

Virtual Machine Management Guide

Novell® PlateSpin Orchestrate

2.0.2

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Contents

About This Guide	7
1 Managing Virtual Machine Hosts	9
1.1 Configuring Policies for VM Provisioning Adapters	9
1.1.1 Configuring Policies for Virtual Center	9
1.1.2 Configuring Policies for Xen 3.0	12
1.1.3 Configuring Policies for VMware Server	12
1.1.4 Configuring Policies for Hyper-V	13
1.1.5 Configuring Policies for ESX	14
1.2 Discovering VM Hosts and Repositories	15
1.3 Discovering VM Images	16
1.4 Resynchronizing the VM Host's State	16
1.5 Shutting Down VM Hosts	17
1.6 Restarting VM Hosts	18
1.7 Understanding VM Host Failover	18
2 Managing Virtual Machines	21
2.1 Provisioning a Virtual Machine	21
2.2 Managing a Virtual Machine in Runtime	22
2.2.1 Using the Right-Click Menu for Provisioning Actions	22
2.2.2 Prerequisites for Performing Provisioning Actions on ESX VMs	25
2.2.3 Releasing a Virtual Machine from Usage	27
2.2.4 Managing Virtual Machine Templates	27
2.2.5 Managed Virtual Machine Actions	28
2.2.6 Virtual Machine Technology-Specific Actions	28
2.3 Resynchronizing the State of All VMs	29
2.4 Resynchronizing the State of All VMs of a Specific VM Host	29
2.5 Shutting Down Multiple VMs	29
2.6 Destroying and Deleting a Virtual Machine	30
3 Managing VM Repositories	31
3.1 Deploying a VM to the Local Repository	31
3.2 Deploying a VM to the Datagrid Repository	32
3.3 Deploying a VM to the NAS Repository	32
3.4 Deploying a VM to the SAN Repository	32
3.5 Virtual Repository	33
4 Troubleshooting Provisioning Actions	35
5 Understanding Autoprep	41
5.1 Setting Autoprep Facts in the Development Client	41
5.1.1 Setting Linux Autoprep Config Facts	42
5.1.2 Setting Autoprep Network Adapter Facts	43
5.2 Applying Autoprep Facts	44
5.2.1 Example Autoprep Scenarios	45

5.2.2	How Autoprep Works	45
5.3	Known Autoprep Limitations	46
A	Virtual Machine Technologies and Actions	47
A.1	Virtual Machine Technologies	47
A.2	Xen Hypervisor on SLES 10 SP2 or SLES 11 Host	49
A.2.1	Additional Xen Provisioning Adapter Information	50
A.3	VMware Virtual Center	50
A.3.1	Additional VMware Virtual Center Provisioning Adapter Information	51
A.4	Microsoft Hyper-V Hypervisor	52
A.5	VMware ESX VM Hypervisor (Experimental)	53
B	Documentation Updates	55
B.1	November 17, 2009	55
B.2	July 9, 2009	55
B.3	June 17, 2009 (2.0.2 Release)	55

About This Guide

In addition to managing virtual machines (VMs) and host servers using the **PlateSpin® Orchestrate VM Client**, you can do other management work using the **PlateSpin Orchestrate Development Client**. This *Virtual Machine Management Guide* provides instructions on the management tasks that you can do in the Development Client.

The guide is organized as follows:

- ♦ Chapter 1, “Managing Virtual Machine Hosts,” on page 9
- ♦ Chapter 2, “Managing Virtual Machines,” on page 21
- ♦ Chapter 3, “Managing VM Repositories,” on page 31
- ♦ Chapter 4, “Troubleshooting Provisioning Actions,” on page 35
- ♦ Chapter 5, “Understanding Autoprep,” on page 41
- ♦ Appendix A, “Virtual Machine Technologies and Actions,” on page 47
- ♦ Appendix B, “Documentation Updates,” on page 55

For documentation on using Orchestrate jobs to further manage VMs, host machines, and physical machines, see “Virtual Machine Job Development” in the *PlateSpin Orchestrate 2.0 Developer Guide and Reference*.

Audience

This book is for data center administrators. 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.

Additional Documentation

In addition to this *Virtual Machines Management Guide*, PlateSpin Orchestrate 2.0 includes the following additional guides that contain valuable information about the product:

- ♦ *PlateSpin Orchestrate 2.0 Getting Started Reference*
- ♦ *PlateSpin Orchestrate 2.0 Installation and Configuration Guide*
- ♦ *PlateSpin Orchestrate 2.0 Upgrade Guide*
- ♦ *PlateSpin Orchestrate 2.0 High Availability Configuration Guide*
- ♦ *PlateSpin Orchestrate 2.0 Administrator Reference*
- ♦ *PlateSpin Orchestrate 2.0 Command Line Reference*

- ◆ *PlateSpin Orchestrate 2.0 VM Client Guide and Reference*
- ◆ *PlateSpin Orchestrate 2.0 Development Client Reference*
- ◆ *PlateSpin Orchestrate 2.0 Developer Guide and Reference*
- ◆ *PlateSpin Orchestrate 2.0 Server Portal Reference*

Documentation Updates

For the most recent version of this guide, visit the [PlateSpin Orchestrate 2.0 documentation Web site](http://www.novell.com/documentation/ps_orchestrate20/) (http://www.novell.com/documentation/ps_orchestrate20/).

Documentation Conventions

In Novell documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

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When a single pathname can be written with a backslash for some platforms or a forward slash for other platforms, the pathname is presented with a backslash. Users of platforms that require a forward slash, such as Linux, should use forward slashes as required by your software.

Managing Virtual Machine Hosts

1

After installing the PlateSpin® Orchestrate Agent on the physical resource, you can discover for the hypervisor technology residing on the resource by editing the appropriate policies and running the Discover VM hosts job. Later on, you can discover and manage VMs residing on the VM hosts. These launch the adapter job to connect to the appropriate hypervisor Web service.

- ♦ [Section 1.1, “Configuring Policies for VM Provisioning Adapters,” on page 9](#)
- ♦ [Section 1.2, “Discovering VM Hosts and Repositories,” on page 15](#)
- ♦ [Section 1.3, “Discovering VM Images,” on page 16](#)
- ♦ [Section 1.4, “Resynchronizing the VM Host’s State,” on page 16](#)
- ♦ [Section 1.5, “Shutting Down VM Hosts,” on page 17](#)
- ♦ [Section 1.6, “Restarting VM Hosts,” on page 18](#)
- ♦ [Section 1.7, “Understanding VM Host Failover,” on page 18](#)

1.1 Configuring Policies for VM Provisioning Adapters

This section contains information on the policies required to manage the Provisioning adapters. Provisioning adapters are programs that provision (start, stop, snapshot, migrate, or pause) a VM. They run just like regular jobs on the PlateSpin Orchestrate Server.

- ♦ [Section 1.1.1, “Configuring Policies for Virtual Center,” on page 9](#)
- ♦ [Section 1.1.2, “Configuring Policies for Xen 3.0,” on page 12](#)
- ♦ [Section 1.1.3, “Configuring Policies for VMware Server,” on page 12](#)
- ♦ [Section 1.1.4, “Configuring Policies for Hyper-V,” on page 13](#)
- ♦ [Section 1.1.5, “Configuring Policies for ESX,” on page 14](#)

1.1.1 Configuring Policies for Virtual Center

Before provisioning and managing the Virtual Center provisioning adapter, you must configure certain policies in the Development Client. However, before configuring the policies for the Virtual Center, make sure that the following prerequisites are met:

- Make sure that the Orchestrate Agent for Windows* is installed and started on the Windows host running Virtual Center.

IMPORTANT: The PlateSpin Orchestrate Server supports only one VMware Virtual Center server per grid.

- Make sure that J2RE with version 1.4.2 for VCenter 1.x or version 1.5 for VCenter 2.x is installed on the Windows system running Virtual Center.

NOTE: In the 2.0.2 release of PlateSpin Orchestrate, the VMware Virtual Center Provisioning Adapter supports only VMware Virtual Center 2.x. Virtual Center 1.x is not supported in this release.

The JREs that ship with Virtual Center and with the Orchestrate Agent are version 1.5. Version 1.4.2_15 can be downloaded from the [Sun* Download Center \(https://sdlc4a.sun.com/ECom/EComActionServlet;jsessionid=88B0E4E7E868F2F6C671427ACC9C0D13\)](https://sdlc4a.sun.com/ECom/EComActionServlet;jsessionid=88B0E4E7E868F2F6C671427ACC9C0D13).

- ❑ Make sure that the keystore is created on the server where Virtual Center is installed.

If the keystore is not created, do the following on the server where Virtual Center is installed to generate it

1. Find the `ruicert.crt` certificate.

On Windows, the default location is: `C:\Documents and Settings\All Users\Application Data\VMware\VMware VirtualCenter\SSL\ruicert.crt`.

2. Create a `VCenter_Certs` directory at the top level by entering `mkdir C:\VCenter_Certs\`.

3. Copy `ruicert.crt` to `C:\VCenter_Certs\`.

4. Run `keytool`.

The default location is `C:\Program Files\VMware\VMware VirtualCenter 2.0\jre\bin\keytool.exe`.

