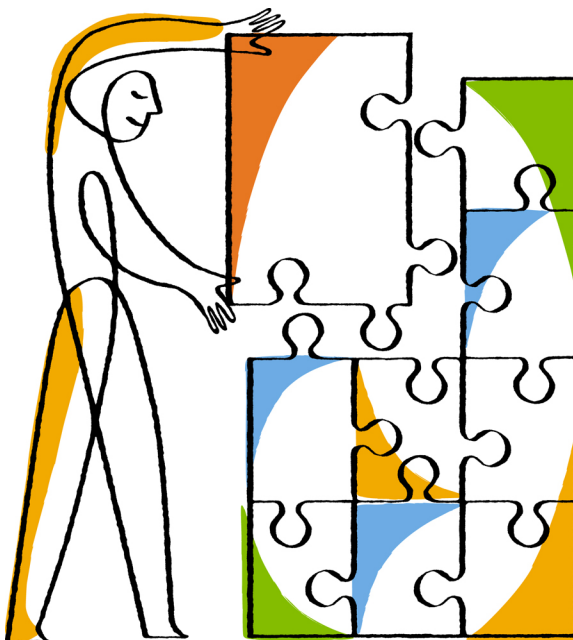




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Virtual Storage Console 1.0 for Red Hat® Enterprise Virtualization

Installation and Administration Guide



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Contents

Overview	4
Installation overview	5
Installation requirements and configuration information	5
Installing VSC for RHEV	6
Accessing VSC for RHEV the first time (if using Firefox browser)	8
Uninstalling VSC for RHEV	8
User Preferences	10
Editing User Preferences	12
Restoring default User Preferences	12
Storage controller management	14
Adding storage controllers	14
Editing storage controllers	15
Managing storage controller resources	16
Deleting storage controllers	16
Storage domain management	17
Provisioning storage domains	17
Resizing storage domains	19
Destroying storage domains	20
Cloning virtual machines overview	21
Cloning virtual machines	21
Copyright information	24
Trademark information	25
How to send your comments	26
Index	27

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 provisioning, and virtual machine (VM) cloning for RHEV environments running NetApp storage systems.

VSC for RHEV software 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 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 RHEV supports running Data ONTAP operating in 7-mode and clustered Data ONTAP

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

- Storage controller configuration
- NFS storage domain provisioning, resizing, and destruction

Note: Block-based storage is not currently supported.

- Rapid VM cloning (in existing NFS-based storage domains) for persistent desktops and virtual servers powered by NetApp FlexClone
- Cloned VMs are 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 same server as where the RHEV Manager is installed; however, the VSC for RHEV product can be installed on any RHEL server and should be on the same subnet as the RHEV Manager server 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 the VSC for RHEV software, follow these guidelines:

- The GUI plug-in must be installed on the same server as the RHEV Manager. The VSC for RHEV software can be installed on any RHEL server.
- The RHEL servers running VSC and the management ports of the storage controllers 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 server needs to be started after installation.
- 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 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 license (for provisioning NFS-based storage repositories)
- MultiStore (if working with vFile units)

Note: For platforms 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; one of the following:
 - 8.1.2
 - 8.2.0 (operating in 7-mode and Clustered)
- Operating systems
 - Red Hat Enterprise Linux (RHEL) 6.4
 - Microsoft Windows (Client only)

- Windows Server 2008
- Windows 7
- Red Hat Enterprise Virtualization (RHEV) Manager 3.2.x
- RHEV Hypervisor 6.4
- Oracle Open Java Development Kit (JDK) 7 (openjdk-7 package)
- Web browsers
 - Internet Explorer 9 and 10 (on Windows)
 - Firefox (on RHEL)

See the Interoperability Matrix, which is online at support.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.

Installing VSC for RHEV

VSC for RHEV should be installed in two segments: the GUI plug-in and then the VSC for RHEV software. The installation must be performed from a command line.

Before you begin

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

Before installing VSC for RHEV, make sure the required software is installed on the servers.

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

About this task

Installing VSC for RHEV is comprised 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 server as the RHEV Manager. The VSC for RHEV server software can be installed on any RHEL server.

To install the VSC for RHEV, perform the following steps.

Steps

1. Download the two VSC for RHEV installation rpm files from the NetApp Support Site at support.netapp.com.

- GUI plug-in component: `vsc-rhev-plugin-1.0-1.el6.noarch.rpm`
- Server-side component: `vsc-rhev-1.0-1.el6.noarch.rpm`

2. Install the GUI plug-in component.

From a command line prompt, switch to the directory where you saved the rpm file and run the following command:

```
rpm -i vsc-rhev-plugin-1.0-1.el6.noarch.rpm
```

Note: For more command line options, enter `man rpm` at the command prompt.

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 component.

From a command line prompt, switch to the directory where you saved the rpm file and run the following command:

```
rpm -i vsc-rhev-1.0-1.el6.noarch.rpm
```

Note: For more command line options, enter `man rpm` at the command prompt.

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.

5. Start the VSC for RHEV server.

Run the following command:

```
service vsc start
```

Result

When you log into the RHEV Manager, the **NetApp** tab will be present and available for use.

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

Accessing VSC for RHEV the first time (if using Firefox 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 server 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.

Uninstalling VSC for RHEV

You must uninstall VSC for RHEV from a command line.

