view queued items in Replay Manager.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select the data source.
3. In the **Backup Sets** area of the navigation pane, click **Queued Items**. The **Queued Items** display opens, showing all queued items on the server. The list can be filtered by making a selection under **Queue** and **State**.

Queue Selection	Result
Show All	Displays all backup jobs and tasks
Show Backup Job Queue	Displays just backup jobs (taking a Replay)
Show Task Queue	Displays just tasks (all operations other than taking a Replay)

State Selection	Result
Show All	Shows the item currently in operation, all items waiting to run, and all items whose operation is finished.
In Progress	Shows just the item currently in operation
Completed	Shows just the operations that are finished running
Successful	Shows just the operations that completed successfully
Failed	Shows just the operations that did not complete successfully

4. Click **Force Refresh** to make Replay Manager update the list.

# Viewing Backup Job Reports

The Reports Explorer provides summary information for backup sets and their associated restore points.

The **Details** tab of the Reports Explorer provides the run time messages generated by Replay Manager when the backup job runs and indicates the success or failure of the restore point. In cases of failure, viewing the error messages on the **Details** tab can be helpful in troubleshooting why the failure occurred.


The **General** tab of the Reports Explorer provides information on the schedule and the retention policy defined for the selected backup set or restore point.

## Topics:

- [Using the Reports Explorer](#)
- [Viewing Backup Set and Restore Point Information](#)

## Using the Reports Explorer

Use the Reports Explorer to show information about all defined backup sets on that host.

 **NOTE:** The Reports Explorer shows information on backup sets and backup jobs (restore points). For information on restore operations, see the Microsoft Management Console Events Viewer.

## Open the Reports Explorer

The Reports Explorer displays the backup sets and their associated restore points for the selected server or host.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the **Backup Sets** area of the navigation pane, click **Reports**.  
The Reports Explorer for the selected data source opens.

## Viewing Backup Set and Restore Point Information

The Reports Explorer shows information about each backup set/restore point. The display lists each restore point, when it was created, its current status, and the backup extension type.

## View General Information for the Backup Set

The **General** tab of the Reports Explorer provides information on the schedule and retention policy for the selected backup set.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the **Backup Sets** area of the navigation pane, click **Reports**.
4. Click a backup set and click the **General** tab in the lower portion of the window. The following information is displayed for the extension:


Item	Description
Name	Name of the backup set.
Backup Set ID	Unique ID for the backup set.
Created	Date and time the backup set job was created.

Item	Description
Last Success	Date and time of the last successful job for the backup.
Last Run	Date and time of the last job for the backup.
Options	Lists options for the backup set.
Components	Lists components included in the backup set.
Extension	Lists the backup extension of the backup set: Local Volumes, Exchange Stores, SQL Databases, Hyper-V guests, VMware Datastores, or VMware Virtual Machines. Extensions are displayed as follows: <ul style="list-style-type: none"> <li>• Local Volumes = Volumes</li> <li>• Exchange Stores = ExchangeServer</li> <li>• SQL Databases = SQLServer</li> <li>• Hyper-V Guests = HyperV</li> <li>• VMware Virtual Machines = VMwareVM</li> <li>• VMware Datastore = VMwareDS</li> </ul>
Backup Type	Shows the backup type: Copy (the default) or Full.
Retention Policy	Shows the retention policy for the backup set restore points.
Schedule	If scheduled, shows a brief description of the schedule.


## View General Information for the Restore Point

The **General** tab of the Reports Explorer provides summary information on the selected restore point.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the **Backup Sets** area of the navigation pane, click **Reports**.
4. Click a restore point and click the **General** tab in the lower portion of the window. The following information is displayed for the extension:

 **NOTE:** The restore point report is generated on the server and reflects the system time and date format set on the server.

Item	Description
Name	Name of the backup set to which the restore point belongs.
Backup Set ID	Unique ID for the backup set.
Snapshot ID	Unique ID for the backup job.
Created	Date and time the backup set job was created.
Completed	Date and time the backup set job was completed.
Time Taken	Amount of time taken to complete the backup job.
Options	Lists options for the backup job.
Notes	Displays the text of the restore point note if a note was created. The field is not displayed if the restore point does not have a note.
Components	Lists components included in the restore point.
Extension	Lists the backup extension of the backup set: Local Volumes, Exchange Stores, SQL Databases, Hyper-V guests, VMware Datastores, or VMware Virtual Machines. Extensions are displayed as follows: <ul style="list-style-type: none"> <li>• Local Volumes = Volumes</li> <li>• Exchange Stores = ExchangeServer</li> <li>• SQL Databases = SQLServer</li> <li>• Hyper-V Guests = HyperV</li> </ul>

Item	Description
	<ul style="list-style-type: none"> <li>VMware Virtual Machines = VMwareVM</li> <li>VMware Datastore = VMwareDS</li> </ul>
Backup Type	Shows the backup type: Copy (the default) or Full.
Retention Policy	Shows how many restore points to keep. Unchecking <b>Delete Old Restore Points</b> keeps all the restore points. The default is to keep 3 restore points.  <b>NOTE:</b> If you decide to keep large number of restore points, check LUN availability.
Schedule	If scheduled, shows a brief description of the schedule.
Status	Shows the status of the restore point: <ul style="list-style-type: none"> <li><b>Available:</b> Restore point is available for restore operations, including transporting the restore point to another server. For Exchange components that were backed up with the <b>Verify Data</b> option enabled, shows the verification status in parentheses. For example, "(Verified)" or "(Not Verified)."</li> <li><b>Imported:</b> Restore point has been accessed. When the status is Imported, the restore point cannot be transported to another server.</li> <li><b>Imported and Exposed:</b> Restore point is exposed as a local drive or mount point on the server.</li> <li><b>Failed:</b> Restore point has not been created because of an error.</li> </ul>
Backup State	Shows the state of the backup job: Successful or Failed.
Snapshot Type	Shows Legacy - NonTransportable if the restore point is non-transportable.

#### Related tasks

[Add a Note to a Restore Point](#) on page 42

[Edit a Note for a Restore Point](#) on page 42

## View Restore Point Details

The **Details** tab displays the job log for a restore point. The job log contains the run time messages generated by Replay Manager when the backup job ran.

1. In the **Server Connections** area of the navigation pane, connect to a server or host.
2. In the **Backup Extensions** area of the navigation pane, select a data source.
3. In the **Backup Sets** area of the navigation pane, click **Reports**.
4. Click a restore point and click the **Details** tab.