5. Enter:

```
cd C:\VCenter_Certs
[path]keytool -import -keystore keystore -file ruicert
```

6. Enter a password when prompted.

The following table provides detailed information about the policies associated with the Virtual Center provisioning adapter that are used to manage the Virtual Center hosts and the VMs in the grid. The policy settings are applied to all the Virtual Center VMs in the grid.

Table 1-1 *Virtual Machine Management Policies for Virtual Center*

Policy Name	Explanation	Additional Details
vcenter	Contains the constraints used to select the vCenter Server resources.	Do not edit the policy.

Policy Name	Explanation	Additional Details
vcenter1x	Contains the constraints used to select the vCenter 1.x Server resources.	<p>You must configure the following facts in the policy before running any job for the vCenter 1.x servers:</p> <ul style="list-style-type: none"> ◆ webservice_url ◆ webservice_user ◆ webservice_password <p>Additionally, you can configure the following facts depending upon your requirements:</p> <ul style="list-style-type: none"> ◆ joblet.maxwaittime ◆ timeout ◆ debug
vcenter2x	Contains the constraints used to select the vCenter 2.x Server resources	<p>You must configure the following facts in the policy before running any job for the vCenter 2.x servers:</p> <ul style="list-style-type: none"> ◆ webservice_url ◆ webservice_user ◆ webservice_password <p>Additionally, you can configure the following facts depending upon your requirements:</p> <ul style="list-style-type: none"> ◆ joblet.maxwaittime ◆ timeout ◆ debug
vcenter_client1x	Contains the settings used to run only the vCenter job on the associated vCenter resource.	<p>You must configure the following facts in the policy before running any job for the vCenter 1.x servers:</p> <ul style="list-style-type: none"> ◆ java1.4.2 ◆ vcenter.truststore ◆ joblets.slots
vcenter_client2x	Contains the settings used to run only the vCenter job on the associated vCenter resource.	<p>You must configure the following facts in the policy before running any job for the vCenter 1.x servers:</p> <ul style="list-style-type: none"> ◆ java1.5.0 ◆ vcenter.truststore ◆ joblets.slots
vcenterDiscovery	Contains the settings required to discover the vCenter Server host machines. It also contains the default installation path of the vCenter server.	Do not edit the policy.

NOTE: VM host discovery on the vcenter adapter can fail because VM host discovery with Virtual Center requires JRE 1.4.2 for VCenter 1.x and JRE 1.5 for VCenter 2.x to be installed on the Windows-based Virtual Center host. The JRE that ships with the Orchestrate Agent and with VMware* Virtual Center is v1.5.

1.1.2 Configuring Policies for Xen 3.0

Before provisioning and managing the Xen* 3.0 Server provisioning adapter, you must configure certain policies in the Development Client. The following table provides detailed information about the policies associated with the Xen 3.0 Server provisioning adapter that are used to manage the Xen 3.0 Server hosts and VMs in the grid. The policy settings are applied to all the VMs in the grid.

Table 1-2 *Virtual Machine Management Policies for Xen 3.0 Server*

Policy Name	Explanation	Additional Details
xen30	Contains the policy settings for the Xen 3.0 Server Provisioning Adapter.	By default, the optimal values are configured for the job and joblets in the policy.
xenDiscovery	Contains the settings required to discover the Xen 3.0 Server host machines. It also contains the default installation path of the Xen server.	If the Xen Server is not installed in the default path, edit this policy to provide the correct information.
xenPA	Contains the constraints used to check whether the Xen 3.0 Server host is registered to the Orchestrate Server, and the host is up and running.	Do not edit the policy.

1.1.3 Configuring Policies for VMware Server

Before provisioning and managing the VMware Server provisioning adapter, you must configure certain policies in the Development Client. The following table provides detailed information about the policies associated with the VMware Server provisioning adapter that are used to manage the VMware Server hosts and VMs in the grid. The policy settings are applied to all the VMware Server VMs in the grid.

Table 1-3 *Virtual Machine Management Policies for VMware Server*

Policy Name	Explanation	Additional Details
vmserver	Contains the policy settings for the VMware Server provisioning adapter.	By default, the optimal values are configured for the job and joblets in the policy.
vmserverPA	Contains the constraints used to check whether the VMware Server host is registered to the Orchestrate Server, and whether the host is up and running.	Do not edit the policy.

Policy Name	Explanation	Additional Details
vmserverDiscovery	Contains settings required to discover the VMware Server host machines. It also contains the default installation path of the VMware server.	Edit the policy only if the VMware Server is not installed in the default path.

1.1.4 Configuring Policies for Hyper-V

Before provisioning and managing the Hyper-V provisioning adapter, you must configure certain policies in the Development Client. The following table provides detailed information about the policies associated with the Hyper-V provisioning adapter that are used to manage the Hyper-V hosts and VMs in the grid. The policy settings are applied to all the Hyper-V VMs in the grid.

Table 1-4 *Virtual Machine Management Policies for Hyper-V*

Policy Name	Explanation	Additional Details
hyperv	Contains the policy settings for the Hyper-V provisioning adapter	By default, the optimal values are configured for the job and joblets in the policy.
hypervDiscovery	Contains the settings required to discover the Hyper-V host.	Do not edit the policy.

1.1.5 Configuring Policies for ESX

Before provisioning and managing the ESX provisioning adapter, you must configure certain policies in the Development Client. The following table provides detailed information about the policies associated with the ESX provisioning adapter that are used to manage the ESX hosts and VMs in the grid. The policy settings are applied to all the ESX VMs in the grid.

Table 1-5 *Virtual Machine Management Policies for ESX*

Policy Name	Explanation	Additional Details
esx	Contains the policy settings for the ESX provisioning adapter.	<p>You must configure the following facts in the policy before running any job for the ESX VM hosts:</p> <ul style="list-style-type: none">◆ webservice_user◆ webservice_password◆ root_user◆ root_password <p>Additionally, you can configure the following facts depending upon your requirements:</p> <ul style="list-style-type: none">◆ joblet.maxwaittime◆ timeout◆ debug
esxPA	Contains the constraints used to check whether the ESX host is registered to the Orchestrate Server, and whether the host is up and running.	Do not edit the policy.
esxServerDiscovery	Contains the settings required to discover the ESX host.	Do not edit the policy.
esxvmPrep	Contains the settings required to perform the Install Agent action and the Personalize Provisioning action.	Do not edit the policy.
esxVncServerConfig	Contains the settings required to perform the Launch Remote Desktop Provisioning action.	Do not edit the policy.

You can customize the facts for a specific ESX VM. This overrides the policy settings configured in the ESX policy of the ESX host on which the VM is hosted.

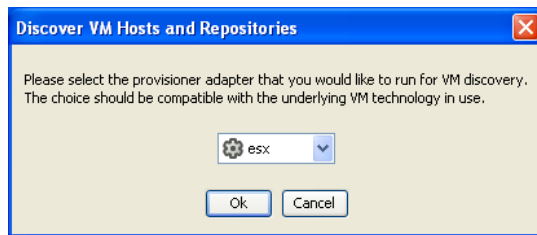
To customize the facts for an ESX VM, do the following in the Development Client:

- 1 Click *Resources > Physical*.
- 2 Click the ESX machine whose policy settings you want to edit.
The *Constraints/Facts* tab is displayed by default.

- 3 To customize the Web service credentials, edit the *resource.webservice_user.override* and *resource.webservice_password.override* facts. (To edit a fact, click the fact, click the *Edit the fact* icon, make the necessary changes, then click *OK*.)
- 4 To customize the VM credentials for installing the Orchestrate agent, edit the *resource.root_user.override* and the *resource.root_password.override* facts.
This overrides the default values configured in the ESX policy for all the ESX machines at the grid level.

1.2 Discovering VM Hosts and Repositories

- 1 Ensure that the policies appropriate to the VM technology are configured.
For more information on the policies, see [Section 1.1, “Configuring Policies for VM Provisioning Adapters,” on page 9](#).
- 2 Ensure that you have set the correct number of joblet slots for the VM hosts in the policies appropriate to the VM technology.
For more information on the policies, see [Section 1.1, “Configuring Policies for VM Provisioning Adapters,” on page 9](#).
- 3 In the Development Client, click *Provision > Discover VM Hosts and Repositories*.
The Discover VM Hosts and Repositories dialog box is displayed.



- 4 Select your provisioning adapter from the drop-down list.
- 5 Click *OK*.
- 6 Click *Jobs* to view the *Jobs* section in the Development Client and verify that the job has started.

After your VM host machines are discovered, you can refresh your tree view or wait for the automatic tree refresh to see the VM host machine listed under the provisioning adapter, although no VMs are listed.

This also discovers:

- ♦ Local repositories for all types of hypervisors.
- ♦ SAN repositories for Xen and ESX.

To view the discovered repositories, click *Repositories*, then click *xen30* or *esx*.

