

Rapid Cloning Utility 2.1

Installation and Administration Guide

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Table of Contents

	Preface	vii
Chapter 1	Installing and Launching the Utility	1
	Overview	2
	System Requirements.	3
	Installing the Rapid Cloning Utility	4
	Launching the Rapid Cloning Utility.	5
Chapter 2	Cloning Virtual Machines	11
	Cloning virtual machines	12
	Importing virtual machines into XenDesktop	22
Chapter 3	Managing Storage Controllers and Datastores	23
	Managing storage controllers.	24
	Managing datastores	28
Chapter 4	Troubleshooting	35
	Troubleshooting	36
Appendix A	Storage system permissions.	39
	Create clones role.	40
	Create storage role	41
	Modify storage role.	42
	Destroy storage role	43
Appendix B	Preferences File, Logs, and Export Files.	45
	Preferences File.	46
	Logs.	47

Export Files 48

Appendix C

Programmable API 49

Overview 50

Methods. 52

RequestSpec 54

CloneSpec. 55

DatastoreSpec. 56

Example SOAP 59

Java 61

Preface

About this guide

This document describes how to install and run the NetApp® Rapid Cloning Utility.

Audience

This document is for VMware® system administrators who manage large numbers of desktop environments or servers.

Terminology

To understand the concepts in this document, you might need to know the terms defined here.

- ◆ *Controller* or *storage controller* refers to the component of a storage system that runs the Data ONTAP® operating system and controls its disk subsystem. Controllers or storage controllers are also sometimes called *storage appliances*, *appliances*, *storage engines*, *heads*, *CPU modules*, or *controller modules*.

Command, keyboard, and typographic conventions

This document uses command, keyboard, and typographic conventions that help you enter commands.

Keyboard conventions: The following list describes keyboard conventions used in this document:

- ◆ When describing key combinations, this document uses the hyphen (-) to separate individual keys. For example, “Ctrl-D” means pressing the “Control” and “D” keys simultaneously.
- ◆ This document uses the term “Enter” to refer to the key that generates the digital equivalent of a carriage return, although the key is named “Return” on some keyboards.

Typographic conventions: The following table describes typographic conventions used in this document.

Convention	Type of information
<i>Italic font</i>	Words or characters that require special attention. Placeholders for information you must supply. For example, if the guide says to enter the arp -d hostname command, you enter the characters “arp -d” followed by the actual name of the host. Book titles in cross-references.
Monospaced font	Command names, option names, keywords, and daemon names. Information displayed on the system console or other computer monitors. The contents of files.
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters.

Special messages

This document might contain the following types of messages to alert you to conditions you need to be aware of.

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

An attention notice contains instructions that you must follow to avoid a system crash, loss of data, or damage to the equipment.

Topics in this chapter

This chapter includes the following topics.

- ◆ [“Overview”](#) on page 2
- ◆ [“System Requirements”](#) on page 3
- ◆ [“Installing the Rapid Cloning Utility”](#) on page 4
- ◆ [“Launching the Rapid Cloning Utility”](#) on page 5

Overview

About the Rapid Cloning Utility

Using FlexClone® technology, the NetApp® Rapid Cloning Utility (RCU) allows users to quickly create and deploy VMware® virtual machines (VMs) across new or existing NetApp NFS or VMFS datastores.

Using the Rapid Cloning Utility, you can quickly and efficiently create virtual machine clones in VMware vCenter Server, power up virtual machines, and apply customized specifications to the guest operating system. The virtual machines can be deployed for both server and desktop use. You can also use the utility to provision, resize, manage deduplication on, and destroy datastores.

The Rapid Cloning Utility can theoretically create thousands of virtual machine clones and hundreds of datastores in a single execution. In practice, however, multiple executions of smaller requests is recommended. The exact size of these requests will depend on the size of the VMware Infrastructure 3 deployment and the hardware configuration of the vCenter Server managing the ESX hosts.

System Requirements

See the *Rapid Cloning Utility Release Notes* at <http://now.netapp.com> for host system requirements for running the RCU.

Installing the Rapid Cloning Utility

Follow these steps to install the Rapid Cloning Utility:

1. Make sure all prerequisites for the host system are met, as described in the *Rapid Cloning Utility Release Notes* at <http://now.netapp.com>.
2. Uninstall any previous version of RCU using Windows **Control Panel > Add or Remove Programs**.
3. Download the RCU setup executable RCUSetup_2_1_win32.exe from <http://now.netapp.com>.
4. Save the file to your local file system.
5. Navigate to the folder containing the executable.
6. Double-click the executable and follow the on-screen directions.

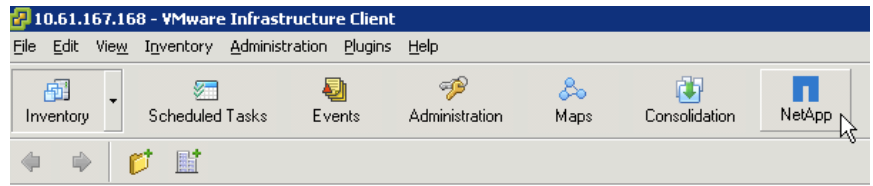
Launching the Rapid Cloning Utility

When you launch the RCU, you must import certificates and identify the controllers that will be used for cloning tasks.

1. Click the **NetApp** button in the toolbar of VMware Infrastructure Client.

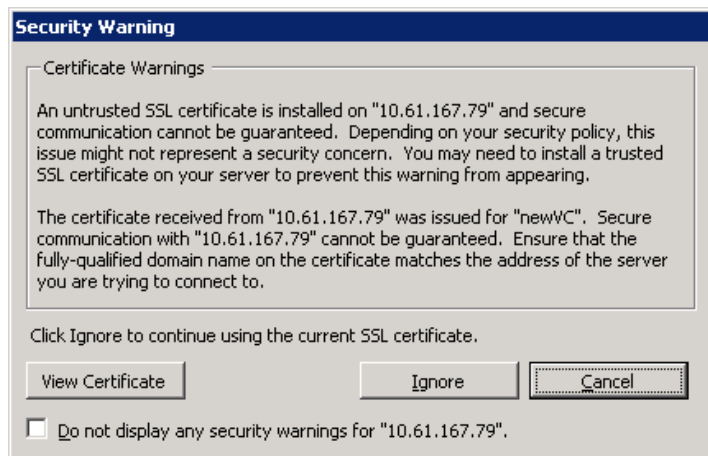
Note

If the NetApp button is not visible, restart the VMware Infrastructure Client.

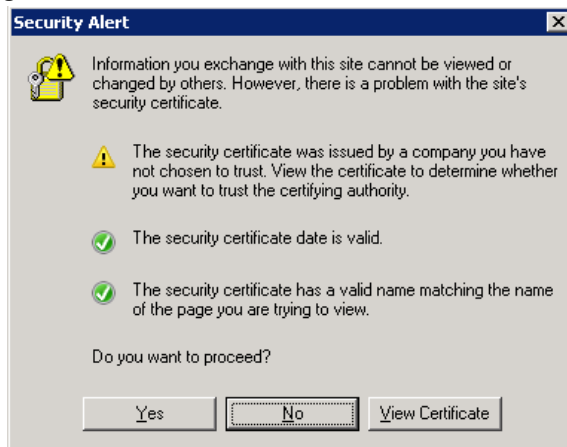


Import certificates

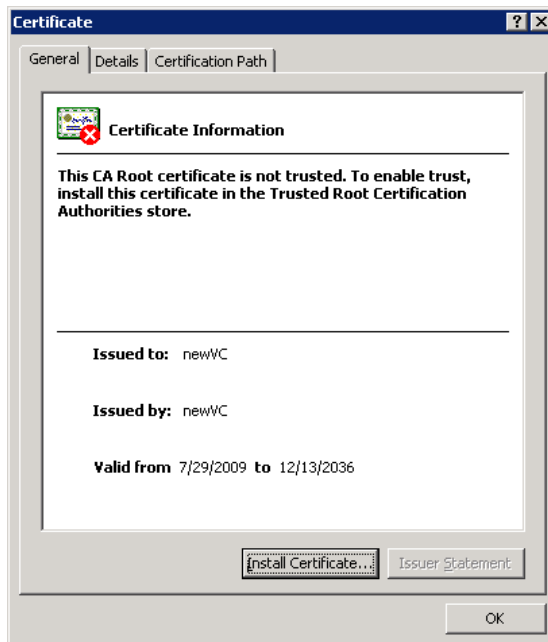
2. RCU uses SSL to encrypt communication to the vCenter Server and the Infrastructure Client. A "self signed" certificate is used in both cases. The first time the Infrastructure Client communicates with the RCU service, a certificate warning appears. To prevent this warning from appearing again, select the **Do not display any security warnings...** check box and click **Ignore**.



3. The first time you click the **NetApp** button in the VMware Infrastructure Client toolbar, a similar warning displays. To prevent this warning from appearing each time, click **View Certificate**.

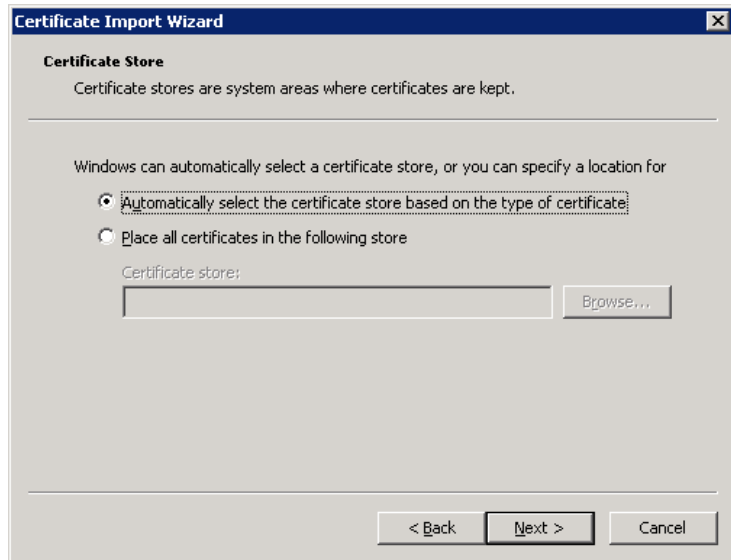


4. Click **Install Certificate...** to launch the Certificate Import Wizard.



5. When the Certificate Import Wizard opens, click **Next**.

6. Accept the default and click **Next**.



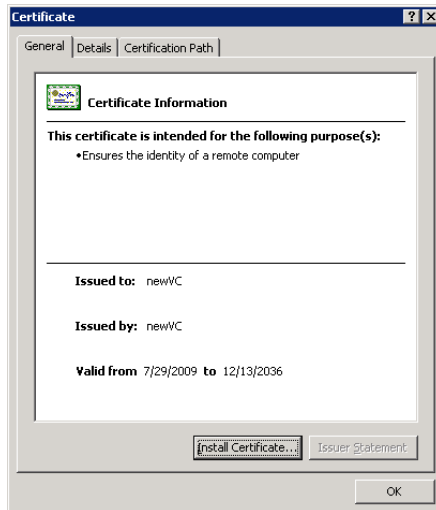
7. Click **Finish**.



