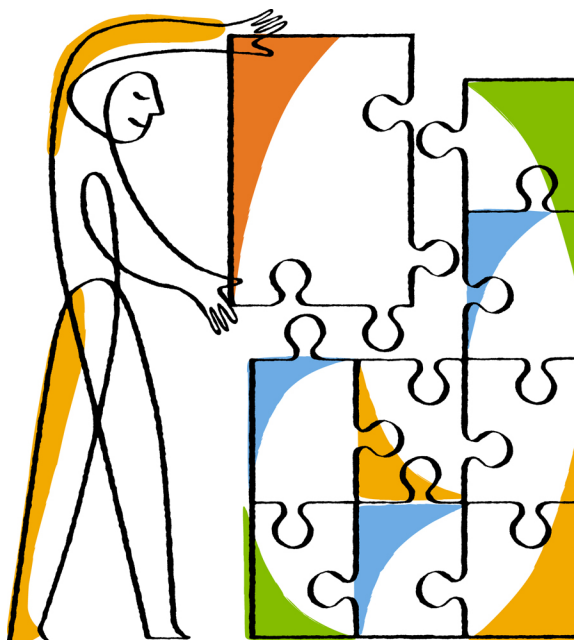




Virtual Storage Console 1.0.1 for Red Hat® Enterprise Virtualization

Installation and Administration Guide



NetApp, Inc.
495 East Java Drive
Sunnyvale, CA 94089
U.S.

Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1 (888) 463-8277
Web: www.netapp.com
Feedback: doccomments@netapp.com

Part number: 215-09411_A0
October 2014

Contents

Overview	5
Installation overview	7
Installation requirements and configuration information	7
Installing VSC for RHEV	8
Accepting security exception certificate when using Firefox web browser	10
Upgrading VSC for RHEV	10
Uninstalling VSC for RHEV	11
User Preferences for VSC for RHEV	13
Editing User Preferences	15
Restoring default User Preferences	15
Storage controller management	17
Role-based access control for VSC for RHEV	18
Adding storage controllers	18
Editing storage controllers	19
Managing storage controller resources	19
Deleting storage controllers	20
Storage domain management	21
Provisioning storage domains	21
Managing deduplication on storage domains	23
Resizing storage domains	24
Updating storage domain exports when adding or removing a host	25
Destroying storage domains	26
Cloning virtual machines overview	27
Cloning virtual machines	27
Troubleshooting and logging	30
Troubleshooting	30
Error codes and resolution	30
Support log files	39
Exporting log files	40
Copyright information	41
Trademark information	42

How to send your comments 43

Index 44

Virtual Storage Console for Red Hat Enterprise Virtualization overview

Virtual Storage Console (VSC) for Red Hat Enterprise Virtualization (RHEV) software is a single plug-in that provides storage controller configuration, NFS-based storage domain management (provisioning, deduplication, resizing, and destruction), and virtual machine (VM) cloning for RHEV environments with storage domains backed by NetApp storage systems.

VSC for RHEV provides the ability to orchestrate common storage and VM deployment tasks to:

- Achieve operational agility and significantly reduce deployment, management, and troubleshooting time
- Ensure compliance with RHEV environments that utilize 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
- Support Data ONTAP operating in 7-mode and clustered Data ONTAP

VSC for RHEV offers fully orchestrated, RHEV Manager administration-driven provisioning and cloning capabilities:

- Storage controller configuration
- NFS storage domain provisioning, deduplication, resizing, and destruction
 - Note:** Block-based storage and local storage are not supported in this release.
- Rapid VM cloning (in existing NFS-based storage domains) for virtual desktops and virtual servers powered by NetApp FlexClone
- Cloned VMs instantly available in RHEV Manager

Before setting up your network, make sure to review the recommended best practices regarding RHEV and NetApp storage design and deployment as provided in the NetApp Technical Report TR-4159: *Red Hat Enterprise Virtualization 3.1 and NetApp Clustered Data ONTAP Storage Best Practices Guide*.

As a plug-in to the RHEV Manager, the graphical user interface (GUI) plug-in portion of the VSC for RHEV package must be installed on the host where the RHEV Manager is installed; however, the VSC for RHEV server software can be installed on any RHEL host and should be on the same subnet as the RHEV Manager host and GUI plug-in.

Related information

[TR-4159: Red Hat Enterprise Virtualization 3.1 and NetApp Clustered Data ONTAP Storage Best Practices Guide.pdf](#)

Installation overview

You must install VSC for RHEV, which consists of two components (the GUI plug-in and the VSC for RHEV server software), from a command line.

When installing VSC for RHEV, follow these guidelines:

- The GUI plug-in must be installed on the same host as the RHEV Manager. The VSC for RHEV server software can be installed on any RHEL host.
- The RHEL hosts running VSC and the management ports of the storage system must be networked with the RHEV hosts.
- The VSC for RHEV software should be on the same subnet as the RHEV Manager host.
- The VSC for RHEV host needs to be started after installation.
- At a minimum, the display resolution must be set to 1,280 by 1,024 pixels to view VSC pages correctly.

Installation requirements and configuration information

Before you install VSC for RHEV, you should be aware of the following requirements and configuration information.

License requirements

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

- NFS (for provisioning NFS-based storage domains)
- A_SIS (for configuring deduplication settings)
- MultiStore (if working with vFiler units)

Note: For Data ONTAP versions where the MultiStore license is installed by default (for example, Data ONTAP 8.1.2), this option must be enabled (`licensed_feature.multistore.enable`).

- FlexClone (for cloning virtual machines)

Software requirements

The following software is required for use with VSC for RHEV:

- Data ONTAP
- Operating systems
 - Red Hat Enterprise Linux (RHEL)
 - Microsoft Windows (Client only)
- Red Hat Enterprise Virtualization (RHEV) Manager
- RHEV Hypervisor
- Oracle Open Java Development Kit (JDK)
- Web browsers
 - Internet Explorer (on Windows with Enhanced Security Configuration disabled where applicable)
 - Firefox (on RHEL)

See the Interoperability Matrix, which is online at mysupport.netapp.com/matrix, for details regarding the supported software.

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

Hardware requirements

Refer to the RHEV hardware requirements. The VSC for RHEV software supports these minimum hardware requirements.

