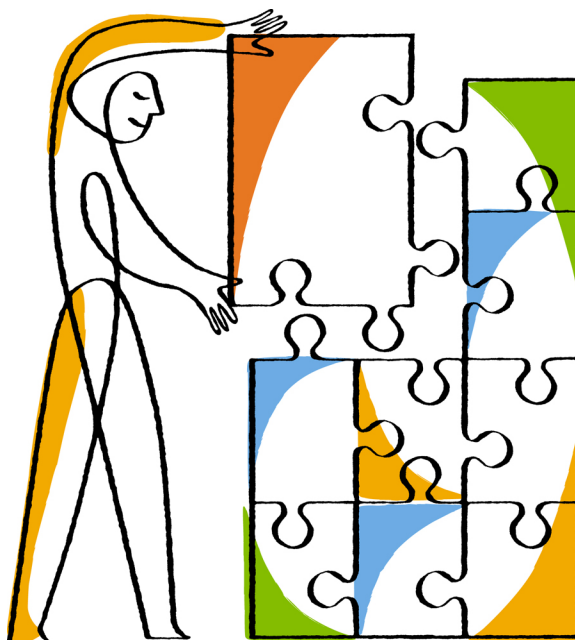




Virtual Storage Console 2.0 for Citrix® XenServer®

Installation and Administration Guide



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Changes to this document: April 2013

This section contains information about the changes made to this guide for the 2.0 version of Virtual Storage Console for Citrix XenServer. Previously, this guide was released with the 1.0 version of VSC for Citrix XenServer.

The guide documents the tasks you can perform with VSC for Citrix XenServer. If new information or corrections that affect this guide become available during the VSC for Citrix XenServer release, then this guide is updated with the new information, and this section lists what has changed and when it was changed. Any time this guide is updated, a note is added to the Release Notes. It is a good practice to check the online Release Notes on a regular basis to determine whether there is new information about using VSC for Citrix XenServer or changes to this guide. The most current versions of the Release Notes and this guide are posted on the NetApp Support Site, which is available online at support.netapp.com.

April 2013 update

In April 2013 this document was updated to add the following information in support of the 2.0 release of VSC for Citrix XenServer:

- There have been some minor changes to the structure of this document and the addition of general information about VSC for Citrix XenServer architecture and its new features for this release.
- You can perform an upgrade of VSC for Citrix XenServer using the installation wizard or silent mode.
For more information, see [Upgrading VSC for Citrix XenServer using installation wizard](#) on page 13 and [Upgrading VSC for Citrix XenServer using silent mode](#) on page 14.
- This release updates the ZAPIs used for role-based access control (RBAC).
For more information, see [Role Based Access Control for VSC for Citrix XenServer](#) on page 26.
- This release added support for block-based (Fiber Channel and iSCSI) storage repositories. Additional User Preferences options have been added to support working with the block-based storage repositories.
For more information, see [User Preferences window](#) on page 24.
- You can perform several management-oriented tasks regarding XenServer hosts: view host information and configure settings (provide host credentials and apply Multipath and iSCSI recommended values).
For more information, see [Managing hosts and storage controllers](#) on page 26.
- You can provision, resize, configure deduplication settings, and destroy the various types of storage repositories (NFS and the newly supported FC and iSCSI).

Note: Resizing is available for NFS-based storage repositories only.

For more information, see [Managing storage repositories overview](#) on page 44.

- Although support for block-based storage repositories is introduced in this release, the ability to clone virtual machines is limited to NFS-based storage repositories only.

For more information, see [Cloning virtual machines overview](#) on page 51.

- This release updates several cmdlets (Create, Resize, and Destroy).

For more information, see [PowerShell Cmdlets](#) on page 55.

- Additional troubleshooting topics, as well as error codes, messages, and resolutions have been added.

For more information, see [Troubleshooting](#) on page 69.

Virtual Storage Console for Citrix XenServer overview

Virtual Storage Console (VSC) for Citrix XenServer software is a single XenCenter Client plug-in that provides storage controller configuration, storage repository provisioning, and virtual machine (VM) cloning for Citrix XenServer environments running NetApp storage systems.

VSC for Citrix XenServer software provides the ability to fully automate and orchestrate common storage and VM deployment tasks to:

- Achieve operational agility and significantly reduce deployment, management, and troubleshooting time
- Ensure compliance with Citrix XenServer on NetApp storage systems provisioning and management best practices
- Achieve multiple levels of storage efficiency to ensure storage cost savings
- Support rapid, efficient, mass VM provisioning to meet changing business needs

VSC for Citrix XenServer software offers fully orchestrated, XenServer administration-driven provisioning and cloning capabilities:

- Storage controller discovery and configuration
- Network File System (NFS) and block (Fiber Channel (FC) and iSCSI (Internet Small Computer System Interface))-based storage repository provisioning, deduplication, resizing, and destruction

Note: Resizing is available for NFS-based storage repositories only.

- Rapid VM cloning (in existing and new NFS-based storage repositories only) for persistent desktops and virtual servers powered by NetApp FlexClone
- Cloned VMs are instantly available in the Citrix XenDesktop for placement into catalogs
- Exporting NFS storage repositories to an entire subnet

Additional features include:

- Role-based access control (RBAC) support, visible through the user interface
- Host management
 - Apply NetApp-recommended values when working with block-based storage repositories
 - Display host information and storage usage

Before setting up your network, make sure to review the recommended best practices regarding Citrix XenServer and NetApp storage design and deployment as provided in the NetApp Technical Report TR-3732: *Citrix XenServer and NetApp Storage Best Practices*.

As a XenCenter Client plug-in, VSC for Citrix XenServer can only be installed where XenCenter is installed.

You can locate VSC for Citrix XenServer version information by selecting the applicable plugins menu option available through your XenCenter environment. For example, select **Tools > Options > Plugins**. From the Plugins window, select **vsc** in the tree and the version information displays in the **Details** section at the bottom of the window.

Note: For more information about selecting the appropriate menu option for plugin version information for your environment, refer to the XenCenter documentation.

The Virtual Storage Console for Citrix XenServer software adds the following **NetApp VSC** options to the XenCenter Client main menu:

- Pool
 - **Provision Storage Repository**
- Server
 - **Provision Storage Repository**
- VM
 - **Clone Virtual Machine**
- Storage
 - **Resize Storage Repository**
 - **Deduplicate Storage Repository**
 - **Destroy Storage Repository**
- Tools
 - **Discovery and Configuration**
 - **User Preferences**
 - **View Audit Log**
 - **Export Support Logs**
- Window
 - **NetApp VSC Log Window**

These menu options (except for the **Tools** and **Window** options) are also available using the right-click menu within the XenCenter Client left pane:

- Right-click a pool or server to provision storage repositories.
- Right-click a storage repository to manage (resize, deduplicate, or destroy) storage repositories.

Note: Resizing is available for NFS-based storage repositories only.

- Right-click a virtual machine to create clones.

Installation overview

You can install VSC for Citrix XenServer on a 32-bit or 64-bit Windows computer that has XenCenter Client installed.

To install the VSC for Citrix XenServer software, follow these guidelines:

- VSC must be installed on a local disk of the Windows computer. Do not attempt to install VSC for Citrix XenServer on a network share.
- VSC is a 32-bit application. When installing on a 32-bit system, the default installation directory is C:\Program Files. When installing on a 64-bit system, the default directory is C:\Program Files (x86). During a silent install, you cannot force the installation to the Program Files directory on a 64-bit system.
- The Windows computer running VSC and the management ports of the storage controllers must be networked with the XenServer hosts.
- A reboot of the Windows computer is not required to complete the installation, upgrade, or uninstall process. However, before installing, upgrading, or uninstalling VSC, make sure to close the XenCenter Client.
- At a minimum, the display resolution must be set to 1280 by 1024 pixels to view VSC pages correctly.

Installation requirements and configuration information

Before you install the Virtual Storage Console for Citrix XenServer plug-in, you should be aware of the following requirements and configuration information.

License requirements

The following software licenses may be required for VSC for Citrix XenServer depending on which tasks you perform:

- NFS license (for provisioning NFS-based storage repositories)
- FC license (for provisioning FC-based storage repositories)
- iSCSI license (for provisioning iSCSI-based storage repositories)
- MultiStore (if working with vFiler units)

Note: For platforms where the MultiStore license is installed by default (for example, Data ONTAP 8.1), this option must be enabled (`licensed_feature.multistore.enable`).

- FlexClone (for cloning virtual machines)
- A_SIS (for configuring deduplication settings)

Software requirements

The following software is required for use with VSC for Citrix XenServer:

- .NET Framework
- PowerShell
- Data ONTAP
- XenServer
- XenCenter
- Microsoft Windows software

See the Interoperability Matrix, which is online at support.netapp.com/NOW/products/interoperability, for details regarding the supported software.

Note: VSC for Citrix XenServer does not support IPv6. If storage controllers that will be used with VSC have IPv6 enabled, IPv6 should be disabled before installing VSC for Citrix XenServer.

Hardware requirements

Refer to the XenCenter Client hardware requirements. The VSC for Citrix XenServer software supports these minimum hardware requirements.

There should be at least 200 MB of space available for the VSC for Citrix XenServer.

Related information

[Interoperability Matrix: support.netapp.com/NOW/products/interoperability](http://support.netapp.com/NOW/products/interoperability)

Installing VSC for Citrix XenServer using the installation wizard

You can use the installation wizard to install the VSC for Citrix XenServer software.

Before you begin

You must be logged on with administrator privileges to the machine where you are installing VSC for Citrix XenServer.

Before installing VSC, make sure that the following are installed on the XenCenter Client:

- .NET Framework
- PowerShell

In addition, VSC for Citrix XenServer does not support IPv6. If storage controllers that will be used with VSC have IPv6 enabled, IPv6 should be disabled before installing VSC for Citrix XenServer.

Note: For specific information regarding these requirements, refer to the topic *Installation requirements and configuration information*.

In addition, make sure to close XenCenter before installing VSC.

About this task

VSC cannot be installed to a mapped network drive.

To install the VSC using the installation wizard, perform the following steps.

Steps

1. Download the VSC for Citrix XenServer installer (VSCX-2.0.exe).
2. Double-click the installer icon, and click **Run** to start the installation wizard.
3. Follow the instructions in the installation wizard to install the software.

Note: When choosing the installation location, make sure to select the XenCenter installation directory as the destination for the VSC for Citrix XenServer plug-in (for example, C:\Program Files\Citrix\XenCenter). If you select a location other than the appropriate XenCenter installation directory, the installer wizard will not allow the installation process to continue.

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

Result

The install.log file containing the actions performed during the installation process is generated and placed in the VSC for Citrix XenServer installation directory (for example, C:\Program Files\Citrix\XenCenter\Plugins\NetApp\vsc). In addition, this file will also contain any errors and associated messages that might occur during this process.

Related concepts

[Installation requirements and configuration information](#) on page 9

Installing VSC for Citrix XenServer using silent mode

You can install VSC for Citrix XenServer using silent mode instead of the installation wizard.

Before you begin

You must be logged on with administrator privileges to the machine where you are installing VSC for Citrix XenServer.

Before installing VSC, make sure that the following are installed on the XenCenter Client:

- .NET Framework
- PowerShell

In addition, VSC for Citrix XenServer does not support IPv6. If storage controllers that will be used with VSC have IPv6 enabled, IPv6 should be disabled before installing VSC for Citrix XenServer.

Note: For specific information regarding these requirements, refer to the topic *Installation requirements and configuration information*.

In addition, make sure to close XenCenter before installing VSC.

About this task

A silent installation means that no user interface, progress bars, or error messages are displayed during the installation process.

VSC cannot be installed to a mapped network drive.

To install the VSC using silent mode from a command line, perform the following steps.

Steps

1. Download the VSC for Citrix XenServer installer (VSCX-2.0.exe).
2. From a command line prompt, switch to the directory where you saved the executable file.
3. Run the following command with the silent mode (/S) option:

```
VSCX-2.0.exe /S /D=XenCenter_installation_directory
```

For example:

```
VSCX-2.0.exe /S /D=C:\Program Files\Citrix\XenCenter
```

Important: When entering the installation directory for the /D option, be aware of the following:

- When installing VSC on a 64-bit system, you cannot force the installation to the Program Files directory. You must use the default directory Program Files (x86).
- Do not use quotation marks around the installation directory:
Incorrect example:

```
VSCX-2.0.exe /S /D="C:\Program Files\Citrix\XenCenter"
```

The installation begins and runs in the background.

Result

The files are installed in the XenCenter Plugins directory (for example, C:\Program Files\Citrix\XenCenter\Plugins\NetApp\vsc).

Note: There is no log file, such as the install.log file generated when using the installation wizard, produced during this silent install.

Related concepts

[Installation requirements and configuration information](#) on page 9

Upgrading VSC for Citrix XenServer using the installation wizard

You can use the installation wizard to upgrade the VSC for Citrix XenServer software. The VSC for Citrix XenServer installer checks the version number of the currently installed plug-in to determine whether you are upgrading to the newer version.

Before you begin

You must be logged on with administrator privileges to the machine where you are installing VSC for Citrix XenServer.

Before installing VSC, make sure that the following are installed on the XenCenter Client:

- .NET Framework
- PowerShell

Note: For specific information regarding these requirements, refer to the topic *Installation requirements and configuration information*.

In addition, make sure to close XenCenter before upgrading VSC.

About this task

When the installer checks the version number of the currently installed plug-in, if you attempt to install the same or an earlier version, the installer will abort the installation.

Steps

1. Download the VSC for Citrix XenServer installer (VSCX-2.0.exe).
2. Double-click the installer icon, and click **Run** to start the installation wizard.

The installer checks the currently installed version.

- If the previous version is detected, then the installer continues the upgrade process.
- If the same or newer version is detected, then the installer aborts the upgrade process.
- If the incorrect version of the installer is detected, then the installer cancels the upgrade process.

3. Follow the instructions in the installation wizard to continue the upgrade process.

Note: When choosing the installation location, make sure to select the XenCenter installation directory as the destination for the VSC for Citrix XenServer plug-in (for example, C:\Program Files\Citrix\XenCenter). If you select a location other than the appropriate

XenCenter installation directory, the installer wizard will not allow the installation process to continue.

