VM Client Guide and Reference

Cloud Manager 2.0

December 8, 2011

Legal Notices

Novell, Inc. makes no representations or warranties with respect to the contents or use of this documentation, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to revise this publication and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes.

Further, Novell, Inc. makes no representations or warranties with respect to any software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to make changes to any and all parts of Novell software, at any time, without any obligation to notify any person or entity of such changes.

Any products or technical information provided under this Agreement may be subject to U.S. export controls and the trade laws of other countries. You agree to comply with all export control regulations and to obtain any required licenses or classification to export, re-export or import deliverables. You agree not to export or re-export to entities on the current U.S. export exclusion lists or to any embargoed or terrorist countries as specified in the U.S. export laws. You agree to not use deliverables for prohibited nuclear, missile, or chemical biological weaponry end uses. See the Novell International Trade Services Web page (http://www.novell.com/info/exports/) for more information on exporting Novell software. Novell assumes no responsibility for your failure to obtain any necessary export approvals.

Copyright © 2008-2011 Novell, Inc. All rights reserved. No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of the publisher.

Novell, Inc.
1800 South Novell Place
Provo, UT 84606
U.S.A.
www.novell.com

Online Documentation: To access the latest online documentation for this and other Novell products, see the Novell Documentation Web page (http://www.novell.com/documentation).

Novell Trademarks

For Novell trademarks, see the Novell Trademark and Service Mark list (http://www.novell.com/company/legal/trademarks/tmlist.html).

Third-Party Materials

All third-party trademarks are the property of their respective owners.

Contents

About This Guide 7

1 Overview 9

1.1 What Is the VM Client? . . . 9
1.2 Understanding the Virtual Machine Life Cycle . . . 10
1.3 Using This Guide to Manage VMs . . . 11

2 Getting Started 13

2.1 Installing the VM Client . . . 13
2.1.1 Minimum Installation Requirements . . . 13
2.1.2 Installing the VM Client on the Windows Operating System . . . 15
2.1.3 Installing the VM Client in a Linux Environment . . . 15
2.2 Starting and Logging In to the VM Client Interface . . . 16
2.2.1 Starting the Interface on a Windows Workstation . . . 16
2.2.2 Starting the Interface on a Linux Workstation . . . 19
2.3 Logging In to Another Virtualization Grid . . . 21
2.4 Registering VM Hosts . . . 22
2.5 Discovering Registered VM Hosts . . . 23
2.6 Discovering VMs of the Registered VM Hosts . . . 24
2.7 Registering VMs . . . 24

3 Understanding the VM Client Interface 27

3.1 Understanding and Navigating the Welcome Page . . . 28
3.1.1 Welcome Page Main Menu Options . . . 29
3.1.2 Welcome Page Buttons . . . 33
3.2 Understanding the VM Client Window . . . 35
3.2.1 Multiple VM Operator Logins . . . 36
3.2.2 Customizing the VM Client Sections . . . 37
3.2.3 Navigating the VM Client Window . . . 40
3.2.4 Sorting, Searching, and Filtering Lists . . . 51
3.2.5 Viewing Additional Information in Fields or Cells . . . 57
3.3 Using the Error Log . . . 59
3.4 Using the Progress View . . . 63
3.5 Resetting the VM Client Perspectives . . . 64
3.6 Changing the VM Client Theme . . . 65

4 Managing VM Host Servers 69

4.1 Understanding VM Host Servers . . . 69
4.2 Viewing and Editing Host Server Details . . . 69
4.2.1 Accessing Host Server Details . . . 70
4.2.2 Using the Details Tabs . . . 70
4.3 Using Feedback to Manage Host Servers . . . 79
4.4 Accessing a Host Server's Console . . . 80
4.5 Resynchronizing a Host Server's State . . . 80

5 Managing Virtual Machines 83

5.1 Viewing and Editing VM Details . . . 83
5.1.1 Accessing VM Details . . . 84
5.1.2 Using the Details Tabs . . . 84
5.2 Using Feedback to Manage VMs . . . 87
5.2.1 Progress View . . . 88
5.2.2 Progress Bar for Details Views . . . 90
5.2.3 Progress Bar in a Tool Tip . . . 92
5.2.4 Event Log Tab . . . 94
5.2.5 Event Logs . . . 94
5.2.6 Error Log . . . 97
5.3 Virtual Machine Actions . . . 98
5.3.1 Understanding a VM's Status . . . 99
5.3.2 Canceling a VM's In-Progress Action . . . 100
5.3.3 Starting a VM . . . 100
5.3.4 Shutting Down a VM . . . 102
5.3.5 Accessing a VM's Console . . . 103
5.3.6 Pausing a VM . . . 103
5.3.7 Resuming a Paused VM . . . 103
5.3.8 Suspending a VM . . . 104
5.3.9 Resuming a Suspended VM . . . 104
5.3.10 Resynchronizing a VM's State . . . 105
5.4 Creating a Xen VM . . . 105
5.5 Installing a VM . . . 117
5.6 Installing the Orchestration Agent on a VM . . . 119
5.7 Installing the Monitoring Agent on a VM . . . 120
5.7.1 Installing the Agent in Windows . . . 120
5.7.2 Installing the Agent in Linux . . . 120
5.8 Editing VMs . . . 120
5.9 Moving VMs . . . 128
5.9.1 Prerequisites . . . 129
5.9.2 Moving a VM . . . 129
5.10 Migrating VMs . . . 130
5.10.1 Prerequisites . . . 130
5.10.2 Migrating a VM . . . 132
5.11 Deleting VMs . . . 134

6 Managing Repositories 135

6.1 Understanding Repositories . . . 135
6.2 Viewing and Editing Storage Details . . . 136
6.2.1 Accessing Storage Details . . . 137
6.2.2 Using the Details Tabs . . . 137
6.3 Adding Repositories . . . 140
6.4 Associating Repositories to Host Servers . . . 143
6.5 Associating Host Servers to Repositories . . . 144
6.6 Removing Repositories . . . 145
6.6.1 Removing a Repository from a Host Server . . . 146
6.6.2 Removing a Host Server from a Repository . . . 147
6.6.3 Removing a Repository from the VM Client . . . 147

7 Managing Templates 149

7.1 Viewing and Editing Template Details . . . 149
7.1.1 Accessing Template Details . . . 149
7.1.2 Using the Details Tabs . . . 150
7.2 Creating a Template from a VM . . . 152

7.3 Editing Templates 154
7.4 Moving a Template 163
7.5 Deleting Templates 164

8 Managing Clones of Templates 167

8.1 Cloning Templates 167
8.2 Detaching Clones from Templates 169

9 Managing with Groups 171

9.1 Understanding Groups 171
9.2 Creating a Group 179
9.3 Adding Members to an Existing Group 180
9.4 Removing Members from a Group 183
9.5 Deleting a Group 186

10 VM Client Debugging and Troubleshooting 189

10.1 Editing the VM Client Preferences File 189
10.2 Troubleshooting the VM Client 191
10.3 Accessing VMs and Host Servers 191
10.4 Moving or Migrating the VMs 191
10.5 Registering VM Hosts 193

A VM Installation Sources 195

A.1 Disk Installation Sources 195
A.2 Guest Operating System Installation Sources 195
A.2.1 SUSE 196
A.2.2 NetWare 196
A.2.3 Other Linux Installation Sources 196

B NPIV Terminology 197

C Uninstalling the VM Client 199

C.1 Uninstalling the VM Client from the Windows Operating System 199
C.2 Uninstalling the VM Client in a Linux Environment 199

D Adding User Logins for VM Operators 201

E VM Client Documentation Quick Index 205

About This Guide

This guide introduces the NetIQ Cloud manager VM Client, including its basic administration environment, which is accessed through an Eclipse rich client platform. The guide provides an introductory overview of the VM Client, and explains how to install, monitor, and manage VMs.

The guide is organized as follows:

- Chapter 1, “Overview,” on page 9
- Chapter 2, “Getting Started,” on page 13
- Chapter 3, “Understanding the VM Client Interface,” on page 27
- Chapter 4, “Managing VM Host Servers,” on page 69
- Chapter 5, “Managing Virtual Machines,” on page 83
- Chapter 6, “Managing Repositories,” on page 135
- Chapter 7, “Managing Templates,” on page 149
- Chapter 8, “Managing Clones of Templates,” on page 167
- Chapter 9, “Managing with Groups,” on page 171
- Chapter 10, “VM Client Debugging and Troubleshooting,” on page 189
- Appendix A, “VM Installation Sources,” on page 195
- Appendix B, “NPIV Terminology,” on page 197
- Appendix C, “Uninstalling the VM Client,” on page 199
- Appendix E, “VM Client Documentation Quick Index,” on page 205

Audience

This book is for data center VM operators. It assumes that users of the product have the following background:

- General understanding of network operating environments and systems architecture
- Knowledge of basic Linux shell commands, the Windows command prompt, and text editors

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to www.novell.com/documentation/feedback.html (http://www.novell.com/documentation/feedback.html) and enter your comments there.

1 Overview

Review the following sections to understand the NetIQ Cloud Manager VM Client:

- Section 1.1, “What Is the VM Client?,” on page 9
- Section 1.2, “Understanding the Virtual Machine Life Cycle,” on page 10
- Section 1.3, “Using This Guide to Manage VMs,” on page 11

1.1 What Is the VM Client?

The VM Client is a management interface that VM operators can use to manage the life cycle of the virtual machines (VMs) in your enterprise, including creating, starting, stopping, migrating, and deleting VMs. Cloud Manager lets you better align IT to your business, control costs, and minimize risks across all VM platforms in the data center. You can increase the functionality of your data center by fully leveraging VMs as a usable resource.

The VM Client provides management of VMs from several different virtualization host types, including SUSE Linux Enterprise Server (SLES) Xen, VMware (through vSphere), and Microsoft Windows Server 2008 R2 with Hyper-V.

The VM Client also allows you to manage both VMs and VM host servers in your data center. A VM host is a server running the Orchestration Agent.

For information on installing the VM Client, see

The VM Client provides the following:

- A VM creation wizard that covers a VM’s installation source and mode, its virtualization mode, repository, and hardware configurations
- A VM editing wizard, which can also be used to edit existing VMs, even those that are in a running state
- The ability to discover existing VMs residing on your VM host servers
- The ability to discover VM host servers in your virtualization grid; a machine can be a host server if it is running hypervisor software
- Methods for controlling VMs, such as starting, stopping, pausing, and suspending
- The ability to migrate a running VM from one host server to another in real time
- The ability to install and manage the Cloud Manager Orchestration Agent on your VMs
- The ability to make templates of VMs, including making clones of the templates
- The ability to move a VM’s repository from one host server to another
- The ability to group VMs, VM hosts, repositories, and templates for easier management
- Detailed views of the properties for each VM, host server, repository, and template

- The ability to monitor your VMs and host servers in real time
- Event logs for VMs, host servers, and templates

The VM Client enhances the functionality of the Cloud Manager Orchestration Server, enabling it to control VMs in your data center.

Cloud Manager also provides the Orchestration Console, where you can manage and control data center jobs and processes through the application of rules, policies, scheduling, utilization, and billing data center resources. For more information on the Orchestration Console, see the *NetIQ Cloud Manager 2.0 Orchestration Console Reference*.

The VM Client and the Orchestration Console management interfaces work together to help you to maximize the use of VMs in your data center. You can have fewer physical machines while giving your data center many additional resources, and you can manage the physical VM host machines and their VMs in your data center.

The Orchestration Server manages resources to perform work. It does this through automated jobs (written in Jython) that in turn are broken down into joblets that are distributed among multiple resources. For more information about Cloud Manager Orchestration Server operations, see "What You Should Know" in the *NetIQ Cloud Manager 2.0 Orchestration Developer Reference*.

In addition, as calls for resources lessen and resources are released, the Orchestration Server evaluates the capabilities of the active resources (VM or physical machine) and keeps the best resource for the job. This might include any of the currently running VMs.

1.2 Understanding the Virtual Machine Life Cycle

The life cycle of a VM includes its creation, testing, modifications, use in your environment, and removal when it's no longer needed.

For example, in setting up your VM environment, you might want to first create basic VMs from which you can create templates. Then, to enable the most efficient use of your current hardware capabilities, you can use those templates to create the many different specialized VMs that you need to perform the various jobs. You can create and manage VM-related jobs through the Orchestration Console interface.

Life cycle functions are performed one at a time per given VM as jobs on the host server in order to prevent conflicts in using the VM. Life cycle events include:

- Creating a VM
- Starting and stopping a VM
- Pausing, suspending, and resuming a VM
- Installing the Orchestration Agent on a VM
- Creating a template from a VM
- Using the VM (starting, stopping, pausing, suspending, restarting, and shutting down)
- Running jobs for the VM
- Editing a VM
- Editing a template
- Moving a stopped VM to another host server
- Migrating a running VM to another host server

- Resynchronizing a VM to ensure that the state of the VM displayed in the Orchestration Console is accurate
- Cloning a VM from a template

To view the histories of life cycle events or why they might fail, simply review a VM's logs. For more information, see Section 5.2, "Using Feedback to Manage VMs," on page 87.

1.3 Using This Guide to Manage VMs

After installing the Cloud Manager VM Client, do the following:

1. Become familiar with the VM Client interface.
2. Start the VM Client interface.
3. Register existing VM host servers.
4. Discover the registered host servers.
5. Discover the registered VMs.
6. Log in to a virtualization grid.
7. Create your VMs.
8. Install the VMs.
9. Install the Orchestration Agent on the VMs.
10. Create templates of the VMs.
11. Add repositories.
12. Configure the VMs:
    - Edit a VM or template.
    - Delete a VM.
    - Delete a template.
    - Clone a template.
    - Move a VM.
    - Migrate a VM.
    - Create groups for managing VMs, host servers, repositories, and templates.
13. Use the VMs:
    - Understand the various VM statuses.
    - Start VMs.
    - Stop VMs.
    - View a VM's server console.
    - Pause a VM.
    - Suspend a VM.
    - Resynchronize a host server with the Orchestration Console.
    - Resynchronize a VM with the Orchestration Console.
    - View logging details that are fed back from the Orchestration Server.
    - View the error log for a VM.

- Open the Progress View for a VM while a life cycle function is running.
- View a VM's details.
- View a host server's details.
- View a repository's details.
- View a template's details.

14. Troubleshoot VMs.
15. Find operating system installation sources for VMs.

2 Getting Started

To get started with the Cloud Manager VM Client, do the following:

- Section 2.1, “Installing the VM Client,” on page 13
- Section 2.2, “Starting and Logging In to the VM Client Interface,” on page 16
- Section 2.3, “Logging In to Another Virtualization Grid,” on page 21
- Section 2.4, “Registering VM Hosts,” on page 22
- Section 2.5, “Discovering Registered VM Hosts,” on page 23
- Section 2.6, “Discovering VMs of the Registered VM Hosts,” on page 24
- Section 2.7, “Registering VMs,” on page 24

2.1 Installing the VM Client

The VM Client program is installed on your Windows or Linux administration machines. The interface is an Eclipse-based rich client environment designed to allow you to create and manage virtual machines (VMs).

To install the VM Client, first fulfill the minimum requirements, then select the installation platform:

- Section 2.1.1, “Minimum Installation Requirements,” on page 13
- Section 2.1.2, “Installing the VM Client on the Windows Operating System,” on page 15
- Section 2.1.3, “Installing the VM Client in a Linux Environment,” on page 15

2.1.1 Minimum Installation Requirements

To install the VM Client software, you must meet the following requirements:

- “Host Servers for VM Repositories” on page 13
- “Workstations for Running the VM Client Software” on page 14
- “Uninstallation of Previous Versions of the Client” on page 14

Host Servers for VM Repositories

The VM Client operates in conjunction with the Cloud Manager Orchestration Server software, which provides the grid environment for creating, storing, and using VMs. For information on installing Orchestration Console for management of Orchestration Servers, see “Installing the Console and Clients on Windows” or “Installing the Console and Clients on a SLES Server”in the *NetIQ Cloud Manager 2.0 Orchestration Installation Guide*.

Workstations for Running the VM Client Software

The following table contains a list of operating system, hardware requirements, and installation file paths for the VM Client. The installed program execution file is found in the ISO in the indicated folder.

Table 2-1 *Workstation Installation Constraints*

Operating System	Recommended Hardware	Installation File
Windows XP, Windows Vista, and Windows 7	◆ i386 (32-bit) and 64-bit ◆ 240 MB of free space	*cd_image*\Windows\vmclient_install.exe where *cd_image* is one of the following images: ◆ NetIQ_Cloud_Manager-2.0.0-SLE10.i386.iso ◆ NetIQ_Cloud_Manager-2.0.0-SLE10.x86_64.iso ◆ NetIQ_Cloud_Manager-2.0.0-SLE11.i386.iso ◆ NetIQ_Cloud_Manager-2.0.0-SLE11.x86_64.iso
SLED/SLES 10 SP3 and SLED/SLES 10 SP34	◆ i386 (32-bit) and 64-bit ◆ 257 MB of free space	*cd_image*/sle10/SLE10/vmclient_install where *cd_image* is one of the following images: ◆ NetIQ_Cloud_Manager-2.0.0-SLE10.i386.iso ◆ NetIQ_Cloud_Manager-2.0.0-SLE10.x86_64.iso
SLED/SLES 11	◆ i386 (32-bit) and 64-bit ◆ 257 MB of free space	*cd_image*/SLE11/vmclient_install where *cd_image* is one of the following images: ◆ NetIQ_Cloud_Manager-2.0.0-SLE11.i386.iso ◆ NetIQ_Cloud_Manager-2.0.0-SLE11.x86_64.iso

Uninstallation of Previous Versions of the Client

You must uninstall the previous version of VM Client before installing version 2.6:

- **Windows:** On the Windows machine where the client is installed, click *Start* > *Settings* > *Control Panel* > *Add or Remove Programs*, select *Cloud Manager VM Client 3.0*, then click *Remove*.
- **Linux:** Run the following command:

  ```
  /opt/novell/zenworks/vmmanagement/Uninstall_ZENworks_VMM/
  Uninstall_Novell_ZENworks_VM_Manager_2.5
  ```

  This opens the InstallAnyWhere utility to uninstall the VM Client.

2.1.2 Installing the VM Client on the Windows Operating System

These installation steps apply only to Windows 7, Windows Vista, and Windows XP.

1. Copy the `vmclient_install.exe` file from the `\Windows` folder (see Table 2-1 on page 14) to a location on your management Windows workstation.
2. Double-click the `vmclient_install.exe` file to start the installation program:
3. Click *Next* on the Introduction page to display the License Agreement page:
4. Read the terms of the license agreement; if you agree to abide by the terms, select the *I accept the terms of the License Agreement* option, then click *Next* to display the Important Information page; otherwise, click *Cancel* to exit the installation:
5. After reviewing the third-party licenses, if you agree with them, click *Next* to display the Choose Install Folder page; otherwise, click *Cancel* to exit the installation:
6. Select your installation folder, then click *Next* to display the Choose Shortcut Folder page:
7. Select a shortcut folder and any other options and groupings you want for the control of this interface, then click *Next* to display the Supported Hardware Platforms page:
8. Click *Next* to display the Pre-Installation Summary page:
9. Verify the information and click *Previous* as necessary to make changes.
10. When ready, click *Install* to begin the installation:

    When the installation has completed, the Install Complete page is displayed:
11. Click *Done* to finish the installation.
12. For some necessary setup tasks, continue with Chapter 5, "Managing Virtual Machines," on page 83.

2.1.3 Installing the VM Client in a Linux Environment

1. Copy the Cloud Manager 2.0 product ISO file to your management Linux workstation.
2. Open a terminal on the workstation and log in as `root`.
3. Mount the Cloud Manager 2.0 product ISO file to a temporary directory.

   For example, if you copied the 32-bit version of the SLES 11 ISO file to `Desktop`, enter the following commands:

```
mkdir /mnt/iso
cd /Desktop
mount -o loop Novell_Cloud_Manager-2.0.0-SLE11.i386.iso /mnt/iso
cd /mnt/iso/SLE11
```

4 From the `/mnt/iso/SLE11` directory, enter `./vmclient_install` to launch the installer:

5 Click *Next* on the Introduction page to display the License Agreement page:

6 Read the terms of the license agreement; if you agree to abide by the terms, select the *I accept the terms of the License Agreement* option, then click *Next* to display the Important Information page; otherwise, click *Cancel* to exit the installation:

7 After reviewing the third-party licenses, if you agree with them, click *Next* to display the Choose Install Folder page; otherwise, click *Cancel* to exit the installation:

8 Select your installation folder, then click *Next* to display the Choose Desktop Launcher Folder page:

9 Select a shortcut folder and any other options and groupings you want for the control of this interface, then click *Next* to display the Supported Hardware Platforms page:

10 Click *Next* to display the Pre-Installation Summary page:

11 Verify the information and click *Previous* as necessary to make changes.

12 When ready, click *Install* to begin the installation:

When the installation has completed, the Install Complete page is displayed:

13 Click *Done* to finish the installation.

14 For some necessary setup tasks, continue with Chapter 5, "Managing Virtual Machines," on page 83.

2.2 Starting and Logging In to the VM Client Interface

You can run the VM Client on both Windows and Linux workstations:

- Section 2.2.1, "Starting the Interface on a Windows Workstation," on page 16
- Section 2.2.2, "Starting the Interface on a Linux Workstation," on page 19

2.2.1 Starting the Interface on a Windows Workstation

1 On your Windows workstation, double-click the VM Client icon ( ) on your desktop to open the interface.

If you do not have the icon, the executable's location is determined by where you installed the VM Client software. The default is `C:\Program Files\Orchestrate VM Client 2.6\bin\vmclient.bat`.

For information on multiple VM operators logging in to the VM Client, see Section 3.2.1, "Multiple VM Operator Logins," on page 36.

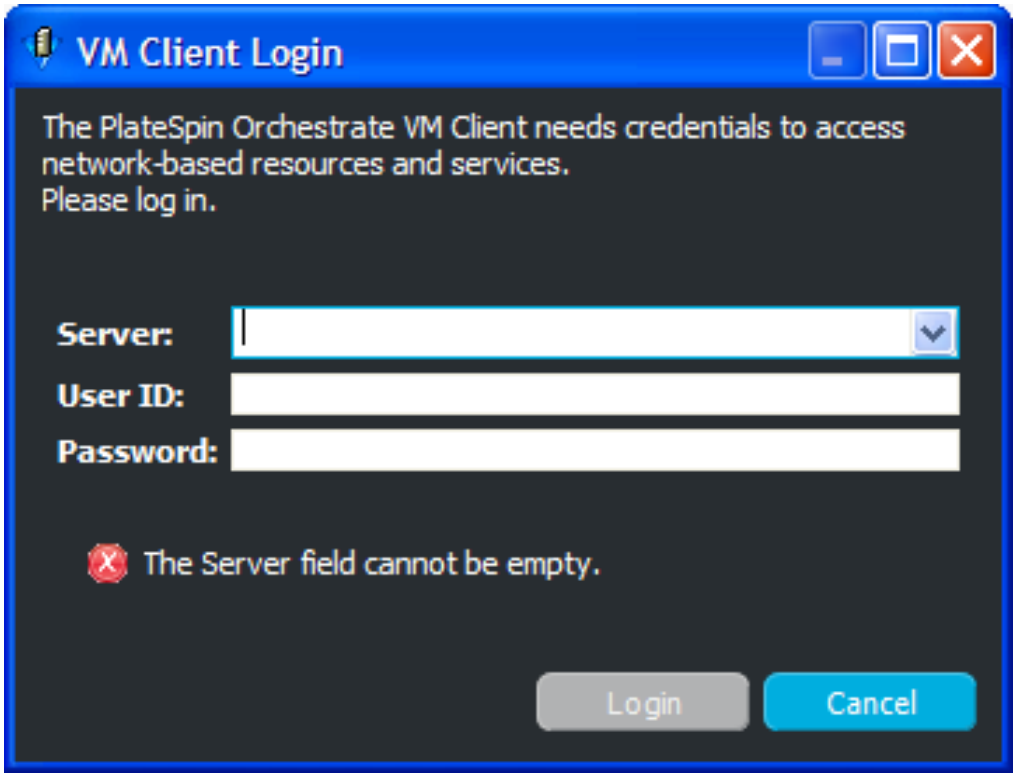
The first time you start the VM Client, the following Welcome page is displayed:

The Welcome page does not display the next time you log in to the VM Client.

The Welcome page can be accessed at any time by clicking *View* > *Show Welcome Page*.

For more information, see Section 3.1, “Understanding and Navigating the Welcome Page,” on page 28.

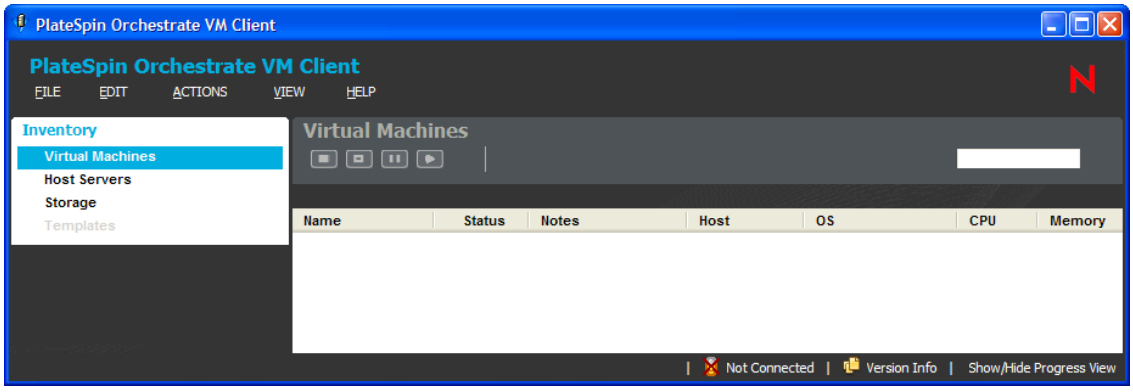
2 To close the Welcome page, click *Manage Your VMs* to display the following login dialog box:



3 Specify the IP address or DNS name of an Orchestration Server.

The Orchestration Server is associated with a virtualization grid, which can be associated with registered VM host servers. Therefore, logging in to one of the Orchestration Servers allows you to manage all VMs in the datagrid.

4 Enter a username and password to authenticate you as the administrator of the Orchestration Server, then click *Login* to view the VM Client interface:



This example shows how the interface looks the first time anyone logs in to the VM Client.

5 (Conditional) If this is the first time that anyone has logged in to the VM Client, continue with Section 2.4, “Registering VM Hosts,” on page 22 to set up the virtualization environment.

2.2.2 Starting the Interface on a Linux Workstation

1 On your Linux workstation, open a command terminal, change to the `/opt/novell/zenworks/vmmanagement/bin/` directory (the default installation location), or to wherever you installed the client, then enter the following command:

```
./vmclient.sh
```

For information on multiple VM operators logging in to the VM Client, see Section 3.2.1, "Multiple VM Operator Logins," on page 36.

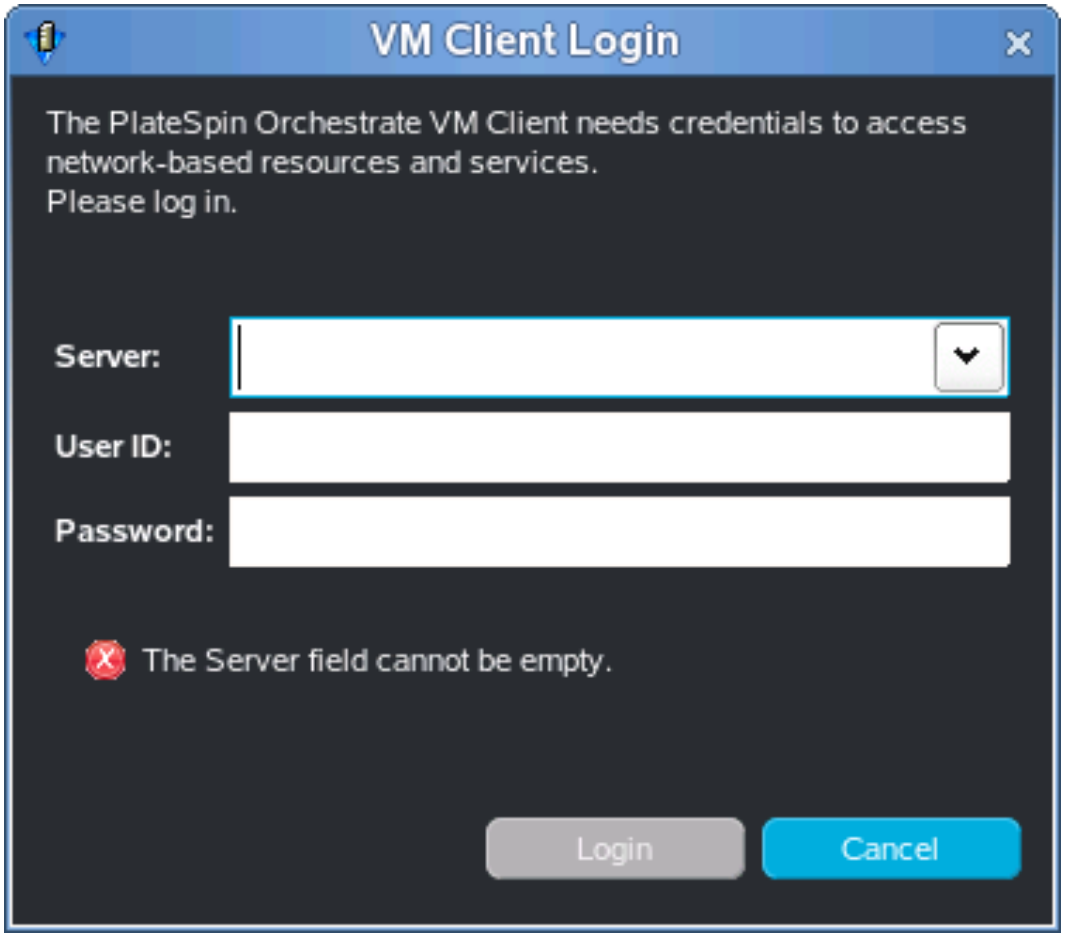
The first time you start the VM Client, the following Welcome page is displayed:

The Welcome page does not display the next time you log in to the VM Client.

The Welcome page can be accessed at any time by clicking *View* > *Show Welcome Page*.

For more information, see Section 3.1, "Understanding and Navigating the Welcome Page," on page 28.

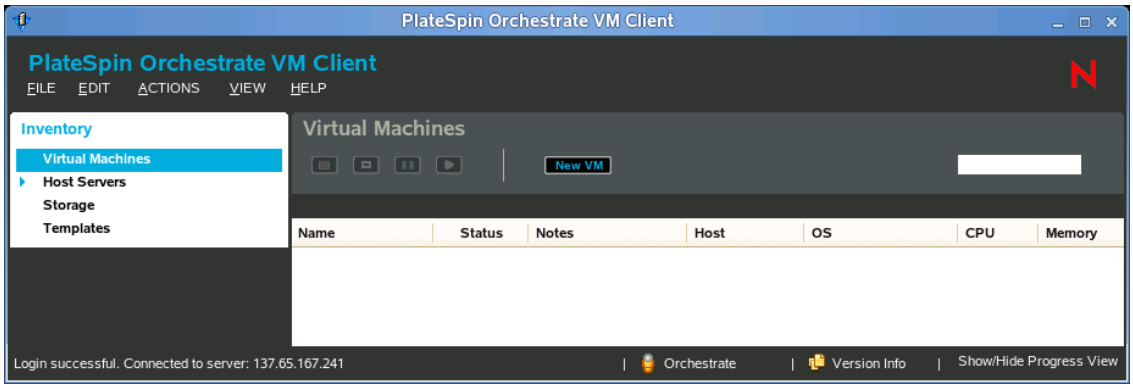
2 To close the Welcome page, click *Manage Your VMs* to display the login dialog box:



3 Specify the IP address or DNS name of a Orchestration Server.

The Orchestration Server is associated with a virtualization grid, which can be associated with registered VM host servers. Therefore, logging in to an Orchestration Server allows you to manage all VMs in the grid.

4 Enter a username and password to authenticate you as the administrator of the Orchestration Server, then click *Login* to view the VM Client interface:



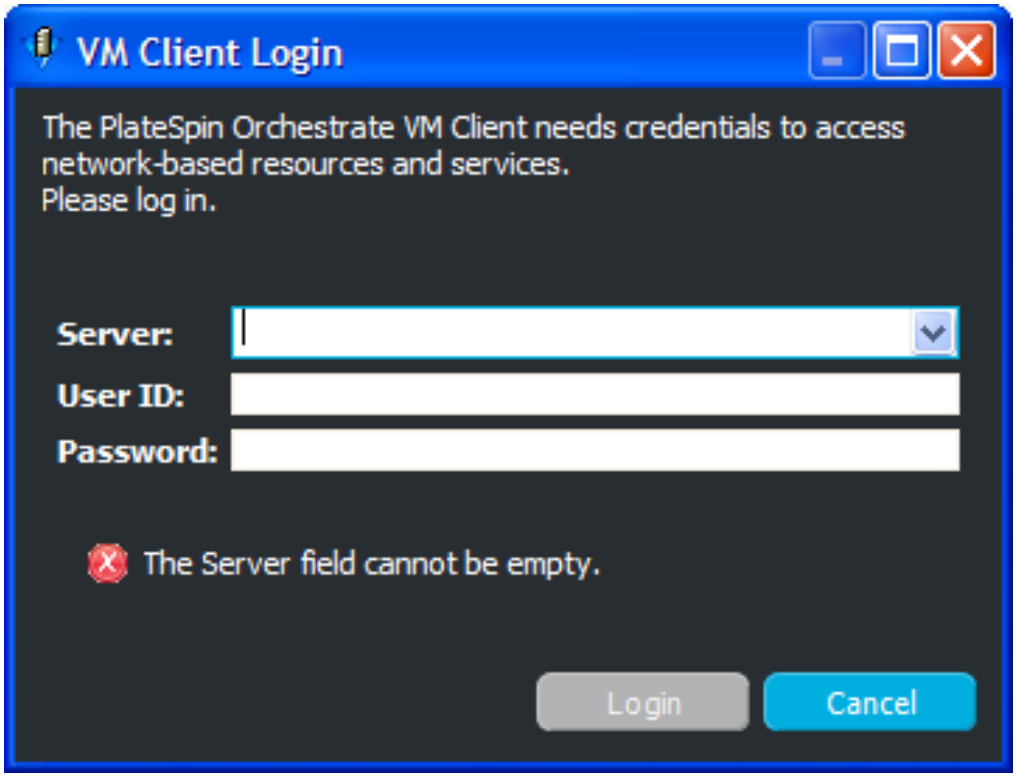
5 (Conditional) If this is the first time that anyone has logged in to the VM Client, continue with Section 2.4, “Registering VM Hosts,” on page 22 to set up the virtualization environment.

2.3 Logging In to Another Virtualization Grid

You can log in to a different Orchestration Server at any time for access to a different virtualization grid. However, you cannot be logged in to multiple Orchestration Servers. If you log in to another Orchestration Server, the previous login is replaced.

For information on multiple VM operators logging in to the VM Client, see Section 3.2.1, "Multiple VM Operator Logins," on page 36.

1 In the VM Client, click *File* > *Log In*.



If you are already logged in to a virtualization grid, you can press Ctrl+Shift+I to log in to a different datagrid.

2 Fill in the fields:

Server: Specify either the DNS name or IP address of the Orchestration Server.

User ID: Specify a username that has admin rights on the server.

Password: Specify this user's password.

3 Click *Login*.

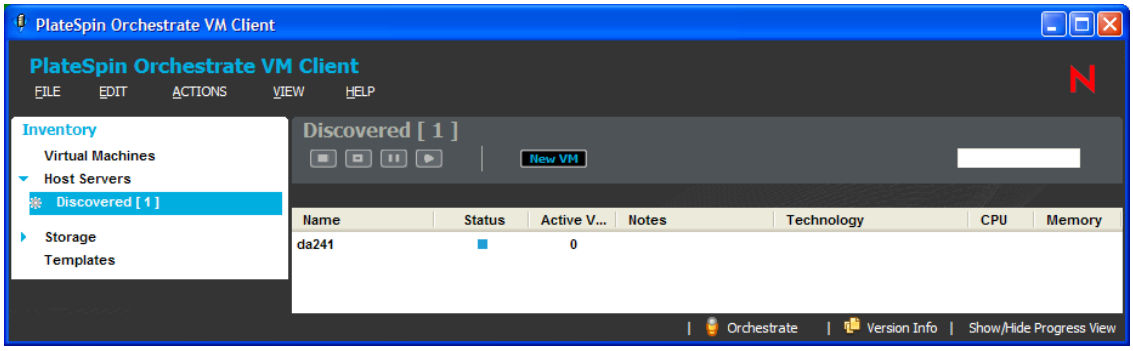
2.4 Registering VM Hosts

After being installed on a computing node, having its credentials defined, and associating itself with the computing node, the Orchestration Agent begins broadcasting the availability of its host as a potential computing resource. A host is defined as a machine running a supported hypervisor agent.

However, before the Orchestration Server can allow an agent to authenticate and establish ongoing communication, you need to create a resource account for the agent on the Orchestration Server. When this account is created or "registered," the agent's host node can be discovered and recognized as a computing resource that can perform the jobs assigned to it. In the Orchestration Console, you can choose to automatically or manually register a VM host server to the Orchestration Server by configuring the *Auto Register Agents* option (the *Resources* panel in the *Authentication* tab of the datagrid). If you choose to manually register to the Orchestration Server, the unregistered VM host servers are displayed in the VM Client. These hosts might or might not have a supported hypervisor installed and running on them.

To register the VM host servers:

1 In the VM Client, click *Host Servers* in the Inventory panel:



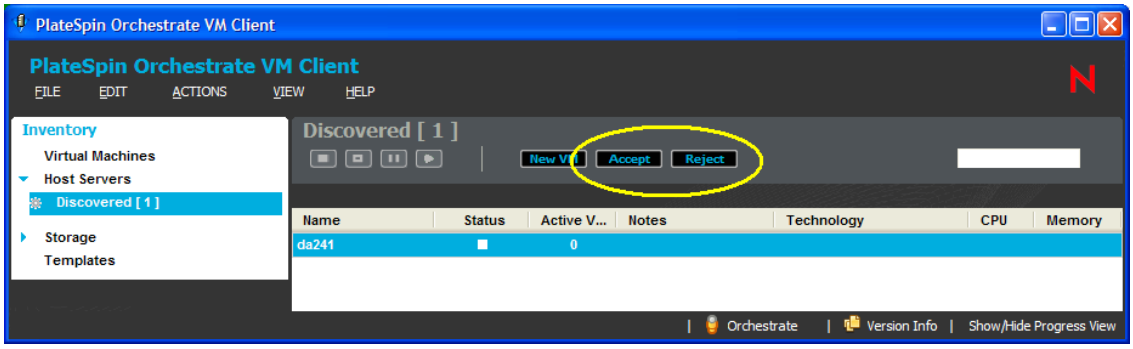
Discovered (#) is displayed below *Host Servers*, where # represents the number of host servers that are waiting to be registered with the Orchestration Server.

2 Click *Discovered (#)* to display the unregistered host servers in the details section on the right.

You can accept (see Step 3) or reject (see Step 4) any of the listed host servers. The host servers that you accept become part of your virtualization grid.

3 Accept an unregistered host server in one of the following ways:

- Select the server in the details view, then click the **Accept** button.
- Right-click the server in the details view, then select *Accept*.
- Select the server in the details view, then click *Actions* > *Accept*.



You can choose to register multiple host servers at a time.

After the host server has been registered with the Orchestration Server, it is listed with its operating system.

If the host server does not become registered after a few minutes, run the *Discover Hosts* job from the *Action* menu.

4 (Optional) To reject the registration of a host server, do one of the following:

- Select the server in the details view, then click the **Reject** button.
- Right-click the server in the details view, then select *Reject*.
- Select the server in the details view, then click *Actions* > *Reject*.

The unregistered server is removed from the Host Servers.

The next time that an unregistered host server attempts to register to the Orchestration Server, the rejected servers are again listed as candidates for acceptance into the virtualization grid.

5 Click the *Storage* view.

The only repositories shown are ZOS and the host's local repository. ZOS is the shared datagrid repository for all hosts to use in storing templates. For information on repositories, see Chapter 6, "Managing Repositories," on page 135. For information on templates, see Chapter 7, "Managing Templates," on page 149.

6 To discover whether there are other VM hosts in the datagrid, continue with Section 2.5, "Discovering Registered VM Hosts," on page 23.

2.5 Discovering Registered VM Hosts

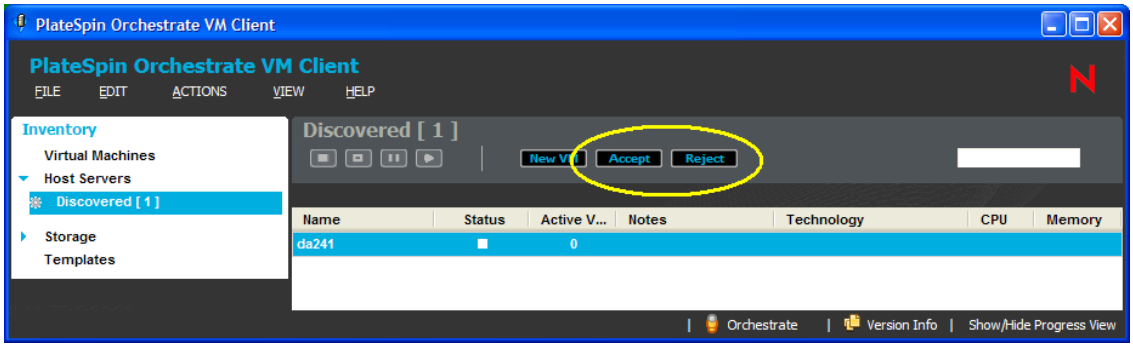
When you first install the VM Client, it is not aware of all of the possible registered VM hosts in the virtualization grid that you log in to. The discovery process finds all hosts that have a supported hypervisor installed and running on them.

You should discover these hosts before continuing to use the product. You should discover hosts before attempting to discover VMs so that any VMs belonging to a particular host can be discovered.

Before discovering the VMware technology-based hosts, ensure that the appropriate policies have been configured in the Orchestration Console. For more information on configuring the policies, see "Configuring VM Provisioning Adapters and Discovered VMs" in the *NetIQ Cloud Manager 2.0 VM Orchestration Reference*.

To discover the existing registered VM hosts:

1 In the VM Client, click *Actions* > *Discover Hosts*.



All the registered VM hosts that are in the virtualization grid and that have hypervisors installed are displayed.

2 To discover any VMs belonging to the VM hosts that you discovered, continue with Section 2.6, "Discovering VMs of the Registered VM Hosts," on page 24.

2.6 Discovering VMs of the Registered VM Hosts

You can use the VMs you have previously created or the VMs you have built by using other hypervisors in your data center. To make use of these VMs, you need to run a discover job. You use the VM Client to detect the VMware ESX, Microsoft Hyper-V, VMware Server, VMware Virtual Center, and SUSE Xen VM host machines. After you have detected the host machines, you can detect the VMs contained on the host machines and in other VM storage repositories.

The only VMs that are automatically discovered are those that are stored in the default location of `/var/lib/xen/images`, unless an Orchestration repository is created that represents an alternative storage location.

Before discovering the VMware technology-based VMs, ensure that the appropriate policies have been configured in the Orchestration Console. For more information on configuring the policies, see "Configuring VM Provisioning Adapters and Discovered VMs" in the *NetIQ Cloud Manager 2.0 VM Orchestration Reference*.

To discover the VMs belonging to the registered VM Hosts:

1 In the VM Client, click *Actions* > *Discover Virtual Machines*.

2 To accept the discovered VMs, continue with Section 2.7, "Registering VMs," on page 24.

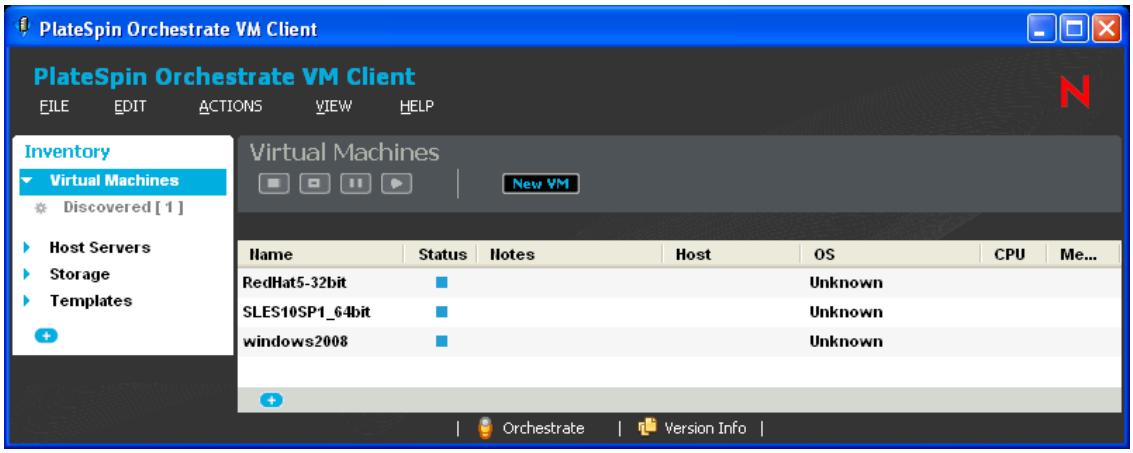
2.7 Registering VMs

If you install the Orchestration Agent on a VM, it must then be registered (accepted) in order to be managed in the VM Client.

In the Orchestration Console, you can choose to automatically or manually register a VM to the Orchestration Server by configuring the *Auto Register Agents* option (the *Resources* panel in the *Authentication* tab of the datagrid). If you choose to manually register to the Orchestration Server, the unregistered VMs are displayed in the VM Client in the *Discovered (#)* group.

To register a VM:

1 In the VM Client, double-click the *Virtual Machines* view.



Discovered (#) is displayed below *Virtual Machines*, where # represents the number of VMs that are waiting to be registered with the Orchestration Server.

2 Click *Discovered (#)* to display the unregistered VMs in the details section on the right.

You can accept (see Step 3) or reject (see Step 4) any of the listed VMs that were discovered. The VMs that you accept become part of your virtualization grid.

3 Accept a discovered VM in one of the following ways:

- Select the VM in the details view, then click the **Accept** button.
- Right-click the VM in the details view, then select *Accept*.
- Select the VM in the details view, then click *Actions* > *Accept*.

You can choose to register multiple VMs at a time.

After a VM has been registered, it is listed with its operating system.

It can take a few minutes for this acceptance process to be completed. Do not proceed with using the VMs until the acceptance process is complete.

4 (Optional) To reject a VM, do one of the following:

- Select the VM in the details view, then click the **Reject** button.
- Right-click the VM in the details view, then select *Reject*.
- Select the VM in the details view, then click *Actions* > *Reject*.

The unregistered VM is removed from the Virtual Machines list.

The next time that an unregistered VM attempts to register to the Orchestration Server, the rejected VMs are again listed as candidates for acceptance into the datagrid.

If the VM is running, you can tell whether a VM has the Orchestration Agent installed on it by whether there are pie charts in its *CPU* and *Memory* columns.

3 Understanding the VM Client Interface

The Cloud Manager VM Client interface, built on an Eclipse-based rich client platform, uses a graphical user interface (GUI) to help you create, store, edit, and use VMs. This interface can be installed on both Windows and Linux administration devices.

Review the following sections for tips on navigating and using the VM Client interface:

- Section 3.1, “Understanding and Navigating the Welcome Page,” on page 28
- Section 3.2, “Understanding the VM Client Window,” on page 35
- Section 3.3, “Using the Error Log,” on page 59
- Section 3.4, “Using the Progress View,” on page 63
- Section 3.5, “Resetting the VM Client Perspectives,” on page 64
- Section 3.6, “Changing the VM Client Theme,” on page 65

3.1 Understanding and Navigating the Welcome Page

The Welcome page provides basic information on the VM Client. By default, it is displayed when you first open the VM Client. Thereafter, you can access the Welcome page using *View* > *Show Welcome Page*.

Figure 3-1 *The VM Client Welcome Page*

Starting the VM Client from your desktop icon or the program's executable does not automatically log you in to the VM Client. This Welcome Page is available without authenticating.

To authenticate, click the *Manage Your VMs* button on the Welcome page to open the VM Client Login dialog box.

The Eclipse-based VM Client GUI allows you to detach any section from the main VM Client window. For example, you can click within the Welcome page and drag it to another location on your desktop. This can also be done with various other sections in the VM Client, such as the *Progress View* and *Error Log* sections.

The VM Client window is resizable, as are any sections that can be dragged out of the VM Client window. Sections can also be resized within the full VM Client window.

Review the following sections for other navigation tips:

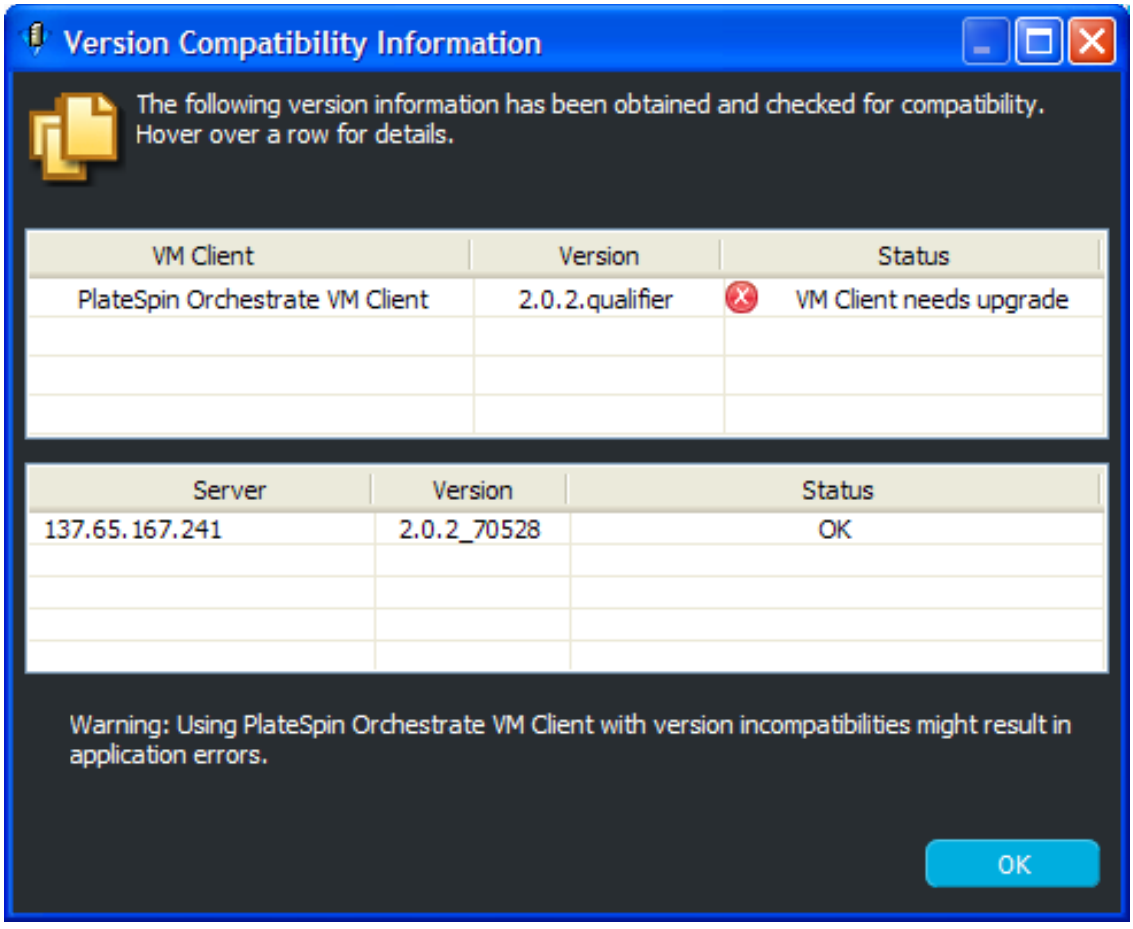
- Section 3.1.1, "Welcome Page Main Menu Options," on page 29
- Section 3.1.2, "Welcome Page Buttons," on page 33

3.1.1 Welcome Page Main Menu Options

The main VM Client menu options are available at the top of the Welcome page, but only those that are applicable are enabled:

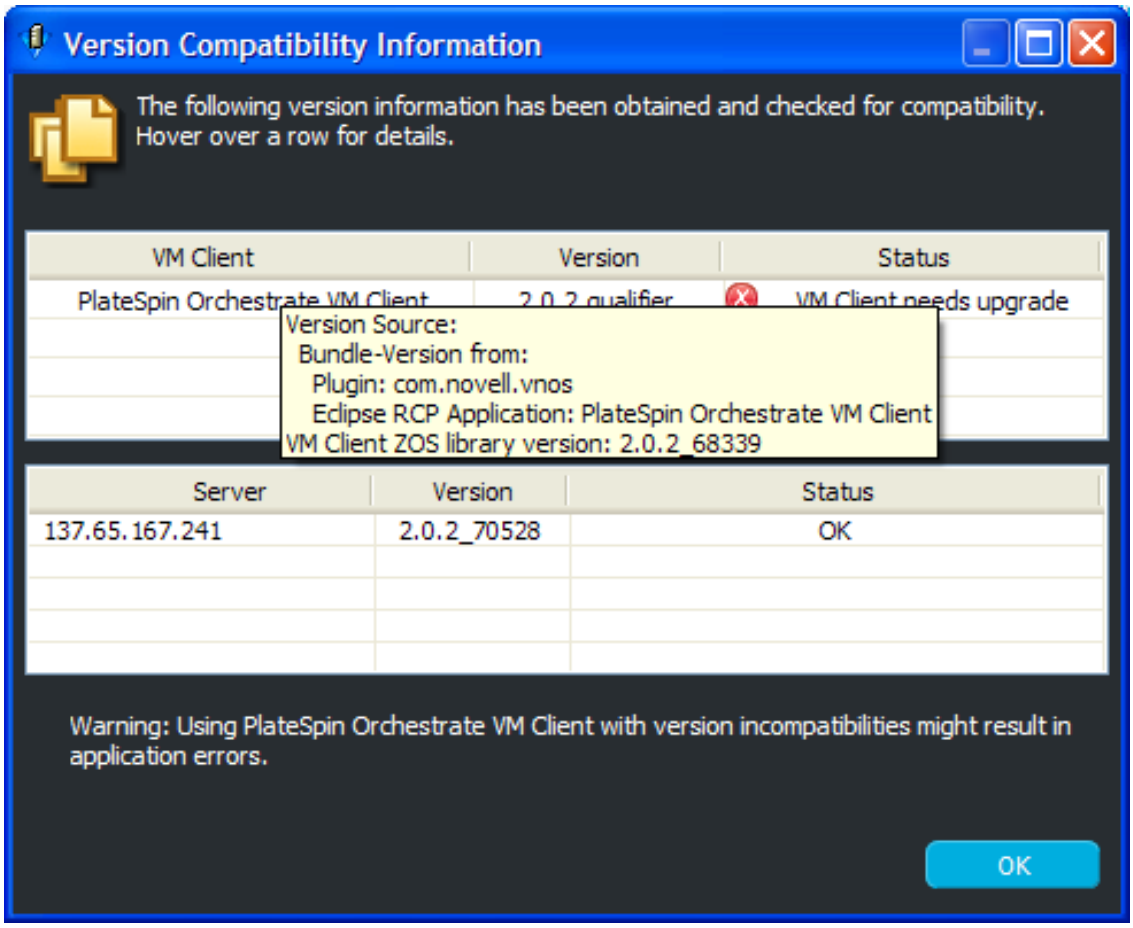
- *File* > *Exit*: Closes the VM Client interface.

  Closing the VM Client interface does not affect the status of any VMs, meaning that the VMs that have processes running, such as cloning, starting, moving, and so on, continue to run those processes. These processes are jobs that are being run on the servers hosting the VMs.
- *View* > *Show Welcome Page*: Displays the Welcome page.
- *View* > *Show Inventory Views*: Displays the Inventory panel. For more information, see Section 3.2, "Understanding the VM Client Window," on page 35.
- *View* > *Change Theme*: Opens the Change Theme dialog box, where you can change the VM Client's appearance. For more information, see Section 3.6, "Changing the VM Client Theme," on page 65.
- *Help* > *Version Information*: Opens the following dialog box:



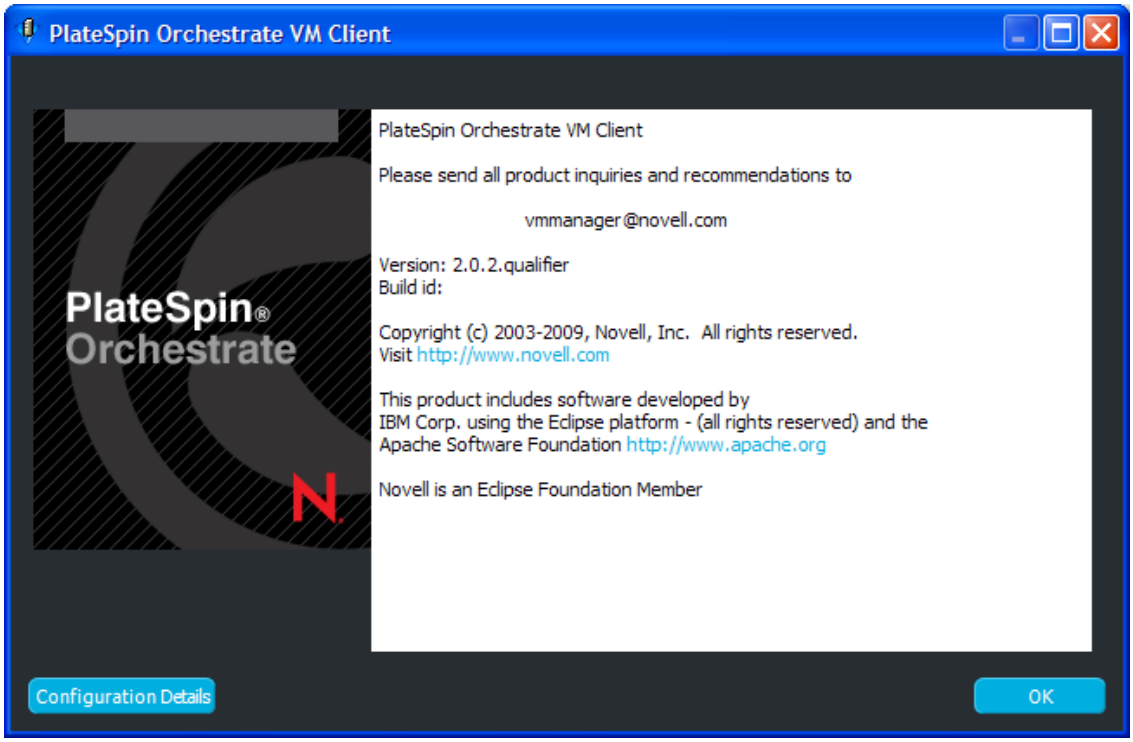
This provides software compatibility information that you might need to know when the software is not working correctly.

To view more details for an entry, mouse over its row:

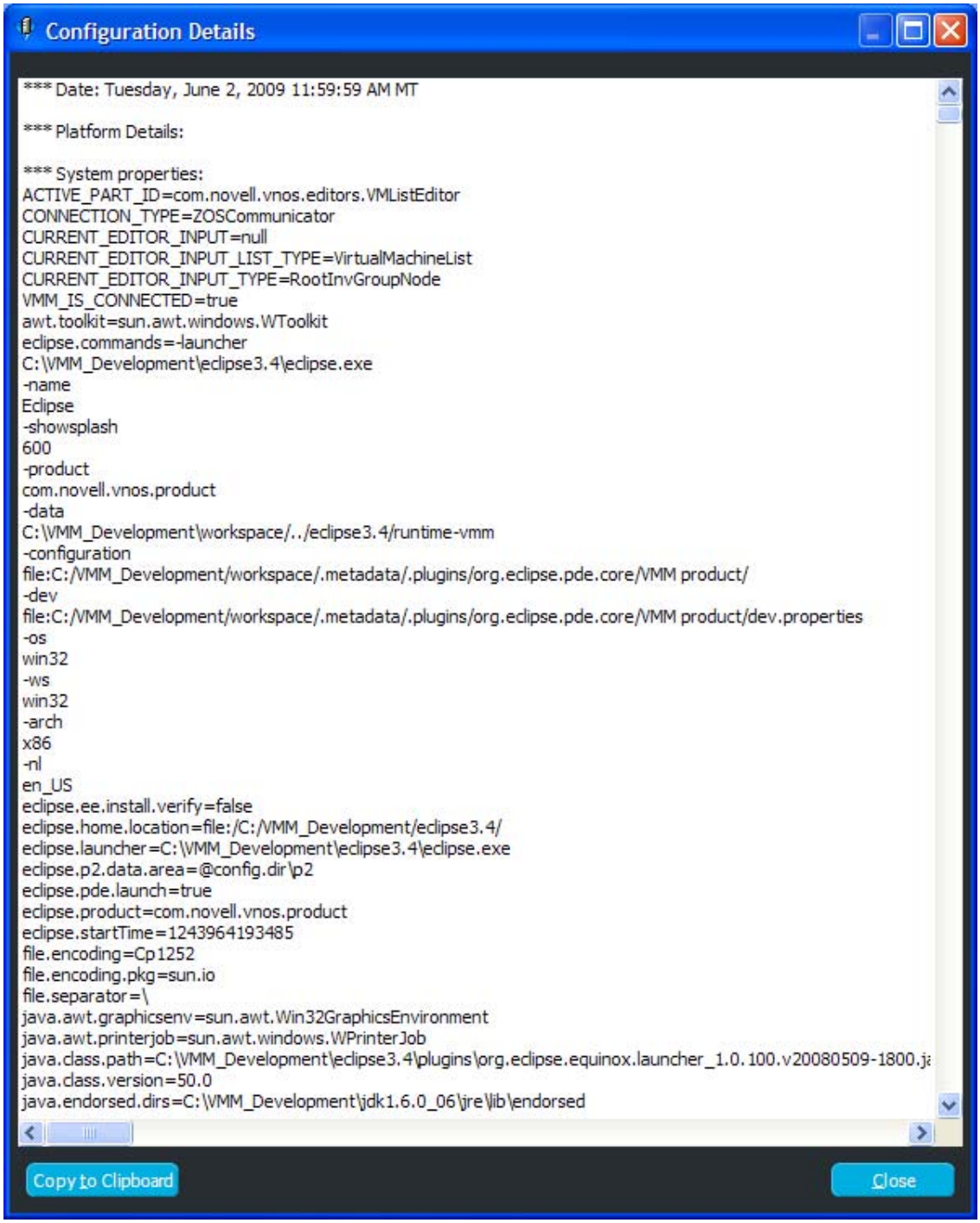


- *Help* > *Readme*: Opens the product Readme in your default Web browser.
- *Help* > *VM Client Reference and Guide*: Opens the product documentation for the VM Client in your default Web browser.
- *Help* > *How to Use This Guide*: Opens a section of the product documentation in your default Web browser and provides a list of things you can do in the VM Client. The list is ordered in a tutorial fashion.
- *Help* > *Index*: Opens a quick index to hard-to-find VM Client information in your default Web browser.

- *Help* > *About Cloud Manager VM Client*: Displays the following dialog box:



The *Configuration Details* button opens the following dialog box where you can copy the text-based configuration information to your operating system's clipboard for further use.