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

Related information

[Interoperability Matrix: mysupport.netapp.com/matrix](https://mysupport.netapp.com/matrix)

Installing VSC for RHEV

VSC for RHEV should be installed in two phases: first, you must install the GUI plug-in, and then you must install the VSC for RHEV server software. The installation must be performed from a command line.

Before you begin

You must be logged in with root privileges to the hosts where you are installing the VSC for RHEV packages.

You must have ensured that the required software is installed on the servers. For details, see information about installation requirements and configuration details.

About this task

The VSC for RHEV installation consists of two rpm (RPM Package Manager) packages: the GUI plug-in and the VSC for RHEV server software. The GUI plug-in must be installed on the same host as the RHEV Manager. The VSC for RHEV server software can be installed on any RHEL host.

Steps

1. Download the two VSC for RHEV installation rpm files from the NetApp Support Site at mysupport.netapp.com to the host where you want to install the packages:

- GUI plug-in: `vsc-rhev-plugin-<version>-1.el6.noarch.rpm`
- Server software: `vsc-rhev-<version>-1.el6.noarch.rpm`

2. Install the GUI plug-in.

From a command line prompt on the host where you downloaded the GUI plug-in package, switch to the directory where you saved the rpm file and run the following command:

```
rpm -i vsc-rhev-plugin-<version>-1.el6.noarch.rpm
```

The plug-in configuration file is installed in the `/etc/ovirt-engine/ui-plugins` directory. The plug-in files are installed in the `/usr/share/ovirt-engine/ui-plugins` directory.

3. Install the VSC for RHEV server software.

From a command line prompt on the host where you downloaded the server software package, switch to the directory where you saved the rpm file and run the following command:

```
rpm -i vsc-rhev-<version>-1.el6.noarch.rpm
```

The files are installed in the `/usr/local/vsc` directory. The VSC service is installed in the `/etc/init.d` directory.

4. Configure the GUI plug-in component.

Open the plug-in configuration file (`/etc/ovirt-engine/ui-plugins/netapp-config.json`) and change the value of the `link` property to point to the URL where the VSC for RHEV is installed (for example, `https://VCS_server_address:8143`).

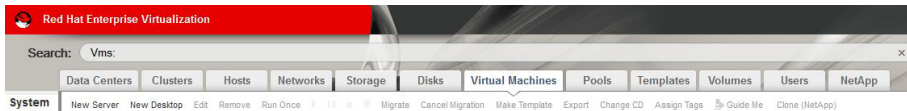
5. Start the VSC for RHEV server.

On the host where you installed the server software, run the following command:

```
service vsc start
```

Result

When you log in to the RHEV Manager, the **NetApp** tab is present and available for use.



Note: If you plan to use the Firefox web browser, the first time you access the application using Firefox you must accept the security exception certificate.

There are no files generated during the installation; if any errors are encountered during the install operation, the error information is written to the output of the RPM command used to install the VSC server.

Related concepts

[Installation requirements and configuration information](#) on page 7

[Accepting security exception certificate when using Firefox web browser](#) on page 10

Accepting security exception certificate when using Firefox web browser

After you install VSC for RHEV and attempt to access the application for the first time using the Firefox browser, you must navigate to the address of the host that you installed VSC on, then go to the URL `https://VSC_server_address:8143/` and accept the security exception certificate.

This is required because Firefox will not show the VSC content in an iframe using SSL with a self-signed certificate. This method allows the certificate to be installed in the browser so that the content can be shown.

Upgrading VSC for RHEV

You must upgrade VSC for RHEV in two phases: first, you must upgrade the GUI plug-in, and then you must upgrade the VSC for RHEV server software. The upgrade must be performed from a command line.

Before you begin

You must be logged in with root privileges to the hosts where you are upgrading the VSC for RHEV packages.

About this task

The VSC for RHEV upgrade contains two rpm (RPM Package Manager) packages: the GUI plug-in and the VSC for RHEV server software. The GUI plug-in must be upgraded on the same host as the RHEV Manager. The VSC for RHEV server software can be upgraded on any RHEL host.

Steps

1. Download the two VSC for RHEV upgrade rpm files from the NetApp Support Site at mysupport.netapp.com to the host where you want to upgrade the packages.
 - GUI plug-in: `vsc-rhev-plugin-<version>-1.el6.noarch.rpm`
 - Server software: `vsc-rhev-<version>-1.el6.noarch.rpm`
2. Stop the VSC server:
service vsc stop
3. Upgrade using the downloaded rpm files.
 - Run the following command on the host where the GUI plug-in is installed:
rpm -Uvh vsc-rhev-plugin-<version>-1.el6.noarch.rpm
 - Run the following command on the host where the VSC server is installed:
rpm -Uvh vsc-rhev-<version>-1.el6.noarch.rpm
4. Configure the GUI plug-in component.
 Open the plug-in configuration file `/etc/ovirt-engine/ui-plugins/netapp-config.json` and change the value of the localhost to desired IP address of VSC server.
5. Start the VSC server:
service vsc start
6. Clear the browser cache on all clients that are accessing the RHEV web admin UI.

Uninstalling VSC for RHEV

You must uninstall VSC for RHEV (consisting of the VSC for RHEV server software and the GUI plug-in) from a command line.

Before you begin

You must be logged on with root privileges to the host where you are uninstalling VSC for RHEV.

Before uninstalling VSC, you should stop the VSC server.

About this task

During the uninstall process, there are no progress bars or error messages displayed.

To uninstall VSC for RHEV, perform the following steps.

Steps

1. On the host where the VSC for RHEV server software is installed, from a command line prompt, run the following command:

```
rpm -e vsc-rhev
```

The files in the `/usr/local/vsc` directory and the VSC service in the `/etc/init.d` directory are removed.

2. On the host where the GUI plug-in is installed, from a command line prompt, run the following command:

```
rpm -e vsc-rhev-plugin
```

The plug-in configuration file in the `/etc/ovirt-engine/ui-plugins` directory and the plug-in files in the `/usr/share/ovirt-engine/ui-plugins` directory are removed.

Result

After removing the plug-in component, when you refresh the browser, the plug-in **NetApp** tab will be removed from the RHEV Manager.