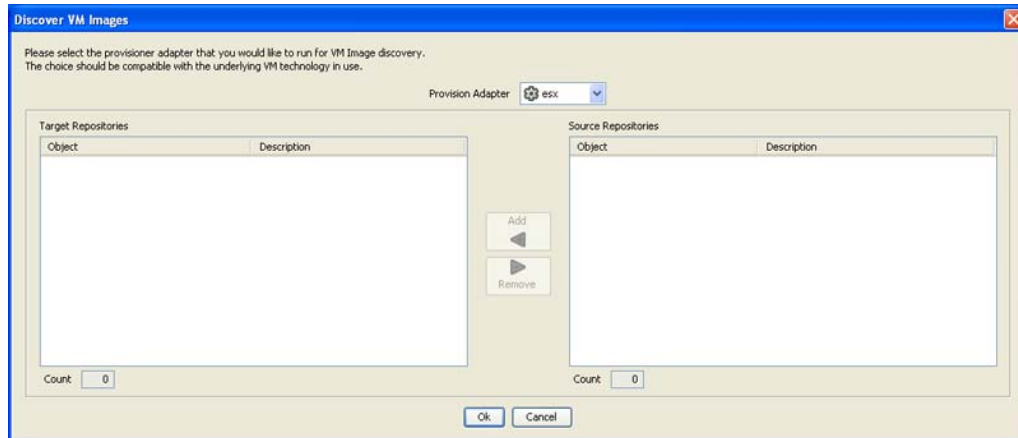
For a list of the VM technologies and supported host and guest operating systems, see [Section A.1, “Virtual Machine Technologies,” on page 47](#).

By default, the VM host is started when you initiate the *Discover VM Hosts and Repositories* action.

1.3 Discovering VM Images

To discover the VM images on a specific repository:

- 1 In the Development Client, click *Provision > Discover VM Images*.
The Discover VM Images dialog box is displayed.



- 2 In the *Provisioning Adapter* drop-down list, select the provisioning adapter for which you want to discover the VM images.

The source repositories for the selected provisioning adapter are displayed.

For information on provisioning adapters, see [Section 2.1, “Provisioning a Virtual Machine,” on page 21](#).

- 3 Select the source repositories, then click *Add*.
The selected repositories are added to the *Target Repositories* pane.

- 4 Click *OK*.

The VM images are displayed.

1.4 Resynchronizing the VM Host’s State

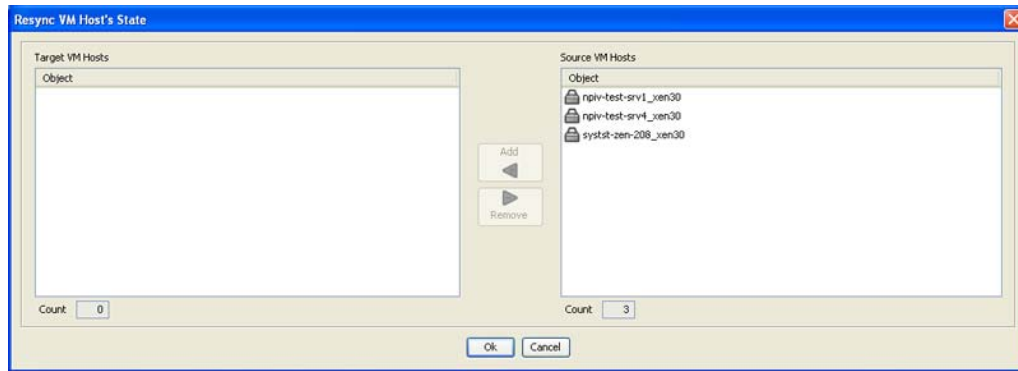
To manually verify and ensure that the state of a VM host displayed in the Development Client is accurate:

- 1 In the Development Client, right-click the VM Host, then click *Discover*.

To manually verify and ensure that the state of multiple VM hosts displayed in the Development Client is accurate:

- 1 In the Development Client, click *Provision > Resync VM Host’s State*.

The Resync VM Host’s State dialog box is displayed.



- 2 In the *Source VM Hosts* pane, select the VM hosts to be resynchronized, then click *Add*.
The selected VM hosts are added to the *Target VM Hosts* pane.
- 3 Click *OK*.

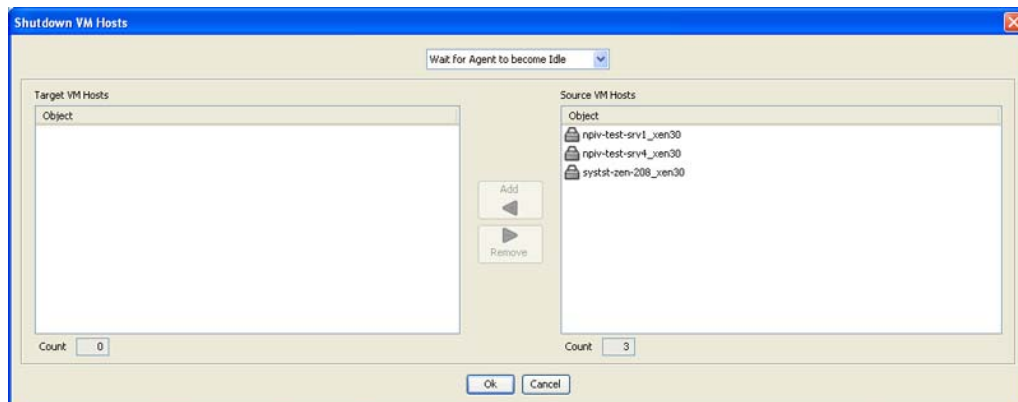
1.5 Shutting Down VM Hosts

To shut down a single VM host:

- 1 In the Development Client, right-click the VM host you want to shut down, then click *Shutdown*.

To shut down multiple VM hosts:

- 1 In the Development Client, click *Provision > Shutdown Hosts*.
The Shut Down VM Hosts dialog box is displayed.



- 2 You can choose to shut down the VM hosts after the Orchestrate Agent becomes idle or to immediately shut down the VM hosts. By default, the *Wait for Agent to become Idle* option is selected.
- 3 In the *Source VM Hosts* pane, select the VM hosts you want to shut down, then click *Add*.
The selected VM hosts are added to the *Target VM Hosts* pane.
- 4 Click *OK*.

The VMs running on the host are automatically shut down and the VM host is moved to the Shutting Down state in which it will not accept any Provisioning actions.

1.6 Restarting VM Hosts

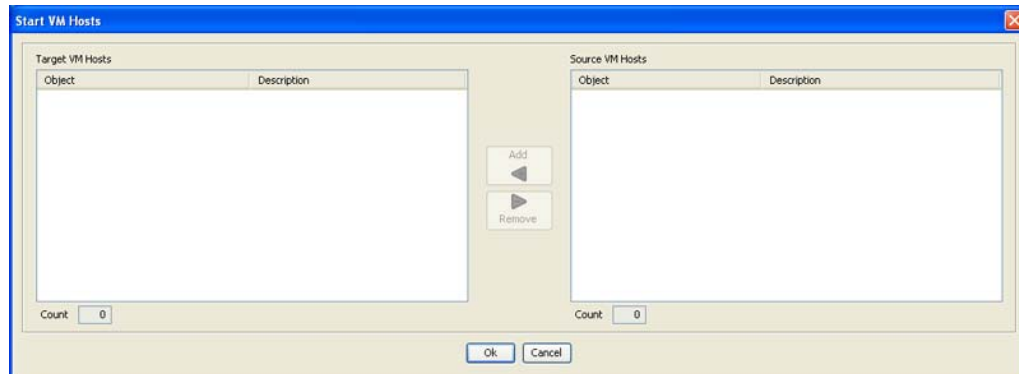
To restart a single VM host:

- 1 In the Development Client, right-click the VM host you want to start, then click *Start*.

To restart multiple VM hosts:

- 1 In the Development Client, click *Provision > Start VM Hosts*.

The Start VM Hosts dialog box is displayed.



- 2 In the *Source VM Hosts* pane, select the VM hosts you want to restart, then click *Add*.

The selected VM hosts are added to the *Target VM Hosts* pane.

- 3 Click *OK*.

1.7 Understanding VM Host Failover

When the PlateSpin Orchestrate Server comes back online after being offline, it rediscovers the state of all resources, including VM hosts and the VMs running on those hosts. This section provides more information about how the Orchestrate Server behaves when the VM Host loses its agent connection.

There are two possible scenarios that can occur in the case of a failure of VM Host running VMs. The failover behavior depends on where the VM image is stored and whether the VM has the agent installed.

The following table shows possible failover scenarios with the VM Host and the expected server behavior when it occurs.