3.1.2 Welcome Page Buttons

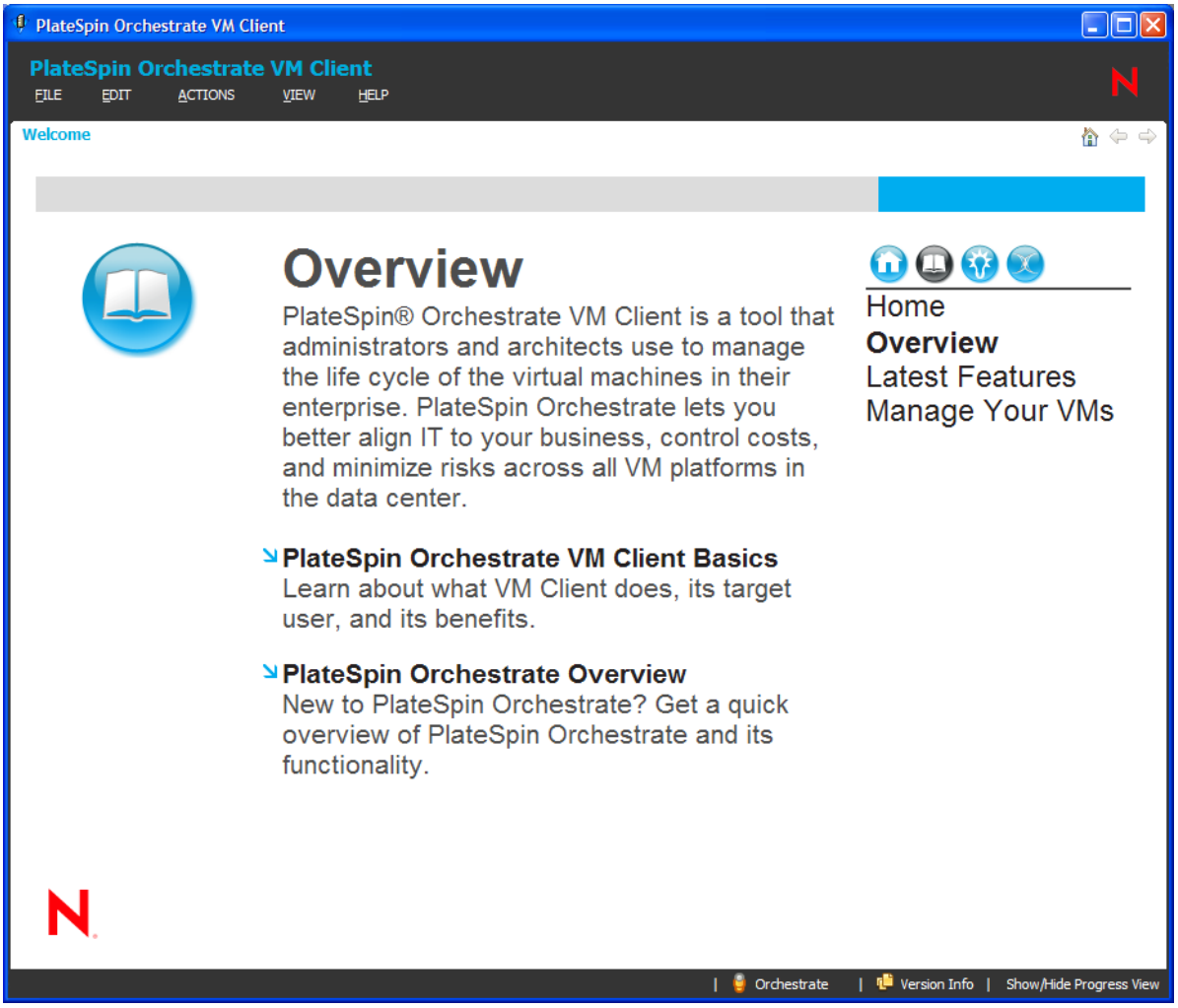
The following buttons are available on the Welcome page:

- "Overview" on page 33
- "Latest Features" on page 34
- "Manage Your VMs" on page 35

Overview

The *Overview* button provides the following information:

Figure 3-2 *Welcome Page Overview*



To navigate to the other locations on the Welcome page, you can use the links in the upper right of the Overview page.

Latest Features

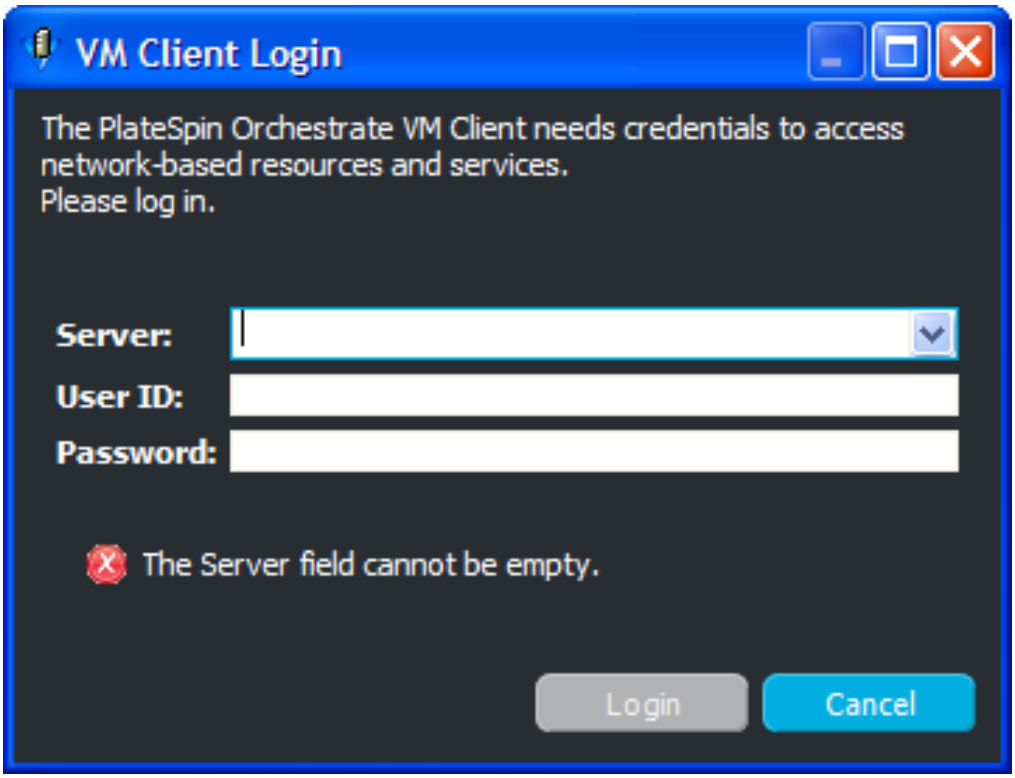
The *Latest Features* button provides the following information:

Figure 3-3 *Welcome Page Latest Features*

Manage Your VMs

The *Manage Your VMs* button opens the VM Client Login dialog box:

Figure 3-4 *The VM Client Login Dialog Box*



For more information on logging in to the VM Client, see Section 2.3, “Logging In to Another Virtualization Grid,” on page 21.

3.2 Understanding the VM Client Window

Review the following sections for an understanding of the VM Client window:

- Section 3.2.1, “Multiple VM Operator Logins,” on page 36
- Section 3.2.2, “Customizing the VM Client Sections,” on page 37
- Section 3.2.3, “Navigating the VM Client Window,” on page 40
- Section 3.2.4, “Sorting, Searching, and Filtering Lists,” on page 51
- Section 3.2.5, “Viewing Additional Information in Fields or Cells,” on page 57

3.2.1 Multiple VM Operator Logins

Multiple VM operators can each be running an instance of the VM Client that is logged in to the same VM virtualization grid. In other words, multiple VM operators can simultaneously manage the VMs on a particular virtualization grid. When any VM operator performs an action against a VM Client object, all VM Clients that are opened to that virtualization grid are updated accordingly.

Because multiple VM operators can be performing actions independently of each other, the VM Client interface automatically updates the appropriate locations in its window, such as displaying a new VM in everyone's VM Client when it is created by one VM operator.

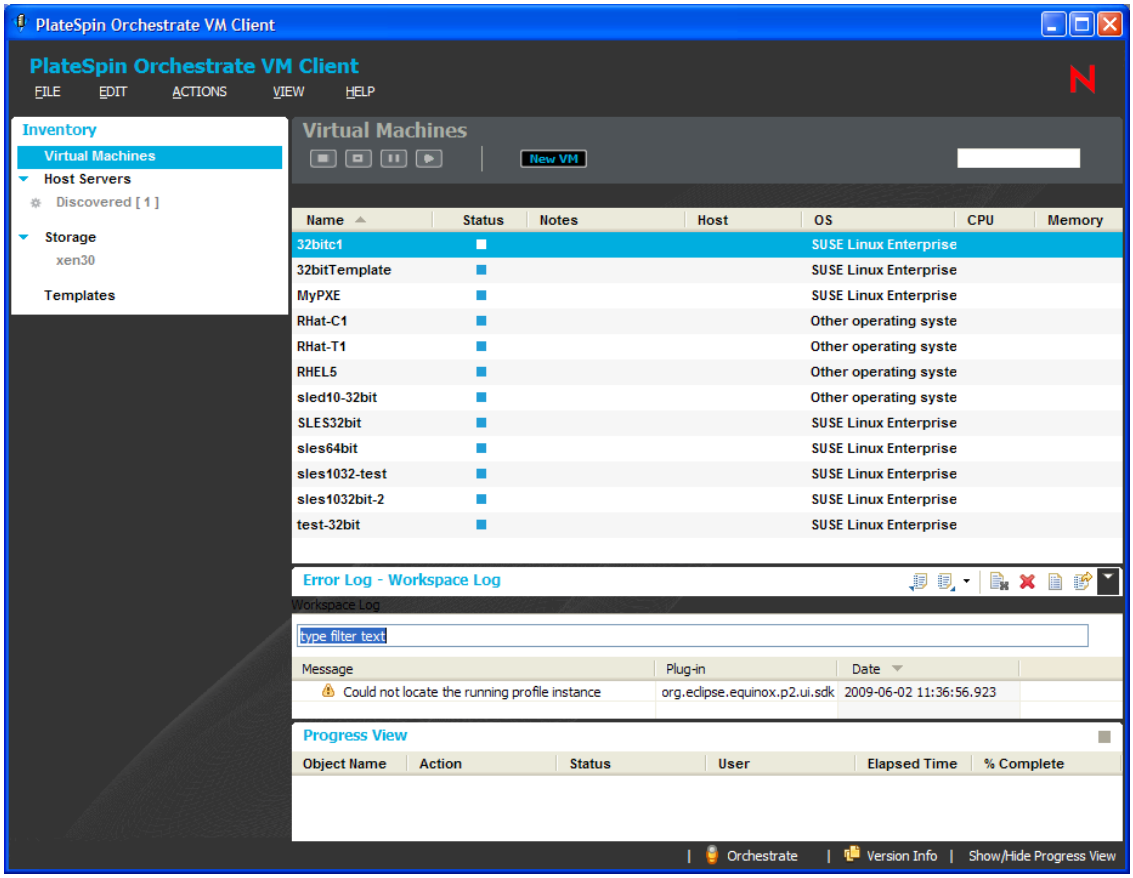
Various functions in the VM Client have set polling intervals for displaying new information. These polling intervals determine how quickly one VM operator's VM Client instance shows another VM operator's actions. For example, starting a VM displays that action in the *Progress View* section in just a few seconds, while it might take up to 30 seconds to show the start action for the VM in the other VM operators' *Virtual Machines* list.

For information on creating multiple login IDs for VM operators, see Appendix D, "Adding User Logins for VM Operators," on page 201.

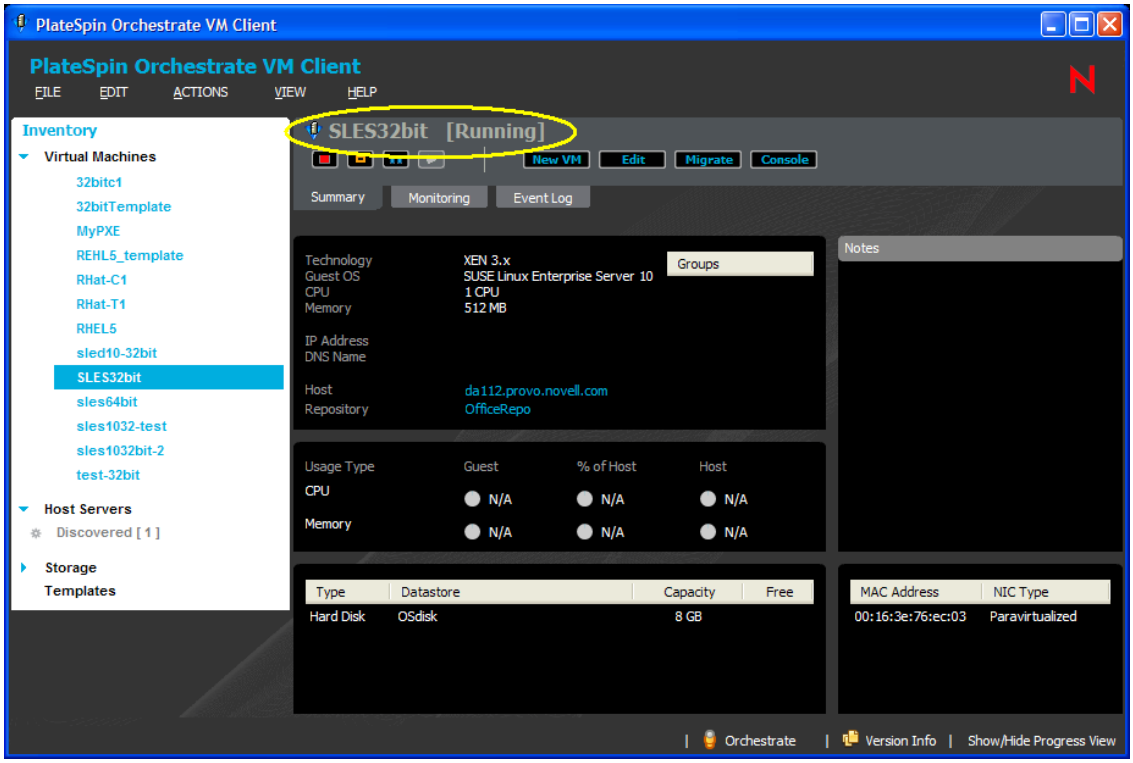
3.2.2 Customizing the VM Client Sections

You can do several things to customize the sections in the VM Client. Any changes you make are remembered the next time you start the VM Client.

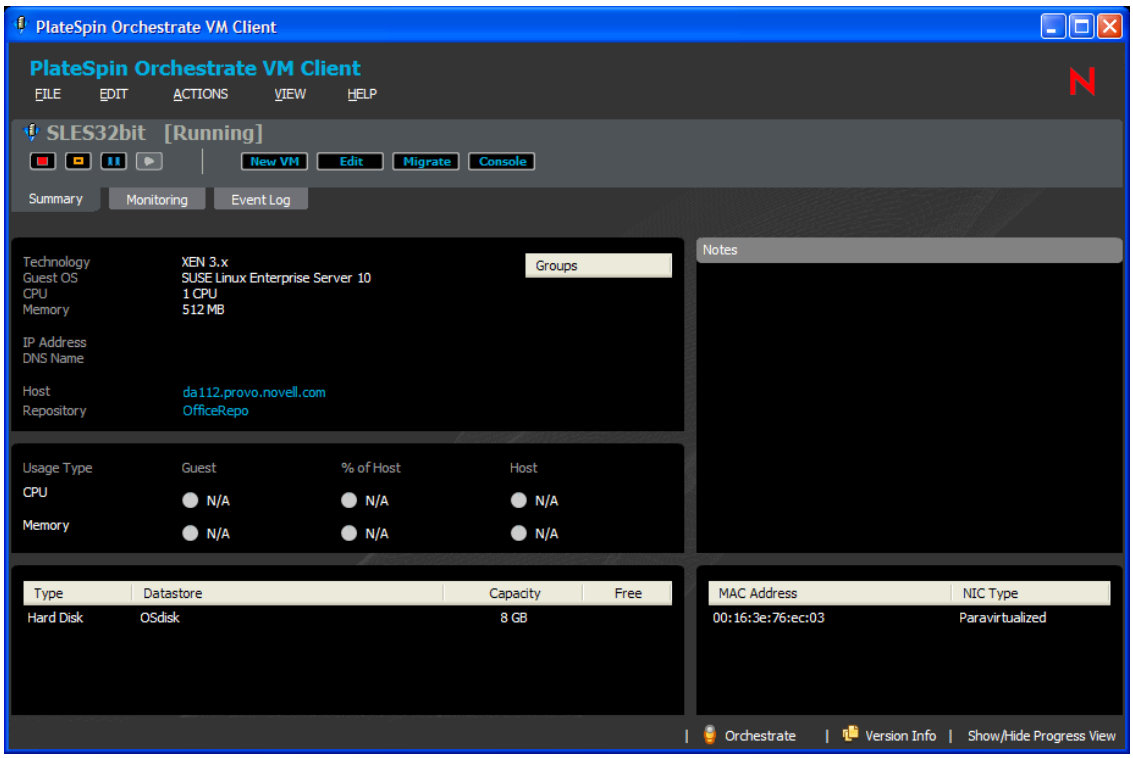
- **Tiling:** Multiple editors can be open at the same time. Select the status bar of an editor and drag it to a different position in the VM Client window to create the tiling effect. This can provide quicker access when you revisit an editor. For example:



- **Maximizing Views:** You can maximize a details tab view by double-clicking the VM or host server's name that is located just above the buttons. For example, click here:

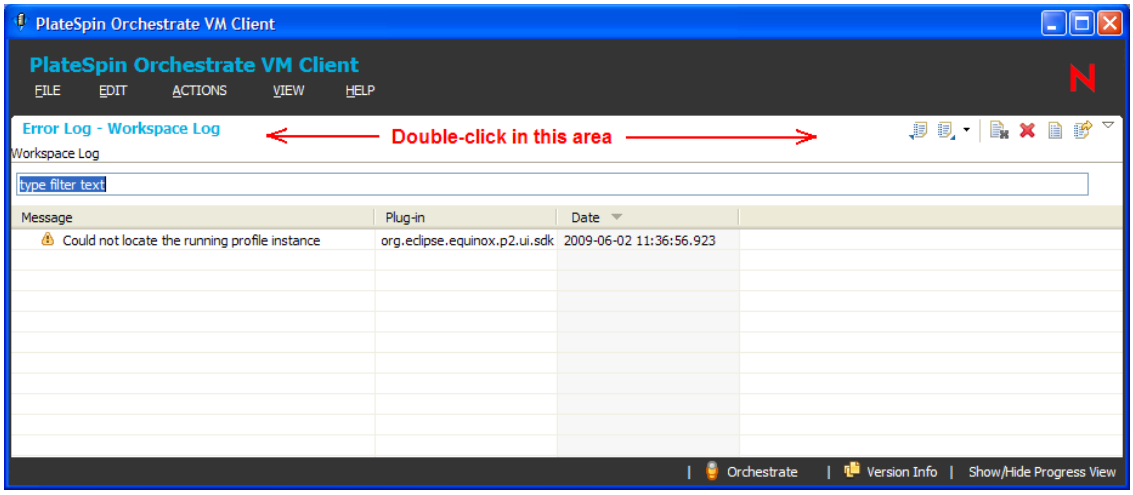


to display:

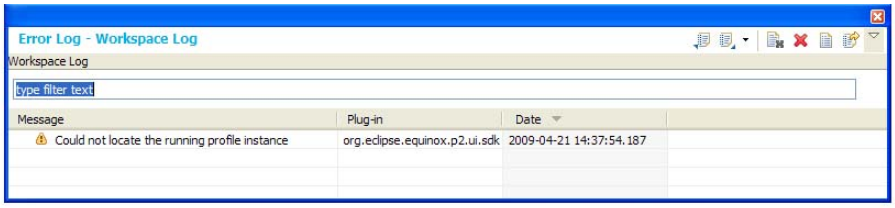


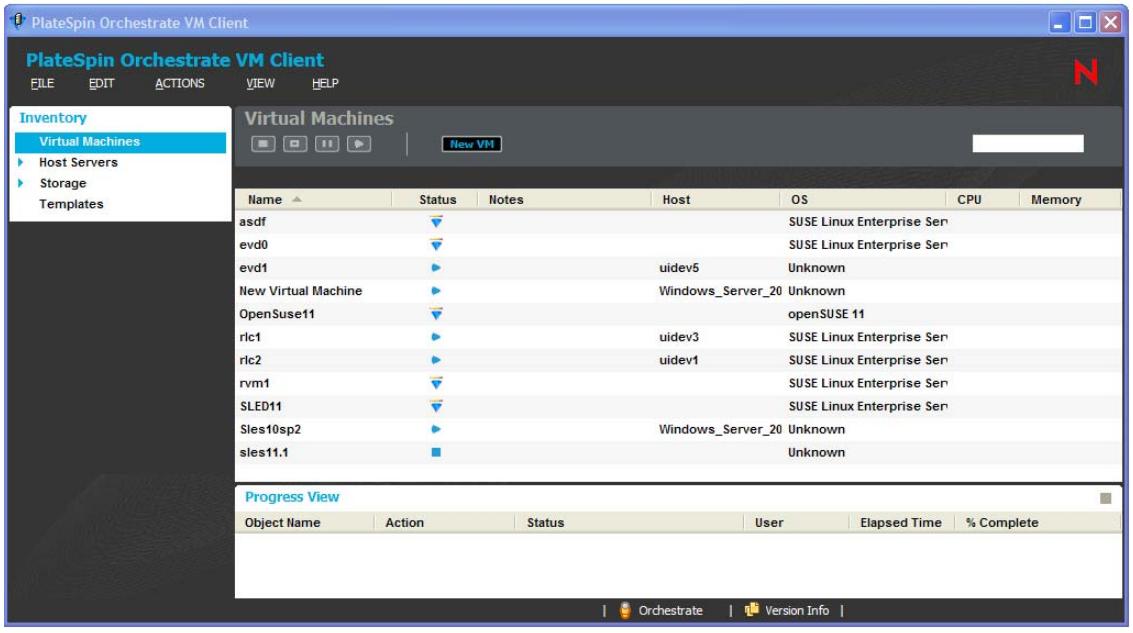
To return to the previous unmaximized view, double-click the VM or host server's name again.

You can also maximize or minimize the *Progress View* or *Error Log* sections by double-clicking in the white area next to the *Error Log* or *Progress View* section's title:

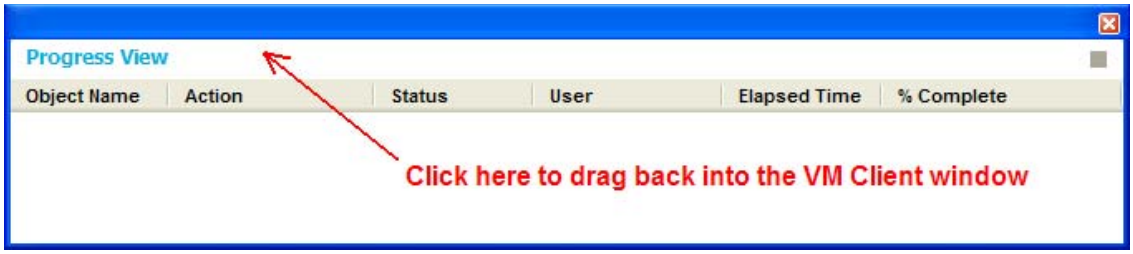


- **Dragging:** You can drag sections (such as *Progress View* or *Error Log*) out of the VM Client window to another position on your desktop. You can also drag sections to different locations within the VM Client window. For example, the following illustrates that the *Error Log* section has been dragged outside of the VM Client window:





To move sections around, click in the white area and drag the section to its new location, either within the VM Client window, or outside of it:



You can close a view that has been dragged outside of the main VM Client window by clicking the in the upper-right corner of the window. To close a view that is contained within the VM Client window, click *View* > *Close Progress View* or click *View* > *Close Error Log*.

- **Returning to Defaults:** To reset any changes that you have made to the positions of sections, click *View* > *Reset Perspective*, which returns everything to the default organization of the VM Client window.
- **Keystrokes and Mouse Clicks:** The following functions are available in the VM Client:

Function	Action
Minimize or maximize of a section in the VM Client window	◆ Double-click the status bar ◆ Press the Spacebar or Enter key ◆ Press the Left-arrow or Right-arrow key
Go to the next or previous node	◆ Press the Left-arrow or Right-arrow key
Go to the next or previous sibling node	◆ Press the Tab or Shift+Tab keys
Open further details on a clickable details item	◆ Double-click a details item, such as a line in the *Event Log* tab that has the icon, to view further details on the event entry.

NOTE: When you make a change to a field in the VM Client, then exit the field by pressing Enter or changing focus to another field or option, the change made to the field is automatically saved. This is different from the Orchestration Console, where you must click *File* > *Save* to retain changes to fields.

3.2.3 Navigating the VM Client Window

Review the following to understand the two main VM Client views:

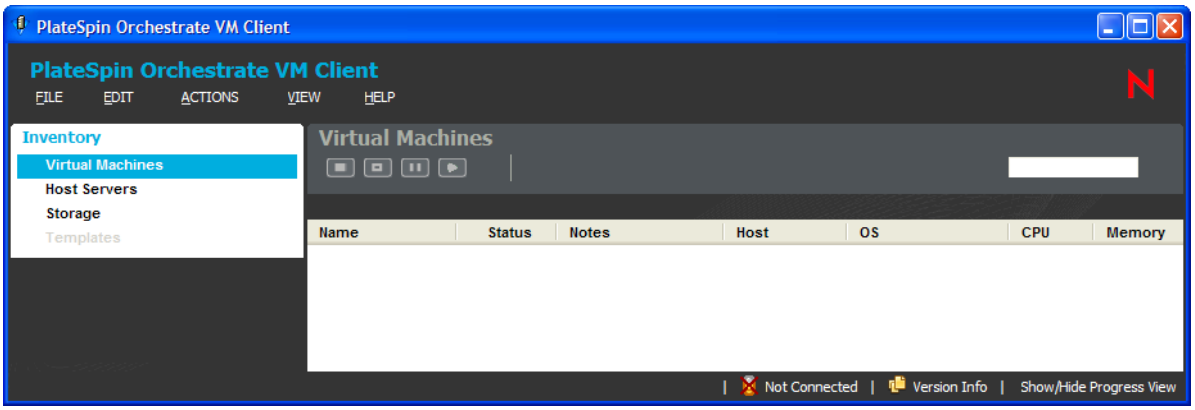
- "Inventory Lists" on page 41
- "Inventory Details" on page 49

For information on the *Progress View* and *Error Log* sections, see Section 3.4, "Using the Progress View," on page 63 and Section 3.3, "Using the Error Log," on page 59.

Inventory Lists

When you first log in to the VM Client, the following view is displayed:

Figure 3-5 *The VM Client Inventory Panel - Initial View*



The Inventory panel on the left contains four links in its navigation area:

- *Virtual Machines*
- *Host Servers*
- *Storage*
- *Templates*

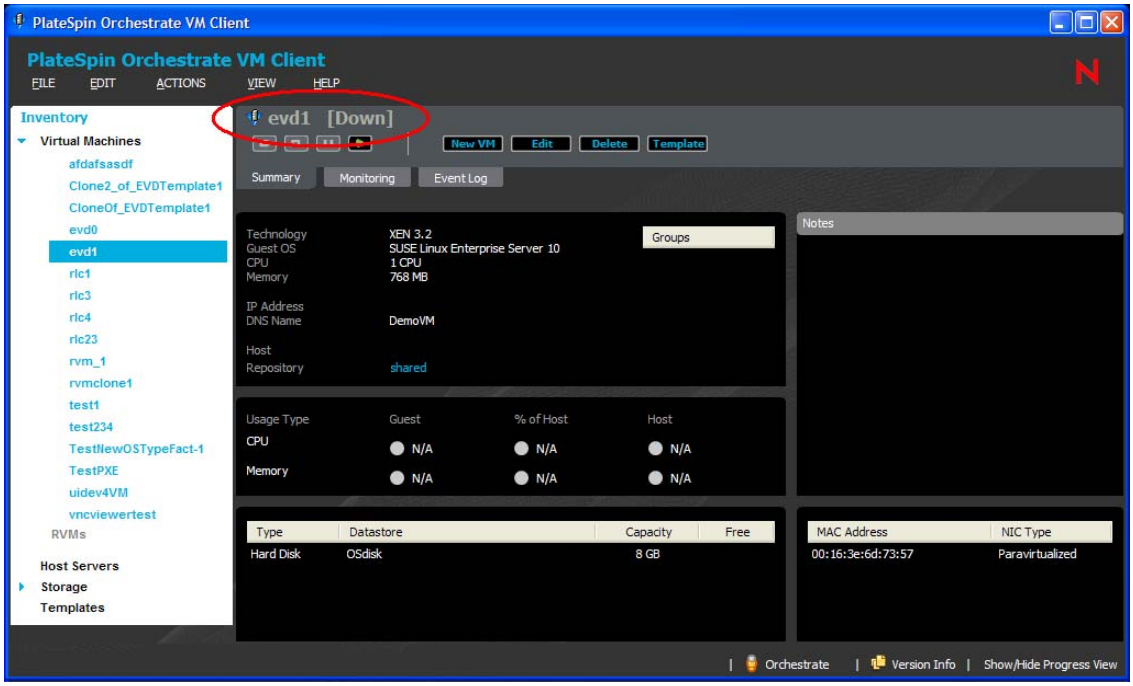
Each of these four links lists the available items, such as known VMs, known host servers, known repositories, and any templates that you have created from the VMs. By default, the *Virtual Machines* list is initially displayed when you log in.

When you double-click an item in a list, its details tabs are displayed (see "Inventory Details" on page 49), usually with the *Summary* tab selected. However, if you click an item that has one of the following states, its *Event Log* tab is selected instead:

- In progress (icon). This icon represents that an action is currently ongoing, such as those described in Section 5.3, "Virtual Machine Actions," on page 98.
- Installing (icon). Used to indicate that a VM is being installed.
- Unknown (? icon). Indicates that the VM Client and Orchestration Server are out of sync, so that the VM's state is unknown. You need to resynchronize the VM.

The following describes the various features of the VM Client window:

- **Inventory item's title area:** This area provides information for what is being viewed, including an icon to indicate which type of resource is being viewed, and square brackets to indicate any action or viewing condition that is in effect. For example, the following indicates where the Inventory item's title area is located:

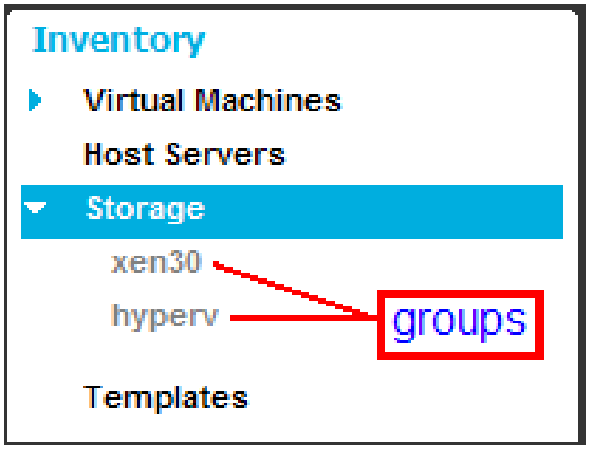


In this case, the icon indicates that `evd1` is a VM name, and `[Down]` indicates its current status. Other icons that can appear in this title area:

	Host server
	Repository
	Template

If a list is being filtered, `[Filtered]` is displayed.

- **Groups:** Each of the four Inventory panel items can have groups listed under them:

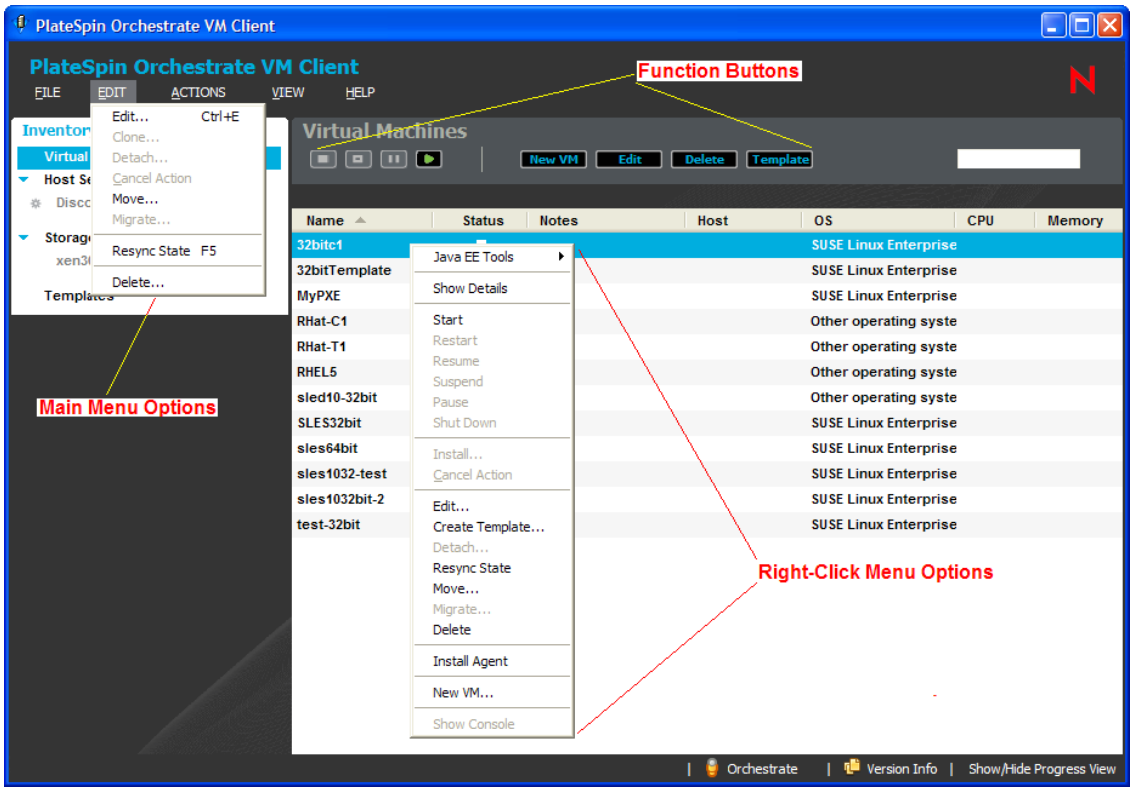


The

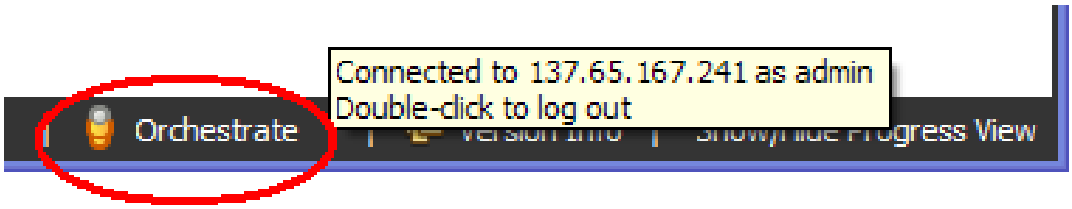
icon indicates that one or more groups exist. Click the icon to display the groups. For more information on using groups, see Chapter 9, "Managing with Groups," on page 171.

When you first log in to the VM Client, the *Virtual Machines* or *Host Servers* sections are automatically expanded to display a *Discovered* group if there are newly discovered VMs or host servers that you have not yet accepted into the virtualization grid. Click the group to show the candidates in the right panel. For information on managing them, see Section 2.4, "Registering VM Hosts," on page 22.

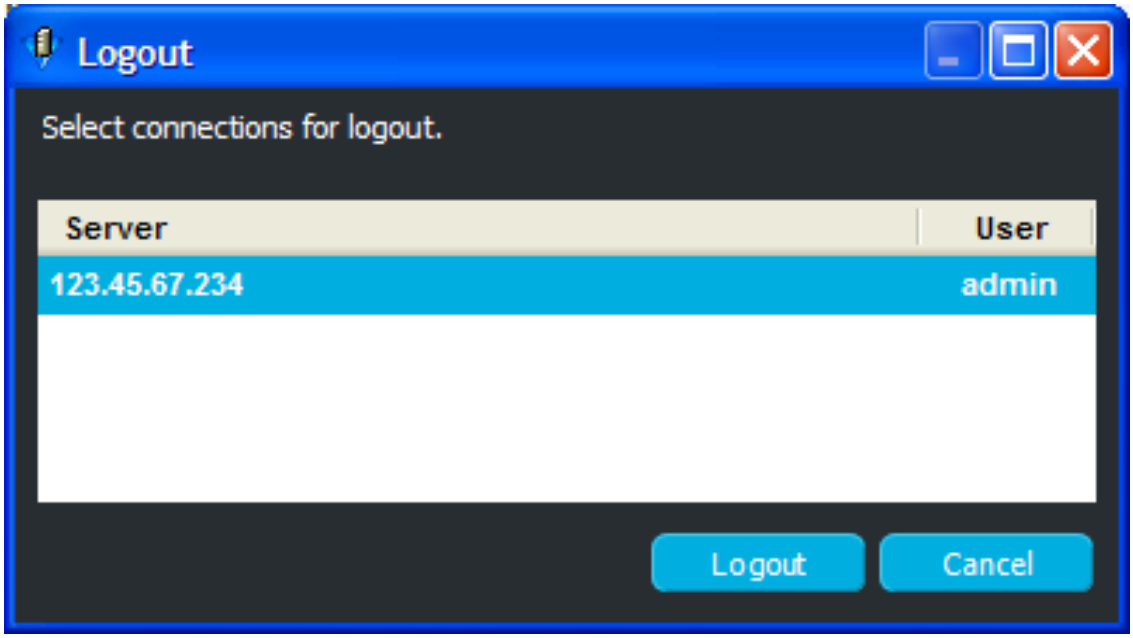
- **Available Options:** For each of the Inventory sections, items listed in the right panel have various main menu options, right-click menu options, and function buttons displayed, not displayed, enabled, or disabled according to the item's status.



- **Column Sorting:** You can sort the various columns of information alphanumerically. Simply click a column heading to sort it in ascending or descending order. The ▲ or ▼ arrows indicate which column was last sorted and whether it was sorted in ascending or descending order. For more information, see "Sorting Lists" on page 52.
- **Logging In/Out:** Mouse over the *Orchestrate* icon to display which host server you are logged in to:

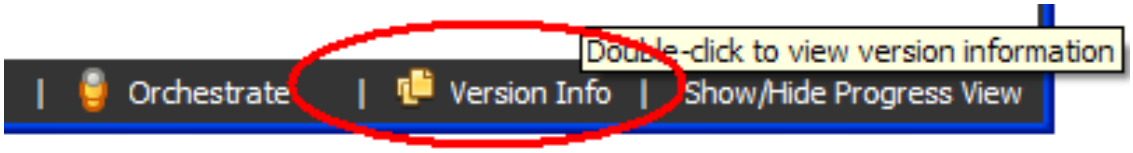


Double-click the icon to log out of that host server and the VM Client:

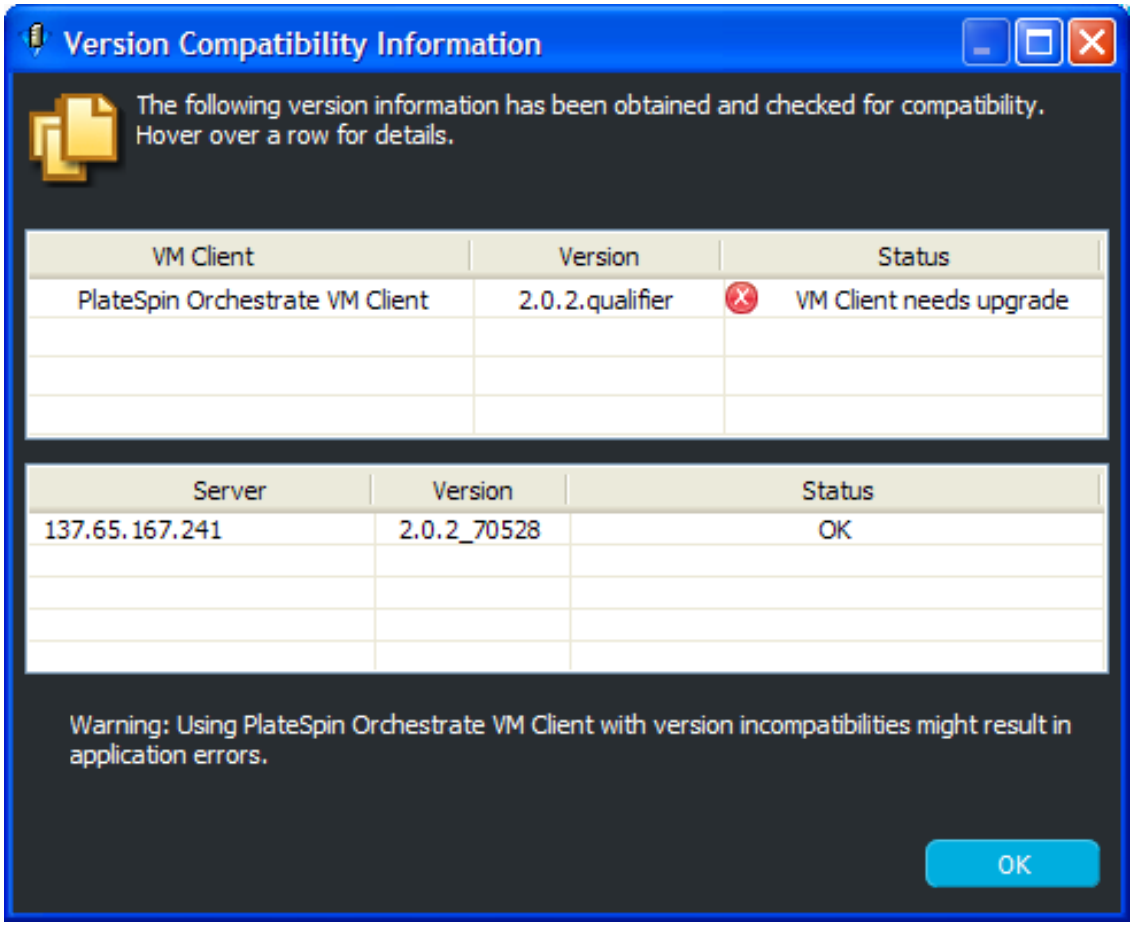


This option is always available.

- **Version Information:** To access the Version Compatibility dialog box, double-click the *Version Info* icon:



This is the same dialog box that clicking *Help* > *Version Information* accesses:

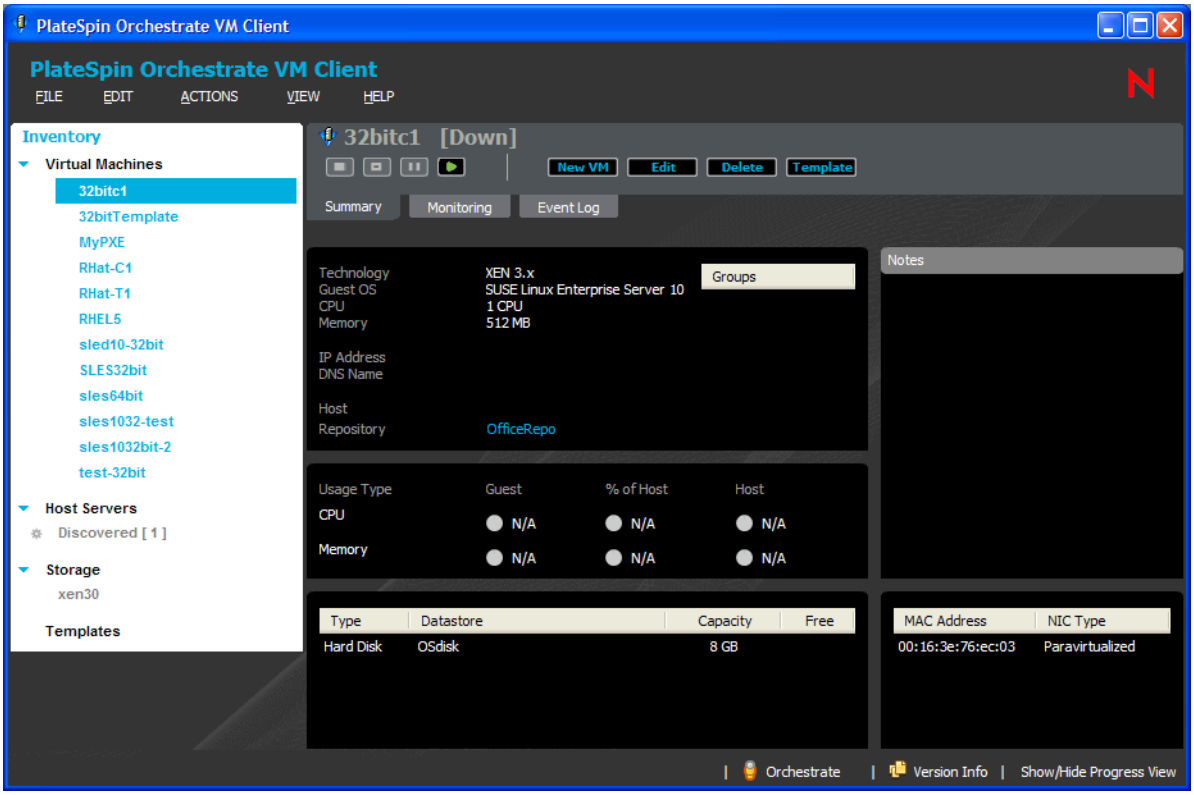


This option is also available for the Inventory details views.

Inventory Details

In each of the four Inventory sections you can display detailed information by either double-clicking an item or right-clicking it and selecting *Show Details*. For example, double-clicking a VM displays its details tabs:

Figure 3-6 *Virtual Machines Details Tabs*



In the Figure 3-6 example, the VMs that were listed to the right of the Inventory panel are now listed on the left within the panel. The details tabs that are displayed are for the VM that is selected in the Inventory panel list. This allows you to navigate the details tabs per VM more quickly.

This same functionality exists for the other three Inventory items.

You can easily navigate between the different Inventory types' details tabs. For example:

- While viewing the details of a VM, you can double-click a host server or repository name that is listed in the first section on the VM's *Summary* tab to display the details tabs for the host or repository instead of the VM's tabs. The Inventory panel on the left remains unchanged. This allows you to return to the VM's details tabs by simply clicking the VM name in the Inventory panel list.
- Conversely, you can view the details of a host server or a repository, then double-click a VM's name in the details to display the VM's details tabs. You can return to the host or repository by simply clicking its name in the Inventory panel list.

You can navigate through the details for each Inventory item by using the tabs, such as those illustrated in Figure 3-6. Each Inventory type has the *Summary* and *Event Log* tabs plus other tabs particular to its own details.

Tab viewing is sticky, meaning the last tab that you viewed for an item is displayed again when you return to that item.

The *Event Log* tab provides access to details on the status of any jobs that have been run or are running, no matter which VM operator initiated the action. You can open multiple views for logging information. Figure 3-7 and Figure 3-8 provide some examples:

Figure 3-7 *Event Log Tab with Event Log Dialog Box and Mouse-Over Display of Detailed Information*

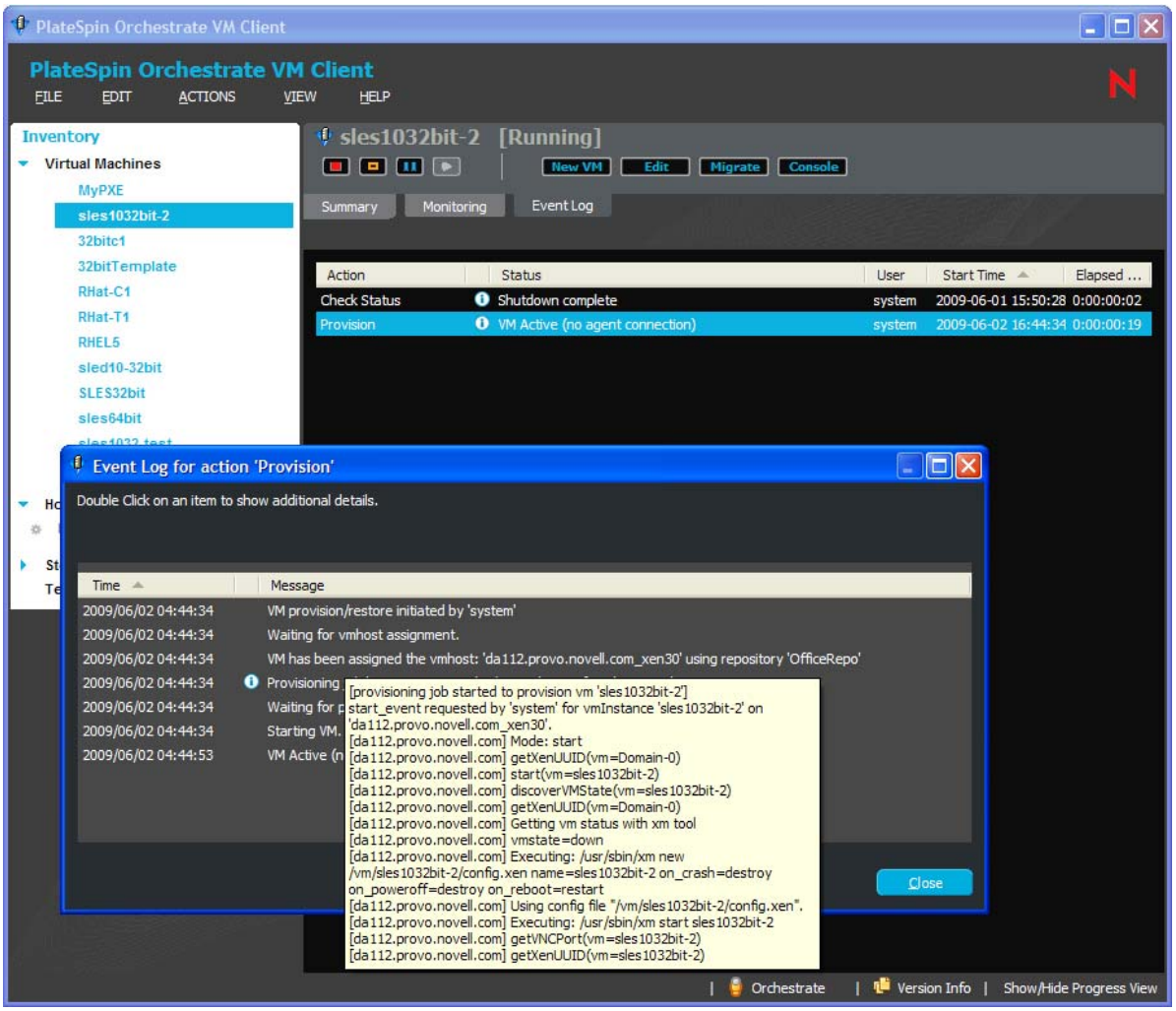
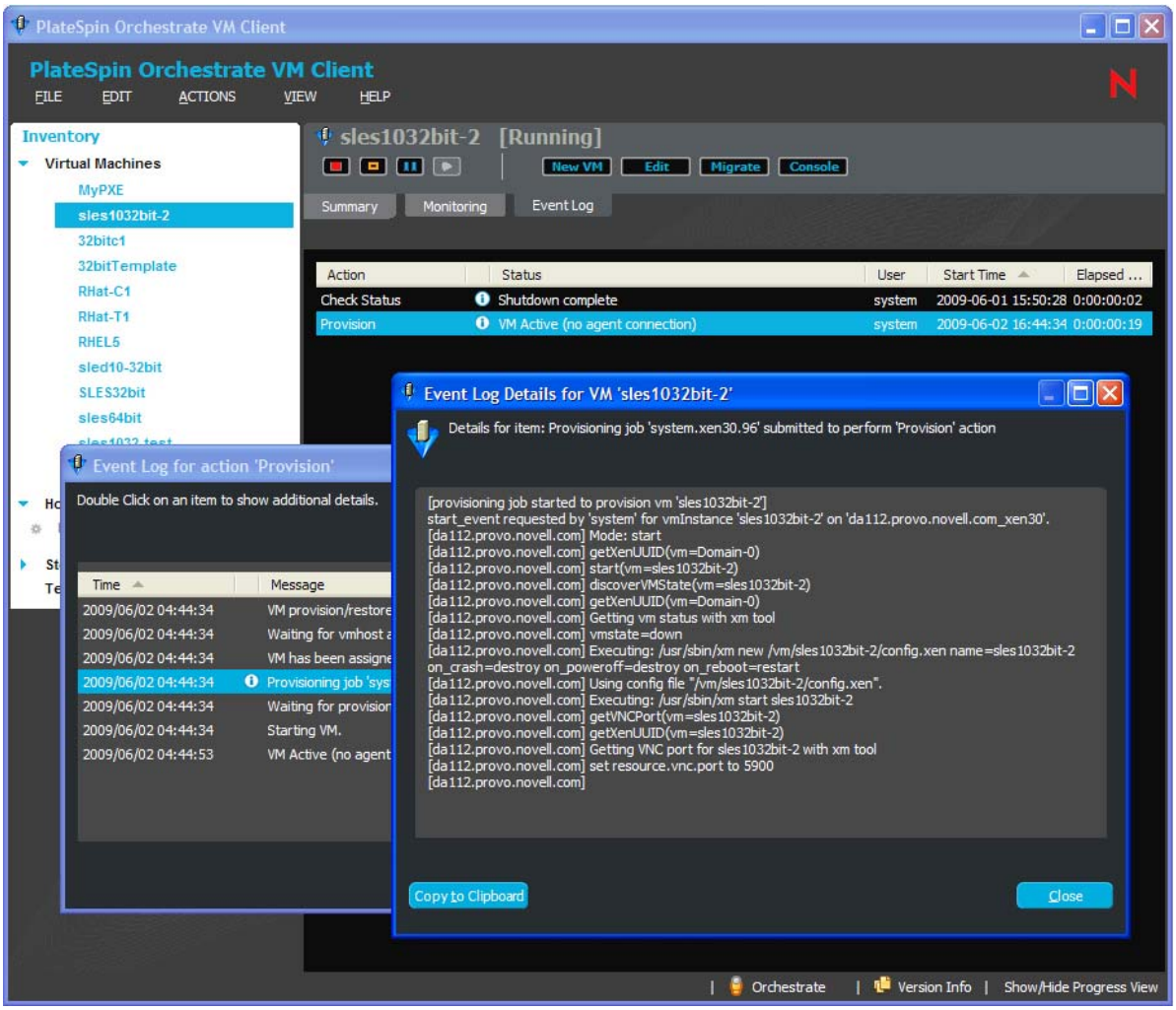


Figure 3-8 *Event Log Tab with Event Log and Event Log Details Dialog Boxes*



For more information, see "Using Feedback to Manage VMs" on page 87.

For information on using and editing information in each of the details tabs, see the applicable sections in:

- Section 4.2, "Viewing and Editing Host Server Details," on page 69
- Section 5.1, "Viewing and Editing VM Details," on page 83
- Section 6.2, "Viewing and Editing Storage Details," on page 136
- Section 7.1, "Viewing and Editing Template Details," on page 149

3.2.4 Sorting, Searching, and Filtering Lists

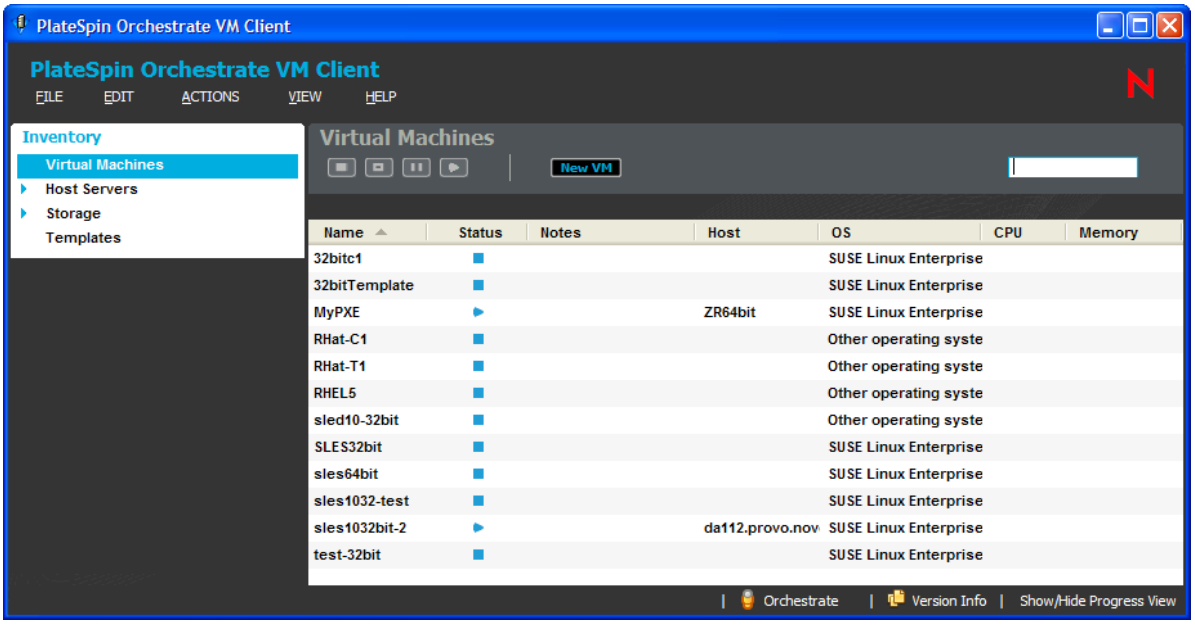
You can manage information in the VM Client by using lists in the following ways:

- "Sorting Lists" on page 52
- "Filtering Lists" on page 54
- "Locating Items in a List" on page 55

Sorting Lists

Any list in the VM Client can be sorted alphanumerically in an ascending or descending order by clicking the column heading. You can sort rows of information by any column. Most lists default to sorting alphabetically on the first column. For example:

Figure 3-9 *VMs Sorted by Name*



VMs, host servers, repositories, and templates are sorted alphanumerically by default. If there are multiple VM operators and one of them adds new objects to a list, the items are correctly sorted according to each VM operator's preference.

For all lists, the most recently sorted column displays its current sort order with an arrow (or). This is per instance of the VM Client; VM operators do not see each others' sorting changes.

Sorting in the VM Client provides benefits such as the following:

- **Technology groups:** Sorting is available wherever lists exist in the VM Client. You can sort any listed information by various technology groups.
- **Virtual Machines' Status column:** Sorting allows you to group the VMs by their status type icons in the following order:

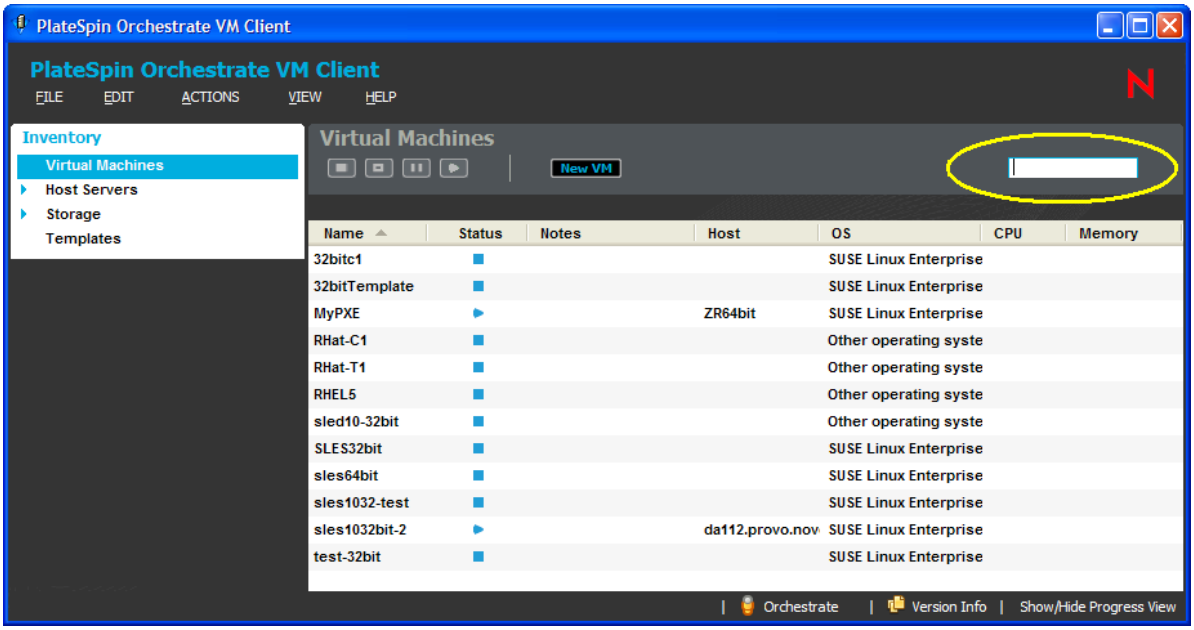
- **Virtual Machines' Host column:** Sorting is a quick way to determine which VMs are running or in a progress state. It also quickly indicates which servers are hosting VMs.
- **Host Servers' Active VMs column:** Sorting is a quick way to determine the most and least active host servers.
- **Host Servers' CPU or Memory columns:** Sorting is a quick way to determine your host servers' utilization if the Orchestration Agent and Monitoring Agent are installed and running on them.
- **Storage's Stored VMs, Type, Capacity, and Free columns:** Sorting might help you in selecting repositories for new VMs, viewing how many repositories you have by type, and determining which repositories are most or least utilized.
- **Templates' # Clones column:** Sorting can show which templates have clones when you have more templates than can be listed in the window.
- **Templates' Location column:** Sorting can show the location that most templates are using.
- **Templates' OS column:** Sorting helps you to find templates by their defined operating system.
- **Templates' Technology column:** Sorting shows which technologies are used most by the templates.
- **Templates' CPUs and Memory columns:** Sorting orders templates by their capacities.
- **Event Log's Action column:** Sorting allows you to group actions so that you can more quickly find a particular action in a long list of actions.
- **Event Log's Status column:** Sorting allows you to more quickly locate a particular status in a long list of statuses.
- **Event Log's User column:** Sorting allows you to view log entries by the user who initiated the actions.
- **Event Log's Start Time column:** Sorting allows you to view the list from either the latest or earliest log posts.
- **Event Log's Elapsed Time column:** Sorting makes it easier to locate time-consuming events.

- **Progress View section's Action column:** Sorting allows you to group actions so that you can find a particular action.
- **Progress View section's Status column:** Sorting allows you to group statuses so that you can quickly discover problem statuses.
- **Progress View section's User column:** Sorting makes it easier to discover how many actions are being initiated by each user.
- **Progress View section's Elapsed Time column:** Sorting helps you to discover actions that might be taking too long.
- **Progress View section's % Complete column:** Sorting shows which actions have longer to complete.

Filtering Lists

You can shorten any list by filtering on its items. This function is best used when you have a very long list and some of the items contain the same characters. This way, you can display only the few items that you want to focus on. For example, you might have a list of VMs similar to the following:

Figure 3-10 *VM Client Showing the Filter Field*

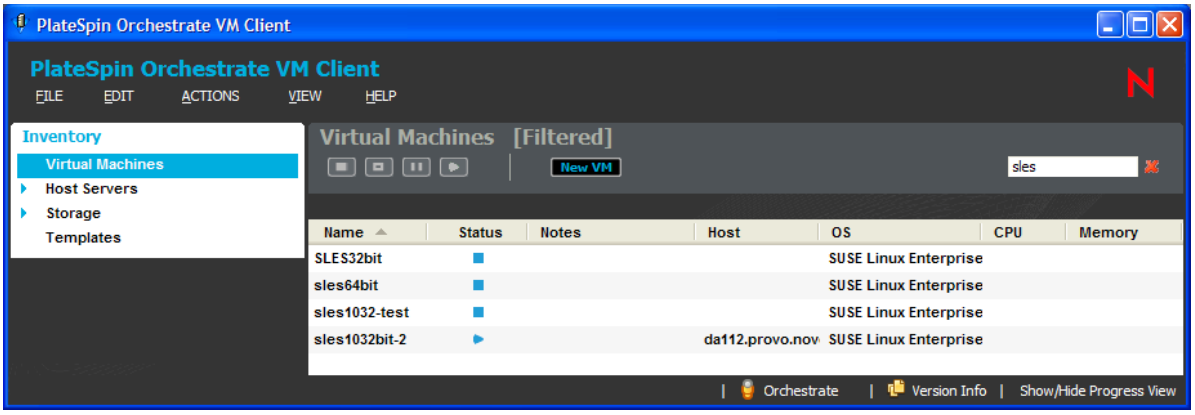


The field circled in the above example is the filter field. This is where you type characters to create the filter. The filter string is not case-sensitive.