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

Result

The `install.log` file containing the actions performed during the upgrade process is generated and placed in the VSC for Citrix XenServer installation directory (for example, `C:\Program Files\Citrix\XenCenter\Plugins\NetApp\vsc`). In addition, this file also contains any errors and associated messages that might occur during this process.

Note: If there was an `install.log` file as a result of a previous installation, that file will be replaced by the current installation log file.

Upgrading VSC for Citrix XenServer using silent mode

You can upgrade VSC for Citrix XenServer using silent mode instead of the installation wizard. The VSC for Citrix XenServer installer checks the version number of the currently installed plug-in to determine whether you are upgrading to the newer version.

Before you begin

You must be logged on with administrator privileges to the machine where you are installing VSC for Citrix XenServer.

Before installing VSC, make sure that the following are installed on the XenCenter Client:

- .NET Framework
- PowerShell

Note: For specific information regarding these requirements, refer to the topic *Installation requirements and configuration information*.

In addition, make sure to close XenCenter before upgrading VSC.

About this task

When the installer checks the version number of the currently installed plug-in, if you attempt to install the same or an earlier version, the installer will abort the installation.

A silent upgrade means that no user interface, progress bars, or error messages are displayed during the installation process.

VSC for Citrix XenServer cannot be installed to a mapped network drive.

To upgrade the VSC using silent mode from a command line, perform the following steps.

Steps

1. Download the VSC for Citrix XenServer installer (VSCX-2.0.exe).
2. From a command line prompt, switch to the directory where you saved the executable file.
3. Run the following command with the silent mode (/S) option:

```
VSCX-2.0.exe /S /D=XenCenter_installation_directory
```

For example:

```
VSCX-2.0.exe /S /D=C:\Program Files\Citrix\XenCenter
```

Important: When entering the installation directory for the /D option, be aware of the following:

- When upgrading VSC on a 64-bit system, you cannot force the installation to the Program Files directory. You must use the default directory Program Files (x86).
- Do not use double quotes around the installation directory:
Incorrect example:

```
VSCX-2.0.exe /S /D="C:\Program Files\Citrix\XenCenter"
```

The installer checks the currently installed version.

- If the previous version is detected, then the installer continues the upgrade process and runs in the background.
- If the same or newer version is detected, then the installer aborts the upgrade process.
- If the incorrect version of the installer is detected, then the installer cancels the upgrade process.

Result

The files are installed in the XenCenter Plugins directory (for example, C:\Program Files\Citrix\XenCenter\Plugins\NetApp\vsc).

Note: There is no log file, such as the install.log file generated when using the installation wizard, produced during this silent upgrade.

Consequently, if there was an existing install.log resulting from a previous installation, the file will not be modified during this silent upgrade.

Uninstalling VSC for Citrix XenServer using Add/Remove Programs

You can uninstall the VSC for Citrix XenServer software from the XenCenter Client using the Windows Remove or Uninstall Programs list.

Before you begin

You must be logged on with administrator privileges to the machine where you are uninstalling VSC for Citrix XenServer.

Before uninstalling VSC, make sure to close XenCenter.

About this task

The uninstall process removes the VSC for Citrix XenServer application. However, the logs and data files are kept in a separate location; when uninstalling with the Windows remove programs feature, you have the option to either remove these files or to leave them.

Note: The option to remove the logs and data files is not available when uninstalling VSC for Citrix XenServer using the silent mode; these files are removed automatically.

To uninstall the VSC for Citrix XenServer using the Windows remove program, perform the following steps.

Steps

1. On the XenCenter Client where the VSC for Citrix XenServer software is installed, navigate to the Windows Control Panel and using the applicable remove or uninstall feature, select **Virtual Storage Console for Citrix XenServer**.

For details on how to use the Windows remove programs feature to uninstall programs, see the documentation for your Windows operating system.

2. Click the uninstall or remove option.

An uninstall prompt appears.

3. At the prompt, click **Yes** to remove all the logs and data files from the installation directory or click **No** to leave the files in the directory.

All of the associated files, except for the user `.config` file, are removed from the XenCenter Plugins directory after a successful uninstall.

If you want to remove the user `.config` file, see the details in the **After you finish** section.

Result

The `netapp-vsc-uninstall.log` file contains the actions performed during the uninstall process. In addition, this file will also contain any errors and associated messages that might occur during this process.

The `netapp-vsc-uninstall.log` file is located in your Temp directory (for example, `C:\Temp`).

After you finish

If you want to completely remove the `user.config` file after the uninstall process, you must delete the following directory:

```
APP_DATA\Local\NetApp\vsc.exe_Url_[ID]
```

The `APP_DATA` string in the path depends on your configuration (for example, `C:\Users\your_username\AppData`) and `ID` is a unique identifier generated by Windows at runtime for security purposes.

If the uninstall is incomplete, you must delete the VSC for Citrix XenServer registry key from your system.

- 32-bit system:
`HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\NetApp Virtual Storage Console for Citrix XenServer`
- 64-bit system:
`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\Windows\CurrentVersion\Uninstall\NetApp Virtual Storage Console for Citrix XenServer`

Uninstalling VSC for Citrix XenServer using silent mode

You can uninstall VSC for Citrix XenServer from the XenCenter Client using silent mode instead of the Windows Add/Remove Program. With the command line, you can automatically uninstall the entire VSC for Citrix XenServer at once.

Before you begin

You must be logged on with administrator privileges to the machine where you are uninstalling VSC for Citrix XenServer.

Before uninstalling VSC, make sure to close XenCenter.

About this task

The uninstall process using the silent mode removes the entire VSC for Citrix XenServer application, including the logs and data files.

In addition, the `netapp-vsc-uninstall.log` file, which is generated when using the Windows remove programs feature, is not produced during this silent uninstall.

To uninstall the VSC for Citrix XenServer using silent mode from a command line, perform the following step.

Step

1. On the XenCenter Client where the VSC for Citrix XenServer software is installed, from a command line prompt, run the following command with the silent mode option:

```
vsc_installation_directory\uninstall.exe /S
```

Where `vsc_installation_directory` is the VSC for Citrix XenServer installation directory. For example:

```
C:\Program Files\Citrix\XenCenter\Plugins\NetApp\vsc
```

All of the associated files, except for the user `.config` file, are removed from the XenCenter Plugins directory after a successful uninstall.

If you want to remove the user `.config` file, see the details in the **After you finish** section.

After you finish

If you want to completely remove the user `.config` file after the uninstall process, you must delete the following directory:

```
APP_DATA\Local\NetApp\vsc.exe_url_[ID]
```

The `APP_DATA` string in the path depends on your configuration (for example, `C:\Users\your_username\AppData`) and `ID` is a unique identifier generated by Windows at runtime for security purposes.

If the uninstall is incomplete, you must delete the VSC for Citrix XenServer registry key from your system.

- 32-bit system:
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\NetApp Virtual Storage Console for Citrix XenServer
- 64-bit system:
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\Windows\CurrentVersion\Uninstall\NetApp Virtual Storage Console for Citrix XenServer

User Preferences

User Preferences consists of the options that control the VSC for Citrix XenServer provisioning and cloning operations.

To view User Preferences, from the XenCenter Client menu bar, select **Tools > NetApp VSC > User Preferences**. The User Preferences window displays the available options. You can edit only the option **Value**.

Preference options

VSC for Citrix XenServer **User Preferences** contains the following options:

Controller Cmdlet Timeout

Default value: 60

Controls the length of time (in seconds) for executing a cmdlet on the storage controller.

Controller Discovery Timeout

Default value: 250

Controls the length of time (in milliseconds) for the controller discovery process. By default, the discovery process is cancelled if it takes longer than 250 ms to validate a storage controller. In some large environments, it may be necessary to increase this timeout value.

Default Volume Dedupe

Default value: True

Enables deduplication on new storage repository volumes, by default.

When provisioning volumes and this option is set to True, be aware that there are limits for volume sizes. For detailed information, refer to the Technical Report TR-3505: *NetApp Deduplication for FAS and V-Series Deployment and Implementation Guide*.

Destroy Parent Volume

Default value: False

When the last NFS-based storage repository FlexClone volume is destroyed, the gold volume is not destroyed. Setting this option to True causes the gold volume to be destroyed when the last FlexClone volume is destroyed.

For example, 100 clones were created to 10 new storage repositories, and a gold volume was created during this process. As a result, there is a total of 11 volumes (one gold volume and 10 copies (FlexClone volumes), which are tied to the 10

storage repositories). When the 10 storage repositories (and consequently the 10 FlexClone volumes) are destroyed, the one gold volume remains – by default. However, if this option is set to `True`, the associated gold volume is destroyed when the last FlexClone volume is destroyed.

Export To All Xen NICs

Default value: `False`

Setting this option to `True` exports to every interface in the Xen environment.

Export To Subnet

Default value: `False`

Setting this option to `True` exports new NFS storage repositories to all hosts in the subnet.

Fractional Reserve

Default value: `0`

Reduces the amount of guaranteed available reserve space. By doing this, the amount of space guaranteed to be available for files-overwrites based on application requirements can be adjusted and make better use of available volume space. It is adjustable between 0 and 100% of the size of the files.

iSCSI Mount Networks

Default value: `None`

Allows only specified networks to mount iSCSI storage repositories. Any matching network between controller and XenServer is used to mount iSCSI storage repositories. In some implementations, it is important to fence off the networks that should be used for iSCSI. The network specified is that of the XenServer interface, not an interface on the storage system. The `all` keyword means that all matching networks between the XenServer and the storage system interfaces can be used for mounting iSCSI storage repositories. You can specify different networks here to enable mounting across different subnets.

iSCSI Restrict Mount Networks

Default value: `None`

Prevents a network from being used to mount iSCSI storage repositories. In some implementations, certain networks should not be used for mounting, even if they contain the required interfaces on both the controller and XenServer hosts.

For example, if you enter `192.168.2.0;10.1.0.0` in the Value field, these networks will be ignored when determining the IP address on the controller to use for the next iSCSI storage repository.

Minimal Read-Ahead

Default value: `Off`

Turns the minimal read-ahead volume buffering off (by default).

Important: If you want to enable this option (setting the value to `On`), consult with NetApp Technical Support. Enabling this option might cause performance issues when not used properly.

Mount Using Host Name

Default value: `False`

Setting this option to `True` mounts a storage repository using the storage controller host name.

NFS Mount Networks

Default value: `None`

Allows only specified networks to mount NFS storage repositories. Any matching network between controller and XenServer is used to mount NFS storage repositories. In some implementations, it is important to fence off the networks that should be used for NFS. The network specified is that of the XenServer interface, not an interface on the storage system. The `all` keyword means that all matching networks between the XenServer and the storage system interfaces can be used for mounting NFS storage repositories. You can specify different networks here to enable mounting across different subnets.

NFS Restrict Mount Networks

Default value: `None`

Prevents a network from being used to mount NFS storage repositories. In some implementations, certain networks should not be used for mounting, even if they contain the required interfaces on both the controller and XenServer hosts.

For example, if you enter `192.168.2.0;10.1.0.0` in the Value field, these networks will be ignored when determining the IP address on the controller to use for the next NFS storage repository.

No ATime Update

Default value: `On`

Disables updating of access time when files are read. For better performance in a heavy read traffic environment, leave the default value (`On`).

No Snap

Default value: `On`

Disables scheduled snapshot copies for new FlexClone volumes.

Only Offline

Default value: `False`

Controls the Destroy feature by establishing whether a volume will be destroyed (by default) or left intact but taken offline (as happens when the value is set to True).

Pre-Resize Snapshot

Default value: True

Takes a snapshot of the volume before resizing the associated NFS-based storage repository.

Volume Snap Reserve

Default value: 0

Sets the snapshot reserve size (in bytes) for new volumes to the specified percentage.

Volume Wrapper Autogrow Increment

Default value: 5

Determines by how much a volume should automatically grow, as a percentage of the original volume size.

Note: When provisioning volumes, make sure the resulting value does not exceed the limits specified by Data ONTAP.

Volume Wrapper Autogrow Multiplier

Default value: 2

Sets the autogrow maximum size multiplier of the original volume size.

Note: When provisioning volumes, make sure the resulting value does not exceed the limits specified by Data ONTAP.

Volume Wrapper Buffer

Default value: 5

Sets the amount of additional capacity in a volume containing block-based storage repositories.

Volume Wrapper Destroy Parent

Default value: False

When the last block-based storage repository LUN is removed, the parent volume is not destroyed. Setting this option to True causes the volume to be destroyed when last LUN is removed.

For example, several new LUN-backed storage repositories were provisioned to an existing volume. When the last storage repository (and consequently the last LUN) is destroyed, the existing volume remains by default. However, if this option is set to True, the parent volume is destroyed when the last LUN contained in it is destroyed.

Note: A volume can have multiple LUNs, which could have been created by VSC (for example, LUN A) or outside of VSC (for example, LUN B). If you attempt to destroy the storage repository on LUN A, and this option is set to `True`, the parent volume will *not* be deleted because LUN B is still present.

Important: In addition to a volume possibly having multiple LUNs, potentially created within and outside of VSC, a volume might also contain additional data outside of the LUN. If you attempt to destroy the last storage repository on the last LUN, and this option is set to `True`, and there is additional data in the volume, the parent volume will be deleted, which will result in losing the outside data.

Volume Wrapper Space Reservation

Default value: `False`

Setting this option to `True` reserves space on the volume containing block-based storage repositories.

Editing User Preferences

You can modify the value for each option contained within the User Preferences window.

About this task

After modifying **User Preferences** options and saving the changes, a restart is not required. The saved changes are available immediately.

To edit the **User Preferences** options, perform the following steps.

Steps

1. From the XenCenter main menu, select **Tools > NetApp VSC > User Preferences**.
The User Preferences window displays.
2. Select the option and click the **Value** entry.
3. Modify the entry by either typing a new value or selecting an option from the drop-down list.
4. When you have finished editing the values, save the changes (click **Save Preferences** or **Ctrl+S**).

Note: Any changes made are validated to make sure appropriate values were entered. If you enter an invalid value, the cell for that value displays a red circle with an exclamation point.

5. Close the window.

Note: If you attempt to close the window without saving the changes, you will be prompted about whether you want to save the changes.

Restoring default User Preferences values

You can restore the User Preferences to their original default values.

About this task

After restoring the **User Preferences** default values and saving the restoration, a restart is not required. The change is available immediately.

To restore the **User Preferences** options to their default values, perform the following steps:

Steps

1. From the XenCenter main menu, select **Tools > NetApp VSC > User Preferences**.

The User Preferences window displays.