The Details view displays all the steps RMS took to create the restore point. For failed restore points, view the **Details** tab to find the error code or message for the failed backup. In general, the error codes and messages are generated by the Microsoft VSS backup component. To find out information on a VSS error code or message, search the Microsoft Development Network ([www.msdn.microsoft.com](http://www.msdn.microsoft.com)) for information on the error.

# Replay Manager Best Practices

This section provides best practices for restoring and backing up data. Guidance is given specific to the backup extension type.

## Topics:


- [Backing Up Replay Manager Data](#)
- [Recovering Data from a Remote Storage Center](#)
- [Local Volumes](#)
- [Microsoft Exchange Server](#)
- [Microsoft Hyper-V](#)
- [Microsoft SQL Server](#)
- [VMware](#)

## Backing Up Replay Manager Data

The following options exist to create a backup of the Replay Manager data that can be leveraged for disaster recovery.

### Backing Up Service Configuration and Database

The Replay Manager Service configuration data and Replay Manager database can be manually copied to another location for safekeeping. The copy can be used to restore the data if the original data becomes lost or if the server running Replay Manager crashes and the data is not recoverable. Moreover, if the copy is placed on a Storage Center volume, Storage Center can be used to replicate the volume to a remote DR site for additional safekeeping.

 **NOTE:** Some data, such as Storage Center passwords, are protected using encryption that is machine-specific. Therefore, some Replay Manager settings must be reconfigured if the copy is restored on a different server.

For Windows Server, copy all the files in the following directory to another location for safekeeping: C:\ProgramData\Compellent\ReplayManager.

### Backing Up Backup Set Data

Replay Manager can be configured to automatically copy backup set data for a given server to another location for safekeeping.

By default, backup set data is not copied to another location. The copy can be used to restore the data if the original volume containing the backup set data becomes lost, or if the server running Replay Manager crashes and the Replay Manager configuration data is not recoverable. Moreover, if the copy is placed on a Storage Center volume, you can use the Storage Center to replicate the volume to a remote DR site for additional safekeeping.

#### Related tasks

[Configure Servers](#) on page 22

## Recovering Data from a Remote Storage Center

Replay Manager is intended to provide only backup and recovery capabilities using individual restore points for Microsoft VSS-enabled applications on the same Storage Center. Replay Manager is not intended to be an end-to-end automated disaster recovery solution.

However, the snapshots created by Replay Manager can be used for disaster recovery at a remote site. Replays on remote sites appear like any other Replay taken with the Storage Center Data Instant Replay feature. These Replays can be replicated using Dell Storage Manager.

Because the Replay Manager application is not used at remote sites, it has no knowledge of the Replays being replicated from the source system, or that Replays now exist on a different storage system at the recovery site.

The Replays created on remote sites outside of the Replay Manager environment can be used by changing the **ReadOnly**, **ShadowCopy**, and **Hidden** attributes for the volume. The following procedure outlines the steps required using the Dell Storage Manager and the `DISKPART` command. For detailed information about using Storage Center, see the *Dell Storage Manager Administrator's Guide*.

## Recover Data from a Remote Storage Center

For each volume you want to recover:

1. In Dell Storage Manager, locate the remote site and select the volume to recover.
2. Click the **Replays** tab in the right pane.
3. Right-click the Replay to recover and select **Create Volume from Snapshot**.
4. In the **Create Volume from Snapshot** dialog box, accept the default, or enter a new name (such as **Log Recovery**). In the **Create Volume from Snapshot** you can map to the server by clicking **Change**.
5. Click **OK**.
6. The system creates a View Volume and displays the **Map Volume to Server** dialog box.
7. Select the server to which you want to map the Replay View Volume. If necessary, create a new server and then click **Continue**.
8. On the server, in Disk Management, right-click and select **Rescan Disks**.  
This action refreshes the iSCSI bus and make the new volume visible. You may have to rescan more than once.
9. Bring the disk online in Disk Management and assign the appropriate drive letter or mount point to the volume.
10. From a command-line interface (CLI) such as Command Prompt, type the following commands to clear the necessary attributes to make the volume usable. Be sure to replace the text with your drive letter where necessary.

```
C:\> DISKPART.EXE
DISKPART> SELECT VOL <DRIVE LETTER>
DISKPART> DETAIL VOL
DISKPART> ATT VOL CLEAR READONLY
DISKPART> ATT VOL CLEAR HIDDEN
DISKPART> ATT VOL CLEAR SHADOWCOPY
DISKPART> DETAIL VOL
```

The volume is now fully readable and writable and can be used for recovery operations.

11. If the volume is recovered in a Windows Server failover cluster, the Windows IO structure must be reset using PowerShell. To reset the Windows IO structure, use the **-ResetSnapshotInfo** parameter of the **Set-DiskDevice** cmdlet available in the Storage Center Command Set for Windows PowerShell (version 6.1 and later). For information on using this cmdlet, refer to the online Storage Center Command Set help.

**NOTE:** Resetting the Windows IO structure is necessary only if you also want to make the new volume a cluster resource. You can recover the volume on a node of a cluster without resetting the IO structure and still use it as a non-clustered disk. However, some clustered applications (like SQL Server) cannot use a volume if it is not a clustered disk.

### Related concepts

[Using Replay Manager as Part of a Disaster Recovery Plan](#) on page 9



# Local Volumes

Replay Manager provides the ability to create VSS backups of one or more local volumes mapped from the server to the Dell Storage Center.

## VSS for Local Volumes

Using the Local Volumes option, an administrator can use VSS to create backups of applications without using a Replay Manager application-specific extension; however, it is up to the administrator to determine which volumes are needed for a complete backup set.

For example, the complete backup set for an Exchange Server with separate database volumes and log volumes for a storage group requires the manual selection of all volumes and logs for the storage group. Therefore, the administrator must know the exact layout and location of all storage group components to create a usable backup set.

The Local Volumes option is primarily intended for backing up and restoring volume file and print environments where the files are flat—that is, the files are not in a transactional database-like environment. Servers that contain shared files or home directories can leverage the Local Volumes backups because the restore points for local volumes can be easily exposed, allowing an administrator to recover files.