You must place the mouse pointer's focus in the filter field in order to use this feature. If you start typing characters when the mouse pointer's focus is on a listed item, the locator pop-up is displayed instead.

For example, to display just the VMs containing the letters `sles` in one or more of the columns, type the characters in the field as depicted in Figure 3-11:

Figure 3-11 *Using the Filter Field in the VM Client*



The list is automatically updated to reflect all VMs that have characters in any of their rows that match what you are typing.

If the list is long, it might take a few seconds to display the filtered hits. You don't need to click somewhere else or press the Enter key to make the listed items change. You can continue to type characters to refine the filter with each character you type in the filter field. If you press Enter, the typed filter is executed, but the mouse pointer's focus remains within the field.

If you enter a string that has no match, the list is empty. To display the full list again, click the icon to clear the filter string, or manually delete the filter string. Because the filter string is dynamically read, you can delete recently typed characters to display previous hits.

For any list in the VM Client, the filter strings that you enter are remembered when you return to those lists. This allows you to set up filter strings for various lists so that you do not need to refilter the lists each time you return to them, even if you log out and log back in to the VM Client.

To show you whether a list is filtered, `[Filtered]` is displayed above the action buttons, as shown in Figure 3-11 on page 55.

When you double-click a VM that is in a filtered list, the details tabs for the VM are displayed and the filtered VMs list is now displayed in the Inventory panel.

Locating Items in a List

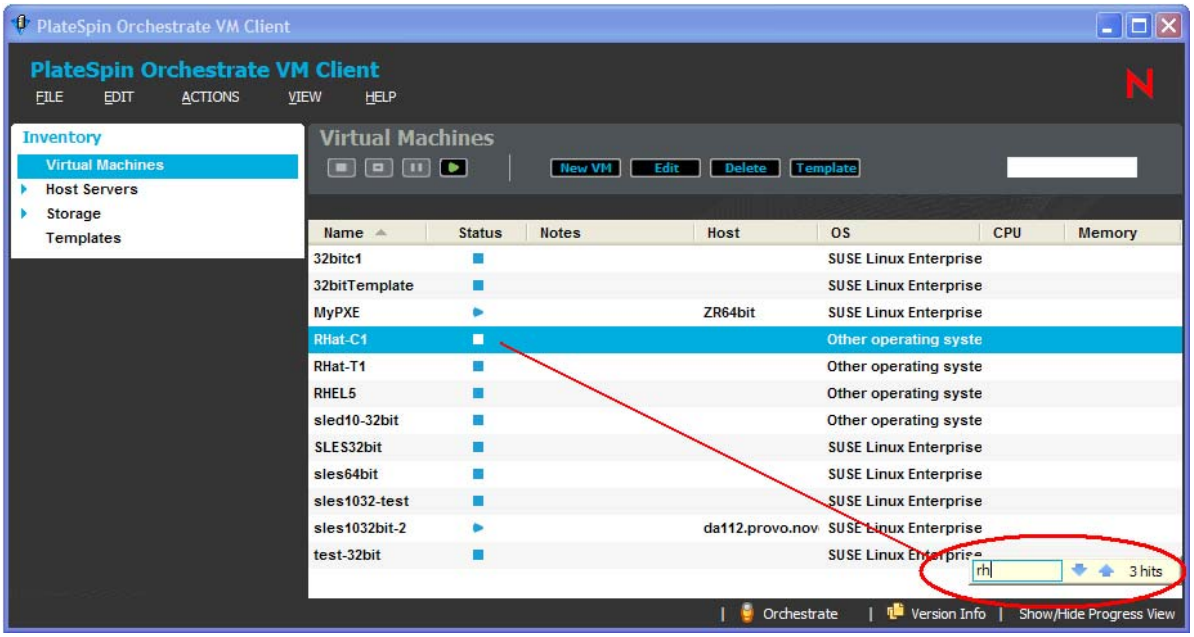
You can use the locator pop-up to move quickly to a specific item, or to identify all relative items in a list of VMs, host servers, storage items, or templates, or in any other kind of list in the VM Client. Hits are based on any of the entries in any column. The hits are based on exact matches to the string that you type. The strings are not case-sensitive.

To use this feature, click anywhere in a list, then begin typing characters. The locator pop-up is automatically displayed, showing the characters that you are typing:

Figure 3-12 *Locator Pop-Up with String Field, Arrows, and Number Hits*

Focus is immediately moved to the first item in the list that matches what you have typed. (If this does not happen immediately, click the down-arrow on the locator pop-up.) You can continue to type characters in the locator pop-up to refine the filter:

Figure 3-13 *Virtual Machines List with a Located Item Highlighted*



If there are no matches for your string, nothing is highlighted; or, if there are no further matches, the last hit remains highlighted.

The up-arrow and down-arrow in the locator pop-up allow you to move from hit to hit in the list. The arrow keys on the keyboard also perform this action when the locator pop-up is visible. This arrow action is very useful in long lists where the hits might not all occur together. For example, typing `start` might find hits that are scattered across an Event Log. The arrows can help you to quickly locate them.

The locator pop-up dynamically displays how many of the items in the list match the characters that you have typed thus far. This lets you know how many hits you can move to by using arrows.

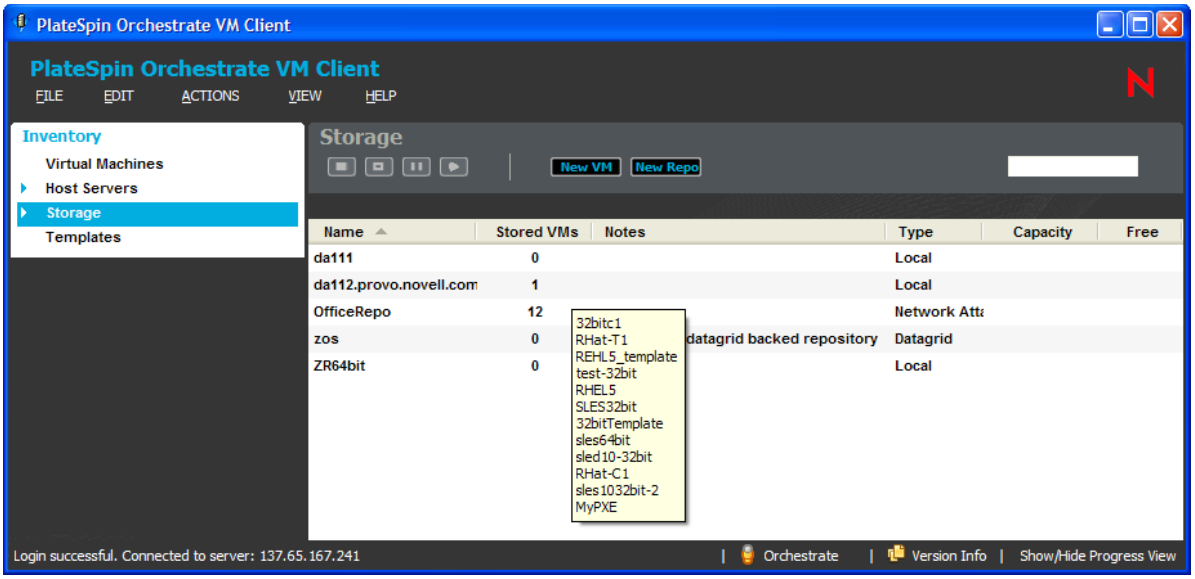
The locator pop-up closes after a brief pause if no further action is taken. To close the locator immediately, click outside of it, or press the Enter key.

When you close the locator pop-up, its content is cleared and is not remembered.

3.2.5 Viewing Additional Information in Fields or Cells

To view more information for any entry in a field or an entry in a table cell, simply mouse over the field or cell. For example:

Figure 3-14 *Mousing Over a Cell*



This example shows that 12 VMs are stored in this repository.

Following are examples of the kind of useful information that you can view by mousing over fields or entries in table cells:

- General viewing functionality:
  - **Notes column:** Displays the full text of the note.
  - **Status column on the Event Log tab:** For any entry with the icon, displays the same information that you can view by double-clicking the entry to open the Event Log dialog box. This is just a quicker way to view that information. However, the dialog box remains open, but the mouse-over information disappears when you change the mouse's focus.
- Progress View section:
  - **Status column:** Displays the same status log information that is in the Event Log dialog box (right-click the entry in the *Status* column and select *Show Log*).
- Virtual Machines view:
  - **Name column:** Displays the VM's name, its host, and its repository.
  - **Status column:** Displays the VM's status. For the in-progress status ( ), it shows the action name, action detail, start time, elapsed time, a progress bar, and the latest three log entries (which are updated dynamically).
  - **Host column:** Displays the VM's host's DNS name or IP address, the type of hypervisor being used, and the repository.
- Host Servers view:
  - **Name column:** Displays either the host server's DNS name or IP address.
  - **Active VMs column:** Displays the names of the VMs that are actively using the host. Nothing is displayed if the count is zero.

- **Virtualization Technology column:** Displays the virtualization type and its source.
- **Stored VMs column on the Summary tab:** Displays the names of the VMs that are assigned to the repository, even if they are not running. Nothing is displayed if the count is zero.
- **Status column on the Summary tab:** Displays the VM's status. For the in-progress status (), it shows the action name, action detail, start time, elapsed time, a progress bar, and the latest three log entries (which are updated dynamically).

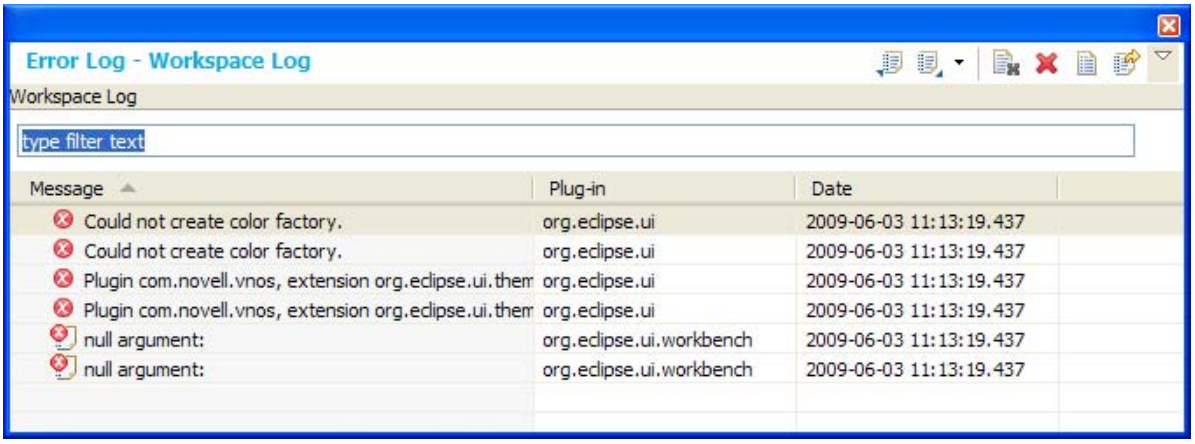
- Storage view:
  - **Stored VMs column:** Displays the names of the VMs that are assigned to the repository, even if they are not running. Nothing is displayed if the count is zero.
  - **Status column on the Virtual Machines tab:** Displays the VM's status. For the in-progress status (), it shows the action name, action detail, start time, elapsed time, a progress bar, and the latest three log entries (which are updated dynamically).
  - **Active VMs column on Hosts tab:** Displays the names of the VMs that are actively using the host. Nothing is displayed if the count is zero.
  - **Virtualization Technology column on Hosts tab:** Displays the virtualization type and its source.
- Templates view:
  - # **Clones column:** Displays the names of the VMs that were cloned from the template. Nothing is displayed if the count is zero.
  - **Hypervisor:** Displays the hypervisor type and its source.
  - **Name column on the Summary tab:** Displays the cloned VM's name, its host, and its repository.
  - **Status column on the Summary tab:** Displays the cloned VM's status. For the in-progress status (), it shows the action name, action detail, start time, elapsed time, a progress bar, and the latest three log entries (which are updated dynamically).
  - **Host column on the Summary tab:** Displays the cloned VM's host's DNS name or IP address, the type of hypervisor being used, and the repository.

3.3 Using the Error Log

The Error Log section is displayed at the bottom of the interface window when you click *View* > *Show Error Log*. You can also double-click an error message in the lower left of the VM Client window to open this view.

Both the *Error Log* and *Progress View* sections use the same position in the VM Client window. You can drag them to other positions or toggle between them by using the *View* menu options.

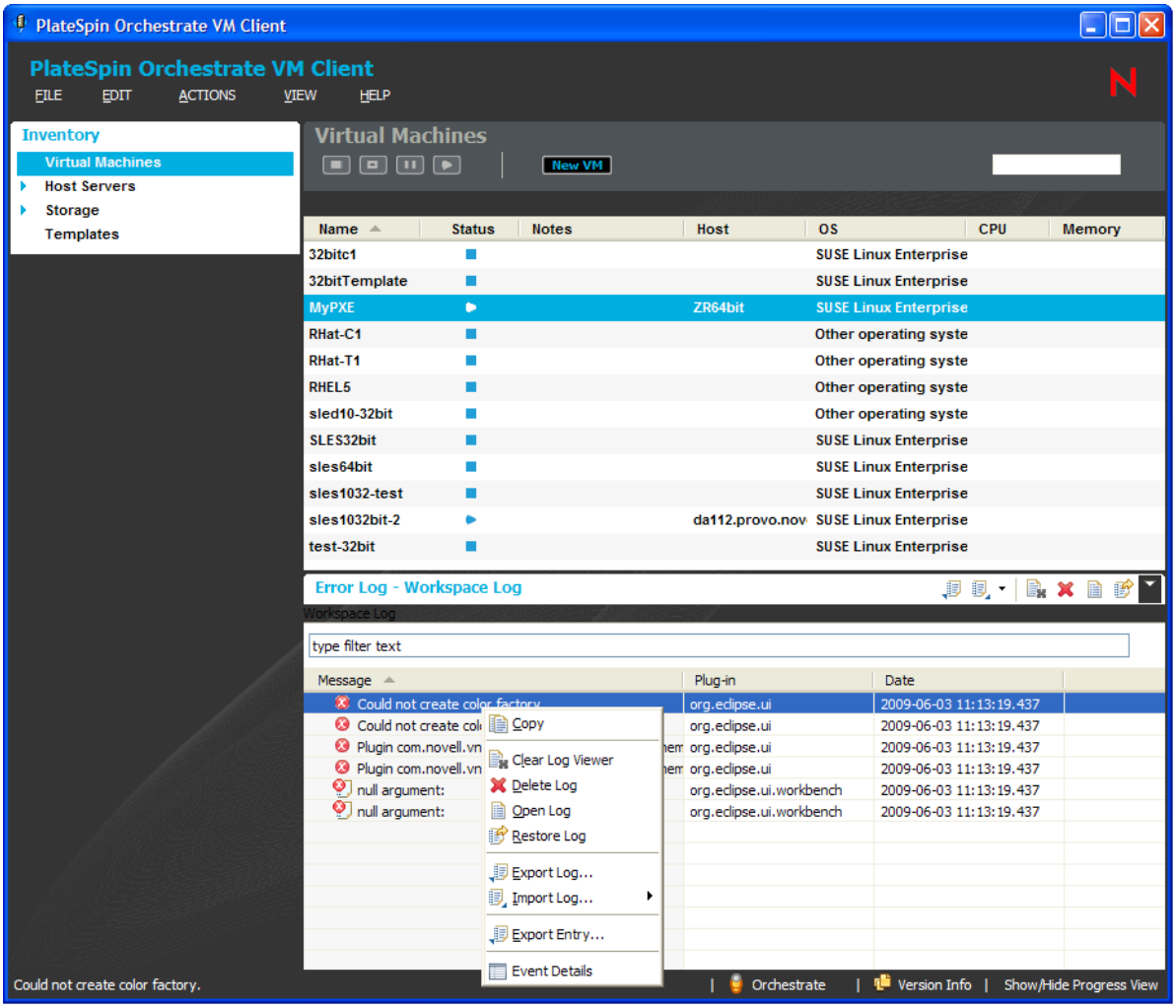
Figure 3-15 *Detached Error Log Section*



You can double-click in the *Error Log* section's title area to expand it to use the entire VM Client window, or the entire computer monitor window if it is detached. Double-click again to return it to its previous size and location.

You can right-click a log entry for access to the same options that are available in the upper right corner of the *Error Log* section. Included in the right-click menu is the *Event Details* option:

Figure 3-16 *Right-Click Menu Options for Error Log Entries*



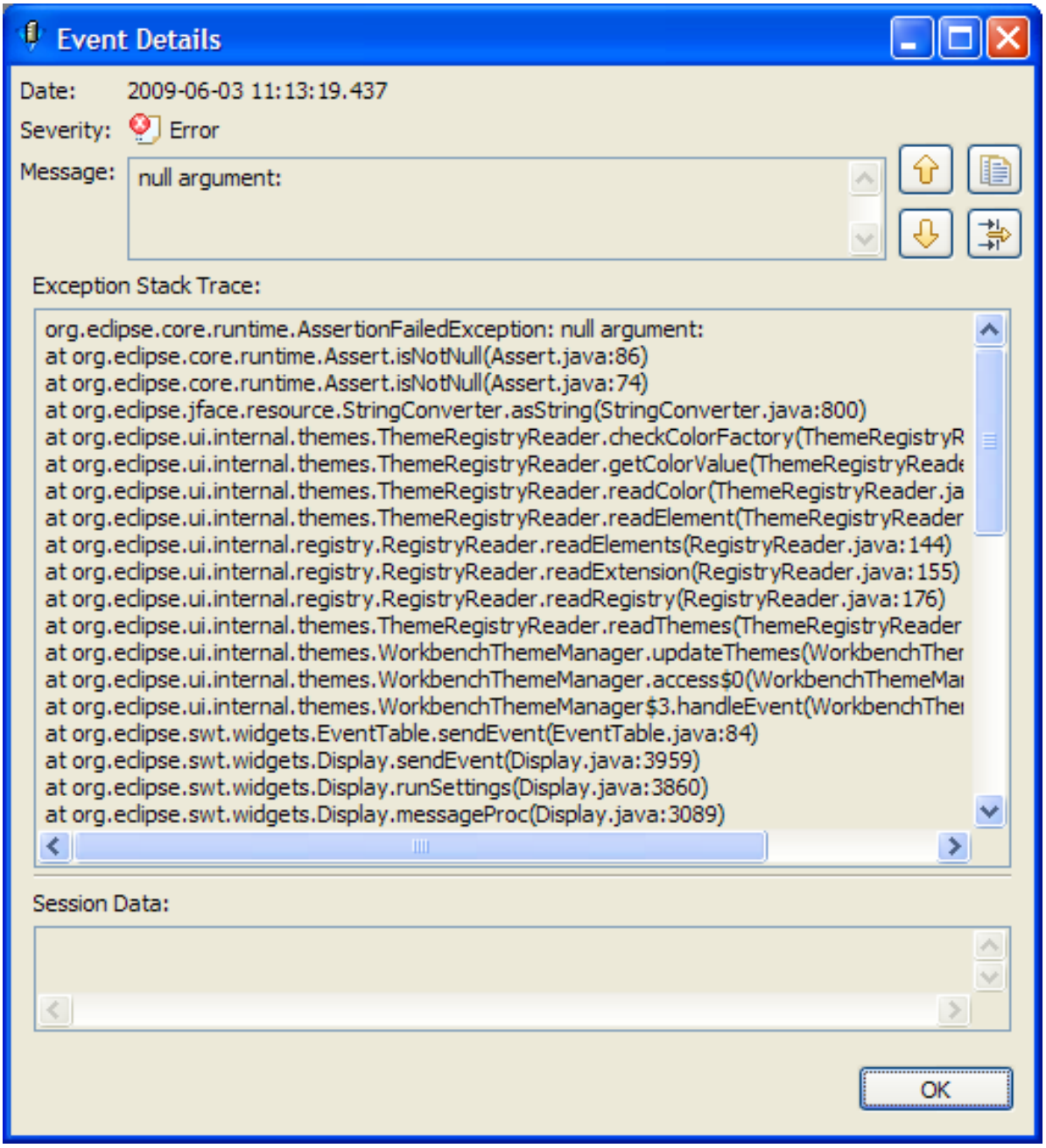
Use these menu options to do the following:

Table 3-1 *Right-Click Menu Options for the Error Log Section*

Option	Function
Copy	Copies information about the error entry that you right-click to your computer's clipboard.
Clear Log Viewer	Clears all entries from the *Error Log* section.
Delete Log	Clears all entries from the *Error Log* section and deletes the log file. It cannot be recovered.
Open Log	Same functionality as the *Restore Log* option. Because the VM Client uses a hard-coded log file on the host server the you are logged in to, an Open dialog box is not displayed.
Restore Log	Restores all entries to the *Error Log* section from an existing log.
Export Log	Exports the complete log to a file that you specify.
Import Log	Same functionality as the *Restore Log* option. This option is not used in the VM Client because a hard-coded log file located on the host server that you are logged in to is used for logging.
Export Entry	Exports only the selected error log entry to a file that you specify.
Event Details	Provides more detail on the error. See Figure 3-17 on page 62.

The *Event Details* option displays the following dialog box:

Figure 3-17 *Event Details Dialog Box*

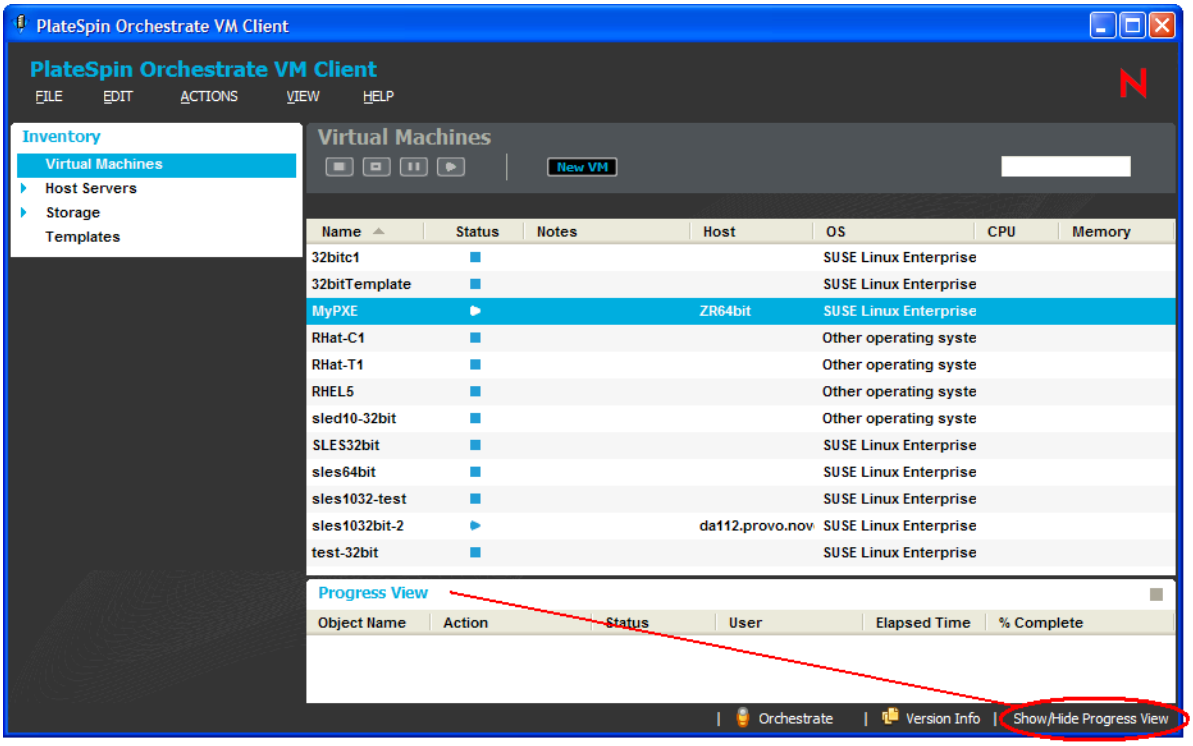


The VM Client is based on Eclipse and uses the standard Eclipse Error Log view. For more information, see Error Log (http://help.eclipse.org/ganymede/topic/org.eclipse.pde.doc.user/guide/tools/views/error_log.htm).

3.4 Using the Progress View

The *Progress View* section is useful for when you have actions occurring simultaneously for multiple VMs because you can keep track of which ones are still running. The *Progress View* section is displayed at the bottom of the interface window. When is not displayed, you click *View* > *Show Progress View* or double-click *Show/Hide Progress View* in the lower right of the VM Client window:

Figure 3-18 *Show/Hide Progress View Option*



The *Progress View* section can be both opened and closed by double-clicking *Show/Hide Progress View*.

Both the *Progress View* and *Error Log* sections use the same position in the VM Client window. You can double-click in the *Progress View* section's title area to expand it to use the entire VM Client window, or the entire computer monitor window if it is detached. Double-click again to return it to its previous size and location.

You can also drag the sections to other positions, including to their own window on the desktop (detached), or use the *View* menu options to toggle between them inside the VM Client window. The following illustrates the *Progress View* section as a detached window:

Figure 3-19 *Detached Progress View Section*

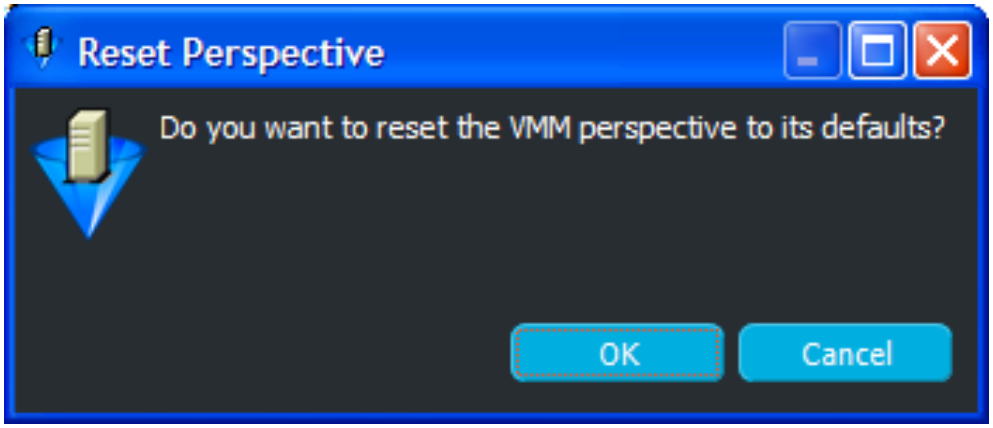
To stop an event that is in progress, select the event, then click the icon located in the upper right of the view. The icon is dimmed when an event is not selected.

3.5 Resetting the VM Client Perspectives

You can reset the various perspectives to their original configuration:

1 In the VM Client, click *View* > *Reset Perspective*.

The following dialog box is displayed:



2 Click *OK* to reset the perspectives:

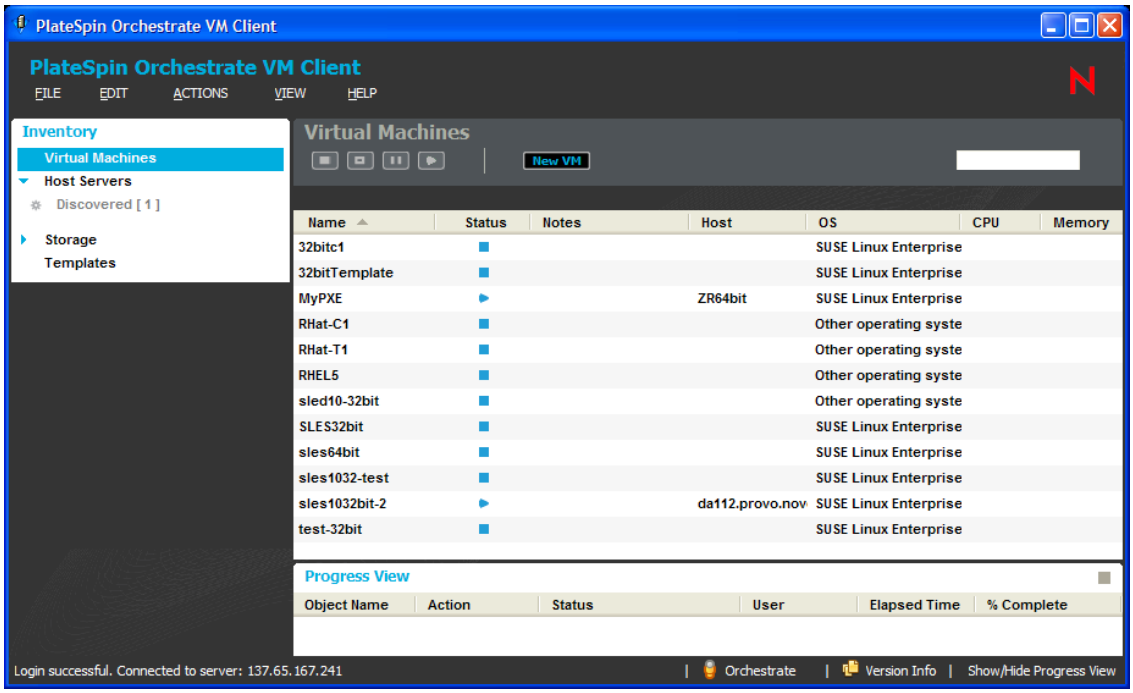
- The Inventory panel is reset to its original size and location, to the left of the VM Client window.
- The Details lists and editors are reset to their original location, to the right of the Inventory panel.
- If the *Error Log* or *Progress View* section is open, it is reset to the lower right portion of the window.

This action cannot be undone. You can reconfigure the perspectives again as needed.

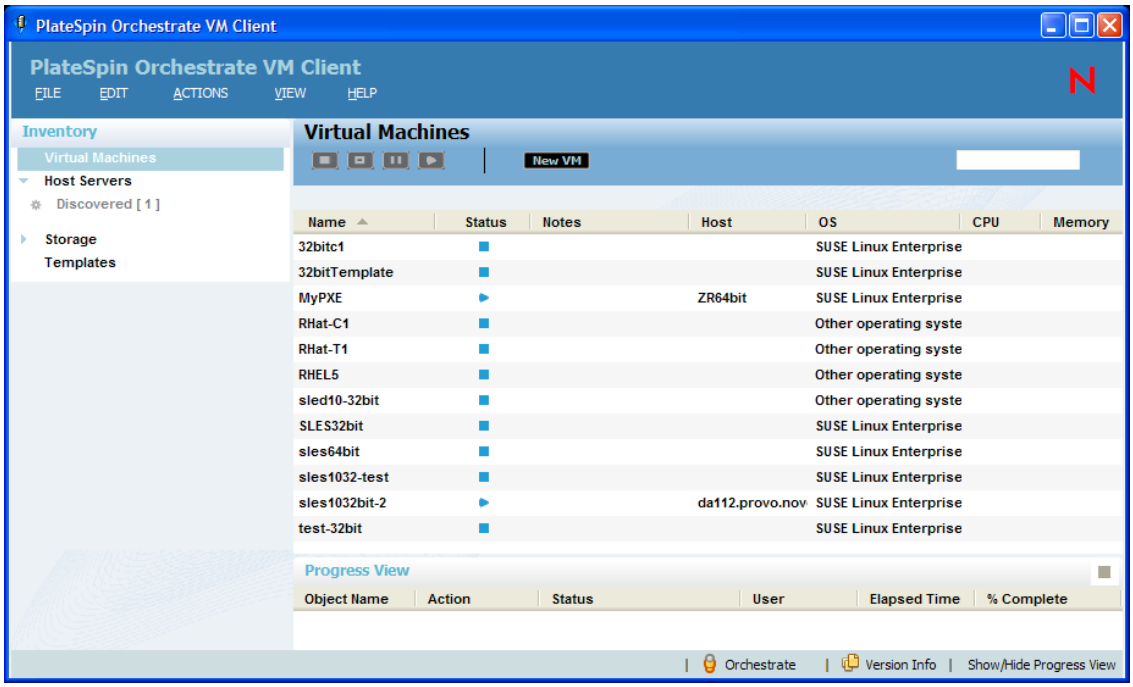
3.6 Changing the VM Client Theme

The default theme is Black Pearl. Following are examples of the available themes:

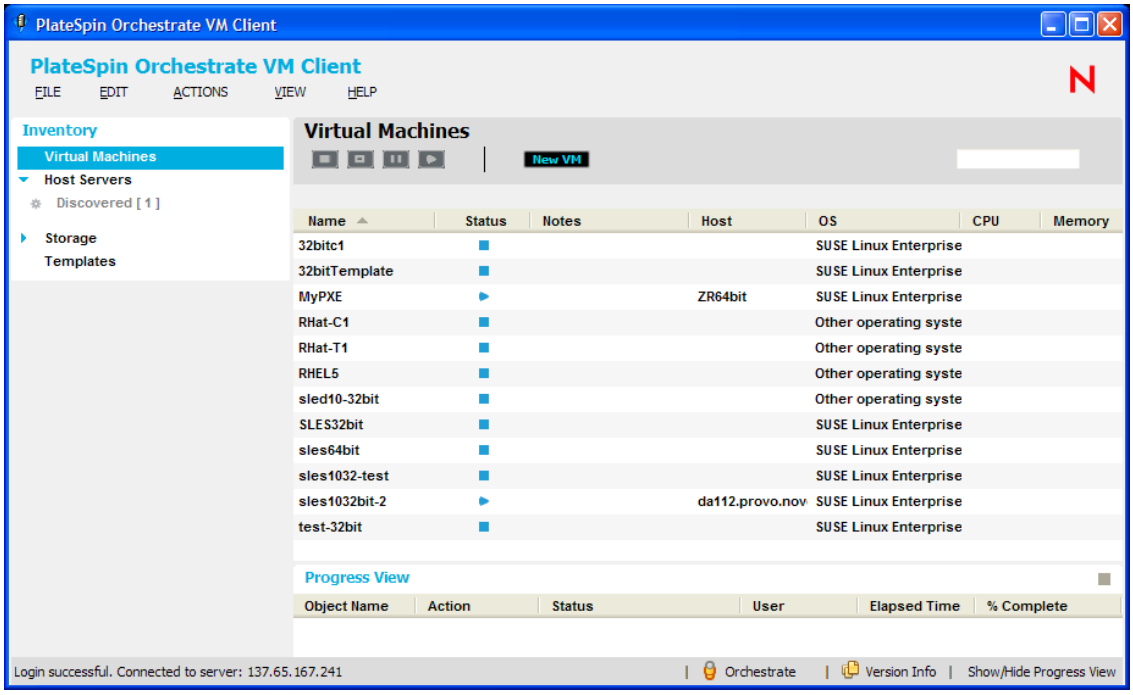
- Black Pearl



- Tahiti Ocean Classic

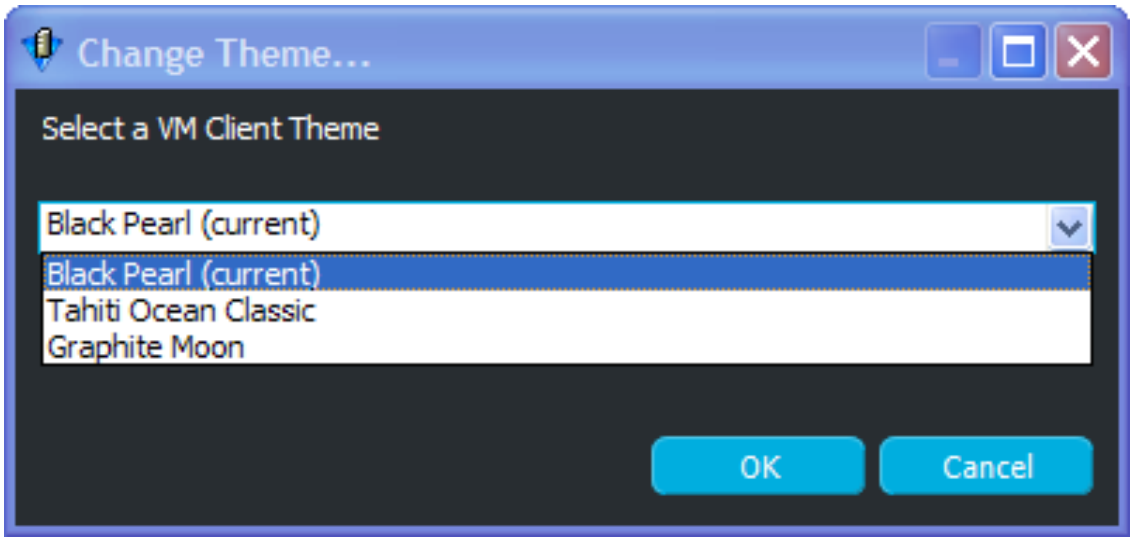


- Graphite Moon



To change the VM Client's color theme:

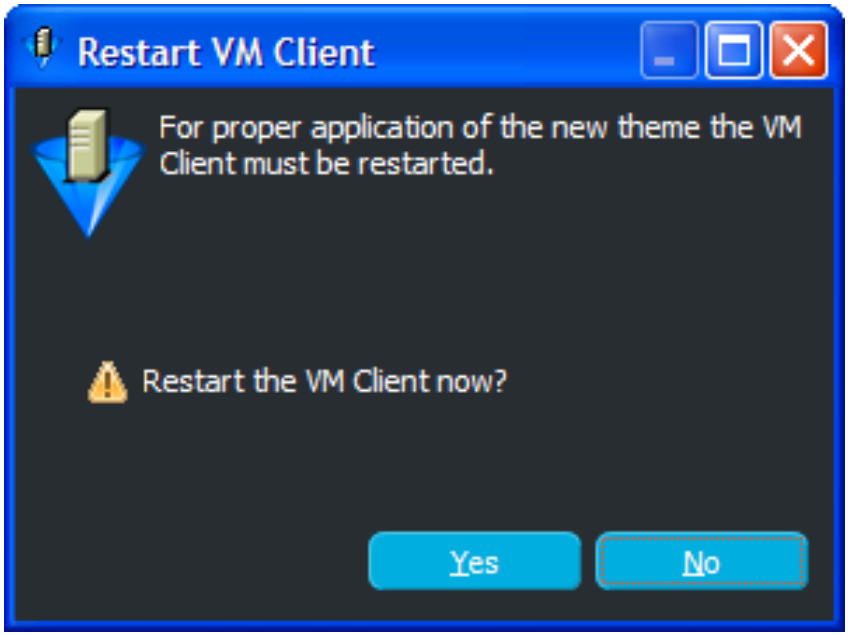
1 In the VM Client, click *View* > *Change Theme* to display the Change Theme dialog box:



The currently selected theme has `(current)` next to its name.

This option is available on both the Welcome page as well as in the Inventory sections, so you can change the theme on the Welcome page before logging in to a host.

2 In the drop-down list, select a theme and click *OK* to display the Restart VM Client dialog box:



If you select the theme with `(current)` next to its name and click *OK*, the Restart VM Client dialog box is not displayed because you have not selected to change the theme.

3 To make the theme change take effect, click *Yes* to restart the VM Client.

You must log in to your host server again when the client restarts.

If you click *No*, the theme change takes effect the next time you reopen the VM Client.

Logging in and out of a host server does not make the theme change take effect.

4 Managing VM Host Servers

You can do the following with VM host servers:

- Section 4.1, “Understanding VM Host Servers,” on page 69
- Section 4.2, “Viewing and Editing Host Server Details,” on page 69
- Section 4.3, “Using Feedback to Manage Host Servers,” on page 79
- Section 4.4, “Accessing a Host Server’s Console,” on page 80
- Section 4.5, “Resynchronizing a Host Server’s State,” on page 80

4.1 Understanding VM Host Servers

VM host servers are generally separate machines from the Orchestration Server, because the Orchestration Server is highly utilized by the Orchestration functions. Host servers’ main function is to manage and run virtual machines, which can also create high utilization.

VM host servers provide the capability to run virtual machines in their RAM. They are also used to store and manage VM files and templates in their local or shared repositories.

Machines must have the following installed on them to qualify as VM host servers:

- The Xen kernel, Hyper-V, or VMware vSphere, which provides the hypervisor capability
- The Orchestration Agent, which provides access to the Orchestration Server in order to work with VMs in the virtualization grid

For more information on setting up VM host servers, see Section 2.4, “Registering VM Hosts,” on page 22.

4.2 Viewing and Editing Host Server Details

Review the following sections for information on the details views:

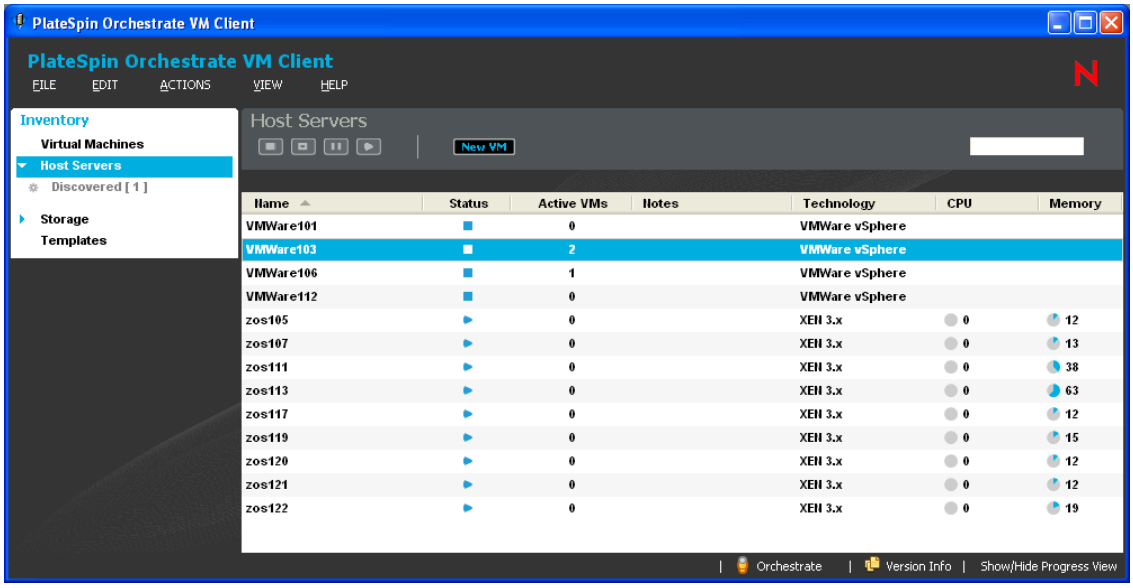
- Section 4.2.1, “Accessing Host Server Details,” on page 70
- Section 4.2.2, “Using the Details Tabs,” on page 70

4.2.1 Accessing Host Server Details

The details for each host server consist of a summary, configuration information, monitoring information, and an event log.

1 In the VM Client, click the *Host Servers* view.

The host servers are displayed:



2 Do one of the following:

- Double-click one of the host servers.
- Right-click one of the host servers, then select *Show Details*.

The tabs for the selected host are displayed.

3 For details on the tabs, see:

- "Summary Tab" on page 71
- "Configuration Tab" on page 72
- "Monitoring Tab" on page 74
- "Event Log Tab" on page 78

4 To close the details view, click the view name in the Inventory perspective panel.

4.2.2 Using the Details Tabs

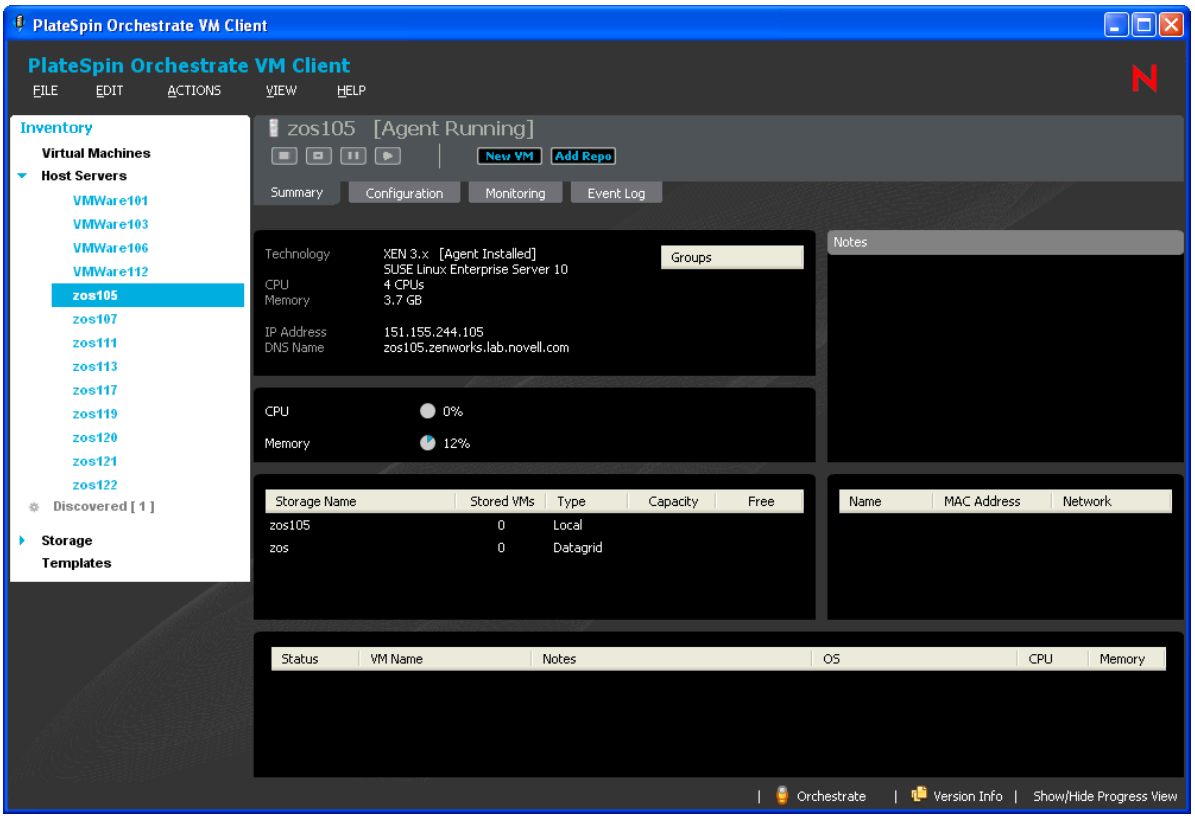
The following sections provide information on the various details tabs:

- "Summary Tab" on page 71
- "Configuration Tab" on page 72
- "Monitoring Tab" on page 74
- "Event Log Tab" on page 78

Summary Tab

This details tab is used by each Inventory panel type:

Figure 4-1 *Summary Tab for Host Servers*



You can do the following with the *Summary* tab for host servers:

- In the first section, right-click a group name under Groups, then select *Remove* to revoke the host server's membership in the group.
- In the Notes section, enter and edit notes for the host server.
- View basic information about the host server, including:
  - The host server's operating system
  - The virtual machine technology being used by the host server
  - Percentage of CPU and memory in use
  - IP address and DNS name, if it is not DHCP
  - Storage items being used by the host server, including how many VMs are using each repository, the type of network access to the repository, and each repository's capacity and percent free
  - A list of VMs being hosted by this server
  - The host server's MAC address
- Right-click a listed storage item, then select either *Remove Repository* or *Associate Repository*.
- Double-click a listed storage item to view its details tabs.

- Right-click a listed VM, then select any of the available menu options. These are the same right-click menu options that are available for the VM in the *Virtual Machines* Inventory list.
- Double-click a listed VM to view its details tabs.

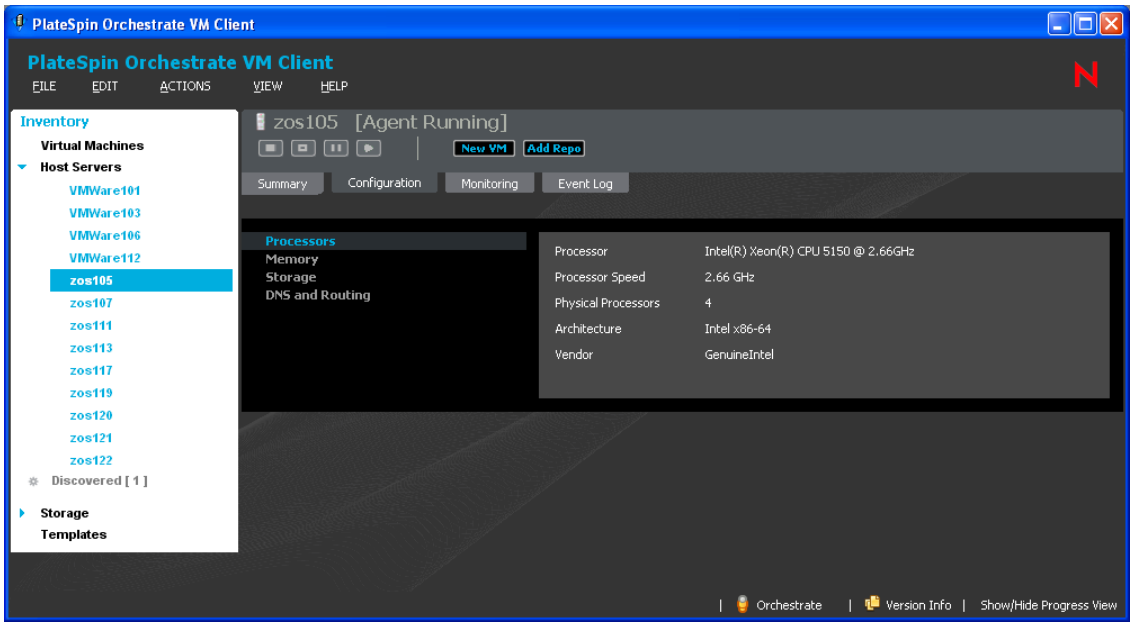
Wherever N/A appears in the details, it means that the information is not available.

Configuration Tab

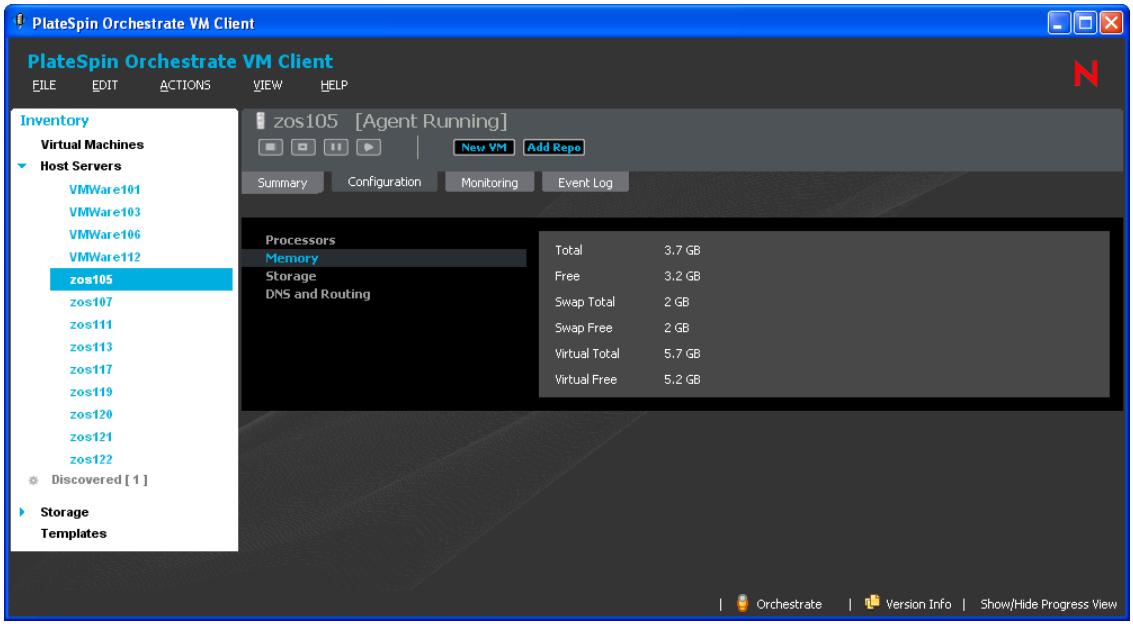
This details tab is used only by host servers. You use information available in the tab to effectively manage the existing VMs hosted on the VM hosts. For example, you can decide to stop a VM when the memory utilization is high. You can also effectively utilize the VM host by deploying additional VMs, if required, and you can install applications on the VMs.

You can do the following with this tab:

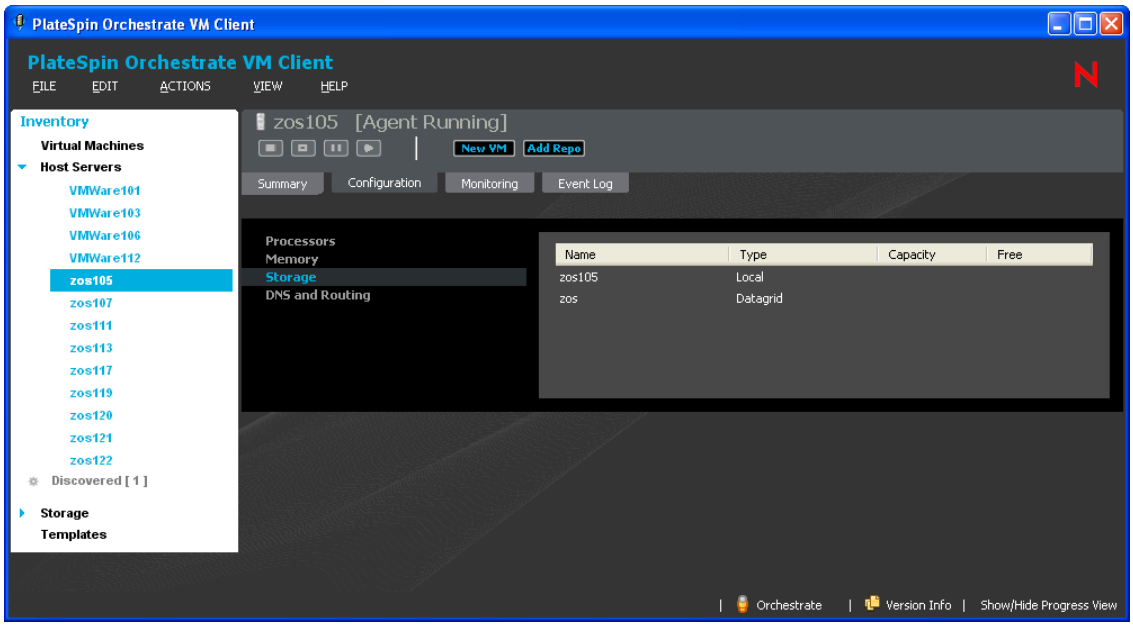
- Click *Processors* to view information about the processors on the host server. This is the default view:



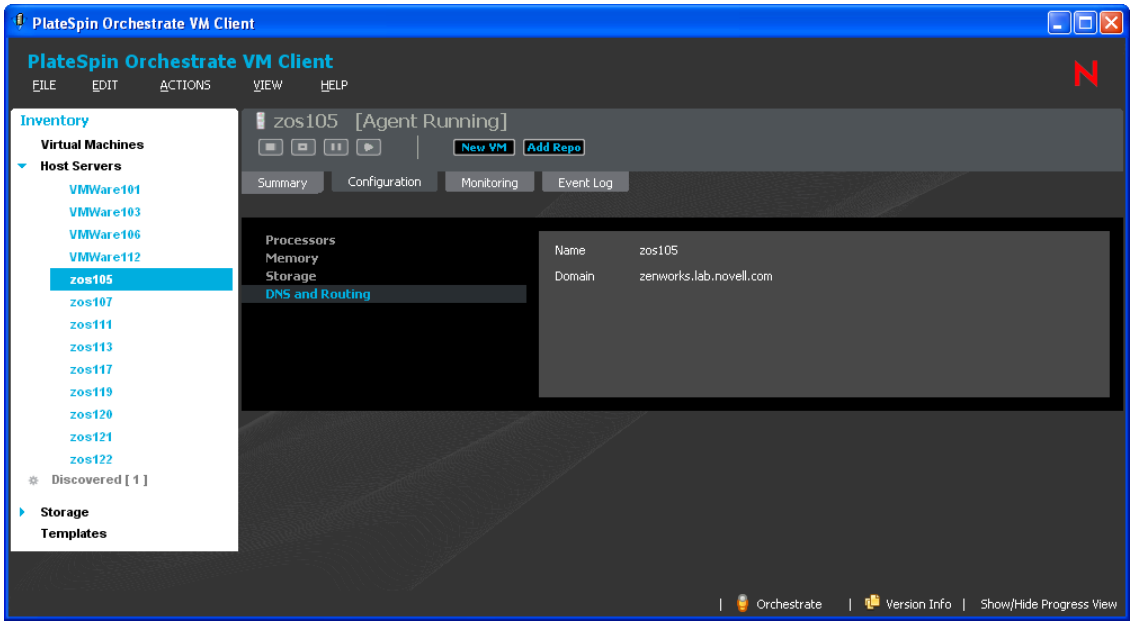
- Click *Memory* to view information about memory usage on the host server:



- Click *Storage* to view information about storage availability on the host server:



- Click *DNS and Routing* to view the computer name and domain name for the host server:



Monitoring Tab

This details tab allows you to monitor many elements of both the virtual machines and physical host machines, aiding you in the overall management of your data center.

The Monitoring Agent must be installed on the device in order for this tab to show any information. For instructions to install the agent manually, see Section 5.7, “Installing the Monitoring Agent on a VM,” on page 120.

Review the following to understand the *Monitoring* tab and how to access and use it:

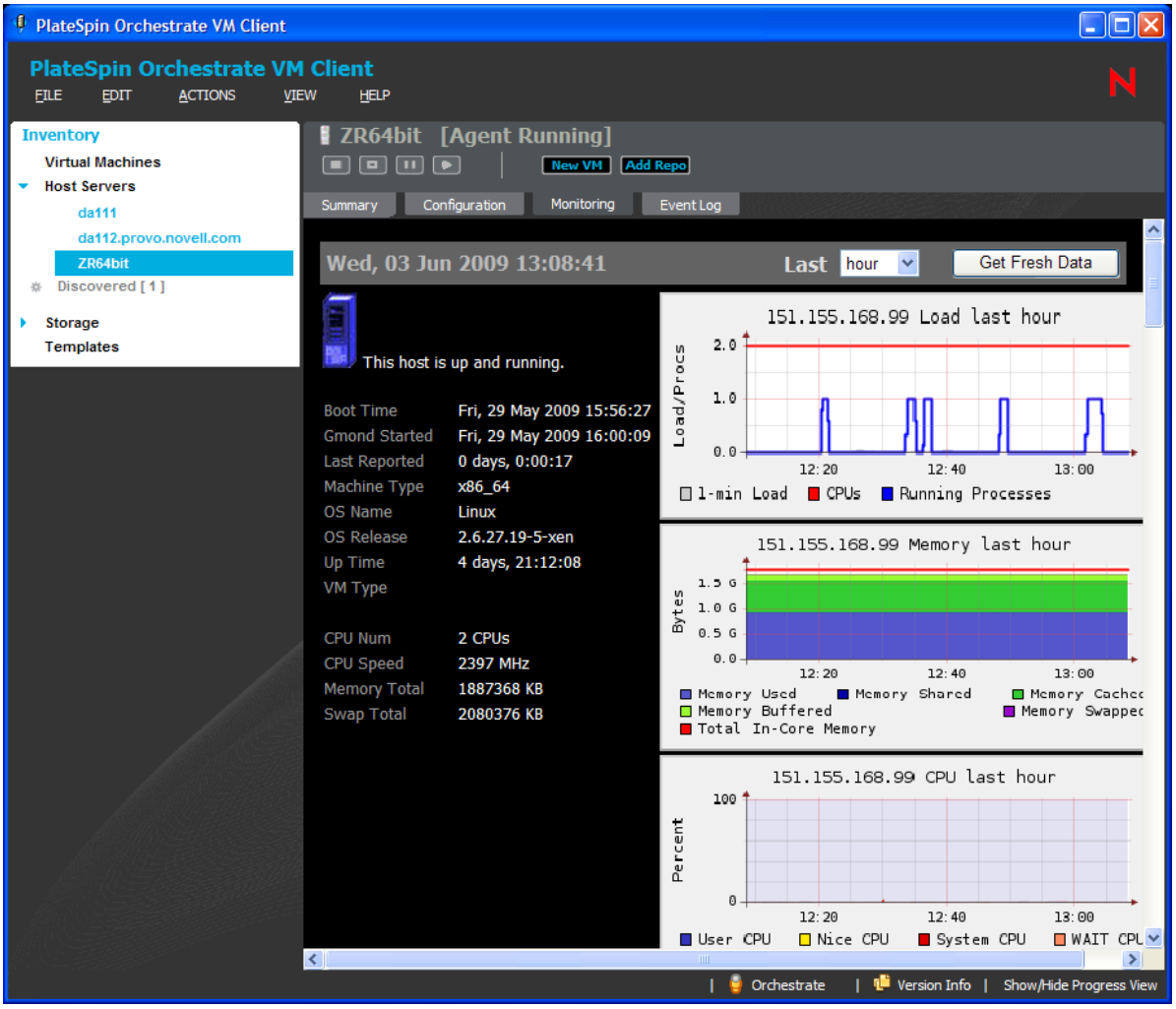
- “Understanding Monitoring” on page 75
- “Monitoring VMs and Host Servers” on page 76

Understanding Monitoring

The *Monitoring* tab displays information about the VM or host server that you can use to monitor whether it is performing correctly, is overused or underused, its history, and details about its capacities.

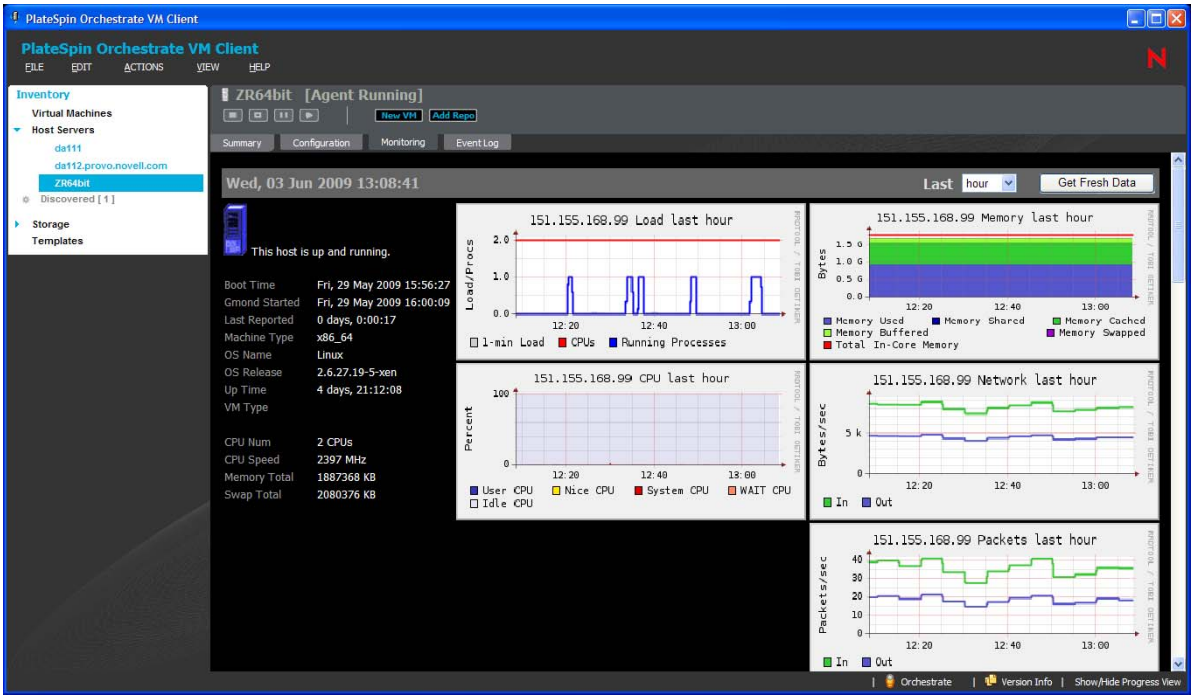
The default window size for the VM Client only allows one column of graphics to be displayed. The following is an example of the *Monitoring* tab's information:

Figure 4-2 *Monitoring Tab for a Host Server Showing Default Single Column View of Graphics*



The following example shows that graphics can be displayed side-by-side when you expand the width of the VM Client window.