8. Click **Yes** in the Security Warning window.

9. Click **OK**.

10. Click **OK**.

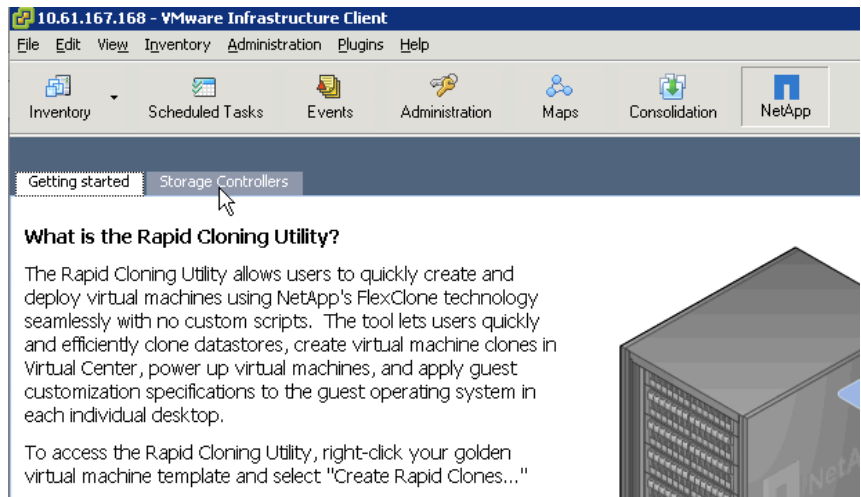


11. Click **Yes** in the Security Alert window.

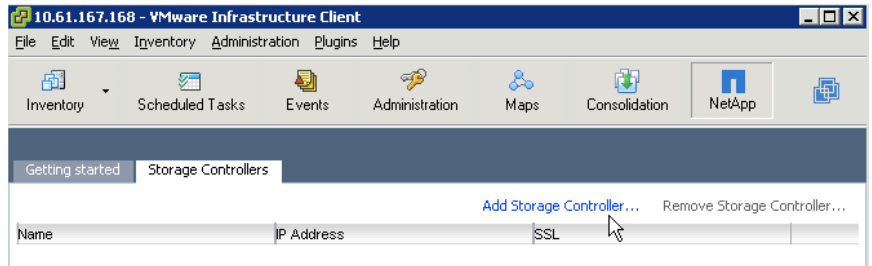
Identify storage controllers

Before creating clones, identify the storage controllers to use for cloning.

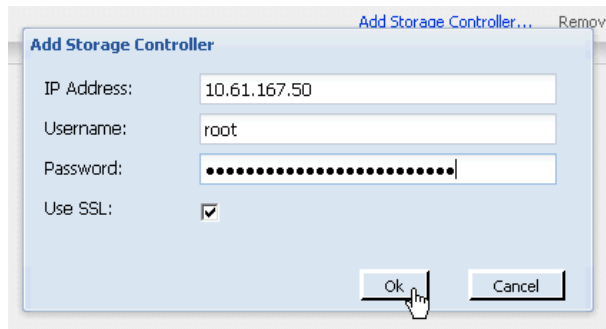
1. Click the **Storage Controllers** tab.



2. Click **Add Storage Controller**.



3. Enter the storage controller credentials and click **OK** to verify connectivity. Optionally deselect **Use SSL** if you do not want to encrypt communication between the RCU service and the storage controller.



Note

See "[Managing storage controllers](#)" on page 24 for additional information on managing storage controllers in the RCU.

Topics in this chapter

This chapter includes the following topics.

- ◆ “[Cloning virtual machines](#)” on page 12
- ◆ “[Importing virtual machines into XenDesktop](#)” on page 22

Cloning virtual machines

1. Click the Infrastructure Client **Inventory** button. Right-click a powered-down VM or template to clone, and select **Create NetApp Rapid Clones....**
2. The Create Rapid Clones Wizard launches. Select the storage controller to use for the new clones. The storage controller credentials are provided.

To prevent clone failure due to a lost VI client session, open the **Advanced options** dialog and enter the password of the current vCenter Server user.

Click **Validate password**, and then click **Next**.

Create Rapid Clones Wizard

Specify the storage controller
What is the storage controller you would like to use?

Storage Controller details
Clone destination
Virtual machine details
Datastore creation
Datastore selection
Connection broker
Summary

Select the storage controller you would like to use from the following list.

Storage Controller: Imahara-1
Username: root
Password:
Use SSL: ☐

Advanced options

If the VI client is closed, the clone operation will fail due to a lost session. To guarantee that the clone operation is successful, provide the Virtual Center password below.

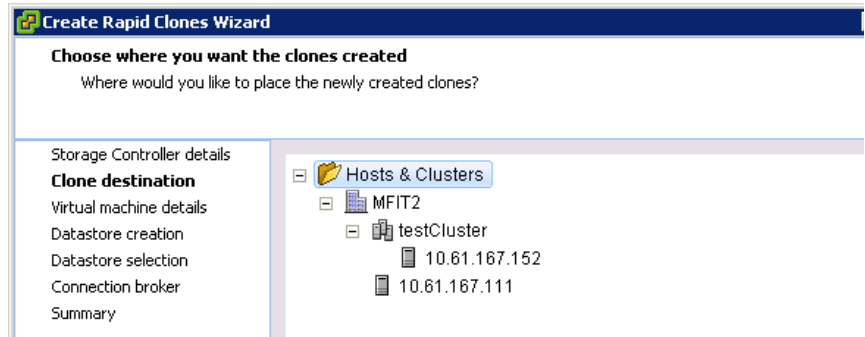
Virtual Center password:

Validate password

3. Select the destination for the new clones and click **Next**.

Note

When the destination is a datacenter, cluster, or resource pool, new clones are distributed across the available servers as quickly as possible. Therefore, new clones might be unevenly distributed, with more clones created on faster servers.



4. Specify the following details for the clone operation, then click **Next**:

- ❖ **Number of clones** - For new datastores, maximum 250. If using existing datastores, maximum depends on available space. The number of clones must be evenly divisible by the number of datastores you intend to create.
- ❖ **Clone name** - Used as a prefix for each clone.

Note

By default, the clone number is placed at the end of the clone name. To force the clone number to a different position, use %CLONE_NUM% where you want the number to appear. For example, *new%CLONE_NUM%clone*.

- ❖ **Starting clone number** - Maximum of eight digits.
- ❖ **Clone increment** - Increment clone numbers by 1, 2, 3, 4 or 5.
- ❖ **Apply customization specification?** - Applies a pre-defined specification to the new VMs. Select from specifications used for the native cloning process.
- ❖ **Power on?** - Powers up the clones after creation.
- ❖ **Import to connection broker?** - Automatically imports clone data into VMware View Server, or creates .csv file for XenDesktop.
- ❖ **Connection broker** - Select the desired output type
- ❖ **Create new datastores?** - Creates new datastores for the virtual machine clones. Enabled for users with create role or higher.

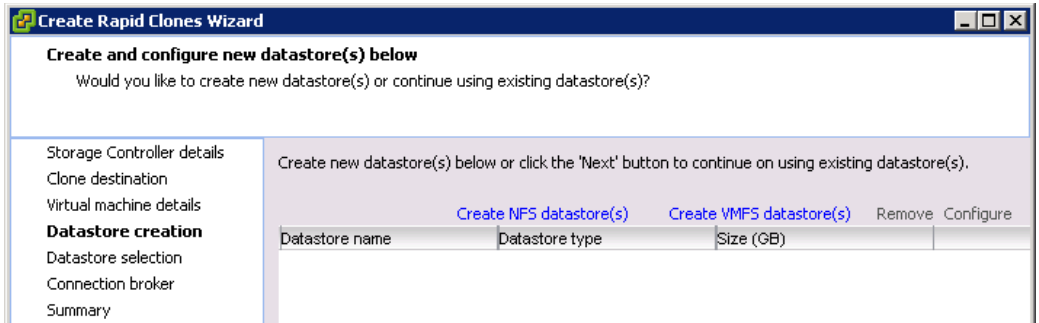
The screenshot shows the 'Create Rapid Clones Wizard' window. The title bar reads 'Create Rapid Clones Wizard'. The main heading is 'Specify the details of the virtual machine clones' with a subtitle 'How many clones would you like to create and what settings would you like to apply to them?'. On the left is a navigation pane with 'Virtual machine details' selected. The main area contains the following settings:

Number of clones:	10	Sample clone names new01Clone new03Clone new05Clone new07Clone new09Clone new11Clone new13Clone new15Clone new17Clone new19Clone
Clone name:	new%CLONE_NUM%Clone	
Starting clone number:	1	
Clone number increment:	2	
Apply customization specification?	☒	
Customization specification:	Win2k3	
Power on?	☐	
Import into connection broker?	☒	
Connection broker:	Xen Desktop	
Create new datastore(s)?	☒	

5. If you requested a new datastore, in the Datastore Creation window click one of the blue links to **Create NFS datastore(s)** or **Create VMFS datastore(s)**. To continue *without* creating a new datastore, click **Next**.

Note

You can create both NFS and VMFS datastores for the new VMs.



6. In the pop-up window, specify details for the new datastores and click **OK**.
 - ❖ **Protocol** (VMFS only) - FCP and iSCSI.
 - ❖ **Number of datastores** - Maximum 32 (NFS) or 256 (VMFS). The number of clones must be evenly divisible by the number of datastores.
 - ❖ **Datastore name** (disabled for multiple datastores) - Use the default or replace with a custom name.

Note

When creating multiple datastores, the golden volume name (NFS) or base name (VMFS) is used in this window and on the Summary tab as the datastore name.

- ❖ **Size** - Maximum datastore size depends on the controller and space available. For details, see the *Data ONTAP Storage Management Guide* for your Data ONTAP release.
- ❖ **Volume** (VMFS only) - Select available volume from drop-down list.
- ❖ **Aggregate** (NFS only) - Select available aggregate from drop-down list.
- ❖ **Thin provision** - Capacity is not reserved for individual datastores. The aggregate is treated as a shared resource pool with capacity consumed as each datastore requires it. By eliminating unused but provisioned storage, more space is presented than is available. It is expected that all datastores will not utilize all of their provisioned storage at once.