## VSS for Shared Folders

VSS for Shared Folders, a similar technology built into Windows, provides the ability to back up a volume which in turn stores the shadow copy on the volume itself in a hidden location. By default, snapshots in VSS for Shared Folders take place at 7:00 a.m. and 12:00 p.m., and shadow copies are replaced as required by the amount of free disk space on the volume. The snapshot times can be adjusted, but the snapshots should run no more than once every 60 minutes.

Using VSS for Shared Folders and Replay Manager on the same volumes is not recommended as this combination uses additional disk space because VSS stores the deltas (data changes or differences) hidden on the volume while Storage Center determines which blocks to freeze. This is essentially duplicating efforts on the volume.

# Microsoft Exchange Server

The Replay Manager Microsoft Exchange Extension can back up and restore data for Microsoft Exchange Server 2019, Microsoft Exchange Server 2016, Microsoft Exchange Server 2013, and Microsoft Exchange Server 2010.

## General Guidelines for Exchange Servers

Follow these general guidelines for backing up and restoring Microsoft Exchange Server data.

- Use the Replay Manager Microsoft Exchange Server Extension:  
Always use the Replay Manager Microsoft Exchange Server Extension to back up and restore Microsoft Exchange Server databases; do not use the Local Volumes extension to back up and restore Microsoft Exchange databases residing on one or more local volumes.
- Install the Exchange Verification Service on non-production servers:  
Replay Manager provides an optional Verification Service that can be installed to check the consistency of the databases during backup and restore operations. By default, the service is configured to run on the localhost; however, the best practice is to run this on a utility server other than the production Microsoft Exchange Server. Since this service is processor, memory, and disk intensive, this load is better suited for a non-production server so that verification does not impact mission-critical operations. Note also that although it is possible to run the Verification Service on every snapshot that is taken, it may be more feasible to consider verifying only one backup set per day to prevent queuing of the verification jobs.
- Configure the Exchange Verification Service:  
The Exchange Verification Service uses the Exchange APIs that are used when an `ESEUTIL /K` command is issued on an Exchange Server. This service checks the consistency of the databases and logs that are part of the selected backup set to make sure that they are readable by Exchange and can be recovered through standard means such as a soft recovery.

The LUN mapping range is configurable through the Exchange Verification Setup screen. If you have LUN numbering requirements or want to reserve certain ranges for verification, it is possible to configure it accordingly. Replay Manager allows LUN numbers 1 through 254. See for information on installing and configuring the Verification Service.

- Use of Expose and Restore to Recover Exchange:

Replay Manager offers two methods for recovering data: Restore or Expose. Both methods provide immediate access to the data using the snapshots.

The Restore function provides the easiest method for recovering a Storage Group. By selecting the restore point and then clicking **Restore Backup Set**, the Restore operation accesses the requested restore point and copies the transaction logs and databases contained within the backup set back to the production volumes. Using Restore requires a dismount of the existing Storage Group and databases since the Restore replaces all Storage Group components. Depending on the size of the database, this can be a time consuming operation as data is copied from one volume to another. This one-click approach is easy for administrators to use; however Restore provides only a point-in-time recovery from which the restore point was created.

The Expose function provides more flexibility for recovering individual components. When a restore point is exposed as a drive letter or mount point, an administrator can then manually select components to recover.

**NOTE:** Restoring a Replay will eliminate any changes made since the Replay was taken. It is advised to create a Replay after all changes are made to a database or use the Expose function to manually merge the Replay data with the existing data set.

### Related concepts

[Installing and Configuring the Verification Service for Exchange](#) on page 16

## Recover a Mailbox

To recover an individual mailbox, Expose the restore point as a drive letter or mount point. Once the snapshot is exposed, an administrator can recover a mailbox using a Recovery Storage Group or Recovery Database and the built-in tools of Microsoft Exchange Server.

1. Locate and Expose the restore point that contains the mailbox as described in [Expose a Restore Point \(Windows Extensions Only\)](#) on page 40.
2. In the **Expose Restore Point Volumes** dialog box:
  - a. Make sure that you expose both the Database and the Log volumes, by setting drive letters for both volumes shown.
  - b. Select **Make exposed volumes writable**.
3. Click **Expose**.
4. To verify that the drive was created, use the Computer Management console on the server:
  - a. Right-click the computer where the drive should appear and select **Manage**.
  - b. In the **Computer Management** navigation tree, expand the Storage entry.
  - c. Select **Disk Management**.
  - d. If the drive does not appear, select **Action** → **Rescan Disks**.
5. Use the Exchange Management Shell to recover the mailbox database:
  - a. Create a database pointer for the recovery files.
  - b. Specify the path to the exposed files.

For example:

```
C:\>new-mailboxdatabase -recovery -name Emailrecovery1 -server ex2010-mb1 -EdbFilePath "h:\replay users\replay users.edb" -logfolderpath "h:\replay users"
```

Where *Emailrecovery1* is the database name, *ex2010-mb1* is the server name, and *h:\replay users* is the path of the exposed files.

6. Use the ESEUTIL program to put the database into a clean shutdown.

**NOTE:** In the preceding example, all files residing in "h:\replay users" are immediately available for recovery. If files outside that directory are required, copy them into the path of the exposed files (in this case h:\replay users).

7. In the **Exchange Management Organization Configuration/Mailbox** dialog box, right-click the recovered database and select **Mount Database**.

8. Create a restore request for the mailbox to recover. For example, to restore an entire mailbox: `H:\Replay Users>new-mailboxrestorererequest -sourcedatabase emailrecovery1 -sourcestoremmailbox "John Hancock" -targetmailbox jhancock@2010test.local` where the target mailbox is the email address of the mailbox you are restoring.

**i** **NOTE:** In the preceding example, the directory `H:\Replay Users` contains both the log and database files. If the files are in different directories, use the `/l /s` and `/d` options to specify the correct directories.

This restore command queues the request. As messages are restored, they appear in the user's mailbox and can be accessed when they are visible. Multiple restore requests can be queued, and wild cards can be used to recover multiple mailboxes. The Exchange server processes all requests until complete. This process can be used to recover everything from a single message to an entire mailbox store.

**i** **NOTE:** To recover from a corrupt database, create a blank database and use this procedure to restore data to individual mailboxes. Database recovery is constrained only by server performance, so messages are restored as fast as the server can process them.

For more information about using the Exchange Management Shell, see [technet.microsoft.com](http://technet.microsoft.com)

### Related tasks

[Expose a Restore Point \(Windows Extensions Only\)](#) on page 40

## Replay Sizes and Storage Center Storage Profiles

By default, Storage Center is configured to use a 2 MB page size. The default page size works best for most storage requirements. However, for some applications, such as Microsoft Exchange Servers, the Storage Center defaults may result in larger than expected Replay sizes.