Figure 4-3 *Monitoring Tab for a Host Server Showing Multiple Column View of Graphics*



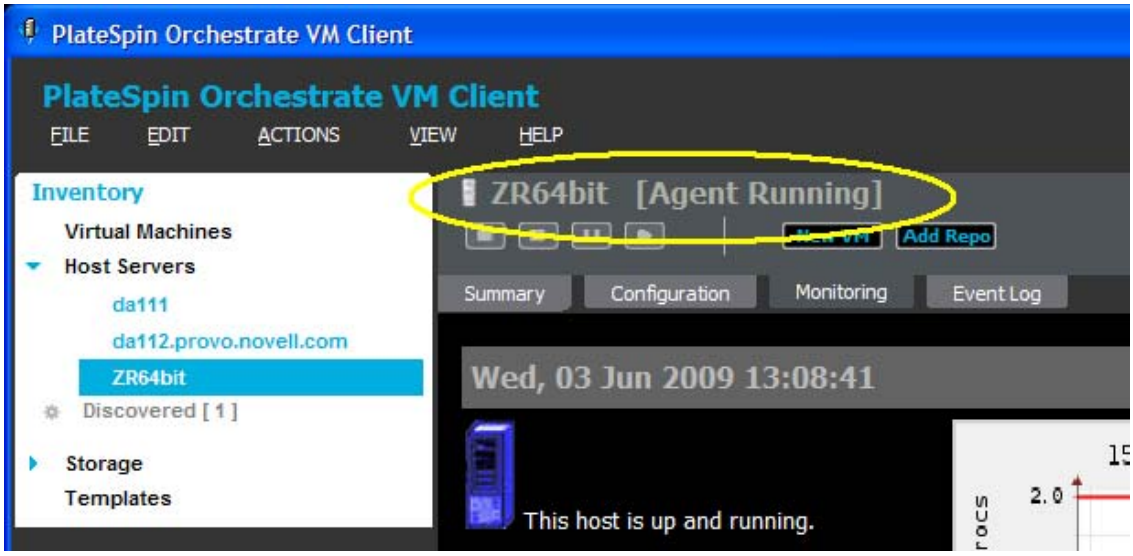
Monitoring VMs and Host Servers

1. In the VM Client, click the *Virtual Machines* view or the *Host Servers* view, then double-click a VM or host server that you want to monitor.

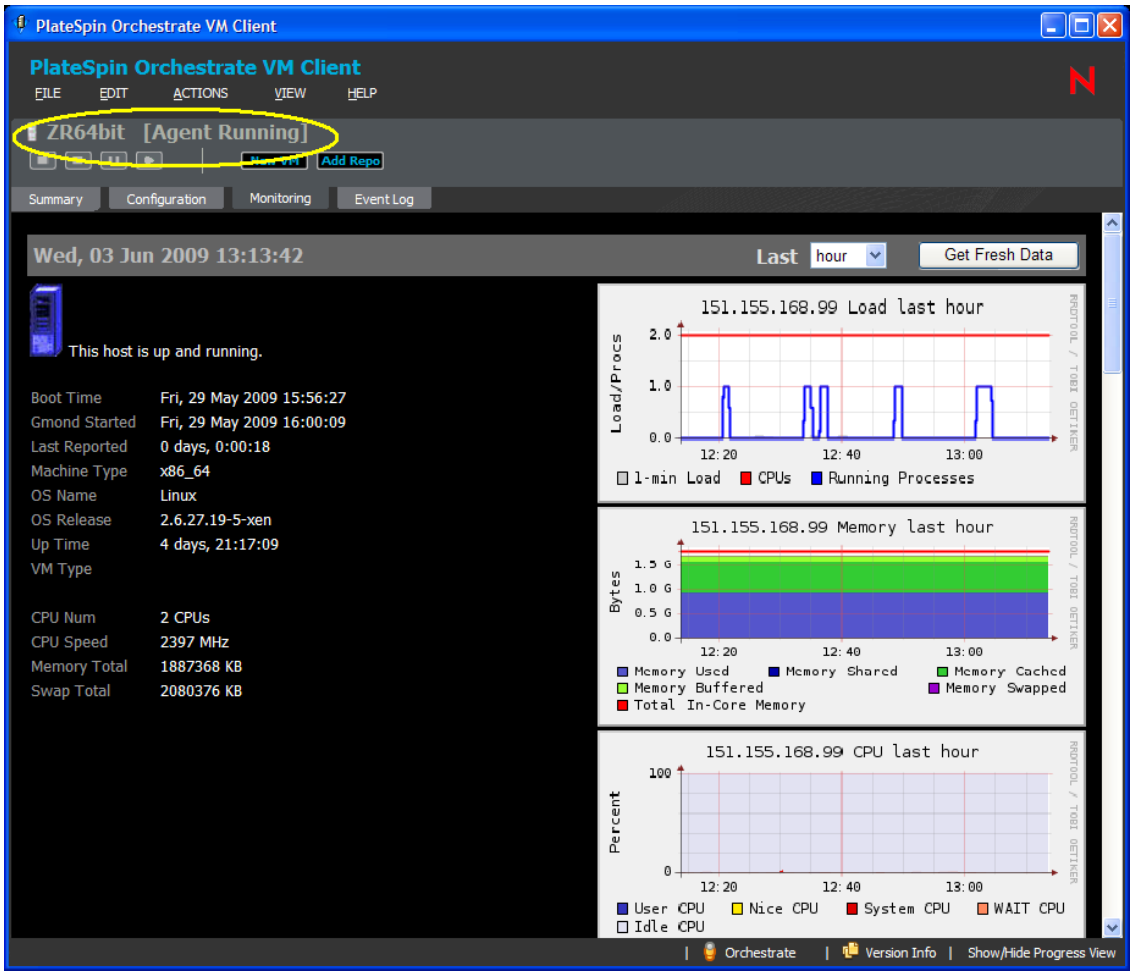
   Wherever N/A appears in the details, it means that this information is not available.

2. Click the *Monitoring* tab to display the *Monitoring* view.
3. If you are requested to provide credentials, enter the Monitoring login name and password.
4. To set the time interval for which you want the data displayed (hour/day/week/month/year), go to the *Last* field and select the time from the drop-down options.

5 To maximize the *Monitoring* tab view in the VM Client window, double-click the VM or Host name located in the Inventory item's title area just above the action buttons:



The following illustrates the *Monitoring* tab maximized in the VM Client Window:



Double-click the item's title again to return the tab to its previous view.

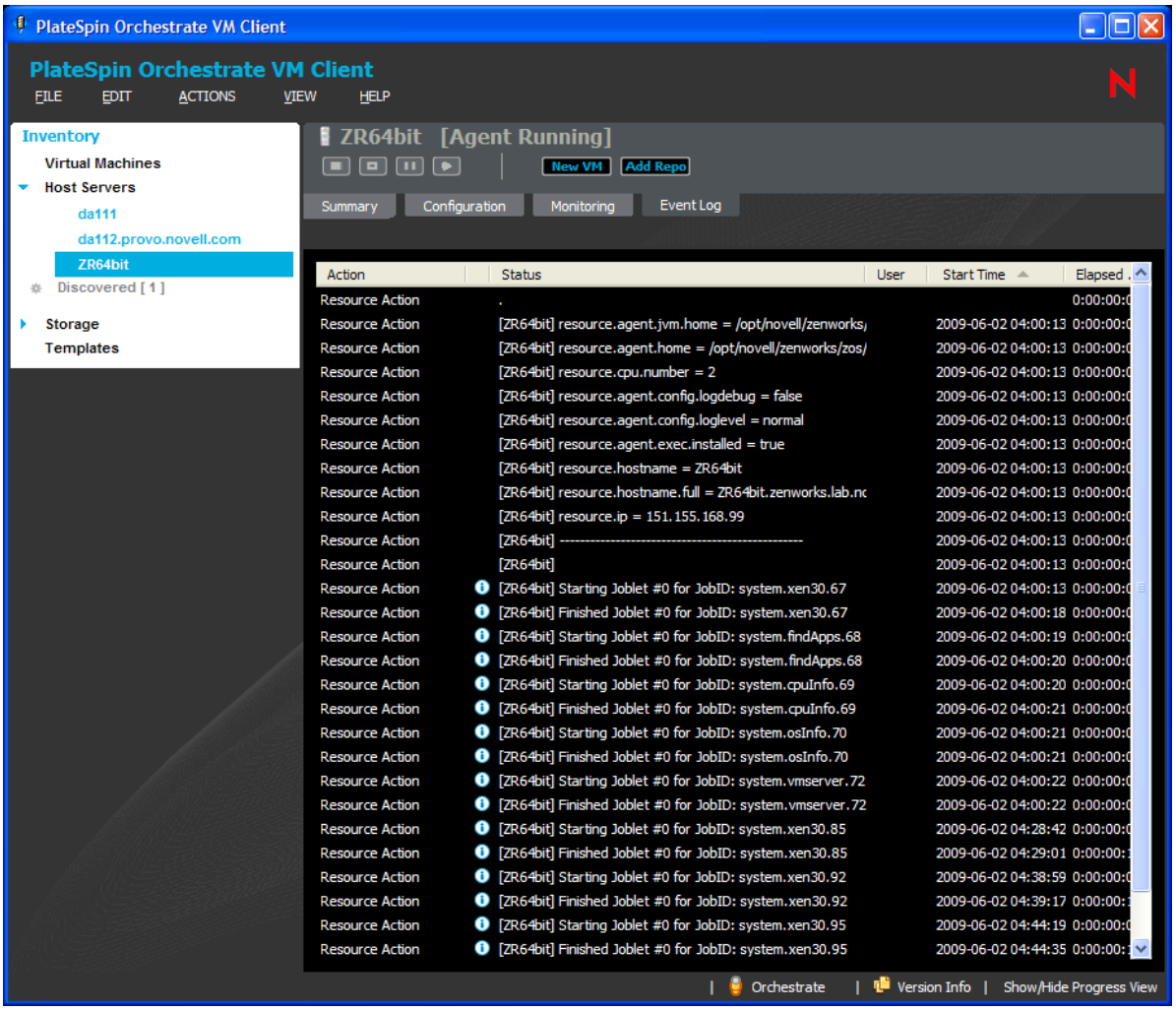
6 To refresh the graphics, click the *Get Fresh Data* button.

You can refresh the view at any time.

Event Log Tab

This details tab is used by VMs and host servers:

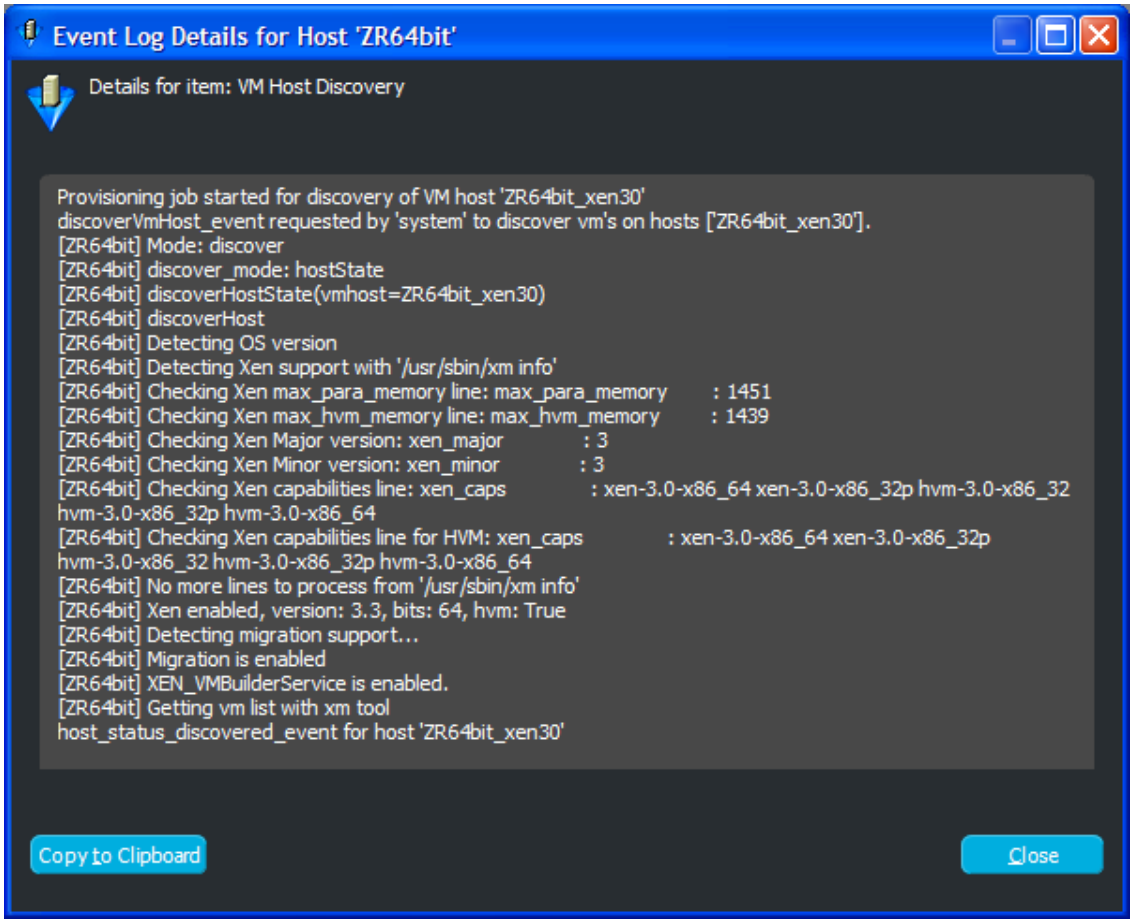
Figure 4-4 *Event Log Tab for VMs*



This tab provides information from both the resource log messages and the action status history log, intermingled based on start times. Therefore, the log provides both information on the host server as well as actions for any VMs it is currently hosting. Double-click the icon to display the host's Event Log Details dialog box.

You can do the following with this tab:

- View the Event Log information.
- Double-click an event item that contains the icon to view the details of the event as reported by the Orchestration Server. The following is an example of an event's details:



4.3 Using Feedback to Manage Host Servers

The VM Client is integrated with the Orchestration Server and the Orchestration Console to provide event details for the host servers that are listed in the VM Client. This integration with the Orchestration Server resource log enables you to see details on any jobs run on each host. You do not need to open the Orchestration Console to discover the events for the host servers that are listed in the VM Client.

The *Event Log* tab for a host server shows all jobs that have been run for VMs hosted by that server. This allows you to view all provisioning and life cycle actions that are being or have been run on that host server.

Some actions for a host server that are not yet associated with a resource in the system, such as `Accept Pending Registration` for the host, can be reviewed for that host after the action has been completed. You can click any of the icons in the *Additional Information* column of the *Event Log* tab for that host to obtain the details of any registration event. For example, the `Accept Pending`

`Registration` action runs multiple jobs on the Orchestration Server, causing multiple events to be logged. Each of those job-related entries in the *Event Log* tab might have further information, as indicated by the icon.

4.4 Accessing a Host Server's Console

In order to access a host server's console using VNC, it first must be configured on the server, then set up and configured in the Orchestration Console. This is normally done when you install and configure the Orchestration Server. For more information, see "Setting Up VNC for a VM Managed by vSphere" in the *NetIQ Cloud Manager 2.0 Orchestration Installation Guide*.

1. In the VM Client, click the *Host Servers* view.
2. Do one of the following:
   - Select the host, then click the Console button.
   - Select the host, then click *View* > *Show Console*.
   - Right-click the host, then select *Show Console*.
3. Provide the VNC password, then click *OK*.

   When attempting to make a VNC connection, VNC tests for a fully qualified domain name (FQDN), simple host name, or IP address.

4.5 Resynchronizing a Host Server's State

The Orchestration Server is automatically updated to list the state of the hosted VMs after every provisioning action. However, the state of the hosted VMs is not automatically updated if the VM state is changed by any third-party tool. You must manually synchronize the state of the hosted VMs in the Orchestration Server to reflect the current state of the host server's VMs.

When a host server is resynchronized, the VM Client in conjunction with the Orchestration Server does the following:

- Runs the provisioning adapter to discover jobs
- Discovers what is enabled with each host
- Discovers the host's capabilities
- Updates the state of active and known VMs
- Detects the types of its hosted VMs
- Does not sync up the states of the host's VMs
- Removes association with any VMs that cannot be found on the host
- Does not discover any VMs that might be on the host's disks

Resynchronizing a host server can be useful when a VM hypervisor has changed and the Orchestration Server needs to be aware of the changes.

IMPORTANT: When a VM is on shared storage, resynchronization is only tried on the host server where the VM was last running.

To resynchronize a host server:

1. In the VM Client, click the *Host Servers* view.
2. Right-click the host server to be resynchronized, then select *Resync State*.

   This resynchronizes the state of all VMs hosted by the host server.

   You can resynchronize only one host server at a time.
3. You can view the progress in any of the following ways:
   - Double-click the host being synchronized, click the *Event Log* tab, then double-click the entry related to the process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
   - Observe messages at the bottom of the VM Client interface.
   - Click *View* > *Show Progress View* to open the Progress window.
   - View the synchronization progress in the *Jobs* tab of the Orchestration Console.

5 Managing Virtual Machines

You can do the following for hands-on management of virtual machines (VMs) in the Cloud Manager VM Client:

- Section 5.1, “Viewing and Editing VM Details,” on page 83
- Section 5.2, “Using Feedback to Manage VMs,” on page 87
- Section 5.3, “Virtual Machine Actions,” on page 98
- Section 5.4, “Creating a Xen VM,” on page 105
- Section 5.5, “Installing a VM,” on page 117
- Section 5.6, “Installing the Orchestration Agent on a VM,” on page 119
- Section 5.7, “Installing the Monitoring Agent on a VM,” on page 120
- Section 5.8, “Editing VMs,” on page 120
- Section 5.9, “Moving VMs,” on page 128
- Section 5.10, “Migrating VMs,” on page 130
- Section 5.11, “Deleting VMs,” on page 134

5.1 Viewing and Editing VM Details

Review the following sections for information on the Details views:

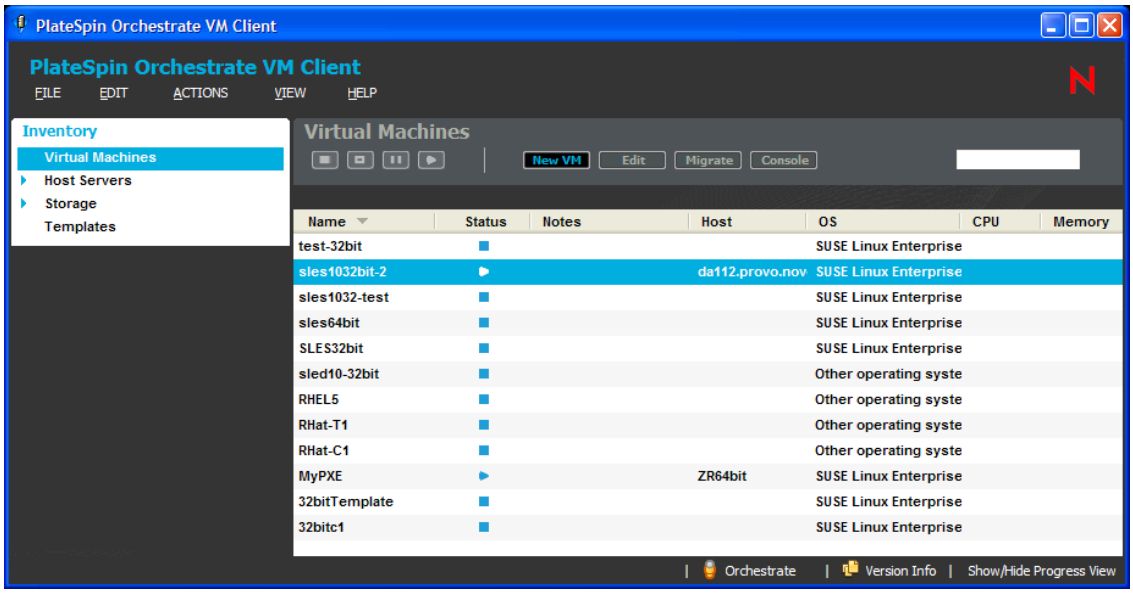
- Section 5.1.1, “Accessing VM Details,” on page 84
- Section 5.1.2, “Using the Details Tabs,” on page 84

5.1.1 Accessing VM Details

The details for each VM consist of a summary, monitoring information, and an event log.

1 In the VM Client, click the *Virtual Machines* view.

The VMs are displayed:



2 Do one of the following:

- Double-click one of the VMs.
- Right-click one of the VMs, then select *Show Details*.

The tabs for the selected VM are displayed.

3 For details on the tabs, see:

- "Summary Tab" on page 71
- "Monitoring Tab" on page 74
- "Event Log Tab" on page 78

4 To close the details view, click the view name in the Inventory perspective panel.

5.1.2 Using the Details Tabs

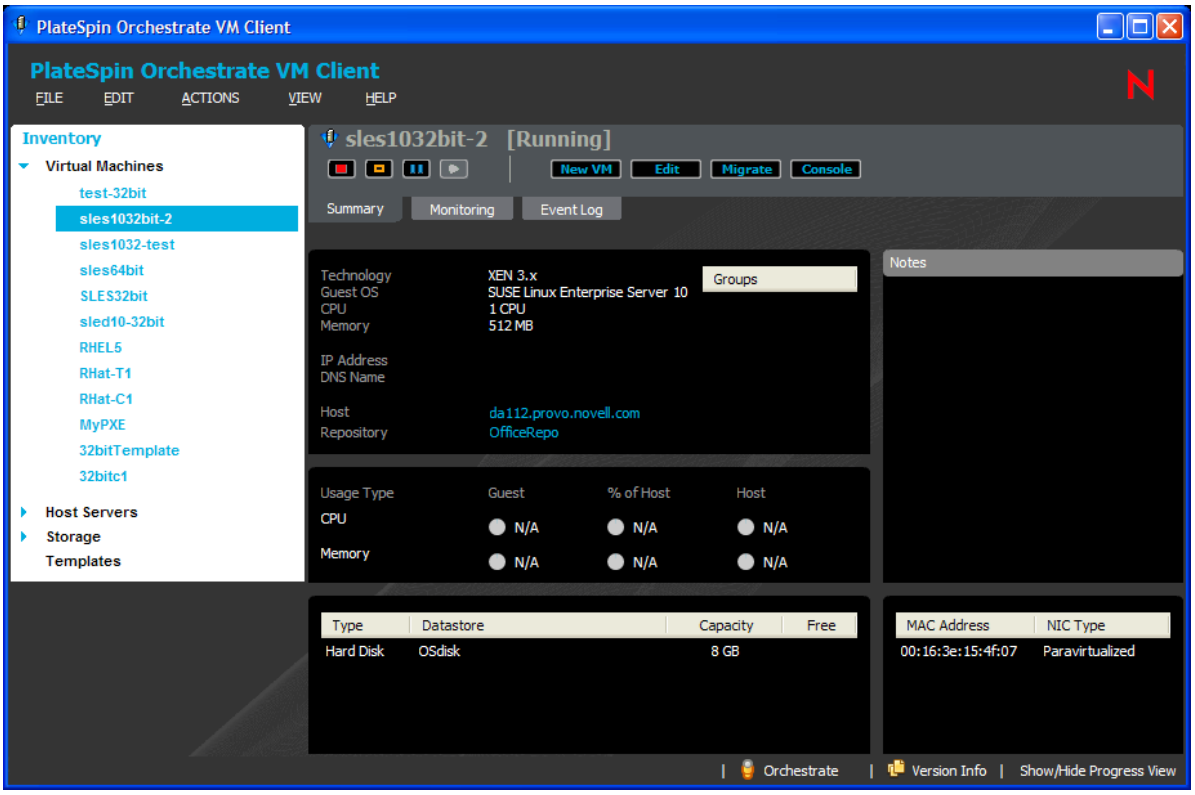
The following sections provide information on the various details tabs:

- "Summary Tab" on page 85
- "Monitoring Tab" on page 86
- "Event Log Tab" on page 86

Summary Tab

This details tab is used by each Inventory panel type:

Figure 5-1 *Summary Tab for Virtual Machines*



You can do the following with the *Summary* tab for VMs:

- In the first section, right-click a group name under Groups, then select *Remove* to revoke the VM's membership in the group.
- In the Notes section, enter and edit notes for the VM.
- View basic information about the VM:
  - The VM's operating system
  - The virtual machine technology being used by the VM
  - CPU and memory, including how it is used by the guest and host and the percentage of the host memory being used
  - IP address and DNS name, if it is not DHCP
  - Storage names and types associated with the host, storage capacity information, and how many VMs are stored on the host per storage name
  - The VM's MAC address and NIC type (paravirtualized)
  - Hosted VMs and their operating status, name, OS type, and CPU/memory statuses

  Some of the above items are only applicable if the Orchestration Agent is installed on the VM.

- Double-click the *Host* entry to view that host server's details tabs.
- Double-click the *Repository* entry to view that storage item's details tabs.

Wherever N/A appears in the details, it means that the information is not available.

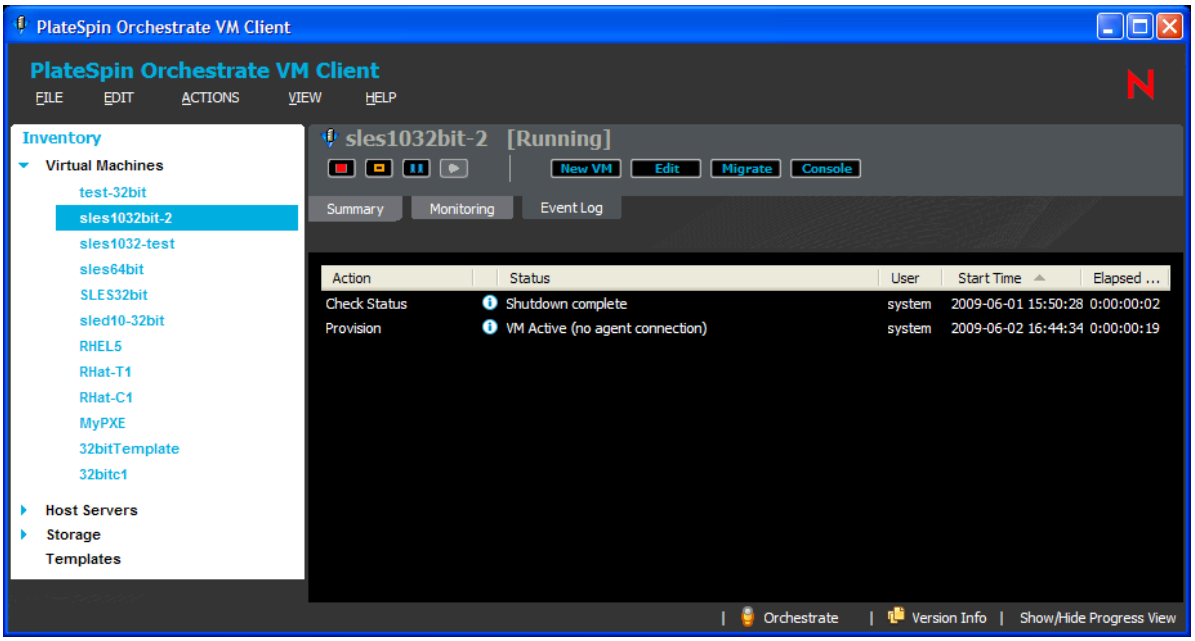
Monitoring Tab

For information on the *Monitoring* tab, see "Monitoring Tab" on page 74, which documents this tab for host servers. The functionality is the same for VMs, although the information displayed can be different.

Event Log Tab

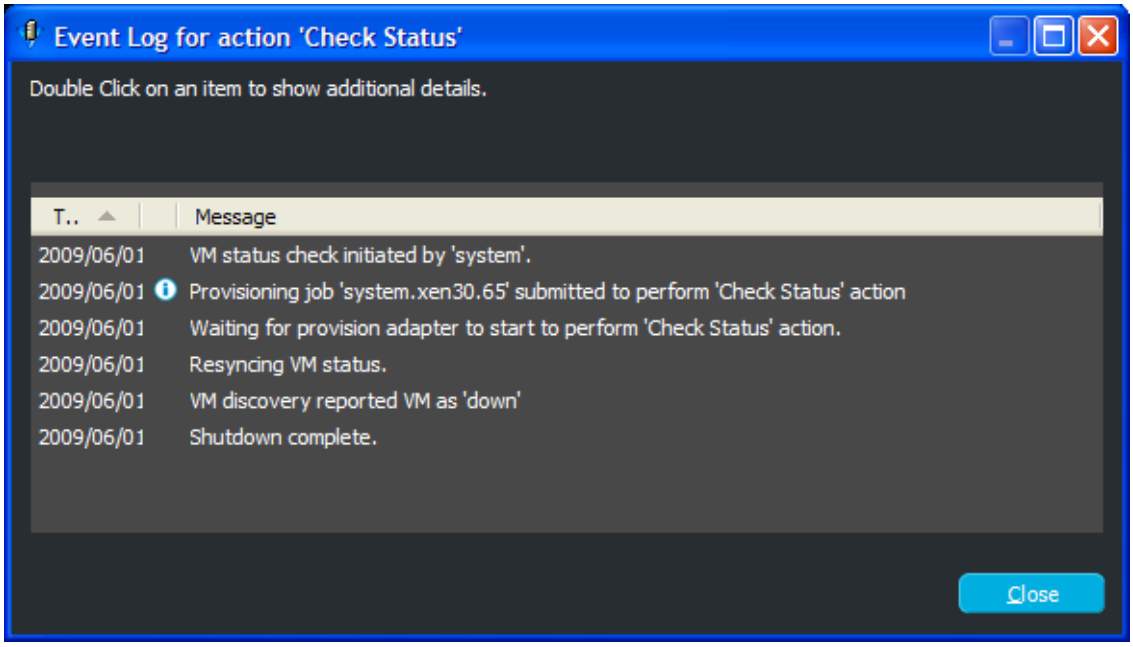
This details tab is used by VMs and host servers:

Figure 5-2 *Event Log Tab for VMs*



You can do the following with this tab:

- View the Event Log information.
- Double-click an event item that contains the icon to view the details of the event as reported by the Orchestration Server. The following is an example of an event's details:



5.2 Using Feedback to Manage VMs

The VM Client is integrated with the Orchestration Server and the Orchestration Console to provide details from any Orchestration jobs that are started by actions you take in the VM Client. This provisioning log integration enables you to see the current status on jobs that are running and to review the status of jobs that are finished. The information is provided in three levels: actions taken, provisioning logs, and job logs. You do not need to open the Orchestration Console to discover the status of jobs started in the VM Client.

The icon is displayed in *Status* columns when a VM is in a progress state. The *Status* column can be viewed in the *Virtual Machines* view and in the VMs sections of the *Summary* tabs for host servers and templates.

Other actions cannot be performed on a VM when it is in a progress state (the icon) because Orchestration jobs are run sequentially per VM.

If you double-click a VM that is in a progress state, its *Event Log* tab is immediately displayed.

All logging information is dynamically updated so that you do not need to refresh or return to a view to see event changes.

Even if you log in and log out of the VM Client, all logs are maintained and continue to progress so that you can still monitor an action after logging back in to the VM Client.

You can view the progress of any action, including error information, using the following features:

- Section 5.2.1, "Progress View," on page 88
- Section 5.2.2, "Progress Bar for Details Views," on page 90

- Section 5.2.3, “Progress Bar in a Tool Tip,” on page 92
- Section 5.2.4, “Event Log Tab,” on page 94
- Section 5.2.5, “Event Logs,” on page 94
- Section 5.2.6, “Error Log,” on page 97

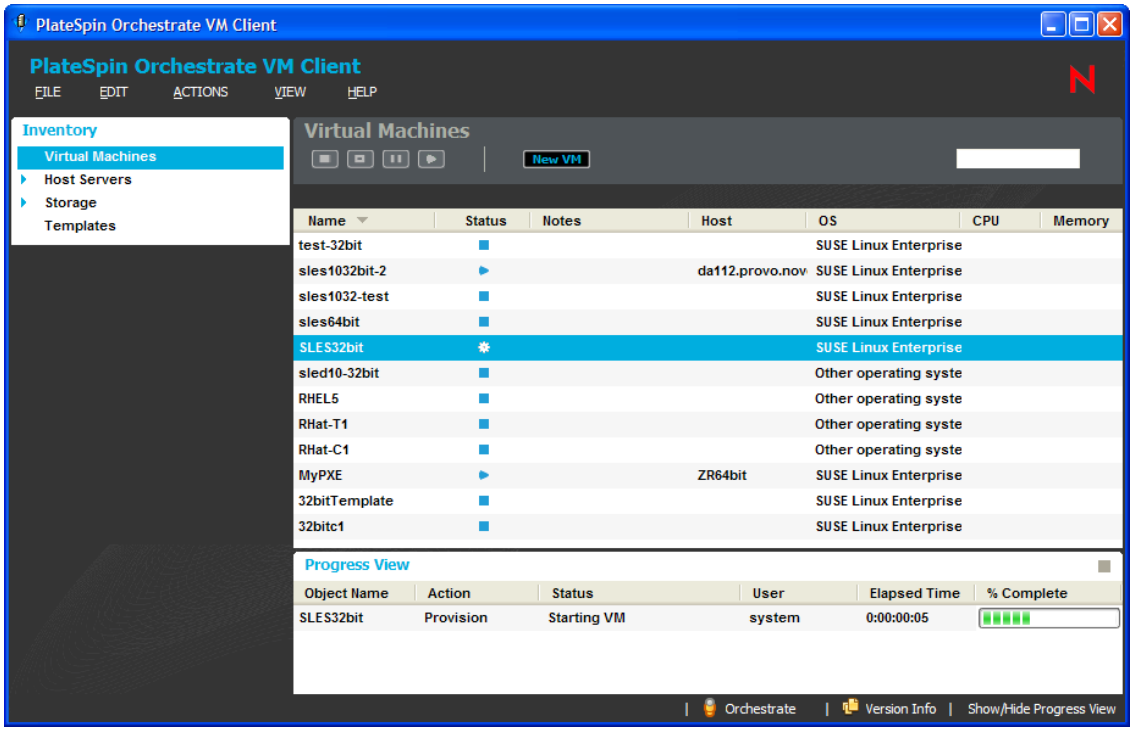
5.2.1 Progress View

The Progress View displays the progress of all VM actions initiated by any VM operator. To use the Progress View:

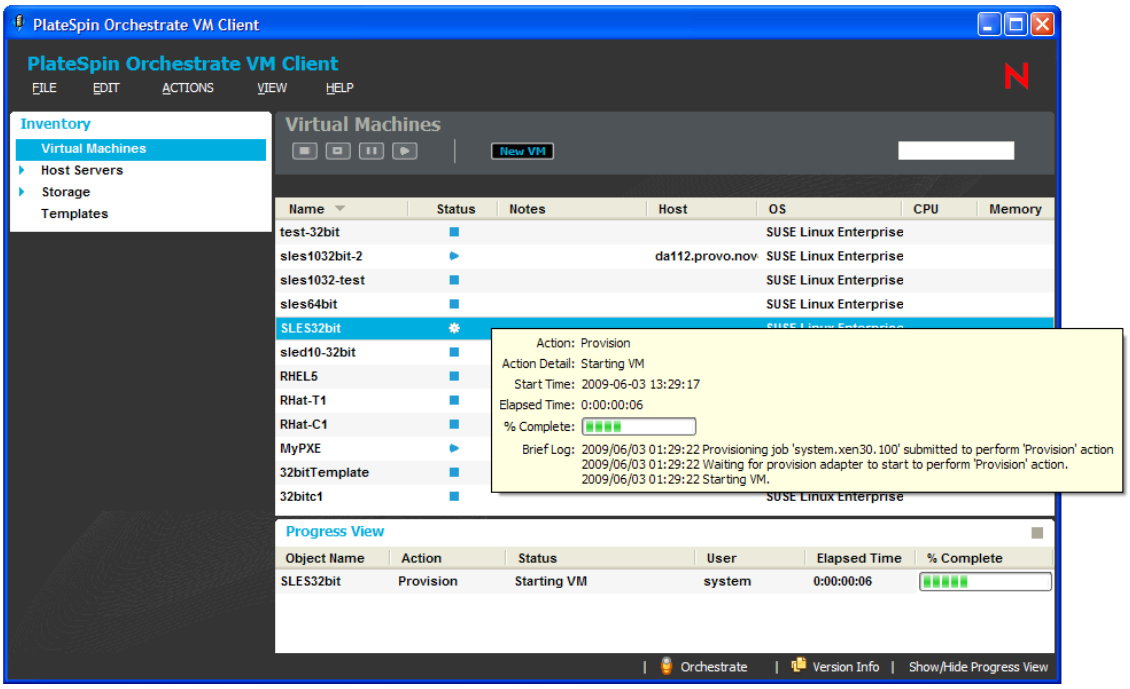
1 The Progress View section is displayed by default; if it is not being displayed, do one of the following:

- In the VM Client, click *View* > *Show Progress View*.
- In the VM Client, double-click *Show/Hide Progress View* in the lower right corner of the VM Client window.

The following view is displayed:

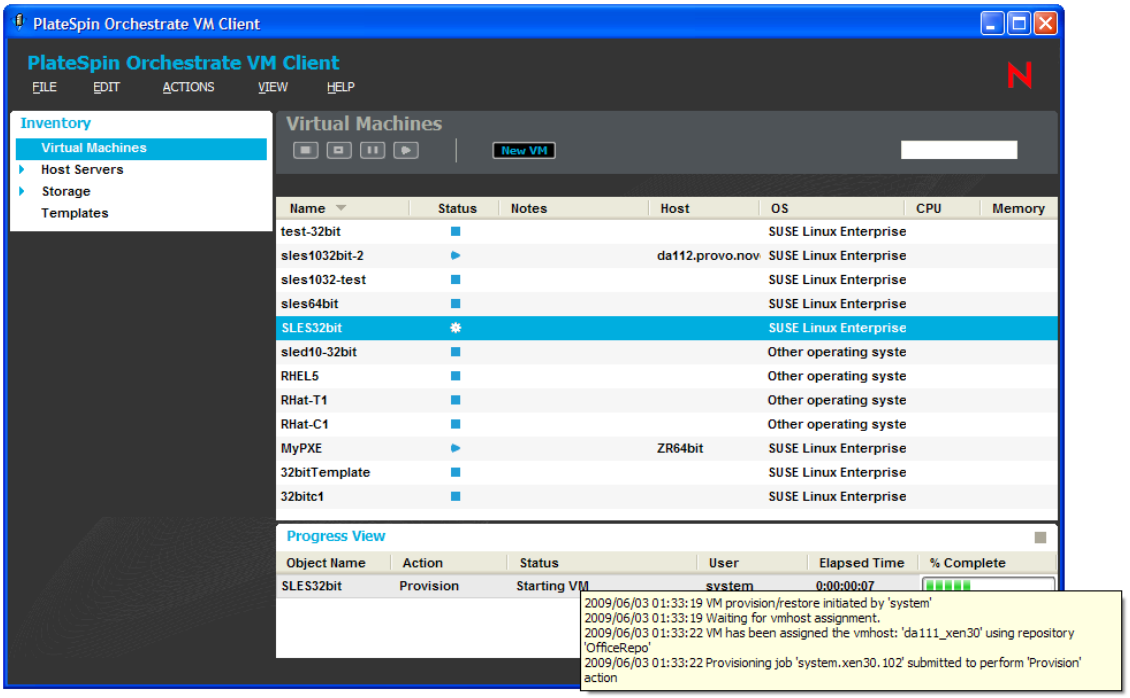


2 For another view of the progress bar with other information, mouse-over the icon in the *Status* column for the Inventory item:



For more information, see Section 5.2.3, "Progress Bar in a Tool Tip," on page 92.

3 To view information specific to a progress task, mouse-over the name in the *Status* column of the *Progress View* section:

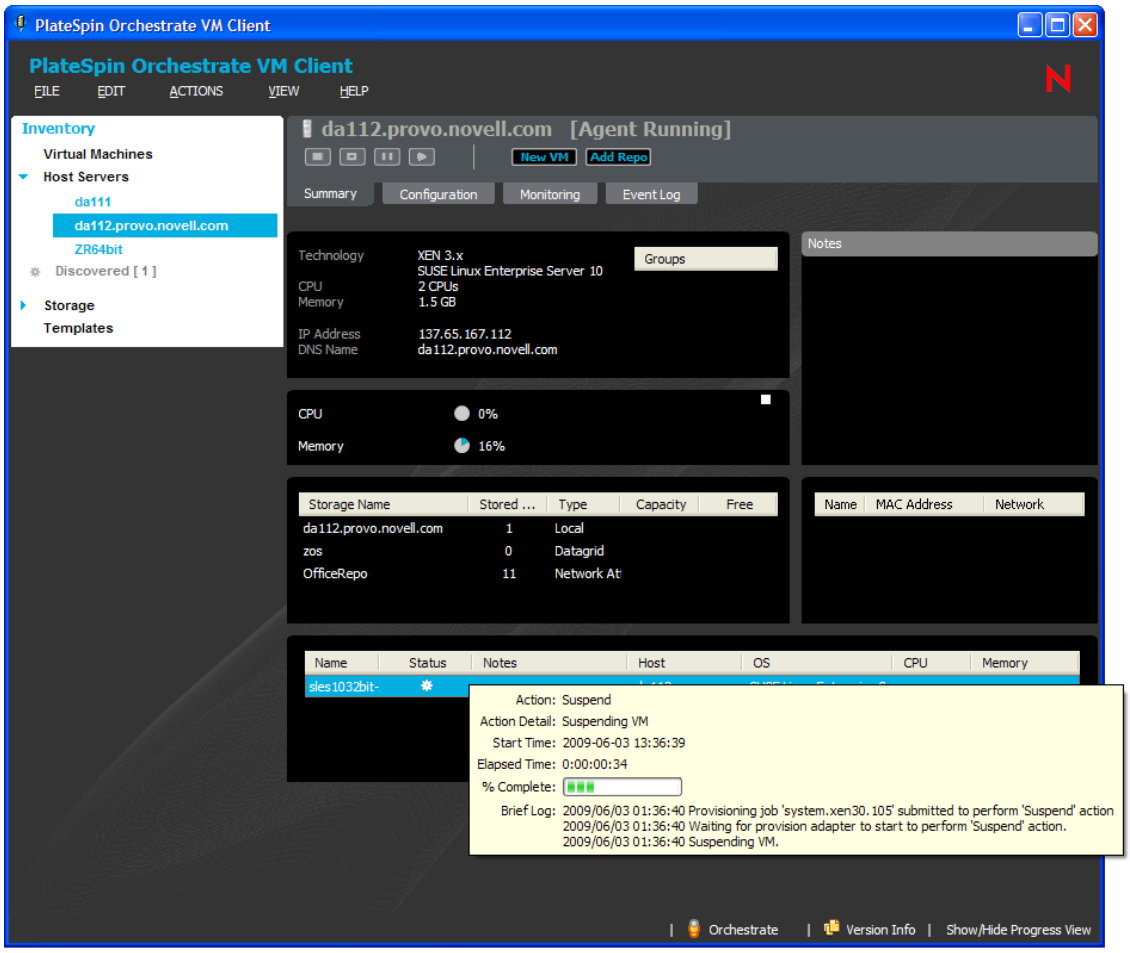


For more information, see Section 5.2.5, "Event Logs," on page 94.

5.2.2 Progress Bar for Details Views

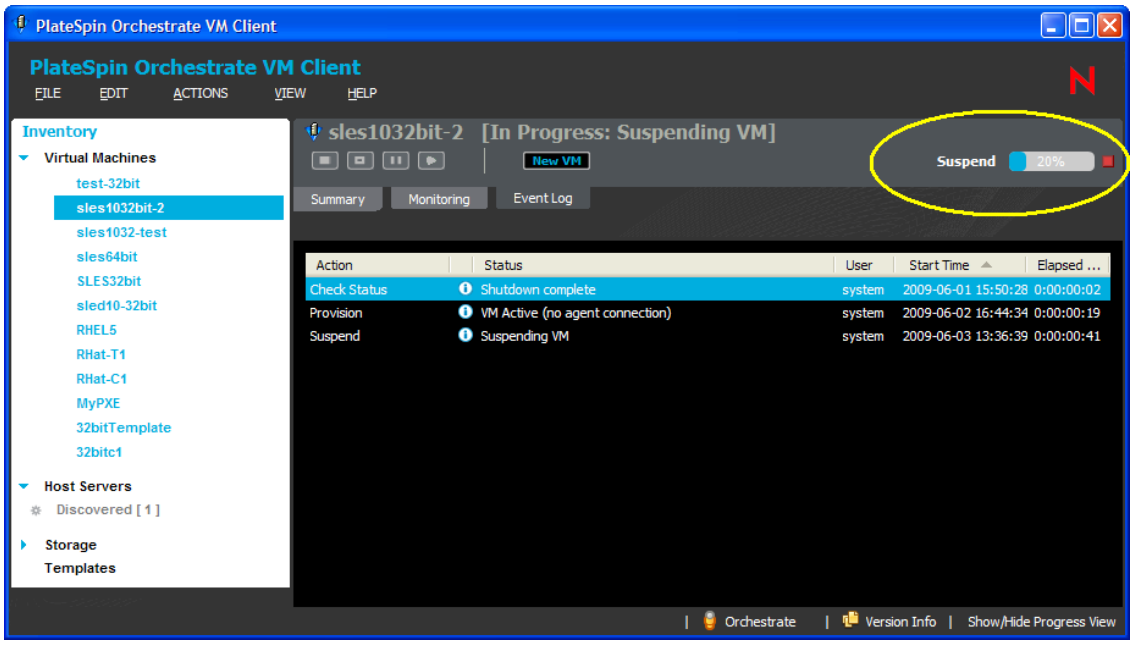
If you start an action on a VM from within a details view, a progress bar is displayed in the upper right of the VM Client window. To view it:

1. To get a VM in an action state, in the host server's *Summary* tab, right-click a VM and select an action.
2. To view a progress bar on the host server's details tab view, mouse over the VM:



3 In the *Virtual Machines* view, double-click the VM.

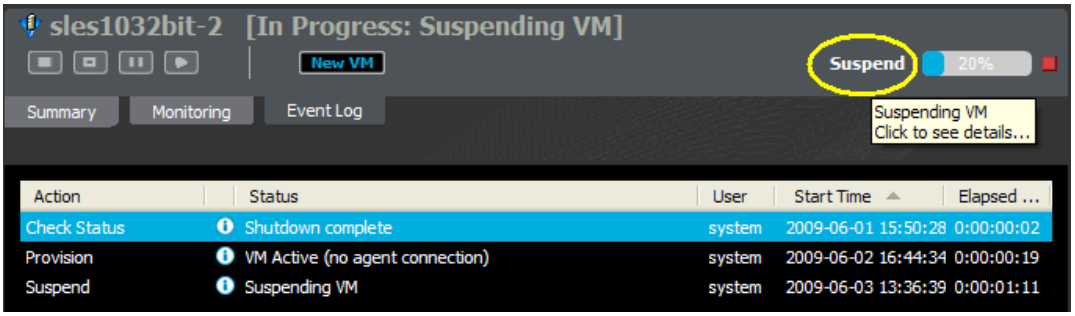
This changes the to details view to of the VM and displays the progress bar and progress description in the upper right of the VM Client window:



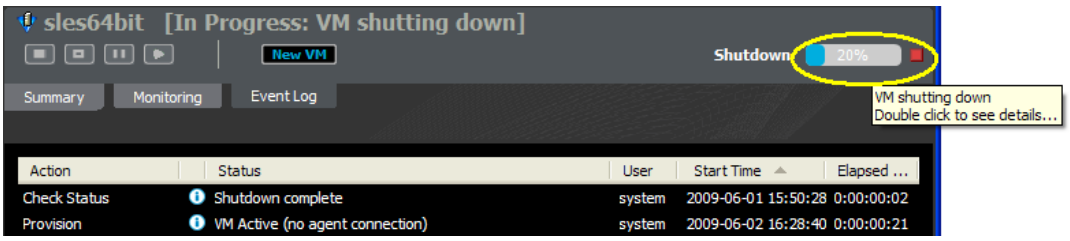
The progress bar shows the percentage completed. It only displays for a selected VM that has an action in progress.

4 To view the log information, do one of the following:

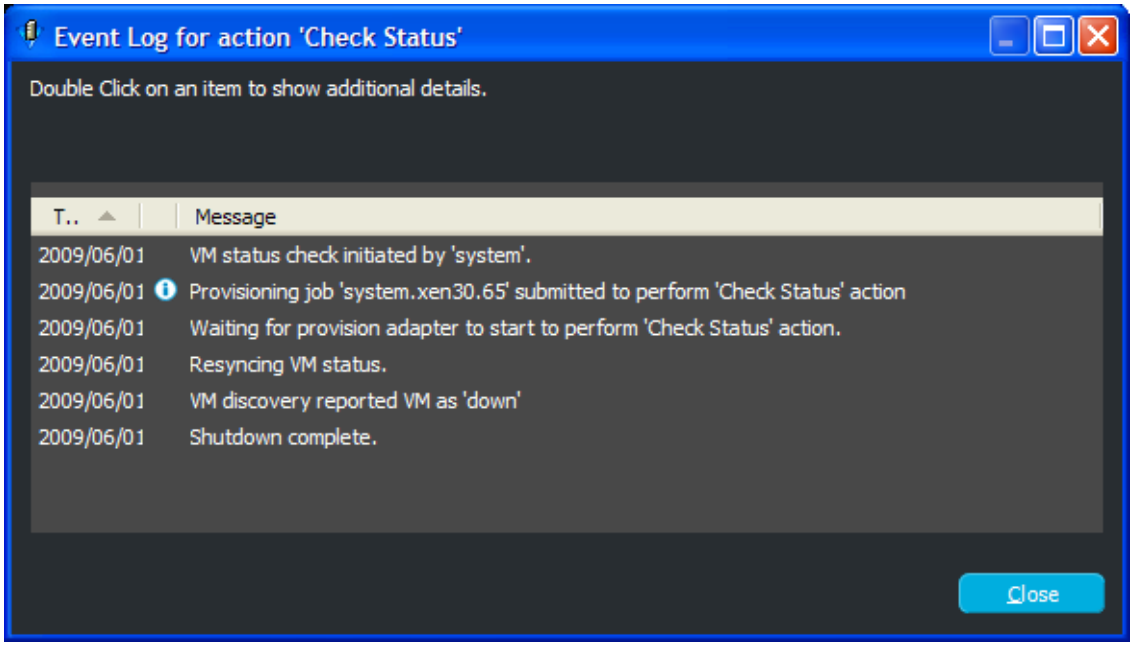
- Single-click the text to the left of the progress bar:



- Double-click the progress bar:



This opens the Event Log dialog box:

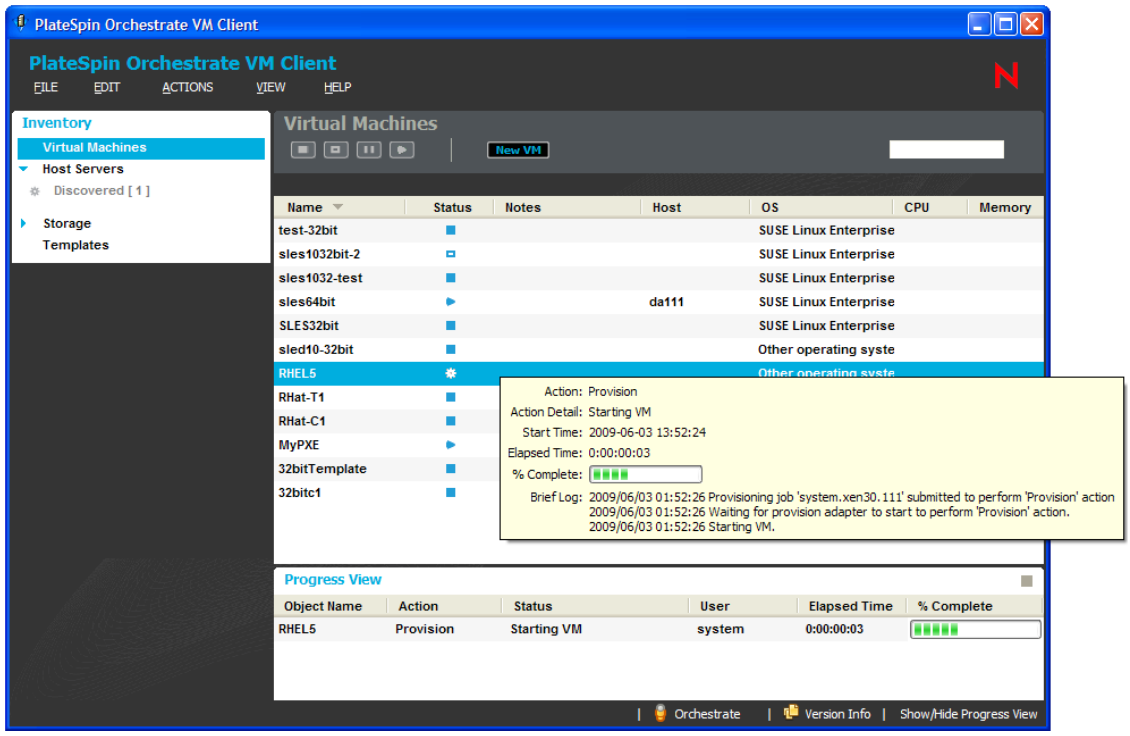


You can click any icons that are displayed for more detailed log information.

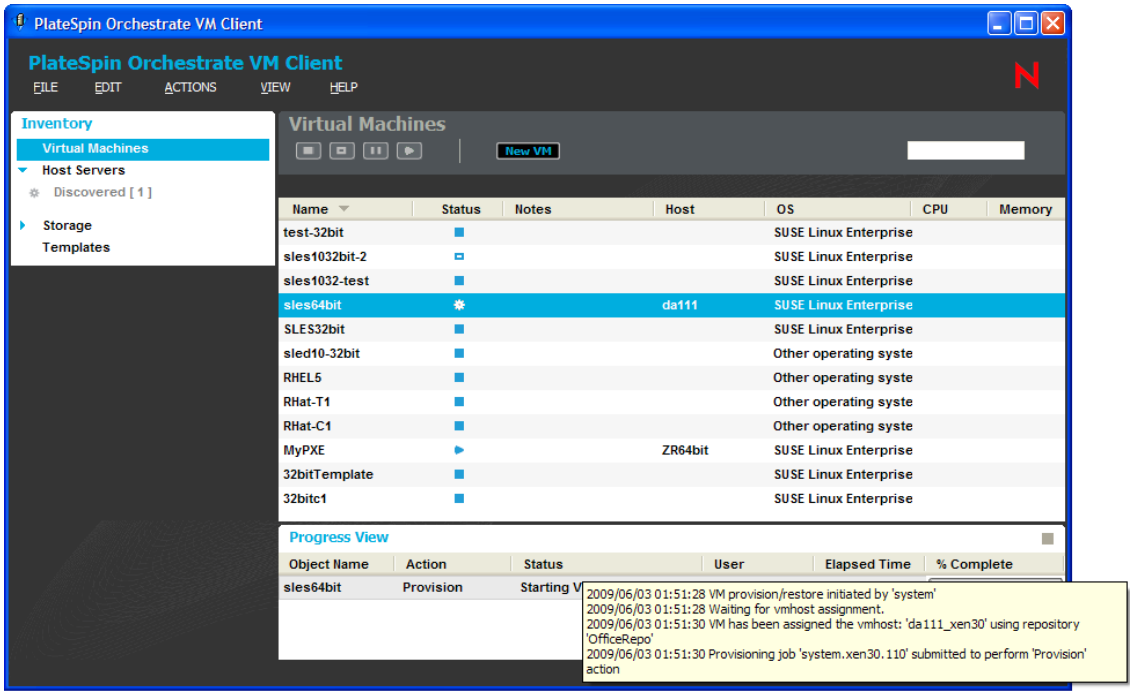
5.2.3 Progress Bar in a Tool Tip

There are two places where you can use the mouse-over function to view progress information:

- You can view the progress of an action by mousing over its icon in the *Status* column of the *Virtual Machines* view, or the *Status* column of the *Summary* tabs for host servers and templates:



- You can view the status log of the action by mousing over the entry in the *Status* column in the Progress View:



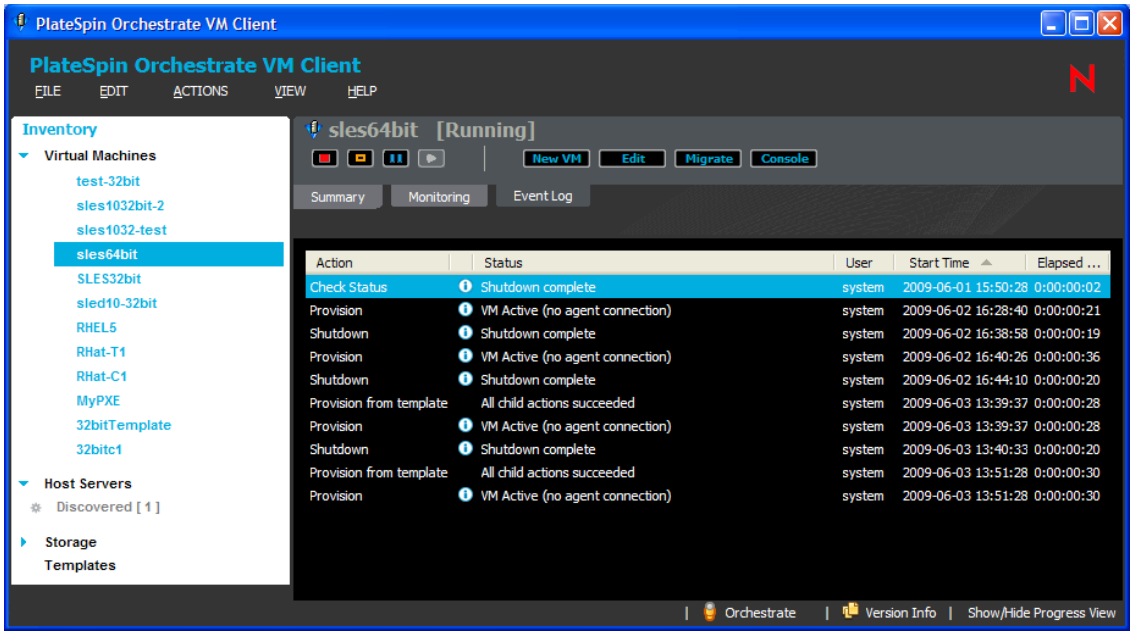
5.2.4 Event Log Tab

You can view the progress of all actions for a VM by viewing its *Event Log* tab:

1 In the VM Client, click *Virtual Machines* to display the VMs, then do one of the following to open its details views:

- Double-click the VM, then click the *Event Log* tab.
- Right-click the VM, select *Show Details*, then click the *Event Log* tab.

The following view is displayed:



2 To view the information in a different order, click any column to sort by that column.

Click the column again to reverse the sorting order.

3 To quickly locate specific information, click anywhere in the list, then begin typing a search string.

This opens the locator pop-up and selects the first match. You can modify the string to refine the search, and you can use the up-arrow and down-arrow to move from match to match.

4 To view more detailed information for an entry, double-click its icon.

For more information, see Section 5.2.5, “Event Logs,” on page 94.

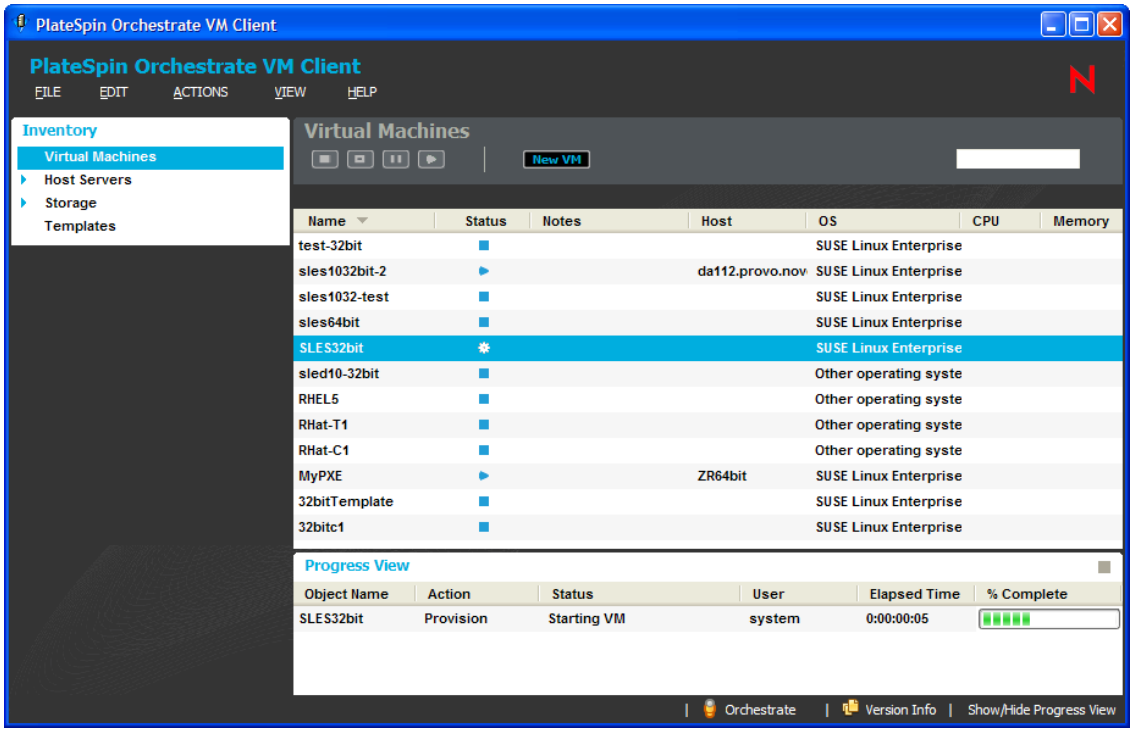
5.2.5 Event Logs

You can view the progress of an action by accessing its individual event logs:

1 In the VM Client, do one of the following to open the *Progress View* section:

- In the VM Client, click *View* > *Show Progress View*.
- In the VM Client, double-click *Show/Hide Progress View* in the lower right corner of the VM Client window.