Note

Thin provisioning sets space reserve to none and disables space checks. Therefore, cloning can fail if the size request uses too much of the aggregate.

- ❖ **Autogrow** (NFS only) - When space is needed, automatically expands the datastore by increment you specify, up to size limit you specify.
- ❖ **Grow increment** (NFS only) - Amount of storage added to datastore each time space is needed.
- ❖ **Maximum datastore size** (NFS only) - Limit at which Autogrow stops.
- ❖ **Set datastore names?** (enabled for multiple datastores) - Select to enable modification of default datastore names.
- ❖ **Group name** (VMFS) or **Golden volume name** (NFS) - Use the defaults or replace with custom names.

The illustration below shows the VMFS datastore creation pop-up window.

The screenshot shows the 'Create new datastore group...' dialog box with the following fields and values:

- Protocol: ☒ FCP ☐ ISCSI
- Number of datastores: 2
- Datastore name: newDatastore
- Size (GB): 120
- Volume: kaminoBlock
- Thin provision: ☐
- Set datastore names?: ☒
- Group name: newDatastore
- Datastore name 1: newDatastore_001
- Datastore name 2: newDatastore_002

The illustration below shows the NFS datastore creation pop-up window.

The screenshot shows the 'Create new datastore group...' dialog box with the following fields and values:

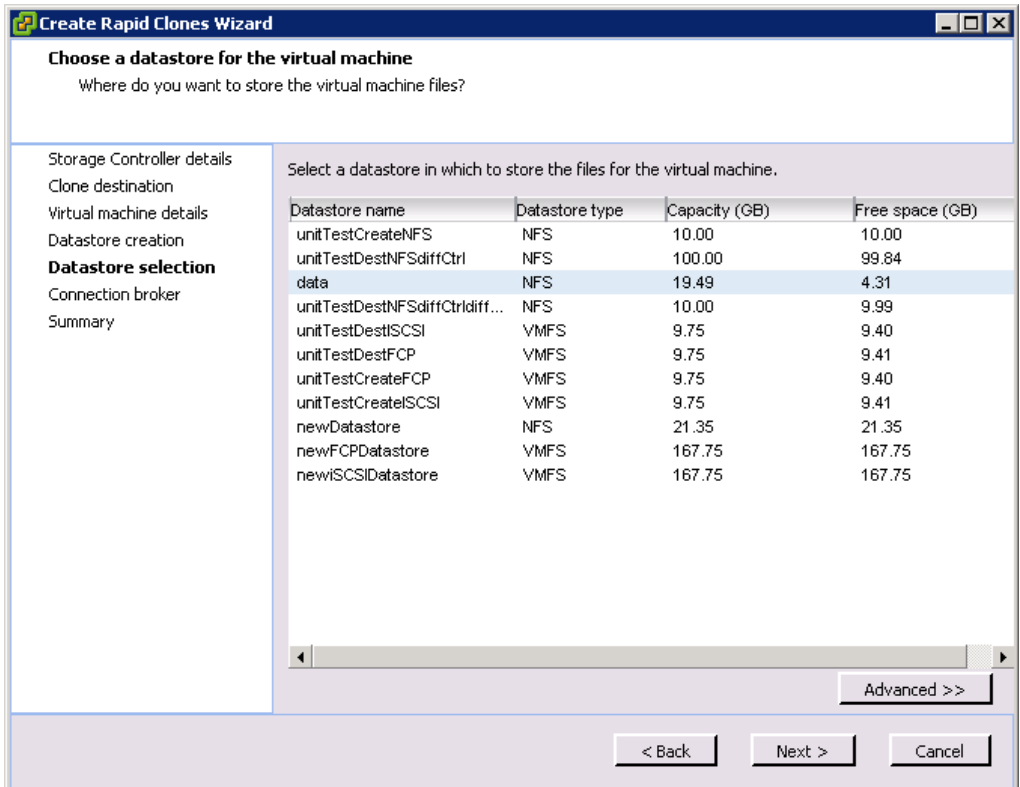
- Number of datastores: 2
- Datastore name: newDatastore
- Size (GB): 19.49
- Aggregate: aggr1
- Thin provision: ☐
- Auto-grow: ☐
- Grow increment (GB): 0
- Maximum datastore size (GB): 0
- Set datastore names?: ☒
- Golden volume name: newDatastore
- Datastore name 1: newDatastore_001
- Datastore name 2: newDatastore_002

7. Select the datastore to house the new VMs.

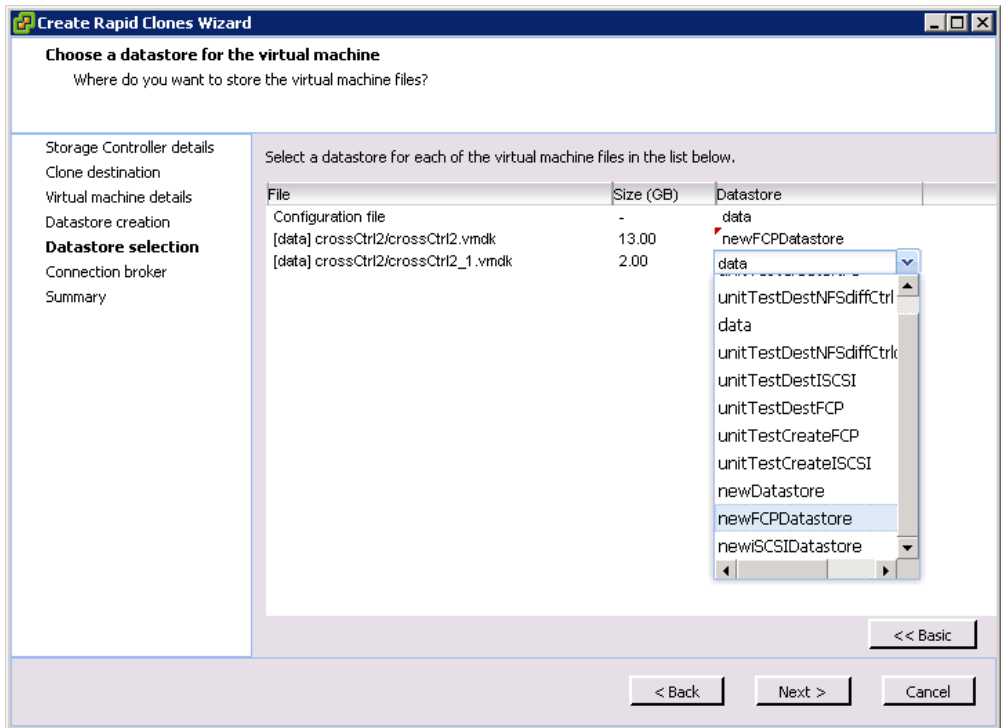
Note

You can clone the VMDK files that comprise the virtual machine to different datastores as described in [Step b](#) below.

- a. To place all VMs in a single datastore, select the datastore and click **Next**.



- b. To distribute VM files across multiple datastores, click **Advanced**. In the new window, select a VM file, open the corresponding Datastore pull-down list and select the datastore to house that file. Repeat for each VM file, then click **Next**.



8. If you specified a connection broker format, enter the details for the connection broker operation, then click **Next**.
- a. For VMWare View server, RCU imports clone data into View Server at the end of the clone operation. You can specify unique desktop names and select from existing desktop pools.
- Desktop type:** Choose **Individual desktops** to create new individual desktops. Select **Manual desktop pool** for a pool of virtual machines that are manually constructed by the View Manager administrator.
- Access mode:** For manual desktop pools, **Persistent** access gives users connection to the same desktop for every session. **Non-persistent** access allocates desktops dynamically.

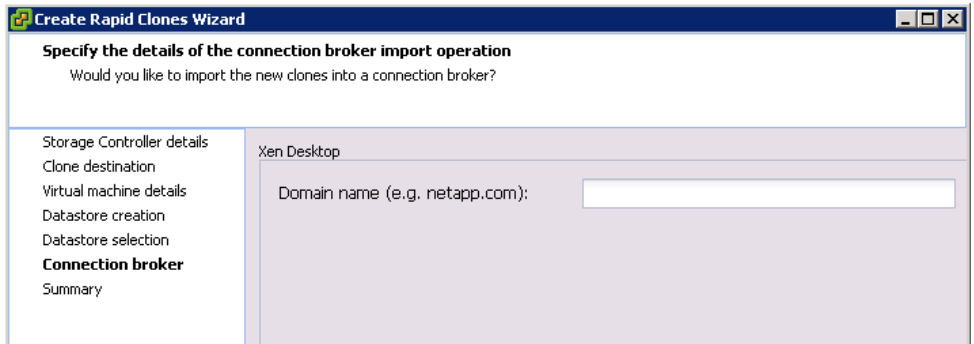
Note

Refer to the *View Manager Administration Guide* at http://www.vmware.com/pdf/viewmanager3_admin_guide.pdf for details on desktop types and access modes.