2. Click **Restore Default Values**.

3. Click **Yes** when prompted about whether you want to restore the preferences to their original values.

The option values are restored to their original default settings and saved.

4. Close the window.

User Preferences window

The User Preferences window enables you to view the VSC for Citrix XenServer user preference options and edit the option values.

Command buttons

The command buttons enable you to perform the following tasks:

Restore Default Values Restores the factory default values for each option.

Save Preferences Saves the latest changes that you made to the data in the User Preferences window.

Options table

The table lists VSC for Citrix XenServer user preferences options.

You can rearrange the order of the listed options by using the sorting feature available for each column.

Name	The name of the option.
Value	The assigned value of the option.
Description	The description of the option.

Managing hosts and storage controllers

VSC for Citrix XenServer provides you with the ability to manage storage controllers, as well as XenServer host configuration settings, through the **Tools > NetApp VSC > Discovery and Configuration** option.

Before storage repositories can be provisioned, you must manually add or discover the storage controllers that provide the storage. As part of the process, you must supply credentials (username/password pairing) for the storage controllers, which can be the root account or a custom account that uses role-based access control (RBAC). The privileges associated with the supplied credentials in the **Credentials** section of the New Controller wizard cannot be changed. For more information about RBAC, see *Role Based Access Control for VSC for Citrix XenServer*.

In addition, if you plan to work with block (FC and iSCSI)-based storage repositories, you can view XenServer host information, as well manage several configuration settings, such as host credentials and the application of Multipath and iSCSI recommended values.

Related concepts

[*Role Based Access Control for VSC for Citrix XenServer*](#) on page 26

Role Based Access Control for VSC for Citrix XenServer

Role-based access control (RBAC) is optional; however, the implementation of RBAC is recommended if you want to manage user roles and access. Otherwise, you can use root or full permission on the NetApp storage controller.

The RBAC operation for VSC for Citrix XenServer is implemented by the use of Zephyr APIs (ZAPIs) on the storage controller side. RBAC also requires permissions associated with the Pool administrator role on the XenServer side.

The following ZAPIs and commands/directories are used to manage the storage controllers:

- Data ONTAP operating in 7-Mode
 - Create clones
 - Minimum role. Required to add storage controllers; permission to use file-level FlexClone to clone VMs.
 - api-aggr-list-info
 - api-cf-status
 - api-clone-clear
 - api-clone-list-status
 - api-clone-start
 - api-clone-stop

- api-ems-autosupport-log
- api-fcp-port-name-list-info
- api-fcp-service-status
- api-file-create-directory
- api-file-delete-directory
- api-file-delete-file
- api-file-get-file-info
- api-file-list-directory-iter-start
- api-file-list-directory-iter-next
- api-file-list-directory-iter-end
- api-igroup-list-info
- api-iscsi-portal-list-info
- api-iscsi-service-status
- api-iscsi-session-list-info
- api-license-list-info
- api-lun-get-geometry
- api-lun-list-info
- api-lun-map-list-info
- api-net-ifconfig-get
- api-nfs-exportfs-list-rules-2
- api-nfs-status
- api-qtree-list
- api-snapmirror-get-volume-status
- api-snapshot-list-info
- api-system-cli
- api-system-get-info
- api-system-get-ontapi-version
- api-system-get-version
- api-useradmin-group-list
- api-useradmin-user-list
- api-vfiler-get-status
- api-vfiler-list-info
- api-volume-autosize-get
- api-volume-list-info
- cli-df
- cli-mv
- cli-ndmpd
- cli-qtree
- cli-vfiler
- login-http-admin

- login-ndmp
- login-ssh
- security-api-vfiler
- security-priv-advanced
- Create storage
Includes previous role. Permission to create storage objects (Create Volume/LUN).
 - api-igroup-add
 - api-igroup-create
 - api-iscsi-node-get-name
 - api-lun-create-by-size
 - api-lun-create-from-file
 - api-lun-get-comment
 - api-lun-map
 - api-lun-move
 - api-lun-online
 - api-lun-set-comment
 - api-lun-set-space-reservation-info
 - api-lun-unmap
 - api-nfs-exportfs-load-exports
 - api-nfs-exportfs-modify-rule-2
 - api-sis-enable
 - api-sis-start
 - api-sis-stop
 - api-snapshot-create
 - api-snapshot-set-reserve
 - api-vfiler-add-storage
 - api-volume-autosize-set
 - api-volume-clone-create
 - api-volume-create
 - api-volume-options-list-info
 - api-volume-set-option
 - cli-iscsi
- Modify storage
Includes previous role. Permission to manipulate storage objects (Resize Volume, Deduplicate Volume).
 - api-volume-size
 - api-sis-disable
- Destroy storage
Includes previous role. Permission to destroy storage objects (Destroy Volume/LUN).
 - api-volume-offline

- api-volume-destroy
- api-lun-offline
- api-lun-destroy
- Clustered Data ONTAP
 - Create clones

Minimum role. Required to add storage controllers; permission to use file-level FlexClone to clone VMs.

 - Read-only commands/directories:
 - storage aggregate
 - cluster identity show
 - vservers export-policy rule show
 - volume file
 - system license show
 - vservers services unix-group show
 - vservers services unix-user show
 - network interface show
 - security login show
 - security login role show
 - volume efficiency show
 - system node show
 - version
 - volume show
 - vservers show
 - Read-write commands/directories:
 - volume file clone create
 - system node
 - volume file show-disk-usage
 - volume file
 - vservers nfs status
 - system node run
 - system services ndmp
 - Create storage

Includes previous role. Permission to create storage objects (Create Volume/LUN).

 - Read-only commands/directories:
 - network fcp adapter show
 - vservers fcp initiator show
 - vservers fcp show
 - vservers fcp status
 - lun igroup show

- vserver iscsi connection show
- vserver iscsi interface accesslist show
- vserver iscsi nodename
- vserver iscsi show
- vserver iscsi status
- vserver iscsi session show
- lun geometry
- lun show
- lun mapped show
- Read-write commands/directories:
 - system node autosupport invoke
 - vserver export-policy rule create
 - lun igroup add
 - lun igroup create
 - lun igroup set
 - vserver iscsi interface accesslist add
 - lun create
 - lun map
 - lun move
 - lun online
 - lun comment
 - lun modify
 - lun unmap
 - vserver services unix-group create
 - vserver services unix-user create
 - vserver export-policy show
 - volume efficiency on
 - volume efficiency start
 - volume snapshot create
 - volume modify
 - volume autosize
 - volume clone create
 - volume create
 - volume modify
- Modify storage
Includes previous role. Permission to manipulate storage objects (Resize Volume, Deduplicate Volume).
- Read-write commands/directories:
 - volume efficiency off
 - volume efficiency stop

- volume size
- Destroy storage
 - Includes previous role. Permission to destroy storage objects (Destroy Volume/LUN).
- Read-write commands/directories:
 - lun delete
 - lun offline
 - volume destroy
 - volume offline
 - volume unmount

Storage controller management

You must manually add or discover the storage controllers that provide the storage.

Prior to setting up your network and initiating the storage controller discovery process, make sure to review the recommended best practices regarding Citrix XenServer and NetApp storage design and deployment as provided in the NetApp Technical Report TR-3732: *Citrix XenServer and NetApp Storage Best Practices*.

From the **Storage Controllers** tab on the Storage Controllers window (accessed from the **Tools > NetApp VSC > Discovery and Configuration** option), you can perform the tasks (add or discover, edit, and delete) to manage storage controllers.

As part of the discovery process, you must supply credentials, which are treated as *global* credentials and are applied to each controller that is discovered. If the credentials fail, you will need to edit the failed credentials individually.

In addition, the only type of storage controllers that are discovered are Administrator Vservers and physical storage controllers. If a physical storage controller has vFiler units configured, those vFiler units display in the Pass-Through Controllers section of the Storage Controllers window.

Discovering and adding storage controllers

You must manually find or discover and add storage controllers to the XenCenter Client.

Before you begin

You must have reviewed the topic *Guidelines for discovering storage controllers*.

About this task

When discovering or adding storage controllers, you have the following options:

- Add a single controller
- Discover a group of controllers by specifying a range of IP addresses
- Discover a group of controllers by specifying an IP address and net mask

As part of the discovery process, you must supply credentials, which are treated as *global* credentials and are applied to each controller that is discovered. If the credentials fail, you need to edit the failed credentials individually.

Steps

1. Open the XenCenter Client.

2. Select **Tools > NetApp VSC > Discovery and Configuration**.

The Storage Controllers window opens, with the **Storage Controllers** tab as the default view.

3. Click **Add a Controller**.

The New Controller wizard opens.

4. Select one of the following storage controller options and provide the required data:

- **Add a single controller** – Adds a single controller with a specified IP address or host name.
- **Discover controllers by IP range** – Discovers a group of controllers within a range of IP addresses.
- **Discover controllers by net mask** – Discovers a group of controllers at a specified IP address and by a net mask.

5. Specify the credentials.

Depending on the storage controller option that was selected, perform one of the following:

- Click **Next** if adding a single controller.
The credentials are validated, and interface, aggregate, and volume information is extracted; the wizard advances to the Roles screen.
- Click **Finish** if discovering multiple controllers.
The wizard finishes and the controllers are listed as discovered in the **Controllers** table in the Storage Controllers window.

6. Verify the roles assigned to the credentials you provided; then, click **Next**.

The wizard advances to the Usables screen.

7. Select the appropriate usable interfaces, aggregates, and volumes, then click **Finish**.

Note: Make sure to follow the recommendations provided in the *Guidelines for discovering storage controllers* topic.

Discovered controllers are added to the **Controllers** table in the Storage Controllers window.

Related concepts

[Guidelines for discovering storage controllers](#) on page 33

Guidelines for discovering storage controllers

There are several factors to consider, depending on the type of controller, when you attempt to add or discover storage controllers.

As you proceed through the New Controller wizard and attempt to add or discover a storage controller, consider the following guidelines:

- You can only set the Usables information (interface, aggregate, and volume) on a storage controller running Data ONTAP operating in 7-mode (except vFiler units). If adding or discovering a storage controller running clustered Data ONTAP (Admin Vserver and data Vserver), the wizard completes the discovery process, bypassing the Usables, and returns to the main Storage Controllers window.
- Any type of discovery operation returns you to the main Storage Controllers window. If you want to see the resulting actions that took place, select **Tools > NetApp VSC > View Audit Log**.
- When discovering a group of controllers, use the following formats as examples for the required fields:
 - by IP range:
 - Start:
10.61.167.40
 - End:
10.61.167.60
 - by net mask:
 - Address:
10.61.167.0
 - Mask:
255.255.255.0
- Discovering a group of controllers by either IP range or by net mask uses SNMP to detect all of the available physical and cluster storage controllers. The pass-through controllers are not discovered directly. The SNMP agent on the storage controllers receives requests over User Datagram Protocol (UDP); any firewall blocking that might drop the packets used during the discovery process.
- For storage controllers that are discovered, the specified set of credentials might not apply. If that is the case, you will need to select those controllers whose credentials are not set and specify them individually.
- When discovering a storage controller with multiple IP addresses and you plan to provision iSCSI storage repositories, the following recommendations will aid in facilitating the provisioning process:
 - Only one IP address (depending on the Data ONTAP version, either one vif or interface group for Data ONTAP operating in 7-mode, or one LIF for clustered Data ONTAP) should be designated for iSCSI provisioning.

- The IP (either vif or interface group or LIF) designated for iSCSI provisioning should not share a subnet with any of the other IP addresses.

If these are not followed, you might encounter an error when provisioning iSCSI storage repositories.

Editing storage controllers

You can edit credentials for any type of storage controller that was added (physical storage controllers, Admin Vserver, or data Vserver), as well as edit Usables information (interfaces and aggregates) for physical storage controllers. Unlike the credential and usables information, the roles assigned to the account cannot be altered.

Before you begin

You must have reviewed the topic *Guidelines for discovering storage controllers*.

Steps

1. Open the XenCenter Client.
2. Select **Tools > NetApp VSC > Discovery and Configuration**.
The Storage Controllers window opens with the **Storage Controllers** tab as the default view.
3. Select the controller that you want to edit and click **Edit Controller Settings**.
4. Depending on the type of storage controller (either physical or running clustered Data ONTAP), perform the following:

- Physical storage controllers:
 - a. Change the credentials, if needed; then, click **Next**.
 - b. The roles cannot be altered; click **Next**.
 - c. Change usable interfaces and aggregate information, if needed; then, click **Finish**.

Note: Make sure to follow the recommendations provided in the *Guidelines for discovering storage controllers* topic.

- Controllers on a clustered system (Admin Vserver or data Vserver):
Change the credentials; then, click **Next**.
 - a. Change the credentials; then, click **Next**.
 - b. The roles cannot be altered; click **Finish**.

Note: Usables information is not applicable to controllers on a clustered system.

The changes to the controller are saved.

Related concepts

Guidelines for discovering storage controllers on page 33

Deleting storage controllers

You can delete storage controllers at any time, as well as delete multiple controllers at the same time.

Steps

1. Open the XenCenter Client.
2. Select **Tools > NetApp VSC > Discovery and Configuration**.
3. Select one or more controllers that you want to delete and click **Delete Controllers**.

Note: Use Ctrl-click or Shift-click to select multiple controllers.

4. Click **Yes** when prompted about whether you want to delete selected controllers.

Result

Selected storage controllers are removed from the list of controllers.

Note: After a storage controller is deleted, VSC for Citrix XenServer operations will not be able to be performed on storage repositories previously created by the VSC.

Host management

If you plan to work with block-based storage repositories, you will need to manage the configuration of XenServer host settings.

From the **XenServer Hosts** tab on the Storage Controllers window (accessed from the **Tools > NetApp VSC > Discovery and Configuration** option), you can view host information, as well as manage the following host settings:

- Credentials

The host credentials must be authenticated if you plan to perform the following:

- Provision FC storage repositories
- Apply Multipath and iSCSI recommended settings
- Multipath or iSCSI Recommended Settings

The application of these settings is not mandatory; however, they are recommended to promote high availability and resilience, and are in line with NetApp best practices. For more information on these settings, refer to the topic *Multipath and iSCSI recommended settings*.

Note: If you plan to work with NFS-based storage repositories only, there is no need to change any of the XenServer host settings.