Customers who experience larger than expected Replays (for example, 75% or greater of database size) can consider using the Storage Center 512 KB page option for Microsoft Exchange volumes on the Storage Center. The smaller page size will reduce the amount of blocks that can write to a page, thus reducing Replay sizes. For information on configuring and using a Storage Center Storage Profile with a smaller page size, see the *Dell Storage Manager Administrator's Guide*.

## Microsoft Hyper-V

The Hyper-V extension included with the Replay Manager installation leverages the Hyper-V VSS Writer to provide enhanced backup and recovery of Hyper-V virtual machines. The Hyper-V VSS writer can take snapshots both in an online and offline operation:

- Online backups use the Hyper-V VSS writer to perform the snapshot while the server is online and does not cause an interruption in service.
- Offline backups (on Windows NT 4.0 or Windows 2000 guests) require that the machine be put into a saved state while the snapshot takes place and does require a service outage.

**i** **NOTE:** When using Replay Manager with Microsoft Hyper-V, only volumes hosting virtual hard disk (VHD or VHDX) files are included in a snapshot. Virtual machine volumes are not included if the volumes are mapped to a virtual machine by iSCSI or pass-through.

**i** **NOTE:** Microsoft Hyper-V Replays create a view volume on the Storage Center for each Replay. All other Replay Manager extensions do not create a view volume for each Replay. This is a limitation of the Microsoft Hyper-V VSS writer.

Microsoft does not provide guidelines for the number of virtual machines that can be snapped at a time or the best interval. Most administrators perform snapshots once a day for most virtual machines, and more frequently on a limited number that require a tighter recovery point objective. For more information on the specifics of the support policies for Microsoft applications when virtualized, see these links:

- Microsoft Server Software and Supported Virtualization Environments: [support.microsoft.com/kb/957006/](http://support.microsoft.com/kb/957006/)
- Support Policies & Recommendations for Exchange in Virtualization Environments: [technet.microsoft.com/en-us/library/cc794548.aspx](http://technet.microsoft.com/en-us/library/cc794548.aspx)

Using Replay Manager with Hyper-V on Front-End SAS

- Hyper-V hosts can use either single or multipath I/O on Front-End SAS.

- Hyper-V guests (VMs) can use only single path I/O. Multipath cannot be installed. These VMs must be gen 2. Gen 1 is not supported.
- Dell has opened a ticket with Microsoft to address this situation.

## Creating Backup Sets in a Hyper-V Cluster

Virtual machines may be moved among cluster nodes for a variety of reasons. Virtual machines may be moved manually, for example, in preparation for planned server maintenance. Virtual machines may also be moved dynamically, for example, when the Dynamic Optimization feature is enabled in Virtual Machine Manager. During Dynamic Optimization, the resources of each node in a cluster are monitored to optimize the placement of virtual machines initially and during failover.

In an environment where virtual machines move often within a cluster, and where collections of virtual machines do not consistently move together, each Replay Manager backup set should contain only one virtual machine per CSV. This avoids the need to frequently re-create backup sets to account for the movement of individual virtual machines.

## Support of Recovery with Pass-Through Disks

As Microsoft supports the virtualization of applications like SQL Server and Exchange, more administrators are virtualizing their application environments and using pass-through disks for data volumes. If there are pass-through disks attached to a virtual machine, Replay Manager can be installed on the virtual server guest to back up the data volumes for the application. Because of the abstraction layer that is introduced in virtualizing the hardware, the only way to recover a snapshot directly back to the virtual machine is by using the Microsoft iSCSI Software Initiator which is available as a free download from Microsoft (for Microsoft Vista and Microsoft Server 2008 (and later), the iSCSI Software Initiator is included with the operating system). iSCSI uses Ethernet connectivity which is readily accessible by a virtual machine and is easy to configure both on the server as well as the storage.

## VSS Error Event ID 8194

When backing up Hyper-V virtual machines, the following error may be logged in the Windows Event Log:

```
Event ID 8194
Volume Shadow Copy Service error: Unexpected error querying for the
IVssWriterCallback interface. hr = 0x80070005, Access is denied.
```

This error does not prevent backup jobs from completing successfully and it can be safely ignored.

## Additional Information on Using Replay Manager with Hyper-V

For further information on how Hyper-V integrates with Replay Manager, see the Dell Storage Center Replay Manager 7 and Microsoft Hyper-V Best Practices Guide.

See the following link (login required) : [http://en.community.dell.com/techcenter/extras/m/white\\_papers/20437951](http://en.community.dell.com/techcenter/extras/m/white_papers/20437951)

## Microsoft SQL Server

Replay Manager supports backing up and restoring data for Microsoft SQL Server 2019, Microsoft SQL Server 2017, Microsoft SQL Server 2016, Microsoft SQL Server 2014, and Microsoft SQL Server 2012.

## General Guidelines for Microsoft SQL Server

For all versions of Microsoft SQL Server, follow these general guidelines for backing up and restoring data.

- Use the Replay Manager SQL Databases backup extension—do not use the Local Volumes backup extension

The Local Volumes Extension allows an administrator to select entire volumes when defining a backup set. Each database stored on the selected volumes wait for the current process to finish before temporarily halting further operations, if all volumes used by the database are included in the backup set. However, you should use the SQL Databases backup

extension for volumes containing SQL Server databases because it provides an enhanced backup and recovery process for the administrator. Some recovery features are only available through the SQL Databases backup extension.

- Determine optimal selections for database backup sets

The administrator must determine the optimal configuration of backup sets, and backup job schedules based on the site environment. Replay Manager allows multiple databases within one backup set. However, for databases with high IO traffic, Dell recommends that an administrator include only one database per backup set. Microsoft recommends that an administrator create a backup set of fewer than 35 databases to prevent problems with VSS timeouts and other related errors. For more information, see [support.microsoft.com/kb/943471](https://support.microsoft.com/kb/943471).

**i NOTE:** A backup includes all files on the volume (or volumes) used by the selected databases, including database files for databases that are not selected. However, unselected databases are not quiesced by VSS before the snapshot is taken. If backup sets are consistently excluding databases on a given set of volumes, consider moving the excluded databases onto a separate set of volumes to reduce the size of the Replays.