The VSC server log directory (`/var/log/vsc`) located on the VSC for RHEV host remains after the uninstall process. However, no log files are generated during the uninstall; any errors that might have occurred during the uninstall process would be delivered to the output of the RPM command that was used to uninstall the VSC server.

User Preferences for VSC for RHEV

The VSC for RHEV User Preferences window provides access to options you can customize to control provisioning and closing operations.

To view **User Preferences**, from the RHEV Manager main window, select the **NetApp** tab, then click **User Preferences**. The User Preferences window displays the available options. You can edit only the option **Value**.

Preference options

VSC for RHEV **User Preferences** contains the following options:

Default Volume Dedupe

Default value: Selected

Enables deduplication on new storage domain volumes, by default.

When provisioning volumes while this option is not selected, be aware that there are limits for volume sizes. If you specify a volume size that is too large, you will receive an error message.

Mount Using Host Name

Default value: Not selected

Selecting this option mounts a storage domain using the storage controller host name.

NFS Restrict Export Networks

Default value: blank

Prevents a network of RHEV host network interface cards (NICs) from being included in the exports for a new volume.

You can specify a value using the following formats:

- Network: 192.168.2.1/24

Note: The range of addresses are separated by a forward slash (/).

- Multiple networks: 192.168.2.1/24;10.10.10.1/24

Note: The networks are separated by a semi-colon (;).

For example, if you enter 192.168.2.1/24;10.10.10.1/24, these networks will be ignored when determining the IP address on the controller to use for the next export of a new volume.

NFS Mount Networks

Default value: blank

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

You can specify a value using the following formats:

- Network: 192.168.2.1/24

Note: The range of addresses are separated by a forward slash (/).

- Multiple networks: 192.168.2.1/24;10.10.10.1/24

Note: The networks are separated by a semi-colon (;).

NFS Restrict Mount Networks

Default value: blank

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

You can specify a value using the following formats:

- Network: 192.168.2.1/24

Note: The range of addresses are separated by a forward slash (/).

- Multiple networks: 192.168.2.1/24;10.10.10.1/24

Note: The networks are separated by a semi-colon (;).

For example, if you enter 192.168.2.1/24;10.10.10.1/24, these networks will be ignored when determining the IP address on the controller to use for the next NFS storage domain.

No ATime Update

Default value: Selected

Disables updating of access time when files are read. For better performance in a heavy read traffic environment, keep the check box selected.

No Snap

Default value: Selected

Disables scheduled Snapshot copies for new FlexClone volumes.

Only Offline

Default value: Not selected

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

Volume Snap Reserve

Default value: 0

Sets the Snapshot reserve for new volumes to the specified percentage.

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 RHEV Manager main window, select the **NetApp** tab, then click **User Preferences** in the menu bar.

The User Preferences window displays.

2. Modify the entry by either typing a new value or selecting/clearing the option check box.
3. When you finish editing the values, click **OK**.

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 border. Hover the cursor over the field to display instructions for entering valid values for that option.

Validated values are incorporated and the User Preferences window closes.

Restoring default User Preferences

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 RHEV Manager main window, select the **NetApp** tab, then click **User Preferences** in the menu bar.

The User Preferences window displays.

2. Click **Reset**.
3. Click **OK** to save the restored values.

The **User Preferences** options are restored to their original default settings and the User Preferences window closes.

Storage controller management

Before storage domains can be provisioned, you must manually add the storage controllers that provide the storage.

Prior to setting up your network and initiating the storage controller process, make sure to review the recommended best practices regarding RHEV and NetApp storage design and deployment as provided in the NetApp Technical Report TR-4159: *Red Hat Enterprise Virtualization 3.1 and NetApp Clustered Data ONTAP Storage Best Practices Guide*.

From the **NetApp** tab on the RHEV Manager main window, you can perform the tasks to manage (add, edit, and delete) storage controllers. You can also configure resources for controllers; however, for Storage Virtual Machine (SVM) controllers, resources are configured when you create the controllers, and for physical storage controllers running Data ONTAP operating in 7-mode, you configure resources by using **Manage Resources**.

The following connections to storage controllers are supported:

- Direct connect to physical storage controllers running Data ONTAP operating in 7-mode
- Pass through from physical storage controllers running Data ONTAP operating in 7-mode to vFiler units
- Direct connect to SVMs
- Pass through from cluster to SVMs

In addition, you might need to consider VSC-based user permissions for storage accounts. For details, see information about role based access control for VSC for RHEV.

Related concepts

[*Role-based access control for VSC for RHEV*](#) on page 18

Related information

[*TR-4159: Red Hat Enterprise Virtualization 3.1 and NetApp Clustered Data ONTAP Storage Best Practices Guide.pdf*](#)

Role-based access control for VSC for RHEV

VSC for RHEV does not provide any role-based access control (RBAC), nor does VSC integrate with any RHEV Manager RBAC capabilities. However, NetApp storage running Data ONTAP does have optional RBAC capabilities based on managing user roles and access.

Storage administrators can leverage these RBAC capabilities or provide root or full permissions on the NetApp storage controller for applications such as VSC for RHEV. For example, an administrator can create a dedicated user, and assign this user to a dedicated group; then a role can be created for that group, and finally assign that role with the necessary RBAC capabilities, which would be in-line with the abilities permitted for that dedicated user. Utilizing RBAC in Data ONTAP to limit the capabilities of a VSC user limits the security exposure of the controller to only the necessary APIs that are required to complete all of the tasks available through the VSC for RHEV.

For detailed information about VSC-based user permissions for storage accounts, see Knowledgebase article 1014504 *Role Based Access Control for VSC for Red Hat Enterprise Virtualization (RHEV)* at kb.netapp.com/support/index?page=content&S:1014504.

Adding storage controllers

You must manually add storage controllers to the RHEV Manager.

Before you begin

- You must have set the list of user privileges as specified in the KB article for RBAC.
- You must have set the firewall policy of the LIF to type **MGMT** if you are adding the controller using the SVM LIF.

Note: This is not applicable if you are adding the controller using cluster LIF.

About this task

You can add only a single controller at a time.

Steps

1. From the RHEV Manager main window, select the **NetApp** tab; then click **Add** in the menu bar.
The Add Storage Controller dialog box opens.
2. Enter information for the following fields:
 - **Target Hostname**
 - **Password**

3. (Optional) Modify the default values for **Target Port** and **User Name**, if needed.
4. (Optional) Select the **Use SSL** check box, if needed.
5. Click **OK**.