Table 1-6 *Orchestrate Server Behavior when the VM Host Loses Its Agent Connection*

Scenario	Failover Behavior
<p>Scenario 1: The VM image is:</p> <ul style="list-style-type: none"> ◆ stored on a non-local repository (for example, the zos repository) ◆ accessible by other VM hosts ◆ successfully provisioned <p>Situation: The VM host fails.</p>	<p>The VMs that had been running on the failed VM host are re-provisioned to other available VM hosts.</p> <ul style="list-style-type: none"> ◆ If the VM was provisioned from a template, there is now another instance of the VM. For example, if the template name is "sles10template," the original VM provisioned from the template is then named "sles10template-1." <p>If the host running "sles10template-1" goes down, or if it loses its agent connection, a new instance of the template named "sles10template-2" is re-provisioned to an available host.</p> <ul style="list-style-type: none"> ◆ If the original VM was a standalone VM, it is re-provisioned to an available host.
<p>Scenario 2: The VM image is stored on a local repository.</p> <p>Situation: The VM host loses its agent connection.</p>	<ul style="list-style-type: none"> ◆ Because the VM image is stored locally, it cannot be re-provisioned to another VM host. ◆ When the VM host comes back online, it is re-provisioned to the host where it is stored.

In either of these scenarios, if the Orchestrate Agent is installed on the VM and if the VM host loses its agent connection but the VMs retain their agent connection (for example, if someone kills the agent process on the VM host), no re-provisioning occurs.

If the VM host loses its agent connection, and if the Orchestrate Agent is not installed on the running VMs, the VMs can continue running indefinitely. However, if the location of the VM image warrants it, the VMs are re-provisioned to other available hosts. When there are two (or more) of the same VM instance running on different VM hosts, the Orchestrate Server is aware only of the VMs running on a VM host with an active agent connection, so the administrator must stop the VMs on the host that has lost its agent connection.

NOTE: If you are interested in failover in a high availability environment, see the *PlateSpin Orchestrate 2.0 High Availability Configuration Guide*.

Managing Virtual Machines

2

Review the following sections for information about the ongoing tasks in PlateSpin® Orchestrate VM Management:

- ◆ [Section 2.1, “Provisioning a Virtual Machine,” on page 21](#)
- ◆ [Section 2.2, “Managing a Virtual Machine in Runtime,” on page 22](#)
- ◆ [Section 2.3, “Resynchronizing the State of All VMs,” on page 29](#)
- ◆ [Section 2.4, “Resynchronizing the State of All VMs of a Specific VM Host,” on page 29](#)
- ◆ [Section 2.5, “Shutting Down Multiple VMs,” on page 29](#)
- ◆ [Section 2.6, “Destroying and Deleting a Virtual Machine,” on page 30](#)

2.1 Provisioning a Virtual Machine

Provisioning is used to get a VM ready to start in a running state. The Orchestrate Server automatically looks for the best VM host machine to run the VM on, unless you have specifically designated another server to run the VM.

By default, you can simultaneously provision eight VMs on a VM host. If you want to provision additional VMs, you must proportionately increase the value of `Max Hosted VMs` for the VM host in the Orchestrate Development Client.

Provisioning VMs that have only an NPIV disk is not supported. You can provision a VM that has a hard disk and an NPIV disk (SAN repository). The OS image of the VM is stored on the local hard disk and the data resides on the SAN repository.

Provisioning adapters on the Orchestrate Server abstract the VM. These adapters are special provisioning jobs that perform operations for each integration with different VM technologies.

The Orchestrate Server uses provisioning adapters to perform life cycle functions for the VMs and allow the Orchestrate Server to control them. Provisioning adapters are programs that provision (start, stop, snapshot, migrate, or pause) a VM. They run just like regular jobs on the Orchestrate Server.

The system can discover SAN repositories for Xen and ESX.

The system can detect a local store on each VM host and detect if a local disk might contain VM images. The provisioner puts in a request for a VM host. However, before a VM is used, the system pre-reserves that VM for exclusive use. That reservation prevents a VM from being “stolen” by any other job waiting for a resource that might match this particular VM.

The constraints specified to find a suitable host evaluate machine architectures, CPU, bit width, available virtual memory, or other administrator-configured constraints, such as the number of virtual machine slots. This process provides heterogeneous virtual machine management.

For procedures and more information on provisioning VMs, see [Section 2.2, “Managing a Virtual Machine in Runtime,” on page 22](#).

2.2 Managing a Virtual Machine in Runtime

There are many ways you can control the VM after it has been deployed. All actions from provisioning to shutting down the VM can be managed directly from the Orchestrate Development Client and through the jobs written and executed by the Orchestrate Server.

Review the following sections for ways to manage VMs in runtime:

- ◆ [Section 2.2.1, “Using the Right-Click Menu for Provisioning Actions,” on page 22](#)
- ◆ [Section 2.2.2, “Prerequisites for Performing Provisioning Actions on ESX VMs,” on page 25](#)
- ◆ [Section 2.2.3, “Releasing a Virtual Machine from Usage,” on page 27](#)
- ◆ [Section 2.2.4, “Managing Virtual Machine Templates,” on page 27](#)
- ◆ [Section 2.2.5, “Managed Virtual Machine Actions,” on page 28](#)
- ◆ [Section 2.2.6, “Virtual Machine Technology-Specific Actions,” on page 28](#)

2.2.1 Using the Right-Click Menu for Provisioning Actions

You can perform provisioning actions by right-clicking a VM in the tree of the Orchestrate Development Client. You start VMs by provisioning them under the VMs list according to the appropriate provisioning adapter.

For information on provisioning adapters, see [Section 2.1, “Provisioning a Virtual Machine,” on page 21](#).

The provisioning actions available from the right-click menu are as follows:

Table 2-1 *Right-Click VM Commands*

Action	Description
Provision	<p>Starts a VM to a running state. The Orchestrate Server automatically looks for the best VM host machine to run the VM on, unless you have specifically designated another server to run the VM.</p> <p>If a VM has snapshots, you cannot start the VM on a different host. If a VM that has snapshots is on shared repository, you can register the VM to a different host and start the VM if the host is also connected to a shared repository.</p>
Pause	Prevents the VM from gaining access to the processor of the host machine, although it is still resident in the memory of the host machine.
Resume	Allows a paused VM to access the processor of the host machine again.
Suspend	Pauses the VM and takes a snapshot of its disk and memory status. In the suspended state, a VM can be moved or migrated to another host machine.
Shutdown	Stops a VM from running, just like shutting down a physical machine. The operating system stops and acts as if it is shut down.
Restart	Shuts down and restarts a running VM.

Action	Description
Migrate	<p>vCenter: Migrates the VM from one host machine to another only if both the source and destination host machines have VMotion enabled. VM migrations can be of the following types:</p> <ul style="list-style-type: none"> ◆ A “warm migrate” is the migration of a suspended VM to another host and starting it there with brief resulting downtime (measured in milliseconds). This function requires shared storage. ◆ A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage. <p>ESX: VM migrations can be of the following types:</p> <ul style="list-style-type: none"> ◆ A “warm migrate” is the migration of a suspended VM to another host and starting it there with brief resulting downtime (measured in milliseconds). This function requires shared storage. ◆ A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage. <p>Ensure that the source and the destination machines have the same architecture.</p> <p>Hyper-V: VM Migration is not supported by PlateSpin Orchestrate.</p> <p>XEN: VM migrations can be of the following types:</p> <ul style="list-style-type: none"> ◆ A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage. <p>NOTE: Migration of a Xen VM on Fibre Channel SAN disks is not supported.</p>
Resync State	Ensures that the state of the VM displayed in the Orchestrate Development Client is accurate.
Apply Config	Updates the VM transient configuration. The VM must be running.
Create Template	Makes a VM instance into a template from which other versions can be cloned. This menu item is replaced by the <i>Clone</i> menu item when you right-click a template VM.
Clone	Launches a cloned instance of the template VM.
Delete/Destroy Resource	Removes a VM from the <i>Resources</i> list in the Orchestrate Development Client. If you want to delete the VM from the host machine, select the <i>Destroy VM Instance</i> option.

Action	Description
Move Disk Images	<p>A “move” is the relocation of VM disk images between two storage devices when the VM is in a not running state (including VMs that are suspended with a checkpoint file). This function does not require shared storage; the move is between separate repositories. Select the storage location from the drop-down menu.</p> <p>You can also move a VM from one VM host machine to another. This is a “cold” migration. VMware Server VMs must be migrated in this manner.</p> <p>If you want to move a VM of considerable size, appropriately increase the timeout fact value in the VM policy. The default value is 2400. For more information on editing the policy, see Section 1.1, “Configuring Policies for VM Provisioning Adapters,” on page 9.</p> <p>If a VM has snapshots, you cannot move the VM but you can register it to a different host if the VM and the host are connected to a shared repository.</p>
Checkpoint	<p>Creates a named snapshot of a VM image. This image is stored on the disk of the repository machine. Xen VMs cannot have a checkpoint applied to them.</p> <p>All the snapshots of a VM are chronologically listed in the resource.vm.snapshots fact, and the latest snapshot is listed in the resource.vm.current_snapshot fact.</p> <p>If the ESX VM or the Hyper-V VM already has snapshots taken through other management consoles, the snapshots are synchronized with the latest snapshot taken through the Orchestrate Development Client, and are listed in the resource.vm.snapshots fact.</p>
Restore	<p>Starts a Checkpoint VM (that is, resumes the operations of a VM made into a stored checkpoint from the moment of storage).</p> <p>If the ESX VM already has snapshots taken through other management consoles, the snapshots are synchronized with the latest snapshot taken through the Orchestrate Development Client, and are listed in the resource.vm.snapshots fact.</p>
Remove Template Dependency	<p>Changes a cloned instance of a VM into a VM instance.</p>
Install Agent	<p>Launches a job that automatically installs the Orchestrate Agent on a VM the next time you provision the VM.</p> <hr/> <p>IMPORTANT: If you stop or cancel a running Install Agent job, the VM is locked and you cannot provision the VM. The VM is automatically released after a period of time.</p> <hr/> <p>Before performing the Install Agent action, check the prerequisites listed in “Automatically Installing the Orchestrate Agent or Personalizing the VM” on page 25.</p>