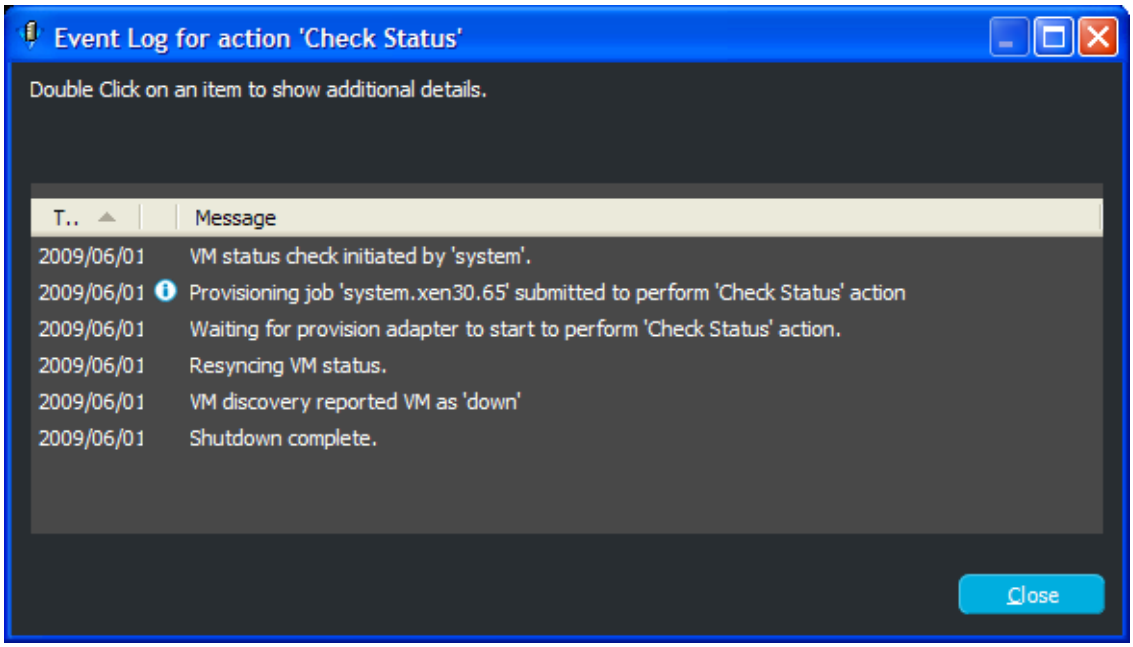
The following view is opened:



2 In the *Progress View* section, do one of the following:

- Double-click the entry that is displayed in the *Status* column.
- Right-click the entry that is displayed in the *Status* column and select *Show Log*.

The following dialog box is displayed:



These events are logged dynamically in the Event Log dialog box. Events with the icon provide further detail (see Step 5).

You can also view this dialog box for VMs that are in an unknown state (the ? icon).

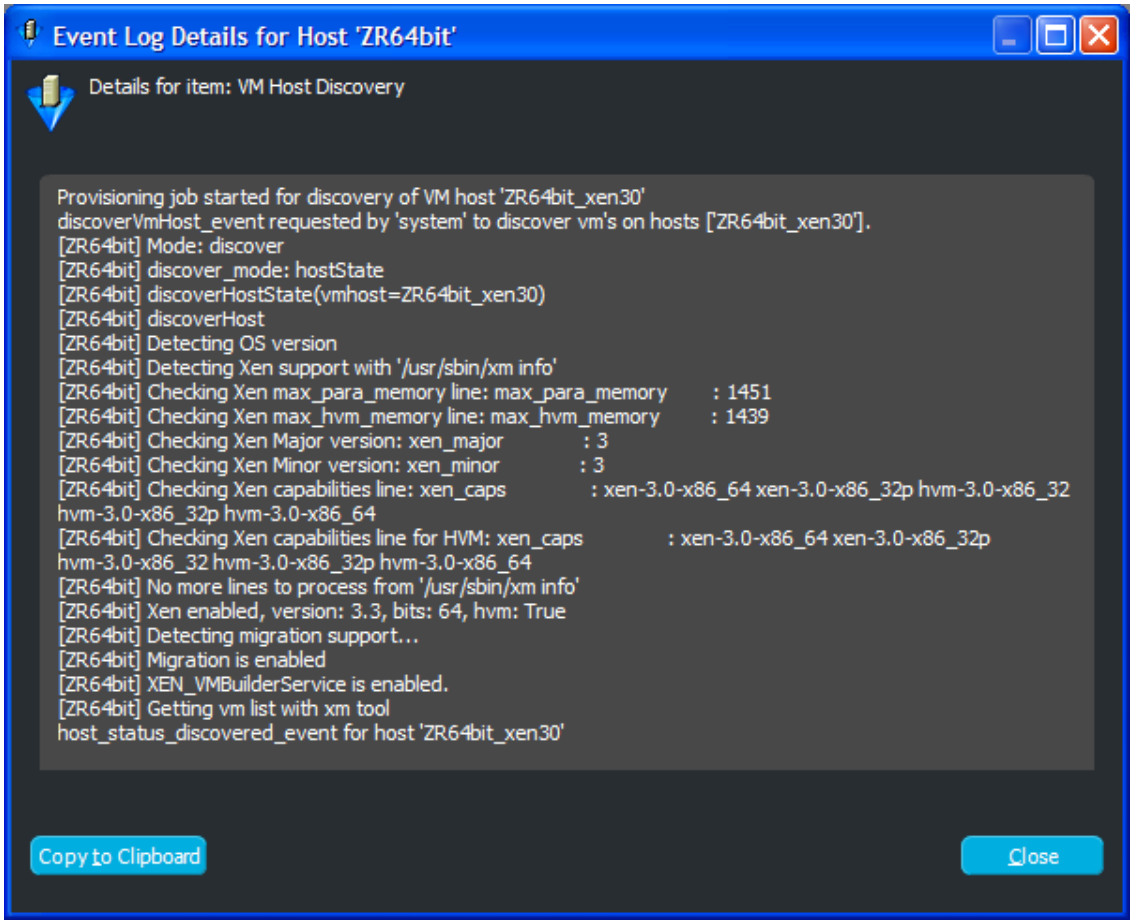
3 To view the information in a different order, click any column to sort by that column.

Click the column again to reverse the sorting order.

4 To quickly locate specific information, click anywhere in the list, then begin typing a search string.

This opens the locator pop-up and selects the first match. You can modify the string to refine the search, and you can use the up-arrow and down-arrow to move from match to match.

5 For further job details on an event, double-click its icon:



These details are logged dynamically in the Event Log Details dialog box.

Only the *Event Log* entries that have further job information available have the icon in the *Additional Information* column.

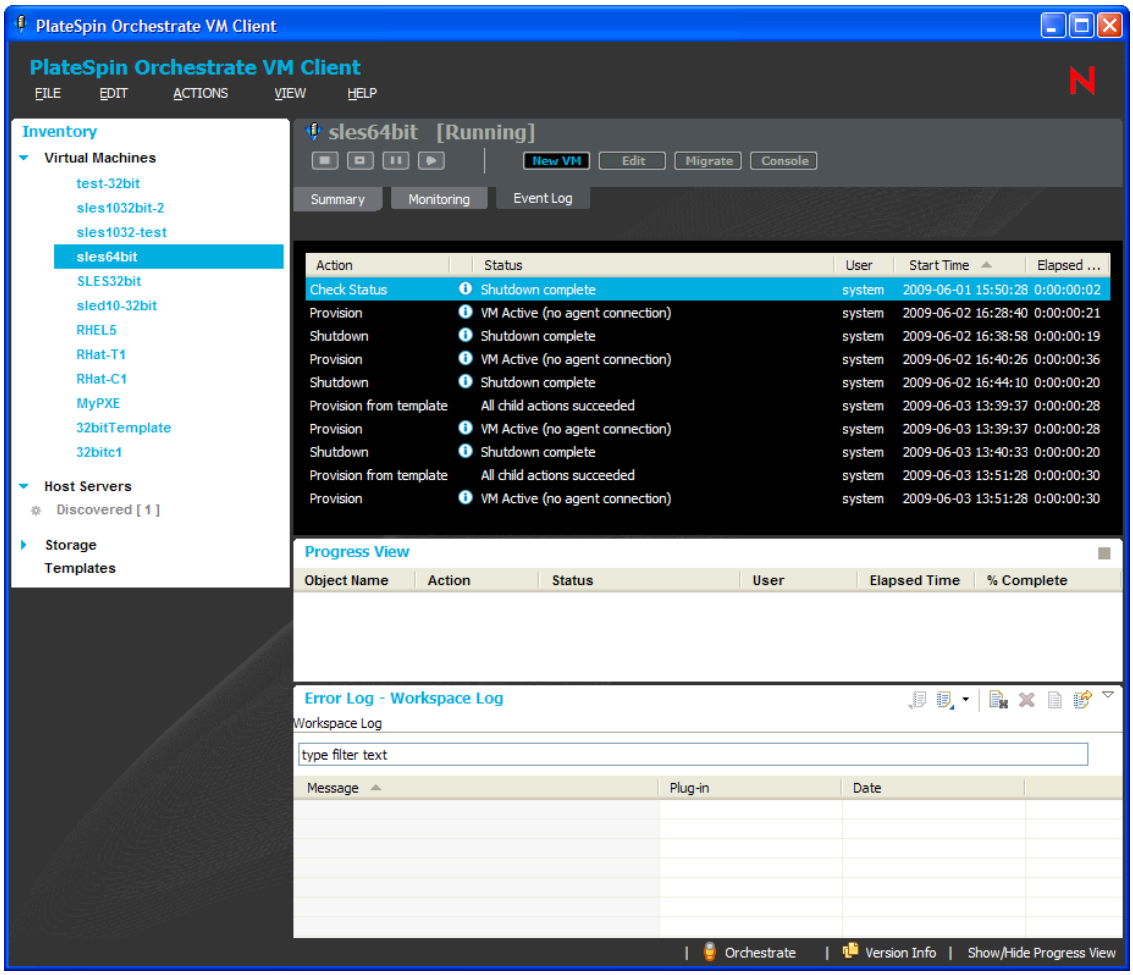
You can have multiple Event Log Details dialog boxes open simultaneously to monitor multiple tasks for the same VM or for multiple VMs.

The Event Log Details dialog box provides the same information as the Job Details dialog box in the Orchestration Console.

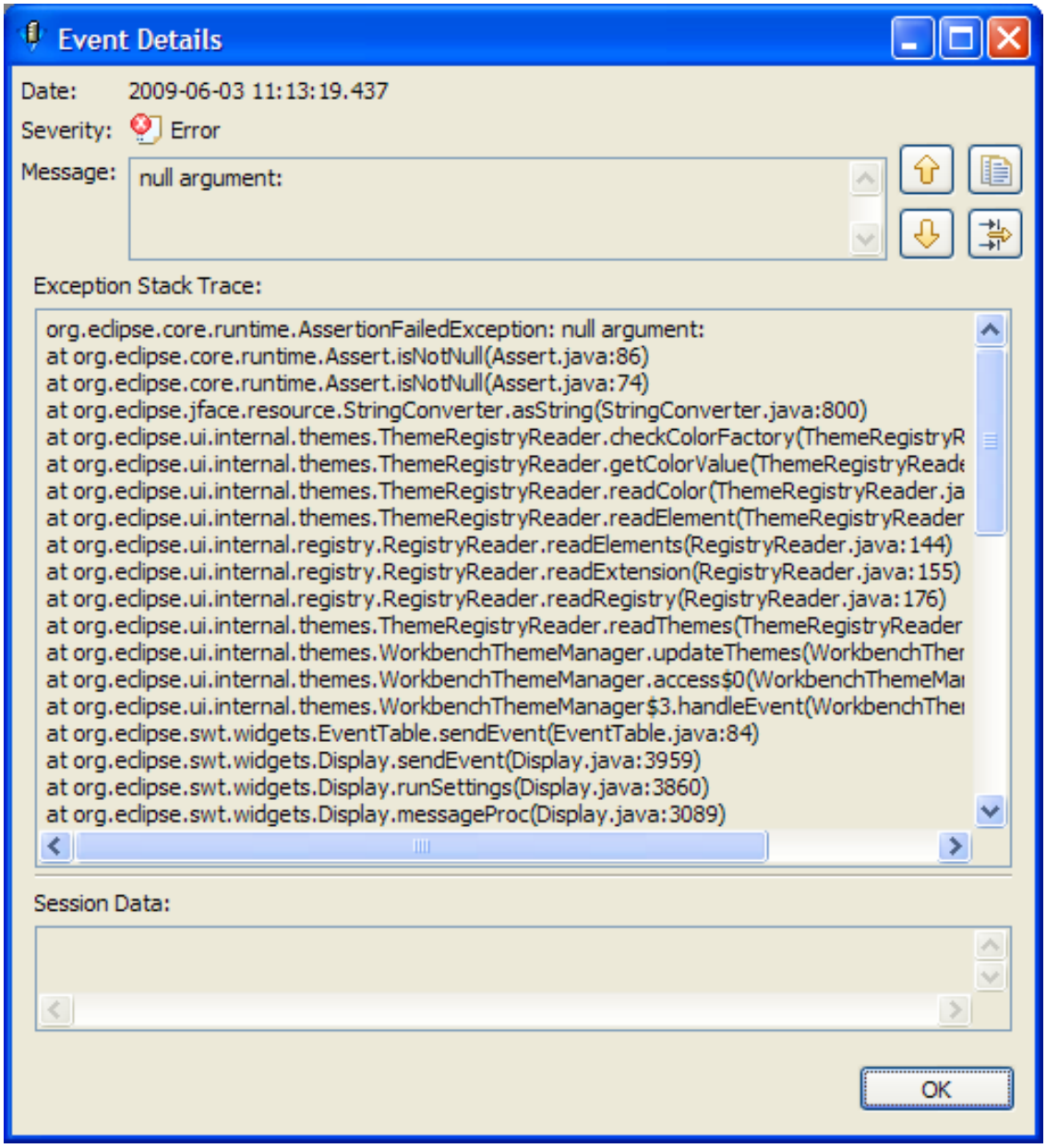
5.2.6 Error Log

To use the *Error Log* section:

1 In the VM Client, click *View* > *Show Error Log* to display the *Error Log* section:



2 To view further information on an error, double-click the error to display its Event Details dialog box:



5.3 Virtual Machine Actions

All of the actions that you can perform on a VM can be tracked during execution by viewing the logging messages in the *Event Log* tab for the VM, and in the Event Log and Event Details dialog boxes (see Section 5.2, "Using Feedback to Manage VMs," on page 87). These logs provide a history of all VM actions.

You can also see which VM operator initiated an action. The VM operator's login name is displayed in the *User* column of the *Event Log* details tab for the VM. For information on setting up different VM operator login names, see Appendix D, "Adding User Logins for VM Operators," on page 201.

Even if you log in and log out of the VM Client, all logs are maintained and continue to progress so that you can still monitor an action after logging back in to the VM Client.

You can do the following for hands-on management of VMs:

- Section 5.3.1, "Understanding a VM's Status," on page 99
- Section 5.3.2, "Canceling a VM's In-Progress Action," on page 100
- Section 5.3.3, "Starting a VM," on page 100
- Section 5.3.4, "Shutting Down a VM," on page 102
- Section 5.3.5, "Accessing a VM's Console," on page 103
- Section 5.3.6, "Pausing a VM," on page 103
- Section 5.3.7, "Resuming a Paused VM," on page 103
- Section 5.3.8, "Suspending a VM," on page 104
- Section 5.3.9, "Resuming a Suspended VM," on page 104
- Section 5.3.10, "Resynchronizing a VM's State," on page 105

5.3.1 Understanding a VM's Status

In the *Virtual Machines* view, the *Status* column indicates the state of each VM:

Table 5-1 *VM Status Icons*

Icon	VM's Status	Enabled Actions for the Selected VM
	Has been defined or is being defined.	*Show Details*, *Install*, *Edit*, *Resync State*, *Delete*, *New VM*, and *Remove from Group*. The VM is eligible to be installed.
	Has an action that is in progress.	Other actions cannot be run against this VM until the current action has finished.
	Is running.	*Show Details*, *Restart*, *Suspend*, *Pause*, *Shut Down*, *Edit*, *Resync State*, *Migrate*, *New VM*, *Show Console*, and *Remove from Group*.
	Is down.	*Show Details*, *Start*, *Edit*, *Create Template*, *Resync State*, *Move*, *Delete*, *Install Agent*, *New VM*, and *Remove from Group*.
	Is paused.	*Show Details*, *Resume*, *Edit*, *Resync State*, *Delete*, *New VM*, and *Remove from Group*.
	Is suspended.	*Show Details*, *Resume*, *Edit*, *Resync State*, *Move*, *Delete*, *New VM*, and *Remove from Group*.
	The state is unknown.	*Show Details*, *Edit*, *Resync State*, *Delete*, *New VM*, and *Remove from Group*. For information on making an unknown state known, see Section 4.5, "Resynchronizing a Host Server's State," on page 80 and Section 5.3.10, "Resynchronizing a VM's State," on page 105.

VM statuses are updated globally; they show any status change that is made in your local instance of the VM Client and any change made from other VM Client instances being run by other VM operators.

You can tell whether a VM or host server has the Orchestration Agent installed on it by whether there are pie charts in its *CPU* and *Memory* columns, but only if the VM or host is running at the time.

5.3.2 Canceling a VM's In-Progress Action

Sometimes the progress hangs for an action taken on a VM, or you might change your mind about continuing with the action. You can do the following:

- To determine whether an action is progressing normally, double-click the icon to open the *Event Log* tab for the VM and review the log entries.

  For more information, see Section 5.2, "Using Feedback to Manage VMs," on page 87.
- To cancel an action in the VM Client, right-click the VM in the *Virtual Machines* view, then select *Cancel Action*.
- To cancel an action in the Orchestration Console, go to the *Explorer* tree view. Under the *Resources* subsection, locate the VM in one of the *Resources* subsections (such as *VMs*), right-click the VM, then select *Cancel Action*.

  In the VM Client window, the *Status* column should now show the previous state of the VM.

5.3.3 Starting a VM

In order to start a VM on a host server, the following conditions must exist:

- The VM's files and image must be either:
  - Stored locally on the host server.

    or
  - Stored in a shared repository accessible by the host server.
- The host server and VM must have the same architecture (such as 32-bit or 64-bit), mount points, and routing of network connections to the virtual network.

  For example, a 64-bit paravirtualized guest created on a 64-bit hypervisor can be started on a host server running a 64-bit hypervisor, but not a 32-bit hypervisor. Or, a 32-bit VM created on a 64-bit hypervisor can be started on a 64-bit hypervisor host. In other words, you cannot start a VM on a host that has a different architecture from the host where the VM was created.
- The host server cannot be fully utilized, because it would be incapable of hosting the VM.
- The host server cannot have met its maximum allowable VMs. This value is set in the Orchestration Console in the *Max Hosted VMs* field. The default is 8. It does not matter whether the maximum VMs that the host server is already hosting are fully utilizing it.
- The VM cannot be disabled by having its *Resource Enabled* check box deselected in the Orchestration Console. By default, this check box is enabled.
- The VM cannot be out of sync, which can occur if it is manually accessed or manipulated via a third-party tool. For example, you could manually start the VM on the physical host machine. However, you can resynchronize the VM with the Orchestration Server.

  Host servers are only available if they are not out of sync.

These conditions are automatically enforced with constraints.

If the above criteria are met by the VM and only one host server, then the VM is automatically started on that host server, provided the VM's files reside on that server or in a shared repository.

If the criteria are met by multiple host servers and the VM's files reside in a shared repository, you can start the VM by selecting any host server, or by selecting to have the Orchestration Server automatically select the host server.

If no host servers meet these requirements, or if the VM does not meet its requirements, the No Start Target Available dialog box is displayed, indicating that you need to resolve the issues to continue.

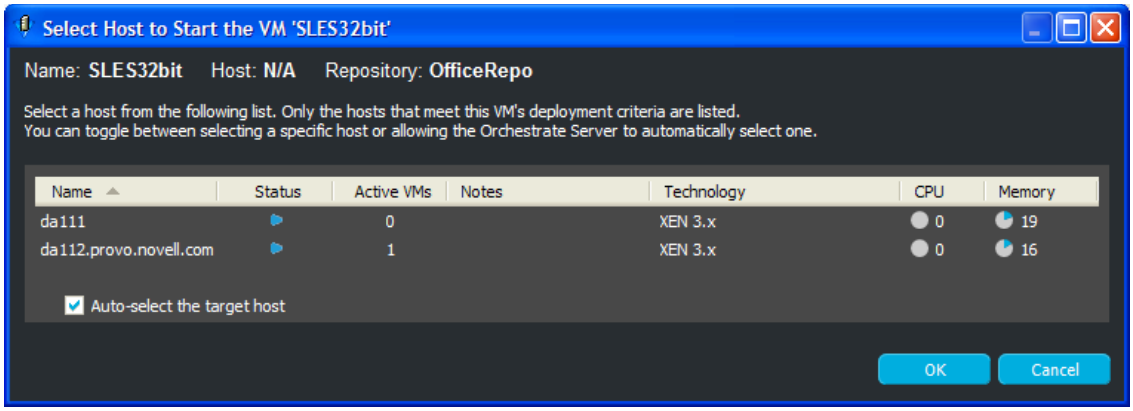
You can start any VM that is not running. However, starting a paused or suspended VM can cause its previously saved state to be lost. For more information on paused or suspended VMs, see Section 5.3.6, "Pausing a VM," on page 103 and Section 5.3.8, "Suspending a VM," on page 104.

To start a VM:

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Click the VM that you want to start, then click the button.
   - Click the VM that you want to start, then click *Action* > *Start*.
   - Right-click the VM that you want to start, then select *Start*.

   If only one host server is available, it is automatically used if the VM's files are either stored on that server or in a shared repository.

   If there are two or more target host candidates, the following dialog box is displayed if the VM's files are stored in a shared repository:

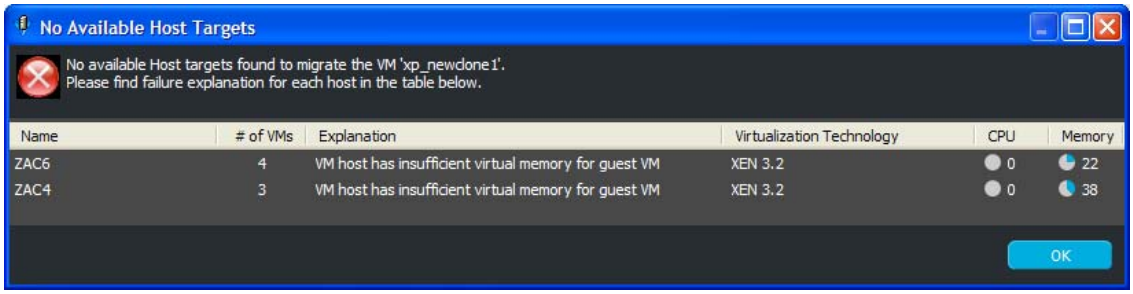


3. Select a host server, or select the *Auto-Select the Target Host* check box.

   The *Auto-Select the Target Host* option allows the Orchestration Server to automatically select a host server from those that are available by using ranking criteria such as architecture similarity and available CPU and RAM resources. For example, hosts are selected that meet the architecture requirements, the cost of moving information is then considered, and if there is still no clear winner, then the least loaded machine is selected. The ranking criteria can be affected by policies that you might have set in the Orchestration Console.

   The VM starts, using the processes for the operating system it is running. You can use the *Show Console* menu option to authenticate if you want to view its console and log in to the operating system.

If there is no available host server for starting the VM, the following dialog box is displayed:



4 Review the issues, resolve them, then repeat from Step 2.

5 You can view the startup progress in any of the following ways:

- Double-click the VM being started, click the *Event Log* tab, then double-click the entry related to the starting process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* to open the Progress window.
- View its progress in the *Jobs* tab of the Orchestration Console.

5.3.4 Shutting Down a VM

Shutting down a VM is the same as shutting down any computer. Its current state is not saved. If you want to retain a VM's state, use one of the following options instead:

- Section 5.3.6, "Pausing a VM," on page 103
- Section 5.3.8, "Suspending a VM," on page 104

To shut down a VM:

1 In the VM Client, click the *Virtual Machines* view.

2 Do one of the following:

- Select the VMs to be shut down, then click the button.
- Select the VMs to be shut down, then click *Actions* > *Shut Down*.
- Right-click each VM to be shut down, then select *Shut Down*.

The selected VMs are shut down. Their current state is not saved.

3 You can view the shutdown progress in any of the following ways:

- Double-click the VM being shut down, click the *Event Log* tab, then double-click the entry related to the process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* to open the Progress window.
- View its progress in the *Jobs* tab of the Orchestration Console.

4 To restart a VM that is shut down, continue with Section 5.3.3, "Starting a VM," on page 100.

5.3.5 Accessing a VM's Console

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Select the VM, then click the Console button.
   - Select the VM, then click *View* > *Show Console*.
   - Right-click the VM, then select *Show Console*.
3. Provide the VNC password, then click *OK*.

5.3.6 Pausing a VM

If you need to free up CPU cycles on the host machine, you can pause some of the VMs. This option writes the current state of the VM to the host machine's RAM so that it can be recovered by resuming the VM. A paused VM can also be moved to a suspended state without resuming it first.

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Select the VMs to be paused, then click the button.
   - Select the VMs to be paused, then click *Actions* > *Pause*.
   - Right-click the VMs to be paused, then select *Pause*.

   Each VM's state is saved to RAM on the host machine.

WARNING: If you use the *Restart* option to reboot a VM, its previous state is lost. If you want to recover its previous state, use the *Resume* option, which reads the VM information from the host machine's RAM.

Also, if you reboot the host machine, the VM's state is lost, because it was saved to the host machine's RAM. To prevent the loss of a VM's state when you need to reboot the host machine, first use the *Suspend* option to suspend the VM.

5.3.7 Resuming a Paused VM

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Select the VMs to start again, then click the button.
   - Select the VMs to start again, then click *Actions* > *Resume*.
   - Right-click the VMs to start again, then select *Resume*.

   The previous state of the VM is restored from the information that was written to the host machine's RAM when the *Pause* option was used.

   If the VM's console was open, it reopens automatically.

5.3.8 Suspending a VM

If you need to temporarily free up RAM on your host machine, or to save the state of any VMs running when you reboot the host machine, use the *Suspend* menu option. This option writes the current state of the VM to the host machine's hard drive so that it can be recovered by resuming the VM.

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Select the VMs to be suspended, then click the button.
   - Select the VMs to be suspended, then click *Actions* > *Suspend*.
   - Right-click the VMs to be suspended, then select *Suspend*.

   When you select multiple VMs, each suspend operation is done according to how jobs are handled by Orchestration Server.

   WARNING: If you use the *Restart* option to reboot the VM, its previous state is lost. If you want to recover its previous state, use the *Resume* option, which reads that information from the host machine's hard drive.
3. You can view the progress in any of the following ways:
   - Double-click the VM being suspended, click the *Event Log* tab, then double-click the entry related to the process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
   - Observe messages at the bottom of the VM Client interface.
   - Click *View* > *Show Progress View* to open the Progress window.
   - View its progress in the *Jobs* tab of the Orchestration Console.

5.3.9 Resuming a Suspended VM

1. In the VM Client, click the *Virtual Machines* view.
2. Do one of the following:
   - Select the VMs to start again, then click the button.
   - Select the VMs to start again, then click *Actions* > *Resume*.
   - Right-click the VMs to start again, then select *Resume*.

   The previous state of the VM is restored from the information that was written to the host machine's hard drive when the *Suspend* option was used.

   If you had the VM's console open, you need to reopen it by using the *Show Console* menu option.
3. You can view the progress in any of the following ways:
   - Double-click the VM being resumed, click the *Event Log* tab, then double-click the entry related to the process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
   - Observe messages at the bottom of the VM Client interface.
   - Click *View* > *Show Progress View* to open the Progress window.
   - View its progress in the *Jobs* tab of the Orchestration Console.

5.3.10 Resynchronizing a VM's State

The Orchestration Server is automatically updated to show the VM's state after every provisioning action. However, the VM's state is not automatically updated in the Orchestration Server if the VM state is changed by any third-party tool or by manually manipulating the VM on the physical host machine (for example, if you use virt-man or XM, or if some process dies). You must manually synchronize the VM's state in the Orchestration Server to reflect the VM's current state.

Resynchronizing a VM allows the Orchestration Server to determine the state of the VM and update the Orchestration Server with that state.

To resynchronize a VM:

1. In the VM Client, click the *Virtual Machines* view.
2. Right-click the VM to be resynchronized, then select *Resync State*.

   You cannot select multiple VMs for this operation.

   If the resync state is not automatically updated for the VM, open the VM's details page for the VM in either of the following ways to get the updated status.

   - Double-click the VM.
   - Right-click the VMs, then click *Show Details*.
3. You can view the progress in any of the following ways:
   - Double-click the VM being synchronized, click the *Event Log* tab, then double-click the entry related to the process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
   - Observe messages at the bottom of the VM Client interface.
   - Click *View* > *Show Progress View* to open the Progress window.
   - View the synchronization progress in the *Jobs* tab of the Orchestration Console.

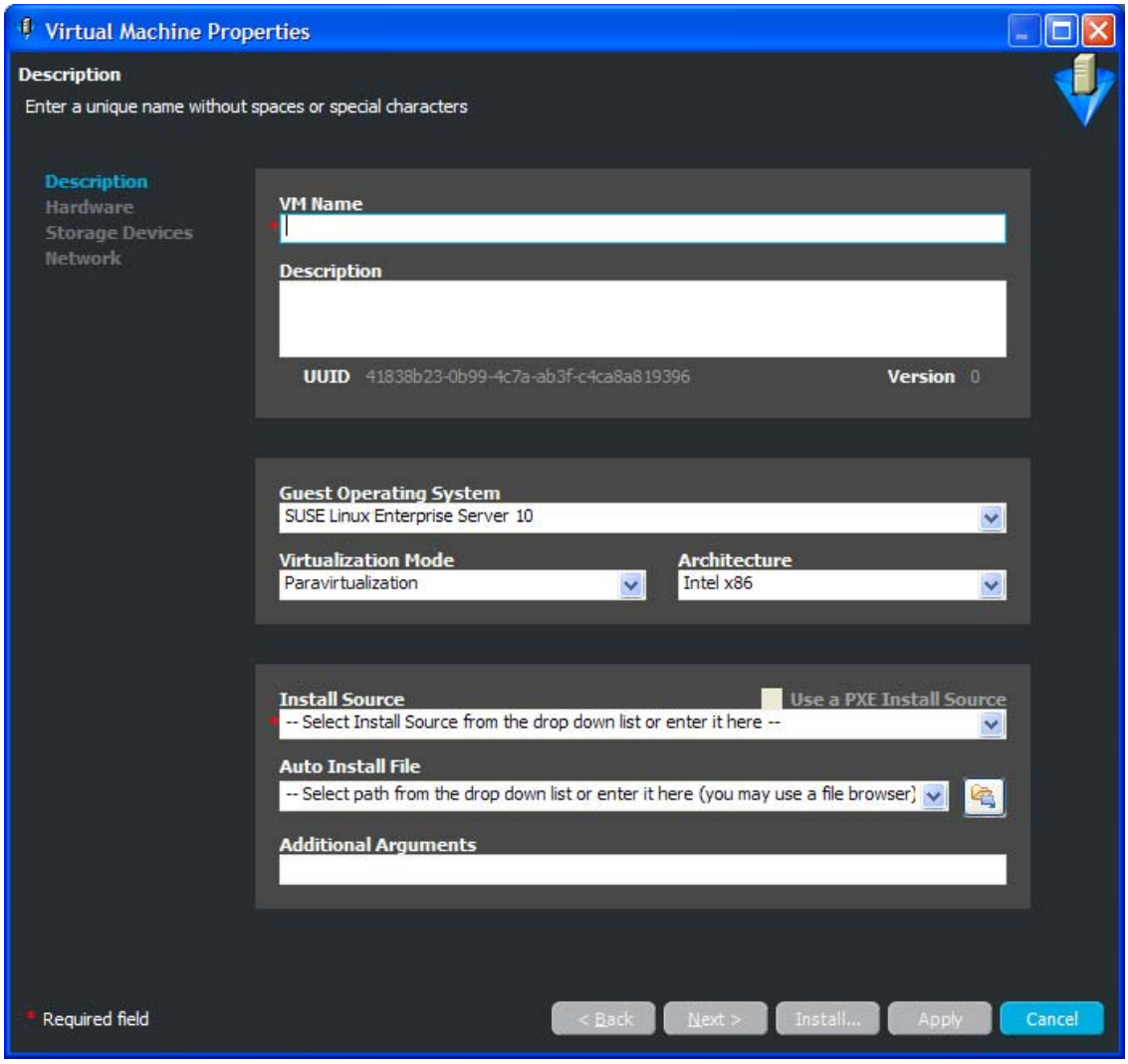
5.4 Creating a Xen VM

Refer to the appropriate third-party documentation for how to create VMs for VMware ESX Server and Microsoft Windows Server 2008 with Hyper-V. To bring them into the virtualization grid, see Section 2.6, "Discovering VMs of the Registered VM Hosts," on page 24.

To create a new Xen VM for the virtualization grid that you are logged in to, run the Virtual Machine Properties Wizard:

1. In the VM Client, do one of the following to start the wizard:
   - Click the New VM button in any view.
   - Click *File* > *New VM* in any view.
   - Press Ctrl+N in any view.
   - Right-click any listed item in any view, then select *New VM*.

The following wizard page is displayed:



2 Fill in the fields to define the basic information for the VM:

VM Name: (Required) Name for the VM.

This name applies to all versions of the VM and must be unique. It cannot already exist in either the *Virtual Machines* or *Templates* lists.

The name cannot be longer than 100 characters and cannot start with the letters "xen."

Description: Note the purpose and any other specifics you might require of the VM. These notes apply to all versions of this VM.

UUID: Displays the UUID for the VM. This field is view-only.

Guest Operating System: The operating system you want to install on your VM. The following are supported:

SUSE Linux Enterprise Server 8
SUSE Linux Enterprise Server 9
SUSE Linux Enterprise Server 10
SUSE Linux Enterprise Server 11
SUSE Linux Enterprise Desktop 10

SUSE Linux Enterprise Desktop 11
openSUSE
openSUSE 11
Novell Open Enterprise Server 2 (Linux)
Novell Open Enterprise Server 2 (NetWare)
Novell NetWare 6.5 SP6 and earlier
Red Hat Enterprise Linux 3
Red Hat Enterprise Linux 4
Red Hat Enterprise Linux 5
Solaris 9 and older
Solaris 10
Microsoft Windows NT
Microsoft Windows XP, 2000, 2003
Microsoft Windows XP, 2003 (x64)
Microsoft Windows Vista
Microsoft Windows Vista (x64)
Microsoft Windows Server 2008
Microsoft Windows Server 2008 (x64)

There is also an "(other)" option for the following:

SUSE
Red Hat
Microsoft Windows

Virtualization Mode: *Full Virtualization* is hardware assisted virtualization, meaning the guest runs on an operating system that is aware it's being virtualized. Microsoft Virtual Server with Hyper-V is an example of full virtualization. *Paravirtualization* means that the operating system directly accesses elements of the hardware, including processor, display, memory, network interface card, and hard drive, and uses the hypervisor to emulate other hardware interactions. Xen is an example of a paravirtualization. However, Xen can also do full virtualization.

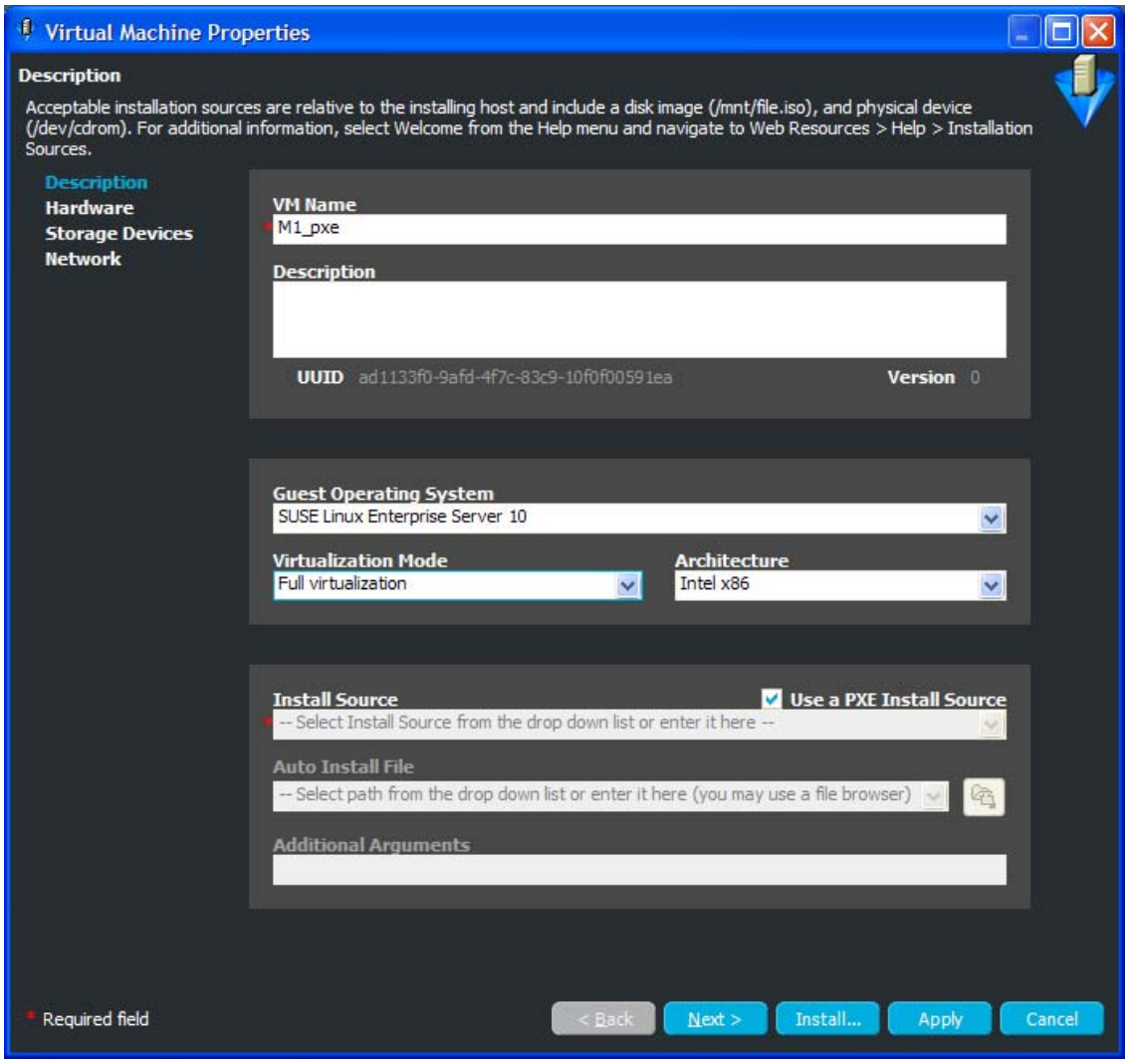
Paravirtualization performs much faster and with better hardware efficiency than full virtualization. However, full virtualization enables complete decoupling of the software from the hardware, which streamlines migration between servers.

NOTE: Refer to the SUSE Linux Enterprise Server (SLES) and Red Hat Enterprise Linux (RHEL) documentation to verify supported platforms in each virtualization mode.

Architecture: The type of processor you want to have as the virtual processor for the VM.

Install Source: (Required, if not PXE) The path to the installation media for your guest operating system. For a fully virtualized VM, the install source must be an ISO. For a paravirtualized VM, an ISO or network install source is required. For more information, see Appendix A, "VM Installation Sources," on page 195.

Use a PXE Install Source: This feature is only available when you select *Full Virtualization* in the *Virtualization Mode* field, and it works only if the host server that is selected for building this VM is on a network where PXE is running.



If you select this option, it disables the *Install Source*, *Auto Install File*, and *Additional Arguments* fields. The installation is then done from a PXE menu that is displayed when you are automatically connected to the target VM via VNC after you click *Install*.

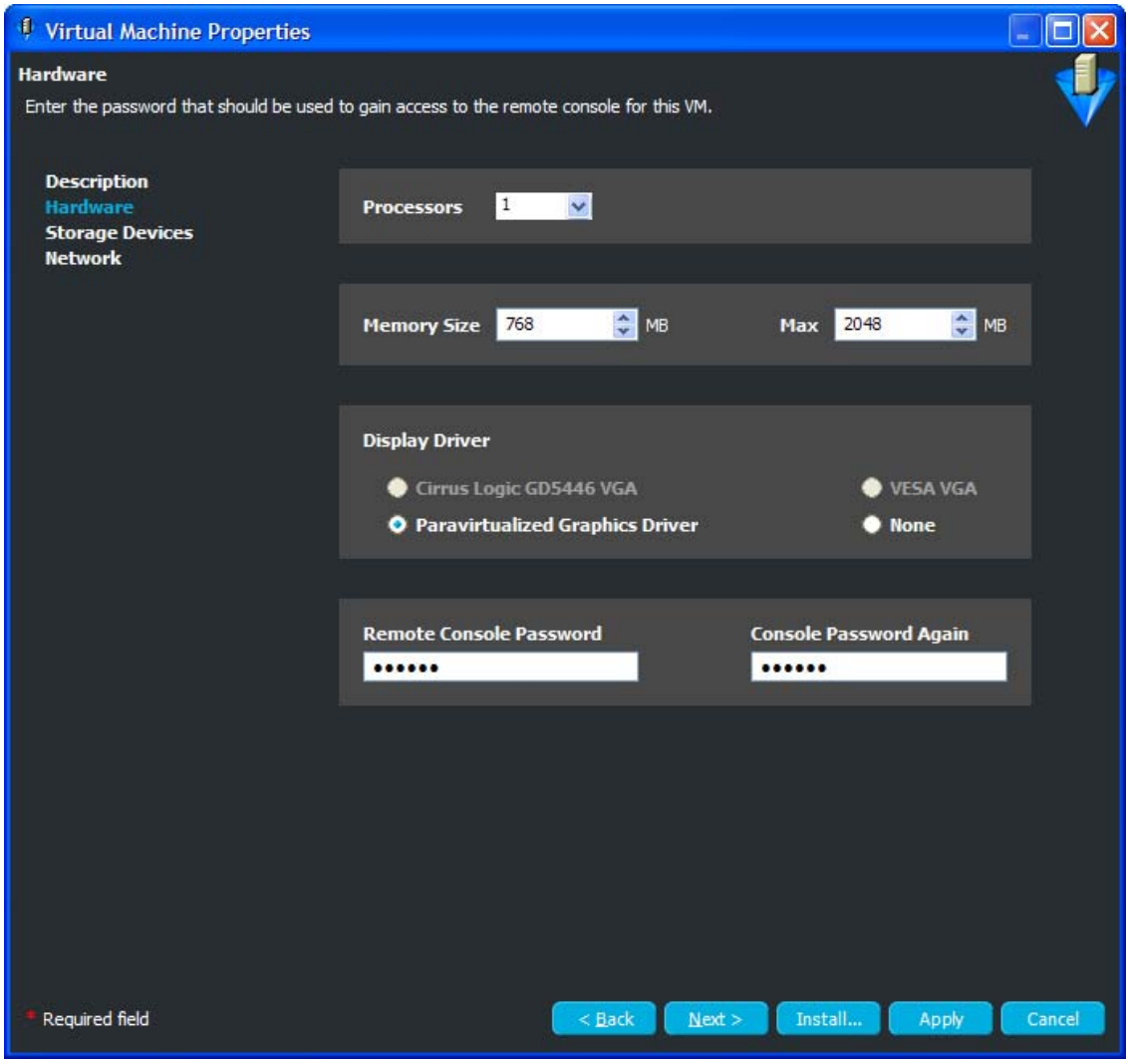
IMPORTANT: The default timeout for the PXE menu's autoboot might be too short because of the time that it takes for VNC to connect with target VM. For example, if your PXE timeout is set to 10 seconds, most of that might be used up in getting the PXE menu to display via VNC. If you want to select the installation source from the PXE menu, we recommend that you change it to a timeout value that works for you, such as 15 or 20 seconds.

Auto Install File: This field applies only to paravirtual installations. The file listed here is used to populate the answers needed during the installation of the guest operating system. Some examples include time zone, language, firewall, and other settings given in response to the user interactive areas of the installation. An AutoYaST file listed here can contain network settings that are applied during the VM Builder job. For RHEL, the file is a kickstart file.

IMPORTANT: The auto install file must reside locally on the machine where you are running the VM Client. It cannot be used from a host machine or another machine in your network.

Additional Arguments: This field applies only to paravirtual installations. These are Linux install arguments, which are operating system parameters similar to the information entered in a GRUB boot loader when running on bare hardware in SUSE Linux Enterprise Server (SLES) and SUSE Linux Enterprise Desktop (SLED). Additional network installation information can be added here, which is used during the build process to find the installation source for the VM build process.

3 Click *Next* to display the following wizard page:



4 Fill in the fields to define the kind of hardware to be virtualized for the VM:

Processors: The number of virtual processors the VM has.

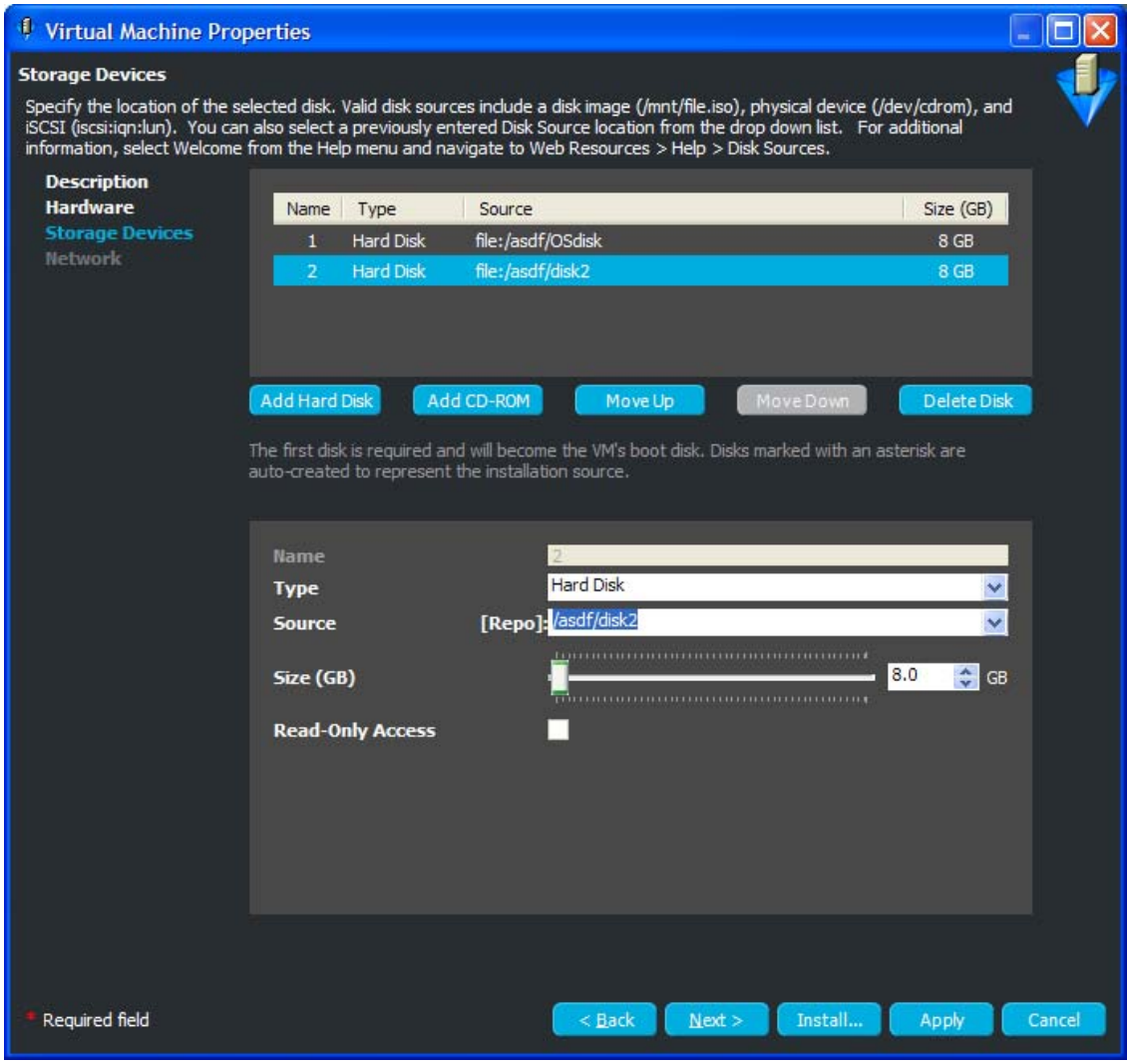
Memory Size: The amount of virtual RAM the VM has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Max: The amount of virtual RAM the VM has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Display Driver: The properties of the VM's display. If you have chosen paravirtualization for this VM, your only option is *Paravirtualized*. If you have chosen full virtualization, you can select between *VESA* or the on-board VGA. If you do not need a display, you can turn off the display on a fully virtualized machine.

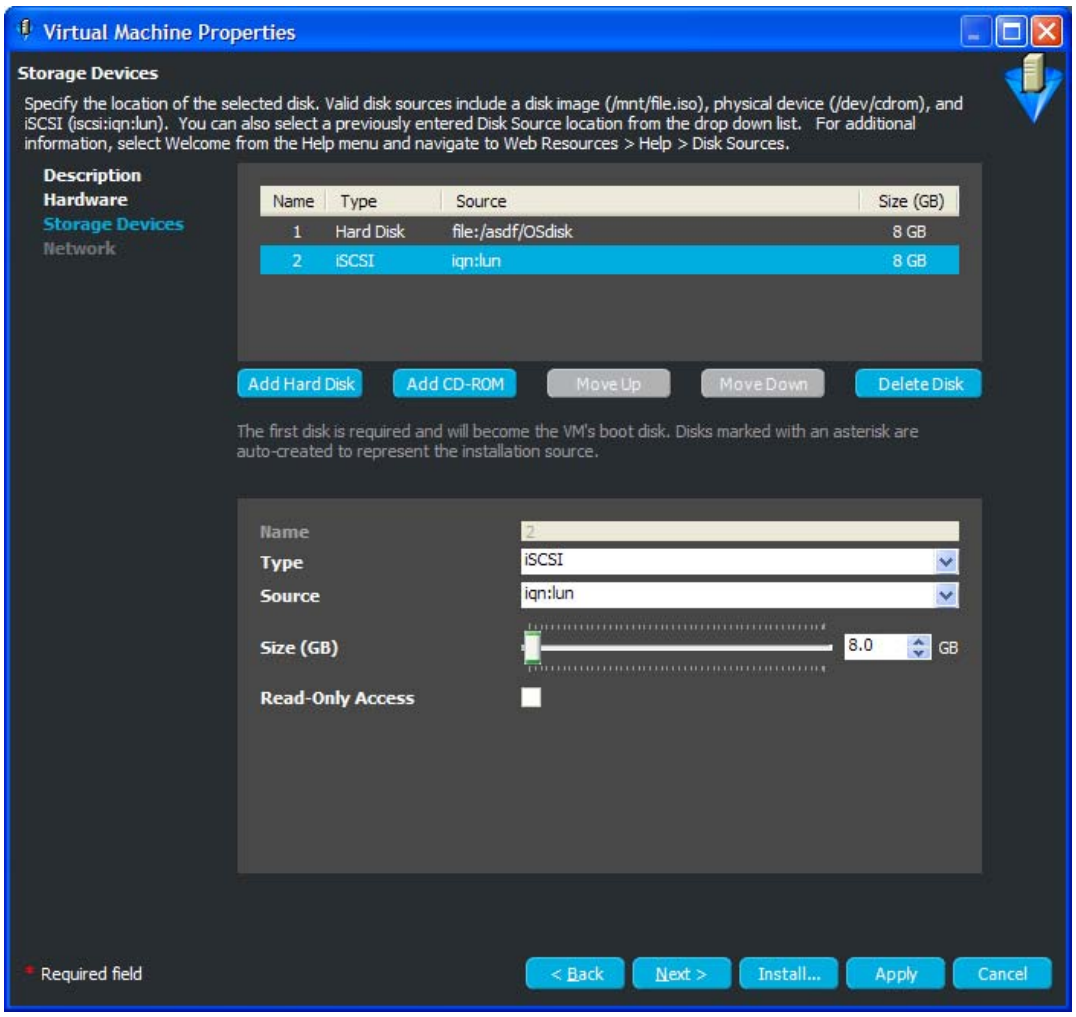
Remote Console Password: The password for remotely controlling the VM. Use the two fields to verify that it is typed correctly.

5 Click *Next* to display the following wizard page:

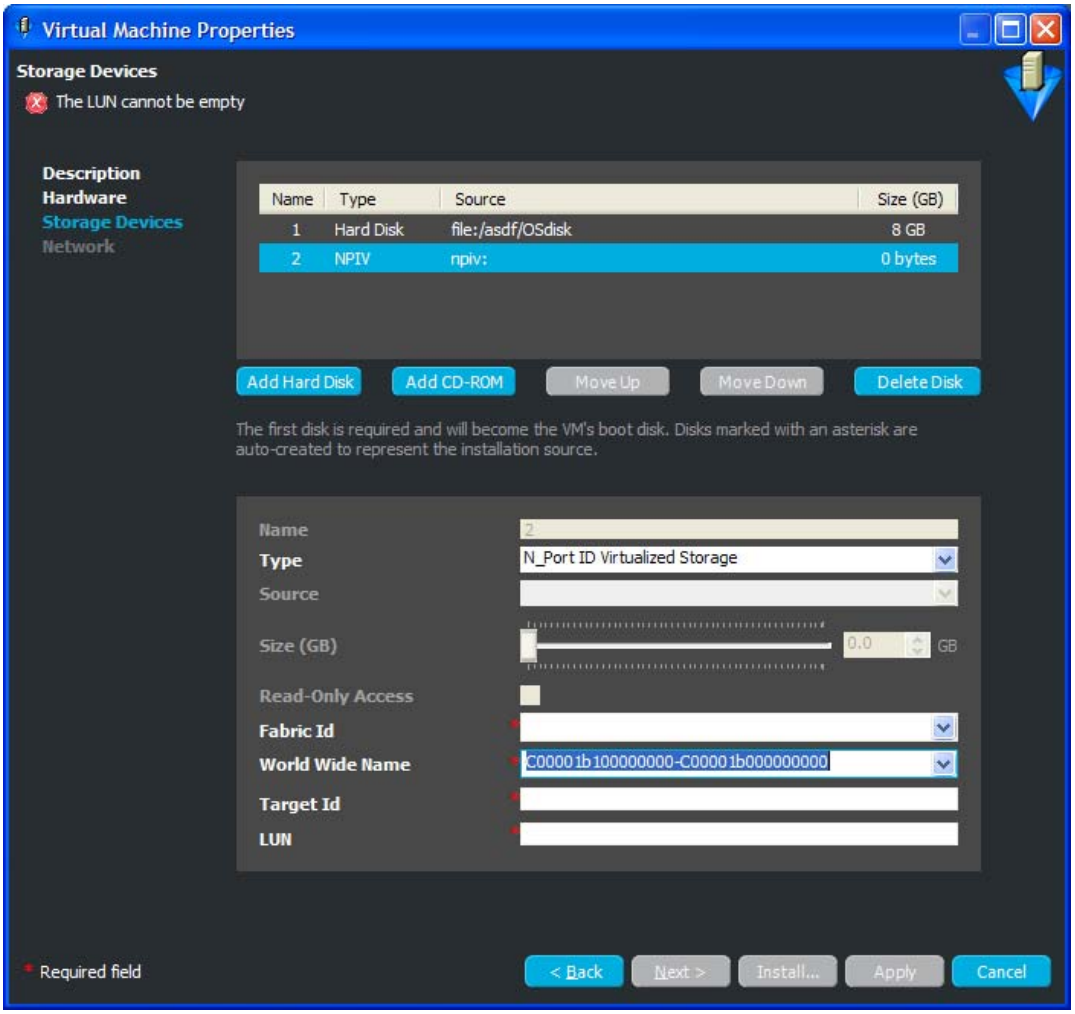


The default for the *Type* field is *Hard Disk*. The other possible types are:

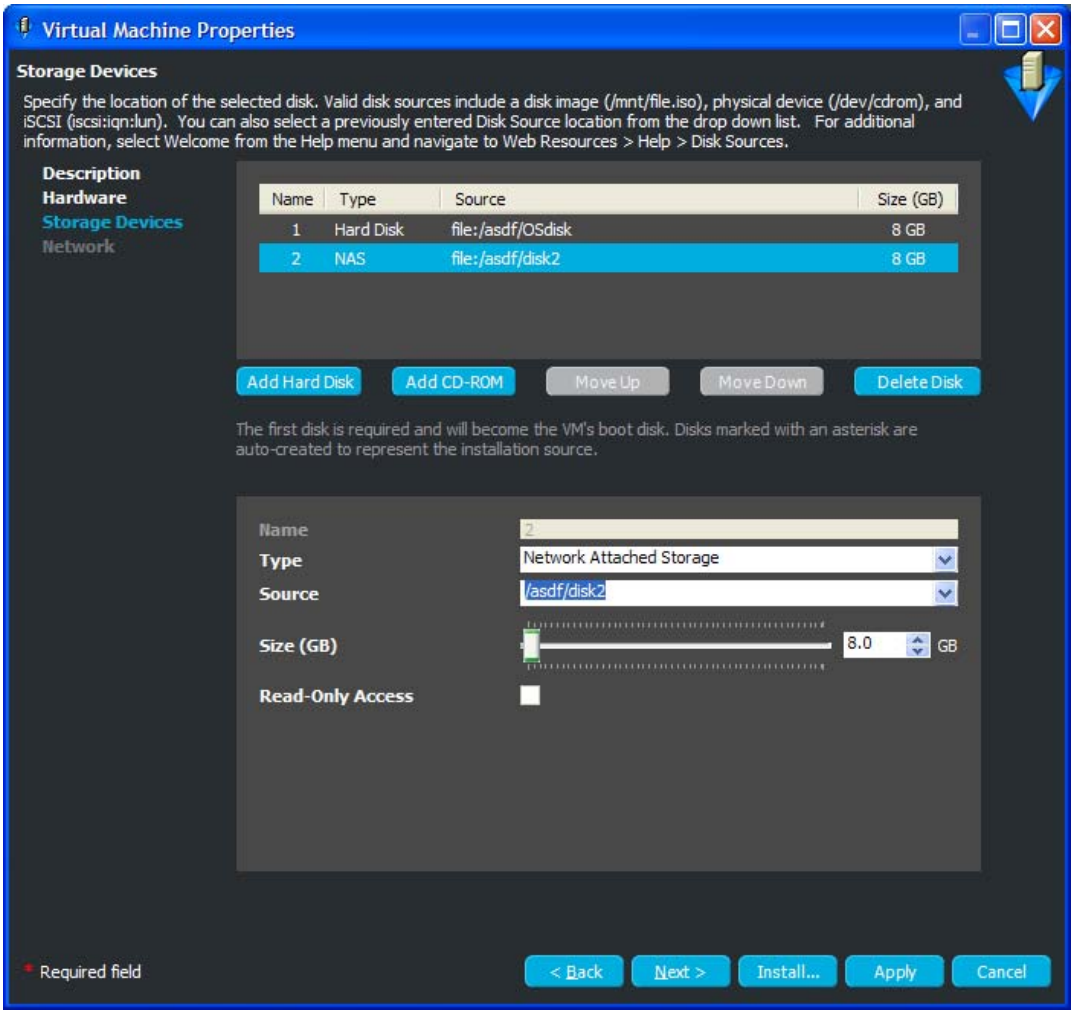
- iSCSI:



- N_Port ID Virtualized Storage (NPIV):



- Network Attached Storage (NAS):



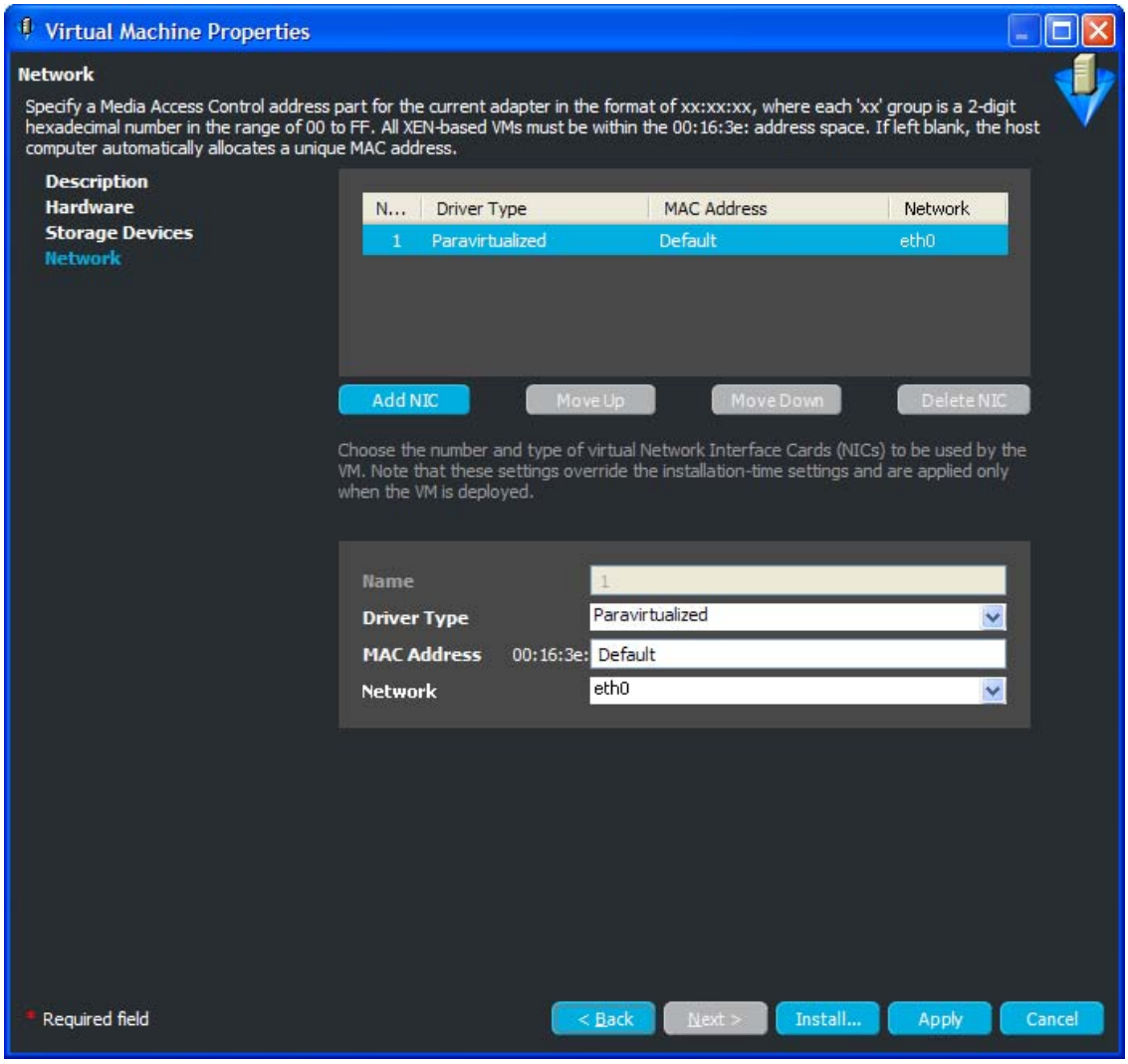
The Storage Devices page is for defining the hard drives and CD or DVD drives that you want to include in the VM profile. The first device must always be a hard disk that cannot be removed unless another hard disk has been put into the first slot. This is the only disk (Disk 0) that is stored. All other disks are virtual and are created upon launching the VM. You can add any other storage devices you want to the VM and prioritize their use in the list.