- Back up the system databases

If you need to recover an entire SQL Server instance, you must have access to the system databases. The standard system databases include master, model, and msdb. Each of these databases plays an important role in the operation of a SQL Server instance. All system databases are created under the SQL Server installation path, which by default is the boot volume. System databases should reside on a SAN volume so they can be included as part of a regular backup set in Replay Manager. Use snapshots of the system databases to perform a full SQL Server instance recovery.

## Restoring a Microsoft SQL Server Database with No Recovery

Use the Do Not Recover Databases option when restoring a Microsoft SQL Server database to leave the database in an unrecoverable state. An administrator can subsequently perform additional restores of the transaction log and/or differential database backups to the restored database.

For complete information on backup and restore strategies for Microsoft SQL Server databases, see [technet.microsoft.com/en-us/library/ms152560.aspx](https://technet.microsoft.com/en-us/library/ms152560.aspx).

## Protecting Microsoft SQL Server AlwaysOn Availability Groups

Replay Manager can be used to back up databases that belong to an AlwaysOn Availability Group. However, a database cannot be restored while it is part of an Availability Group. Just as with native Microsoft SQL Server restores, a database must be removed from the Availability Group before it can be restored with Replay Manager.

**i NOTE:** This feature applies to Microsoft SQL Server 2019, Microsoft SQL Server 2017, Microsoft SQL Server 2016, Microsoft SQL Server 2014, and Microsoft SQL Server 2012.

1. Remove the database from the Availability Group.
2. Restore the database using Replay Manager.
3. Remove any existing replica databases.
4. Add the database back into the Availability Group.
5. Start data synchronization to the replica databases, if not done when the database was added back into the Availability Group.

# VMware

Replay Manager supports backing up and restoring VMware datastores and virtual machines on VMware ESXi hosts that are managed by a vCenter Server.

## Backup Extensions for VMware

Two VMware-specific backup extensions, VMware Datastores and VMware Virtual Machines, support VMware integration. Although both extensions provide flexible options to create VM embedded Replays, you should understand each backup extension to determine which backup extension is best suited for a particular job or environment.

### VMware Datastores

Use the VMware Datastores backup extension to create Replay Manager jobs based on vSphere datastores. This extension allows large groups of virtual machines to be protected by a Replay simply by selecting the datastore or datastores the virtual machines reside on. Any other data contained on the datastore is also included such as templates and .ISO files which are commonly found in virtual datacenters. This extension is ideal for virtual machines that have a single virtual machine disk file (.vmdk) or that have multiple .vmdk files residing on the same datastore.

**NOTE:** The VMware Datastore extension only supports the Expose data recovery action. It does not support the automated Restore recovery action nor does it support physical or virtual RDMs or VMFS volumes.

When using the VMware Datastores backup extension, consider the following:

- If a virtual machine straddles multiple VMFS datastores, you may still use the VMware Datastores backup extension. However, all datastores required to obtain a complete job must be selected.
- Because virtual machine protection is founded at the datastore layer, the Replay Manager job methodology should fit each of the virtual machines on the datastore. Only one Replay Manager job is needed for a datastore. This practice helps to prevent Replay Manager jobs from overlapping.

### VMware Virtual Machines

Use the VMware Virtual Machines backup extension to create Replay Manager jobs with finer granularity based on individual virtual machines. This extension supports both the Expose and Restore data operations.

The placement of the virtual machines or their virtual machine disk files (.vmdk) across datastores or the use of RDMs is not a constraint because Replay Manager determines the necessary datastores and volumes to include at the time of job creation. However, since vSphere cannot create a VMware snapshot of physical RDMs, the physical RDM Replays are unlikely to be consistent with the Replay containing the .vmdk file for the same virtual machine. Additionally, the VMware Virtual Machines backup extension supports including virtual machine memory in the VMware snapshot contained in the Replay.

**NOTE:** Use this extension if the virtual machine memory state is a requirement.

When using the VMware Virtual Machines backup extension, consider the following.

- Grouping by data protection characteristics  
Replay Manager jobs created using the VMware Virtual Machines backup extension should be grouped by similar or identical data protection characteristics to minimize the overlap of Replay Manager jobs in the queue and to ensure the required protection and retention of virtual machine data.
- Backing up RDMs  
To include RDM volumes when using the VMware Virtual Machines backup extension, select the virtual machine configured to use the RDM.
- Backing up physical mode RDMs  
To include pRDM volumes when using the VMware Virtual Machines backup extension, select the virtual machine configured to use the pRDM. To include physical RDMs in a backup, select the **Create Storage Center Replay of Physical RDMs** backup set option.

**NOTE:** Windows guest virtual machines that store data for VSS aware applications (like SQL Server or Exchange) on physical RDMs, or iSCSI volumes mapped directly to the guest, may fail to create snapshots when using the VMware

Virtual Machines backup extension. This is a known issue with Windows VSS snapshot integration and VMware snapshot creation. If a failure occurs, use the vSphere Client to change the value of the `disk.EnableUUID` parameter to `FALSE`. For further instructions, see: [HTTP://KB.vmware.com/KB/1031298](http://KB.vmware.com/KB/1031298)

- Backing up virtual machine memory

By default, a backup of a VMware virtual machine does not include machine memory. To include a dump of the virtual machine memory at the time of the backup, use the **Include virtual machine memory in vSphere snapshot** backup set option. Including machine memory causes the backup to take more time to complete. For more information, see: [HTTP://KB.vmware.com/KB/1007532](http://KB.vmware.com/KB/1007532)

## Data Recovery for VMware

Replay Manager provides two data recovery actions: Expose and Restore. The VMware backup extension selected for the Replay Manager job determines which data recovery actions are available.

### Expose Action for VMware

The Expose action is supported by both VMware backup extensions. This action presents a View of the exposed Replay back to the vSphere cluster in order to recover data at either the image or file level.

Although exposing the volume is managed by Replay Manager, the act of data recovery is not. The administrator must manually register the virtual machine on the View volume and power it on for an image level recovery, or add its .vmdk disk file back to the original (or surrogate) virtual machine's virtual inventory to perform file level recovery.

### Restore Data with VSS Consistency

If data is required to be restored with VSS consistency, take the following steps for each virtual machine being recovered:

1. Register the virtual machine in inventory.
2. From VMware, Revert to Snapshot.
3. From VMware, Delete Snapshot.

Although the Expose action requires some manual steps, it is the fastest way to recover data at both the file and image levels while maintaining storage efficiency and while preserving the data progression history. Experienced users of vSphere and Dell storage should use the Expose action whenever possible to ensure the fastest recovery and most efficient use of raw storage.