Related references

[*Multipath and iSCSI recommended settings*](#) on page 39

Viewing XenServer host information

You can view various kinds of information about each XenServer host.

Before you begin

There must be at least one valid XenServer host added to the XenCenter Client. For more information, refer to the documentation for the XenCenter Client.

About this task

From the **XenServer Hosts** tab on the Storage Controllers window, you can view various host information, as well as the status of several configuration settings.

Steps

1. Open the XenCenter Client.
2. Select the **XenCenter** node at the top of the tree in the left pane.
3. Select **Tools > NetApp VSC > Discovery and Configuration**.

The Storage Controllers window displays.

4. Select the **XenServer Hosts** tab.

The following information displays for each host in the XenCenter:

Hosts table:

- Name
- IP Address
- Authenticated host credentials
 - Green checkmark indicates credentials were validated and saved; the host is authenticated.
 - Red "X" indicates the credentials were not validated; the host is not authenticated.
 - Yellow triangle with exclamation mark ("!") indicates the credentials were not validated yet, but were saved; the host is not authenticated.
- Number of CPUs
- Memory (in GB)
- XenServer version
- Application of MP and iSCSI recommended settings
 - Green checkmark indicates the settings were applied
 - Red "X" indicates the settings were not applied

NetApp Recommended Settings tab

- Multipath values
- iSCSI values

For more information on these settings, refer to the topic *Multipath and iSCSI recommended settings*.

Result

If you want to authenticate the credentials or apply the recommended Multipath or iSCSI settings, refer to the topic *Configuring host settings*.

Related tasks

[Configuring host settings](#) on page 37

Related references

[Multipath and iSCSI recommended settings](#) on page 39

Configuring host settings

If you plan to work with block-based storage repositories, you will need to provide valid host credentials. Additionally, you have the option to apply recommended Multipath and iSCSI settings.

Before you begin

There must be at least one valid XenServer host added to the XenCenter Client. For more information, refer to the documentation for the XenCenter Client.

About this task

The host credentials must be valid and authenticated if you plan to perform the following:

- Provision FC storage repositories
- Apply Multipath and iSCSI recommended settings

Although not mandatory, you should apply the recommended settings for Multipath or iSCSI (depending on your environment) to provide high availability and resilience. Before the settings are applied to the system, VSC for Citrix XenServer creates a backup file for each setting:

- Multipath: `/etc/multipath.conf.bak`
- iSCSI: `/etc/iscsi/iscsid.conf.bak`

For more information on these settings, refer to the topic *Multipath and iSCSI recommended settings*.

To configure the host settings, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Select the **XenCenter** node at the top of the tree in the left pane.
3. Select **Tools > NetApp VSC > Discovery and Configuration**.

The Storage Controllers window displays.

4. Select the **XenServer Hosts** tab.

The detailed information for each host displays in the **Hosts** table.

Note: If the desired hosts do not display in the table, make sure that you select the **XenCenter** node at the top of the tree and not just an individual pool or host when opening the Storage Controllers window.

5. If you want to enter valid credentials for a host, perform the following:

- a) Select the host and click **Edit Host Credentials** (or double-click the selected host).

Note: Use Ctrl-click or Shift-click to select multiple hosts.

The XenServer Credentials dialog box displays.

- b) Enter a valid username and password for the root user and click **Test**.

Note: Because this task requires modifying the .conf files, which are owned by the root user, credentials for the root user must be provided.

A Success dialog box displays to inform you that the username and password are correct.

- c) Click **OK**.

The Success dialog box closes.

- d) Click **Save**.

The XenServer Credentials dialog box closes and a green checkmark displays in the **Authentication** column for the host.

6. If you want to apply the recommended settings to a host, perform the following:

Note: Before you can apply recommended settings, the host must have valid credentials (indicated by a green checkmark in the **Authentication** column).

- a) Verify that the host has authenticated credentials.
- b) Select the host and click **Apply** for the appropriate recommended settings based on the following criteria:

Note: Use Ctrl-click or Shift-click to select multiple hosts.

- **Multipath** only: if you plan to work with FC storage repositories.

Note: Multipathing is not allowed on iSCSI storage repositories and Data ONTAP operating in 7-mode.

- **iSCSI** only: if you plan to work with iSCSI storage repositories and Data ONTAP operating in 7-mode.
- **Multipath** or **iSCSI**: if you plan to work with block-based storage repositories in a clustered system.

Important: If applying the **Multipath** recommended settings, you must enable multipathing on the host. For more information about enabling multipathing and making sure changes take effect, refer to the XenCenter documentation.

Tip: If the authenticated credentials are changed and are not valid (as indicated by a red "X") any time after the recommended settings have been applied, a red "X" will display in the applicable **Settings** column. However, when the credentials are authenticated again, any recommended settings that were previously applied to the host will be automatically re-instated and a green checkmark will display in the applicable **Settings** column.

Result

The XenServer configuration file is modified with the new values.

Note: If you need to back out the applied recommended settings made to the XenServer configuration file, use the backup files that VSC created to restore the settings that were in place before the associated values were modified:

- Multipath: /etc/multipath.conf.bak
- iSCSI: /etc/iscsi/iscsid.conf.bak

If you plan to restore the multipath settings, then you will need to disable multipathing on the host.

Related references

[Multipath and iSCSI recommended settings](#) on page 39

Multipath and iSCSI recommended settings

When applied, VSC will modify the /etc/multipath.conf and /etc/iscsi/iscsid.conf files to set NetApp recommended values.

Multipath settings

The following are the recommended settings for multipath:

```
defaults {
    user_friendly_names no
    queue_without_daemon no
    flush_on_last_del yes
    max_fds max
}

blacklist {
    devnode "^(ram|raw|loop|fd|md|dm-|sr|scd|st) [0-9]*"
    devnode "^hd[a-z]"
    devnode "^cciss.*"
}

device {
```

```

vendor "NETAPP"
product "LUN"
path_grouping_policy group_by_prio
features "1 queue_if_no_path"
prio_callout "/sbin/mpath_prio_alua /dev/%n"
path_checker directio
failback immediate
hardware_handler "1 alua"
rr_weight uniform
rr_min_io 128
getuid_callout "/lib/udev/scsi_id -g -u -s /block/%n"
}

```

iSCSI settings

The following are the recommended settings for iSCSI:

```

node.session.timeo.replacement_timeout = 5
node.startup = automatic

```

Storage Controllers window

The Storage Controllers window contains two main tabs: **Storage Controllers** and **XenServer Hosts**. These tabs provide various kinds of information regarding the respective components. By default, the **Storage Controllers** tab view is the initial display for this window

Storage Controllers tab

The storage controllers are listed in a table format, along with associated pass-through controller and storage repository information.

Command buttons

The actions associated with command buttons (add, edit, delete, and refresh) in this section are not applicable to the pass-through controllers listed in the table at the bottom of the **Storage Controllers** tab.

Add a Controller	Opens the New Controller wizard that enables you to add storage controllers.
Edit Controller Settings	Opens the Edit Controller wizard that enables you to edit credentials for existing storage controllers, as well as usable interface and aggregate information for physical storage controllers.
Delete Controllers	Deletes the selected storage controller.
Refresh List	Refreshes the list of storage controllers. This refresh also includes finding any new vFiler units or Vservers that might have been added, as well as

updating applicable volumes and interfaces. This refresh process might take a few minutes.

Controllers table

The storage controllers are listed in the table according to the following columns:

Name	The name of the storage controller.
IP Address	The IP address that maps to the host name of storage controller.
Type	The type of storage controller.
Version	The version of Data ONTAP software that the controller is running.
User	The username that was utilized for the Credentials when the storage controller was added.
Authenticated	The status of the controller login credentials validation process during the discovery operation. <code>True</code> indicates credentials that have been validated and the controller is authenticated; <code>False</code> indicates the credentials have failed the validation process and are not authenticated.

Note: Only storage controllers that have been successfully authenticated (`True`) will be used for VSC for Citrix XenServer operations. For example, there might be several IP addresses resulting from the discovery operation where the **Authenticated** status is `False`, but those IP addresses will not be displayed as valid options during the storage repository provisioning process.

You can rearrange the order of the listed controllers by using the sorting feature available for each column.

Pass-Through Controllers tab

Pass-through controllers (vFiler units and data Vservers) are displayed by name and type for the storage controller selected in the top table. In addition, the operational status of each pass-through controller is provided.

Storage Repositories tab

Storage repositories associated with the controller selected in the top table, as well as any storage repositories that belong to pass-through controllers for the selected controller, are listed in the **Name** table.

Select the desired storage repository to display its detailed information. The **Ctrl** field in the **Details** area shows where the selected storage repository actually resides (for example, in the pass-through controller or on the physical controller). The **Hosts** table lists the hosts where the storage repositories are mounted.

Note: If the desired storage repository is not listed, then the incorrect node was selected in the XenCenter tree in the left pane prior to opening the Storage Controllers window. Close the window; then, select either the Pool on which the storage repository is mounted (if known) or the **XenCenter** node in the left pane and re-open the Storage Controllers window.

XenServer Hosts tab

The XenServer hosts associated with the selected node are listed in a table format, along with associated Multipath and iSCSI recommended settings.

Command buttons

The following command buttons are available on the **XenServer Hosts** tab.

Edit Host Credentials	Opens the XenServer Credentials dialog box that enables you to provide new credentials, as well as edit existing credentials, for the selected host.
Refresh List	Refreshes the list of hosts.
Apply	Applies the associated recommended settings (Multipath or iSCSI) to the configuration file of the selected XenServer host.

Hosts table

The hosts are listed in the table according to the following columns:

Name	The name of the host.
IP Address	The IP address of the host.
Authenticated	The status of the host login credentials. • Green checkmark indicates credentials were validated and saved; the host is authenticated. • Red "X" indicates the credentials were not validated; the host is not authenticated. • Yellow triangle with exclamation mark ("!") indicates the credentials were not validated yet, but were saved; the host is not authenticated.
CPUs	The number of CPUs associated with the host.
Memory (GB)	The total amount of memory (in gigabytes) available on the host.
Version	The version of XenServer that the host is running.
MP Settings	The status of the recommended settings application. • Green checkmark indicates the settings were applied. • Red "X" indicates the settings were not applied.

iSCSI Settings The status of the recommended settings application.

- Green checkmark indicates the settings were applied.
- Red "X" indicates the settings were not applied.

You can rearrange the order of the listed hosts by using the sorting feature available for each column.

NetApp Recommended Settings tab

Multipath The recommended values for Multipath.

iSCSI The recommended values for iSCSI.

Managing storage repositories overview

You can provision, configure deduplication settings, and destroy storage repositories (NFS, FC, iSCSI). NFS-based storage repositories can also be resized.

If you modify storage repositories outside of the VSC interface (for example, from the command line directly on the storage controller), you must refresh the storage controller through the VSC interface.

When managing storage repositories in clustered systems, if Load Sharing Mirror (LSM) on the root volume of a clustered system is enabled, you should either perform an incremental update so the volume is available for VSC or disable LSM altogether. For detailed information, refer to the NetApp Technical Report TR-4015: *SnapMirror Configuration and Best Practices Guide for Data ONTAP 8.1 Operating in Cluster-Mode*.

Provisioning storage repositories

You can create new storage repositories at the Pool and individual XenServer levels. At the Pool level, the storage repository will appear in all of the servers currently configured in that Pool.

Before you begin

Before you can provision storage repositories, storage controllers must be discovered and configured. In addition, the applicable licenses must be installed on the storage controller to allow provisioning of the desired storage repositories. For more information, refer to the topic *Installation requirements and configuration information*.

You must have reviewed the topic *Guidelines for provisioning storage repositories*.

About this task

Depending on the mode in which you are operating, storage repositories can be provisioned as follows:

- When using Data ONTAP operating in 7-mode, you can elect to provision on a physical storage controller or any vFiler units it might contain.
- In clustered systems, you can either select the cluster and choose the data Vserver through which to provision the new storage repository, or select any data Vservers which may have been added directly (for example, without an Admin Vserver) to the VSC for Citrix XenServer.

Note: There are certain limitations with direct-connect data Vservers:

- To provision storage repositories on direct-connect data Vservers, you must create a new role and a new user with the required privileges. The default vsadmin role assigned to data Vservers does not contain the volume efficiency commands needed for provisioning and cloning. For more information about performing this operation, see the System Manager or

Element Manager documentation available on the NetApp Support Site, which is available online at support.netapp.com.

- Before using data Vservers, resources—including aggregates—should be allocated for the data Vservers.
- Storage repositories creation is not supported on striped aggregates. When you add a direct-connect Vserver, any striped aggregates associated with it appear as available. Provisioning on those striped aggregates will fail.
- If provisioning storage repositories in the root volume of a clustered system and LSM is enabled on that volume, either perform an incremental update so the volume is available for VSC or disable LSM.

Also, when provisioning block-based (FC and iSCSI) storage repositories, the process might take longer (as compared to NFS-based storage repositories) due to having to re-scan Host Bus Adapters (HBAs) on the XenServers.

To provision storage repositories, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Right-click a pool or XenServer and select **NetApp VSC > Provision Storage Repository**.

The Storage Repository Provisioning wizard opens.

3. Select the target storage controller where the storage repository will be provisioned.

Depending on the type of storage controller selected, you can specify associated pass-through controller data, if applicable.

- If you are using Data ONTAP operating in 7-mode, you can specify a vFiler unit if needed. To identify vFiler units for provisioning and cloning operations, select the **Use vFiler Context** check box and select a unit from the **vFiler** drop-down list.
- In clustered systems, you can connect directly to a data Vserver by selecting a Vserver from the drop-down list, or connect to a data Vserver through an Admin Vserver.

4. Select the desired type of storage repository.

Note: If the option for the type of storage repository is not available, make sure the host or storage controller is configured correctly.

- The appropriate license must be installed on the storage controller.
- The XenServer host must be configured correctly and appropriate options enabled (for example, Multipath or World-Wide Port Name (WWPN)).

For more information on host configuration, refer to the topic *Host management*.

5. Depending on the type of storage repository, specify the applicable details:

- **Size** – For NFS-based storage repositories, maximum size depends on the storage controller and space available. For more information, refer to the storage controller documentation.

For block-based storage repositories, maximum size is 16 TB.