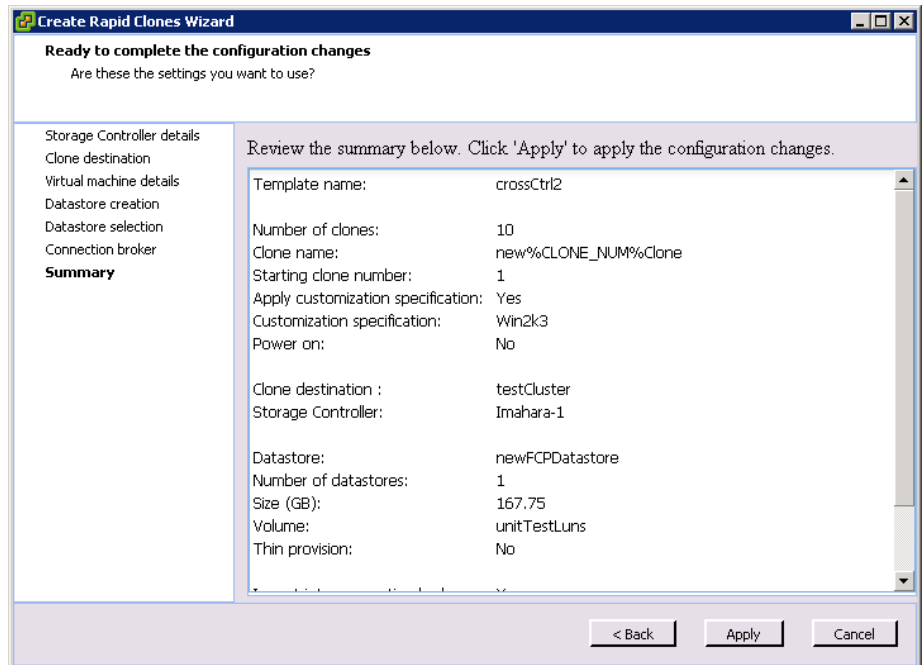
- b. For XenDesktop, enter a fully qualified domain name. RCU creates a .csv file in the *install_directory\exports* directory with the following format:
- ```
[ADComputerAccount], [AssignedUser], [VirtualMachine], [HostID]
```

### Note

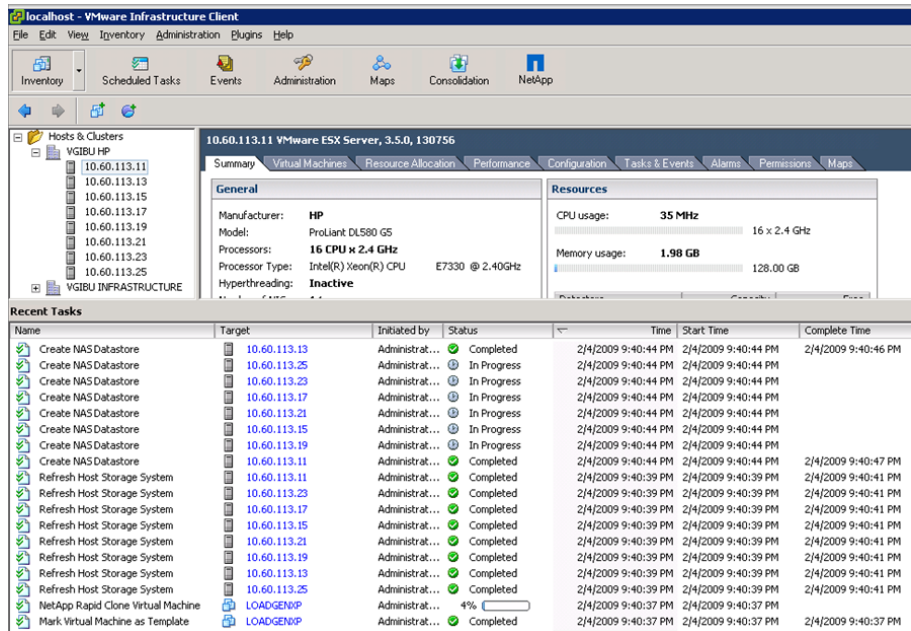
See “[Importing virtual machines into XenDesktop](#)” on page 22 for details on importing this file into XenDesktop.



9. Review the summary page and click **Apply** to proceed. To return to previous pages and modify settings, click **Back**.



10. The Recent Tasks pane of VMware Infrastructure Client is populated as clone creation proceeds.



## Log of new VMs

A list of new VMs is written to a .csv file in the <install\_directory>\exports directory. The filename is in the following format:

◆ import\_generic\_date\_time.csv

## Importing virtual machines into XenDesktop

---

To create a XenDesktop import file, select **XenDesktop** as the Connection Broker in the Virtual Machine Details page of the Create Rapid Clones Wizard.

RCU creates the following XenDesktop import file:

◆ `<install_directory>\exports\xenDesktop_timestamp.csv`

The file contents are in the following format:

◆ `[ADComputerAccount],[AssignedUser],[VirtualMachine],[HostID]`

To import the file into XenDesktop:

1. Copy the export file to the XenDesktop system. Using the Citrix Access Management Console, choose to create a new desktop group.
2. A wizard will launch. Follow the wizard prompts to the fifth panel (Virtual Desktops page), and select the option to import the desktops from a .csv file.
3. Browse to the import file and click **OK**.

## Topics in this chapter

This chapter includes the following topics.

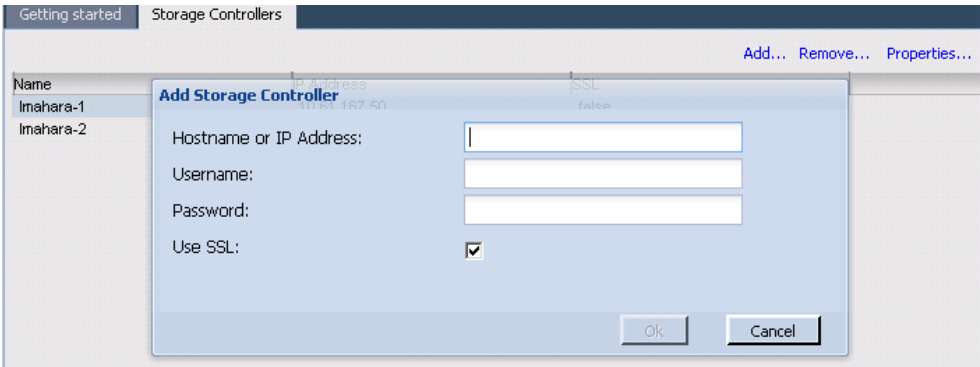
- ◆ “[Managing storage controllers](#)” on page 24
- ◆ “[Managing datastores](#)” on page 28

# Managing storage controllers

## Add storage controller

To add a storage controller to the list of controllers available to RCU:

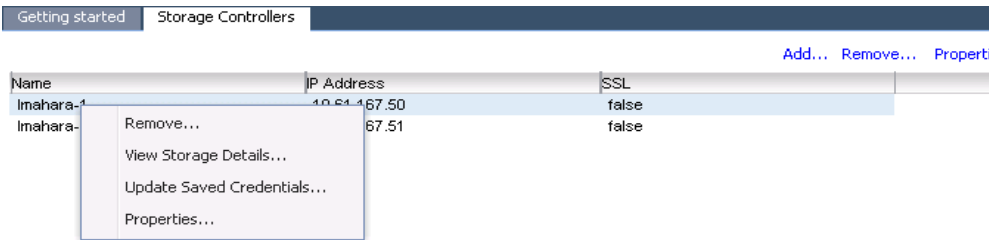
- 1. Click the **NetApp** button in VMware Infrastructure Client.
- 2. On the **Storage Controllers** tab, click **Add**.
- 3. Enter the hostname or IP address and credentials of the storage controller. Optionally deselect **Use SSL** if you do not want to encrypt communication between the RCU service and the storage controller. Click **OK**.



## Remove storage controller

To remove a storage controller to the list of controllers available to RCU:

- 1. Click the **NetApp** button in VMware Infrastructure Client.
- 2. Right-click a storage controller and select **Remove**.

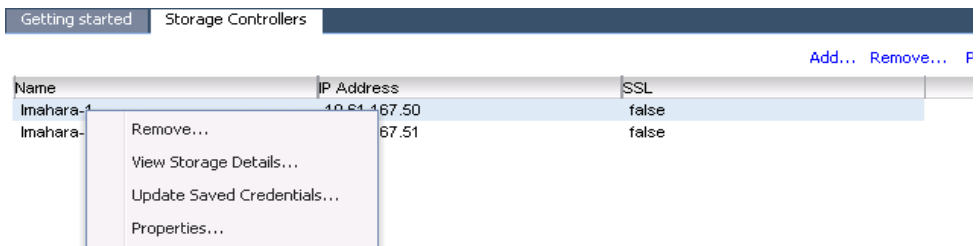


- 3. Click **Yes** to confirm removal of the storage controller from the list of controllers available to RCU.

## View storage controller details

To view usage and deduplication statistics for a storage controller's aggregates, volumes, and LUNs:

1. Click the **NetApp** button in VMware Infrastructure Client.
2. Right-click a storage controller and select **View Storage Details**.



3. Click **OK** to close the window.
  - ❖ **Size** - Total storage on the controller.
  - ❖ **Used** - Storage used by RCU.
  - ❖ **Available** - Unused storage.
  - ❖ **Deduplicated** - Amount of total storage saved by deduplication.
  - ❖ **Deduplicated %** - Percent of total storage saved by deduplication.

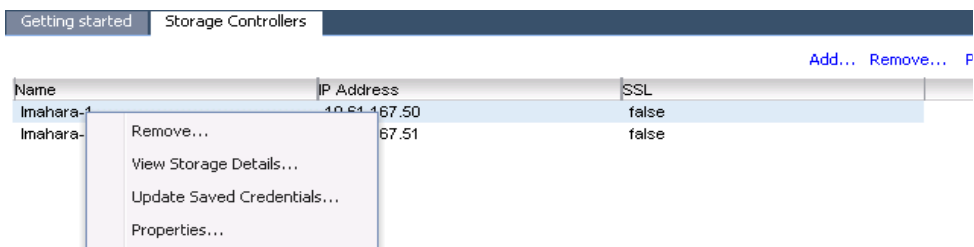
The screenshot shows the 'View Storage Details...' window. It displays a table with columns: Name, Total, Used, Available, Deduplicated, and Deduplicated %. The table lists various storage aggregates and volumes, including 'aggr1', 'gold\_volume', 'georgeISCSITest', 'newDatastore', 'xpDataStore', 'gold', 'unitTestDestNFSdiffCtrl', 'iscsiRDMDTest', 'golduseCase3Nfs2MultiNfsDiffCtrl', 'kaminoBlock', 'georgeTest', 'unitTestDestNFS\_DoNotDelete', 'unitTestLuns', 'eric', 'xoNfs2Newlscsi', 'bac', 'abc', 'xoNfs2Newlscsi01', and 'xoNfs2Newlscsi02'.

| Name                             | Total      | Used       | Available | Deduplicated | Deduplicated % |
|----------------------------------|------------|------------|-----------|--------------|----------------|
| aggr1                            | 1,816.60GB | 1,064.51GB | 752.09GB  | 132.25GB     | 11             |
| gold_volume                      | 320.00GB   | 151.11GB   | 168.89GB  | 58.12GB      | 28             |
| georgeISCSITest                  | 50.00GB    | 5.38GB     | -         | -            | -              |
| newDatastore                     | 20.00GB    | 0.02GB     | -         | -            | -              |
| xpDataStore                      | 25.88GB    | 4.99GB     | 20.89GB   | 43.91GB      | 90             |
| gold                             | 8.87GB     | 2.03GB     | 6.84GB    | 0.00GB       | 0              |
| unitTestDestNFSdiffCtrl          | 100.00GB   | 0.16GB     | 99.84GB   | 0.43GB       | 73             |
| iscsiRDMDTest                    | 200.00GB   | 0.02GB     | 199.98GB  | 0.00GB       | 0              |
| golduseCase3Nfs2MultiNfsDiffCtrl | 20.00GB    | 0.02GB     | 19.98GB   | 0.04GB       | 65             |
| kaminoBlock                      | 300.00GB   | 4.41GB     | 295.59GB  | 13.73GB      | 76             |
| georgeTest                       | 100.00GB   | 0.01GB     | 99.99GB   | 0.00GB       | 0              |
| unitTestDestNFS_DoNotDelete      | 10.00GB    | 0.01GB     | 9.99GB    | 0.02GB       | 73             |
| unitTestLuns                     | 200.00GB   | 0.08GB     | 199.92GB  | 0.00GB       | 0              |
| eric                             | 18.00GB    | 0.00GB     | 18.00GB   | 0.00GB       | 0              |
| xoNfs2Newlscsi                   | 3.00GB     | 1.01GB     | 1.99GB    | 3.00GB       | 75             |
| bac                              | 3.00GB     | 1.01GB     | 1.99GB    | 1.00GB       | 50             |
| abc                              | 3.00GB     | 1.01GB     | 1.99GB    | 3.00GB       | 75             |
| xoNfs2Newlscsi01                 | 3.00GB     | 1.01GB     | 1.99GB    | 3.00GB       | 75             |
| xoNfs2Newlscsi02                 | 3.00GB     | 1.01GB     | 1.99GB    | 3.00GB       | 75             |

## Update saved credentials

If a storage controller's credentials are changed after the controller is added to RCU, use this feature to update the RCU settings to match the controller settings.