Action	Description
Personalize	<p>Allows you to customize the VM. This includes changing elements like the DNS server. The changes are made to a VM that is shut down.</p> <hr/> <p>IMPORTANT: If you stop or cancel a running Personalize job, the VM is locked and you cannot provision the VM. The VM is automatically released after a period of time.</p> <hr/> <p>Before performing the Personalize action, check the prerequisites listed in “Automatically Installing the Orchestrate Agent or Personalizing the VM” on page 25.</p>
Shutdown Agent	Shuts down the Orchestrate Agent and makes the VM unavailable as a resource.
Cancel Action	Stops an action that has been requested.
Check Host Assignment	Opens a window so you can compare the VM hosts capable of hosting the VM.
Launch Remote Desktop	<p>Launches a VNC terminal in which you can view and control the VM. Specify the credentials configured for the Web service in the appropriate VM policy.</p> <hr/> <p>Before performing the Launch Remote Desktop action, check the prerequisites listed in “Launching a VNC Terminal of the VM” on page 26.</p>
<p>TIP: For information about using the PlateSpin Orchestrate VM Client to perform many of these actions, see “Managing Virtual Machines” in the <i>PlateSpin Orchestrate 2.0 VM Client Guide and Reference</i>.</p>	

2.2.2 Prerequisites for Performing Provisioning Actions on ESX VMs

You need to perform certain tasks before performing the Install Agent, Personalize, or the Launch Remote Desktop actions.

- ♦ [“Automatically Installing the Orchestrate Agent or Personalizing the VM” on page 25](#)
- ♦ [“Launching a VNC Terminal of the VM” on page 26](#)

Automatically Installing the Orchestrate Agent or Personalizing the VM

Complete this procedure before performing the Install Agent or Personalize actions.

- 1 On any Windows or Linux resource, install the Virtual Disk Development Kit (Vmware-Vix-Disklib) from the [VMware Web site](http://www.vmware.com/download/sdk/virtualdisk.html) (<http://www.vmware.com/download/sdk/virtualdisk.html>).
- 2 (Conditional) On Linux, ensure that the root partition is not on LVM.
- 3 In the Orchestrate Development Client, click *Scheduler > vmDiskLibDiscovery > Run Now*.

- 4 Click *Jobs > vmDiskLibDiscovery* to view the job execution details on all the resources within the grid.

The job execution details are displayed in the *Joblet* tab.

- 5 Click the *Resources* tab to view the resources that have the Virtual Disk Development Kit.

For the ESX on Windows, the following facts are automatically configured:

- ♦ `resource.vmware.disklib` with the value set to `true`.
- ♦ `resource.vmware.vmmount_cmd` with the value containing the location of `vmware-mount.exe`.

For the ESX on Linux, the `resource.vmware.disklib` fact is automatically set to `true`.

If you want to configure a Linux resource, continue with [Step 6](#); else skip to [Step 7](#).

- 6 (Conditional) For the ESX on Linux, set the value of `resource.vmware.disklibpath` fact to the location of `lib32` or `lib64`, depending upon the processor.

- 7 (Optional) Install the Orchestrate Agent:

- 7a Shut down the VM on which you want to install the Orchestrate Agent.

- 7b Right-click the VM, then click *Install Agent*.

- 7c Provision the VM.

The resource is automatically registered as a VM in the Orchestrate Server if the Orchestrate Server is registered to the DNS server.

- 8 (Optional) Personalize the VM:

- 8a Click *Resources > VMs*.

- 8b Click the VM you want to personalize.

The *Info/Groups* tab is displayed by default.

- 8c For a Linux VM, configure all the settings in the *Linux Autoprep Config* pane.

For a Windows VM, configure the computer name and the workgroup settings in the *Windows Sysprep Config* pane

- 8d In the *Autoprep Network Adapter* pane, configure the following settings:

- ♦ Mac Address
- ♦ DHCP or Static IP address settings.

Launching a VNC Terminal of the VM

Before starting the Launch Remote Desktop action, perform the following tasks:

- ♦ Ensure that the VM is powered on.
- ♦ In the Orchestrate Development Client, click the *Scheduler* tab > *esxVncServerConfig* > *Run Job* to enable the VNC Server service on the ESX host machine.

2.2.3 Releasing a Virtual Machine from Usage

When the demand and load on your data center decreases, the Orchestrate Server analyzes the remaining resources and releases the most appropriate resource. If a VM meets the requirements of the remaining job demands better than a physical machine, the physical machine is released before the VM is released. This dynamic analysis allows you to make sure that the needs of your data center are met.

2.2.4 Managing Virtual Machine Templates

A VM template is a special kind of VM that is not deployed separately. When the Orchestrate Server needs a VM of the template's type to be used as a resource, it automatically clones a version of the VM and uses that clone as the VM. You can change cloned VMs into instances of VMs instead of clones.

Review the following tasks to manage VM templates:

- ♦ [“Making a Virtual Machine Instance into a Template” on page 27](#)
- ♦ [“Changing a Virtual Machine Template Clone to an Instance” on page 27](#)

Making a Virtual Machine Instance into a Template

- 1 In the Orchestrate Development Client, right-click the VM.
- 2 Select *Create Template*.
- 3 Name the template.
- 4 Specify a repository.
- 5 Specify a visible VM host.
- 6 Select a recommended host for the VMs to be launched on, if any are present.
- 7 Click *OK*.

When the clone of the template VM is provisioned, it appears as a sub-branch of the template's location in the resources tree, as in the following Linux and Windows examples:

This clone functions as an instance of a VM and runs as though it were its own version with its own MAC address and other unique identifiers. The UUID is the only new information that is automatically generated for the clone. All the rest of the new information comes from autoprep, including the MAC address if an asterisk (*) is placed in the *Mac Address* field in the *Autoprep Network Adapter* section of the *Info/Groups* tab for the template (the default is a blank field, meaning no MAC address is created), and if the *Use Autoprep* check box is enabled in the *Create VM from Template* dialog box.

Changing a Virtual Machine Template Clone to an Instance

- 1 If you decide to keep a clone VM, go to the PlateSpin Orchestrate Development Client, right-click it, and select *Remove Template Dependency*.
The *Remove Template Dependency* dialog box is displayed.
- 2 Click *OK*.

2.2.5 Managed Virtual Machine Actions

You can perform many actions on the VM through the Orchestrate Development Client and the Orchestrate VM Client or you can write jobs to have actions performed on the VMs in your data center. The following table lists the managed VM actions that you can perform or use in a written job.

Table 2-2 *Managed VM Actions*

Action	Description
Provision	Starts a VM. This action clones and start a cloned VM template.
Clone	Creates a new, unique instance of a VM template.
Cold Migrate	Moves the storage location of the configuration and first disk files to another physical storage host. This might allow the VM to start faster.
Shutdown	Stops an active VM instance (including a started template VM).
Delete/Destroy	Removes a VM from the <i>Resources</i> list in the Orchestrate Development Client. If you want to delete the VM from the host machine, select the <i>Destroy VM Instance</i> option.
Suspend	Takes a snapshot of an active VM and pauses it in order to move it to another VM host.
Pause	Prevents the VM from obtaining CPU cycles, but it stays resident.
Resume	Allows a paused VM to access the CPU again.
Create Template	Creates a VM template from a VM instance.
Hot Migrate	Changes the association of the VM, which is residing in a shared storage location, from one host machine to another.
Checkpoint	Create a named snapshot of a moment that can later be accessed to restart from the same point
Restore	Resumes a VM at a previously stored checkpoint.
Install Orchestrator Agent	Opens a VM image and installs the Orchestrate Agent.
Make Standalone	Removes the association of a template and makes the active VM into its own instance.
Check Status	Checks the current state of the VM to verify if the VM is provisioned or shut down.
Personalize	Modifies the Orchestrate Agent properties and disk image that are currently part of a clone.
Save Config	Transfers changes made to a VM to its permanent image storage.