- **Storage Repository Name** – Specify a unique name.
- **Aggregate** – (Only if the **Create Volume Wrapper** option is selected.) Select an available aggregate from the drop-down list.
- **Volume** – Select an existing volume with sufficient space available from the drop-down list.
- **Thin provision** – Sets space reserve to none, and disables space checks.

Important: Cloning and storage repository creation can fail if your size request uses too much of the aggregate. Capacity is not reserved for an individual storage repository. By eliminating unused but provisioned areas of storage, more space is presented than is actually available. The aggregate or volume is treated as a shared resource pool, where capacity is consumed as each storage repository requires it. Product design constraints assume that all storage repositories will not normally use all of their provisioned storage at the same time.

- **Create Volume Wrapper** – Creates a new volume for the LUN. If selecting this option, you must also select an aggregate from the **Aggregate** drop-down list (this field toggles between **Aggregate** or **Volume** depending on the selection of this option) for the new volume to be created.

Note: If this option is not selected, you must select an existing volume with enough space from the **Volume** drop-down list.

Tip: When this option is selected, the applicable User Preferences **Volume Wrapper** options will take effect on the newly provisioned storage repository. Make sure to pay particular attention to the autogrow options (**Volume Wrapper Autogrow Increment** and **Volume Wrapper Autogrow Multiplier**) to prevent the resulting value from exceeding the limits specified by Data ONTAP. For more information on these options, refer the topic *User Preferences*.

- **Auto-Grow** – (For NFS-based storage repositories.) If more space is required, automatically expands the storage repository by the specified increment (**Grow Increment**), up to the specified size limit (**Maximum Storage Repository Size**).
- **Grow Increment** – (For NFS-based storage repositories.) When **Auto-Grow** is selected, specify the amount of storage added to the storage repository each time space is needed.
- **Maximum Storage Repository Size** – (For NFS-based storage repositories.) When **Auto-Grow** is selected, specify the maximum limit at which the automatic expansion stops.

6. Verify that the details for the storage repository are accurate. Click **Finish**.

The storage repository is added to the XenCenter Client user interface.

Note: If any errors occurred during this process, a message will display with an associated error code. For resolution information, refer to the topic *Error codes and mitigation*.

Related concepts

[Guidelines for provisioning storage repositories](#) on page 47

[Installation requirements and configuration information](#) on page 9

[Host management](#) on page 35

Related references

[Error codes and mitigation](#) on page 71

[User Preferences](#) on page 19

Guidelines for provisioning storage repositories

There are several factors to consider, depending on the type of storage repository, when you attempt to provision storage repositories.

As you proceed through the Storage Repository Provisioning wizard and attempt to provision storage repositories, observe the following guidelines:

- Make sure that the storage controller on which you plan to provision storage repositories does not have IPv6 enabled; if so, disable IPv6. For more information, see the topic *Installation requirements and configuration information*.
- When provisioning iSCSI storage repositories, there should be only one IP address (depending on the Data ONTAP version, either one vif or interface group for Data ONTAP operating in 7-mode, or one LIF for clustered Data ONTAP) delegated for iSCSI provisioning. If load balancing or high availability is required, refer to the NetApp Technical Report TR-3732: *Citrix XenServer and NetApp Storage Best Practices* for information about how to configure your network.

If you are provisioning iSCSI storage repositories while multiple IP addresses are present in the storage controller, the following scenarios apply:

- Multiple IP address on different subnets: you will need to use the User Preferences iSCSI Restrict Mount Networks option to isolate the use of a specified IP address (either vif or interface group or LIF) for iSCSI storage repository provisioning by providing non-matching subnets. For more information about this option, see the topic *User Preferences*.
- Multiple IP address on the same subnet: you will need to edit the storage controller configuration by using the Usables screen to designate the specific IP address (either vif or interface group; Usables information is not applicable to controllers running clustered Data ONTAP) for iSCSI provisioning. For more information about editing the Usables, see the topic *Editing storage controllers*.

Related concepts

[Installation requirements and configuration information](#) on page 9

Related tasks

[Editing storage controllers](#) on page 34

Related references

[User Preferences](#) on page 19

Resizing storage repositories

You can resize NFS-based storage repositories only.

About this task

For NFS-based storage repositories, the volume maximum value is a function of aggregate space and bits (for example, 32-bit or 64-bit for thin provisioning), the Data ONTAP version, and the storage controller model.

Note: If you resize the storage repository outside of the VSC for Citrix XenServer interface (for example, from the command line directly on the storage controller), you must re-scan the storage repository through the XenCenter Client interface.

If resizing storage repositories in the root volume of a clustered system and LSM is enabled on that volume, either perform an incremental update so the volume is available for VSC or disable LSM.

To resize storage repositories, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Right-click a storage repository and select **NetApp VSC > Resize Storage Repository**.

Note: Make sure to select an NFS-based storage repository only; otherwise, if you attempt to resize a block-based storage repository, you will receive an error message.

The Resize Storage Repository dialog box opens.

3. Increase the size.

Note: The maximum size depends on the storage controller and space available. For more information, refer to the storage controller documentation.

4. Click **OK**.

The information for the storage repository is updated.

Deduplicating storage repositories

You can enable deduplication on selected storage repositories to optimize space utilization.

Before you begin

Verify that the A_SIS license is enabled.

About this task

If you are configuring deduplication settings for storage repositories in the root volume of a clustered system and LSM is enabled on that volume, either perform an incremental update so the volume is available for VSC or disable LSM.

To apply deduplication to storage repositories, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Right-click a storage repository and select **NetApp VSC > Deduplicate Storage Repository**.

The Storage Repository Deduplication Management dialog box opens.

3. Select the appropriate deduplication settings:

- **Disable Deduplication** turns the deduplication feature off.

Note: By default, the deduplication feature is enabled through the User Preferences option **Default Volume Dedupe**. If this option is set to **False**, then this deduplication setting check box displays as **Enable Deduplication** and turns the deduplication feature on when selected.

- **Start Deduplication** begins deduplication from the last marker position.
- **Scan** begins deduplication at the beginning of the volume.

4. Click **OK**.

The selected deduplication settings are applied to the storage repository.

Destroying storage repositories

You can permanently destroy a storage repository, including all virtual machines.

About this task

The destroy storage repository feature enables you to perform the following actions:

- Destroy all virtual machines in a storage repository
- Detach the storage repository from the XenCenter Client environment
- Free the space on the storage controller by destroying the volume, if the appropriate User Preferences option is set

For NFS-based storage repositories, when you destroy the last storage repository of a gold volume, the gold volume is destroyed if you set the User Preferences option **Destroy Parent Volume** to **True**. When you create more than one new storage repository, a gold volume is created on the storage controller. The storage repositories that are then attached to the XenCenter Client are FlexClones of the gold volume. Because the FlexClones share the storage with the gold volume, this space is not wasted. When the last storage repository (FlexClone) of a gold volume

is destroyed, the gold volume is destroyed only if you select the option to delete the parent volume if the last child clone of it has been deleted.

For block-based storage repositories, when you destroy the storage repository, the parent volume container (either the volume wrapper or the existing volume) for the LUN is destroyed if you set the User Preferences option **Volume Wrapper Destroy Parent** to True.

For more information on the User Preferences options, refer to the topic *User Preferences*.

If destroying storage repositories in the root volume of a clustered system and LSM is enabled on that volume, either perform an incremental update so the volume is available for VSC or disable LSM.

To destroy storage repositories, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Right-click a storage repository and select **NetApp VSC > Destroy Storage Repository**.

The Destroy Storage Repository dialog box opens.

3. Review the information to verify your selection and click **OK**.

The storage repository and all of the virtual machines are removed from the XenCenter Client environment.

Related references

[*User Preferences*](#) on page 19

Cloning virtual machines overview

You can clone virtual machines to existing and new NFS-based storage repositories.

Cloning virtual machines

You can theoretically create thousands of virtual machine clones (to a maximum of 2,000) and hundreds of NFS-based storage repositories at one time. However, it is best to perform multiple executions of fewer requests. The ideal size of the requests depends on the size of the XenServer deployment and the hardware configuration of the XenCenter Client.

Before you begin

The new virtual machine clones should be configured to run **sysprep** at startup. For more information, refer to the documentation for the XenCenter Client.

About this task

Using VSC, you can clone virtual machines to the following:

- Existing storage repositories
- New storage repositories
- Multiple new storage repositories

Note: Cloning is applicable to NFS-based storage repositories only.

In addition, virtual machine clones created through VSC for Citrix XenServer are instantly available in the Citrix XenDesktop for placement into catalogs.

Steps

1. Open the XenCenter Client.
2. Right-click a virtual machine and select **NetApp VSC > Clone Virtual Machine**.

The Clone Virtual Machine wizard opens.

3. Select the target storage controller to where the storage repository will be provisioned.

Depending on the type of storage controller selected, you can specify associated pass-through controller data, if applicable.

- If you are using Data ONTAP operating in 7-mode, you can specify a vFiler unit if needed. To identify vFiler units for provisioning and cloning operations, select the **Use vFiler Context** check box and select a unit from the **vFiler** drop-down list.
- In clustered systems, you can connect directly to a data Vserver by selecting a data Vserver from the drop-down list, or connect to a data Vserver through an Admin Vserver.

4. Specify the virtual machine clone details:

- **Number of Clones** – Specify the number of clones to create (maximum limit per cloning instance: 2,000).

Note: Whether you can use the cloning maximum of 2,000 virtual machines depends on the size and performance of the XenServer.

- **Base Clone Name** – Specify the prefix name. By default, the clone number is placed at the end of the base clone name.

Note:

To force the clone number to a different position, use \$ID where you want the number to appear. For example, new\$IDclone produces clone names such as new1clone, new2clone, new3clone.

- **Starting Clone Number** – Specify the starting number. Maximum of eight digits.
- **Clone Increment** – Increment the clone numbers by 1, 2, 3, 4 or 5.
- **Power On** – Select to power on all the clones at the same time after the cloning process completes. If check box is clear, clones remain powered off after the cloning process completes.

Based on your entries and selections, the virtual machine clones are listed in the **Sample Clone Names** pane.

5. Specify virtual processor and memory resources.

- **Number of vCPUs** – Select the number of virtual processors to apply to the new virtual machines.
- **Memory** – Specify the amount of memory (in MB or GB) to apply to the new virtual machines.

6. Configure the storage repositories for the virtual machine clones.

You can either select an existing storage repository from the list to contain the clones, or add one new storage repository, or add multiple new storage repositories.

- To add *one* new storage repository:

a. Click **Add**.

The Add New Storage Repository wizard opens.

b. Specify the following details for the new storage repository:

- **Size** – Maximum storage repository size depends on the storage controller and space available. For more information, refer to the storage controller documentation.
- **Storage Repository Name** – Specify a name.
- **Aggregate** – Select an available aggregate from the drop-down list.
- **Thin provision** – Sets space reserve to none, and disables space checks.

Important: Cloning and storage repository creation can fail if your size request uses too much of the aggregate. Capacity is not reserved for an individual storage

repository. The aggregate is treated as a shared resource pool, where capacity is consumed as each storage repository requires it. By eliminating unused but provisioned areas of storage, more space is presented than is actually available. It is expected that all storage repositories will not utilize all of their provisioned storage at the same time.

- **Auto-Grow** – If more space is required, automatically expands the storage repository by the increment you specify, up to the size limit you specify.
- **Grow Increment** – Amount of storage added to storage repository each time space is needed.
- **Maximum Storage Repository Size** – Limit at which Auto-Grow stops.
- To add *multiple* new storage repositories:
 - a. Click **Add**.
The Add New Storage Repository wizard opens.
 - b. Select the desired number of new storage repositories from the **Number of Storage Repositories** drop-down list. The number of new storage repositories must divide evenly into the number of total new clones.

Important: The number of storage repositories that can be added is limited by the number of FlexClone volumes that can be created on the storage platform and Data ONTAP version. As a result, because of these limitations and depending on your environment, if you attempt to add a large number (for example, 1,000) of storage repositories, the operation might fail. For more information, refer to the *Hardware Universe* on the NetApp Support Site, which is available online at support.netapp.com or the storage controller documentation.

- c. Specify the following details for the new storage repositories:
 - **Size** – Maximum storage repository size depends on the storage controller and space available. For more information, refer to the storage controller documentation.
 - **Gold Volume Name** – Specify a name.
 - **Aggregate** – Select an available aggregate from the drop-down list.
 - **Thin provision** – Sets space reserve to none, and disables space checks.

Important: Cloning and storage repository creation can fail if your size request uses too much of the aggregate. Capacity is not reserved for an individual storage repository. By eliminating unused but provisioned areas of storage, more space is presented than is actually available. The aggregate is treated as a shared resource pool, where capacity is consumed as each storage repository requires it. Product design constraints assume that all storage repositories will not normally use all of their provisioned storage at the same time.

- **Auto-Grow** – If more space is required, automatically expands the storage repository by the increment you specify, up to the size limit you specify.
- **Grow Increment** – Amount of storage added to storage repository each time space is needed.
- **Maximum Storage Repository Size** – Limit at which Auto-Grow stops.

- **Set Storage Repository Names** – Enables modification of default storage repositories names.
7. Review the summary page and click **Finish** to proceed. To return to previous pages and modify settings, click **Back**.

PowerShell Cmdlets

This section provides reference information about the VSC for Citrix XenServer PowerShell cmdlets.

New-VscxStorageRepository

This cmdlet creates a new storage repository on NetApp storage systems.

Syntax

New-VscxStorageRepository

```
[ -Name] String
[ -Container] String
[ -Protocol SrProtocols]
[ -CreateVolumeWrapper]
[ -AutoGrow]
[ -SpaceReserve String]
[ -VolumeOptions Hashtable]
[ -Preferences Hashtable]
-Controller AbstractController
-XenSession Session
[ -Size] String
[ -WorldWidePortName String[]]
[ -AutoGrowIncrementSize String]
[ -AutoGrowMaximumSize String]
[ -PreferredIPAddress String[]]
[ -WhatIf]
[ -Confirm]
[ CommonParameters]
```

Description

This cmdlet allocates new storage on the controller and then creates a storage repository on the XenServer stored on the new volume.

Parameters

-Name *String*

The name of the new storage repository.

-Container *String*

The name of the containing aggregate.

-Protocol *SrProtocols*

The protocol of the new storage repository. Possible values: `nfs`, `iscsi`, or `fcp`.