1. Click the **NetApp** button in VMware Infrastructure Client.
2. Right-click a storage controller and select **Update Saved Credentials**.



3. Enter the new credentials. Optionally select **Use SSL** if you want to encrypt communication between the RCU service and the storage controller. Click **Save** when finished.

The 'Update Saved Credentials...' dialog box is shown. It has a light blue background. The 'Username' field contains 'root'. The 'New password' and 'Confirm new password' fields are empty. The 'Use SSL' checkbox is unchecked. At the bottom right are 'Save' and 'Cancel' buttons.

**Update Saved Credentials...**

Username:

New password:

Confirm new password:

Use SSL: ☐

## Restrict or expand available interfaces, volumes, and aggregates

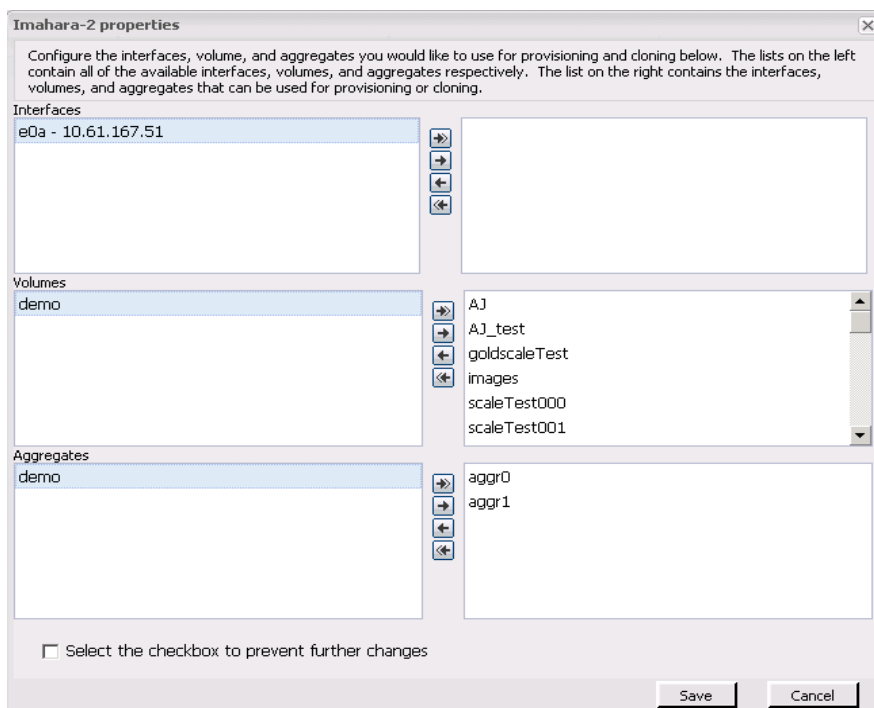
To restrict or expand the interfaces, volumes and aggregates available to RCU:

1. Click the **NetApp** button in VMware Infrastructure Client.
2. On the **Storage Controller** tab, right-click a storage controller and select **Properties**.
3. All available interfaces, volumes, and aggregates are presented.
  - a. To restrict or expand availability to RCU, select items and click the directional buttons to move them to the desired column.
    - ❖ Items in the left column will *not* be used by RCU.
    - ❖ Items in the right column will be used by RCU.

### Note

New volumes and aggregates created outside RCU appear in the left column as unused.

- b. Select the checkbox if you want to prevent users from modifying these settings without providing storage system credentials.



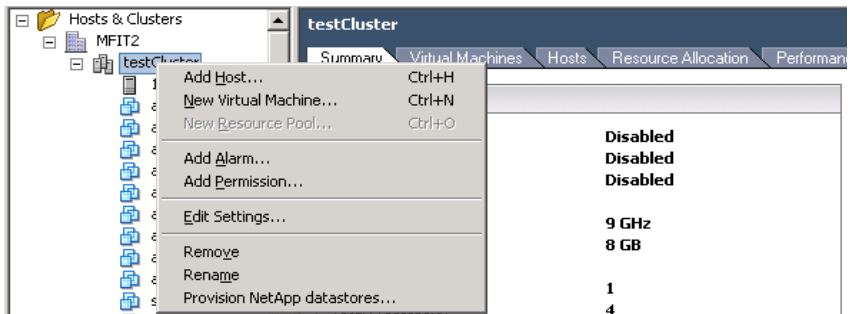
4. Click **Save** when finished.

# Managing datastores

## Provision new datastore

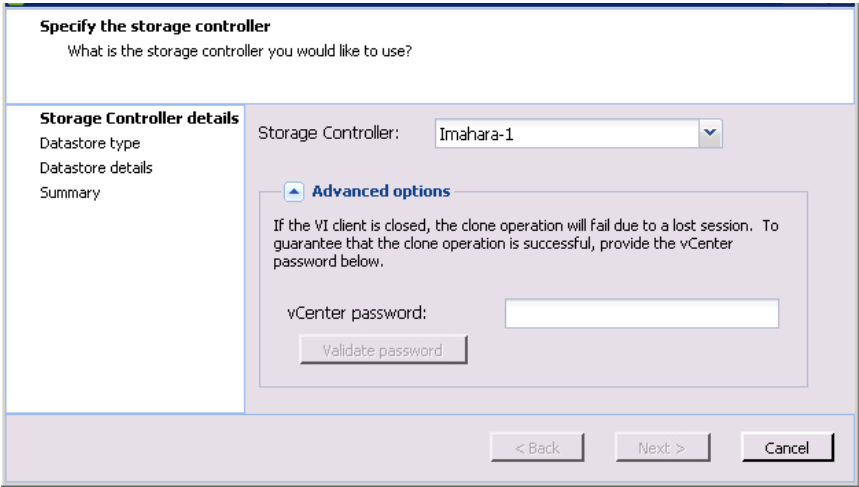
You can create new datastores at the datacenter, cluster, or host level. The new datastore appears on every host in the datacenter or the cluster.

- 1. Click the Infrastructure Client **Inventory** button. In the inventory tree, right-click a datacenter, cluster, or host and select **Provision NetApp Datastores**.



- 2. Select the storage controller to use for the new datacenter.  
To prevent failure due to a lost VI client session, open the **Advanced options** dialog and enter the password of the current VCenter user.

Click **Validate password**, and then click **Next**.



3. Select the desired datastore type and click **Next**.

Select the datastore type you would like to create  
Which of the 2 types of datastores would you like to use?

Storage Controller details  
**Datastore type**  
Datastore details  
Summary

☒ NFS  
☐ VMFS

< Back   Next >   Cancel

4. Specify details for the new datastore and click **Next**.

- ❖ **Protocol** (VMFS only) - FCP or iSCSI
- ❖ **Size** - Maximum datastore size depends on the controller and space available. For details, see the *Data ONTAP Storage Management Guide* for your Data ONTAP release.
- ❖ **Datastore name** - Use the default or replace with a custom name.
- ❖ **Volume** (VMFS only) - Select an available volume from drop-down list.
- ❖ **Aggregate** (NFS only) - Select an available aggregate from drop-down list.
- ❖ **Thin provision** - Capacity is not reserved for an individual datastore. The aggregate is treated as a shared resource pool, where capacity is consumed as each datastore requires it. By eliminating unused but provisioned areas of storage, more space is presented than is actually available. It is expected that all datastores will not utilize all of their provisioned storage at the same time.  
**Note:** Thin provisioning sets space reserve to none, and disables space checks. Cloning can fail if your size request uses too much of the aggregate.
- ❖ **Autogrow** (NFS only) - If more space is required, automatically expands the datastore by the increment you specify, up to the size limit you specify.
- ❖ **Grow increment** (NFS only) - Amount of storage added to datastore each time space is needed.
- ❖ **Maximum datastore size** (NFS only) - Limit at which Autogrow stops.

The illustration below shows the VMFS datastore details window.

**Specify the details for new datastore**  
What is the size and the name of the new datastore that you would like to create?

Storage Controller details  
Datastore type  
**Datastore details**  
Summary

Protocol: ☒ FCP ☐ iSCSI

Size (GB):

Datastore name:

Volume:

Thin provision: ☐

< Back   Next >   Cancel

The illustration below shows the NFS datastore details window.

**Specify the details for new datastore**  
What is the size and the name of the new datastore that you would like to create?

Storage Controller details  
Datastore type  
**Datastore details**  
Summary

Size (GB):

Datastore name:

Aggregate:

Thin provision: ☐

Auto-grow: ☐

Grow increment (GB):

Maximum datastore size (GB):

< Back   Next >   Cancel

5. Review the datastore configuration summary and click **Apply** to begin provisioning the new datastore.

## Manage deduplication

Deduplication eliminates redundant objects on a selected datastore and references only the original object. For details on deduplication, refer to your *Data ONTAP Data Protection Online Backup and Recovery Guide*.

1. In VMware Infrastructure Client, click **Inventory** and select a host. On the Summary tab, right-click a datastore and select **Deduplication management**.