2.2.6 Virtual Machine Technology-Specific Actions

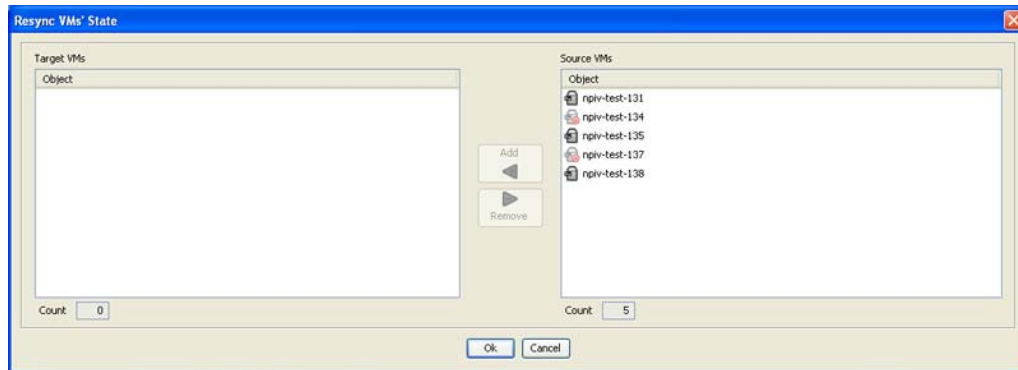
For a detailed breakdown of the actions you can perform on and with a VM, see the appropriate VM technology and configuration section in [Appendix A, “Virtual Machine Technologies and Actions,”](#) on page 47.

2.3 Resynchronizing the State of All VMs

To manually verify and ensure that the state of the VMs of all VM hosts displayed in the Orchestrate Development Client is accurate:

- 1 In the Orchestrate Development Client, click *Provision > Resync VM's State*.

The Resync VM's State dialog box is displayed.



- 2 In the *Source VMs* pane, select the VMs to be resynchronized, then click *Add*.

The selected VMs are added to the *Target VMs* pane.

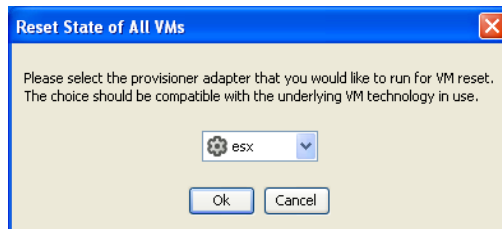
- 3 Click *OK*.

2.4 Resynchronizing the State of All VMs of a Specific VM Host

To manually verify and ensure that the state of the VMs of a specific VM host displayed in the Orchestrate Development Client is accurate:

- 1 In the Orchestrate Development Client, click *Provision > Reset State of All VMs*.

The Reset State of All VM's dialog box is displayed.



- 2 Select the VM host whose VMs you want to resynchronize.

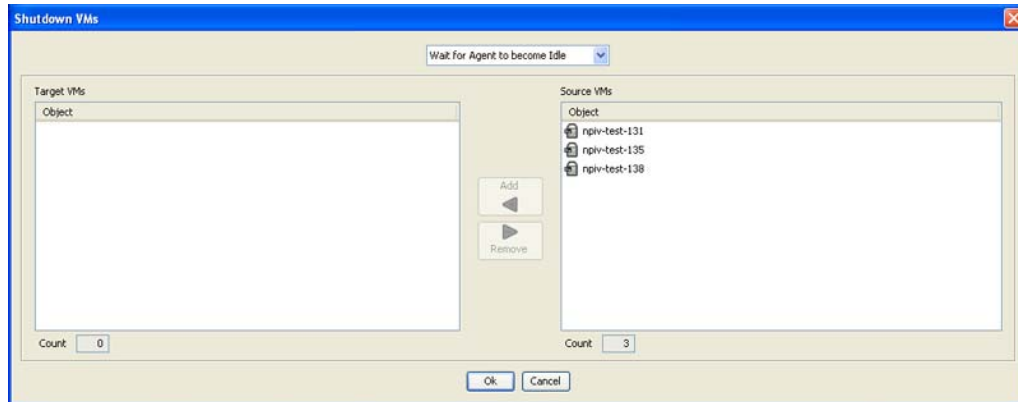
- 3 Click *OK*.

2.5 Shutting Down Multiple VMs

- 1 In the Development Client, click *Provision > Shutdown VMs*.

The Shut Down VMs dialog box is displayed.

- 2 You can choose to shut down the VMs after the Orchestrate Agent becomes idle or to immediately shut down the VMs. By default, the *Wait for Agent to become Idle* option is selected.
- 3 In the *Source VMs* pane, select the VMs you want to shut down, then click *Add*.



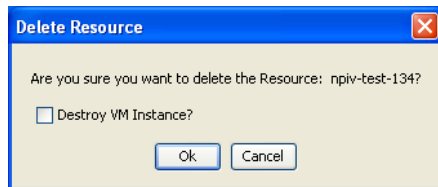
The selected VMs are added to the *Target VMs* pane.

- 4 Click *OK*.

2.6 Destroying and Deleting a Virtual Machine

- 1 In the PlateSpin Orchestrate Development Client, right-click the VM in the tree and select *Delete/Destroy Resource*.

The Delete Resource dialog box is displayed.



- 2 (Optional) To delete a VM from the VM host, select the *Destroy VM Instance* option.

This completely deletes the VM and all its versions from your data center. You cannot restore any version of the VM after you delete it.

If you do not choose this option, the VM is removed from the resource list. However, the actual image of the VM is still stored in its directory.

- 3 Click *OK*.

If you choose only to delete a VM from your resource tree, you can rediscover the VM by running a discovery job (click *Provision > Discover VM Images*).

PlateSpin Orchestrate uses the Repository object to represent where VMs are stored. VMs can be stored on local disks, the Orchestrate datagrid, a network attached storage (NAS), a storage area network (SAN), or by using a separate VM technology.

Before VMs can be used by PlateSpin Orchestrate, you must create Repository objects and then discover the VM Images within the Repository:

- ♦ [Section 3.1, “Deploying a VM to the Local Repository,” on page 31](#)
- ♦ [Section 3.2, “Deploying a VM to the Datagrid Repository,” on page 32](#)
- ♦ [Section 3.3, “Deploying a VM to the NAS Repository,” on page 32](#)
- ♦ [Section 3.4, “Deploying a VM to the SAN Repository,” on page 32](#)
- ♦ [Section 3.5, “Virtual Repository,” on page 33](#)

3.1 Deploying a VM to the Local Repository

By default, the Xen and VMware server adapters create a local Repository object for local VM images when PlateSpin Orchestrate accomplishes the Discover VM Hosts action.

A local repository represents VMs residing in a VM Host's local storage where the VMs are only visible to the VM Host. VMs are searched for in the default paths for each adapter.

IMPORTANT: Do not use local repositories for shared directories visible to more than one VM Host. Instead, create a new NAS or SAN repository.

For information on NAS storage, see [“Deploying a VM to the NAS Repository” on page 32](#). For information on SAN storage, see [“Deploying a VM to the SAN Repository” on page 32](#).

When discovering VM Images, the adapters use the `location`, `searchpath` and `preferredpath` facts for searching. The `repository.location` is usually the root path, such as `/`. For Xen, the adapter creates a local repository with search paths of `/etc/xen/vm` and a preferred search path of `/var/lib/xen/images`.

When the Discover VM Images action is run, the **provisioning adapter** follows these steps:

- ♦ Concatenates the `repository.location` and every element of `repository.searchpath` and searches for VMs in those directories.
- ♦ Concatenates the `repository.location` and `repository.preferredpath` and searches for VMs in that directory.

These steps are also followed when searching in NAS and SAN repositories when representing auto-mounted file systems, and when the location, search path, and preferred path are set.

For more information on facts, see [“Defining Values for Grid Objects”](#) in the *PlateSpin Orchestrate 2.0 Developer Guide and Reference*.

3.2 Deploying a VM to the Datagrid Repository

By default, a datagrid repository named `zos` is automatically created. The datagrid repository represents VMs residing in the PlateSpin Orchestrate datagrid, which is a storage area on the Orchestrate Server.

The `zos` datagrid repository has a location of `grid:///vms`, which points to an area in the datagrid reserved for VM archival storage.

You can store VMs to the datagrid and deploy them to a VM host as necessary.

The datagrid repository storage is archival because VMs cannot be run from the datagrid repository. You must move VMs out of the datagrid to a VM Host in order to run them.

3.3 Deploying a VM to the NAS Repository

The Network Attached Storage (NAS) repository represents VMs stored in a NAS. This is a storage where VMs are visible to multiple VM Hosts, so they can be run by any one of the available hosts.

The following procedure shows an example of setting up a NAS repository. For the example, assume you have a Xen setup where the `/vms` directory is auto-mounted on multiple VM hosts as the shared storage location for your VMs.

- 1 To create a new Repository object, go to the [PlateSpin Orchestrate Development Client](#), then click *Actions > Create Repository*.
- 2 Specify a new name and choose which adapter group this repository is used for.
The example is for Xen VMs, so choose the `xen30` adapter.
- 3 Close the dialog box to display the *Info/Groups* tab for the new repository.
- 4 Set the location path.
This is the root path for the repository. It is usually `/`.
- 5 Set the search path and preferred path.
In this example, the VMs are all in `/vms`, so leave `searchpath` empty and set the `preferredpath == "vms"`.
- 6 Select the VM Host objects that have visibility to the shared directory and add the new repository to the VM hosts list of available repositories.
To find a VM host, either go to the *VM Hosts* view or open the *Physical* tree under *Resources* and open the physical host representing the VM host.
- 7 Run *Provision > Discover VM Images* on the new repository.