### Restore Action for VMware

Instead of exposing the datastore for large scale or rapid image level recovery, the Restore action automatically deletes the existing virtual machines being restored and then restores the virtual machines individually by using a copy operation from a View volume back to its original location. The Restore action is only supported by the VMware Virtual Machines backup extension and is fully automated.

Because Restore is a bulk copy operation, available blocks are written to as new according to the storage profile applied to the volume. Using the Storage Center defaults, the virtual machines are copied into Tier 1 storage regardless of where the blocks existed previously. The main benefit of this method is that it provides automated virtual machine recovery at the expense of storage efficiency and Recovery Time Objective (RTO).

## vSphere Site Recovery Manager

VMware Site Recovery Manager (SRM) provides an automated disaster recovery solution for vSphere virtualized datacenters. When integrated with Dell Storage Center, Replays are used by SRM to register and power on virtual machines during the recovery process at the remote site and as such Replays effectively represent the Recovery Point Objective (RPO) for virtual machines.

 **NOTE:** When creating Replay Manager job schedules, RPO and expiration should always be considered.

SRM can leverage Replays created by Replay Manager, however, the following points should be considered to ensure that the disaster recovery design meets expectations during testing or execution of the recovery plan:

- Replays created by Replay Manager will contain vSphere snapshots. By default, when SRM recovers these virtual machines, they will still be in a vSphere snapshot state.
- The application and data consistency through VSS is frozen in the read-only snapshot.
- Any data written after the snapshot occurred and before the volume Replay was created will not be application or data consistent. Rather, the data will be crash consistent.
- If the application needs to be recovered with VSS consistency, revert to the previous vSphere snapshot and then delete the vSphere snapshot using the vSphere Client. This must be done before the virtual machine is powered on automatically by SRM or manually through human intervention.
- If application or data consistency is not required for disaster recovery purposes, the virtual machines at the recovery site may be immediately powered on in a vSphere snapshot state. However, it is not advisable to allow virtual machines to continue running for extended periods of time in a snapshot state. The vSphere snapshots for each virtual machine should be committed and deleted as soon as possible.

### Related tasks

[Restore Data with VSS Consistency](#) on page 63

## Storage vMotion

vSphere enables the ability of a virtual machine to migrate between hosts using vMotion and between storage using Storage vMotion. vMotion will not create any issues for Replay Manager as long as all vSphere hosts are zoned and mapped to the necessary volumes, however, there are some usage considerations.

 **CAUTION: Do not use the VMware Datastores backup extension if you are using Storage vMotion. Storage vMotion will cause a Replay Manager job to fail if the VMware Datastores backup extension was used for the job.**


Replay Manager jobs using the VMware Virtual Machines backup extension are not impacted by Storage vMotion as long as the Storage vMotion destination is a Storage Center configured in Replay Manager. Every time a Replay Manager job using this extension is run, Replay Manager will update the virtual machine's file locations as necessary before performing the job. The Replay Manager job will be updated accordingly and no action will be required of the administrator.

## Storage DRS

vSphere Storage DRS (also known as SDRS) leverages the Storage vMotion feature when configured for fully automated mode.

## VMware Tools

vSphere snapshots leverage and rely on the VMware Tools installation inside of the guest virtual machine for VSS integration to obtain application and data consistent snapshots. A VMware Tools failure likely results in the failure of a Replay Manager job and/or negatively affects the necessary application and data consistency desired in a Replay.

 **NOTE:** Ensure that the VMware Tools software inside each guest virtual machine is current. Doing so increases the reliability and success of Replay Manager jobs. VMware Tools generally need to be upgraded with each new version of the vSphere Hypervisor installed. It is most important to upgrade the software when there is a major version release.



# Using Replay Manager Cmdlets

The Replay Manager Command Set provides Windows PowerShell scripting support for all Replay Manager functions.

**NOTE:** For Windows PowerShell downloads, as well as additional Windows PowerShell information, go to [technet.microsoft.com/en-us/scriptcenter/default](http://technet.microsoft.com/en-us/scriptcenter/default).

## Topics:

- [Install the Replay Manager Command Set](#)
- [Replay Manager Cmdlets](#)

## Install the Replay Manager Command Set

Use the following procedure to install the Replay Manager Command Set which is a part of the Replay Management Tools.

1. Download and run the setup file `DellStorageReplayManagerManagementSetup_version.msi` for the Replay Manager Management Tools. Dell software downloads are available from the Dell EMC support site ([www.dell.com/support](http://www.dell.com/support)).
2. When the **Custom Setup** dialog box opens, select to install the Replay Manager Command Set.

**NOTE:** You do not need to install the Replay Manager Explorer to run Replay Manager scripts.

3. Complete the remaining steps of the installation wizard.

**NOTE:** The Replay Manager Command Set is a Windows PowerShell snapin. You must load the Replay Manager Command Set using one of these methods:

- From the Start menu, open the (All) Programs menu and then select **Dell Storage > Replay Manager Command Set Shell**. Depending on the version of Windows installed on your computer, there is a subfolder under **Dell Storage**.
- Open Windows PowerShell and load this snapin:

```
PS C:\> add-pssnapin Compellent.ReplayManager.Scripting
```

## Replay Manager Cmdlets

This table lists the Replay Manager cmdlets.

Cmdlet	Description
Add-RMLicenseInfo	Enables a Replay Manager license by either of these methods: <ul style="list-style-type: none"> <li>• Applies a license key to the Replay Manager server.</li> <li>• Applies a confirmation number that enables the license for the Replay Manager server. The confirmation number is obtained from Dell support by phone and is used when the Replay Manager server has no internet access available.</li> </ul>
Add-RMSystemSettings	Creates a Storage Center connection.
Connect-RMServer	Connects to a Replay Manager server using authentication supplied on cmdlet parameters.
Disable-RMBackupSetSchedule	Disables a backup set schedule.
Disconnect-RMServer	Disconnects from a Replay Manager server session.
Enable-RMBackupSetSchedule	Enables a backup set schedule.