**General**

Manufacturer: **IBM**  
 Model: IBM System x3550 -[7978AC1]-  
 Processors: **2 CPU x 2.659 GHz**  
 Processor Type: Intel(R) Xeon(R) CPU 5150 @ 2.66GHz  
 Hyperthreading: **Inactive**  
 Number of NICs: 2

State: **connected**  
 Virtual Machines: **14**  
 VMotion Enabled: **no**  
 Active Tasks:

**Commands**

New Virtual Machine

**Resources**

CPU usage: **159 MHz**  
 2 x 2.659 GHz

Memory usage: **1.41 GB**  
 8.00 GB

| Datastore        | Capacity | Free      |
|------------------|----------|-----------|
| x3550rre5:chrnan | 60.50 GB | 42.95 GB  |
| demo             |          | 24.87 GB  |
| gold_v           |          | 169.53 GB |
| unitTe:          |          | 68.76 GB  |
| transie          |          | 68.76 GB  |
| unitTe:          |          | 99.84 GB  |
| unitTe:          |          | 9.99 GB   |
| unitTe:          |          | 9.41 GB   |
| unitTe:          |          | 68.76 GB  |
| unitTe:          |          | 68.76 GB  |

2. Select a check box to **Disable** or **Start** deduplication. The **Deduplicated** column presents previously used space that is saved by Deduplication.
  - ❖ **Start** begins deduplication from the last marker position.
  - ❖ **Rescan** begins deduplication at the beginning of the volume.

**Datastore deduplication management**

| Name                | Total      | Used       | Available | Deduplicated | Deduplicated % |
|---------------------|------------|------------|-----------|--------------|----------------|
| aggr1               | 1,816.60GB | 1,066.32GB | 750.28GB  | 69.76GB      | 6              |
| kaminoBlock         | 300.00GB   | 34.70GB    | 265.30GB  | 69.76GB      | 67             |
| newDatastore_001    | 60.00GB    | 26.08GB    | -         | -            | -              |
| unitTestDestFCP     | 10.00GB    | 9.46GB     | -         | -            | -              |
| unitTestCreateISCSI | 10.00GB    | 0.02GB     | -         | -            | -              |
| unitTestDestISCSI   | 10.00GB    | 0.47GB     | -         | -            | -              |
| unitTestCreateFCP   | 10.00GB    | 0.04GB     | -         | -            | -              |
| vmfsTest_002        | 76.25GB    | 30.09GB    | -         | -            | -              |

**Deduplication status**

Datastore name: tempVMFS  
 Volume name: kaminoBlock  
 Deduplication state: Enabled  
 Deduplication status: idle  
 Space saved (GB): 69.76  
 Percent saved: 67

**Deduplication settings**

Disable deduplication? ☐  
 Start deduplication? ☐  
 Rescan? ☐

## Resize datastore (NFS only)

To increase or decrease the size of an NFS datastore:

1. Click the Infrastructure Client **Inventory** button and select a host. On the Summary tab, right-click a datastore and select **Resize**.

The screenshot shows the vSphere Summary tab for a host. The 'Resources' section displays a table of datastores. A context menu is open over the 'demo' datastore, with 'Resize' selected.

| Datastore        | Capacity | Free      |
|------------------|----------|-----------|
| x3550pre5.choran | 60.50 GB | 42.95 GB  |
| demo             |          | 24.87 GB  |
| gold_v           |          | 169.53 GB |
| unitTe           |          | 68.76 GB  |
| transie          |          | 68.76 GB  |
| unitTe           |          | 99.84 GB  |
| unitTe           |          | 9.99 GB   |
| unitTe           |          | 9.41 GB   |
| unitTe           |          | 68.76 GB  |
| unitTe           |          | 68.76 GB  |
| unitTestHostFCP  | 9.75 GB  | 9.41 GB   |

2. Enter the new datastore size and click **OK**.

The screenshot shows the 'Resize datastore' dialog box. The 'Volume settings' section shows the volume name 'unitTestSourceNFS' and the total size '100.00'. The 'Datastore' section shows the datastore name 'unitTestSourceNFS' and the new size '100.00'.

| Volume settings       |                   |
|-----------------------|-------------------|
| Volume name:          | unitTestSourceNFS |
| Total size (GB):      | 100.00            |
| Used size (GB):       | 24.42             |
| Snapshot reserve (%): | 0                 |

| Datastore          |                   |
|--------------------|-------------------|
| Datastore name:    | unitTestSourceNFS |
| Minimum size (GB): | 27.00             |
| Maximum size (GB): | 14,336.00         |
| Current size (GB): | 100.00            |
| New size (GB):     | 100.00            |

OK Cancel

## Destroy datastore

The RCU can quickly destroy all virtual machines in a datastore, detach the datastore from the VMware Infrastructure Client environment, and free the space on the storage controller. These actions permanently destroy all VMs, datastores, snapshots and FlexVolumes. To destroy a group of VMs:

1. Right-click the datastore and select **Destroy**.

**General**

Manufacturer: **IBM**  
Model: IBM System x3550-[7978AC1]-  
Processors: **2 CPU x 2.659 GHz**  
Processor Type: Intel(R) Xeon(R) CPU 5150 @ 2.66GHz  
Hyperthreading: **Inactive**  
Number of NICs: **2**

State: **connected**  
Virtual Machines: **14**  
VMotion Enabled: **no**  
Active Tasks:

**Commands**

New Virtual Machine

**Resources**

CPU usage: **159 MHz**  
2 x 2.659 GHz

Memory usage: **1.41 GB**  
8.00 GB

| Datastore        | Capacity | Free      |
|------------------|----------|-----------|
| x3550rr5:cthoran | 60.50 GB | 42.95 GB  |
| demo             |          | 24.87 GB  |
| gold_v           |          | 169.53 GB |
| unitTe:          |          | 68.76 GB  |
| transie          |          | 68.76 GB  |
| unitTe:          |          | 99.84 GB  |
| unitTe:          |          | 9.99 GB   |
| unitTe:          |          | 9.41 GB   |
| unitTe:          |          | 68.76 GB  |
| unitTe:          |          | 68.76 GB  |

2. Click **OK** to confirm the action.

**Destroy Datastore and Virtual Machines**

newDataStore and all of the virtual machines listed below will be destroyed and removed from your system. Click OK to continue.

| Virtual machine name | Power state |
|----------------------|-------------|
| testClones01         | Off         |
| testClones02         | Off         |
| testClones03         | Off         |
| testClones04         | Off         |
| testClones05         | Off         |
| testClones06         | Off         |
| testClones07         | Off         |
| testClones08         | Off         |
| testClones09         | Off         |
| testClones10         | Off         |

## Multiple datastore note (NFS only)

When a request is made to create more than one new NFS datastore, the RCU first creates a *golden volume* on the controller. The datastores that are then attached to vCenter Server will be FlexClones of the golden volume. Because the FlexClones share the storage with the golden volume, this space is not wasted. When the last datastore (FlexClone) of a golden volume is destroyed as described above, the golden volume is destroyed as well. This gives you complete control over each individual datastore.



## Topics in this chapter

This chapter includes the following topics.

- ◆ “[Troubleshooting](#)” on page 36

# Troubleshooting

---

For a list of known issues and resolutions, see the latest *Rapid Cloning Utility Release Notes* at <http://now.netapp.com>.

If you have a question that is not resolved by the *Release Notes*, contact NetApp Technical Support.

## Things to check before you call Technical Support

Before calling Technical Support, there are several things you can try in effort to solve the problem yourself. These include:

- ◆ Review the known issues and resolutions in the latest *Rapid Cloning Utility Release Notes* at <http://now.netapp.com> to see if they contain information on your problem.
- ◆ Review this guide to make sure you are performing the steps correctly.
- ◆ Review the System Requirements in the *Release Notes* to verify that your environment is in compliance with NetApp requirements.
- ◆ Check all cables to make sure that they are connected properly.

## Information you need to provide to Technical Support

Before you contact Technical Support, you need to gather the following information about your system and your problem:

- ◆ A valid NetApp storage controller serial number that is licensed and under warranty.
- ◆ Your contact information.
- ◆ A list of all the products you are using including software versions and licenses.
- ◆ All the error messages from the system.
- ◆ Information on your VMware environment.

## How to contact NetApp Technical Support

You can contact NetApp Technical Support by telephone or from the NetApp NOW site.

To contact Technical Support by telephone, use the following numbers:

- ◆ 888 4-NETAPP (US and Canada)
- ◆ 00.800.44.NETAPP (EMEA/Europe)
- ◆ +800.800.80.800 (Asia/Pacific)

To contact Technical Support from the Web, use the following address:

◆ <http://now.netapp.com>

For a detailed listing of Technical Support phone numbers, go to the NetApp Support page at

<http://www.netapp.com/us/support/ngs-contacts.html>



## Topics in this appendix

This Appendix presents the storage system permissions required by the Rapid Cloning Utility. It includes the following topics.

- ◆ [“Create clones role”](#) on page 40
- ◆ [“Create storage role”](#) on page 41
- ◆ [“Modify storage role”](#) on page 42
- ◆ [“Destroy storage role”](#) on page 43

## Create clones role

---

A role and group must be created or modified as described below. Then a user must be created or modified to include this group. Finally, when the storage system is added to the Rapid Cloning Utility, the user just created or modified should be used.

The following permissions are required to use File Level FlexClone (flfc) to clone vmdk files in the same datastore while creating VMs.

- ◆ api-system-get-version
- ◆ login-http-admin
- ◆ api-system-get-info
- ◆ api-system-cli
- ◆ api-license-list-info
- ◆ cli-ifconfig
- ◆ api-aggr-list-info
- ◆ api-volume-list-info
- ◆ api-lun-list-info
- ◆ api-lun-map-list-info
- ◆ api-igroup-list-info
- ◆ api-ems-autosupport-log
- ◆ api-file-get-file-info
- ◆ api-clone-\*
- ◆ api-file-create-directory
- ◆ api-file-read-file
- ◆ api-file-delete-file
- ◆ api-file-write-file
- ◆ cli-mv
- ◆ api-file-delete-directory
- ◆ cli-ndmpd
- ◆ cli-ndmpcopy
- ◆ api-useradmin-user-list
- ◆ api-cf-status
- ◆ api-snapshot-list-info
- ◆ api-volume-autosize-get
- ◆ api-iscsi-session-list-info
- ◆ api-iscsi-portal-list-info
- ◆ api-fcp-service-status
- ◆ api-iscsi-service-status

## Create storage role

---

The following access is required to create volumes and mount a datastore while creating VMs (includes previous rights).