The storage controller is added.

Editing storage controllers

You can edit the storage controller information (Target Port, User Name, Password, Use SSL option).

About this task

To edit storage controller information, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **NetApp** tab, then click **Edit** in the menu bar.
The Modify Storage Controller dialog box opens.
2. Modify the desired fields.
3. Click **OK**.

The modified storage controller information is saved.

Managing storage controller resources

You can configure the resources (interface and aggregates) for physical storage controllers running Data ONTAP operating in 7-mode that you want to use for provisioning and cloning.

About this task

To configure the resources for physical storage controllers running Data ONTAP operating in 7-mode, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **NetApp** tab.
2. Select the controller, then click **Manage Resources** in the menu bar.

The Manage Storage Controller Resources dialog box opens.

3. For each category (**Interfaces, Aggregates**), move the desired options that you want to use for provisioning and cloning from the left column to the right column (either double-click an option, or select an option and click the single right arrow, or click the double right arrow to move all of the options).
4. (Optional) If needed, select the **Prevent further changes** check box.
5. Click **OK**

The information is saved for the controller.

Deleting storage controllers

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

About this task

To delete storage controllers, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **NetApp** tab; then select one or more controllers that you want to delete.

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

The Delete Confirmation opens.

2. Click **Yes**.

The selected controllers are removed from the list of controllers under NetApp management.

Note: The deleted storage controllers continue to exist and serve data, including any volumes that were mounted as storage domains in VSC for RHEV. However, those volumes will not have any NetApp-specific functionality (for example, resize, destroy, or dedupe) available to them.

Storage domain management

You can provision, resize, configure deduplication settings, and destroy NFS-based storage domains.

Provisioning storage domains

You can provision new NFS-based storage domains.

Before you begin

Before you can provision storage domains, storage controllers must be configured. In addition, the applicable licenses must be installed on the storage controller to enable provisioning of the desired storage domains. For details, see information about installation requirements and configuration details.

About this task

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

- For storage systems running 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 SVM through which to provision the new storage domain, or select any SVM which may have been added directly (for example, without an Admin SVM) to the VSC for RHEV.

Note: There are certain limitations with direct-connect SVMs:

- To provision storage domains on direct-connect SVM, you must create a new role and a new user with the required privileges. The default vsadmin role assigned to SVMs 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 mysupport.netapp.com.
 - Before using SVMs, resources—including aggregates—should be allocated for the SVMs.
 - Storage domain creation is not supported on striped aggregates. When you add a direct-connect SVM, any striped aggregates associated with it appear as available. Provisioning on those striped aggregates will fail.
- If provisioning storage domains 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 provision new storage domains, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **Storage** tab; then click **Provision (NetApp)** in the menu bar.

The Provision Storage Domain (NetApp) wizard opens to the **Storage Controller Details** view.

2. Specify the applicable controller details.
 - **Target Storage Controller** – Select the controller name from the drop-down list. Depending on the type of storage controller selected, 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 **Set vFiler Context** check box and select a unit from the **vFiler** drop-down list.
 - In clustered systems, you can connect directly to a SVM by selecting from the **Storage Virtual Machine** drop-down list.
3. Click **Storage Domain Host**; then specify the following host information:
 - **Data Center** – Select the data center name from the drop-down list.
Note: This list only shows NFS-type data centers.
 - **Host** – Select the host name from the drop-down list.
4. Click **Storage Domain Details**; then specify the applicable storage domain details.
 - **Domain name** – Enter a unique domain name.
 - **Domain Function** – Select the function of the storage domain from the drop-down list.
 - **Size** – Specify the amount of storage (in MB, GB, or TB) to apply to the new storage domain. Maximum size depends on the storage controller and space available. For more information, refer to the storage controller documentation.
 - **Aggregate** – Select an available aggregate from the drop-down list.
 - **Thin provision** – Select to set space reserve to none, and disable space checks.

Note: Cloning and storage domain creation can fail if your size request uses too much of the aggregate. Capacity is not reserved for an individual storage domain. 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 domain requires it. Product design constraints assume that all storage domains will not normally use all of their provisioned storage at the same time.

- **Auto-grow** – If more space is required, selecting this check box automatically expands the storage domain by the specified increment (Grow Increment), up to the specified size limit (Maximum storage domain size).
- **Grow increment** – When Auto-grow is selected, specify the amount of storage added to the storage domain each time space is needed.
- **Maximum domain size** – When Auto-grow is selected, specify the maximum limit at which the automatic expansion stops.

5. Click **Summary** to review the storage domain details; then click **OK**.

Note: If you prefer to hide the progress status for this process, click **Run In Background**. The dialog box closes and the process continues on the VSC for RHEV server; you can view the event log in RHEV for updates on the progress including the occurrence of any error.

The storage domain is added to the RHEV Manager user interface.

Note: If any errors occur during this process, a message displays with an associated error code.

Related references

[Error codes and resolution](#) on page 30

Managing deduplication on storage domains

You can manage the deduplication on selected storage domains 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 domains 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 manage the deduplication on storage domains, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **Storage** tab.

The available storage domains are listed in the window.

2. Select the desired storage domain, then click **Deduplicate (NetApp)** in the menu bar.

The Deduplicate Storage Domain (NetApp) window 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 was not selected when the storage domain was initially provisioned, 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**.

Note: If you prefer to hide the progress status for this process, click **Run In Background**. The dialog box closes and the process continues on the VSC for RHEV server; you can view the event log in RHEV for updates on the progress including the occurrence of any error.

The selected deduplication settings are applied to the storage domain.

Resizing storage domains

You can resize NFS-based storage domains.

Before you begin

If you are planning to reduce the storage domain, make sure that the required space is available on the storage domain.

About this task

For NFS-based storage domains, 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 domain outside of the VSC for RHEV interface (for example, from the command line directly on the storage controller), you must re-scan the storage domain through the RHEV Manager interface.

If resizing storage domains 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 domains, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **Storage** tab.

The available storage domains are listed in the window.

2. Select the desired storage domain; then click **Resize (NetApp)** in the menu bar.

The Resize Storage Domain (NetApp) window opens.