-CreateVolumeWrapper

Specify to create a new volume for a new LUN that is created. This is only available when the protocol is set to `iscsi` or `fcp`.

-AutoGrow

Specify to enable autosize.

-SpaceReserve *String*

Specifies the type of volume guarantee that the new volume will use. Possible values: `none`, `file`, `volume`.

-VolumeOptions *Hashtable*

Volume options. VSC supports the following options when creating new storage repositories:

- `nosnap`: defaults to on
- `no_atime_update`: defaults to on
- `minra`: defaults to off
- `fractional_reserve`: 0

-Preferences *Hashtable*

User preferences. The following preferences are available when creating storage repositories.

- `volume_sis_enable`: defaults to true; enables sis on the new volume.
- `volume_snap_reserve`: defaults to 0; allows you to set the snapshot reserve of the new volume.
- `export_to_all_xen_nics`: defaults to false; specifies whether to export the new volume to all IPs on the XenServers.
- `nfs_mount_networks`: specifies the networks of the XenServers to which the new volume should be exported. For example, if this is set to `192.168.10.0`, VSC exports this new volume to the IP addresses on that network.
- `restrict_nfs_mount_networks`: specifies the networks of the storage controller that should not be used for mounting.
- `mount_using_hostname`: allows you to mount the new storage repository via the hostname of the interface on the controller.
- `iscsi_mount_networks`: specifies the networks of the XenServers to which the new iSCSI LUN should be made available. For example, if this is set to `192.168.10.0`, VSC only maps the new LUN to the XenServers that are in that network.

- `restrict_iscsi_mount_networks`: specifies the networks on the storage controller that should not be used as the target IP address when mapping an iSCSI LUN.
- `volume_wrapper_buffer`: defaults to 5; the space (in GB) to keep between the wrapper volume and the new LUN.
- `space_reserve_volume_wrapper`: defaults to false; specifies whether VSC should space reserve the new wrapper volume.
- `volume_wrapper_autogrow_increment`: defaults to 5; specifies the autogrow increment for the new wrapper volume (in GB).
- `volume_wrapper_autogrow_max_multiplier`: defaults to 2; specifies the maximum autogrow size as a multiplier of the original size. For example, a value of 2 sets the maximum volume autogrow size to 2 times the initial size.
- `export_to_subnet`: defaults to false; specifies whether to export new NFS volumes to the entire subnet of the XenServers.

-Controller *AbstractController*

An instance of `NaController` or `NcController`, obtained from `Connect-NaController` or `Connect-NcController`.

-XenSession *Session*

An instance of `Session`, obtained from `Connect-XenServer` (in the XenServer PowerShell snap-in).

-Size *String*

The size of the new storage repository. Specify a unit after the size number; for example, 3 GB.

-WorldWidePortName *String* []

The world wide port name(s) of the fc adapters that will be mapped to the new LUN. This is required when the `Protocol` is set to `fc`.

-AutoGrowIncrementSize *String*

The auto-grow increment. This parameter is required if `AutoGrow` is specified.

-AutoGrowMaximumSize *String*

The auto-grow maximum size. This parameter is required if `AutoGrow` is specified.

-PreferredIPAddress *String* []

The list of preferred IP addresses on the storage controller to use when mounting a new storage repository.

-Whatif

-Confirm

This cmdlet supports the following common parameters: `Verbose`, `Debug`, `ErrorAction`, `ErrorVariable`, `WarningAction`, `WarningVariable`, `OutBuffer`, and `OutVariable`. For more information, type:

get-help about_commonparameters

Example: Creating a new FC-based storage repository

The following cmdlet creates a new FC-based storage repository named *newSR* in aggregate named *aggr1* within a new volume named *newSR* with a size of *100 GB* using the specified world wide port names.

```
New-VscxStorageRepository -Name newSR -Container aggr1 -Controller $f
-XenSession $x -Size 100gb -Protocol fcp -CreateVolumeWrapper -
WorldWidePortName
"10000000c9721a16", "10000000c9721a15", "210000e08b9dc54d", "210100e08bbd
c54d"
```

Set-VscxStorageRepositorySize

This cmdlet resizes a storage repository that is mapped to a volume on NetApp storage systems.

Syntax

```
Set-VscxStorageRepositorySize
[-Name] String
[-Uuid String]
[-OpaqueRef] String
-Controller AbstractController
-XenSession Session
-NewSize String
[-WhatIf]
[-Confirm]
[CommonParameters]
```

Description

This cmdlet resizes a storage repository that is mapped to a volume on NetApp storage systems.

Parameters

-Name *String*

The name of the storage repository.

-Uuid *String*

The UUID of the storage repository.

-OpaqueRef *String*

The opaque_ref of the storage repository.

-Controller *AbstractController*

An instance of NaController or NcController, obtained from Connect-NaController or Connect-NcController.

-XenSession *Session*

An instance of Session, obtained from Connect-XenServer (in the XenServer PowerShell snap-in).

-NewSize *String*

The new size of the storage repository. Specify the storage repository size using the following format:

[+|-]<number>[k|m|g|t|%]

If a leading "+" or "-" is displayed, it indicates that the volume size is to be increased or decreased (respectively) by the indicated amount, else the amount is the absolute size to set. The optional trailing k, m, g, and t indicates the desired units, namely "kilobytes", "megabytes", "gigabytes", and "terabytes" respectively. The optional trailing "%" indicates to increase or decrease the size of the volume by a percentage of its current size. If the trailing unit character does not appear, then <number> is interpreted as the number of bytes desired.

-Whatif

-Confirm

This cmdlet supports the following common parameters: Verbose, Debug, ErrorAction, ErrorVariable, WarningAction, WarningVariable, OutBuffer, and OutVariable. For more information, type:

get-help about_commonparameters

Example: Setting the size of a storage repository

The following cmdlet sets the size of the storage repository named *SR1* to *200 GB*.

```
Set-VscxStorageRepositorySize -Name SR1 -Controller $c -XenSession $x  
-NewSize 200GB
```

Remove-VscxStorageRepository

This cmdlet destroys a storage repository and deletes its NetApp storage systems.

Syntax

Remove-VscxStorageRepository

[-Name] *String*

[-Uuid] *String*

[-OpaqueRef] *String*

```
[ -Preferences Hashtable ]
-Controller AbstractController
-XenSession Session
[ -WhatIf ]
[ -Confirm ]
[ CommonParameters ]
```

Description

This cmdlet deletes the volume on the controller and destroys the storage repository on the XenServer.

Parameters

-Name *String*

The name of the storage repository.

-Uuid *String*

The UUID of the storage repository.

-OpaqueRef *String*

The opaque_ref of the storage repository.

-Preferences *Hashtable*

User preferences. The following preferences are available when removing storage repositories.

- `destroy_parent_if_last_clone`: defaults to false; when set to true will delete the parent gold volume if there are no additional volume clones of it.
- `only_offline`: defaults to false; will only offline the volume backing the storage repository being deleted.
- `destroy_volume_if_last_lun`: defaults to false; when set to true deletes the volume containing the LUN. This only applies if the storage repository is mapped to a LUN.

-Controller *AbstractController*

An instance of `NaController` or `NcController`, obtained from `Connect-NaController` or `Connect-NcController`.

-XenSession *Session*

An instance of `Session`, obtained from `Connect-XenServer` (in the XenServer PowerShell snap-in).

-Whatif

-Confirm

This cmdlet supports the following common parameters: Verbose, Debug, ErrorAction, ErrorVariable, WarningAction, WarningVariable, OutBuffer and OutVariable. For more information, type:

get-help about_commonparameters

Example: Removing a storage repository

The following cmdlet removes a storage repository named *SR1* and will also destroy the parent volume if it has no more clone children.

```
Remove-VscxStorageRepository -Name SR1 -Controller $c -XenSession $x -  
Preferences @{"destroy_parent_if_last_clone"=$true}
```

Invoke-VscxStorageRepositoryDedupe

This cmdlet changes the deduplication state of the volume on the NetApp controller to which the given storage repository is mapped.

Syntax

```
Invoke-VscxStorageRepositoryDedupe  
[-Name] String  
[-Uuid String]  
[-OpaqueRef] String  
-DedupeAction DedupeActions  
-Controller AbstractController  
-XenSession Session  
[-WhatIf]  
[-Confirm]  
[CommonParameters]
```

Description

This cmdlet changes the deduplication state of the volume on the NetApp controller to which the given storage repository is mapped.

Parameters

-Name *String*

The name of the storage repository.

-Uuid *String*

The UUID of the storage repository.

-OpaqueRef *String*

The opaque_ref of the storage repository.

-DedupeAction *DedupeActions*

The action to perform enable, disable, start, stop, or scan. Multiple actions take place as necessary; for example, if you invoke the start action on a storage repository with dedupe disabled, it will first be enabled and then will be started.

-Controller *AbstractController*

An instance of NaController or NcController, obtained from Connect-NaController or Connect-NcController.

-XenSession *Session*

An instance of Session, obtained from Connect-XenServer (in the XenServer PowerShell snap-in).

-Whatif

-Confirm

This cmdlet supports the following common parameters: Verbose, Debug, ErrorAction, ErrorVariable, WarningAction, WarningVariable, OutBuffer, and OutVariable. For more information, type:

get-help about_commonparameters

Example: Deduplication scan on a storage repository

The following cmdlet starts a deduplication scan on the volume backing the storage repository named *SR1*.

```
Invoke-VscxStorageRepositoryDedupe -Name SR1 -DedupeAction scan -  
Controller $c -XenSession $x
```

New-VscxVmSpec

This cmdlet creates VmSpec object(s) for use in a CloneSpec.

Syntax

```
New-VscxVmSpec  
[-Count] Int32  
[[-PowerOn]  
[[-Prefix] String]  
[[-Suffix] String]  
[[-ZeroPadded]  
[[-StartNumber] String]  
[CommonParameters]
```

Description

This cmdlet creates `VmSpec` object(s) that define the details of each individual VM clone. This allows you to specify the clone name, power on setting, and MAC addresses to apply to the new virtual machine clones.

Parameters

-Count *Int32*

The number of new VM clones to create.

-PowerOn

Power on each of the new VMs after it is created.

-Prefix *String*

The prefix to prepend to each VM name.

-Suffix *String*

The suffix to append to each VM name.

-ZeroPadded

Pad the number with zeroes (for example, for 100 VMs: 001,002,...,100).

-StartNumber *String*

Create the first VM with this number, and increment by 1 for successive VMs.

This cmdlet supports the following common parameters: `Verbose`, `Debug`, `ErrorAction`, `ErrorVariable`, `WarningAction`, `WarningVariable`, `OutBuffer` and `OutVariable`. For more information, type:

get-help about_commonparameters

Example: Creating VmSpec objects

The following cmdlet creates 10 `VmSpec` objects that will be the definition of the new clones.

```
New-VscxVmSpec -Count 10 -Prefix baseCloneName -ZeroPadded
```

New-VscxStorageRepositorySpec

This cmdlet creates a `StorageRepositorySpec` object for use in the `New-VscxCloneSpec` cmdlet.

Syntax

```
New-VscxStorageRepositorySpec
```

```
[-Name] String
```

```
[-Uuid String]
```

```
[-OpaqueRef] String
```

```
[-GoldVolumeName] String
```

```

[-Container] String
[-Size] String
-XenSession Session
[[-SpaceReserve] String]
[[-AutoGrow]]
[[-AutoGrowIncrementSize] String]
[[-AutoGrowMaximumSize] String]
[[-VolumeOptions] Hashtable]
[-StorageRepositoryCloneName] String[]
[CommonParameters]

```

Description

This cmdlet creates a new **StorageRepositorySpec** object that defines the details of the location for the new virtual machine clones. This can be an existing storage repository, a single new storage repository, or a group of new storage repositories.

Parameters

-Name *String*

The name of the new storage repository to create or the existing storage repository to clone into.

-Uuid *String*

The UUID of the existing storage repository to clone into.

-OpaqueRef *String*

The opaque_ref of the storage repository.

-GoldVolumeName *String*

The name of the volume to clone the new storage repositories' volumes from.

-Container *String*

The name of the aggregate to contain the new storage repository(s).

-Size *String*

The size of the new storage repository. Specify a unit after the size number; for example 3 GB.

-XenSession *Session*

An instance of Session, obtained from Connect-XenServer (in the XenServer PowerShell snap-in).

-SpaceReserve *String*

The space reserve of the new storage repository(s).

-AutoGrow

Enable auto-grow.

-AutoGrowIncrementSize *String*

The auto-grow increment. This parameter is required if AutoGrow is specified.

-AutoGrowMaximumSize *String*

The auto-grow maximum size. This parameter is required if AutoGrow is specified.

-VolumeOptions *Hashtable*

Volume options. VSC supports the following options when creating new storage repositories:

- nosnap: defaults to on
- no_atime_update: defaults to on
- minra: defaults to off
- fractional_reserve: 0

-StorageRepositoryCloneName *String*

The names of the new storage repositories to create.

This cmdlet supports the following common parameters: Verbose, Debug, ErrorAction, ErrorVariable, WarningAction, WarningVariable, OutBuffer and OutVariable. For more information, type:

get-help about_commonparameters

Example: Creating new StorageRepositorySpec object

The following cmdlet creates a new StorageRepositorySpec object given the gold volume named *gold_volume* which will have 2 volume clones named *clone1* and *clone 2*. They will be created in an aggregate named *aggr1* with a size of *100 GB* each.

```
New-VscxStorageRepositorySpec -GoldVolumeName gold_volume -  
StorageRepositoryCloneName clone1,clone2 -Container aggr1 -Size 100gb
```

New-VscxCloneSpec

This cmdlet creates a **CloneSpec** object for use with the New-VscxVirtualMachineClone cmdlet.

Syntax

```
New-VscxCloneSpec  
[-Name] String  
[-Uuid String]  
[-OpaqueRef] String  
-XenSession Session  
[-VmSpec] VmSpec[]  
-DestinationStorageRepositorySpec StorageRepositorySpec  
[-Memory String]
```

```
[ -CPUCount Int32]  
[CommonParameters]
```

Description

This cmdlet creates a **CloneSpec** object for use with the `New-VscxVirtualMachineClone` cmdlet. This object contains the details of the source VM, the number of clones to create with their settings, and the details of the destination storage repository on which to put the new clones.

Parameters

-Name *String*

The name of the virtual machine to clone.