- ◆ `api-volume-create`
- ◆ `api-volume-set-option`
- ◆ `api-volume-autosize-set`
- ◆ `api-sis-enable`
- ◆ `api-sis-start`
- ◆ `api-snapshot-create`
- ◆ `api-snapshot-set-reserve`
- ◆ `api-volume-clone-create`
- ◆ `api-nfs-exportfs-list-rules-2`
- ◆ `api-nfs-exportfs-modify-rule-2`
- ◆ `api-nfs-exportfs-load-exports`
- ◆ `api-igroup-create`
- ◆ `api-lun-create-by-size`
- ◆ `api-lun-map`
- ◆ `api-lun-set-comment`
- ◆ `api-igroup-add`
- ◆ `cli-qtree`
- ◆ `cli-iscsi`

## Modify storage role

---

The following access is required to manipulate storage objects (resize volume, dedupe volume) (includes previous rights).

- ◆ `api-volume-size`
- ◆ `api-sis-disable`
- ◆ `api-sis-stop`

## Destroy storage role

---

The following access is required to destroy a datastore (volume/flexclone) (includes previous rights).

- ◆ `api-volume-offline`
- ◆ `api-volume-destroy`
- ◆ `api-lun-offline`
- ◆ `api-lun-destroy`



## Topics in this appendix

This Appendix includes the following topics.

- ◆ [“Preferences File”](#) on page 46
- ◆ [“Logs”](#) on page 47
- ◆ [“Export Files”](#) on page 48

## Preferences File

---

The RCU preferences file contains options that control RCU operation. This file is stored in the following location:

◆ `install_directory/conf/rcuPreferences.xml`

The preferences file contains the following options:

| Option                   | Default Setting | Default Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| snapreserve              | 0               | Sets the snapshot reserve size for new volumes to the specified percentage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| minra                    | off             | Controls how many blocks are pre-fetched at each read operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| no_atime_update          | on              | Disables updating of access time when files are read. Leave on for better performance in a heavy read traffic environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| nosnap                   | on              | Disables snapshots for new flexclone volumes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| sis                      | true            | Enables deduplication on new volumes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| destroyParentIfLastClone | true            | When last flexclone is destroyed, the golden volume is destroyed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| checkPossibleCrossMount  | true            | If an administrator mounts a volume for use as a datastore to an ESX host using a different ip address or volume path than what was used to mount the volume to other ESX hosts, there is a potential for the RCU Destroy feature to incorrectly report which VMs are present on the datastore. This is because the datastore uuid is generated by the ESX host based on the ip address and volume path. <code>checkPossibleCrossMount</code> addresses this issue and therefore should be left set to <code>true</code> . The only time this should be set to <code>false</code> is if the Destroy window stays in the "Loading..." state for an extended period of time and there is no chance of the issue described above. |
| onlyOffline              | false           | By default, the Destroy feature takes offline and destroys the volume that was mounted as a datastore. Setting <code>onlyOffline</code> to <code>true</code> leaves the volume intact, just offline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

# Logs

---

The RCU creates the following log files.

- ◆ *install\_directory*/logs/rcu.log
- ◆ *install\_directory*/logs/rcuSupport.xml

The log files include RCU version, build number, and build date. Each log file is rotated at a size of 8192 KB. Up to nine log files are retained.

# Export Files

---

## Network configuration file

After each cloning procedure, RCU creates a .csv network configuration file in the *install\_directory\exports* directory. The filename is in the following format:

- ◆ `import_generic_date_time.csv`

For example: `import_generic_2009_03_06_11_04.csv`

The file includes the following information for each VM:

- ◆ VM Name
- ◆ UUID, VMX Path
- ◆ Number of CPUs
- ◆ Memory in MB
- ◆ Guest Full Name
- ◆ Guest Alternate Name
- ◆ Datastore Name

The file also includes the following information for up to ten NICs:

- ◆ NIC x
- ◆ NIC x Network Label
- ◆ NIC x Address Type
- ◆ Manual - Statically assigned MAC address.
- ◆ Generated - Automatically generated MAC address.
- ◆ Assigned - MAC address assigned by VirtualCenter.
- ◆ NIC x WOL Enabled
- ◆ Wake-on-LAN enabled or disabled on this virtual network adapter
- ◆ NIC x MAC Address

## XenDesktop

When XenDesktop connection broker output is requested in the cloning wizard, RCU creates a .csv file in the *install\_directory\exports* directory. The filename is in the following format:

- ◆ `xenDesktop_timestamp.csv`

The file includes the following information:

`[ADComputerAccount],[AssignedUser],[VirtualMachine],[HostID]`

## Topics in this appendix

This Appendix describes the RCU programmable API. It includes the following topics.

- ◆ [“Overview”](#) on page 50
- ◆ [“Methods”](#) on page 52
- ◆ [“RequestSpec”](#) on page 54
- ◆ [“CloneSpec”](#) on page 55
- ◆ [“VmFile Spec”](#) on page 55
- ◆ [“DatastoreSpec”](#) on page 56
- ◆ [“ControllerSpec”](#) on page 58
- ◆ [“VmSpec”](#) on page 58
- ◆ [“Example SOAP”](#) on page 59
- ◆ [“Java”](#) on page 61

# Overview

---

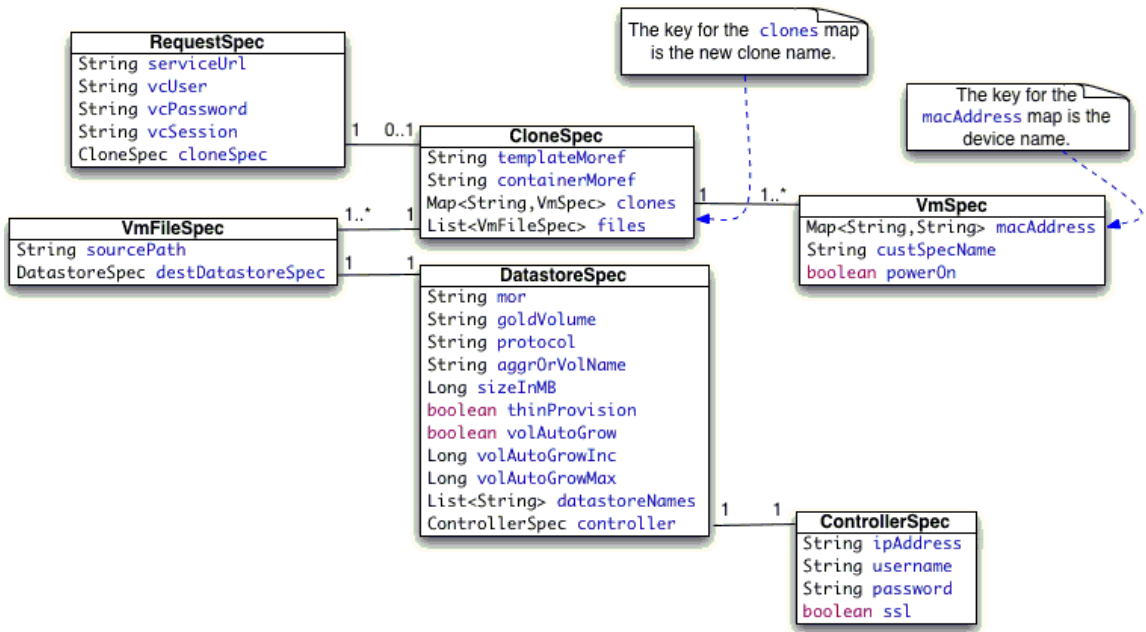
The RCU Application Programming Interface (API) is exposed using Simple Object Access Protocol (SOAP). The API is a layer over the NetApp API (called ZAPI) and the VMware VI SDK, but does not require either in the consumer application or script. The RCU API is designed to be leveraged with the VI SDK to offload the intricacies of storage object cloning while cloning virtual machines. To this end, the managed object reference returned by the VMware VI SDK is used to identify components in the vCenter Inventory. You can view this information using the Managed Object Browser on the vCenter server.

This version of the API exposes the clone creation engine. This method, called `createClones`, can be used to create VM clones on new or existing datastores. In the case that more than one datastore is created, the `FlexClone` feature on the controller is leveraged to create clones of the datastore. There are two utility methods:

- ◆ The `getVmFiles` returns a list of files that make up the virtual machine. This is useful for creating the list of files required in the `cloneSpec` described below.
- ◆ The `getMoref` returns the managed object reference of the requested object based on name and type. The `getMoref` returns the first object that matches the name and type combination. For this reason, this method should not be used in production environments unless all object names are unique.

The input to the methods are a combination of a *specification* (complex) and *strings* (simple). The specifications are described below.

Very little verification or validation is done in the API. For example, if the username and password combination is not correct, the API will fail. If there is not enough space to create the requested datastore(s), the API will fail.



## Methods

---

### createClones

Create VM clones on new or existing datastores. The clone or template must *not* contain any RDMs and must be in a good state (i.e., connected).

#### Parameters:

| Name        | Type        | Example   | Description |
|-------------|-------------|-----------|-------------|
| requestSpec | RequestSpec | See below | See below   |

#### Return:

| Type   | Example     | Description                                                                                           |
|--------|-------------|-------------------------------------------------------------------------------------------------------|
| String | Task:task-2 | A managed object reference to a vCenter Task. This task can be monitored and altered using the VI SDK |

### getVmFiles

Get a skeleton list of VmFileSpec to be completed and used in the submission to createClones.

#### Parameters:

| Name     | Type   | Example              | Description                             |
|----------|--------|----------------------|-----------------------------------------|
| vmMorRef | String | VirtualMachine:vm-40 | The managed object reference of the VM. |

#### Return:

| Type             | Example     | Description                                                                                                            |
|------------------|-------------|------------------------------------------------------------------------------------------------------------------------|
| List<VmFileSpec> | Task:task-2 | A list of VmFileSpec based on the VM specified. This information should be modified and submitted using the CloneSpec. |

## getMoref

Returns the managed object reference of the requested object based on name and type. The `getMoref` returns the first object that matches the name and type combination. For this reason, this method should not be used in production environments unless all object names are unique.

### Parameters:

| Name        | Type        | Example        | Description                         |
|-------------|-------------|----------------|-------------------------------------|
| name        | String      | winXP          | The name of the object to look for. |
| type        | String      | VirtualMachine | The Managed Object Type.            |
| requestSpec | RequestSpec | See below      | See below                           |

### Return:

| Type   | Example              | Description                                      |
|--------|----------------------|--------------------------------------------------|
| String | VirtualMachine:vm-40 | The managed object reference in a String format. |

# RequestSpec

---

The Request Specification describes the URL of the VMware vCenter SDK as well as the authentication information. The authentication information may be in the form of a user name and password combination or a vCenter SOAP Session ID. An optional Clone Specification may also be present.

| Name       | Type      | Example                              | Description                                                       |
|------------|-----------|--------------------------------------|-------------------------------------------------------------------|
| serviceURL | String    | https://10.61.167.79/sdk             | URL for the VMware vCenter SDK.                                   |
| vcUser     | String    | Administrator                        | VMware vCenter username (null ok if using vcSession).             |
| vcPassword | String    | pass123                              | VMware vCenter password (null ok if using vcSession).             |
| vcSession  | String    | CDF37576-C2E2-461A-8797-D33FBA6D5D82 | VMware vCenter SOAP Session (null ok if using vcUser/vcPassword). |
| cloneSpec  | cloneSpec |                                      | A clone specification.                                            |

## Notes

- ◆ cloneSpec may be null when using this spec with one of the utility methods.
- ◆ vcSession may be null if vcUser and vcPassword are used.
- ◆ vcUser and vcPassword may be null if vcSession is used.