3. Modify 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**.

Note: If you prefer to hide the progress status for this process, click **Run In Background**. The dialog box closes and the process continues on the VSC for RHEV server; you can view the event log in RHEV for updates on the progress including the occurrence of any error.

The information for the storage domain is updated.

Updating storage domain exports when adding or removing a host

You can update the storage domain exports after adding or removing a host.

About this task

If you add a new RHEV host or host interface to a data center, the host cannot be activated until it can successfully connect to every storage domain in that data center. And because the host did not exist when the storage domain was provisioned, it will not be in any of the storage domain exports. As a result, any new RHEV host must be added to all of the exports for all of the storage domains. In addition, if you removed a host, that host must be removed from all of the storage domain exports.

To update storage domain exports after adding or removing a host, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **Storage** tab.

The available storage domains are listed in the window.

2. Click **Update Exports (NetApp)** in the menu bar.

An analysis is run comparing the NFS exports for all storage domains that are on managed NetApp volumes with the network interfaces of all hosts in each associated data center. After the analysis is complete, the Update All Storage Domain Exports (NetApp) opens listing any host interfaces that need to be added to the exports for a particular storage domain (in the **Exports to be Added** column) and any exports found for a storage domain that do not match any host (in the **Exports to be Removed** column).

3. Click **OK**.

The exports for each storage domain listed are updated accordingly.

Destroying storage domains

If the storage domain is no longer needed, you can permanently destroy it, including all virtual machines in that domain.

About this task

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

- Destroy all virtual machines in a storage domain.
- Detach the storage domain from the RHEV Manager environment.
- Destroy the backing volume on the NetApp controller

If destroying storage domain 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.

Steps

1. From the RHEV Manager main window, select the **Storage** tab.

The available storage domains are listed in the window.

2. Select the desired storage domain; then click **Destroy (NetApp)** in the menu bar.

The Destroy Storage Domain (NetApp) window opens.

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

A confirmation prompt opens.

4. Click **OK**.

Note: If you prefer to hide the progress status for this process, click **Run In Background**. The dialog box closes and the process continues on the VSC for RHEV server; you can view the event log in RHEV for updates on the progress including the occurrence of any error.

The storage domain and all of the virtual machines are removed from the RHEV Manager environment.

Cloning virtual machines overview

You can clone virtual machines (VMs) to a single, existing NFS-based storage domain.

You can clone VMs according to the following scenarios:

- Clone within the same existing storage domain
- Clone to a different existing storage domain on the same NetApp controller
- Clone to a different existing storage domain on a different NetApp controller

Cloning virtual machines

While it is possible to create up to 2000 virtual machine clones at one time, it is best to perform multiple executions of fewer requests.

Before you begin

- Make sure there is enough space on the destination storage domain to contain all of the clones.
- Make sure there is enough space on the source storage domain to create a template.
- If you are cloning a guest operating system, you must manually update unique information such as a static IP address or hostname for each clone.

About this task

Virtual machine clones created through VSC for RHEV are instantly available in the RHEV Manager.

To clone virtual machines to a single, existing storage domain, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **Virtual Machines** tab.

Note: You can also select the **Templates** tab to access the Clone Virtual Machine (NetApp) wizard.

The available virtual machines are listed in the window.

2. Select a virtual machine; then click **Clone (NetApp)** in the menu bar.

The Clone Virtual Machine (NetApp) wizard opens to the **Storage Controller Details** view where you specify the storage controller information.

3. Specify the applicable controller details.

- **Target Storage Controller** – Select the controller name from the drop-down list. Depending on the type of storage controller selected, 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 **Set vFiler Context** check box and select a unit from the **vFiler** drop-down list.
 - In clustered systems, you can connect directly to a SVM by selecting from the **Storage Virtual Machine** drop-down list.

4. Click **Virtual machine host**; then specify the details as to where you want the clones to be created.

- **Run On**
 - **Data Center** – Select the data center from the drop-down list.
Note: This list only shows NFS-type data centers.
 - **Cluster** – Select the cluster name from the drop-down list.
 - **Host** – Select the host name from the drop-down list.
- **Migration options** – Select the migration option from the drop-down list.

5. Click **Virtual machine details**; then specify the VM clone details.

- **Virtual processors** – Enter the number of processors.
- **Memory size** – Specify the amount of memory (in MB, GB, or TB) to apply to the new virtual machines.
- **Number of Clones** – Enter the number of clones to create (maximum limit per cloning instance: 2,000).
Note: If you enter a value greater than 255, a warning message will display advising that the MAC address range will need to be updated to include enough values for the specified number of clones.
- **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 number 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 the check box is not selected, clones remain powered off after the cloning process completes.

Note: Powering on a large number of clones at the same time might adversely affect the host or hosts on which the machines are running. Additionally, if there is not enough RAM on the hosts to accommodate all of the virtual machines, some of them will fail to start.

6. Click **Storage Domain Selection**; then select the storage domain in which the files for the virtual machine will be stored.
7. Click **Summary** and review the details; then click **OK**.

Note: If you prefer to hide the progress status for this process, click **Run In Background**. The dialog box closes and the process continues on the VSC for RHEV server; you can view the event log in RHEV for updates on the progress including the occurrence of any error.

Result

For most cloning operations, a template must first be created through which the disks will be copied to the destination storage domain. This process can take a long time; however, after it is finished, the actual process of cloning from that template is very fast. If the destination storage domain is the same as the storage domain of all of the disks of the source virtual machine, a template is not needed, and the cloning process will run faster.

Troubleshooting and logging

This section provides information about VSC for RHEV error codes and mitigation, as well as support logs.

Troubleshooting

This section provides information about error codes and mitigation.

Error codes and resolution

Various error codes and messages might be generated as you use VSC for RHEV.

Each error message is comprised of a four-digit unique identifier, along with the message. For example:

RVSC1001

An error occurred and the connection information was not available for editing.

Note: For error codes that are displayed through the user interface, the unique identifier is displayed in the dialog box title bar, along with the message.