6 To fill in the storage device information, select a task from the following table:

Tasks	Steps	Additional Details
Adding a hard disk to your VM	1. Click *Add Hard Disk*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of hard disk you want to create on the VM: ◆ Hard Disk ◆ iSCSI Not supported as the first disk. ◆ N_Port ID Virtualized Storage (NPIV) Not supported as the first disk. ◆ Network Attached Storage (NAS) **Source:** The repository on the hard disk of the VM. **Size (GB):** The VM's hard drive size, ranging from 0.25 GB (250 MB) to 4 TB. This is the maximum allowable size of the VM. **Read Only Access:** Select this option to give the hard drive Read-Only access. By default, hard drives are writable. **Fabric ID:** (Available only for N_Port ID Virtualized Storage). Select or specify a fabric ID that uniquely identifies a SAN repository. The *Fabric ID* drop-down list is populated with fabric IDs of the discovered SAN repositories. **World Wide Name:** (Available only for N_Port ID Virtualized Storage). Select or specify a unique World Wide Name. The World Wide Name value is automatically assigned for the NPIV disks. You can edit it, if required. **Target ID:** (Available only for N_Port ID Virtualized Storage). Specify the target ID of the SAN repository. **LUN:** (Available only for N_Port ID Virtualized Storage). Specify a LUN value between 0 and 254. 3. Click *Apply*.	The following restrictions apply per VM: ◆ Limit of 4 fully virtualized disks (hda-hdd). ◆ Limit of 16 paravirtualized disks (xvda-xvdp). While adding an additional NPIV disk to a VM, ensure that the disk values for Fabric ID, World Wide Name, Target ID, and LUN are unique for each NPIV disk of the VM. Creation of a block-based VM is not supported for NPIV. **IMPORTANT**: iSCSI and NPIV can be used for secondary disks. However, if you add iSCSI or NPIV as a secondary disk, you can change the order of the disks and make it to be the first disk. This is not supported. If you define iSCSI or NPIV as a first disk, when the VM is stopped and restarted, the configuration file that is stored on the iSCSI or NPIV disk is looked for in a local repository, and when not found, a local repository is created for the VM, thus losing connection to the iSCSI or NPIV disk.

Tasks	Steps	Additional Details
Adding a CD-ROM or DVD ROM to your VM	1. Click *Add CD-ROM*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of CD-ROM you want to create on the VM: ◆ CD-ROM ◆ DVD **Source:** The repository on the hard disk of the VM. **Size (GB):** The size is zero and cannot be changed. **Read Only Access:** These drives can only have Read-Only access. 3. Click *Apply*.	**IMPORTANT**: If you add a CD-ROM or DVD-ROM, the VM can only be moved, migrated, or used to create a template if the CD-ROM's or DVD-ROM's ISO or image is accessible through shared storage.
Rearranging the order in which each storage device is accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.	The first storage device in the list must be a hard disk, which is the only one actually stored in the VM image.
Deleting a storage device	1. Select the storage device you want to delete. 2. Click *Delete*.	Removes the selected storage device from the table. **WARNING**: If the storage device is based on a disk image, that could also be deleted. To preserve the disk image, manually copy it to another location before deleting the storage device.

7 Click *Next* to display the following wizard page:



The network devices are added, deleted, and defined on the Network page, where you add specific information about your network connections or intended network connections for your VM. You can define more detailed NIC settings in your auto-install files or when performing a guest installation.

8 To fill in the NIC information, select a task from the following table:

Tasks	Steps
Adding a NIC to your VM	1. Click *Add NIC*. 2. Fill in the following fields: **Name:** The number, based on the NIC's order in the list, automatically assigned to the NIC. **Driver Type:** Indicates whether the VM has direct access to the NIC. If the NIC should only interface with the hypervisor, you can select the specific type of full virtualization. You should have a paravirtualized NIC with a paravirtualized VM. **MAC Address:** Unless you have a specific MAC address you want to assign to this VM, leave this set to *Default*, and Xen assigns it a unique MAC address when you launch the VM. **Network:** Select the network you want associated with the NIC. 3. Click *Apply*.
Rearranging the order in which the NICs are accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.
Deleting a NIC from your VM	1. Select the NIC you want to remove. 2. Click *Delete NIC*.

9 To complete the wizard, click one of the following buttons:

- **Install:** Lists the VM in the *Virtual Machines* view, then immediately installs the configured VM.

  A VNC login dialog box is displayed so that you can view the progress of the installation from the VM's console. There is a 30-second timeout while the VNC sets up the parameters of the VM.

  You can cancel the use of VNC; however, if user interaction is necessary, you need to use the VNC to help complete the installation. You can start the VNC for a VM being installed by right-clicking the VM and clicking *Show Console*.

- **Apply:** Applies the wizard configuration and saves the new VM in the *Virtual Machines* view, but does not install the VM.

  Focus is returned to the *Virtual Machines* view after you exit the wizard, with the new VM selected in the list.

  To install the VM at a later time, see Section 5.5, "Installing a VM," on page 117.

You can click *Back* to make changes before installing or applying the VM definition.

5.5 Installing a VM

To install an existing VM definition:

1 (Optional) In the VM Client, click the *Virtual Machines* view, right-click the VM that you want to install, then select *Edit*.

If you have any changes for the VM, complete those by using the *Next* and *Back* buttons.

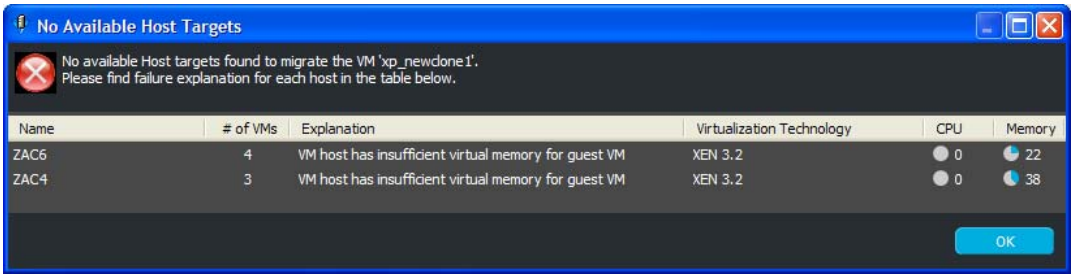
For more information on editing the wizard pages, see Section 5.8, "Editing VMs," on page 120.

2 To install the VM, do one of the following:

- While you are in the Edit VM wizard, click *Install*.
- In the *Virtual Machines* view, select the defined VM (it shows in the *Status* column), then click the **Install** button.
- In the *Virtual Machines* view, right-click the defined VM (it shows in the *Status* column), then select *Install*.

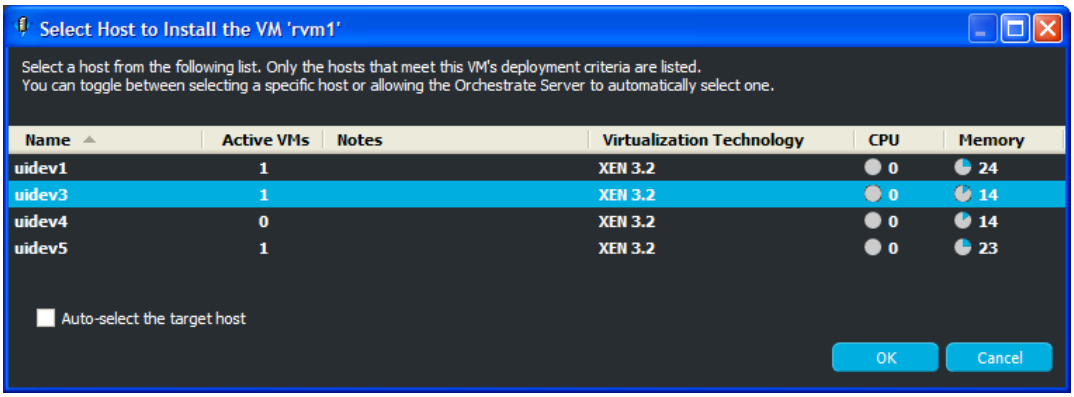
3 One of three possibilities exists for selecting the host on which to build the VM:

- **No valid host exists:** If you do not yet have a valid host server to for installing the VM, the following dialog box is displayed:



  Review the issues, resolve them, then repeat from Step 2.

- **Only one valid host exists:** It is automatically selected, so continue with Step 5.
- **Multiple valid hosts exist:** The following dialog box is displayed if there are two or more target host candidates:



  Do one of the following:

  - Select the *Auto-Select the Target Host* check box.

    The *Auto-Select the Target Host* option allows the Orchestration Server to automatically select a host server from those that are available by using a ranking criteria, such as architecture similarity and available CPU and RAM resources. For example, hosts are selected that meet the architecture requirements, the cost of moving information is

then considered, and if there is still no clear winner, then the least loaded machine is selected. The ranking criteria can be affected by policies that you might have set in the Orchestration Console.

- Select the VM host where you want to install the VM.

These options are mutually exclusive, meaning that selecting one disables the other.

4 Click *OK* when you have selected a host server or selected the *Auto-Select the Target Host* check box.

5 Do one of the following:

- If the installation is proceeding from an installation source that requires user input, the VNC is automatically started. Log in with the VNC password to view and interact with the installation as it progresses on the VM's console, then continue with Step 6.
- If the installation is using YaST, the VM is automatically installed without user input. You can either manually use VNC (click *View* > *Show Console*) to view the installation's progress, or you can continue with Step 6.

6 You can view the installation progress in any of the following ways:

- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* or double-click *Show/Hide Progress View* to open the *Progress View* window. In the *Progress View* you can mouse over the entry in the *Status* column, or right-click that entry and select *Show Log*, to view the log information for installing the VM.
- Double-click the VM being installed, click the *Event Log* tab, then double-click the entry related to the installation process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- View its progress in the *Jobs* tab of the Orchestration Console.

7 If you want to cancel the installation before it finished, do one of the following:

- Select the VM being installed, then click *Edit* > *Cancel Install*.
- Right-click the VM being installed, then select *Cancel Install*.

The VM's status is returned to being configured but not installed.

5.6 Installing the Orchestration Agent on a VM

For instructions on installing the agent on a host server, see "SLES 11 Standard Installation" in the *NetIQ Cloud Manager 2.0 Orchestration Installation Guide*.

1 In the VM Client, click the *Virtual Machines* view, right-click the VM where you want to install the agent, then select *Shut Down*.

The VM cannot be running during installation of the agent because the VM's image is modified.

The agent cannot be installed on a template.

2 After the VM has completed shutting down, select the VM again, then do one of the following:

- Click *Actions* > *Install Agent*.
- Right-click the VM, then select *Install Agent*.

The agent installation begins.

3 You can view the installation progress in any of the following ways:

- Double-click the VM being installed, click the *Event Log* tab, then double-click the entry related to the installation process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* to open the Progress window.
- View the progress in the *Jobs* tab of the Orchestration Console.

4 To have the VM accepted into the datagrid, follow the instructions in Section 2.7, "Registering VMs," on page 24.

After the Orchestration Agent has been installed on a VM, the agent begins to communicate with the Orchestration Server. However, the VM is not yet available to the datagrid because it must be accepted.

You can tell which VMs have the Orchestration Agent installed by whether pie charts are being displayed in the *CPU* and *Memory* columns in the *Virtual Machines* view, but only if the VM is running.

5.7 Installing the Monitoring Agent on a VM

In order to use the Monitoring feature on VMs or host servers, you must manually install the Monitoring Agent on them, then configure the agent.

The Monitoring Agent is usually installed on host servers during installation of the Orchestration Server product.

To install the agent manually, use the following instructions, as applicable:

- Section 5.7.1, "Installing the Agent in Windows," on page 120
- Section 5.7.2, "Installing the Agent in Linux," on page 120

5.7.1 Installing the Agent in Windows

For instructions, see "Installing the Cloud Manager Monitoring Agent On Windows Machines" in the *NetIQ Cloud Manager 2.0 Orchestration Installation Guide*.

5.7.2 Installing the Agent in Linux

For instructions, see "Installing the Cloud ManagerMonitoring Agent on Linux Servers" in the *NetIQ Cloud Manager 2.0 Orchestration Installation Guide*.

5.8 Editing VMs

VMs can be edited at any time. However, the fields and sections that are displayed on each of the four wizard pages depend on various circumstances:

- Which type of VM is it? Xen, VMware, or Hyper-V?
- What is the VM's installed state? Defining, defined, installing, or installed?
- What is the VM's defined state? Defining or defined?

- What is the run time state of the VM? Running, paused, suspended, or stopped?
- Is the VM state unknown?

Any combination of these factors determines which fields can be edited or shown. The displayed fields that can't be edited are inaccessible (dimmed), or if no fields on a wizard page are editable, the page is not shown.

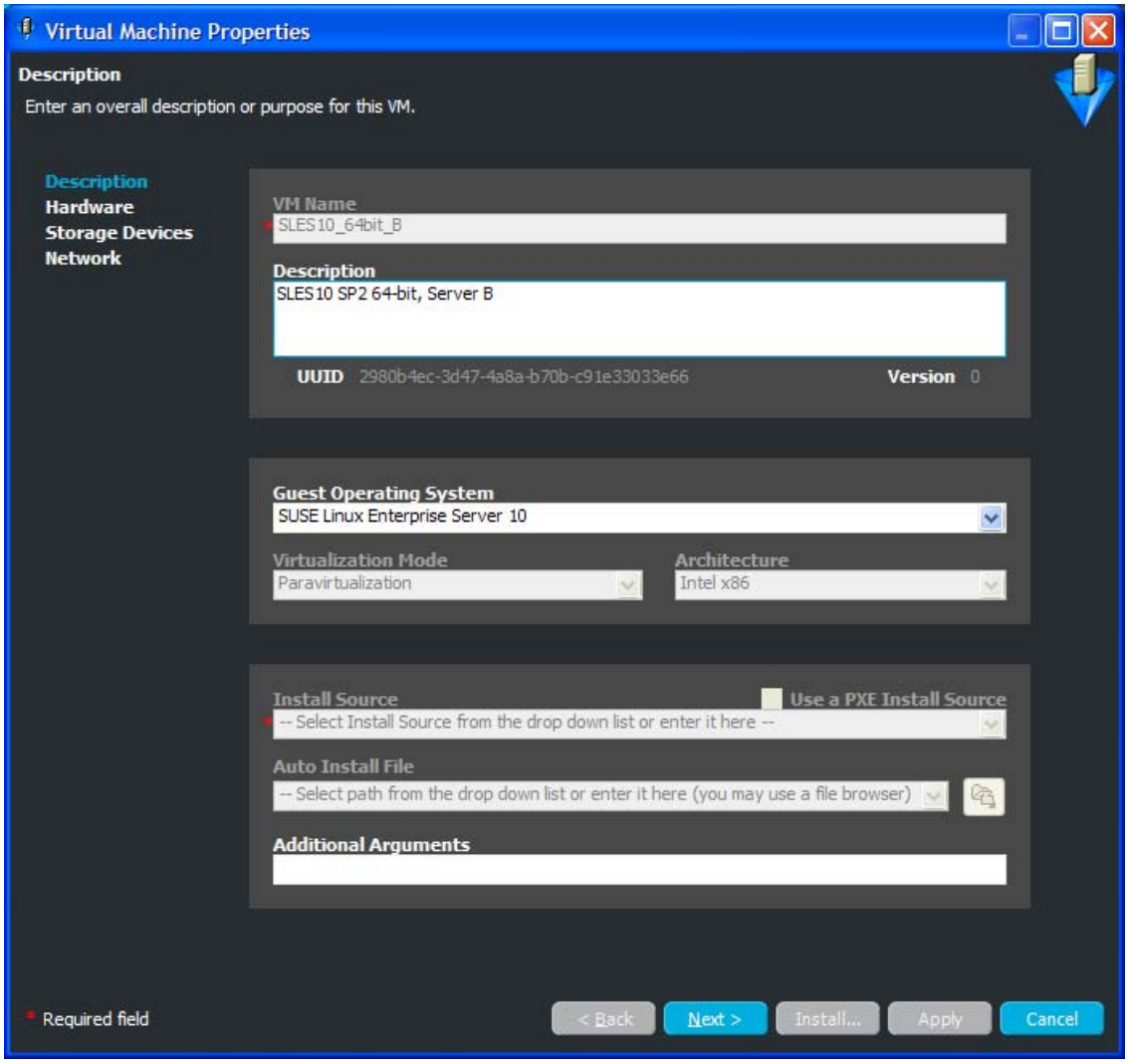
IMPORTANT: If the VM that you want to edit is running, only a few of its properties can be changed. If you want to edit a running VM, know that any changes are only retained in RAM, so when this instance if the VM is stopped, those edits are not kept.

The following steps include information for all possible VM fields and pages. The VM you are editing might not have all of the fields and pages.

To edit a VM, run the Virtual Machine Properties Wizard:

1. If you want to retain your edits on a VM, click the *Virtual Machines* view in the VM Client, right-click the VM that you want to edit, then select *Shut Down*.
2. Do one of the following to start the wizard:
   - Select a VM, then click the Edit button.
   - Select a VM, then click *Edit* > *Edit*.
   - Select a VM, then press Ctrl+E.
   - Right-click any listed VM, then select *Edit*.

The following wizard page is displayed:



The above example is for a stopped VM.

3 Fill in the available fields:

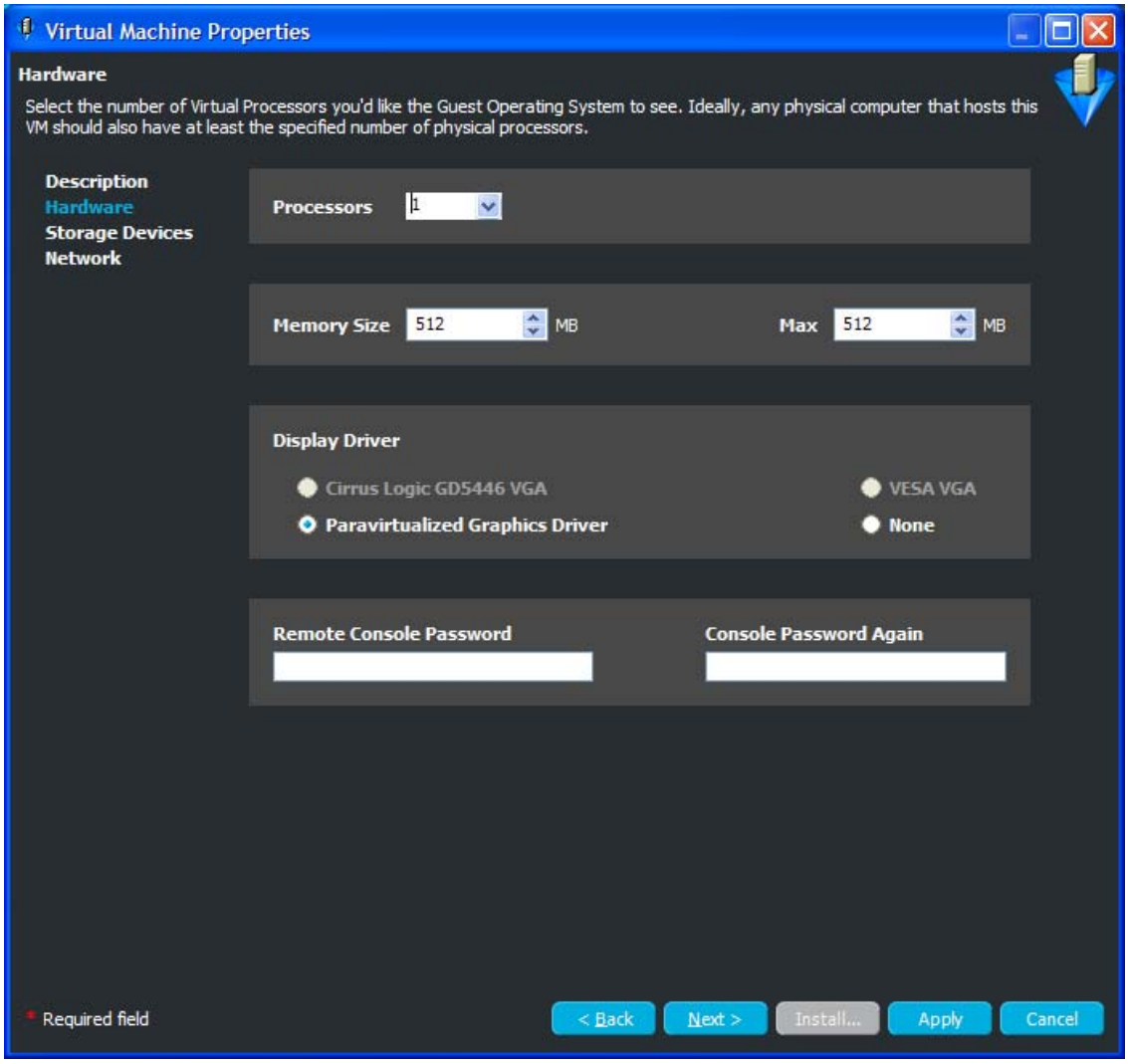
Description: Note the purpose and any other specifics you might require of the VM. These notes apply to all versions of this VM.

Guest Operating System: The operating system you want to install on your VM.

If the *OS* column on the *Virtual Machines* view displays `Unknown` for the VM you are editing, you can select an operating system here.

Additional Arguments: This field applies only to paravirtual installations. These are Linux install arguments, which are operating system parameters similar to the information entered in a GRUB boot loader when running on bare hardware in SLES and SLED. Additional network installation information can be added here, which is used during the build process to find the installation source for the VM build process.

4 Click *Next* to display the following wizard page:



The above example is for a stopped VM.

5 Fill in the available fields to define the kind of hardware to be virtualized for the VM:

Processors: The number of virtual processors the VM has.

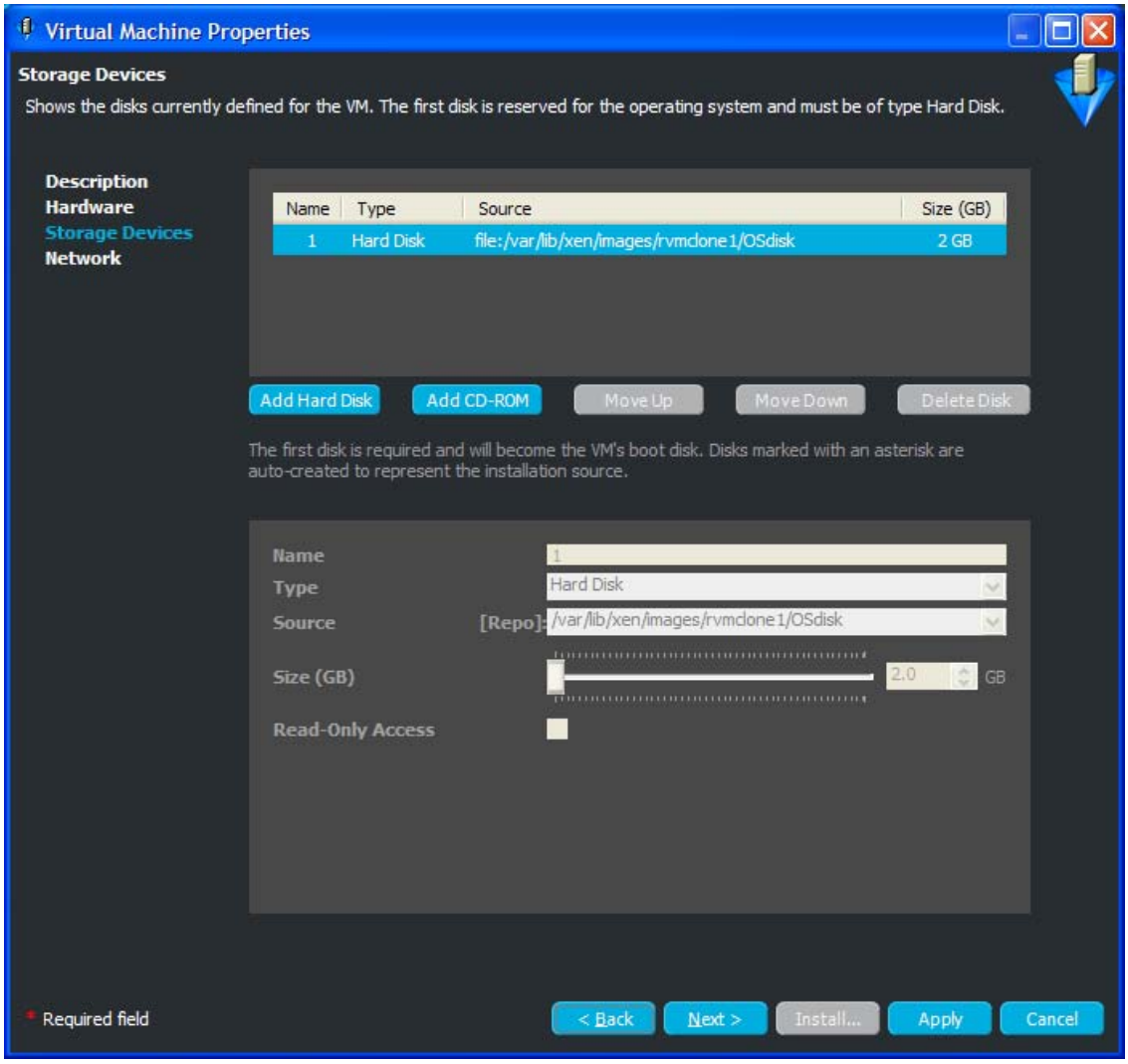
Memory Size: The amount of virtual RAM the VM has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Max: The amount of virtual RAM the VM has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Display Driver: The properties of the VM's display. If you have chosen paravirtualization for this VM, your only option is *Paravirtualized*. If you have chosen full virtualization, you can select between *VESA* or the on-board VGA. If you do not need a display, you can turn off the display on a fully virtualized machine.

Remote Console Password: The password for remotely controlling the VM. Use the two fields to confirm that the password is typed correctly.

6 Click *Next* to display the following wizard page:



The above example is for a stopped VM. The default for the *Type* field is *Hard Disk*. The other possible types are iSCSI, NPIV, and NAS. For more information, see Step 5 on page 110.

The Storage Devices page is for defining the hard drives and CD or DVD drives that you want to include in the VM profile. The first device must always be a hard disk that cannot be removed unless another hard disk has been put into the first slot. This is the only disk (Disk 0) that is stored. All other disks are virtual and are created upon launching the VM. You can add any other storage devices you want to the VM and prioritize their use in the list.

IMPORTANT: After installing a VM, you cannot change the disk settings for existing disks. However, you can add and configure newer disks.

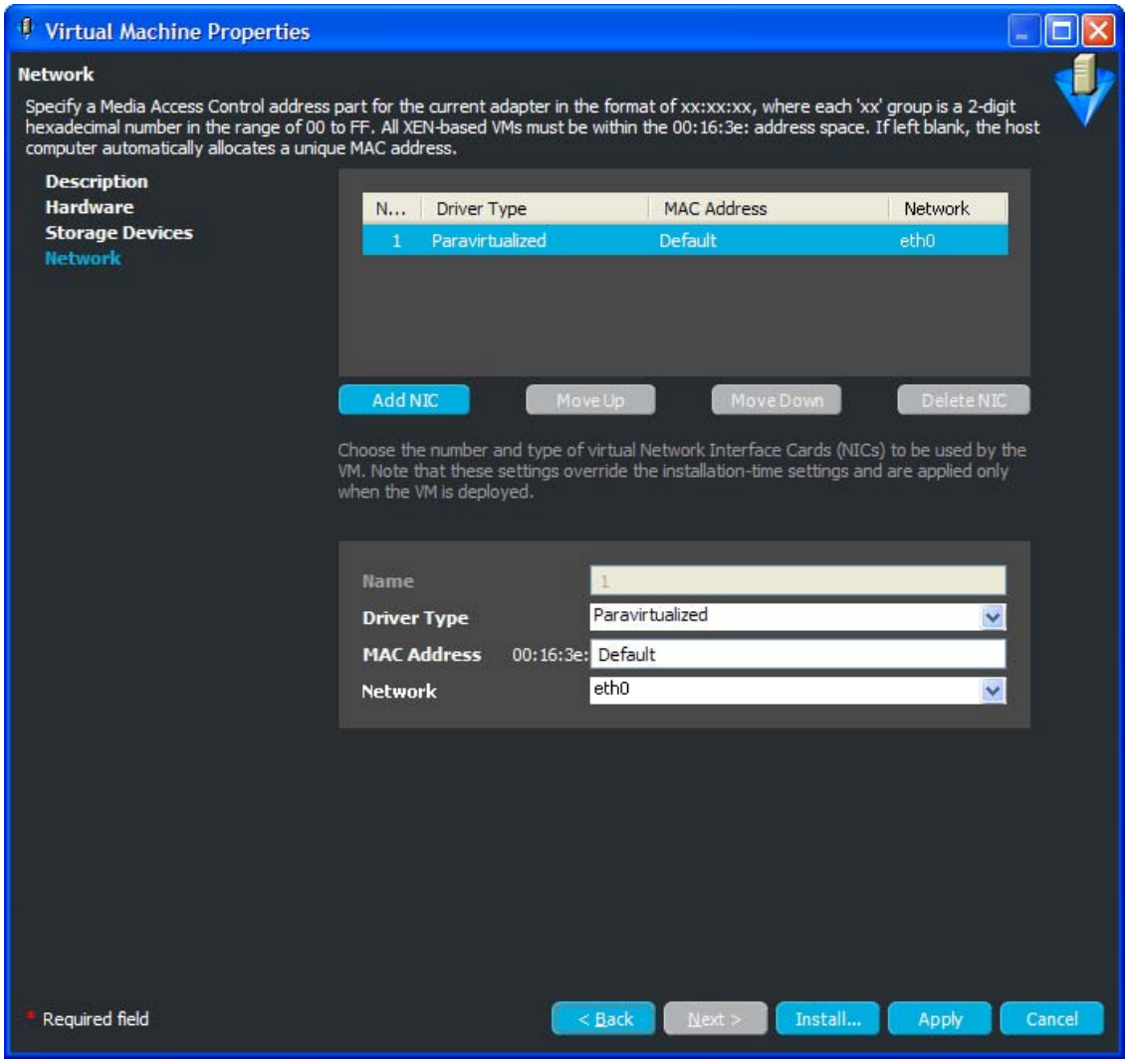
---

7 To fill in the storage device information, select a task from the following table:

Tasks	Steps	Additional Details
Adding a hard disk to your VM	1. Click *Add Hard Disk*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of hard disk you want to create on the VM: ◆ Hard Disk ◆ iSCSI Not supported as the first disk. ◆ N_Port ID Virtualized Storage Not supported as the first disk. ◆ Network Attached Storage **Source:** The repository on the hard disk of the VM. **Size (GB):** The VM's hard drive size, ranging from 0.25 GB (250 MB) to 4 TB. This is the maximum allowable size of the VM. **Read Only Access:** Select this option to give the hard drive Read-Only access. By default, hard drives are writable. **Fabric ID:** (Available only for the N_Port ID virtualized storage). Select or specify a fabric ID that uniquely identifies a SAN repository. The *Fabric ID* drop-down list is populated with fabric IDs of the discovered SAN repositories. **World Wide Name:** (Available only for the N_Port ID virtualized storage). Select or specify a unique World Wide Name. The World Wide Name value is automatically assigned for the NPIV disks. You can edit it, if required. **Target ID:** (Available only for the N_Port ID virtualized storage). Specify the target ID of the SAN repository. **LUN:** (Available only for the N_Port ID virtualized storage). Specify a LUN value between 0 and 254. 3. Click *Apply*.	The following restrictions apply per VM: ◆ Limit of 4 fully virtualized disks (hda-hdd). ◆ Limit of 16 paravirtualized disks (xvda-xvdp). While adding an additional NPIV disk to a VM, ensure that the disk values for Fabric ID, World Wide Name, Target ID, and LUN are unique for each NPIV disk of the VM. Creation of a block-based VM is not supported for NPIV. **IMPORTANT**: iSCSI and NPIV can be used for secondary disks. However, if you add iSCSI or NPIV as a secondary disk, you can change the order of the disks and make it to be the first disk. This is not supported. If you define iSCSI or NPIV as a first disk, when the VM is stopped and restarted, the configuration file that is stored on the iSCSI or NPIV disk is looked for in a local repository, and when not found, a local repository is created for the VM, thus losing connection to the iSCSI or NPIV disk.

Tasks	Steps	Additional Details
Adding a CD-ROM or DVD ROM to your VM	1. Click *Add CD-ROM*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of CD-ROM you want to create on the VM: ◆ CD-ROM ◆ DVD **Source:** The repository on the hard disk of the VM. **Size (GB):** The size is zero and cannot be changed. **Read Only Access:** These drives can only have Read-Only access. 3. Click *Apply*.	**IMPORTANT**: If you add a CD-ROM or DVD-ROM, the VM can only be moved, migrated, or used to create a template if the CD-ROM's or DVD-ROM's ISO or image is accessible through shared storage.
Rearranging the order in which each storage device is accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.	The first storage device in the list must be a hard disk, which is the only one actually stored in the VM image.
Deleting a storage device	1. Select the storage device you want to delete. 2. Click *Delete*.	Removes the selected storage device from the table. **WARNING**: With Hyper-V VMs, if the storage device is based on a disk image, the disk image is also deleted. To preserve the disk image, manually copy it to another location before deleting the storage device. This applies only to Hyper-V VMs, not XEN VMs or VMware VMs.

8 Click *Next* to display the following wizard page:



The above example is for a stopped VM.

The network devices are added, deleted, and defined on the Network page, where you add specific information about your network connections or intended network connections for your VM. You can define more detailed NIC settings in your auto-install files or when performing a guest installation.

9 To fill in the NIC information, select a task from the following table:

Tasks	Steps
Adding a NIC to your VM	1. Click *Add NIC*. 2. Fill in the following fields: **Name:** The number, based on the NIC's order in the list, automatically assigned to the NIC. **Driver Type:** Indicates whether the VM has direct access to the NIC. If the NIC should only interface with the hypervisor, you can select the specific type of full virtualization. You should have a paravirtualized NIC with a paravirtualized VM. **MAC Address:** Unless you have a specific MAC address you want to assign to this VM, leave this set to *Default*, and Xen assigns it a MAC address when you launch the VM. **Network:** Select the network you want associated with the NIC. 3. Click *Apply*.
Rearranging the order in which the NICs are accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.
Deleting a NIC from your VM	1. Select the NIC you want to remove. 2. Click *Delete NIC*.

10 To complete and close the wizard, click *Apply*.

You can click *Back* to make further changes before applying the edits.

The wizard configuration changes are applied and the VM is saved in the *Virtual Machines* view.

Focus is returned to the *Virtual Machines* view after you exit the wizard, with the edited VM selected in the list.

To install an edited VM at a later time, see Section 5.5, "Installing a VM," on page 117.

5.9 Moving VMs

When you need to change a VM's host server, you can either move or migrate the VM:

- **Moving:** For host resource reallocation.

  Physically moves all of the VM's files and its image from one host server to another while the VM is shut down. When you start the VM, it starts from its new repository.

- **Migrating:** For host server availability. For more information, see Section 5.10, "Migrating VMs," on page 130.

  Transfers just the VM's instance in RAM from one host server to another (essentially keeping the VM live), assuming that both hosts have shared access to the VM's files and image. When you shut down the VM and later restart it, it restarts from the new host server. In other words, its files are not moved, but it now has a new host server association.

For issues related to a VM being moved from outside of the VM Client, such as within the Orchestration Console, or from a command line, see "VM is out of sync in the VM Client after it was moved" on page 192.

Review the following sections to move a VM:

- Section 5.9.1, "Prerequisites," on page 129
- Section 5.9.2, "Moving a VM," on page 129

5.9.1 Prerequisites

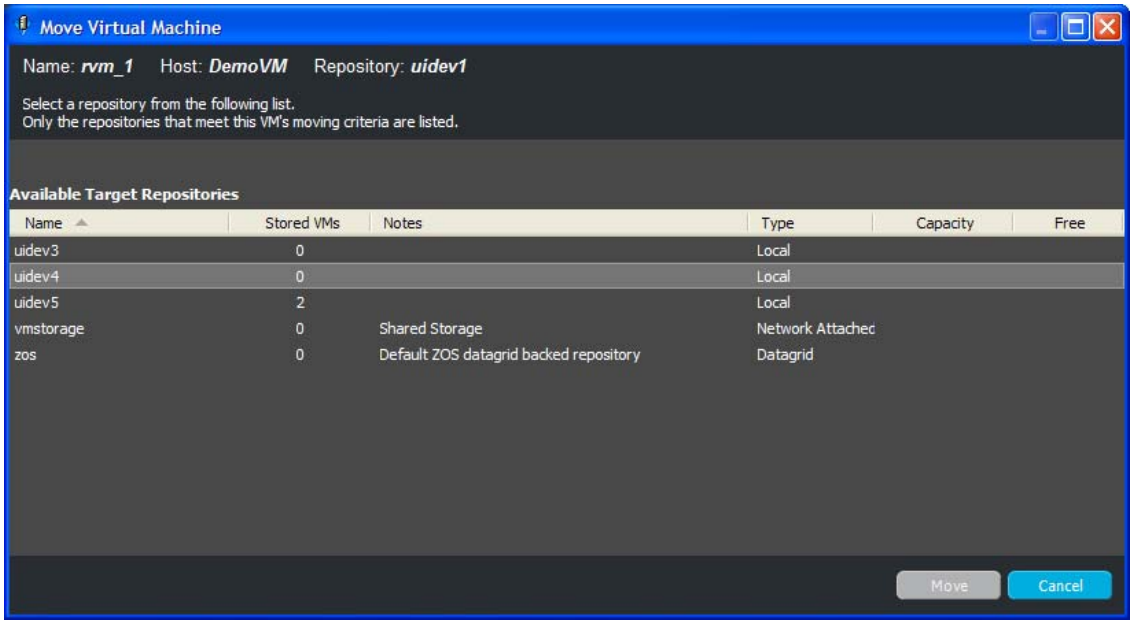
In order for a move to work, the following conditions must exist:

- The provisioning adapter for the VM being moved must match the repository's enabled provisioning adapters. (For this information, see the Summary details tab for the repository.)
- The target repository's device must have enough disk space available to hold the VM's files and image.
- If the VM has a CD-ROM or DVD-ROM defined for it, it must be accessible through shared storage to the target host server. Otherwise, the CD-ROM or DVD-ROM is not included in the move and the moved VM cannot start. In that case, you should remove the CD-ROM or DVD-ROM from the VM before continuing with Section 5.9.2, "Moving a VM," on page 129.

5.9.2 Moving a VM

1. In the VM Client, click the *Virtual Machines* view, then make sure the VM you want to move is shut down.
2. Select the VM.
3. Do one of the following to move the VM:
   - Click *Edit* > *Move*.
   - Right-click the selected VM, then select *Move*.

   The following dialog box is displayed:



4 Under *Available Target Repositories*, select a repository.

   The VM hosts connected to the repository are displayed. When you select the repository, you are selecting the host to move the VM to.

5 Click *Move*.

   Depending on your hardware capabilities, moving the files can take a few minutes.

   You can view the move progress in any of the following ways:

   - Double-click the VM being moved, click the *Event Log* tab, then double-click the entry related to the moving process that has the icon next to it. The Event Log Details dialog box is displayed and automatically updated as events occur.
   - Observe messages at the bottom of the VM Client interface.
   - Click *View* > *Show Progress View* to open the Progress window.
   - View the progress in the *Jobs* tab of the Orchestration Console.

6 Start the VM from its new location.

5.10 Migrating VMs

When you need to change a VM's host server, you can either move or migrate the VM:

- **Migrating:** For host server availability.

  Transfers just the VM's instance in RAM from one host server to another (essentially keeping the VM live), assuming that both hosts have shared access to the VM's files and image. When you shut down the VM and later restart it, it restarts from the new host server. In other words, its files are not moved, but it now has a new host server association.

- **Moving:** For host resource reallocation. For more information, see Section 5.9, "Moving VMs," on page 128.

  Physically moves all of the VM's files and its image from one host server to another while the VM is shut down. When you start the VM, it starts from its new repository.

Hyper-V migrations are not supported.

Migration of Xen VMs with Fibre Channel SAN disks is not supported.

If you have a secondary iSCSI disk defined for a VM, migration is supported between two host servers only if both are connected to the same iSCSI disk.

Review the following sections to migrate a VM:

- Section 5.10.1, "Prerequisites," on page 130
- Section 5.10.2, "Migrating a VM," on page 132

5.10.1 Prerequisites

In order for a migration to work, the following conditions must exist:

- Xen must be configured to allow for migrating its VMs. For more information setting up Xen for a live migration, see Option 2 in Novell AppNotes (http://www.novell.com/communities/node/5050/xen-virtual-machine-migration).

- For vCenter (ESX) VM migrations, both the source and target machines must have VMotion enabled. ESX servers with vCenter are migrated faster because VMotion allows the migration to occur live, instead of losing some time for suspending the VM as is necessary for ESX migrations.
- The two host servers involved in the migration must have access to the shared repository where the VM's files and image reside.
- Every entity involved must have the same architecture, such as 32-bit or 64-bit, mount points, and routing of network connections to the virtual network.

  For example, a 64-bit paravirtualized guest created on a 64-bit hypervisor can be migrated to another host server running a 64-bit hypervisor, but not a 32-bit hypervisor. Or, you can create a 32-bit VM on a 64-bit hypervisor and migrate it to another 64-bit hypervisor host. In other words, you cannot start a VM on a host that has a different architecture from the host where the VM was created.
- The host server cannot be fully utilized, because it would be incapable of hosting the VM.
- The host server cannot have met its maximum allowable VMs. This value is set in the Orchestration Console in the *Max Hosted VMs* field. The default is 8. It does not matter whether the maximum VMs it is already hosting are fully utilizing it.
- A host server cannot be disabled by having its *Resource Enabled* check box deselected in the Orchestration Console. By default, this check box is enabled.
- A host server is only available if it is not out of sync, which can occur if it is manually accessed or manipulated via a third-party tool. However, you can resynchronize the host server with the Orchestration Server.
- If the VM has a CD-ROM or DVD-ROM defined for it, they must be accessible through shared storage to the target host server. Otherwise, the CD-ROM or DVD-ROM will not be included in the migration and the migrated VM cannot start again after it has been stopped. In that case, you should remove the CD-ROM or DVD-ROM from the VM before continuing with Section 5.10.2, "Migrating a VM," on page 132.

Some conditions are automatically enforced with constraints, such as operating system, shared storage, xend configuration, and possibly the architecture.

During migration:

- Even if the above criteria are met by only one host server, the Migrate Virtual Machine dialog box is displayed.
- If the criteria are met by multiple host servers, you can either select a host server, or select to have the VM Client automatically select the host server.
- If no host servers meet the requirements, the No Migrate Target Available dialog box is displayed, indicating that you need to resolve the issues to continue.

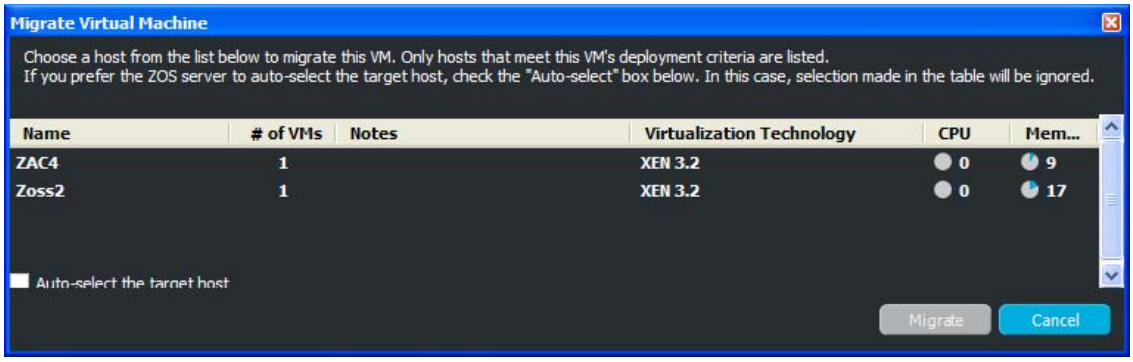
NOTE: For ESX migrations, the VM is suspended, it is migrated from one host to another, then it is provisioned.

5.10.2 Migrating a VM

To migrate a VM, you need to prepare the host servers, then migrate the VM.

1. Make sure that each host has access to the shared repository to be used for the VM's files.
2. In the VM Client, click the *Virtual Machines* view, select the VM to migrate, then do one of the following:
   - Click the **Migrate** button.
   - Click *Edit* > *Migrate*.
   - In the *Virtual Machines* view, right-click the selected VM, then select *Migrate*.

   If only one host server is available, it is automatically used and you can continue with Step 4. Otherwise, the following dialog box is displayed if there are two or more target host candidates:

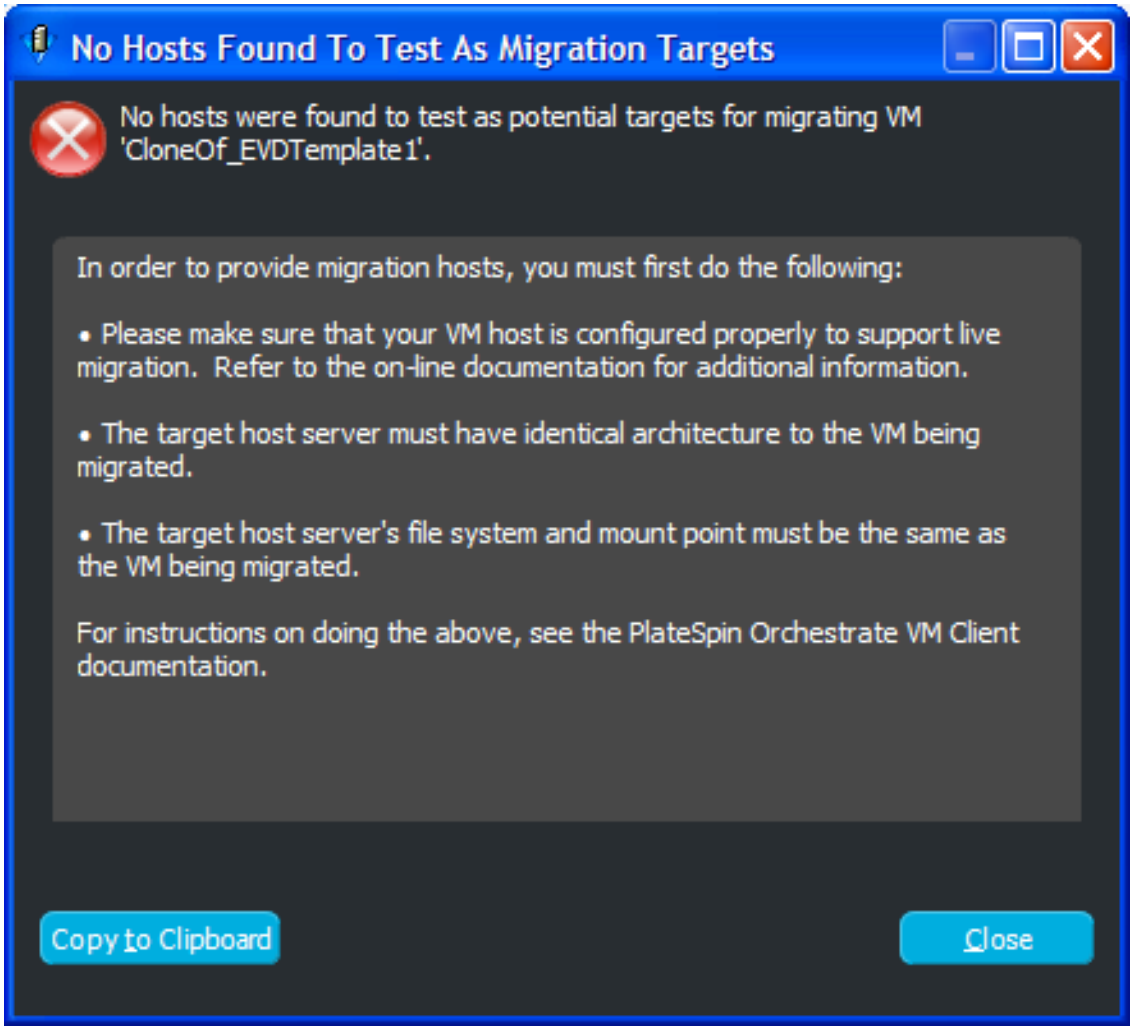


3. If you have multiple host servers to select from, do one of the following:
   - Leave the *Auto-select the Target Host* check box selected.

     The *Auto-Select the Target Host* option allows the Orchestration Server to automatically select a host server from those that are available by using a ranking criteria, such as architecture similarity and available CPU and RAM resources. For example, hosts are selected that meet the architecture requirements, the cost of moving information is then considered, and if there is still no clear winner, then the least loaded machine is selected. The ranking criteria can be affected by policies that you might have set in the Orchestration Console.
   - Select the VM host to which you want to migrate the VM.

   These options are mutually exclusive, meaning that selecting one disables the other.

If you do not yet have a valid host server to migrate to, the following dialog box is displayed:



Review the issues, resolve them, then repeat from Step 1.

4 Click *Migrate*.

You can view the migration progress in any of the following ways:

- Double-click the VM being migrated, click the *Event Log* tab, then double-click the entry related to the migration process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* to open the Progress window.
- View its progress in the *Jobs* tab of the Orchestration Console.

When the migration has completed, the VM continues to run on its new host.

ESX migrations might take a bit longer because the ESX server must be suspended in order to migrate its RAM content.

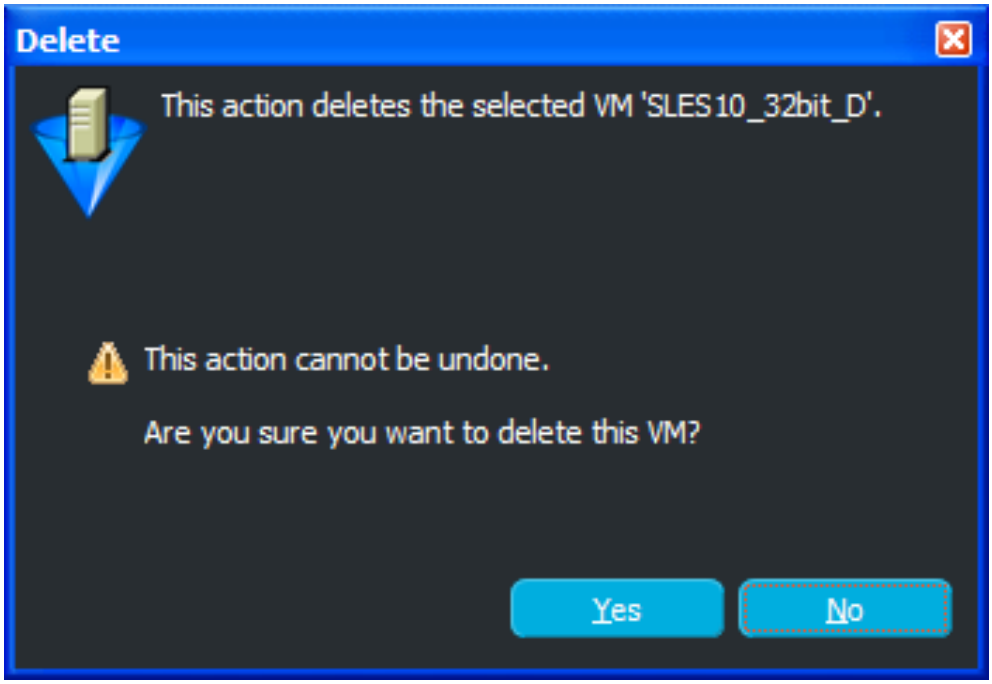
5.11 Deleting VMs

Deleting a VM in the VM Client causes an Orchestration job to run that deletes all of the VM's files in the `/etc/xen/vm` and `/etc/xen/images` (or `/var/lib/xen/images`) directories.

WARNING: Deleted VMs cannot be recovered.

1. In the VM Client, click the *Virtual Machines* view, then select one or more VMs.
2. Do one of the following to delete the selected VMs:
   - Click the Delete button.
   - Click *Edit* > *Delete*.
   - In the *Virtual Machines* view, right-click a selected VM, then select *Delete*.

   If a VM is running or is suspended, the deletion options are not displayed or enabled.
3. Click either *Yes* or *No* to delete the VM:



This completely removes the selected VMs from the *Virtual Machines* view, as well as all files in the repository associated with it.

6 Managing Repositories

You can do the following to manage the repositories for VM files:

- Section 6.1, “Understanding Repositories,” on page 135
- Section 6.2, “Viewing and Editing Storage Details,” on page 136
- Section 6.3, “Adding Repositories,” on page 140
- Section 6.4, “Associating Repositories to Host Servers,” on page 143
- Section 6.5, “Associating Host Servers to Repositories,” on page 144
- Section 6.6, “Removing Repositories,” on page 145

6.1 Understanding Repositories

Repositories are where VM and template files are stored. A datagrid’s repositories are displayed in the VM Client in the *Storage* view.

If a VM’s files are stored on a particular host server, that VM must be run from that host server. If a VM’s files are stored on a shared repository, that VM can be run on any host server that has access to the shared repository.

Host servers can have multiple repositories associated with them, and some repository types can be associated with multiple host servers as shared repositories. A host server can be associated with both repositories stored locally on its server and shared repositories stored on other machines.

The default size for all repositories is unlimited. To control disk space usage, you should change this default in the Orchestration Console. For more information, see Step 9 on page 142.

Review the following table for information about the various repository types used by the VM Client:

Table 6-1 *Repository Types*

Repository	Adapters	Image File Path	Description
Datagrid	All	`grid:///vms`	The shared repository (named ZOS) on the Orchestration Server that is accessible to all host servers in the datagrid. Each datagrid has one shared ZOS repository.

Repository	Adapters	Image File Path	Description
Local	All	The default paths are: ◆ Physical location: / (root), or /var/xen/images, which is the physical location of the VM's files. ◆ Preferred Path: var/lib/xen/images, which is the relative path from the location to search and place VM files for moving or cloning. ◆ Configuration Search Path: /etc/xen/vm, which is the relative path from the location to search for VM configuration files.	The default repository on a host server. Each host server starts with its own local repository, which has the same name as the server's hostname.
NAS (Network Attached Storage)	All.	The default paths are: ◆ Physical location: /u, or /mnt/*myshareddisk*, which is the physical location of the VM's files. This is the mount point that is assumed to be the same on every host server that has a connection to this NAS. ◆ Preferred Path: *my_vms*, which is the relative path from the location to search and place VM files for moving or cloning. ◆ Configuration Search Path: *my_vms*, *saved_vms*, or null (no path entry), each of which is the relative path from the location to search for VM configuration files. Null specifies to search the whole mount.	An NFS mount repository that can be shared, if it is not on a host server.
SAN (Storage Area Network)	All	N/A	Represents an iSCSI or Fibre Channel SAN. Currently supported only with the vsphere provisioning adapter.
Virtual	Amazon EC2	N/A	An externally managed VM's virtual disk (Amazon EC2), so no path is required.

6.2 Viewing and Editing Storage Details

Review the following sections for information on the Details views:

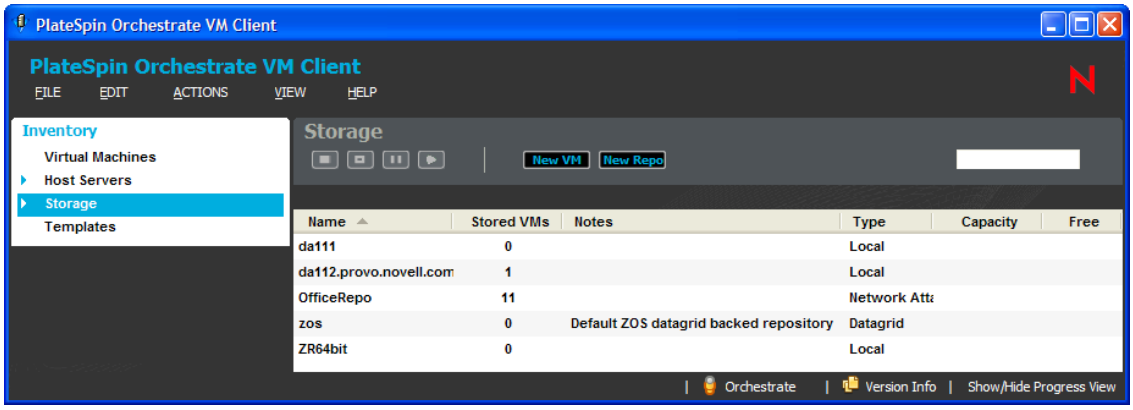
- Section 6.2.1, "Accessing Storage Details," on page 137
- Section 6.2.2, "Using the Details Tabs," on page 137

6.2.1 Accessing Storage Details

The details for each storage item consist of a summary, VMs using this storage capacity, host servers providing the storage space, and an event log.

1 In the VM Client, click the *Storage* view.

The storage items are displayed:



2 Do one of the following:

- Double-click one of the storage items.
- Right-click one of the storage items, then select *Show Details*.

The tabs for the selected storage item are displayed.

3 For details on the tabs, see:

- "Summary Tab" on page 71
- "Virtual Machines Tab" on page 139
- "Hosts Tab" on page 139

4 To close the details view, click the view name in the Inventory perspective panel.

6.2.2 Using the Details Tabs

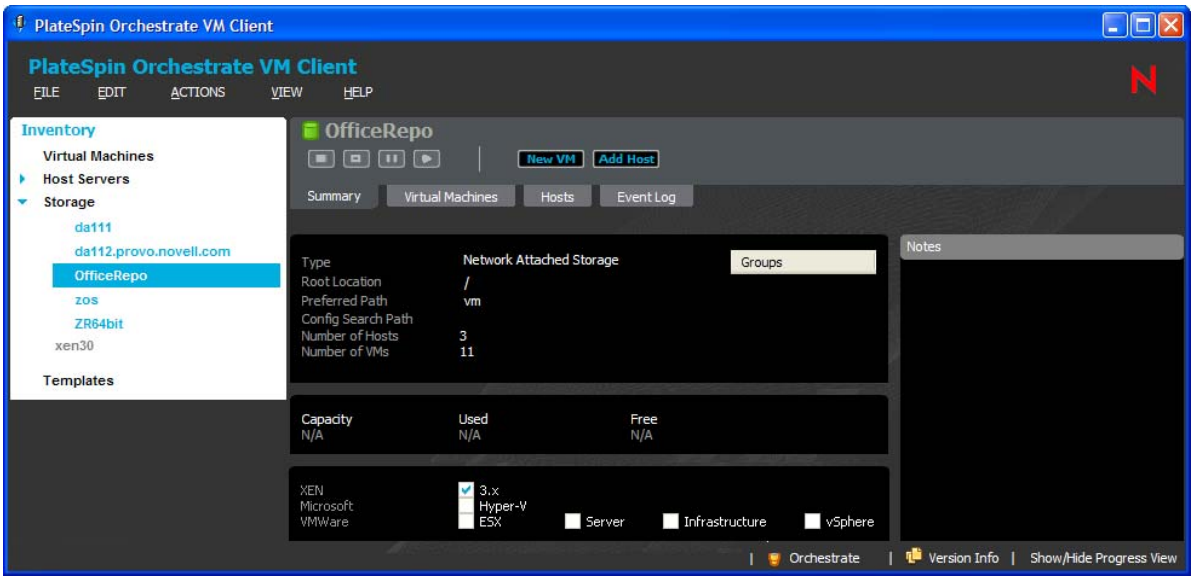
The following sections provide information on the various details tabs:

- "Summary Tab" on page 138
- "Virtual Machines Tab" on page 139
- "Hosts Tab" on page 139
- "Event Log Tab" on page 140

Summary Tab

This details tab is used by each Inventory panel type:

Figure 6-1 *Summary Tab for Storage Items*



You can do the following with the *Summary* tab for storage items:

- In the first section, the available options in the *Type* field are:

  Network Attached Storage (NAS)
  Local
  Storage Area Network (SAN)
  Datagrid
  Virtual

  However, only the first two options (NAS and Local) are selectable for repositories that are created in the VM Client. The others are modified in the Orchestration Console.

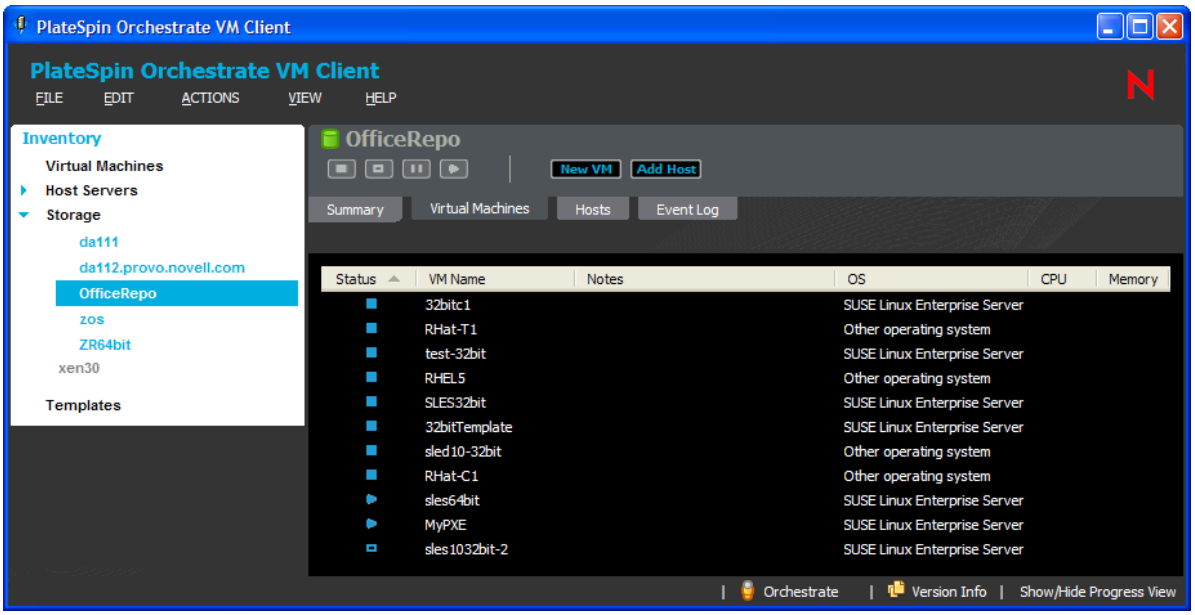
  Other fields are editable, depending on your selection in the *Type* field.
- In the first section, right-click a group name under Groups, then select *Remove* to revoke the storage item's membership in the group.
- In the Notes section, enter and edit notes for the storage item.
- View basic information about the storage item, including:
  - The repository's type and path information, including the ability to edit the information
  - The repository's capacity, including how much is being used and how much is free
  - Which hypervisors the location can be used with, including the ability to enable or disable them for this repository

Wherever N/A appears in the details, it means that the information is not available.

Virtual Machines Tab

This details tab is used only by storage items:

Figure 6-2 *Virtual Machines tab for Storage*



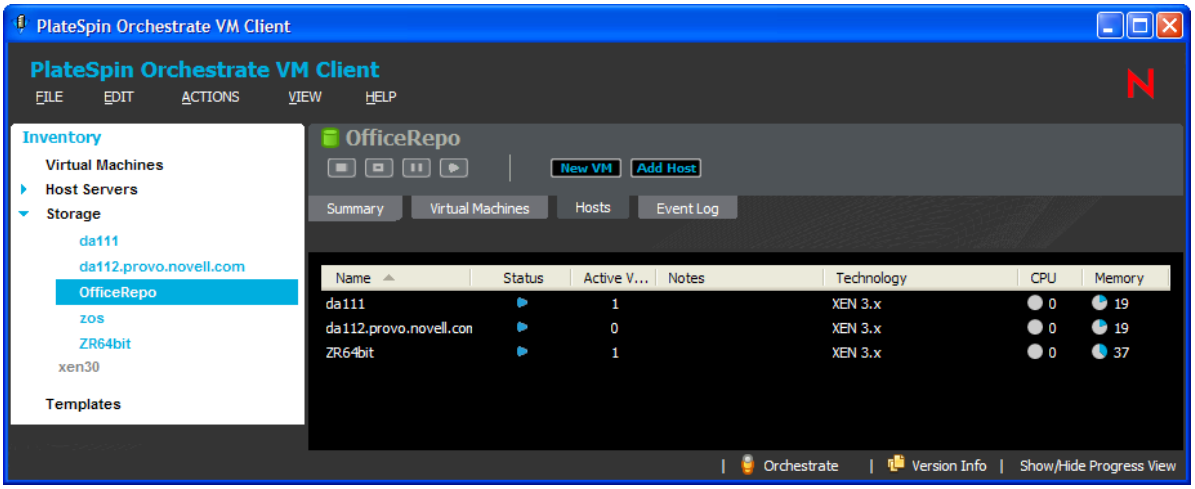
You can do the following with this tab:

- View which VMs are associated with the storage item.
- View the status of each associated VM.
- Double-click a listed VM to view its details tabs.