<b>Cmdlet</b>	<b>Description</b>
Get-RMBackupSet	Gets backup set definitions.
Get-RMCommandSetVersion	Gets the version of the Replay Manager command set currently in use.
Get-RMComponentInfo	Gets the available components for use in a backup set.
Get-RMComponentRestoreOptions	Gets an array of component options that can be passed into Restore-RMRestorePoint. These options include the ability to exclude components from restore and perform restore with rename on SQL Server Databases.
Get-RMEmailSettings	Gets email notifications settings.
Get-RMExtension	Gets a list of the application extensions installed on the Replay Manager server. For each extension, the extension name (used with extension-specific cmdlets) and a brief description are returned.
Get-RMHostAvailableDriveLetter	Gets the available drive letters on the Replay Manager host that can be used for exposing a restore point. Not available for VMware.
Get-RMHostPath	Gets the directory path information from the Replay Manager host. The path can be used along with the Test-RMIsValidMountPath to find an available mount point for exposing a restore point. Not available for VMware.
Get-RMLicenseInfo	Gets the license state for the Replay Manager server.
Get-RMQueuedItem	Gets a list of tasks and jobs currently queued up or running on the server. This list includes the backup jobs in the queue, and other tasks like delete and restore.
Get-RMRestorePoint	Gets available restore points (successful backups).
Get-RMRestorePointReport	Gets the report log of a restore point.
Get-RMServerDefinition	Gets server definitions from a Storage Center for use in locating the server definition to use in Add-RMSystemSettings cmdlet. Not available for VMware.
Get-RMServerTime	Gets the current time and time zone of the connected server.
Get-RMServiceOptions	Gets service options for Replay Manager.
Get-RMSystemSettings	Gets the configured or discovered Storage Center connections.
Get-RMVerificationSettings	Gets verification settings for Replay Manager.
Get-RMVersion	Gets the Replay Manager version installed on the server.
Get-RMVMwareDatastoreInfo	Gets datacenter and datastore names.
Get-RMVMwareHostInfo	Gets datacenter and host name with cluster info.
Import-RMRestorePoint	Imports a transportable restore point on the server.
Mask-RMRestorePoint	Undoes the import of a restore point that was previously imported, exposed, or restored.
Mount-RMRestorePoint	Exposes a component from an available restore point.
Move-RMRestorePoint	Imports or exports a transportable restore point to or from another Replay Manager server.
New-RMBackupSet	Creates a backup set definition.
New-RMHostPath	Creates a directory path to be used as a mount point for exposing a restore point. If the requested path exists, the path information is returned. Not available for VMware.
Remove-RMBackupSet	Deletes a backup set definition.
Remove-RMBackupSetSchedule	Deletes a backup set schedule.

Cmdlet	Description
Remove-RMRestorePoint	Deletes a restore point.
Remove-RMSystemSettings	Deletes a Storage Center connection.
Restore-RMRestorePoint	Restores a component from an available restore point.
Resync-RMRestorePoint	<p>Resyncs a volume back to its original location.</p> <p><b>i</b> <b>NOTE:</b> The Resync-RMRestorePoint cmdlet is not supported for SMB file shares.</p> <p>If the resync fails with the message <code>VSS restore completed with failure</code> and the disk appears offline:</p> <ol style="list-style-type: none"> <li>1. Open <b>Server Manager</b> and select <b>Disk Management</b>.</li> <li>2. Right-click on the disk that is offline and select <b>Online</b>.</li> <li>3. From a command-line interface type the following commands:</li> </ol> <pre>DISKPART&gt; select disk &lt;DISK NUMBER&gt; DISKPART&gt; attributes disk clear readonly DISKPART&gt; online Disk</pre> <p><b>i</b> <b>NOTE:</b> For a resync failure with Exchange databases or volumes having an Exchange database, mount the Exchange database from Exchange Admin Center.</p>
Set-RMBackupSet	Updates settings for a backup set.
Set-RMBackupSetSchedule	Modifies a backup set schedule.
Set-RMEmailSettings	Sets email notification options.
Set-RMRestorePoint	Sets the Keep flag of a restore point.
Set-RMServiceOptions	Sets Replay Manager service options.
Set-RMSystemSettings	Updates a Storage Center connection.
Set-RMVerificationSettings	Sets verification server settings.
Submit-RMBackupSet	Submits a backup set for execution.
Test-RMEmailSettings	Submits a test email to verify email setup.
Test-RMIsValidMountPath	Verifies that the specified path is a valid drive letter or mount point that can be used to expose a restore point. Not available for VMware.
Unmount-RMRestorePoint	Unexposes a restore point.

# Troubleshooting

This section identifies solutions to specific problems in Replay Manager and provides instructions for generating a log file.

## Topics:

- [Troubleshooting Table](#)
- [Collecting Replay Manager Log Files](#)

## Troubleshooting Table

Use the following table to help troubleshoot issues with Replay Manager.

Problem	Solution
Backup set name is different in Storage Center than in Replay Manager	Names are truncated to 31 characters in Storage Center. <b>For more information:</b> <a href="#">User-Defined Name in Summary of Backup Set Options</a>
Connection failure	<ul style="list-style-type: none"> <li>• Check the firewall setting. This scenario is the most likely cause of the connection failure.</li> <li>• Open port 27444.</li> <li>• Configure the HTTP Proxy server using the <b>Bypass proxy server for local addresses</b> option.</li> </ul> <b>For more information:</b> <ul style="list-style-type: none"> <li>• <a href="#">Configure an HTTP Proxy Service</a></li> <li>• <a href="#">Inbound Ports in Replay Manager Ports</a></li> </ul>
Connection failure related to installation of RMS	<ul style="list-style-type: none"> <li>• Install the Replay Manager Service on all servers.</li> <li>• Open port 27444 on all servers.</li> </ul> <b>For more information:</b> <ul style="list-style-type: none"> <li>• <a href="#">Inbound Ports in Replay Manager Ports</a></li> </ul>
Scheduled backup did not run	Replay Manager queues a maximum of one scheduled job per backup set. Click Job Queue to make sure that the job is in the queue waiting to run. <b>For more information:</b> <ul style="list-style-type: none"> <li>• <a href="#">Guidelines for Backup Jobs</a></li> <li>• <a href="#">View Queued Items</a></li> </ul>
Connection to server fails	<ul style="list-style-type: none"> <li>• Install the Replay Manager Service on all servers.</li> <li>• Open port 27444 on all servers.</li> </ul> <b>For more information:</b> <ul style="list-style-type: none"> <li>• <a href="#">Install Replay Manager Service for Windows</a></li> <li>• <a href="#">Inbound Ports in Replay Manager Ports</a></li> </ul>
Data disappears after restoring a Replay	The <b>Restore</b> action restores data to its original location, overwriting the current data. To avoid losing current data, take a Replay immediately before using <b>Restore</b> or use <b>Expose</b> (rather than <b>Restore</b> ) and manually merge the Exposed data with the existing data. <b>For more information:</b> <ul style="list-style-type: none"> <li>• <a href="#">Restore Data to Its Original Location</a></li> <li>• <a href="#">Expose a Restore Point (Windows Extensions Only)</a></li> </ul>