3.4 Deploying a VM to the SAN Repository

The Storage Area Network (SAN) repository is a single storage server that can be accessed by multiple machines. PlateSpin Orchestrate 2.x does not support booting a VM from a SAN repository. SAN repositories can only be used as data disks for VMs.

3.5 Virtual Repository

A Virtual Repository is where PlateSpin Orchestrate assumes the VM store is handled by the underlying VM technology. For example, the Virtual Repository is used by the Virtual Center adapter because Virtual Center is managing the VM storage.

Troubleshooting Provisioning Actions

4

The following sections provide solution to the problems you might encounter while performing provisioning actions:

- ♦ “The vCenter provisioning adapter for vCenter 1.x does not work properly if the `vcenter_client1x` policy is not configured with the Java (JRE) 1.4.2 path” on page 35
- ♦ “After installing the Orchestrate Agent on VM, the VM is not displayed as a resource in the Orchestrate Development Client” on page 36
- ♦ “Unable to launch a remote session on the ESX host through the VNC port configured in the Orchestrate Development Client” on page 36
- ♦ “The VM is suspended when you try to revert the snapshot of a powered-on VM running on a Hyper-V host” on page 36
- ♦ “Moving or migrating VMs between two ESX hosts that are registered to a vCenter server by using the Orchestrate Development Client fails” on page 36
- ♦ “Moving a VM from one ESX host local storage to another ESX host local storage might fail” on page 37
- ♦ “Unable to perform any provisioning adapter action after the Save Config action on the vCenter VM” on page 37
- ♦ “Provisioning of a Xen VM doesn’t work on the host server” on page 37
- ♦ “Multiple instances of the same Xen VM running when located on shared storage” on page 38

The vCenter provisioning adapter for vCenter 1.x does not work properly if the `vcenter_client1x` policy is not configured with the Java (JRE) 1.4.2 path

Source: The PlateSpin Orchestrate Development Client.

Explanation: The vCenter provisioning adapter for vCenter 1.x does not work properly if the `vcenter_client2x` policy is not configured with the correct path of Java (JRE) 1.4.2. Even though the job log does not report any error, the following message is logged into the `server.log` file:

```
<date and time>: Broker,STATUS: assertion: workflowDone()  
isProcessingComplete==true jobid=zosSystem.vcenter1x.8
```

Action: In the `vcenter_client1x` policy, which has been automatically associated with the vcenter host, set the JAVA (JRE) 1.4.2 path for the vCenter PA job in the `java1.4.2` fact tag:

```
<fact name="java1.4.2"  
    type="String"  
    value="location_of_the_JRE_1.4.2"  
    description="Location of Java VM 1.4.2"/>
```

If JRE 1.5 is installed with the Orchestrate Agent, the default location of the JRE on Windows is `c:\program files\novell\zos\agent\jre`.

After installing the Orchestrate Agent on VM, the VM is not displayed as a resource in the Orchestrate Development Client

Source: The PlateSpin Orchestrate Development Client.

Action: Do the following:

- ◆ Ensure that the Orchestrate Agent is running on the VM.
- ◆ Ensure that no errors have been logged into the `agent.log` file.

The log file is located in the

`Orchestrate_Agent_installation_directory\novell\zos\agent\node.default` directory on Windows and in the `/opt/novell/zos/agent/node.default` directory on Linux.

- ◆ Ensure that the Orchestrate Server is registered to the DNS server.

Unable to launch a remote session on the ESX host through the VNC port configured in the Orchestrate Development Client

Source: The PlateSpin Orchestrate Development Client.

Possible Cause: The VMs are powered on when you run the discovery job.

Action: Shut down the VM and start the VM.

Action: In the Orchestrate Development Client, ensure that the `esxVncServerConfig` job has run.

This enables the VNC Server service on the ESX host machine

The VM is suspended when you try to revert the snapshot of a powered-on VM running on a Hyper-V host

Source: The PlateSpin Orchestrate Development Client.

Explanation: If you try to revert the snapshot of a powered-on VM running on a Hyper-V host, the VM is suspended. This is a known behavior of VMs running on a Hyper-V host.

Action: Provision the suspended VM:

- 1 In the Orchestrate Development Client, right-click the suspended VM, then click *Provision*.

The Provision VM dialog box is displayed.

- 2 In the *Plan (Host/Repository)* drop-down list, select the appropriate Hyper-V host.
- 3 Click *OK*.

Moving or migrating VMs between two ESX hosts that are registered to a vCenter server by using the Orchestrate Development Client fails

Source: The PlateSpin Orchestrate Development 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 Orchestrate Development Client.

Moving a VM from one ESX host local storage to another ESX host local storage might fail

Source: The PlateSpin Orchestrate Development 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 timeout value. For more information, see [Section 1.1, “Configuring Policies for VM Provisioning Adapters,” on page 9](#).

Unable to perform any provisioning adapter action after the Save Config action on the vCenter VM

Source: The PlateSpin Orchestrate Development Client.

Explanation: An explanation of the message.

Possible Cause: The VM UUID value of the vCenter VM is not a 128-bit hexadecimal value. Even though the Save Config action is successful and the VM is provisioned, the hypervisor automatically assigns a different UUID value. Subsequently, any provisioning adapter action performed on the VM fails.

Action: Specify a 128-bit hexadecimal value for the VM UUID.

- 1 In the Orchestrate Development Client, click *Resources* > the vcenter VM.
The *Info/Groups* tab is displayed by default.
- 2 In the Virtual Machine Configuration panel, set the value of *VM UUID* to a 128-bit hexadecimal value.
- 3 Right-click the vCenter VM, then click *Save Config*.

Provisioning of a Xen VM doesn't work on the host server

Source: The PlateSpin Orchestrate Development Client.

Explanation: When you try to provision a Xen 3.0 VM, the job might fail with the following error message in the job log:

```
[c121] RuntimeError: vmprep: Autoprep of /var/lib/xen/images/  
min-tmpl-1-2/disk0  
failed with return code 1: vmprep: autoprep:  
/var/adm/mount/vmprep.3f96f60206a2439386d1d80436262d5e:  
Failed to mount vm  
image "/var/lib/xen/images/min-tmpl-1-2/disk0": vmmount: No  
root device found  
Job 'zosSystem.vmprep.76' terminated because of failure.  
Reason: Job failed
```

A VM host cannot provision a VM that has a different file system than the VM host. The currently supported file systems are ext2, ext3, reiserfs, jfs, xfs, vfat, and ntfs.

Action: To work around the issue load the VM's file system Linux module on the VM host, or add this support to the Linux kernel if a custom kernel is being used.

Typically, last Linux kernels autoload the appropriate module to do the work.

You must manually load the proper kernel module on the VM host to support the VM's file system.

For example, if the VM host uses ext3 and the VM image uses reiserfs, load the proper kernel module onto the VM host to support the VM image's reiserfs file system. Then, on the VM host, run:

```
modprobe reiserfs
```

Next, provision the VM.

Cloning with prep is limited to what the Virtual Center of VMware Server supports.

Multiple instances of the same Xen VM running when located on shared storage

Source: Shared storage for Xen VMs.

Explanation: The `xendConfig` job runs when a VM host is added to the PlateSpin Orchestrate Server. This job automates some of the configurations possible on a Xen VM host. When using the default Xen configuration, it is possible to incorrectly start an already-running a VM a second time from storage that is shared by and accessible to another Xen VM host.

Possible Cause: A running Xen VM can only be locked to a specific Xen VM host when the `xend` service is configured to share a VM domain lock file on a shared file system. By default, the `xend` service will place these VM domain lock files in the `/var/lib/xend/domains` directory, which is usually not located on shared storage.

Action: You can configure Xen VM locks in PlateSpin Orchestrate by uncommenting certain facts in the policy file (search for `xend.xend-domain-lock`).

Uncomment these facts in `xendConfig.policy`:

```
<!--
  <fact name="xend.xend-domain-lock"
        type="String"
        description="Create an external lock file when domains are started. Lock
                    file is placed in xend-domains-lock-path/[domain_uid] on domain
                    startup and removed when domain is stopped. Set to yes to enable
                    lock file creation.

                    Note that external locking mechanisms are no substitute for a cluster
                    environment that protects shared resources, but may be useful in
                    some circumstances nonetheless."
        value="yes" />
  <fact name="xend.xend-domain-lock-path"
        type="String"
        description="Path where domain lock is stored if xend-domain-lock is enabled.
                    Note: This path must be accessible to all VM Servers participating
                    in domain locking, e.g. by specifying a shared mount point.
                    Lock is placed in {xend-domain-lock-path}/[domain-uuid].
                    Default is /var/lib/xend/domains/"
        value="/var/lib/xend/domains" />
-->
```

To uncomment a section of code, remove the “<!--” (comment open) tag and the “-->” (comment close) tag. Edit the `xend-domain-lock-path` fact to set an alternate location on shared storage that is available to all VM hosts.