## CloneSpec

The Clone Specification describes a request to create clones of a VM or template. This VM must be powered off. A new VM is created for each entry in the Map named clones. The String in this Map is the name of the clone and the VmSpec describes the new clone configuration. The List named files describes the files that make up the source VM or template. This list can be used to specify different destinations for each file as well as create new datastores.

| Name           | Type               | Example                 | Description                                                                                                                                                                                                                       |
|----------------|--------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| templateMoref  | String             | VirtualMachine:vm-255   | Source VM or template of cloning operation. String representation of type and value of the ManagedObjectReference from VMware VI API.                                                                                             |
| containerMoref | String             | Datacenter:datacenter-2 | Destination for resulting clones. Valid destination types: Datacenter, ResourcePool, ClusterComputeResource, and ComputeResource. A string representation of type and value of the ManagedObjectReference from the VMware VI API. |
| clones         | Map<String,VmSpec> |                         | Map of new VM name to VM Specification (VmSpec).                                                                                                                                                                                  |
| files          | List<VmFileSpec>   |                         | List of files that make up source VM or template specified in templateMoref.                                                                                                                                                      |

## VmFile Spec

This describes the source configuration file (vmx) or the source virtual hard disk files (vmdk) as well as the destination datastore specification.

| Name              | Type          | Example                                 | Description                          |
|-------------------|---------------|-----------------------------------------|--------------------------------------|
| sourcePath        | String        | [testSource] demoSource/demoSource.vmdk | Path to vmx or vmdk file.            |
| destDatastoreSpec | DatastoreSpec |                                         | Destination datastore specification. |

## DatastoreSpec

---

DatastoreSpec describes the destination datastore. This can describe new datastores (to be created) as well as existing datastores. See the “[Required parameters](#)” section below for valid parameter combinations. The number of clones must be evenly divisible by the number of datastores.

| Name           | Type    | Example                | Description                                                                                                                                                                       |
|----------------|---------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mor            | String  | Datastore:datastore-31 | Destination datastore. String representation of type and value of ManagedObjectReference from the VMware VI API.                                                                  |
| goldVolume     | String  | goldVolume             | Name of volume used when creating more than one NFS-based datastore. This volume is not permanently presented to the ESX hosts. This volume becomes the parent of the FlexClones. |
| protocol       | String  | FCP                    | Valid values are NFS, FCP, ISCSI.                                                                                                                                                 |
| aggrOrVolName  | String  | vmwareLuns             | Name of the aggregate for new NFS datastores or name of volume for new VMFS datastores.                                                                                           |
| sizeInMB       | Long    | 204800                 | Size of the datastore in MB. An additional 256MB is added for VMFS datastores to cover metadata overhead.                                                                         |
| thinProvision  | Boolean | true                   | If true, space will not be reserved for the storage object. For NFS, the volume will guarantee=none. For VMFS, the LUN will be created with '-o noreserve'.                       |
| volAutoGrow    | Boolean | true                   | If true, the volAutoGrowInc and volAutoGrowMax values will be applied to the volume.                                                                                              |
| volAutoGrowInc | Long    | 204800                 | Increment in which to grow volume automatically as needed in MB.                                                                                                                  |
| volAutoGrowMax | Long    | 204800                 | Maximum size to which to grow the volume automatically in MB.                                                                                                                     |

| Name           | Type          | Example      | Description                                                                                                                                                                                                         |
|----------------|---------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| datastoreNames | List<String>  | newDatastore | List of datastore names. Care should be taken by the application to prevent duplicate datastore, volume or LUN names. For NFS, datastore name is used as volume name. For VMFS, datastore name is used as LUN name. |
| numDatastores  | int           | 1            | Number of datastores. This should indicate the size of the list of names in datastoreNames.                                                                                                                         |
| controller     | ConrollerSpec | 1            | The destination NetApp controller.                                                                                                                                                                                  |

### Required parameters

#### Existing datastore:

- ◆ mor
- ◆ controller

#### Single new NFS datastore:

- ◆ aggrOrVolName
- ◆ sizeInMB
- ◆ thinProvision
- ◆ volAutoGrow
- ◆ volAutoGrowInc
- ◆ volAutoGrowMax
- ◆ protocol - must be NFS
- ◆ controller
- ◆ datastoreNames - only one name in the list
- ◆ numDatastores - should be 1

#### New NFS datastores:

- ◆ goldVolume
- ◆ aggrOrVolName
- ◆ sizeInMB
- ◆ thinProvision
- ◆ volAutoGrow
- ◆ volAutoGrowInc
- ◆ volAutoGrowMax
- ◆ protocol - must be NFS
- ◆ controller
- ◆ datastoreNames
- ◆ numDatastores

### New VMFS datastore(s):

- ◆ aggrOrVolName
- ◆ sizeInMB
- ◆ thinProvision
- ◆ protocol - must be FCP or ISCSI
- ◆ controller
- ◆ datastoreNames
- ◆ numDatastores

## ControllerSpec

---

This describes the controller connection and authentication data. This information is used by the RCU to connect to the controller using the ZAPI interface. No other protocol is used to connect to the controller.

| Name      | Type    | Example      | Description                                                          |
|-----------|---------|--------------|----------------------------------------------------------------------|
| ipAddress | String  | 10.61.167.51 | IP or host name of the NetApp controller.                            |
| username  | String  | root         | User name (does not need to be root).                                |
| password  | String  | pass123      | Password.                                                            |
| ssl       | Boolean | true         | If true, use HTTPS. If false, use HTTP to connect to the controller. |

## VmSpec

---

This describes configuration and action options for each VM created. The MAC address must be in a range defined by VMware. Refer to VMware documentation for more information.

| Name         | Type               | Example                                     | Description                                                         |
|--------------|--------------------|---------------------------------------------|---------------------------------------------------------------------|
| macAddress   | Map<String,String> | "Network Adapter 1",<br>"00:0c:29:39:8c:c1" | Virtual network adapter to MAC address information (optional).      |
| custSpecName | String             | winXP_HR                                    | Name of guest customization specification to be applied (optional). |
| powerOn      | Boolean            | false                                       | If true, the new VMs are powered on after all have been created.    |

## Example SOAP

---

```
<ns2:createClones xmlns:ns2="http://server.rcu.netapp.com/">
 <arg0>
 <cloneSpec>
 <clones>
 <entry>
 <key>apiTestClone1</key>
 <value>
 <powerOn>>false</powerOn>
 </value>
 </entry>
 <entry>
 <key>apiTestClone2</key>
 <value>
 <powerOn>>false</powerOn>
 </value>
 </entry>
 <entry>
 <key>apiTestClone3</key>
 <value>
 <powerOn>>false</powerOn>
 </value>
 </entry>
 </clones>
 <containerMoref>Datacenter:datacenter-2</containerMoref>
 <files>
 <destDatastoreSpec>
 <controller>
 <ipAddress>10.61.167.51</ipAddress>
 <password></password>
 <ssl>>false</ssl>
 <username>root</username>
 </controller>
 <mor>Datastore:datastore-17</mor>
 <numDatastores>0</numDatastores>
 <thinProvision>>false</thinProvision>
 <volAutoGrow>>false</volAutoGrow>
 </destDatastoreSpec>
 <sourcePath>[unitTestSourceNFS]
demoSource/demoSource.vmx</sourcePath>
 </files>
 <files>
 <destDatastoreSpec>
 <controller>
 <ipAddress>10.61.167.51</ipAddress>
 <password></password>
 <ssl>>false</ssl>
 <username>root</username>
```

```

 </controller>
 <mor>Datastore:datastore-17</mor>
 <numDatastores>0</numDatastores>
 <thinProvision>>false</thinProvision>
 <volAutoGrow>>false</volAutoGrow>
 </destDatastoreSpec>
 <sourcePath>[unitTestSourceNFS]
demoSource/demoSource.vmdk</sourcePath>
 </files>
 <templateMoref>VirtualMachine:vm-255</templateMoref>
</cloneSpec>
<serviceUrl>https://10.61.167.79/sdk</serviceUrl>
<vcPassword>pass123</vcPassword>
<vcUser>Administrator</vcUser>
</arg0>
</ns2:createClones>

```

This information is for use with Java-based tools as well as the Java programming language.

## Java SSL Security

**Issue:** Java SSL security demands a hostname in the CN to work properly. The IP address that RCU configures during application installation is not adequate.

### Solution:

1. Stop the RCU service.
2. On the RCU server, delete the keystore from the conf directory in the installation path. For example:  

```
del "C:\Program Files\netapp\Rapid Cloning Utility\conf\keyStore"
```
3. Create a keystore using the hostname (instead of ip address) as the hostname. The following example uses vc123.domain.com as the name of the VC server where RCU was installed:  

```
"C:\Program Files\netapp\Rapid Cloning
Utility\jre\bin\keytool.exe" -genkeypair -alias RCU -keyalg RSA
-keysize 1024 -dname "CN=vc123.domain.com, OU=Department,
O=Company, L=Somewhere, S=Somestate, C=US,
EMAILADDRESS=root@localhost" -validity 9999 -storepass
RCUVersion2 -keypass RCUVersion2 -keystore "C:\Program
Files\netapp\Rapid Cloning Utility\conf\keyStore"
```
4. Import the key into the keystore that the client application (the consumer of the RCU API) uses.
5. Make sure the application uses the host name in the URL. For example:  

```
https://vc123.domain.com:61921/rcu/api?wsdl
```

If, after completing the steps described above, you are still having trouble, please see the following document for more information:  
<http://communities.netapp.com/docs/DOC-3578>

## Java Samples

The examples provided in the API directly were built using Java 6. The following steps were taken to create the supporting classes:

```
cd "C:\Program Files\netapp\Rapid Cloning
Utility\api\Samples\java\src"
wsimport -keep -p com.netapp.rcu.api
https://vc123.domain.com:61921/rcu/api?wsdl
```