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

Error Code	Message	Resolution
RVSC1001	An error occurred and the connection information was not available for editing.	Verify that the connection to the VSC server is active and try again.
RVSC1002	Unable to validate credentials for managing resources of this controller.	Verify that the connections to the VSC server and the storage controller are active and try again.
RVSC1003	The maximum grow size must be no larger than X.	Choose a value smaller than X for the maximum grow size.
RVSC1004	The maximum domain size must be no larger than X.	Choose a value smaller than X for the domain size.
RVSC1005	The minimum domain size must be at least X.	Choose a value larger than X for the domain size.

Error Code	Message	Resolution
RVSC1006	The data center you selected has no valid clusters. Make sure you have a least one cluster with a host in the "up" state.	Make sure that at least one cluster with at least one host is in the "up" state; then try again.
RVSC1007	The selected Virtual Machine must be powered down before it can be cloned.	Power down the selected virtual machine and attempt the cloning operation again.
RVSC1008	The available size of <i>X</i> on the selected storage domain is less than the needed size of <i>Y</i> for the cloning operation.	Perform one of the following: • Resize the selected storage domain to have enough storage to complete the operation. Or, • Select a different storage domain with enough storage to complete the operation.
RVSC1009	An error occurred while validating the clone name. A virtual machine with the same name may or may not already exist.	Verify that the connections to the VSC server and the RHEV Manager server are active and that the clone name is not already used.
RVSC1010	A virtual machine with the name <i>X</i> already exists.	Select a different name for the new virtual machine.
RVSC1011	The following clone names conflict with existing virtual machines: <i>X</i> , <i>Y</i> , ..., <i>Z</i> .	Select different names for the specified virtual machines.
RVSC1012	The clone name can only contain alphanumeric, ., _ , or - characters.	Only use the characters allowed to create the clone name.
RVSC1013	The data center you selected has no valid hosts. Make sure you have at least one host in the "up" state.	Perform one of the following: • Select a different data center that contains at least one host in the "up" state. Or, • Make sure that at least one host in the selected data center is in the "up" state.

Error Code	Message	Resolution
RVSC1014	There are no valid data centers available.	Make sure a data center is available and contains a host with a valid network for mounting a volume from the selected controller. Make sure that at least one data center is available for use and that it contains at least one host with a valid network for mounting a volume from the selected storage controller.
RVSC1015	A storage domain with the same name already exists.	Select a different name for the new storage domain.
RVSC1016	A volume on the selected controller with the same name already exists.	Perform one of the following: - Specify a different name for the new volume. Or, - Select another controller that does not have that volume name in use already.
RVSC1017	The connection with the VSC server has been lost. Check the logs to see if the operation completed successfully.	Verify the VSC server is active and can be reached by the RHEV Manager server. Also, check the logs to determine whether or not the operation that was running completed successfully. (For details, see information about Support log files.)
RVSC1018	The connection with the VSC server has been lost. The operation cannot be completed. Make sure that the VSC server is running and try again.	Verify the VSC server is active and can be reached by the RHEV Manager server.
RVSC1019	An error occurred while loading the controller. Check the logs for more information.	Verify the connection to the VSC server is active. Also, check the VSC logs for more information. (For details, see information about Support log files.)

Error Code	Message	Resolution
RVSC1020	An error occurred while adding the storage domain.	Perform one of the following: • Make sure that the connection to the RHEV Manager server is active. • Make sure that the connection to the storage controller is active. • Make sure that the VSC server can communicate with the RHEV Manager server and the associated storage controller. Check the logs for more information. (For details, see information about Support log files.)
RVSC1021	An error occurred while saving the preferences.	Verify the connection to the VSC server is active and that the file system where the user preferences are stored is not Read-Only or that another process is not using the user preferences file.
RVSC1022	The controller cannot be added as it is already present.	The controller is already present and can be used for all VSC-related activities. You could also add another controller.
RVSC1023	The Storage Virtual Machine you are trying to add has already been added through its Admin Storage Virtual Machine, X.	You can access the Storage Virtual Machine (SVM) through the Admin SVM or you can remove the Admin SVM and only add the SVM that you wish to use in VSC.
RVSC1024	The type of controller you are trying to add is invalid.	Make sure that the controller you are trying to connect to is a valid NetApp storage controller in a good state.
RVSC1025	You cannot add a cluster via its node_mgmt LIF. You must connect using the cluster management LIF.	Use the cluster management LIF to connect to a cluster instead of the node_mgmt LIF.
RVSC1026	The credentials you have entered for this controller are invalid.	Enter the correct credentials for the controller to which you are trying to connect.

Error Code	Message	Resolution
RVSC1027	The address you are trying to add is not a valid controller.	Make sure that the address you are connecting to corresponds to a NetApp storage controller.
RVSC1028	A Storage Virtual Machine under the Admin Storage Virtual Machine you are trying to add is already present. You must remove that Storage Virtual Machine before connecting to the Admin Storage Virtual Machine.	You must remove any SVMs under the Admin SVM before adding the Admin SVM to VSC.
RVSC1029	There are no usable Data Storage Virtual Machines under the Admin Storage Virtual Machine you are trying to add.	Make sure that there is at least one Data SVM under the Admin SVM you are trying to add.
RVSC1030	Could not connect to the controller using the stored credentials.	Make sure that the credentials you are using to connect to the storage controller match those that are currently used to connect to it. You can update the credentials to access the storage controller. (For details, see information about editing storage controllers.)
RVSC1031	No interface on the controller was found that matched the rules for selecting an NFS mount network. Verify an interface is in the same network as at least one host or that the interface network is listed in the NFS mount network user preference.	Make sure that at least one interface on the storage controller is in the same network as at least one network interface on one host. Alternatively, make sure that the interface network is listed in the User Preference, NFS Mount Networks option. (For details, see information about user preferences for VSC for RHEV.)
RVSC1032	At least one interface on the controller matches the NFS mount rules but does not have a direct path to the aggregate containing the volume. Ensure at least one interface is located on the same node as the aggregate.	Make sure that at least one interface is located on the same node as the aggregate.
RVSC1033	Cannot create NFS storage domain - This could be because there is no matching networks between the controller and the RHEV hosts prevent indirect data access.	Make sure there is at least one matching network between the storage controller and the RHEV hosts.