-Uuid *String*

The UUID of the virtual machine to clone.

-OpaqueRef *String*

The `opaque_ref` of a virtual machine to clone, as given by the XenServer API.

-XenSession *Session*

An instance of `Session`, obtained from `Connect-XenServer` (in the XenServer PowerShell snap-in).

-VmSpec *VmSpec[]*

A list of `VmSpec` objects, obtained from `New-VscxVmSpec`.

-DestinationStorageRepositorySpec *StorageRepositorySpec*

The destination storage repository spec, obtained from `New-VscxStorageRepositorySpec`.

-Memory *String*

The amount of memory to set on each new virtual machine. Specify the memory size using the following format:

number[k|m|g]

The amount is the absolute size to set. The optional trailing k, m, g, and t indicates the desired units, namely "kilobytes", "megabytes", "gigabytes", and "terabytes" (respectively). If the trailing unit character does not appear, then `<number>` is interpreted as the number of bytes desired.

-CPUCount *Int32*

The number of CPUs to set on each new virtual machine.

This cmdlet supports the following common parameters: `Verbose`, `Debug`, `ErrorAction`, `ErrorVariable`, `WarningAction`, `WarningVariable`, `OutBuffer` and `OutVariable`. For more information, type:

get-help about_commonparameters

Example: Creating new StorageRepositorySpec object

The following cmdlet creates a new **CloneSpec** object that contains the details of the cloning operation. It will use the VM named *windowsXP* as the source of the new VM clones and configure each new clone with *1 GB* of memory and *4 vCPUs*.

```
New-VscxCloneSpec -Name windowsXP -DestinationStorageRepositorySpec $srSpec -VmSpec $cloneSpecs -XenSession $x -Memory 1GB -CPUCount 4
```

New-VscxVirtualMachineClone

This cmdlet clones new virtual machines.

Syntax

```
New-VscxVirtualMachineClone
[-CloneSpec] CloneSpec
[-Preferences HashTable]
-Controller AbstractController
-XenSession Session
[-PreferredIPAddress String[]]
[-WhatIf]
[-Confirm]
[CommonParameters]
```

Description

This cmdlet executes a CloneSpec, creating the clones as specified.

Parameters

-CloneSpec *CloneSpec*

For more information, see the topic *New-VscxCloneSpec*.

-Preferences *HashTable*

User preferences. There are a number of preferences available when creating storage repositories as part of the cloning process.

- **volume_sis_enable**: defaults to true; enables sis on the new volume
- **volume_snap_reserve**: defaults to 0; allows you to set the snapshot reserve of the new volume
- **export_to_all_xen_nics**: defaults to false; exports the new volume to all IPs on the XenServers

- `nfs_mount_networks`: specifies the networks of the XenServers that the new volume should be exported to. For example, if this is set to 192.168.10.0, VSC will export this new volume to the IP addresses on that network.
- `restrict_nfs_mount_networks`: specifies the networks of the storage controller that should not be used for mounting
- `mount_using_hostname`: allows you to mount the new storage repository via the hostname of the interface on the controller

-Controller *AbstractController*

An instance of `NaController` or `NcController`, obtained from `Connect-NaController` or `Connect-NcController`.

-XenSession *Session*

An instance of `Session`, obtained from `Connect-XenServer` (in the XenServer PowerShell snap-in).

-PreferredIPAddress *String[]*

The list of preferred IP addresses on the storage controller to use when mounting a new storage repository.

-Whatif

-Confirm

This cmdlet supports the following common parameters: `Verbose`, `Debug`, `ErrorAction`, `ErrorVariable`, `WarningAction`, `WarningVariable`, `OutBuffer` and `OutVariable`. For more information, type:

get-help about_commonparameters

Example: Creating new VM clones based on `CloneSpec` object

The following cmdlet creates new virtual machine clones based on the specified **`CloneSpec`** object and only exporting new volumes to IPs on the specified network.

```
New-VscxVirtualMachineClone -CloneSpec $cloneSpec -XenSession $x -  
Controller $c -Preferences @"nfs_mount_networks="10.10.10.0"
```

Troubleshooting and logging

This section provides information about VSC for Citrix XenServer general troubleshooting issues, error codes and mitigation, as well support logs.

Troubleshooting

This section provides information about VSC for Citrix XenServer general troubleshooting issues, as well as error codes and mitigation.

Initial copy while cloning takes longer than expected

There might be times when you are cloning virtual machines, and the process is taking longer than expected to complete.

The length of time to complete a cloning operation depends on the initial copy; this initial copy becomes the source of all subsequent clones. As a result, the time to complete this operation will vary due to the source virtual machine (VM) location relative to the destination of the new clones.

The following table shows the initial copy method used based on the relationship between the source VM location and the new clone destination.

Source	Destination	Initial copy method
NFS	Existing NFS (different controller)	VM copy
NFS	Existing NFS (same controller)	NDMP copy*
NFS	Existing NFS (same volume)	File FlexClone
NFS	New NFS (different controller)	VM copy
NFS	New NFS (same controller)	NDMP copy*
Non-NFS	Existing or new NFS	VM copy

* In the case of clustered Data ONTAP, you must configure the NDMP account on each node to match the credentials used to connect to the cluster. If these credentials are not configured, the NDMP copy will fail and a **XenServer VM copy** operation is used.

Note: If the source VM is a parent or child of a XenServer fast-clone, the initial copy will be a full VM copy to resolve the differences between the original file and the delta file.

If the cloning process is stalled and hanging, check if there is enough available space in the destination storage repository. If there is not enough space, increase the size of the destination storage repository.

You should also check that the copy operation is still in progress and has not failed for another reason.

Not all storage controllers are discovered within given IP range

VSC for Citrix XenServer did not discover all of the storage controllers with in the given IP range.

The first action to take is to increase the value of the **User Preferences Controller Discovery Timeout** option. The default value is 250 ms.

Also, discovering a group of controllers by either IP range or by net mask uses SNMP to detect all of the available physical and cluster storage controllers. The SNMP agent on the storage controllers receives requests over User Datagram Protocol (UDP); any firewall blocking that might drop the packets used during the discovery process. Because SNMP uses UDP for discovery, make sure your firewall is not blocking UDP ports 161 and 162.

Not all XenServer hosts are listed in Storage Controllers window

While on the **XenServer Hosts** tab in the Storage Controllers window, not all of the hosts are displaying for the XenCenter.

The issue is that you wanted to view all of the hosts for the XenCenter, so you either selected a pool or a specific host in XenCenter tree in the left pane and then opened the Storage Controllers window (**Tools > NetApp VSC > Discovery and Configuration**) and then selected the **XenServer Hosts** tab. However, not all of the hosts were listed.

The reason is that only the hosts associated with the node selected in the XenCenter tree display on this tab; in this case, you either selected a pool or a specific host. In order to list all of the hosts in the XenCenter on the **XenServer Hosts** tab at the same time, you must select the **XenCenter** node at the top of the tree.

User Preferences incorrect after re-installing VSC for Citrix XenServer

The values of the User Preferences options are not restored to their original settings after you re-installed VSC for Citrix XenServer.

You re-installed VSC for Citrix XenServer, wanting a clean install (complete with default settings and values). The following scenario might have occurred:

1. VSC for Citrix XenServer was originally installed.
2. The **User Preferences** values were modified.
3. VSC for Citrix XenServer was uninstalled.
4. The user .config file was not deleted.
5. VSC for Citrix XenServer was re-installed.

When you re-opened VSC for Citrix XenServer, you expected to see the **User Preferences** options set to their original default values; however, they are set to the previously modified settings. At this point, you need to simply restore the User Preferences default values. For detailed information, see the *Restoring default User Preferences values* topic.

Related tasks

[Restoring default User Preferences values](#) on page 24

[Uninstalling VSC for Citrix XenServer using Add/Remove Programs](#) on page 16

[Uninstalling VSC for Citrix XenServer using silent mode](#) on page 17

Provisioning operation not working on newly restarted service

When you restart any service on a XenServer host, make sure the restart process is complete before invoking any VSC provisioning operation.

For example, suppose you restart the iSCSI service on a host, and then you quickly attempt to resize a storage repository on that same host. If the service is not ready yet, the operation fails. Before attempting the resize operation, you must wait until the service restart process is complete.

Storage repositories are not available after Data ONTAP upgrade

You just upgraded Data ONTAP, and the storage repositories listed in the XenCenter left pane are not available (there is a red "X" on each storage repository).

After an upgrade, the XenServer needs to be rebooted. If this reboot does not resolve the issue, log out of the iSCSI sessions and repair the affected storage repositories. If the issue is still not resolved and you are receiving an error message, log out and login to the iSCSI sessions again. For more information about the specific commands, refer to the XenCenter documentation.

Note: Do not detach the affected storage repositories because detaching prevents the storage repositories from being managed by VSC.

Error codes and mitigation

There are various error codes and messages that might occur as you use VSC for Citrix XenServer.

Each error message is comprised of a four-digit unique identifier that is displayed in the dialog box title bar, along with the message. For example:

Error 1113

The credentials you provided are incorrect. Try again.

Note: Error codes are only available and visible only when using the graphical interface, through these displayed messages. These error codes do not appear in the log files; however, the associated error messages are contained in the log files. In addition, these error codes are not produced when using cmdlets.

The following table lists the VSC for Citrix XenServer error codes in numerical order, along with their associated messages and resolutions.

Error Code	Message	Resolution
1000	It appears that you have not added any XenServer instances to XenCenter. The Virtual Storage Console cannot be used without at least one XenServer reference. Add one and try again.	Add at least one XenServer.
1001	Cannot create NFS storage repository - could not determine the best IP address to use for mounting. This could be because there are no matching networks between the controller and the XenServer hosts or in the case of cluster mode to prevent indirect data access.	Make sure that the storage controller interfaces and XenServer interfaces are on the same subnet. If they differ, modify the User Preferences option NFS Mount Networks to include the network that your XenServer storage interface is on. Additionally, in a clustered system, you might not have selected an aggregate that is on the same node as the LIF being used to mount the storage. To prevent indirect data access, this is not allowed to proceed.
1002	Cannot create NFS storage repository - the list of host addresses to export to is empty. This could be because there are no matching networks between the controller and the XenServer hosts or in the case of cluster mode to prevent indirect data access.	Make sure that you have controller interfaces and XenServer interfaces on the same subnet. If they differ, modify the User Preferences option NFS Mount Networks to include the network that your XenServer storage interface is on. Additionally, in a clustered system, you might not have selected an aggregate that is on the same node as the LIF being used to mount the storage. To prevent indirect data access, this is not allowed to proceed.

Error Code	Message	Resolution
1003	"Unable to detect an NFS service on this target" or "There was an error while attempting to mount the NFS share"	When the mount operation is failing from the XenServer, check the following: 1. Confirm that there is network connectivity between the storage controller and the XenServer storage interface. 2. Confirm that the NFS service has been configured for NFSv3 and started on the storage controller. 3. If using a Vserver, confirm that the ns-switch property is configured to file. 4. Confirm that the interface being used for mounting has been enabled to allow NFS.

Error Code	Message	Resolution
1004	<i>Error message from the Data ONTAP PowerShell SDK or the NetApp Manageability SDK</i>	Indicates an error from the Data ONTAP PowerShell SDK or the NetApp Manageability SDK. For example: - Volume or maxfiles exceeded max allowed for SIS. In this case, set the Default Volume Dedupe User Preferences option to False. - Selected SIS volume is too large; maximum is 14716g. In this case, decrease the values of the Volume Wrapper Autogrow Increment and Volume Wrapper Autogrow Multiplier User Preferences options until the resulting values are within the limits specified by Data ONTAP. Note: For more information about these options, see the topic <i>User Preferences</i>. Check the error message and logs on the storage controller.
1005	Cannot clone a powered on VM.	Power off the VM and attempt the cloning operation again.
1006	No clones have been specified.	No clone definitions have been provided to the clone API.
1007	The specified SR does not map to a volume on specified controller.	Attempted to clone into an existing storage repository that does not reside on a NetApp storage controller that has been provided. Provide a different storage repository that resides on a NetApp controller or provide the proper controller.
1008	The gold volume name has not been specified.	When cloning to more than one new storage repository, the gold volume name must be specified.

Error Code	Message	Resolution
1009	The new storage repository names have not been specified.	When cloning to new storage repositories, you must provide their names.
1010	New volume name was null.	The volume to where a storage repository is mapped or the name of the new volume that was created could not be determined. When cloning to an existing storage repository, make sure it is attached properly. When cloning to a new volume, verify that the volume was created successfully and there are no error messages on the storage controller.
1011	Invalid file location.	When VSC for Citrix XenServer cannot determine which copy strategy to use for the initial copy, check the following: 1. Make sure ndmp is properly configured. 2. When cloning from another storage system to a NetApp storage system, VSC for Citrix XenServer uses a native VM copy to create the initial copy. Make sure this native VM is working properly. 3. When ndmpcopy is used to copy from one volume to another in a clustered system, make sure that ndmp is enabled on each node and that the ndmp credentials are configured as the same credentials used to manage the storage controller.
1012	Source volume name should not be null.	The initial copy operation might have failed. Make sure ndmp is properly configured (see Error code 1011 - Resolution). Make sure that the XenServer VM copy operation works successfully.

Error Code	Message	Resolution
1101	The virtual machine you are trying to clone is running. Please halt it before attempting to clone it.	Power off or halt the VM before attempting to clone it.
1102	The data Vserver you are trying to add has already been added through its admin Vserver.	A direct-connect Vserver cannot be added if its parent Admin Vserver has been previously added. If the data Vserver needs to be used directly, then its Admin Vserver must be removed.
1103	The controller you are trying to add is already present. You cannot add it again.	An attempt was made to add a duplicate storage controller. VSC for Citrix XenServer prevents duplicate controllers.
1104	No controllers have been added to the NetApp Virtual Storage Console. Add controllers by selecting Tools > NetApp VSC > Discovery and Configuration .	At least one storage controller must be added through VSC for Citrix XenServer before any actions can be performed with the plug-in. Add at least one storage controller using the Tools > NetApp VSC > Discovery and Configuration option (see the topic <i>Discovering and adding storage controllers</i>).