Problem	Solution
	<ul style="list-style-type: none"> <li>• <a href="#">Expose a Restore Point (VMware Only)</a></li> <li>• <a href="#">Expose a Restore Point on an SMB File Share</a></li> </ul>
Email notifications not working	<ul style="list-style-type: none"> <li>• Verify SMTP settings.</li> <li>• Adjust spam settings on email server and/or client.</li> </ul>
Hyper-V/VMware backup fails	In a clustered server environment, make sure the VM owner and disk owner match.
Partial Replays created—Microsoft and VMware environments	If components are moved after configuring a backup set, only the components in the original locations get backed up. To correct, move components back to their original locations or create a backup set with the new locations.
Paths are truncated/different in SQL Server	This scenario is a known issue with SQL Server Management Studio (SSMS) data files. The full path is displayed for data and log files.
Backup failure	<p><b>Storage Center Issues</b></p> <ul style="list-style-type: none"> <li>• Make sure LUNs are available—transportable snapshots might not be expiring.</li> <li>• Expected behavior with Microsoft Exchange if the component is not a Storage Center volume.</li> <li>• <b>For more information:</b> <ul style="list-style-type: none"> <li>◦ <a href="#">Add or Modify Storage Centers for a Server or Host</a></li> <li>◦ <a href="#">Run Exchange Verification in Summary of Backup Set Options</a></li> </ul> </li> </ul> <p><b>Extension-specific Issues</b></p> <p>Sometimes when a Replay is taken during the time a primary controller fails over to the secondary controller, the Replay fails. Furthermore, the Microsoft VSS writer may be left in a bad state causing all future Replays to fail. In this case, bring the primary controller back online and follow the troubleshooting step for failed or missing VSS Writers.</p>
When you expose a Restore point of a Datastore, the Restore operations fail with the following error:  Failed to locate VMFS volume for snapshotThis issue may occur when ESX is configured with default timeout values in some configurations or setup.	<p>To decrease the time of the query operation, you can disable the filesystem liveness check.</p> <ol style="list-style-type: none"> <li>1. Log in to your host as root.</li> <li>2. Open the configuration file for <code>hostd</code> using a text editor.  The configuration file is located in <code>/etc/vmware/hostd/config.xml</code> under <code>plugins/hostsvc/storage</code> node.</li> <li>3. Add the <code>checkLiveFSUnresolvedVolume</code> parameter and set its value to <code>FALSE</code>. Use the following syntax: <pre>&lt;checkLiveFSUnresolvedVolume&gt;FALSE&lt;/checkLiveFSUnresolvedVolume&gt;</pre> </li> <li>4. As an alternative, you can set the ESXi Advanced option <code>VMFS.UnresolvedVolumeLiveCheck</code> to <code>FALSE</code> in the vSphere Client.</li> </ol>
Scheduled backup occurs at an unexpected time	<p>Verify <b>Current Server Time</b> in the <b>Modify Backup Schedule</b> dialog box. Replay Manager takes a Replay by using the server's time. If Replay Manager Explorer is installed on a different computer, with different time zone, it runs on server time.</p> <p>Replay Manager can only run one backup job at a time. If there are many jobs waiting in the queue, the scheduled backup is delayed.</p> <p><b>For more information:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Modify Schedules for an Existing Backup Set</a></li> <li>• <a href="#">Guidelines for Backup Jobs</a></li> </ul>
Exchange transaction logs are truncated or missing	<p>Expected behavior when VSS full backup is selected.</p> <p><b>For more information:</b></p> <p><a href="#">VSS full backup on Summary of Backup Set Options</a></p>
Unable to create an overnight schedule	<p>Use the <b>Exclude Time Range</b> option for the day hours—for example, 8:00 a.m. – 5:00 p.m..</p> <p><b>For more information:</b></p> <p><a href="#">Modify Settings for an Existing Backup Set</a></p>

<b>Problem</b>	<b>Solution</b>
Scheduled backup did not happen after volume was failed over	<p>Confirm that the Replay Manager Service is installed on the owner node, and that the Replay Manager Service is running as a user with proper privileges.</p> <p><b>For more information:</b></p> <p><a href="#">Replay Manager Service for Windows</a></p>
Failed or missing VSS Writers	<p>Restart the correct service for the missing VSS Writer. To view the current VSS Writers, open an elevated command prompt and run <code>vssadmin list writers</code>. These services might require an outage:</p> <ul style="list-style-type: none"> <li>• For Exchange Server: restart Microsoft Exchange Information Store (MSExchangeIS)</li> <li>• For Hyper-V: restart Hyper-V Virtual Machine Management (vmms)</li> <li>• For SQL Server: restart SQL Server VSS Writer (SQLWriter)</li> </ul>
Dell Storage folder appears empty on Windows Server 2016	<p>After installation of Replay Manager on Windows 2016, a Dell Storage folder is added to the list of Windows Apps. However, the folder might be empty, even though it should include all installed Replay Manager components. The installed Replay Manager components will be shown in the Recently Added Apps list and can be selected from there.</p> <p>There is no user workaround for this issue. Within one to two days, the Replay Manager components should be included in the Dell Storage folder.</p>

## Collecting Replay Manager Log Files

If requesting assistance from Dell Support, you might be asked to collect and send Replay Manager log files.

1. Create the directory `C:\work\Temp` on the server where the RMS service is installed.

Three RMS debug log files that are generated when the directory `C:\work\Temp` is present:

- `ReplayManagerProvider.log`—Debug log for the RMS VSS Provider
- `ReplayManagerService.log`—Debug log for the RMS Service
- `ReplayManagerExplorer.log`—Debug log for the RMS Explorer

2. After completing troubleshooting with Dell Support, delete the directory to stop RMS debug logging.

When troubleshooting Replay Manager problems, in addition to RMS log files you can also consult the Windows system logs for VSS type failures.