Error Code	Message	Resolution
RVSC1034	Failed to configure the default export policy for access.	Verify the connection to the storage controller is active and that the volume in question is not busy or in a bad state.
RVSC1035	Failed to set qtree security.	Verify the connection to the storage controller is active and that the volume in question is not busy or in a bad state.
RVSC1036	Failed to export volume.	Verify the connection to the storage controller is active and that the volume in question is not busy or in a bad state.
RVSC1037	Unable to retrieve host networks for building restricted network list.	Verify the connection to RHEV Manager server is active and that you can get information about the host networks.
RVSC1038	Cannot create NFS storage domain - the list of host addresses to export to is empty. This could be because there is no matching network between the controller and the RHEV hypervisors or in the case of cluster mode to prevent indirect data access.	Make sure that at least one interface on the storage controller is in the same network as at least one network interface on one host. Also, in Clustered Data ONTAP, make sure that there is a direct path to the aggregate where the volume is being created.
RVSC1039	Failed to configure a unix user.	Verify the connection to the storage controller is active and that the volume you are attempting to configure is not busy or otherwise in a bad state.
RVSC1040	Failed to set unix permissions to 0755 which is needed to mount in RHEV.	Verify the connection to the storage controller is active and that the volume you are attempting to configure is not busy or otherwise in a bad state.
RVSC1041	ISO domain already exists within the selected data center.	There can only be one ISO domain per data center. Either select another data center or select another storage domain type.
RVSC1042	Export domain already exists within the selected data center.	There can only be one Export domain per data center.

Error Code	Message	Resolution
RVSC1043	Cannot find the controller information for this storage domain. Select a domain that exists on a managed NetApp storage controller.	Make sure that the storage domain you want to interact with resides on a NetApp storage controller.
RVSC1044	Could not remove storage domain from data center. Make sure the domain is not in use by any RHEV entities (VMs) or other operations.	Make sure that the storage domain you want to destroy is not in use by any RHEV entities (such as VMs) or another operation.
RVSC1045	Unable to register domain in RHEV.	Verify the connection to the RHEV Manager server is active. Check the VSC logs for more information. (For details, see information about Support log files.)
RVSC1046	Unable to register domain in RHEV. (Reason: X) Make sure the storage controller is running and accessible via the network.	Verify the connection to the RHEV Manager server is active. Check the VSC logs for more information. (For details, see information about Support log files.)
RVSC1047	Storage domain could not be accessed during registration in RHEV. Make sure the storage controller remains running and accessible via the network.	Verify the storage controller is running and is accessible through the network.
RVSC1048	There was a problem creating a volume on the controller. make sure the controller is accessible and the proper protocols are enabled.	Verify the storage controller is running and is accessible through the network, as well as having the required licenses enabled.
RVSC1049	Could not connect to the storage controller. Make sure the controller is running and accessible via the network.	Verify the storage controller is running and is accessible through the network.
RVSC1050	The domain you are trying to destroy contains one or more delete protected VMs. Disable delete protection on all VMs on the domain before destroying.	Disable delete protection on any VMs that are on the storage domain you want to destroy; then try the destroy operation again.
RVSC1051	The source virtual machine must reside on a NetApp controller to be used in cloning.	Verify the virtual machine that you are attempting to clone resides on a NetApp storage controller.

Error Code	Message	Resolution
RVSC1052	The temporary template X was created for the cloning process but after Y minutes is still locked. Verify there are no network issues, manually delete the template and try the cloning process again.	Verify the connections to both the VSC server and the RHEV server are active, then manually delete the temporary template and try the cloning operation again.
RVSC1053	The disk X in the temporary template Y was created for the cloning process but after Z minutes is still locked. Verify there are no network issues, manually delete the template and try the cloning process again.	Verify the connections to both the VSC server and the RHEV server are active, then manually delete the temporary template and try the cloning operation again. If necessary, the timeout for the disk copying process can be extended by editing the file <code>/usr/local/vsc/user-preferences.properties</code> on the VSC server and increasing the value for the <code>cloningTimeout</code>. This value specifies the timeout in minutes per GB of disk space that is copied. The default value of 5 provides a timeout period of 100 minutes for copying a 20 GB disk.
RVSC1054	The controller X is an Admin Storage Virtual Machine. Specify a controller that is a Data Storage Virtual Machine or a 7-mode filer or vFiler.	To configure deduplication, you need to specify a storage controller that is a Data Storage Virtual Machine or a 7-Mode controller or vFiler unit. (For details, see information about managing storage controller resources.)
RVSC1055	The volume X could not be found on the specified controller Y.	Make sure that the volume specified exists on the specified storage controller.
RVSC1056	A controller with id X could not be found.	Make sure that the controller with the specified ID exists and can communicate over the network.
RVSC1057	An error occurred during SSO authorization. Logging out and back in to the RHEV administration console may clear up the problem.	Log out and then log in to the RHEV Manager application.

Error Code	Message	Resolution
RVSC1058	Warning: The default MAC address range available for virtual interfaces contains only 255 values. If needed, update this range to include enough values for the needed number of clones.	Update the MAC address range in the RHEV Manager configuration through the RHEV Manager configuration CLI. For example, the following command run on the RHEV Manager server would increase the number of MAC addresses to 65535: <pre>rhevm-config -s MacPoolRanges=00:1A: 4A:A0:00:00-00:1A: 4A:A0:FF:FF</pre>
RVSC1059	The maximum name for a Windows based Virtual Machine is 15 characters. If creating multiple clones, the maximum clone identifier is included in this size.	Shorten the name of the clone to a value smaller than 15 characters. If multiple clones are being created (for example, 300 clones) the maximum clone name could only be 12 characters because the name of the last clone would be XXXXXXXXXXXX300.
RVSC1100	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. (For details, see information about Support log files.)

Related concepts

[Support log files](#) on page 39

Related tasks

[Editing storage controllers](#) on page 19

[Managing storage controller resources](#) on page 19

Related references

[User Preferences for VSC for RHEV](#) on page 13

Support log files

VSC for RHEV uses two log files (`jetty.out` and the `vsc.log.x` files) to record detailed information about event messages and errors.

The following log files are contained in the `logs` directory on the VSC server (`/var/log/vsc/`):

jetty.out

Log file generated by the Jetty server that is running the VSC server

vsc.log.x

Log files (labeled `vsc.log.0` through `vsc.log.9`) generated by the VSC server

These files contain the timestamp of each message, as well as a short description of its contents. Each `vsc.log.x` 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.