Error Code	Message	Resolution
1105	Could not find a storage controller for the given storage repository. Check the logs for more information.	Verify that the storage repository was created within VSC for Citrix XenServer and resides on a NetApp storage controller. Check the log files (see the topic <i>Support log files</i>). • If the storage repository was created outside of VSC for Citrix XenServer and is on a NetApp controller, then add the controller using the Tools > NetApp VSC > Discovery and Configuration option (for more information, see topic <i>Discovering and adding storage controllers</i>). • If the storage repository was created outside of VSC for Citrix XenServer and is NOT on a NetApp controller, then re-create the storage repository on the applicable controller (for more information, see topic <i>Provisioning storage repositories</i>).
1106	There was an error creating the storage repository. Check the logs for more information.	Additional information regarding the root cause of the problem should be displayed in this error message. If not, check the log files (see the topic <i>Support log files</i>).
1107	There was an error applying deduplication settings to the storage repository. Check the logs for more information.	Additional information regarding the root cause of the problem should be displayed in this error message. If not, check the log files (see the topic <i>Support log files</i>).

Error Code	Message	Resolution
1108	There was an error destroying the storage repository. Check the logs for more information.	Additional information regarding the root cause of the problem should be displayed in this error message. Verify that the storage repository/volume was removed within VSC for Citrix XenServer. For more information, check the log files (see the topic <i>Support log files</i>).
1109	A storage repository with that name already exists. Try a different one.	Duplicate storage repository names are not allowed. Enter a unique name for the storage repository. If the name you are entering is unique, check the log files (see the topic <i>Support log files</i>).
1110	An error occurred during discovery. Check the logs for more information.	The Data ONTAP PowerShell Toolkit is invoked for discovery. Any errors resulting from a discovery process are entered into the log files. Check the log files (see the topic <i>Support log files</i>).
1111	The selected Vserver does not have any LIFs on the node containing the aggregate being used. This will create an indirect data path. Select a different aggregate to continue.	Perform <i>one</i> of the following: - Select a different aggregate for the clustered Data ONTAP data Vserver controller. For more information, refer to the topic <i>Editing storage controllers</i>. Or, - Add a new data Vserver controller on the node that owns the aggregate. For more information, refer to the topic <i>Discovering and adding storage controllers</i>.
1112	The type of controller you are trying to add is invalid.	A vFiler unit cannot be added directly. The only storage controllers that can be direct-connect are physical storage controllers, Admin Vservers, and data Vservers.
1113	The credentials you provided are incorrect. Try again.	Either the username or password or both are incorrect. Enter correct credentials.

Error Code	Message	Resolution
1114	NFS is not enabled on the selected storage controller.	Verify that the NFS is licensed on the applicable storage controller. If licensed, make sure NFS is enabled. For more information, refer to the storage controller documentation.
1115	No controllers were found in the given range.	A timeout might have occurred during the storage controller discovery process. 1. Increase the value for the User Preferences Controller Discovery Timeout option (for more information, see topic <i>User Preferences</i>). 2. If that does not resolve the issue, directly add the storage controller with the IP instead of using the discovery process. 3. If that does not resolve the issue, check the log files (see the topic <i>Support log files</i>).
1116	There was an error resizing the storage repository. Check the logs for more information.	Additional information regarding the root cause of the problem should be displayed in this error message. Perform the suggested solution. If this does not resolve the issue, retrieve the log files and send to Technical Support for analysis (see the topic <i>Support log files</i>).
1118	The backing volume is currently [offline / restricted]. Resolve this and try again.	Verify the volume is online before attempting to perform any operations with it, such as a resize or a destroy. • If offline, put the volume online. • If restricted, un-restrict the volume.

Error Code	Message	Resolution
1119	The storage repository you selected does not reside in a NetApp storage system, or the controller is currently not managed by the NetApp Virtual Storage Console.	Either the storage repository is not on a NetApp controller or the controller where the storage repository resides has not been added through VSC for Citrix XenServer. Add the controller using the Tools > NetApp VSC > Discovery and Configuration option (for more information, see topic <i>Discovering and adding storage controllers</i>). If this does not resolve the issue, check the log files (see the topic <i>Support log files</i>).
1120	Could not find a volume in <i>controller name</i> for the given storage repository. Check the logs for more information.	The volume might have been removed directly from the storage controller, resulting in VSC for Citrix XenServer not finding it. You can either re-create the volume or remove the storage repository from the XenCenter Client directly. If this does not resolve the issue, check the log files (see the topic <i>Support log files</i>).
1121	You must provide a value.	A Value entry was not provided for the User Preferences option. Enter an appropriate value for the option.
1122	The value must be a valid number, greater than or equal to 0.	You must provide a value greater than 0 in the User Preferences numeric fields.
1123	The credentials that are currently configured for this storage controller are no longer valid. You can reset those credentials in the NetApp VSC Discovery and Configuration panel.	The credentials for the storage controller are stale. Reset the credentials using the Tools > NetApp VSC > Discovery and Configuration option (see the topic <i>Discovering and adding storage controllers</i>).

Error Code	Message	Resolution
1124	You cannot add a cluster via its node_mgmt LIF. Connect using the cluster LIF.	You attempted to add the cluster using the node_mgmt LIF rather than the cluster LIF. Use the cluster LIF instead.
1125	The option is not available on the selected object.	You chose to perform an operation from the toolbar menu that does not apply to the selected inventory item.
1126	The value must be a valid percentage between 0 and 100.	User Preferences options that specify percentages must be between 0 and 100 percent.
1127	There was an error adding the storage controller. Check the logs for more information.	When adding a storage controller to VSC for Citrix XenServer, the process might fail due to a permissions issue. Check the permissions and try again.
1128	User <i>username</i> does not have enough privileges to create clones.	The specified user is missing certain privileges to create clones. View the assigned privileges using the Tools > NetApp VSC > Discovery and Configuration option (In the Storage Controllers window, select the desired controller and click Edit Controller Settings; navigate to the Roles screen). If the required privileges are not assigned (as displayed in the Missing APIs section), you can take one of the following actions: • Add the missing privileges to the controller. • Contact the storage administrator and request the required privileges.

Error Code	Message	Resolution
1129	User <i>username</i> does not have enough privileges to provision Storage Repositories.	The specified user is missing certain privileges to provision storage repositories. View the assigned privileges using the Tools > NetApp VSC > Discovery and Configuration option (In the Storage Controllers window, select the desired controller and click Edit Controller Settings; navigate to the Roles screen). If the required privileges are not assigned (as displayed in the Missing APIs section), you can take one of the following actions: • Add the missing privileges to the controller. • Contact the storage administrator and request the required privileges.
1130	User <i>username</i> does not have enough privileges to modify Storage Repositories.	The specified user is missing certain privileges to modify storage repositories. View the assigned privileges using the Tools > NetApp VSC > Discovery and Configuration option (In the Storage Controllers window, select the desired controller and click Edit Controller Settings; navigate to the Roles screen). If the required privileges are not assigned (as displayed in the Missing APIs section), you can take one of the following actions: • Add the missing privileges to the controller. • Contact the storage administrator and request the required privileges.

Error Code	Message	Resolution
1131	User <i>username</i> does not have enough privileges to destroy Storage Repositories.	The specified user is missing certain privileges to destroy storage repositories. View the assigned privileges using the Tools > NetApp VSC > Discovery and Configuration option (In the Storage Controllers window, select the desired controller and click Edit Controller Settings; navigate to the Roles screen). If the required privileges are not assigned (as displayed in the Missing APIs section), you can take one of the following actions: • Add the missing privileges to the controller. • Contact the storage administrator and request the required privileges.
1132	iSCSI is not enabled on the selected controller.	Verify that the iSCSI is licensed on the applicable storage controller. If licensed, make sure iSCSI is enabled. For more information, refer to the storage controller documentation.
1133	Fibre Channel is not enabled on the selected controller.	Verify that the FC is licensed on the applicable storage controller. If licensed, make sure FC is enabled. For more information, refer to the storage controller documentation.
1134	XenServer credentials are needed for at least one of the hosts where the SR is mounted. See the XenServer Hosts tab (Discovery and Configuration option) to specify credentials.	You must specify login credentials for the host. Add the credentials for the host using the Tools > NetApp VSC > Discovery and Configuration option (see the topic <i>Configuring host settings</i>).

Error Code	Message	Resolution
1135	World-Wide Port Names are not available. Make sure you have specified credentials in the XenServer Hosts tab (Discovery and Configuration option) so the WWPN can be retrieved.	You must specify appropriate login credentials for the host. Add the appropriate credentials for the host using the Tools > NetApp VSC > Discovery and Configuration option (see the topic <i>Configuring host settings</i>).
1136	The backing LUN, <i>lun_name</i> , is currently offline. Resolve this and try again.	The LUN is offline. Place the LUN back online and try again. For more information, refer to the storage controller documentation.
1137	Multipathing is not allowed for iSCSI storage repositories on 7-mode controllers.	When provisioning storage repositories, the iSCSI option is disabled. Multipathing is enabled on the hosts. The issue is multipathing hosts combined with storage controllers with Data ONTAP operating in 7-mode is not supported for iSCSI storage repositories. You need to turn off multipathing on the applicable hosts involved in provisioning and revert any multipathing recommended setting that were applied. For more information, see the topic <i>Configuring host settings</i>).
1138	You are attempting to provision a block-based storage repository with a volume wrapper that has the same name as an existing volume. Specify a unique name for the storage repository.	Specify a unique name for the storage repository. For more information, see the topic <i>Provisioning storage repositories</i>).

Error Code	Message	Resolution
1139	You are attempting to provision a block-based storage repository with a volume wrapper that has the same name as an existing LUN. Specify a unique name for the storage repository, as well as selecting a volume with a name different from the existing LUN.	Specify a unique name for the storage repository, as well as selecting a volume with a name different from the existing LUN. For more information, see the topic <i>Provisioning storage repositories</i>.
1140	The value must be a valid number, greater than or equal to 1.	You must provide a value greater than or equal to 1 for applicable the User Preferences option (either Volume Wrapper Buffer and Volume Wrapper Autogrow Increment).
1141	The value must be a valid number, greater than or equal to 2.	You must provide a value greater than or equal to 2 for the User Preferences option Volume Wrapper Autogrow Multiplier.
1142	There are no hosts in the selected pool. You must select a pool with at least one host in order to provision a storage repository.	You must add at least one host (for example, a XenServer instance) before you can provision a storage repository in that pool.
1143	A_SIS is not enabled on the selected storage controller.	Verify that the A_SIS is licensed on the applicable storage controller. If licensed, make sure A_SIS is enabled. For more information, refer to the storage controller documentation.
1144	The selected storage repository is block-based. Only NFS-based storage repository resizing is supported.	You have selected a block-based storage repository, which cannot be resized. You can either select an NFS-based storage repository or discontinue this action.

Error Code	Message	Resolution
1145	The SCSI id parameter is missing or incorrect.	One of the following incidents occurred: - An IPv6 address is on the storage controller on which you attempted to provision a storage repository. If this is the case, disable IPv6 and try the provisioning operation again. - You attempted to provision an iSCSI storage repository and you did not single out an IP address (depending on the Data ONTAP version, either one vif or interface group for Data ONTAP operating in 7-mode, or one LIF for clustered Data ONTAP) for iSCSI provisioning. If this is the case, perform one of the following: - If multiple IP addresses do NOT share the same subnet, isolate an IP address (either vif or interface group or LIF) for iSCSI provisioning and enter the non-matching subnets in the iSCSI Restrict Mount Networks user preference (see the topic <i>User Preferences</i>). - If multiple IP addresses are highlighted in the Usables interfaces screen, and all IP addresses share the same subnet, edit the storage controller configuration by selecting only one IP address (either vif or interface group; Usables information is not applicable to controllers running clustered Data ONTAP) for iSCSI provisioning and try the provisioning operation again (see the topic <i>Editing storage controllers</i>).

Error Code	Message	Resolution
1200	General Error.	Any errors that do not have a specific error code (as specified in this table) are designated with this code. Check the log files (see the topic <i>Support log files</i>).

Related concepts

[Support log files](#) on page 87

Related tasks

[Discovering and adding storage controllers](#) on page 31

[Editing storage controllers](#) on page 34

[Configuring host settings](#) on page 37

[Provisioning storage repositories](#) on page 44

Related references

[User Preferences](#) on page 19

Support log files

VSC for Citrix XenServer uses two log files (`Linji.log` and `Cmdlets.log`) to record detailed information regarding event messages and errors.

These log files are contained in the Logs directory:

```
APP_DATA/NetApp/Virtual Storage Console for Citrix XenServer/Logs
```

The `APP_DATA` string in the path example depends on your configuration (for example, `C:/Users/your_username/AppData`).

Both of these log files contain the timestamp of each message, as well as the debug message, and are created at runtime if either does not exist. Each log file contains 10 MB of data before a new file is created, and a maximum of 10 files is retained before the logs are rotated.

Linji.log Contains logs for all of the VSC for Citrix XenServer operations.

Cmdlets.log Created and written to when *directly* invoking the PowerShell cmdlets.

Exporting support logs

You can export all of the associated log files (up to 10) to a directory of your choice.

About this task

When exporting the log files, the entire Logs directory (which includes the `Linji.log` and, if available, `Cmdlets.log`) is saved to a .zip file to a location of your choice.

To export the log files (in .zip format), perform the following steps.

Steps

1. Open the XenCenter Client.
2. Select **Tools > NetApp VSC > Export Support Logs**.

The Save the log file dialog box opens with the timestamped .zip file containing the associated log files (for example, `Linji_log_20120507_124613`).

3. Locate the directory to where you want to save the .zip file and click **Save**.

Viewing Audit log

You can view the audit log file for information about event messages. This file does not contain debug information.

About this task

To view the audit log, perform the following steps.

Steps

1. Open the XenCenter Client.
2. Select **Tools > NetApp VSC > View Audit Log**.

The Audit Log window displays non-debugging messages about the state of execution of the VSC for Citrix XenServer.

Result

From the Audit Log window, you can perform any of the following actions:

- Open the Log folder that contains the support log files.
- Open the audit log in the default text editor.
- Export all of the support log files in a .zip file.
- Clear the Audit Log window.

Audit Log window

The Audit Log window displays the informational messages from the `Linji.log` file.

Command buttons

The Audit Log window contains the following command buttons.

Open logs folder	Opens the Logs folder that contains the support log files.
Open audit log in text editor	Opens the audit log in the default text editor.
Export support logs	Exports all of the support log files in a .zip file.
Clear audit log	Clears the Audit Log window.

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