Hosts Tab

This details tab is used only by storage items:

Figure 6-3 *Hosts Tab for Storage*



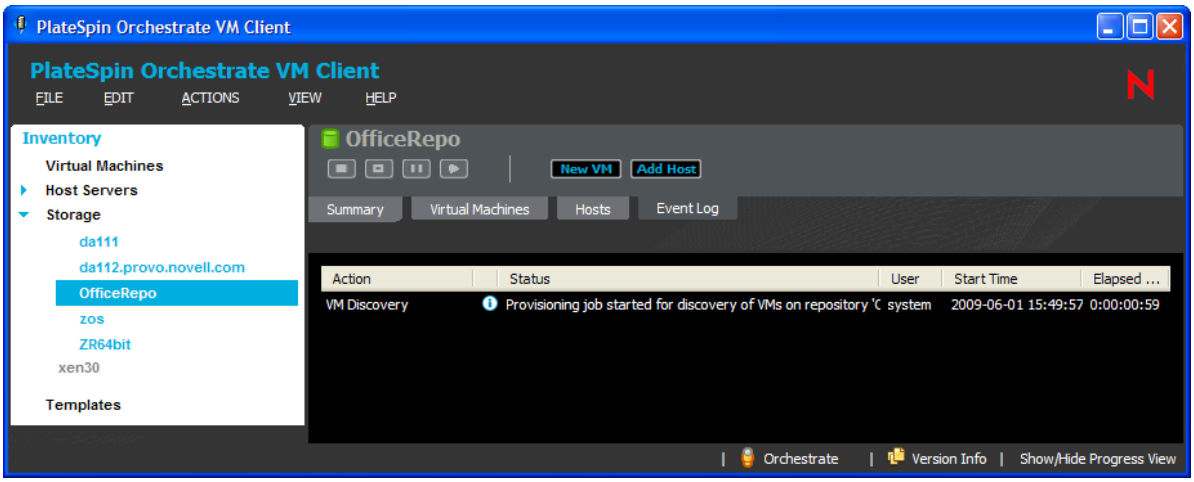
You can do the following with this tab:

- View information about the host server this storage item is associated with.
- Double-click a listed host server to view its details tabs.

Event Log Tab

This details tab is used by all Inventory types:

Figure 6-4 *Event Log Tab for Storage*



You can do the following with this tab:

- View actions related to the repository.
- View the Event Log information.
- Double-click an event item that contains the icon to view the details of the event as reported by the Orchestration Server.

6.3 Adding Repositories

You can add new repositories for a VM's files, including its image. *Local* is the default, but the path information is blank and must be filled in with known data.

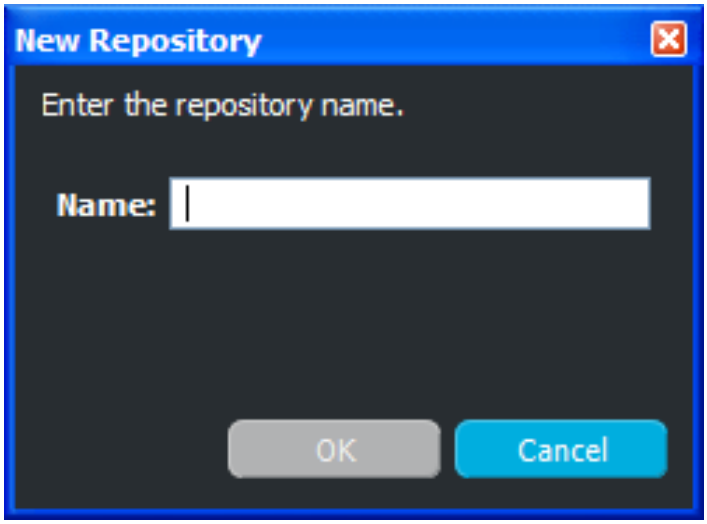
1. On the server where you plan to specify a new repository, create the path that you plan to use and make a note of it.

   When you provide this path information in Step 6, the fields do not provide browsing.

2. In the VM Client, click the *Storage* view, then do one of the following:

   - Click the **New Repo** button.
   - Click *File* > *New Repository*.
   - Press Ctrl+R.

The following dialog box is displayed:

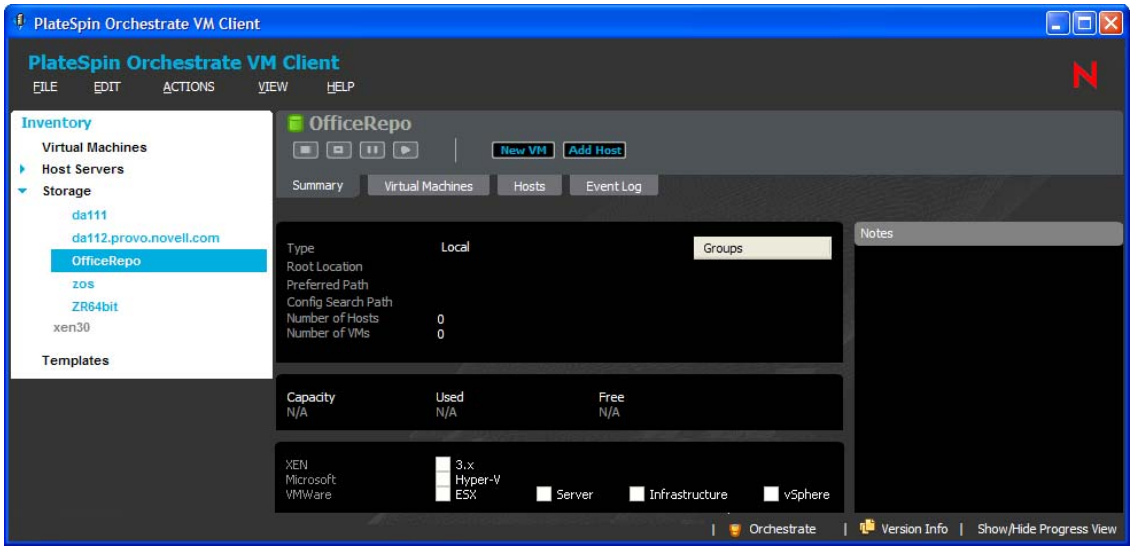


3 Specify a name for the repository, then click *OK*.

A default local repository is created, using default paths and other information.

4 Right-click the new repository, then select *Show Details*.

The following is displayed:



5 On the *Summary* tab, from the drop-down list for the *Type* field, select one of the following:

- Network Attached Storage
- Local

The following also display, but are not selectable. They must be created outside of the VM Client. For example, the Datagrid type is created by default as ZOS for the datagrid that belongs to the Orchestration Server.

- Storage Area Network
- Datagrid
- Virtual

6 Fill in the fields:

Root Location: For example, "/" (root) for *Local*.

Preferred Path: For example, `var/lib/xen/images` for *Local*. This path does not start with a forward slash. The root of the path is provided in the *Root Location* field.

Config Storage Path: For example, `/etc/xen/vm` for *Local*. Be sure to include the root of the path, such as the forward slash.

The *Number of Hosts* and *Number of VMs* fields display only hosts and VMs that are currently using this repository.

7 To enable one or more hypervisors for access to this repository, click the check box:

- XEN 3.*x*
- Microsoft Hyper-V
- VMware ESX
- VMware Server
- VMware Infrastructure
- VMware vSphere

At least one must be selected. Unavailable options are dimmed.

8 (Optional) Provide any useful information in the *Notes* field.

When you change focus from *Notes* field, the information that you entered is automatically saved.

9 (Optional) Control disk space usage as necessary:

NOTE: By default, all repository sizes are set to unlimited (-1).

9a In the Orchestration Console, browse for the repository in the Explorer panel.

It should be listed under the *Repositories* section for your grid.

9b On the *Info/Groups* tab, open the *Info* section, then open the *Repository Information* section.

9c In the *Capacity* field, change the default (-1) to the desired repository limitation in megabytes.

For example, to create a repository size limit of 20 GB, enter 20000.

9d Click *File* > *Save* to make the change effective.

10 To associate this repository with host servers, see:

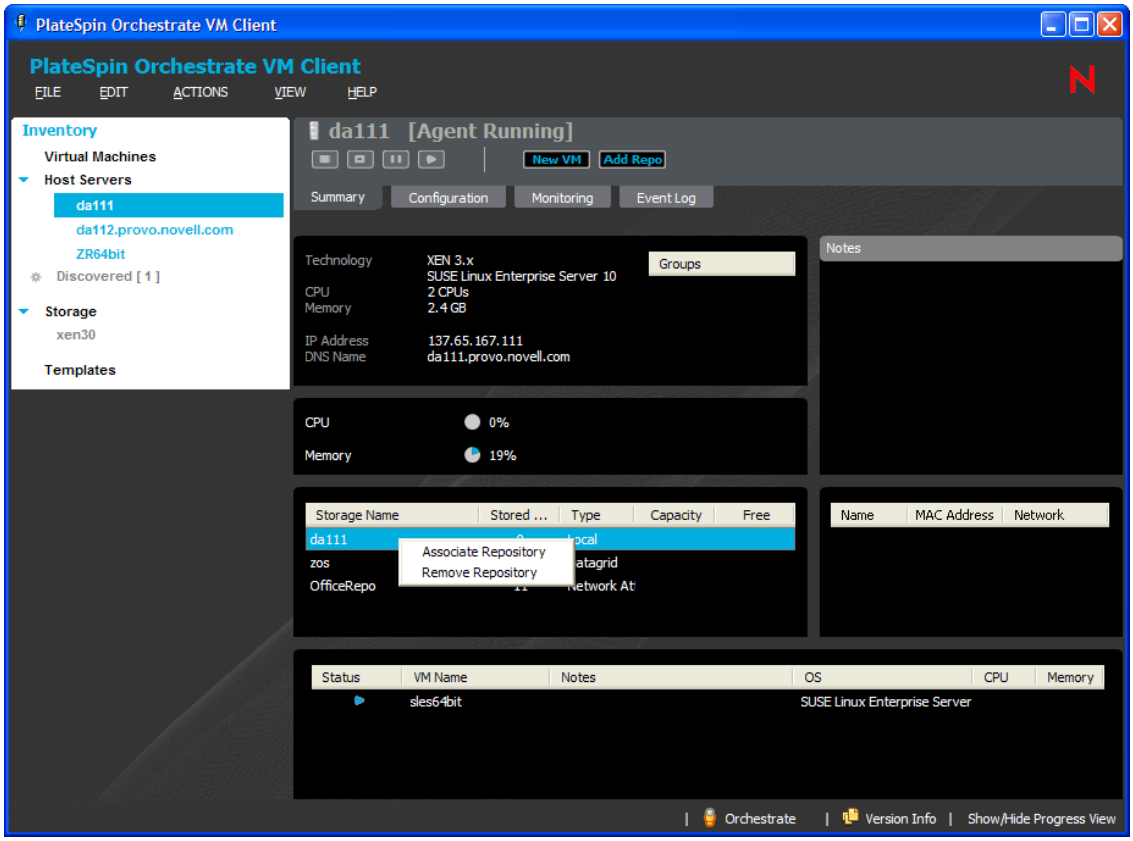
- Section 6.4, "Associating Repositories to Host Servers," on page 143
- Section 6.5, "Associating Host Servers to Repositories," on page 144

6.4 Associating Repositories to Host Servers

You can associate repositories with a host server, which allows VMs using the repository to then be run by any of the host servers associated with the repository.

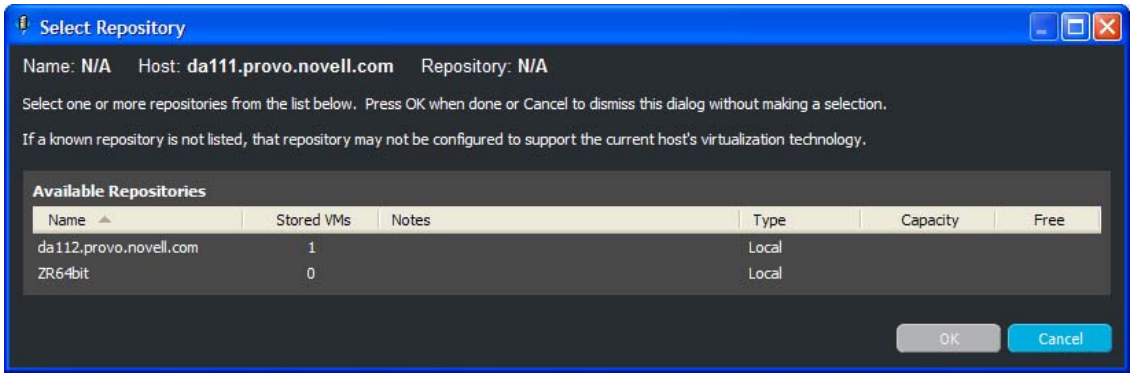
For information on creating new repositories, see Section 6.3, "Adding Repositories," on page 140.

1 In the VM Client, click the *Host Servers* view, right-click a host machine, then select *Show Details*.



2 Right-click a repository in the storage section, then select *Associate Repository*.

The following dialog box is displayed:



3 Select a repository, then click *OK*.

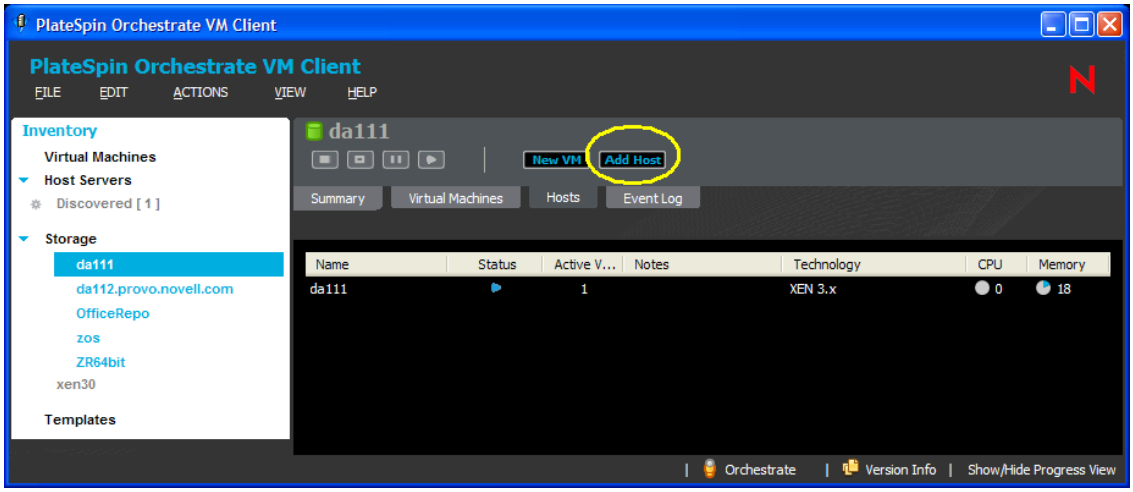
The repository is listed with the others for the selected host server.

6.5 Associating Host Servers to Repositories

You can associate host servers with a repository, which allows VMs using the repository to then be run by any of the host servers associated with the repository.

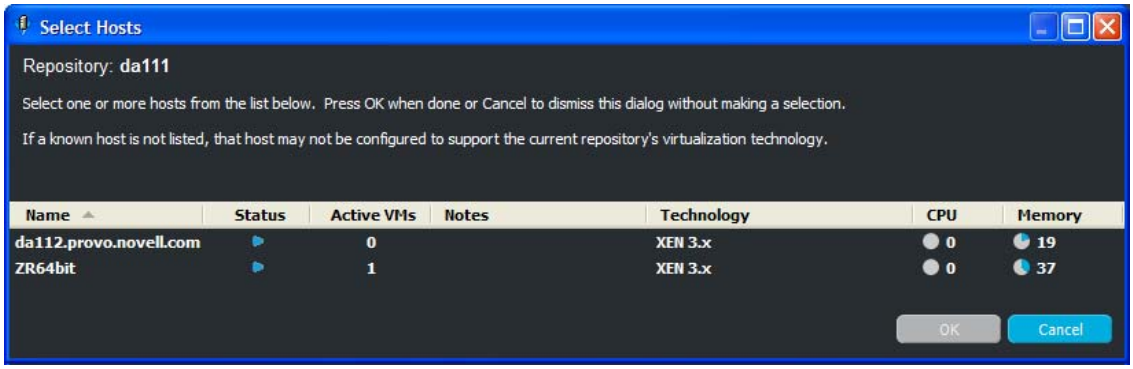
For information on creating new repositories, see Section 6.3, "Adding Repositories," on page 140.

1 In the VM Client, click the *Storage* view, right-click a storage item, then select *Show Details*.

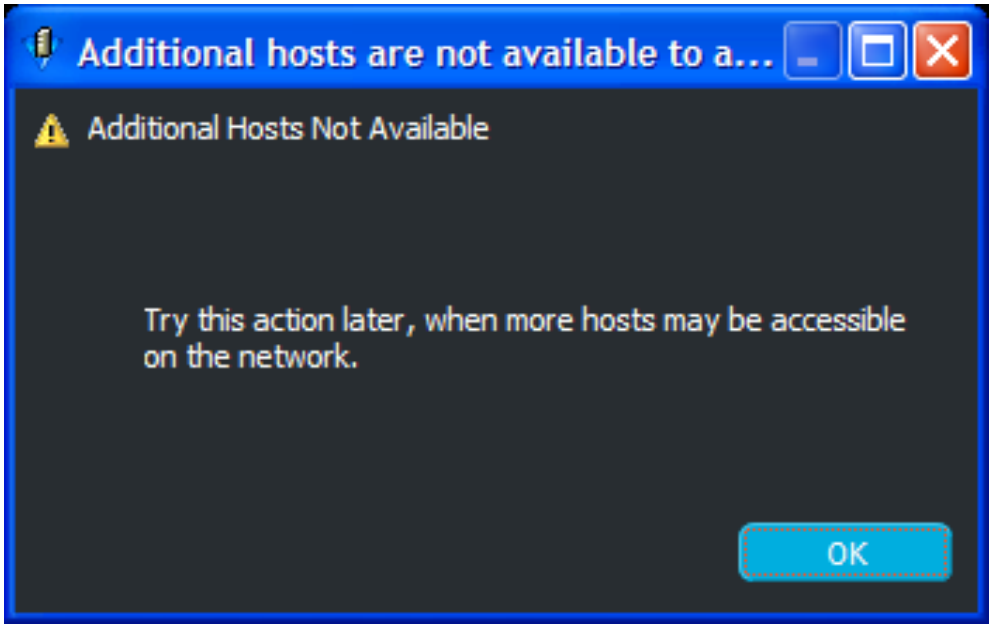


2 Click the *Hosts* tab, then click the **Add Host** button, or right-click any host and select *Associate Host*.

The following dialog box is displayed:



If no hosts are available, the following dialog box is displayed, instead:



3 Select one or more host servers, then click *OK*.

The host server is listed with the others for the selected storage item.

6.6 Removing Repositories

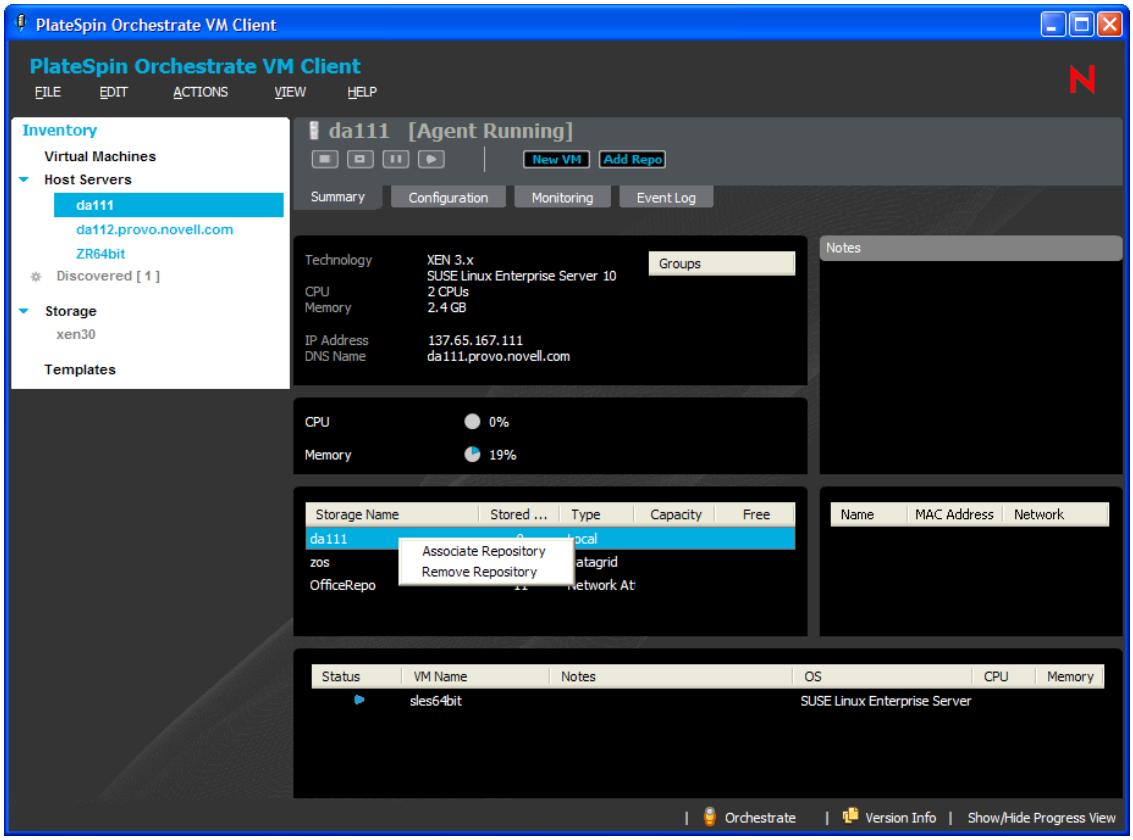
You can remove repositories from being associated with a host server, or you can remove a repository altogether:

- Section 6.6.1, “Removing a Repository from a Host Server,” on page 146
- Section 6.6.2, “Removing a Host Server from a Repository,” on page 147
- Section 6.6.3, “Removing a Repository from the VM Client,” on page 147

6.6.1 Removing a Repository from a Host Server

IMPORTANT: When you remove the repository from association with the host server, the VMs stored in the repository can no longer be managed through this host server.

1 In the VM Client, click the *Host Servers* view, right-click a host server, then select *Show Details*.



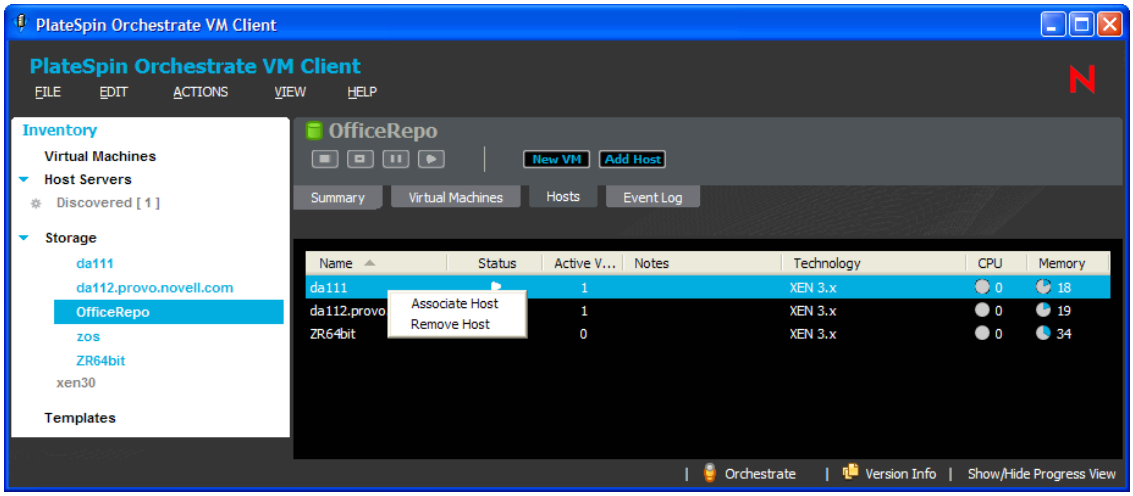
2 Right-click any repository listed in the storage section, then select *Remove Repository*.

The repository is removed from those listed for the selected host server and is no longer available to the host server.

6.6.2 Removing a Host Server from a Repository

IMPORTANT: When you remove the repository from association with the host server, the VMs stored in the repository can no longer be managed through this host server.

1 In the VM Client, click the *Storage* view, right-click a repository, then select *Show Details*.



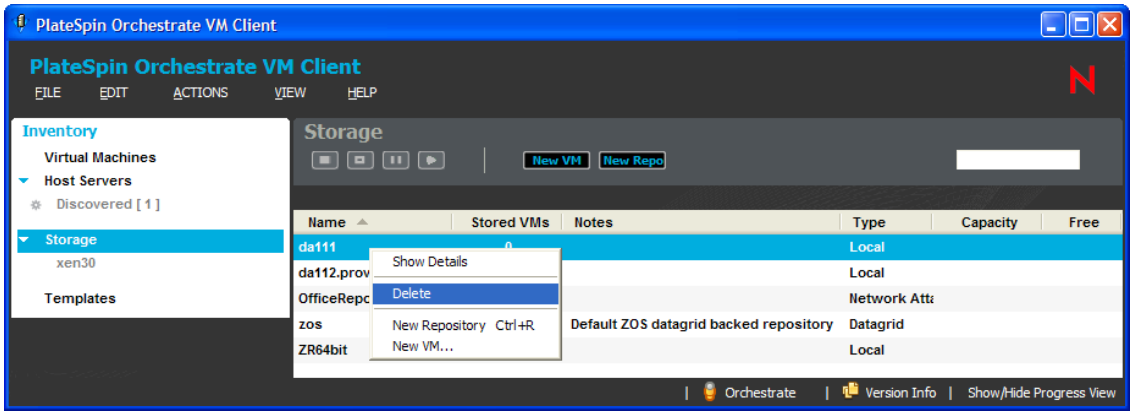
2 Click the *Hosts* tab, right-click a host, then select *Remove Host*.

The host is immediately removed from those listed for the selected repository so that it no longer uses the repository.

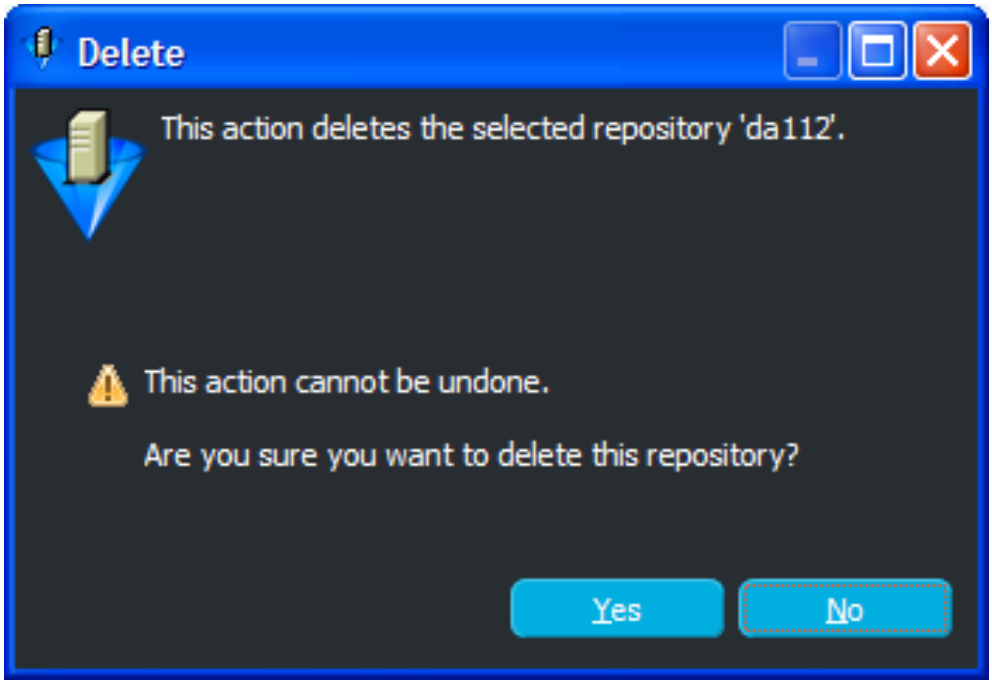
6.6.3 Removing a Repository from the VM Client

WARNING: If a repository that you delete has VMs stored in it, the physical storage for the VMs' files remains, but the files are no longer accessible to the VM Client, so the VMs can no longer be managed.

1 In the VM Client, click the *Storage* view, right-click a repository, then select *Delete*.



The following confirmation dialog box is displayed:



2 Click *Yes* to delete the repository.

The repository is removed from those listed.

7 Managing Templates

A template enables you to create multiple VMs using the same set of standard settings (guest operating system, hardware, storage devices, and network settings). When you create (or clone) a new VM from a template, you can personalize the settings required for the new VM.

You create templates from existing VMs. Currently, templates are supported only for Xen VMs and VMware VMs. You cannot create a template from a Hyper-V VM.

The following sections provide information to help you create and manage templates:

- Section 7.1, “Viewing and Editing Template Details,” on page 149
- Section 7.2, “Creating a Template from a VM,” on page 152
- Section 7.3, “Editing Templates,” on page 154
- Section 7.4, “Moving a Template,” on page 163
- Section 7.5, “Deleting Templates,” on page 164

7.1 Viewing and Editing Template Details

Review the following sections for information on the Details views:

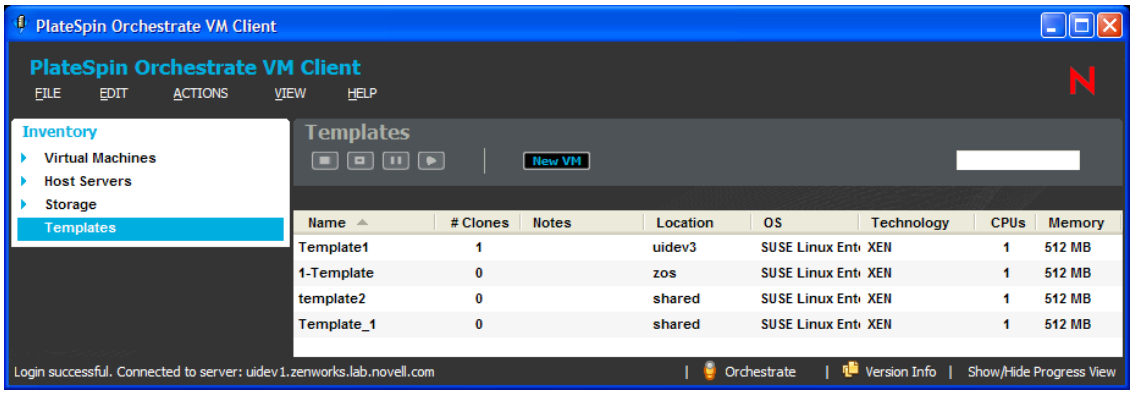
- Section 7.1.1, “Accessing Template Details,” on page 149
- Section 7.1.2, “Using the Details Tabs,” on page 150

7.1.1 Accessing Template Details

The details for each template consist of a summary and an event log.

1 In the VM Client, click the *Templates* view.

The templates are displayed:



2 Do one of the following:

- Double-click one of the templates.
- Right-click one of the templates, then select *Show Details*.

The tabs for the selected template are displayed.

3 For details on the tabs, see:

- "Summary Tab" on page 71
- "Event Log Tab" on page 78

4 To close the details view, click the view name in the Inventory perspective panel.

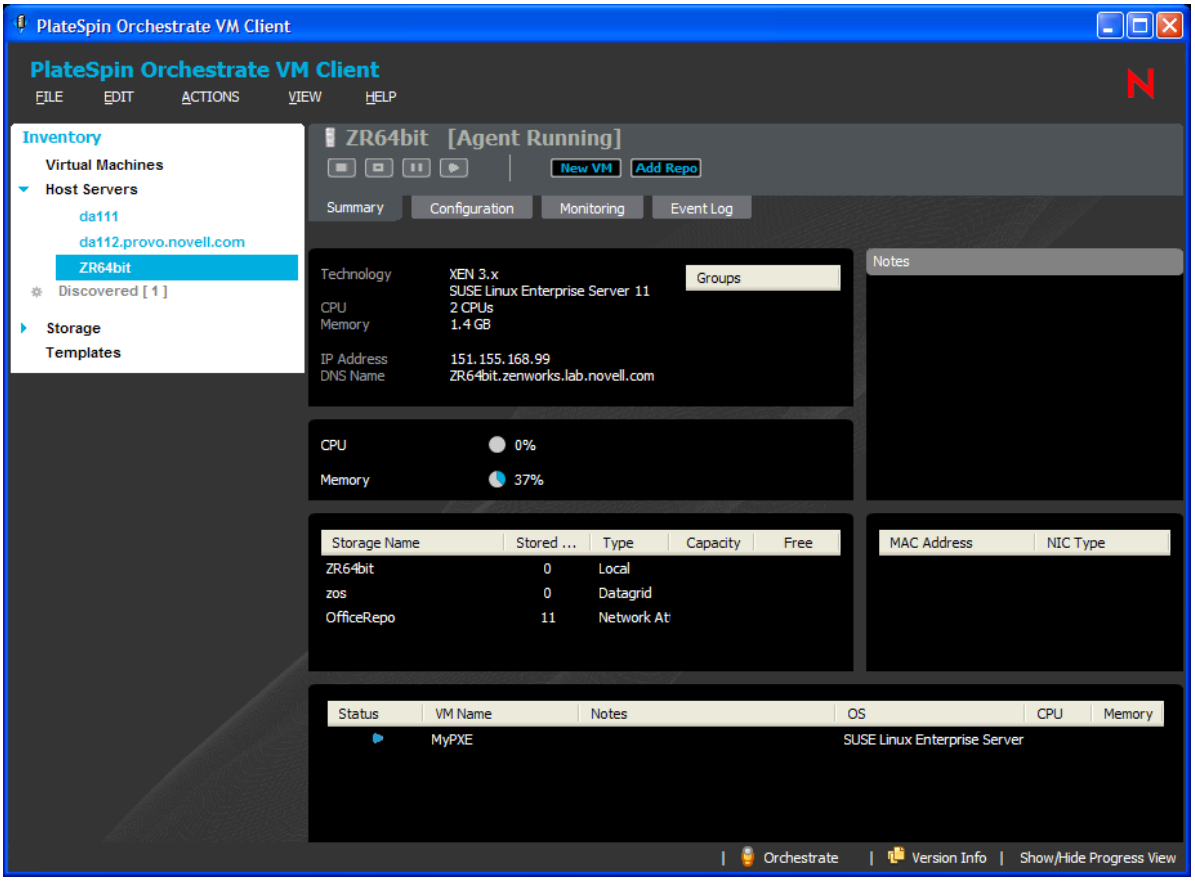
7.1.2 Using the Details Tabs

The following sections provide information on the various details tabs:

- "Summary Tab" on page 150
- "Event Log Tab" on page 151

Summary Tab

Figure 7-1 *Summary Tab for Templates*



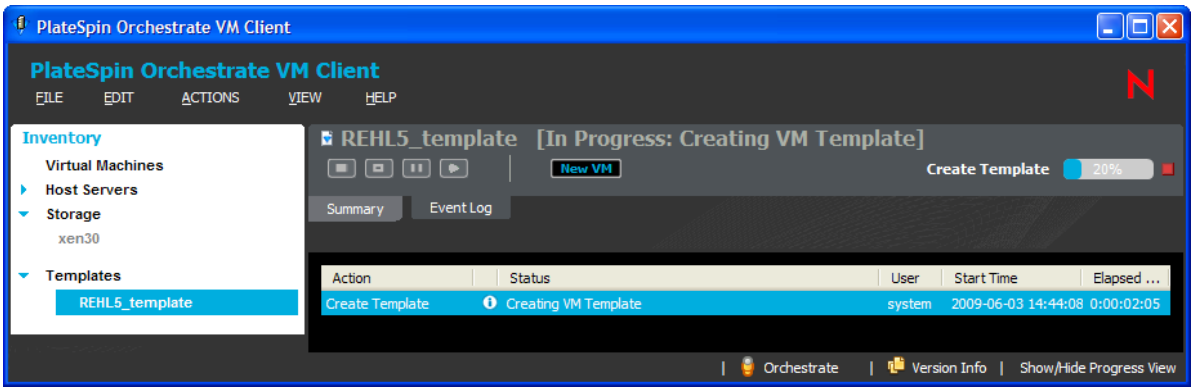
You can do the following with the *Summary* tab for templates:

- In the first section, right-click a group name under Groups, then select *Remove* to revoke the template's membership in the group.
- In the Notes section, enter and edit notes for the template.
- View basic information about the template:
  - The template's operating system
  - The virtual machine technology being used by the template
  - Number of clones of the template
  - IP address and DNS name, if it is not DHCP
  - The type of datastore and capacity
  - The template's MAC address
  - The VMs it is associated with
- Double-click the *Location* entry to view the storage location's details tabs.
- Double-click a listed VM to view its details tabs. These are the VMs that were cloned from the template.
- Right-click a listed VM, then select any of the available menu options. These are the same right-click menu options that are available for the VM in the *Virtual Machines* Inventory list.

Wherever N/A appears in the details, it means that the information is not available.

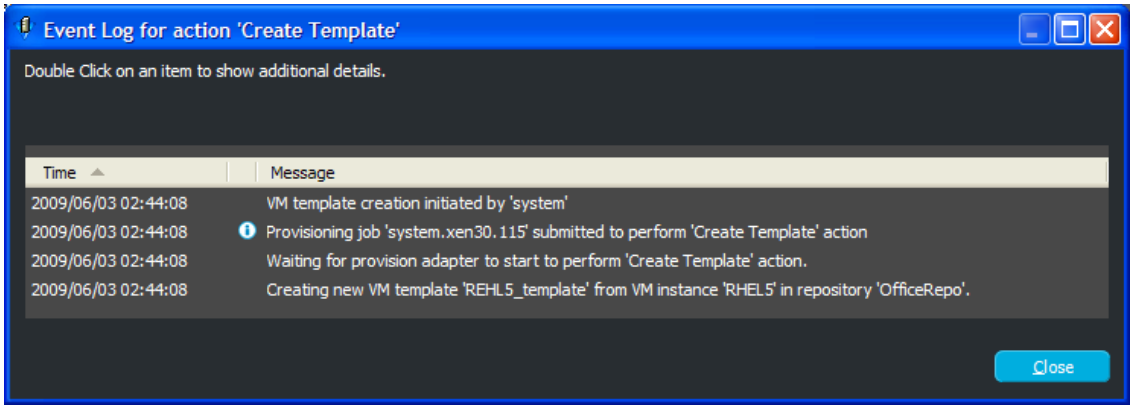
Event Log Tab

Figure 7-2 *Event Log Tab for Templates*



You can do the following with this tab:

- View the Event Log information.
- Double-click an event item that contains the icon to view the details of the event as reported by the Orchestration Server. The following is an example of an event's details:



7.2 Creating a Template from a VM

Templates are created from an existing VM, but it is created with some default settings so that it is not identical to the VM. Templates allow you to quickly clone new VMs that are based on the template's configuration.

Currently, template creation is supported only for Xen VMs and VMware VMs. You cannot create a template from a Hyper-V VM.

You can modify a template's configuration. However, after you clone VMs from a template, the template configuration can no longer be modified without first deleting or detaching the VMs that were cloned from it. Therefore, when you create the template, plan to make all of your modifications before using it to clone new VMs.

For information on cloning templates, see Section 8.1, "Cloning Templates," on page 167. For information on detaching cloned VMs from their templates, see Section 8.2, "Detaching Clones from Templates," on page 169.

IMPORTANT: If you define a CD-ROM or DVD-ROM in the template, it must be accessible through shared storage to any future target host server. Otherwise, the CD-ROM or DVD-ROM might not be included when a VM is cloned from the template and the VM will not start.

To create a template:

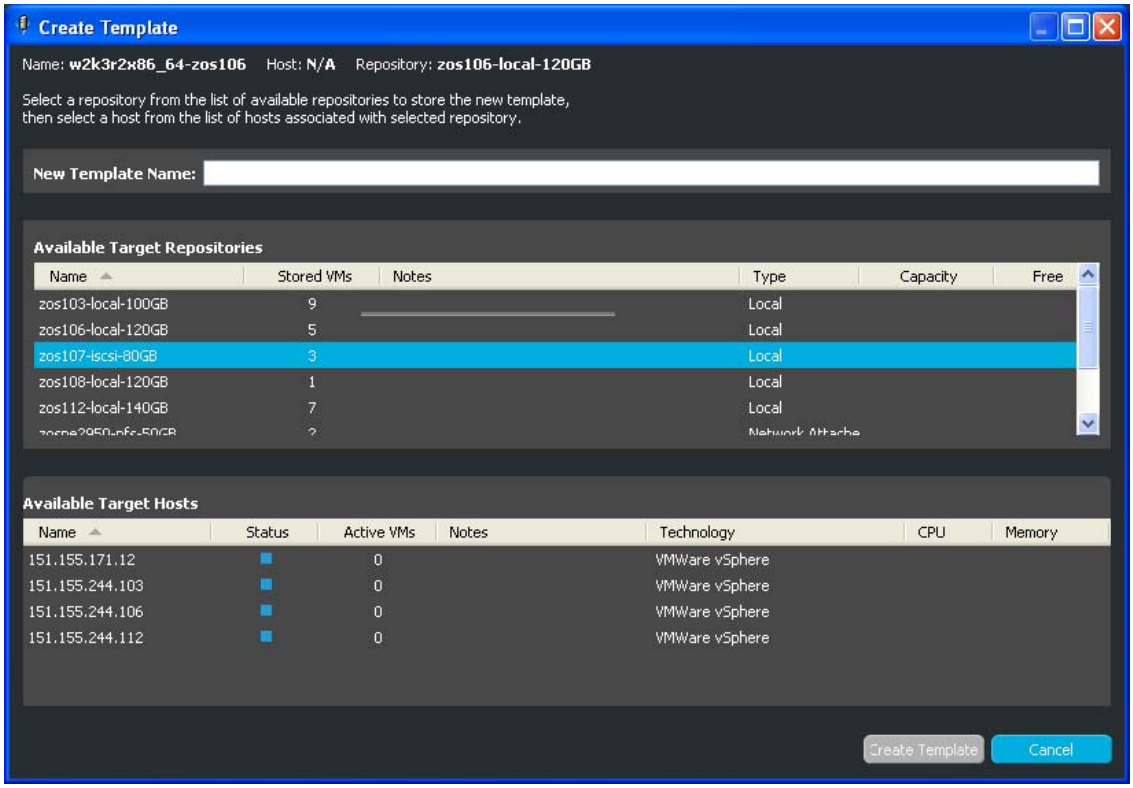
1. In the VM Client, click the *Virtual Machines* view, right-click the VM that you want to use to create the template, then select *Shut Down*.

   The VM cannot be running during creation of the template because the VM's image is modified.

2. In the VM Client, click the *Virtual Machine* view, select the VM that you want to use to create the template, then do one of the following:

   - Click the **Template** button.
   - Click *File* > *Create Template*.
   - Right-click the VM, then select *Create Template*.

The following dialog box is displayed:



3 Specify a name in the *New Template Name* field.

4 Select the repository for the template from the *Available Target Repositories* section.

Template files can be stored anywhere that provides access to them. The known repositories are displayed.

It is preferable to use a repository for storing templates that is accessible to all host servers. The first choice is a shared repository that provides fast access. The second choice is the ZOS repository, which is shared; however, it is on the Orchestration server, which might have high utilization and slower access to template files. The last choice is a repository on a particular host server, because it might not be shared.

5 Select a host from the *Available Target Hosts* section.

This is the host against which the template is registered. In essence, this is the host that owns the template.

6 Click *Create Template*.

You can view the progress in any of the following ways:

- Observe messages at the bottom of the VM Client interface.
- Click *View* > *Show Progress View* or double-click *Show/Hide Progress View* to open the *Progress View* window. In the *Progress View* you can mouse over the entry in the *Status* column, or right-click that entry and select *Show Log* to view the log information for creating the template.
- In the *Virtual Machines* view, double-click the VM from which the template is being created, click the *Event Log* tab, then double-click the entry related to the creation process that has the icon next to it. The Event Log Details dialog box is displayed and automatically updated as events occur.

- In the *Templates* view, double-click the template that is being created, click the *Event Log* tab, then double-click the entry related to the creation process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- View its progress in the *Jobs* tab of the Orchestration Console.

The new template is listed in the *Templates* view.

7 To modify the template to your desired specifications, continue with Section 7.3, "Editing Templates," on page 154.

After editing the template, you can then use it to clone new VMs. For more information, see Section 8.1, "Cloning Templates," on page 167.

7.3 Editing Templates

Templates can be edited at any time. However, if a template was cloned, you must first detach the clones before you can edit it. For more information, see Section 8.2, "Detaching Clones from Templates," on page 169.

The following steps include information for all possible template fields and pages. Depending on VM type, you might not be able to edit the template or the template might not have all of the fields and pages.

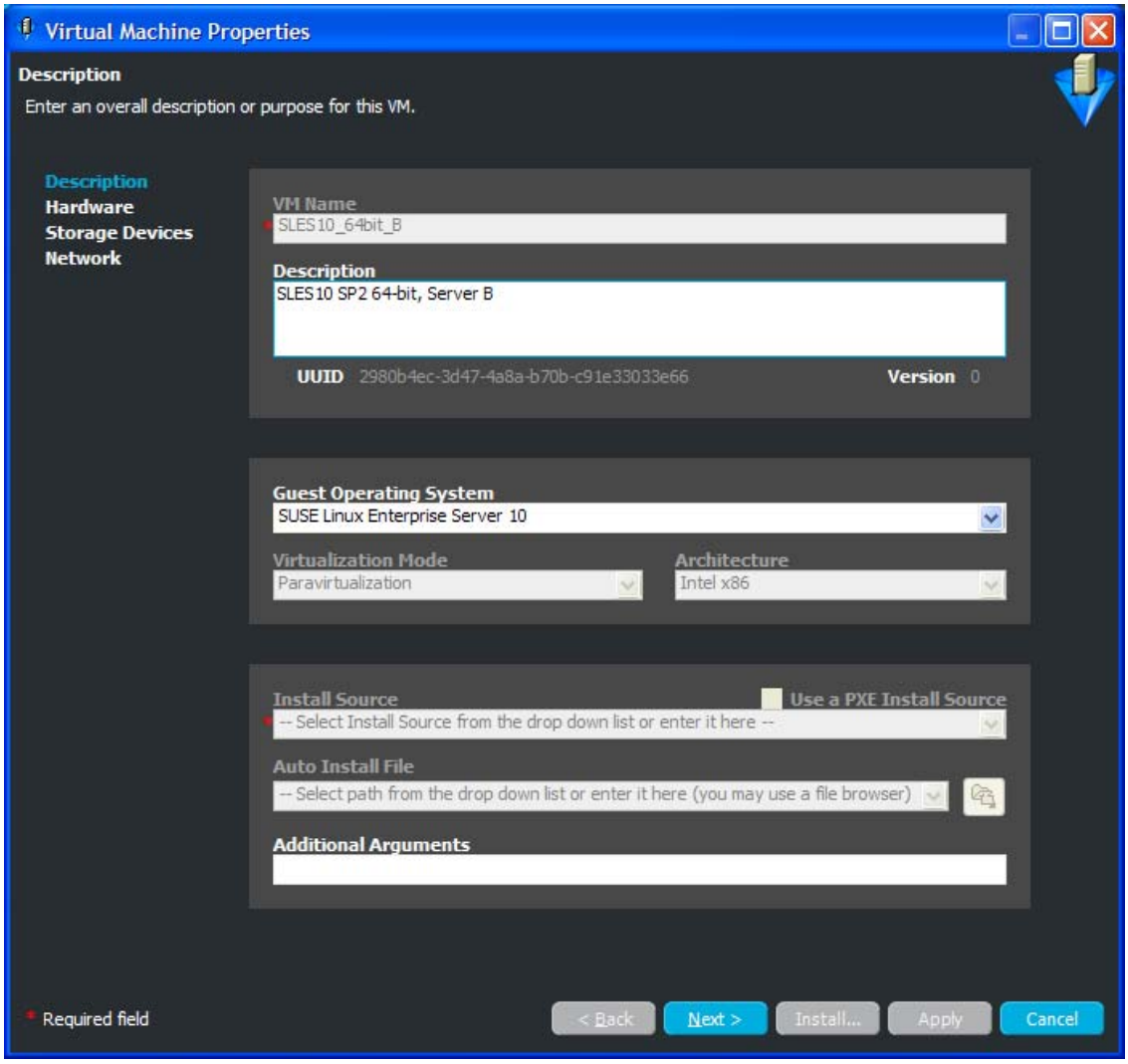
To edit a template, run the Virtual Machine Properties Wizard:

1 If you want to retain your edits on a VM, click the *Virtual Machines* view in the VM Client, right-click the VM that you want to edit, then select *Shut Down*.

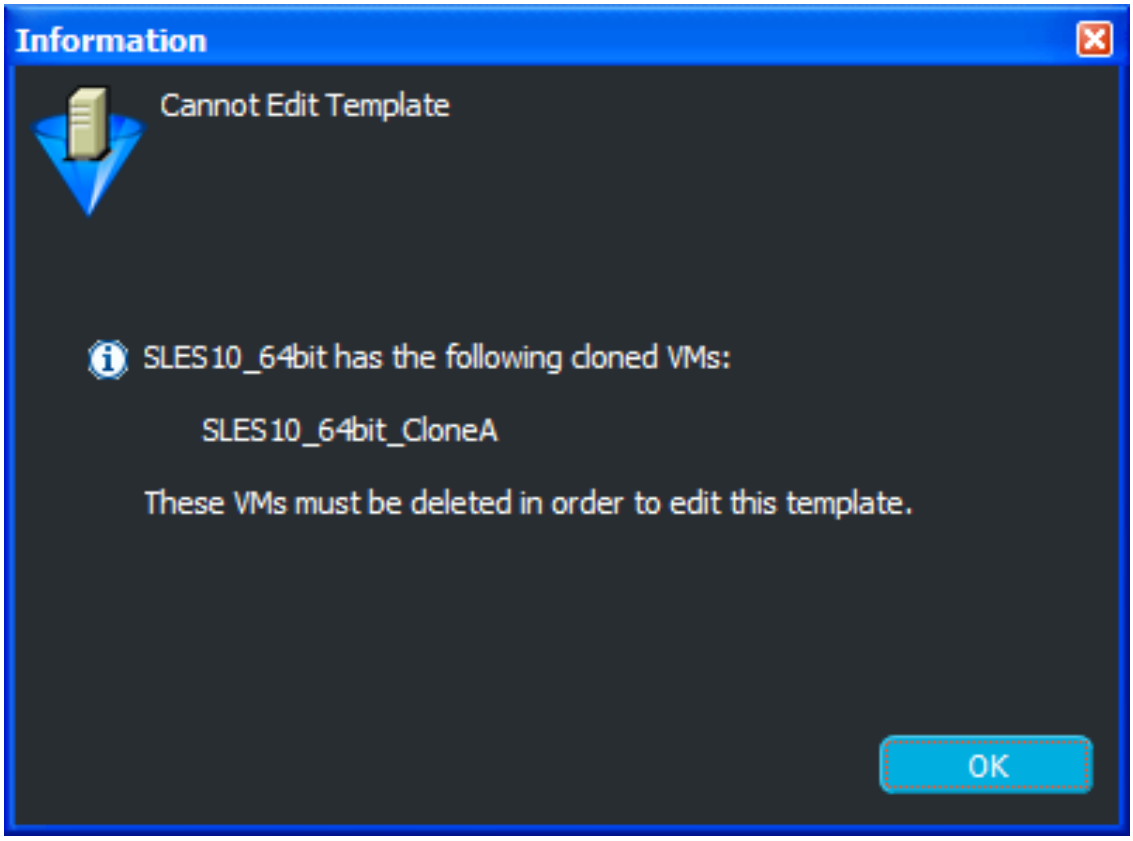
2 Do one of the following in the *Templates* view to start the wizard:

- Select a template, then click the Edit button.
- Select a template, then click *Edit* > *Edit*.
- Select a template, then press Ctrl+E.
- Right-click any listed template, then select *Edit*.

The following wizard page is displayed:



If a template currently has cloned VMs associated with it, you cannot edit the template. The following dialog box is displayed when you attempt to edit such a template:



After noting which VMs are involved, click *OK* to close the dialog box, then determine whether you want to detach those VMs in order to edit the template. For more information on detaching the clones from the template in the Orchestration Console, see Section 8.2, "Detaching Clones from Templates," on page 169.

3 Fill in the available fields:

Description: Note the purpose and any other specifics you might require of the template. These notes apply to all versions of this template.

Guest Operating System: The clones of the template inherit the operating system of the VM from which this template was created. Therefore, you should only change it if it is incorrect. The following are supported:

SUSE Linux Enterprise Server 8
SUSE Linux Enterprise Server 9
SUSE Linux Enterprise Server 10
SUSE Linux Enterprise Server 11
SUSE Linux Enterprise Desktop 10
SUSE Linux Enterprise Desktop 11
openSUSE
openSUSE 11
Novell Open Enterprise Server 2 (Linux)
Novell Open Enterprise Server 2 (NetWare)

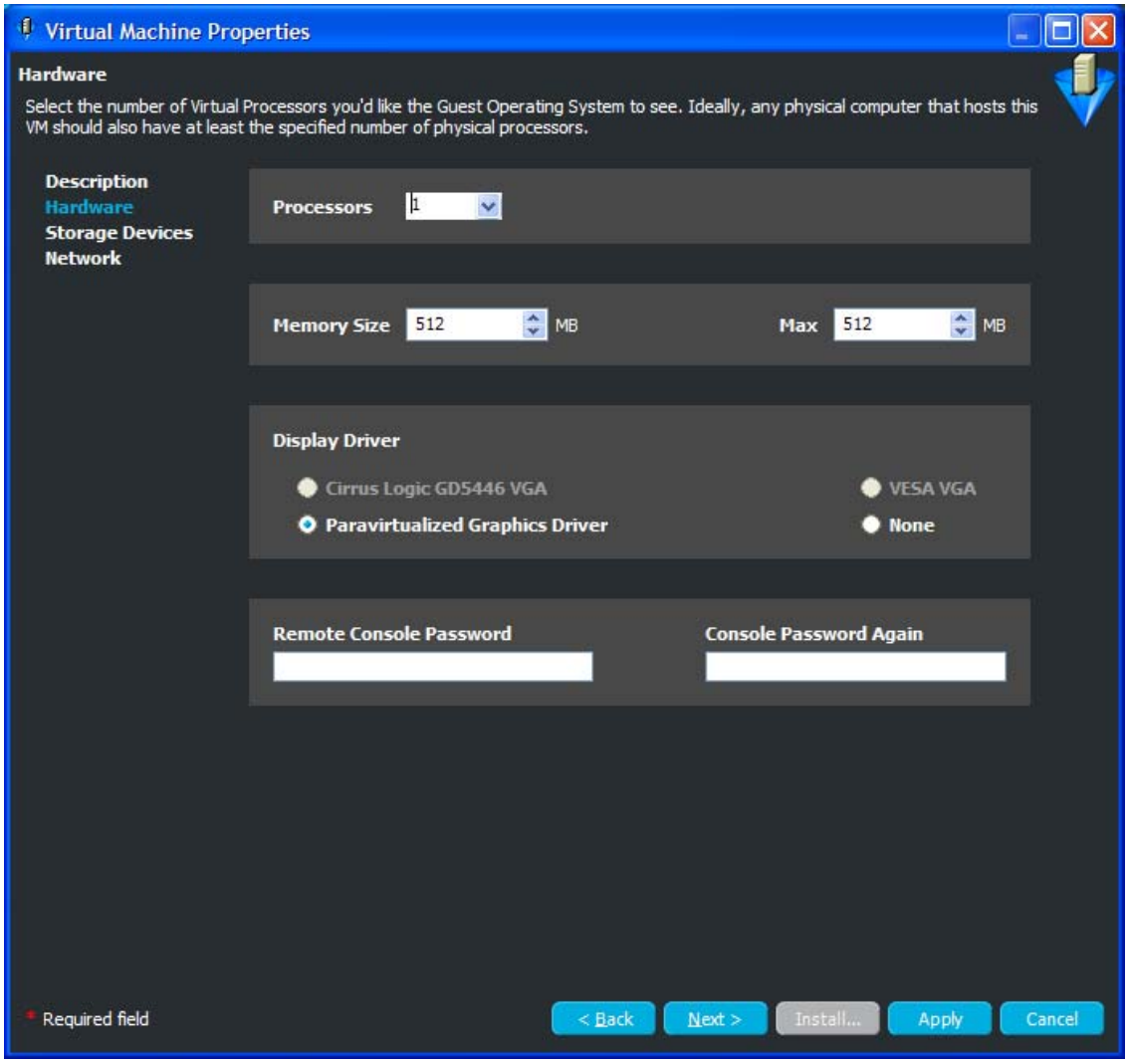
Novell NetWare 6.5 SP6 and older
Red Hat Enterprise Linux 3
Red Hat Enterprise Linux 4
Red Hat Enterprise Linux 5
Solaris 9 and older
Solaris 10
Microsoft Windows NT
Microsoft Windows XP, 2000, 2003
Microsoft Windows XP, 2003 (x64)
Microsoft Windows Vista
Microsoft Windows Vista (x64)
Microsoft Windows Server 2008
Microsoft Windows Server 2008 (x64)

There is also an "(other)" option for the following:

SUSE
Red Hat
Microsoft Windows

Additional Arguments: This field applies only to paravirtual installations. These are Linux install arguments, which are operating system parameters similar to the information entered in a GRUB boot loader when running on bare hardware in SUSE Linux Enterprise Server (SLES) and SUSE Linux Enterprise Desktop (SLED). Additional network installation information can be added here, which is used during the build process to find the installation source for the VM build process.

4 Click *Next* to display the following wizard page:



5 Fill in the available fields to define the kind of hardware to be virtualized for the template:

Processors: The number of virtual processors the template has.

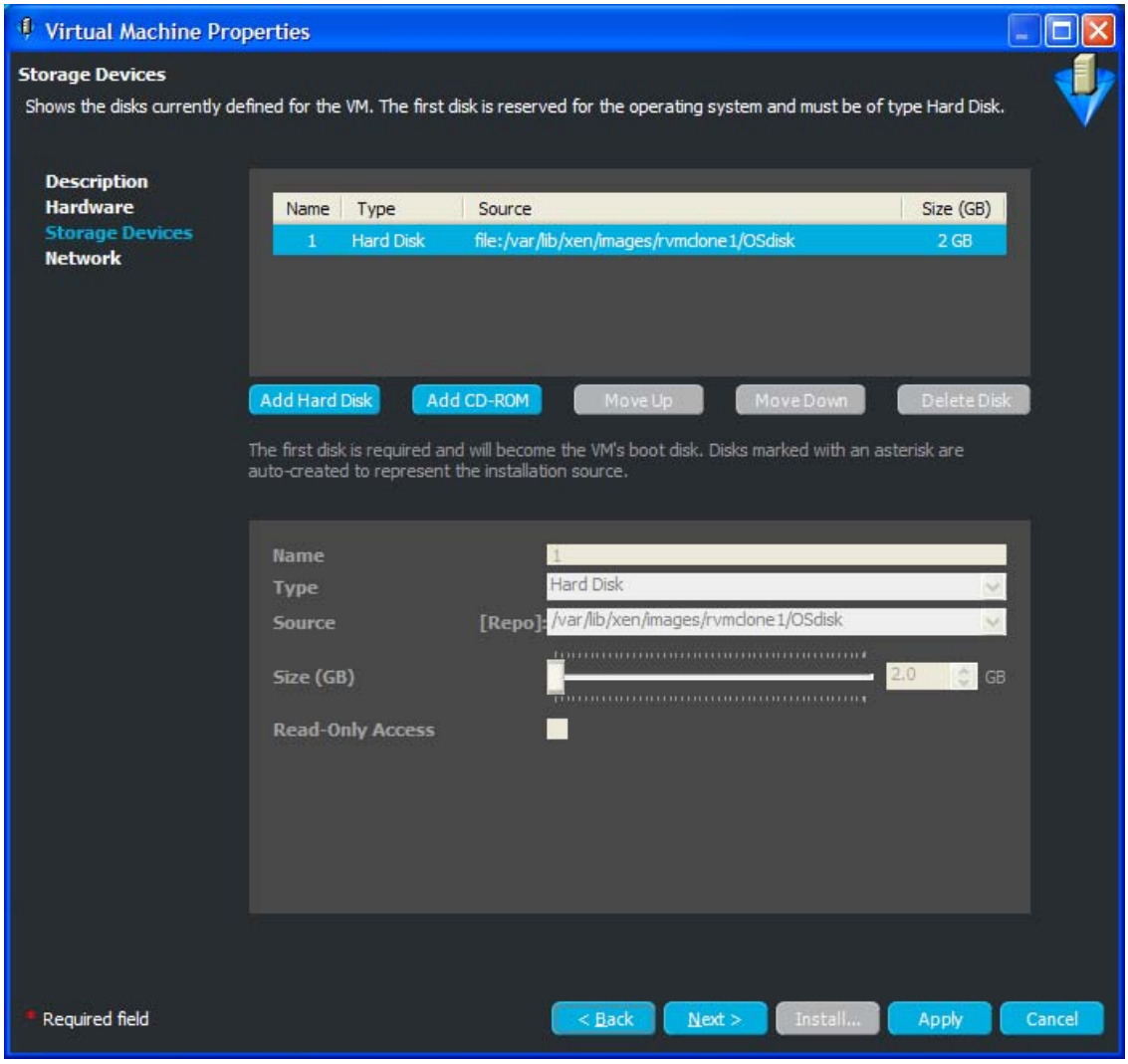
Memory Size: The amount of virtual RAM the template has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Max: The amount of virtual RAM the template has, or paravirtualized memory that can be used by the VM if it is paravirtualized.

Display Driver: The properties of the VM's display. If you have chosen paravirtualization for this VM, your only option is *Paravirtualized*. If you have chosen full virtualization, you can select between *VESA* or the on-board VGA. If you do not need a display, you can turn off the display on a fully virtualized machine.

Remote Console Password: The password for remotely controlling the VM. Use the two fields to confirm that the password is typed correctly.

6 Click *Next* to display the following wizard page:



The example shown is for a template.