Before you begin

You must be logged on with root privileges to the machine 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 the VSC for RHEV, perform the following steps.

Steps

1. On the server where the VSC for RHEV 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 server where the VSC for RHEV 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 server - 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

User Preferences consists of the options that control the VSC for RHEV provisioning and cloning 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: Not selected

Enables deduplication on new storage domain volumes, by default.

When provisioning volumes and this option is not selected, 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*.

Export To All NICs

Default value: Not selected

Selecting this option exports to every interface in the RHEV environment.

Mount Using Host Name

Default value: Not selected

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

NFS Export Networks

Default value: blank

Allows only specified networks to export new volumes to RHEV host network interface cards (NICs).

NFS Restrict Export Networks

Default value: blank

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

For example, if you enter `192.168.2.0/24;10.10.10.0/24` in the Value field, 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.

Use the format in the following example: `192.168.2.0/24;10.10.10.0/24`

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.

For example, if you enter `192.168.2.0/24;10.10.10.0/24` in the Value field, 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: Not selected

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

No Snap

Default value: Not 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 the 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 have finished 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; 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; 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 (add, edit, and delete) to manage storage controllers. You can also configure resources for the controller; however, for Storage Virtual Machine (SVM) controllers, these resources are configured when you create the controller; for physical storage controllers running Data ONTAP operating in 7-mode, you can configure the 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

Related information

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

Adding storage controllers

You must manually add storage controllers to the RHEV Manager.

Before you begin

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

About this task

When adding storage controllers, you can only add a single controller at a time.

To add a storage controller, perform the following steps.

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).

Before you begin

About this task

To edit storage controllers, 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**), select the desired option(s) from the left column and move to the right column.
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.

Storage domain management

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

Provisioning storage domains

You can create 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 allow provisioning of the desired storage domains. For more information, refer to the topic *Installation requirements and configuration information*.

About this task

Depending on the mode in which you are operating, storage domains 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 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 support.netapp.com.
- Before using SVMs, resources—including aggregates—should be allocated for the SVMs.
- Storage domains 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 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 provision 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 **Provision NetApp Domain** in the menu bar.

The Provision NetApp Domain wizard opens to the **Storage Controller Details** page.

3. Specify the applicable controller details.

- **Target Storage Controller** – Select the controller name from the drop-down list.
- **Set vFiler Context** – Select this check box if needed.
- **vFiler** – Available only if **Set vFiler Context** is selected; the appropriate option from the drop-down list.

4. 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 data centers of type "NFS".

- **Host** – Select the host name from the drop-down list.

5. 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** – For NFS-based storage domains, 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.

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

The storage domain is added to the RHEV Manager 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*.

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 Domain** in the menu bar.

The Resize NetApp Domain 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**.

The information for the storage domain is updated.

Destroying storage domains

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

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 Domain** in the menu bar.

The Destroy NetApp Domain window opens.

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

A confirmation prompt opens.

4. Click **OK**.

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 in 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

You can theoretically create thousands of virtual machine clones (to a maximum of 2,000) at one time. However, 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.

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 Create NetApp Clone(s) wizard.

The available virtual machines are listed in the window.

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

The Create NetApp Clone(s) wizard opens to the page 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 **Use vFiler Context** check box and select a unit from the **vFiler** drop-down list.

- In clustered systems, you can connect directly to a storage virtual machine by selecting from the 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 data centers of type "NFS".
 - **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).
 - **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 check box is clear, 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 **Summary** and review the details; then click **OK**.

Result

A modal dialog will display while the cloning process completes.

Note: For most cloning operations, a template must first be created through which the disk(s) will be copied to the destination storage domain. This process can take a long time; however, once 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 much faster.

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Index

A

- accessing VSC for RHEV using Firefox [8](#)
- accepting security exception certificate [8](#)
- aggregates
 - manage [16](#)

C

- cloning virtual machines
 - procedure [21](#)
- command line
 - installation directory option [6](#)
 - installer log file option [6](#)
 - installing [6](#)
 - uninstalling [8](#)

D

- default values
 - restoring User Preferences [12](#)
- destroying storage domains [20](#)

F

- Firefox browser
 - accepting security exception certificate [8](#)

H

- Hardware requirements [5](#)

I

- installer log file
 - command option during installation [6](#)
- installing
 - configuration information [5](#)
 - from a command line [6](#)
 - overview [5](#)
 - request the installer log file [6](#)
 - requirements [5](#)
- interface
 - manage [16](#)

L

- License requirements [5](#)

O

- overview
 - VSC for RHEV [4](#)

P

- provisioning storage domains [17](#)

R

- resizing storage domains [19](#)
- resources
 - configuring physical storage controllers [14](#)

S

- Software requirements [5](#)
- Storage Controller Details
 - settings [17](#)
- storage controllers
 - adding [14](#)
 - deleting [16](#)
 - editing [15](#)
 - managing [14](#)
 - managing resources [16](#)
- Storage Domain Details
 - settings [17](#)
- Storage Domain Host
 - settings [17](#)
- storage domains
 - destroying [20](#)
 - managing [17](#)
 - provisioning [17](#)
 - resizing [19](#)

U

- uninstalling
 - using a command line [8](#)
- User Preferences

editing [12](#)

options [10](#)

restoring default values [12](#)

cloning [21](#)

VSC for RHEV

overview [4](#)

V

virtual machines