Example of a log file:

```
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Module execution: 173ms
(FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Interceptors creation:
2ms (FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: TypeListeners creation:
3ms (FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Scopes creation: 2ms
(FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Converters creation: 1ms
(FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Binding creation: 26ms
(FINE)
09/04/2013 01:18:05 PM $Stopwatch.resetAndLog: Private environment
creation: 1ms (FINE)
```

To view the log files, you must export the zip archive and open the log files using your text editor. For details, see information in the related links about exporting log files.

Related tasks

[Exporting log files](#) on page 40

Exporting log files

You can export all of the associated log files to a directory of your choice.

About this task

When exporting the log files, the entire `logs` directory (which includes the `vsc.log.x` and `jetty_out` log files) is saved to a `.zip` file (for example, `vsc_logs_1234567890123.zip`) to a location of your choice.

To export the log files, perform the following steps.

Steps

1. From the RHEV Manager main window, select the **NetApp** tab; then click **Export Logs** in the menu bar.

The Save as dialog box opens.

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

The `.zip` file is saved to the specified location.

Result

You can view a log file by extracting the `.zip` file and opening the file (for example, `vsc.log.4`) using your text editor.

Copyright information

Copyright © 1994–2014 NetApp, Inc. All rights reserved. Printed in the U.S.

No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark information

NetApp, the NetApp logo, Go Further, Faster, ASUP, AutoSupport, Campaign Express, Cloud ONTAP, clustered Data ONTAP, Customer Fitness, Data ONTAP, DataMotion, Fitness, Flash Accel, Flash Cache, Flash Pool, FlashRay, FlexArray, FlexCache, FlexClone, FlexPod, FlexScale, FlexShare, FlexVol, FPolicy, GetSuccessful, LockVault, Manage ONTAP, Mars, MetroCluster, MultiStore, NetApp Insight, OnCommand, ONTAP, ONTAPI, RAID DP, SANtricity, SecureShare, Simplicity, Simulate ONTAP, Snap Creator, SnapCopy, SnapDrive, SnapIntegrator, SnapLock, SnapManager, SnapMirror, SnapMover, SnapProtect, SnapRestore, Snapshot, SnapValidator, SnapVault, StorageGRID, Tech OnTap, Unbound Cloud, and WAFL are trademarks or registered trademarks of NetApp, Inc., in the United States, and/or other countries. A current list of NetApp trademarks is available on the web at <http://www.netapp.com/us/legal/netapptmlist.aspx>.

Cisco and the Cisco logo are trademarks of Cisco in the U.S. and other countries. All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such.

How to send your comments

You can help us to improve the quality of our documentation by sending us your feedback.

Your feedback is important in helping us to provide the most accurate and high-quality information. If you have suggestions for improving this document, send us your comments by email to doccomments@netapp.com. To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

You can also contact us in the following ways:

- NetApp, Inc., 495 East Java Drive, Sunnyvale, CA 94089 U.S.
- Telephone: +1 (408) 822-6000
- Fax: +1 (408) 822-4501
- Support telephone: +1 (888) 463-8277

Index

A

- accessing VSC for RHEV using Firefox [10](#)
- accepting security exception certificate [10](#)
- aggregates
 - manage [19](#)

C

- cloning virtual machines
 - procedure [27](#)
- command line
 - installation directory option [8](#)
 - installer log file option [8](#)
 - installing VSC for RHEV from [8](#)
 - uninstalling [11](#)
 - upgrading directory option [10](#)
 - upgrading VSC for RHEV from [10](#)
- comments
 - how to send feedback about documentation [43](#)
- controllers, storage
 - adding manually using direct-connect SVM [18](#)

D

- deduplication
 - managing [23](#)
- default values
 - restoring User Preferences [15](#)
- destroying storage domains [26](#)
- direct-connect SVM
 - using to manually add storage controllers [18](#)
- documentation
 - how to send feedback about [43](#)

E

- error codes [30](#)
- export log files [40](#)

F

- feedback
 - how to send comments about documentation [43](#)
- Firefox browser

- accepting security exception certificate [10](#)

H

- Hardware requirements [7](#)

I

- information
 - how to send feedback about improving documentation [43](#)
- installation, VSC for RHEV
 - requesting the installer log file [8](#)
- installer log file
 - command option during installation [8](#)
- installing
 - configuration information [7](#)
 - overview [7](#)
 - requirements [7](#)
- installing VSC for RHEV
 - from a command line [8](#)
- interface
 - manage [19](#)

J

- jetty log file [39](#)

L

- License requirements [7](#)

O

- overview
 - VSC for RHEV [5](#)

P

- provisioning storage domains [21](#)

R

- RBAC
 - VSC for RHEV [18](#)

- resizing storage domains [24](#)
- resources
 - configuring physical storage controllers [17](#)
- role-based access control
 - See* RBAC

S

- Software requirements [7](#)
- Storage Controller Details
 - settings [21](#)
- storage controllers
 - adding manually using direct-connect SVM [18](#)
 - deleting [20](#)
 - editing [19](#)
 - managing [17](#)
 - managing resources [19](#)
- Storage Domain Details
 - settings [21](#)
- Storage Domain Host
 - settings [21](#)
- storage domains
 - deduplication [23](#)
 - destroying [26](#)
 - managing [21](#)
 - provisioning [21](#)
 - resizing [24](#)
 - update exports [25](#)
- suggestions
 - how to send feedback about documentation [43](#)
- Support log file
 - viewing [39](#)
- Support log files
 - example [39](#)

- exporting [40](#)
- jetty log file [39](#)
- viewing [40](#)
- vsc.log file [39](#)
- SVM, direct-connect
 - using to manually add storage controllers [18](#)

T

- Troubleshooting
 - error codes and resolution [30](#)

U

- uninstalling
 - using a command line [11](#)
- update storage domain exports [25](#)
- upgrade log file
 - requesting as part of upgrade [10](#)
- upgrading VSC for RHEV
 - from a command line [10](#)
- User Preferences
 - editing [15](#)
 - options [13](#)
 - restoring default values [15](#)

V

- virtual machines
 - cloning [27](#)
- VSC for RHEV
 - overview [5](#)