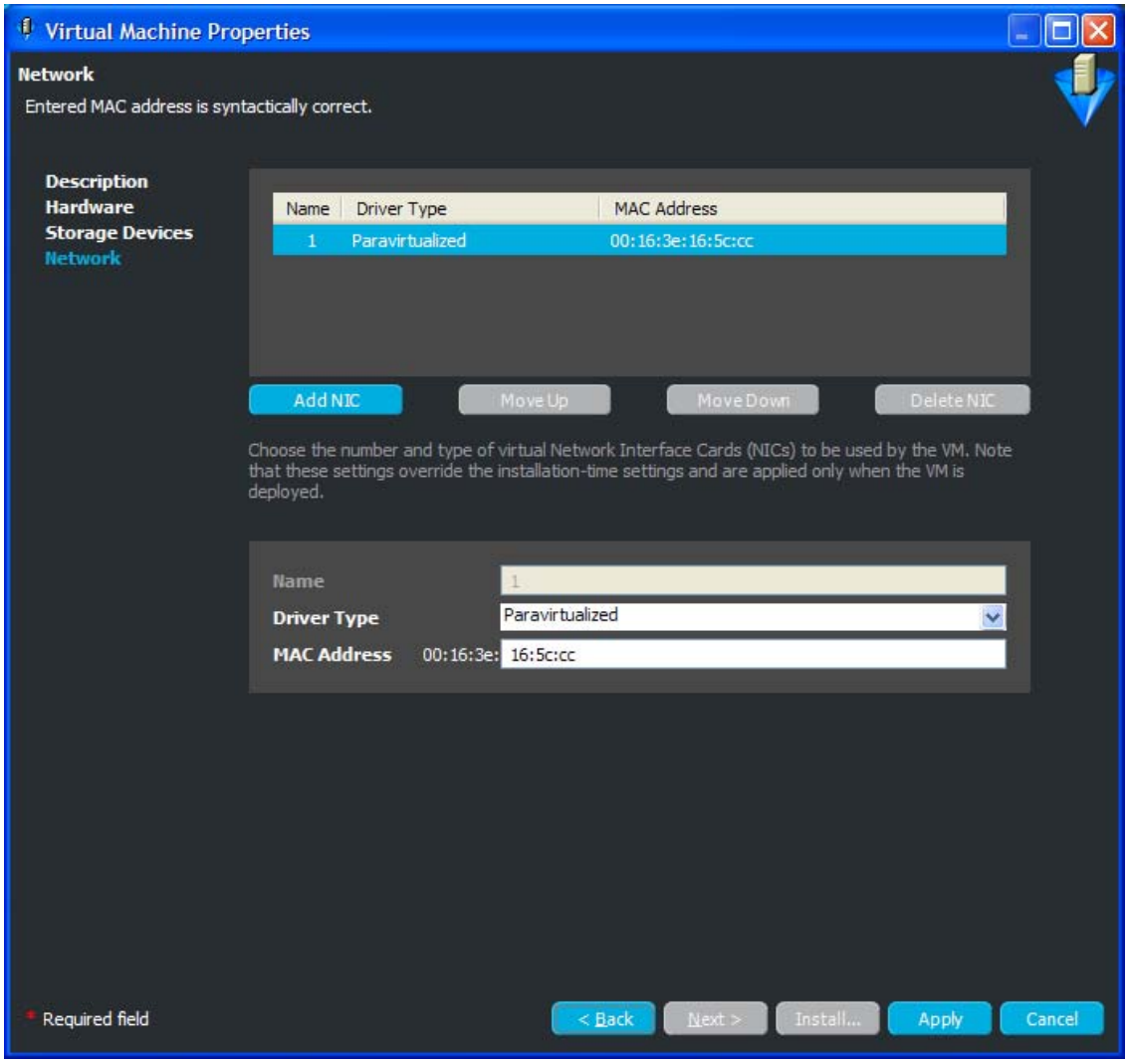
The Storage Devices page is for defining the hard drives and CD or DVD drives that you want to include in the template profile. The first device must always be a hard disk that cannot be removed unless another hard disk has been put into the first slot. This is the only disk (Disk 0) that is stored and version controlled. All other disks are virtual and are created upon launching the VM. You can add any other storage devices you want to the template and move them according to priority in the list.

7 To fill in the storage device information, select a task from the following table:

Tasks	Steps	Additional Details
Adding a hard disk to your VM	1. Click *Add Hard Disk*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of hard disk you want to create on the VM: ◆ Hard Disk ◆ iSCSI (see Warning) ◆ N_Port ID Virtualized Storage (see Warning) ◆ Network Attached Storage **Source:** The repository on the hard disk of the VM. **Size (GB):** The VM's hard drive size, ranging from 0.25 GB (250 MB) to 4 TB. This is the maximum allowable size of the VM. **Read Only Access:** Select this option to give the hard drive Read-Only access. By default, hard drives are writable. **Fabric ID:** (Available only for the N_Port ID virtualized storage). Select or specify a fabric ID that uniquely identifies a SAN repository. The *Fabric ID* drop-down list is populated with fabric IDs of the discovered SAN repositories. **World Wide Name:** (Available only for the N_Port ID virtualized storage). Select or specify a unique World Wide Name. The World Wide Name value is automatically assigned for the NPIV disks. You can edit it, if required. **Target ID:** (Available only for the N_Port ID virtualized storage). Specify the target ID of the SAN repository. **LUN:** (Available only for the N_Port ID virtualized storage). Specify a LUN value between 0 and 254. 3. Click *Apply*.	The following restrictions apply per VM: ◆ Limit of 4 fully virtualized disks (hda-hdd). ◆ Limit of 16 paravirtualized disks (xvda-xvdp). **WARNING**: Do not select iSCSI or NPIV when defining or editing a template. This causes all VMs cloned from the template to use the same iSCSI or NPIV location, thus corrupting the disk. While adding an additional NPIV disk to a VM, ensure that the disk values for Fabric ID, World Wide Name, Target ID, and LUN are unique for each NPIV disk of the VM. Creation of a block-based VM is not supported for NPIV.

Tasks	Steps	Additional Details
Adding a CD-ROM or DVD ROM to your VM	1. Click *Add CD-ROM*. 2. Fill in the following fields: **Name:** The name is the number in the order the drive appears in its VM image list. **Type:** Select the type of CD-ROM you want to create on the VM: ◆ CD-ROM ◆ DVD **Source:** The repository on the hard disk of the VM. **Size (GB):** The size is zero and cannot be changed. **Read Only Access:** These drives can only have Read-Only access. 3. Click *Apply*.	**IMPORTANT**: If you add a CD-ROM or DVD-ROM, any VMs created from this template can only be moved, migrated, or used to create another template if the CD-ROM's or DVD-ROM's ISO or image is accessible through shared storage.
Rearranging the order in which each storage device is accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.	The first storage device in the list must be a hard disk, which is the only one actually stored in the VM image.
Deleting a storage device	1. Select the storage device you want to delete. 2. Click *Delete*.	Removes the selected storage device from the table. **WARNING**: If the storage device is based on a disk image, that could also be deleted. To preserve the disk image, manually copy it to another location before deleting the storage device.

8 Click *Next* to display the following wizard page:



The example shown is for a template.

The network devices are added, deleted, and defined on the Network page, where you add specific information about your network connections or intended network connections for your template. You can define more detailed NIC settings in your auto-install files or when performing a guest installation.

9 To fill in the NIC information, select a task from the following table:

Tasks	Steps
Adding a NIC to your VM	1. Click *Add NIC*. 2. Fill in the following fields: **Name:** The number, based on the NIC's order in the list, automatically assigned to the NIC. **Driver Type:** Indicates whether the VM has direct access to the NIC. If the NIC should only interface with the hypervisor, you can select the specific type of full virtualization. You should have a paravirtualized NIC with a paravirtualized VM. **MAC Address:** Unless you have a specific MAC address you want to assign to this VM, leave this set to *Default*, and Xen assigns it a MAC address when you launch the VM. **Network:** Select the network you want associated with the NIC. 3. Click *Apply*.
Rearranging the order in which the NICs are accessed	1. Select the storage device whose order you want to change. 2. Click *Move Up* or *Move Down*.
Deleting a NIC from your VM	1. Select the NIC you want to remove. 2. Click *Delete NIC*.

10 To complete and close the wizard, click *Apply*.

You can click *Back* to make further changes before applying the edits.

Applies the wizard configuration changes and saves the template in the *Templates* view.

Focus is returned to the *Virtual Machines* view after you exit the wizard with the edited template selected in the list.

After editing a template, you can then use it to clone new VMs. For more information, see Section 8.1, "Cloning Templates," on page 167.

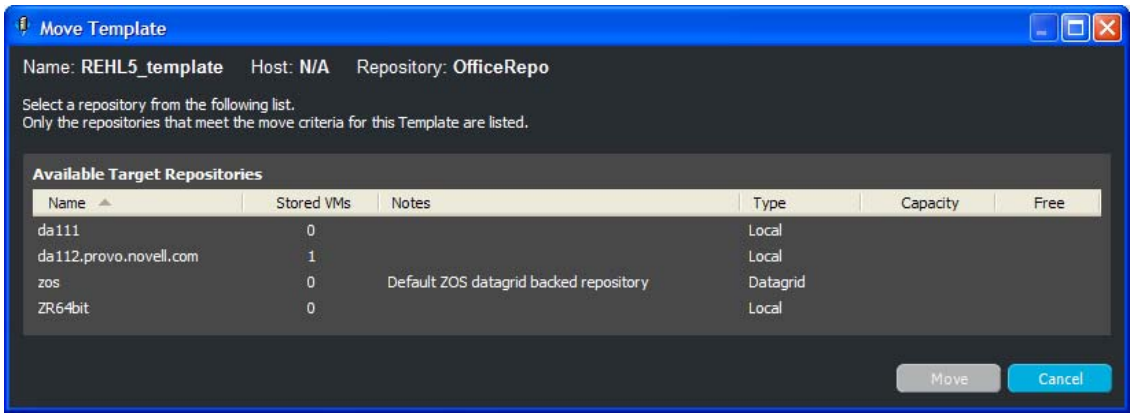
7.4 Moving a Template

IMPORTANT: If the template has a CD-ROM or DVD-ROM defined in it, it must be accessible through shared storage to the target host server. Otherwise, the CD-ROM or DVD-ROM is not included in the move and any VMs cloned from the template cannot start. In that case, you should remove the CD-ROM or DVD-ROM from the template before moving it.

If the VM you want to move has had clones made from it, you must first detach all of the clones. For more information, see Section 8.2, "Detaching Clones from Templates," on page 169.

You can move a template's files from one host server to another.

1 In the VM Client, click the *Templates* view, right-click the template to be moved, then select *Move* to display the following dialog box:



2 Select the repository, then click *Move*.

The template's files are moved to the host server where the repository resides.

7.5 Deleting Templates

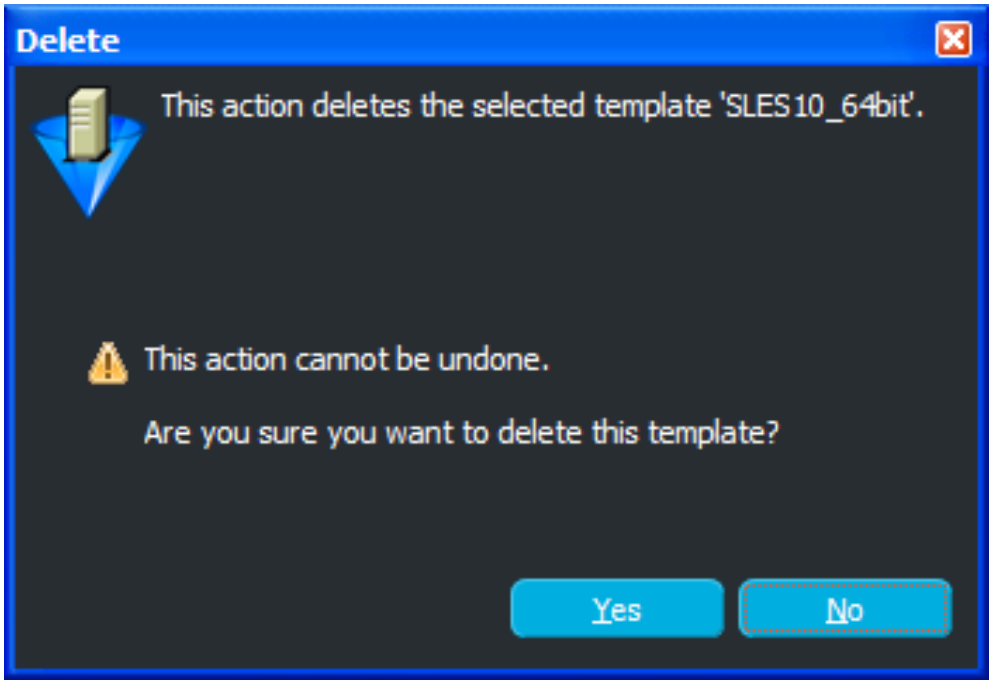
Deleted templates cannot be recovered. You also cannot delete a template that has clones. However, you can use the Orchestration Console to detach the clones from the template. For more information, see Section 8.2, "Detaching Clones from Templates," on page 169.

1 In the VM Client, click the *Templates* view, then select one or more templates.

2 Do one of the following to delete the selected templates:

- Click the Delete button.
- Click *Edit* > *Delete*.
- In the *Templates* view, right-click the selected template, then select *Delete*.

3 Click either *Yes* or *No* to delete the template:



This completely removes the templates from the *Templates* view. It does not have any affect on any VMs cloned from these templates.

8 Managing Clones of Templates

You can clone templates to create new VMs. The following sections provide instructions:

- Section 8.1, “Cloning Templates,” on page 167
- Section 8.2, “Detaching Clones from Templates,” on page 169

8.1 Cloning Templates

Templates provide a method for quickly creating a new VM. Information for the new VM is taken from the VM template. You simply personalize the VM with a new name and description.

A clone of a template contains just the differences between the template and the clone. The template's file contains the bulk of the VM information. Before cloning a template, you should use the Orchestration Console to ensure that the template includes the correct information.

Because clones are so closely related to their parent template, you cannot perform actions against a template without directly affecting its clones. So, in order to edit, delete, or move a template using the VM Client, you must first detach or delete its clones. The detaching process creates a complete VM image for the clone, which is then no longer considered to be a clone in the VM Client.

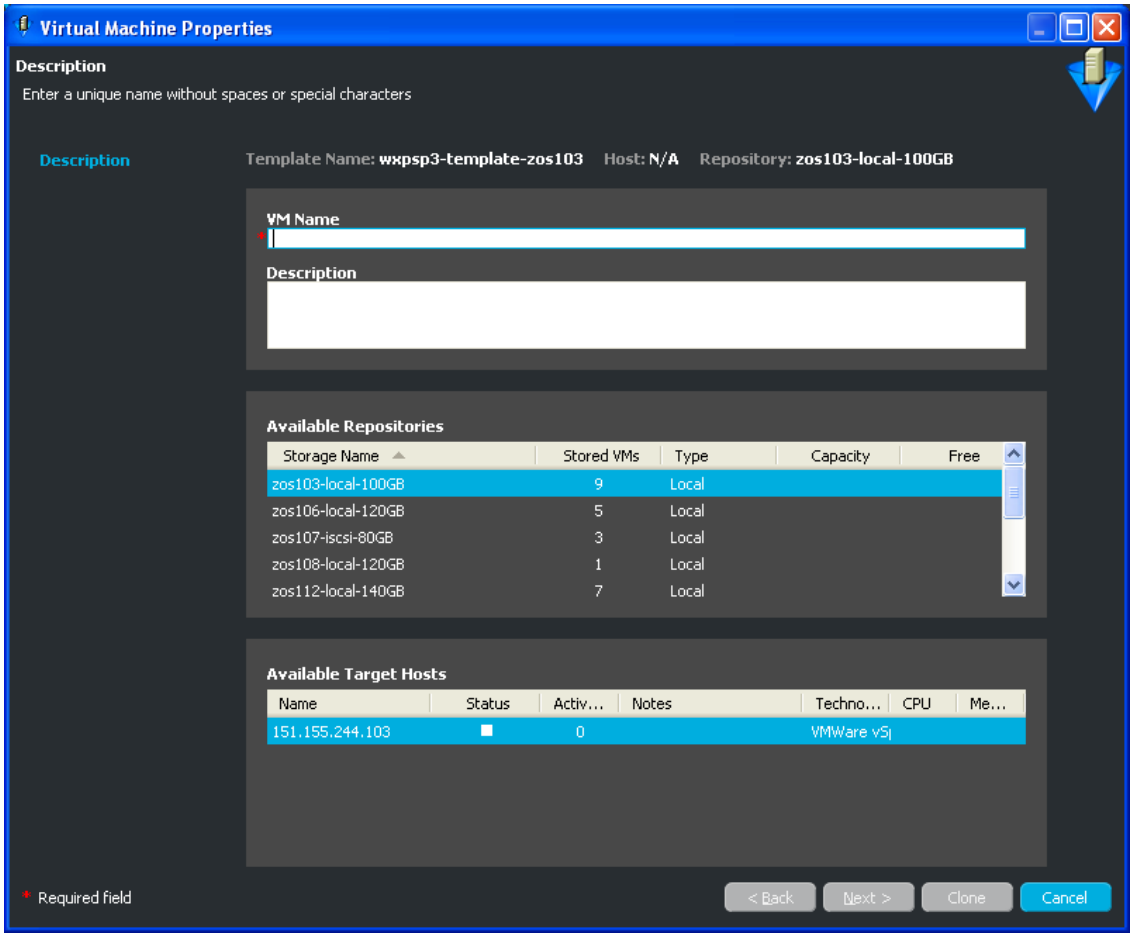
IMPORTANT: If a CD-ROM or DVD-ROM is configured for the template that you want to clone, it will be included only if its ISO or image is accessible through shared storage. If it is not accessible, the VM cloned from this template cannot start. In that case, you must remove the CD-ROM or DVD-ROM definition from the template's properties before cloning the template.

The following steps include information for all possible fields and pages. Depending on VM type, the clone might not have all of the fields and pages.

To create a clone:

1. In the VM Client, click the *Templates* view, then select a template.
2. Do one of the following to clone the template:
   - Click the Clone button.
   - Click *Edit* > *Clone*.
   - In the *Templates* view, right-click the selected template, then select *Clone*.

The following wizard opens:



3 Configure the following options:

VM Name: Specify a name for the cloned VM. This name must be unique. It cannot already exist in either the *Virtual Machines* or *Templates* lists. The name cannot be longer than 100 characters and cannot start with the letters "xen."

Entering a name enables the *Clone* button. All remaining fields and pages are optional; you can configure them now or after the VM clone is created.

Description: Add any information you want to identify this VM.

Available Repositories: The template's repository is automatically selected. If you do not want to store the VM clone in this repository, select another one.

Available Target Hosts: This list displays the hosts associated with the selected repository. Select the host that you want to run the VM when it starts.

4 Click *Clone*.

A cloning job is started. You can view its progress in any of the following ways:

- Double-click the template being cloned, click the *Event Log* tab, then double-click the entry related to the cloning process that has the icon next to it. The Event Log Details dialog box is displayed and is automatically updated as events occur.
- Observe messages at the bottom of the VM Client interface.

- Click *View* > *Show Progress View* to open the Progress window.
- View its progress in the *Jobs* tab of the Orchestration Console.

When the cloning process is complete, the VM Client's job status is displayed in a pop-up message, as well as in the Event Log Details dialog box. It is also listed in the Orchestration Console as `Completed`.

The cloned template is now listed with the other VMs in the *Virtual Machines* view.

5. (Optional) Right-click the cloned VM, then select *Edit* to modify it as necessary.

8.2 Detaching Clones from Templates

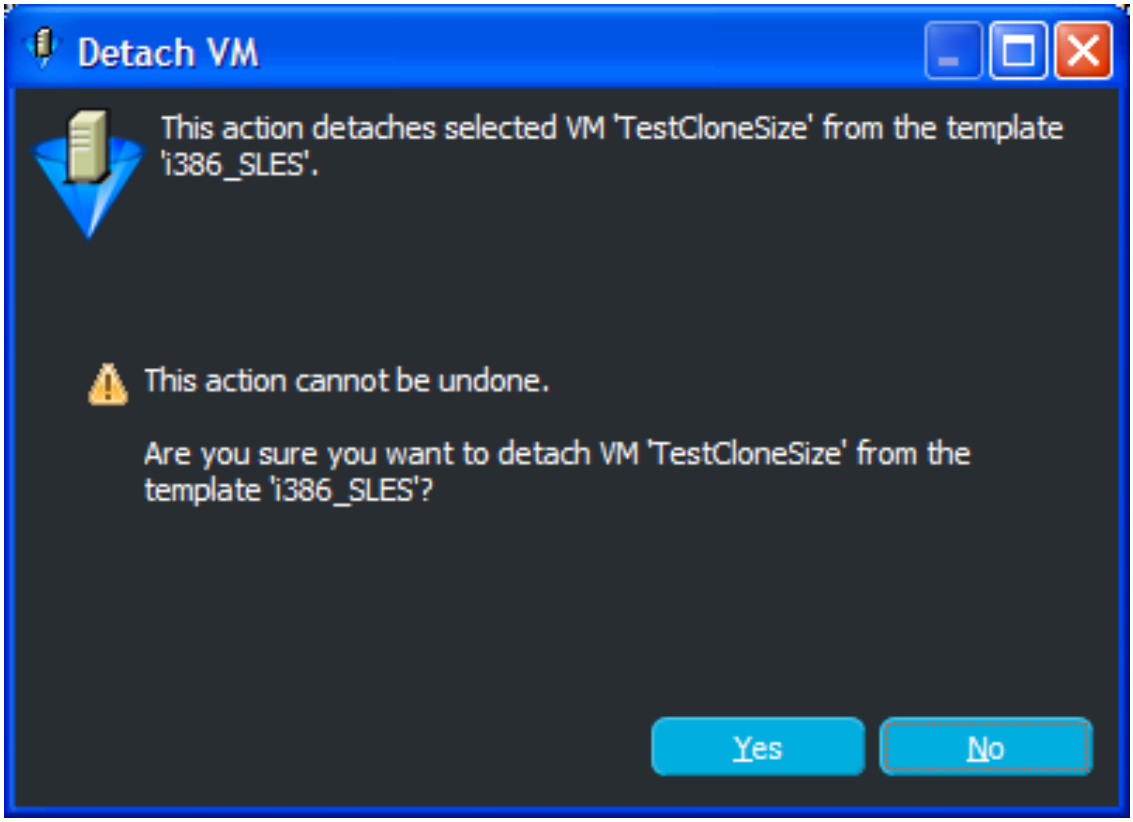
To edit, delete, or move a template using the VM Client, you must first detach or delete its clones. The detaching process creates a complete VM image for the clone, which is then no longer considered to be a clone by the VM Client.

Deleting a clone is the same as deleting a VM. For more information, see Section 5.11, "Deleting VMs," on page 134.

To detach one or more cloned VMs:

1. In the VM Client, view the dialog box that is displayed when you attempt to edit, delete, or move a template and note which VMs need to be detached.
2. Select *Virtual Machines* in the Inventory panel, then do one of the following:
   - Select a VM to be detached, then click the Detach button.
   - Select a VM to be detached, then click *Edit* > *Detach*.
   - Right-click a VM to be detached, then select *Detach*.

The following dialog box is displayed:



3 Click *OK* to confirm the detachment of the VM from the template.

   The VM is repositioned under *VMs* now that it is no longer related to a template.

4 To detach more VM clones, repeat Step 2 through Step 3.

5 Return to the VM Client to either edit, delete, or move the template.

9 Managing with Groups

You use groups to manage the items listed in the Inventory panel:

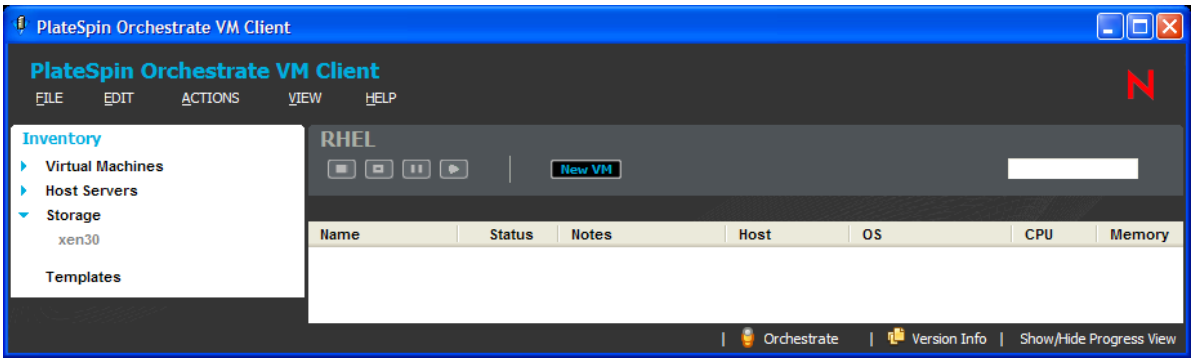
- Section 9.1, “Understanding Groups,” on page 171
- Section 9.2, “Creating a Group,” on page 179
- Section 9.3, “Adding Members to an Existing Group,” on page 180
- Section 9.4, “Removing Members from a Group,” on page 183
- Section 9.5, “Deleting a Group,” on page 186

9.1 Understanding Groups

Groups allow you to better manage a view’s items when you have too many items to view on one screen. You can create multiple groups under any of the four Inventory perspective views (*Virtual Machines*, *Host Servers*, *Storage*, or *Templates*).

The following figure illustrates groups in the Inventory panel:

Figure 9-1 *Groups in the Inventory Perspective of the VM Client*



The presence of the

indicates that the Inventory type has groups within it. It changes to the icon when you click the

to expand the groups list.

To view groups and group memberships:

1 In the VM Client, click the

icon for an Inventory's view (*Virtual Machines*, *Host Servers*, *Storage*, or *Templates*) to expand its existing groups.

2 To view a group's membership, click the group's name in the Inventory panel.

The group's members are displayed in the details panel on the right. You can work with those members the same way you work with the items in the view's full listing.

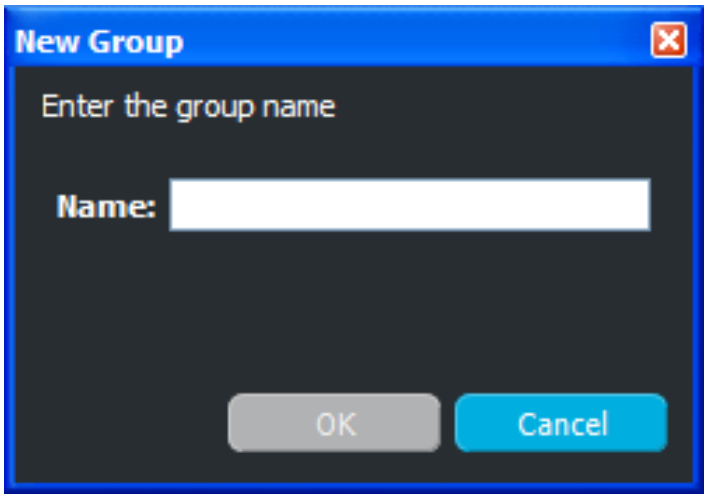
You can expand as many groups as you like. A vertical scroll bar provides navigation.

9.2 Creating a Group

1 In the VM Client, do one of the following:

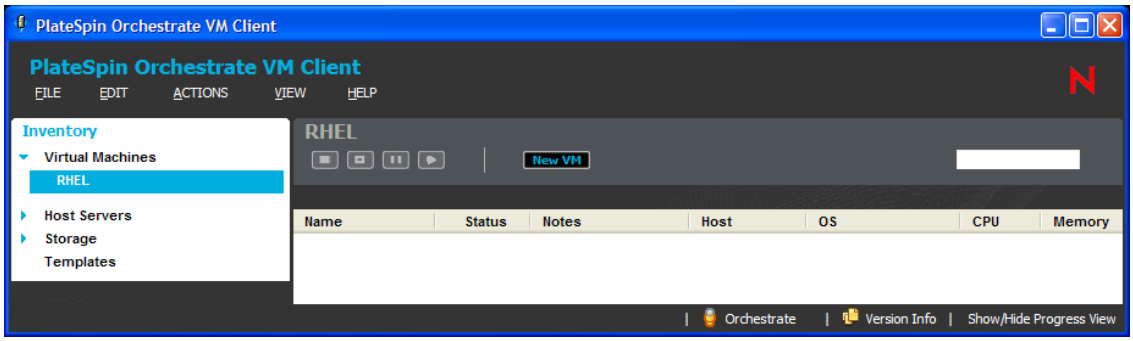
- Right-click a view in the Inventory perspective, then click *New Group*.
- Select a view in the Inventory perspective, the click *File* > *New Group*.

This opens the New Group dialog box:



2 Specify a group name, then click *OK*.

The group is now displayed under the selected view:



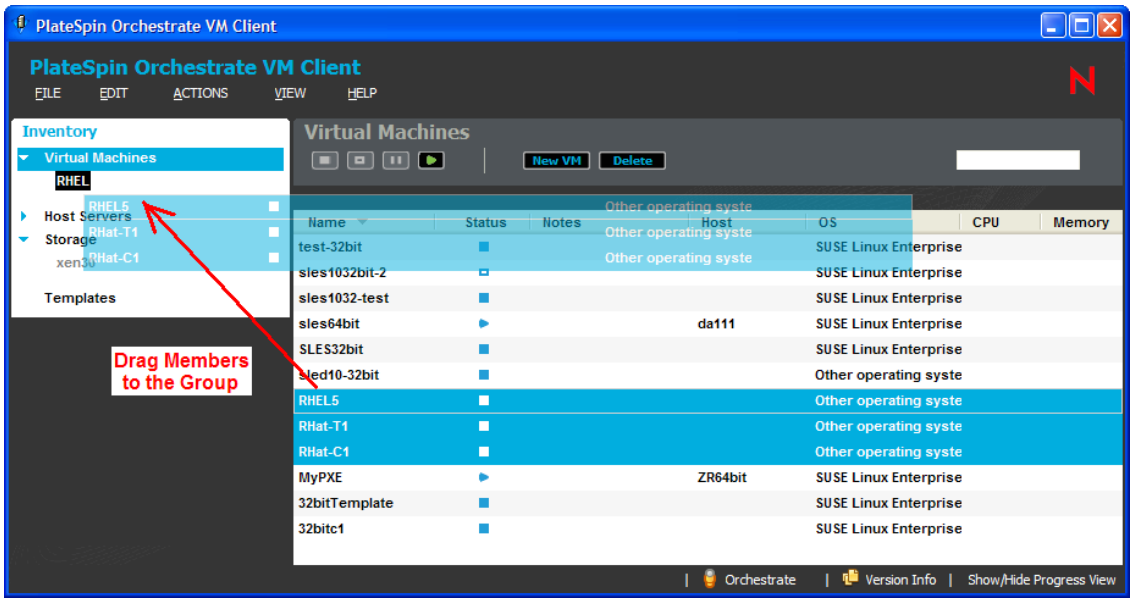
3 To add members to the group, continue with Section 9.3, "Adding Members to an Existing Group," on page 180.

9.3 Adding Members to an Existing Group

1. In the VM Client, click a view in the Inventory perspective.
2. Click the view's

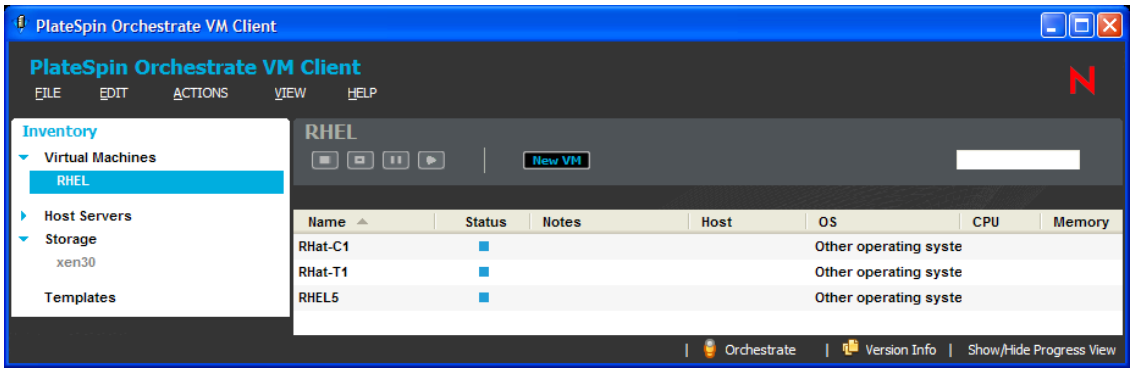
icon to expand its groups.

3 In the details panel, right-click one of the listed items (a VM, a host server, a repository, or a template), then drag and drop it into one of the view's existing groups:



The item is still listed in the view if you do not have a group selected for the view. That way, you can assign an item membership in multiple groups.

4 After copying the members into a group, click the group in the Inventory panel to view its membership:



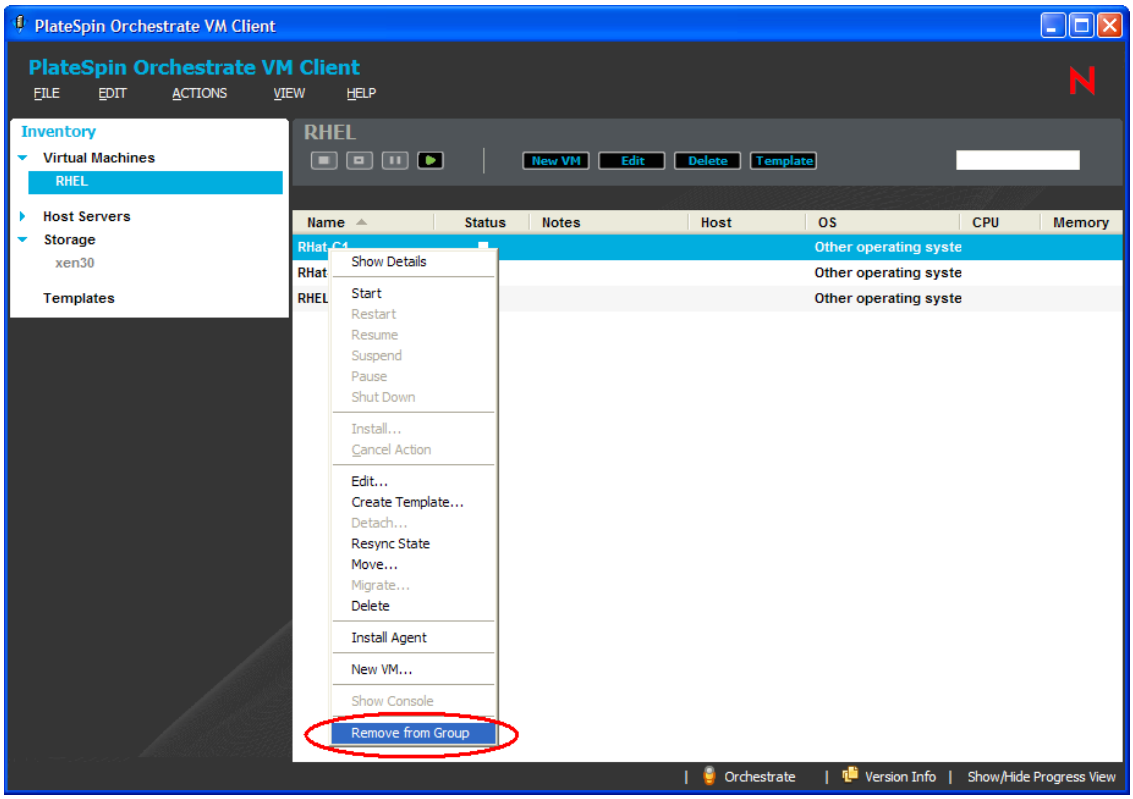
9.4 Removing Members from a Group

1. In the VM Client, click a view in the Inventory perspective (*Virtual Machines*, *Host Servers*, *Storage*, or *Templates*).
2. Click the view's

icon to expand its groups, then select one of the groups.

The details panel on the right now displays only the members of the group.

3 In the details panel, right-click one of the listed items (a VM, a host server, a repository, or a template).



4 Click *Remove from Group*.

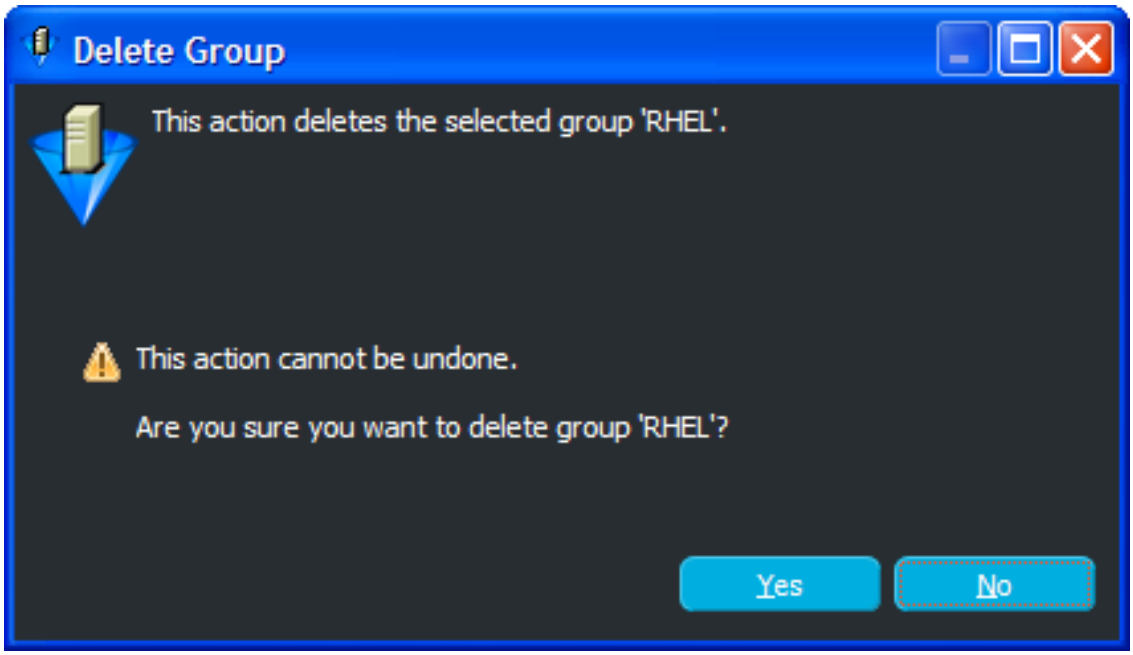
The selected item is removed from the view's group, but not from the view's full list.

9.5 Deleting a Group

1 In the Inventory perspective in the VM Client, click a view's

icon to expand the view.

2 Right-click the group that you want to delete, then select *Delete* to display the Delete Group dialog box:



3 Click *Yes* to delete the group.

The group is removed from the Inventory perspective panel. However, the members of the group are not removed from the view's list. They are only disassociated from the deleted group.

10 VM Client Debugging and Troubleshooting

This section includes information to help you debug and troubleshoot the NetIQ Cloud Manager VM Client after you install it.

- Section 10.1, “Editing the VM Client Preferences File,” on page 189
- Section 10.2, “Troubleshooting the VM Client,” on page 191
- Section 10.3, “Accessing VMs and Host Servers,” on page 191
- Section 10.4, “Moving or Migrating the VMs,” on page 191
- Section 10.5, “Registering VM Hosts,” on page 193

10.1 Editing the VM Client Preferences File

A preferences file is created after the first time you use the VM Client. This preferences file contains locations for storing list data, such as successful logins, installation sources, and auto-install files. Some preference settings are for debugging that you can use with the guidance of NetIQ Support.

Following is an example of a preference file with default settings:

```
#Thu May 07 17:38:03 GMT 2011
Use\ Alpha=true
Login\ Info\ Sets\ Preference\
List=m1.zenworks.lab.novell.com;admin;ZOSCommunicator
Trace=false
Stale\ Update=true
Auto\ Update=true
Show\ Edit\ Running\ VM\ Warning=true
eclipse.preferences.version=1
Show\ Part\ Menu=false
```

To prevent issues with the VM Client and to keep it working properly, you should contact Cloud Manager Support for help when you edit the preferences file.

- “Transparency of VM Client Window Causes Display Problems” on page 189

Transparency of VM Client Window Causes Display Problems

Source: The VM Client Window.

Possible Cause: When you open a dialog box, the VM Client window becomes somewhat transparent, which can cause display issues in Windows (but not Linux) while using VNC to view a VM or host server machine’s command line or desktop, or when using a Web casting software to view or interact with the VM Client that is running on another machine. This transparency is controlled by the `Use\ Alpha=true` setting. By default, transparency is set to be in effect (True).

Action: Change `true` to `false` before using VNC or a Web casting software program so that viewing is in a non-transparent mode.

1. If you have not yet opened and exited the VM Client for the first time, do the following to establish the preferences file; otherwise, go to Step 2:

   1a (Conditional) Install the VM Client.

   For instructions, see Section 2.1, "Installing the VM Client," on page 13.

   1b Open the VM Client.

   For instructions, see Section 2.2, "Starting and Logging In to the VM Client Interface," on page 16.

   This initializes the preference file settings.

   1c Exit the VM Client.

   This causes the `com.novell.vnos.prefs` file to be created on the machine where you installed the client.

2. Make a backup copy of the `com.novell.vnos.prefs` file.

   You might need this backup copy in Step 5b.

3. Open the `com.novell.vnos.prefs` file in a text editor.

   - Windows:

     ```
     installation_path\VM Client
     2.6\bin\workspace\.metadata\.plugins\org.eclipse.cor.runt
     ime\.settings\com.novell.vnos.prefs
     ```

   - Linux:

     ```
     /home/user/.novell/nvmm/workspace/.metadata/.plugins/
     org.eclipse.cor.runtime/.settings/com.novell.vnos.prefs
     ```

4. Edit the preferences file as necessary.

   Valid preference values are `true` and `false`.

   IMPORTANT: If you edit the preferences file, do not remove any backslashes (\) that accompany the key names, including the space after the backslash.

5. Save the file, then reopen the VM Client.

   The preferences file changes should be in effect. If not, or if the VM Client is not working properly, do the following:

   5a Exit the VM Client.

   5b Replace the preferences file with the backup copy that you made in Step 2.

   5c Restart the VM Client.

10.2 Troubleshooting the VM Client

The following sections provide solutions to the problems you might encounter while working with the VM Client:

- "Duplicate NPIV disks are not allowed" on page 191

Duplicate NPIV disks are not allowed

Source: The VM Client.

Action: When you add an additional NPIV disk to a VM, ensure that the disk values for Fabric ID, World Wide Name, Target ID, and LUN are unique for each NPIV disk of the VM.

10.3 Accessing VMs and Host Servers

- "VM or Host server is Mot Accessible" on page 191

VM or Host server is Mot Accessible

Source: The VM Client.

Explanation: A VM or host server does not appear to be accessible for any actions. This might be because its *Enabled* check box is disabled. By default, this check box is enabled.

Action: In the Orchestration Console:

1. In the *Explorer* panel, expand the *Resources* section.
2. Browse for and select the VM or host server.
3. Click the *Info* tab and expand the *Info* section.
4. For a VM, expand its *Resource Information* section; for a host server, expand its *VmHost Information* section.
5. For a VM, make sure the *Resource Enabled* check box is selected; for a host server, make sure the *Enabled* check box is selected.
6. If you changed the status of the check box, click *File* > *Save* to make the change effective.

   You should now be able to perform actions against the VM or host server.

10.4 Moving or Migrating the VMs

- "VM is out of sync in the VM Client after it was moved" on page 192
- "Moving or migrating VMs between two ESX hosts that are registered to a vCenter server by using the Orchestration Console fails" on page 192
- "Moving a VM from one ESX host local storage to another ESX host local storage might fail" on page 192
- "A migrated VM's Orchestration Agent loses connection with the Orchestration Server" on page 192

VM is out of sync in the VM Client after it was moved

Explanation: If you move a VM outside of the VM Client, such as from a command line or in using the Orchestration Console, the VM is out of sync and cannot be used.

Possible Cause: Moving a VM outside of the VM client causes its state to be out of sync between the VM Client and the Orchestration Server.

Action: To resynchronize the VM in the VM Client:

1. Right-click the VM that was moved, then select *Resync State*.

Moving or migrating VMs between two ESX hosts that are registered to a vCenter server by using the Orchestration Console fails

Source: The VM Client.

Action: Do the following:

1. Disconnect and remove one of the ESX hosts from the vCenter server.
2. Move or migrate the VMs by using the Orchestration Console.

   For more information, see Section 5.9, "Moving VMs," on page 128 or Section 5.10, "Migrating VMs," on page 130.

Moving a VM from one ESX host local storage to another ESX host local storage might fail

Source: The VM Client.

Explanation: When you try to use the VM Client to move a VM of considerable size from one ESX host local storage to another ESX local storage, the move job might fail with the following error message:

```
Job timeout, because Max elapsed time expired.
```

Action: In the policy associated with the VM, appropriately increase the time-out value. For more information, see "Provisioning a Virtual Machine" in the *NetIQ Cloud Manager 2.0 VM Orchestration Reference*.

A migrated VM's Orchestration Agent loses connection with the Orchestration Server

Source: The VM Client.

Explanation: After you migrate a Xen VM that has the Orchestration Agent installed, the agent might lose connection with the Orchestration Server.

Action: Restart the agent on the VM to reestablish the connection.

10.5 Registering VM Hosts

- "VM Hosts are not registered to the Orchestration Server even after a considerable time" on page 193

VM Hosts are not registered to the Orchestration Server even after a considerable time

Source: The VM Client.

Action: In the VM Client, click *Action* > *Discover Hosts*.

The registered VM host is displayed in the Host Servers list.

A VM Installation Sources

You have two sources from which to install VMs for the NetIQ Cloud Manager VM Client:

- Section A.1, “Disk Installation Sources,” on page 195
- Section A.2, “Guest Operating System Installation Sources,” on page 195

A.1 Disk Installation Sources

To install a fully virtualized machine, you can specify an installation source that must be mounted in such a way that the VM recognizes it as a mounted installation source. For example, FTP, HTTP, and NFS.

For other installation sources to use for both fully virtualized and paravirtualized installations, the following sources can be designated to serve as virtual mount points:

- A disk image, such as an ISO file accessible from the local file system of the machine performing the installation. For example: `/install_ISOs/sles10sp2.iso`

  IMPORTANT: This ISO needs to be available on all Orchestration Servers in the virtualization grid that were installed with the Virtual Machine Builder pattern, because a VM could access this ISO from any of them.

- A remote storage device specified by using the Internet SCSI (iSCSI) protocol. For example: `iscsi:iqn.2001-04.com.acme:0ac47ee2-216e-452a-a341-a12624cd0225`

  Also, in order to add an iSCSI hard drive to a VM, the host server needs to have the iSCSI targets discovered, or it will not create the VM.

- A remote storage device specified by using a Fibre Channel (NPIV) protocol. For example: `npiv:210400e08b80c40f`

Both Linux and Windows operating systems can use these installation sources, as applicable.

A.2 Guest Operating System Installation Sources

You need to designate an installation source for a paravirtualized machine. The following is a list of guest operating systems and the installation sources to use for a paravirtualized installation. The listed sources are suggestions and examples.

- Section A.2.1, “SUSE,” on page 196
- Section A.2.2, “NetWare,” on page 196
- Section A.2.3, “Other Linux Installation Sources,” on page 196

A.2.1 SUSE

- A remote directory containing the install files, specified by using the HTTP protocol: The HTTPS protocol is not supported.

  `http://www.domain.com/install_sources/sles10sp2/`

- A remote directory containing the install files, specified by using the FTP protocol:

  `ftp://www.domain.com/install_sources/sles10sp2/`

- A remote directory containing the install files, specified by using the NFS protocol:

  `nfs://www.domain.com/install_sources/sles10sp2/`

A.2.2 NetWare

A paravirtualized NetWare operating system can be installed by using the same installation sources as fully virtualized VMs.

NOTE: Open Enterprise Server (OES) 2 and OES 2 Linux can be paravirtualized or fully virtualized. NetWare 6.5 and earlier must be fully virtualized. See Section A.1, “Disk Installation Sources,” on page 195 for instructions on fully virtualizing the guest operating system.

A.2.3 Other Linux Installation Sources

Paravirtualized operating systems other than SUSE and NetWare can be installed by using the same installation sources as the fully virtualized VMs (see Section A.1, “Disk Installation Sources,” on page 195).

B NPIV Terminology

Terms associated with N_Port ID Virtualized (NPIV) Storage:

- **Fabric ID:** A unique numeric identifier of the SAN repository.
- **LUN:** Logic Unit Number. A unique number used to identify a logical unit on the disk storage. The value can be between 0 and 254.
- **Target ID:** The port number of the storage disk provided by the SAN vendor.
- **WWN:** World Wide Name. An 8-byte number used as a unique identifier in a Fibre Channel or Serial Attached SCSI storage network. The first 16 digits represent the WWPN; the last 16 digits represent the WWNN.
- **WWNN:** World Wide Node Name. A 16-digit World Wide Name assigned to a node (an endpoint or a device) in a Fibre Channel fabric or Serial Attached SCSI storage network.
- **WWPN:** World Wide Port Name. A16-digit World Wide Name assigned to a port in a Fibre Channel fabric or Serial Attached SCSI storage network.

C Uninstalling the VM Client

The NetIQ Cloud Manager VM Client program is installed on your Windows or Linux administration machines. You can uninstall the client from these machines.

Select the appropriate platform:

- Section C.1, “Uninstalling the VM Client from the Windows Operating System,” on page 199
- Section C.2, “Uninstalling the VM Client in a Linux Environment,” on page 199

C.1 Uninstalling the VM Client from the Windows Operating System

1. On the Windows machine where the client is installed, click *Start* > *Settings* > *Control Panel* > *Add or Remove Programs*.
2. Select *Cloud Manager VM Client*, then click *Remove* to open the InstallAnyWhere utility, which displays the first wizard page:
3. Click *Next* to display the Uninstall Options page:
4. Click *Next* to display the Uninstalling page:

   This removes all installation files and registry settings.

   After the installation has completed, the Uninstall Complete page is displayed:
5. Click *Done* to complete the uninstallation.

   If you receive a message after the client is uninstalled indicating that some folders could not be removed, you must delete them manually.

C.2 Uninstalling the VM Client in a Linux Environment

1. Run the following command:

   ```
   /opt/novell/zenworks/vmmanagement/Uninstall_PlateSpin_VMM/
   Uninstall_PlateSpin_Orchestrate_VM_Client_2.6.0
   ```

   This opens the InstallAnyWhere utility, which displays the first wizard page:
2. Click *Next* to display the Uninstall Options page:
3. Click *Next* to display the Uninstalling page:

   This removes all installation files.

After the installation has completed, the Uninstall Complete page is displayed:

4 Click *Done* to complete the uninstallation.

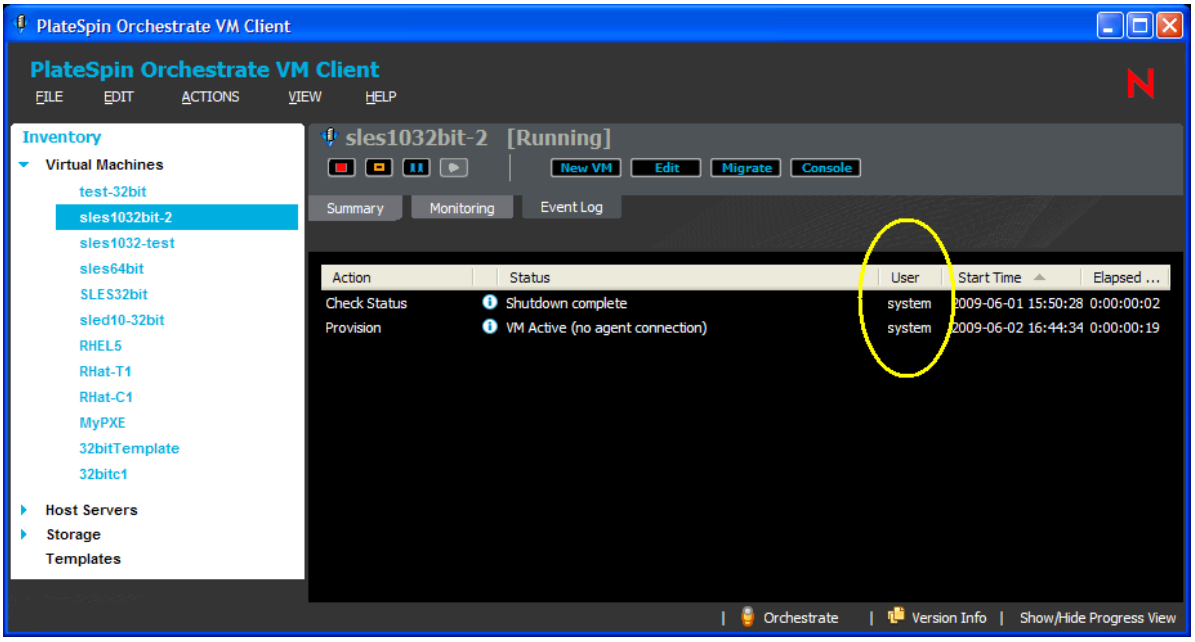
If you receive a message after the client is uninstalled indicating that some folders could not be removed, you must delete them manually.

D Adding User Logins for VM Operators

In a default setup, the Orchestration infrastructure administrator is the only user who can log in to the VM Client and manage VMs. This section explains how you can add individual VM operator login IDs, so that they can also log in to and use the VM Client to manage VMs.

The login names that you create are displayed in the *User* column for event logs in the VM Client. For example:

Figure D-1 *Event Log Tab for a VM Showing the User Column*



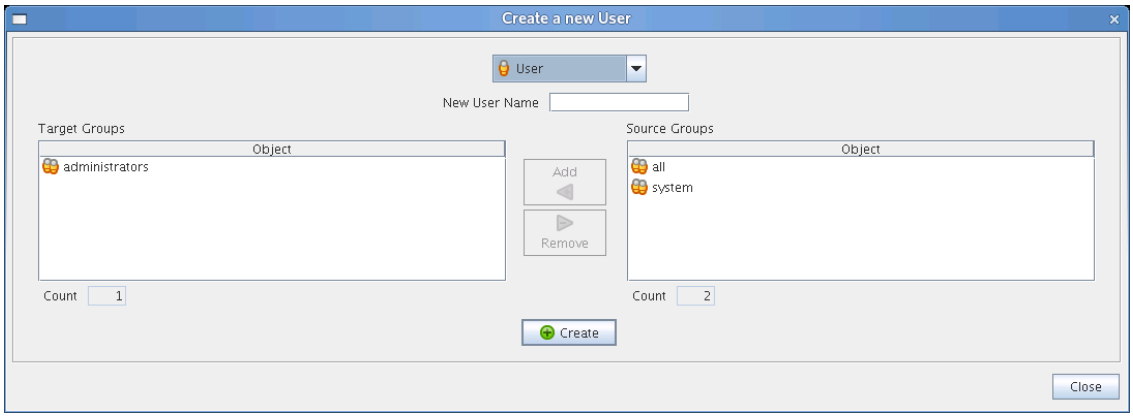
In this example, `system` is displayed as the user who initiated the actions because the VM operator logged in to the grid as the default administrator user.

When you provide individual login names for VM operators, their login names are displayed so that anyone logged in to the VM Client can see who initiated each action.

To add individual user login IDs:

1. In the Orchestration Console, click *Actions* > *Create User*.

   This opens the Create a New User dialog box:

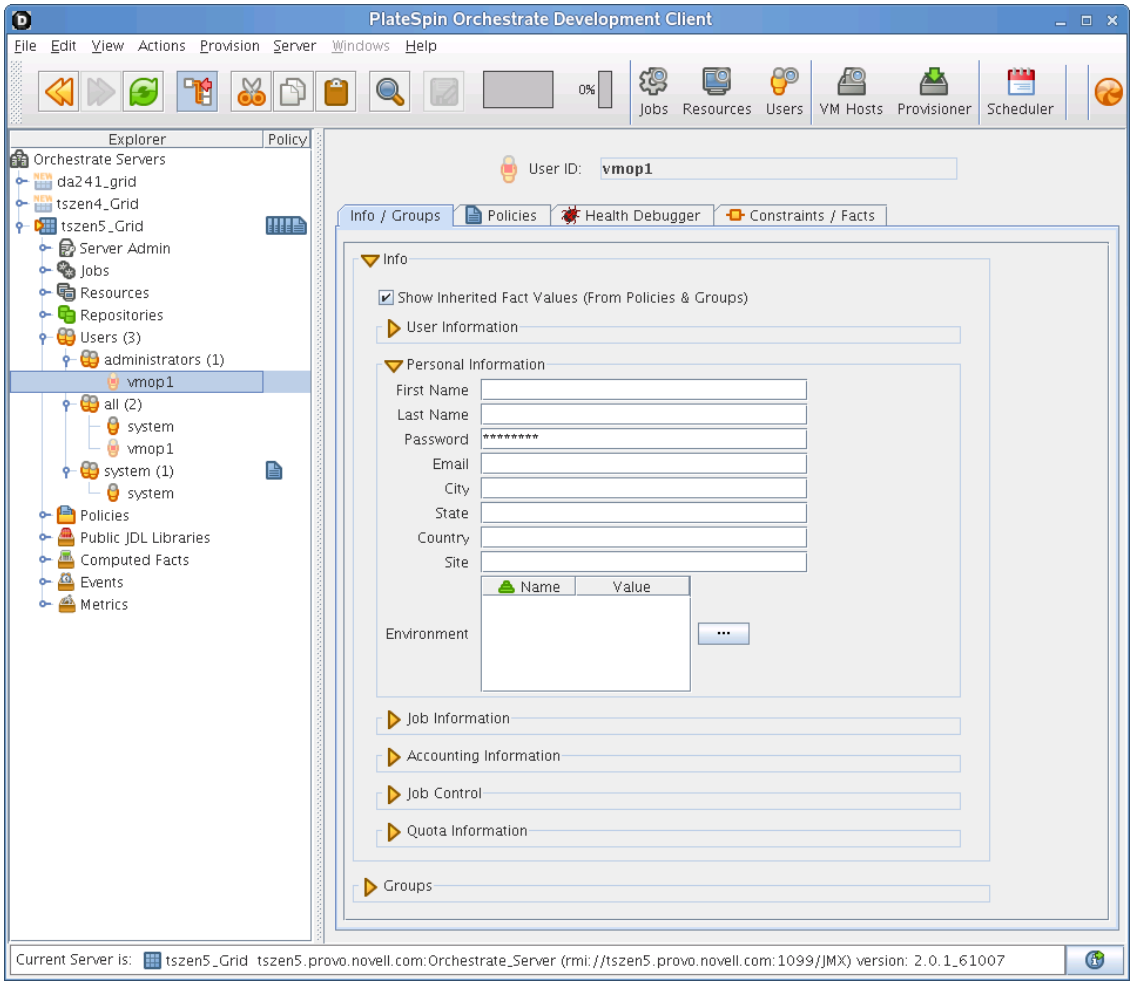


2. In the *New User Name* field, specify the login name.
3. Make sure that the *Target Groups* section contains *administrators*.

   If not, select *administrators* in the *Source Groups* section, then click the *Add* button.

   When you add this user to the administrators group, the user can use the VM Client to administer life cycle operations on virtual machines.
4. Click *Create* > *Close*.

5 In the *Explorer* panel, browse to the new user:

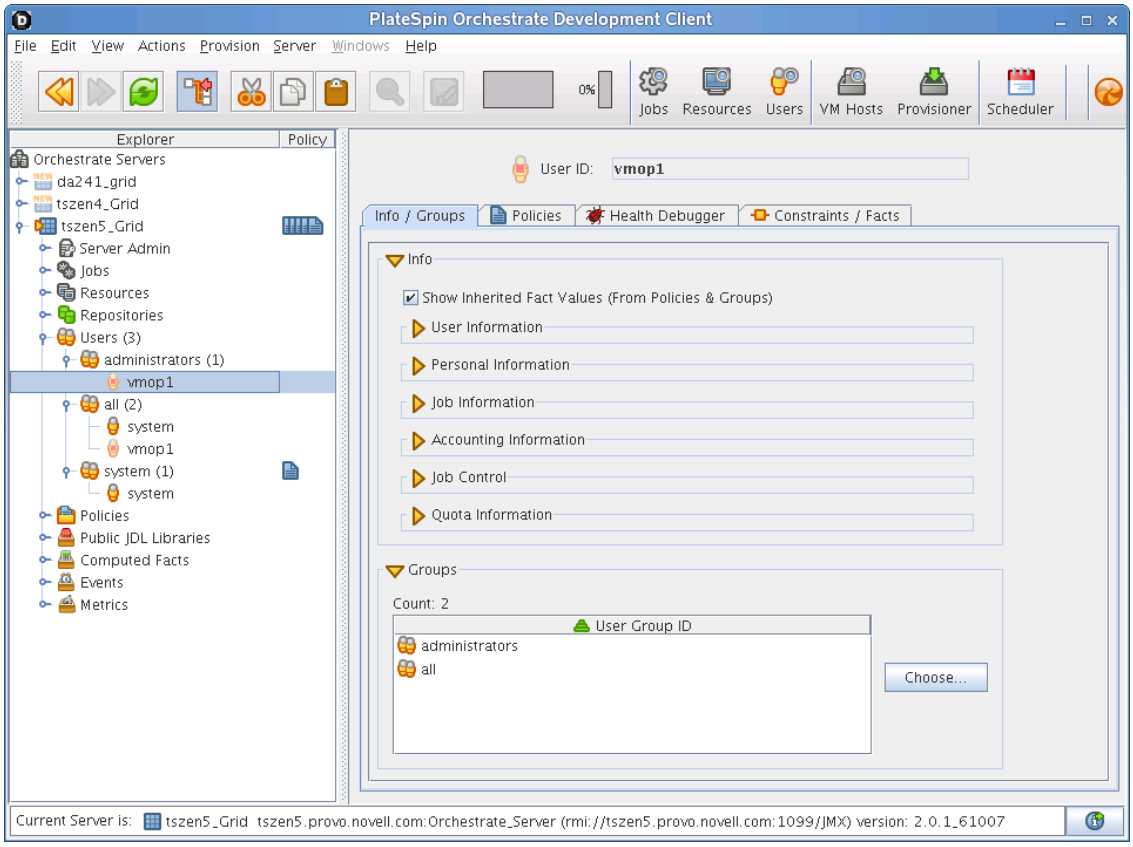


6 On the *Info/Groups* tab, expand the *Info* section, then fill in the fields in the other subsections as necessary.

IMPORTANT: In the *Password* field in the *Personal Information* subsection, the default password is the one that you created for the administrator login when you installed the Orchestration Server software. Be sure to change this default password to another password for this new user.

---

7 Expand the *Groups* section and confirm that `administrators` is displayed in the *User Group ID* list:



If the `administrators` group is not listed, click *Choose* to add it.

8 Click *File* > *Save* to save the new user's information.

9 Repeat Step 1 through Step 8 for each new VM operator login that you want to create.

E VM Client Documentation Quick Index

This short index is designed to provide quick access to hard-to-find information in the *Cloud Manager VM Client Reference and Guide*. Some index entries access other Cloud Manager guides for information related to managing VMs.

An extensive index is not intended here, so most of the section titles that are visible on the Contents page for this manual are not included.

Agent, Monitoring
Agent, Orchestration
Canceling a VM installation
Configuration Details dialog box
Configuration details tab
Orchestration Server Console
Discovered (#) group for host servers
Enabled check box in the orchestration Console
Error Log
Event logs
Event Log details tab
Filtering lists
Groups
Guest operating systems
Hosts details tab
Installing the VM Client
Locator pop-up
Login IDs
Logs
Migrating VMs
Moving VMs
Monitoring Agent
Monitoring details tab
Mouse-over information
Multiple VM operator logins
Orchestration Agent
Polling intervals for displaying new information
Progress bars
Provisioning adapter policies
Provisioning in the Orchestration Console

PXE
Repositories, adding
Repositories, associating
Repositories, managing in the Server Console
Repositories, removing
Reset Perspective menu option
Saving changes
Searching: filtering lists; locating items in a list
Sorting
Summary details tab
Themes (skins)
Tool tips
Transparency
Version Information dialog box
Virtual Machines details tab
Virtualization host types
VM technologies and actions
VNC
Windows VM installation source

We encourage you to use the User Comment feature on the NetIQ Cloud Manager documentation Web site (http://www.novell.com/documentation/cloudmanager2/) to help us keep this index up-to-date and useful for you.

To use the feature, simply access this Index section (http://www.novell.com/documentation/cloudmanager2/ncm2_vmclient/data/bj2pd1o) on the documentation Web site and suggest new entries or corrections to existing entries in the User Comment field there.

Please include the following information:

- The new entry's label and the URL to the section containing the related information.

  The proper URL can be obtained by right-clicking on the Web page link to that section, saving it to your operating system's clipboard, then pasting it into the User Comment.
- The existing entry's label and the correction for it.