When you make the changes and save the file, the facts become active and the VM locking parameters of each newly-joining VM host are adjusted accordingly.

You can also schedule an immediate run of the `xendConfig` job to adjust all configuration files of the Xen VM hosts that are already connected to the PlateSpin Orchestrate Server.

NOTE: Setting the lock path using PlateSpin Orchestrate only supports the scenario where all VM hosts have the domain lock path connected to the same shared repository. For more complex setups, you need to use alternative methods to adjust the VM host lock configurations.

Understanding Autoprep

5

In the PlateSpin® Orchestrate Development Client, “Autoprep” refers to the function of preparing unique network settings for Linux VMs on VM hosts so that the VMs can be provisioned by the provisioning adapter without creating network conflicts. As the administrator, you can set “facts” in the PlateSpin Orchestrate Development Client that can later be automatically applied to a VM clone during a *Provision* or a *Clone* action from a VM template. The Autoprep facts can also be manually applied to an existing VM by using the *Personalize* action.

This section includes the following information:

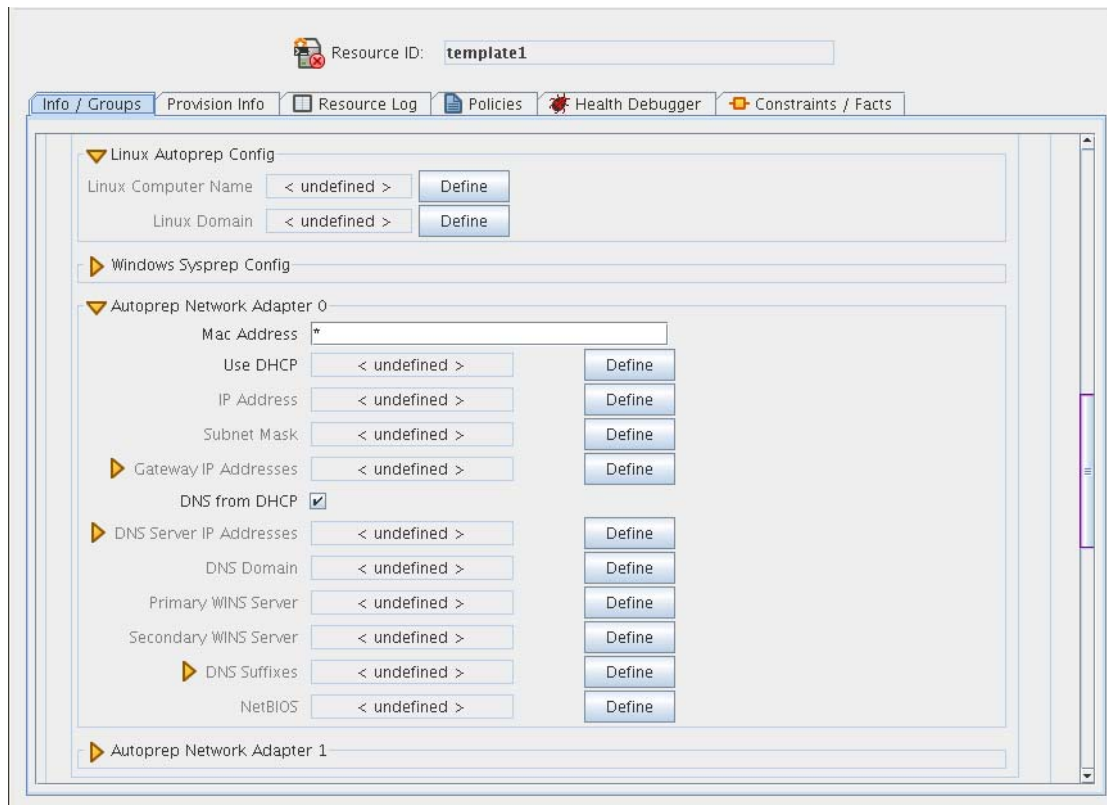
- ♦ [Section 5.1, “Setting Autoprep Facts in the Development Client,” on page 41](#)
- ♦ [Section 5.2, “Applying Autoprep Facts,” on page 44](#)
- ♦ [Section 5.3, “Known Autoprep Limitations,” on page 46](#)

5.1 Setting Autoprep Facts in the Development Client

You can use the Development Client to configure the facts for autoprep of a VM. This section includes information about the Development Client interface where those facts are set.

When you select a VM object in the Explorer tree of the Development Client, click the *Info/Groups* tab to open the Info Groups page, then scroll down to the *Provisioning Information* panel of this page. Open the *Linux Autoprep Config* panel and at least one of the *Autoprep Network Adapter* panels.

Figure 5-1 The Autoprep Sections of the Info/Groups Page of a VM Template Object



NOTE: Windows Sysprep Config is not supported in PlateSpin Orchestrator 2.0.2.

The fact settings for each of these panels are discussed below.

- ♦ [Section 5.1.1, “Setting Linux Autoprep Config Facts,” on page 42](#)
- ♦ [Section 5.1.2, “Setting Autoprep Network Adapter Facts,” on page 43](#)

5.1.1 Setting Linux Autoprep Config Facts

The settings located in the *Linux Autoprep Config* panel are global to a configuration of the a Linux VM and are not specific to a particular network adapter. Click *Define* to enter string values for each fact.

NOTE: It is not mandatory to define these facts. If they are left undefined, they are not applied to the “autoprepped” VM.

The field names and the accompanying fact value settings for this section include the following:

- ♦ **Linux Computer Name:** The fact name for this setting is `resource.provisioner.autoprep.linuxglobal.ComputerName`.

The string value you enter here becomes the network host name of the new VM. If you enter an asterisk (*), the current Grid object ID (`resource.id`) of the new VM will be used.

- ♦ **Linux Domain:** The fact name for this setting is `resource.provisioner.autoprep.linuxglobal.Domain`.
The string value you enter here becomes the network domain name where the new VM is a member.

5.1.2 Setting Autoprep Network Adapter Facts

The PlateSpin Orchestrate Development Client supports creating network settings (facts) for two network interfaces or “adapters” on a VM. The first adapter is identified as zero (0), and maps to `eth0`, and the second adapter is identified as one (1), and maps to `eth1`. It is possible to define settings for one or both of these interfaces, but you should always configure *Network Adapter 0* first.

Although you can define individual static settings to be applied to these adapters, Autoprep can be useful to provision multiple clones with unique, autogenerated MAC addresses and DHCP defined IP addresses (even though the VM clones are copies of the same VM template OS image), thus avoiding network conflicts.

The field names and the accompanying fact value settings for this section of the VM Autoprep adapter information are listed below. Click *Define* to enable selection or data entry in each field.

- ♦ **MAC Address:** The fact name for this setting is `resource.provisioner.autoprep.adapters[0].MACAddress`
or
`resource.provisioner.autoprep.adapters[1].MACAddress.`

This is the name for each NIC that represents the MAC Address for the interface. If you enter an asterisk (*), PlateSpin Orchestrate automatically generates the MAC address. If you leave this field undefined, the existing MAC address is re-used.

NOTE: When multiple clones are to be provisioned from a template, we recommend that you regenerate the MAC Address for each clone to avoid possible ARP table conflicts.

- ♦ **Use DHCP:** The fact name for this setting is `resource.provisioner.autoprep.adapters[0].UseDHCP`
or
`resource.provisioner.autoprep.adapters[1].UseDHCP.`
If you select this check box, the new VM retrieves its network settings from a DHCP server and all other IP-specific adapter settings are ignored. If you do not select this check box, you must define additional adapter settings (for example, IP address, Subnet Mask, and others).
- ♦ **IP Address:** The fact name for this setting is `resource.provisioner.autoprep.adapters[0].IPAddress`
or
`resource.provisioner.autoprep.adapters[1].IPAddress.`
If you enter a legitimate string value here, it becomes the assigned static IP address for this adapter. The setting is ignored if the *Use DHCP* check box is selected.
- ♦ **Subnet Mask:** The fact name for this setting is `resource.provisioner.autoprep.adapters[0].subnetMask`
or

```
resource.provisioner.autoprep.adapters[1].subnetMask.
```

The string value you enter here becomes the network subnet mask for the specified adapter. The setting is ignored if the *Use DHCP* check box is selected.

- ◆ **Gateway IP Address:** The fact name for this setting is
`resource.provisioner.autoprep.adapters[0].Gateways`
or

```
resource.provisioner.autoprep.adapters[1].Gateways.
```

This is a list of Internet gateways that are available to the network adapter. One or more gateway addresses can be added to this list, but in the case of Autoprep for Linux VMs, only the first Gateway address in the list is used. The setting is ignored if the *Use DHCP* check box is selected.

- ◆ **DNS from DHCP:** The fact name for this setting is
`resource.provisioner.autoprep.adapters[0].DNSFromDHCP`
or

```
resource.provisioner.autoprep.adapters[1].DNSFromDHCP.
```

If you select this check box, the new VM retrieves its DNS server settings from a DHCP server. If you do not select this check box, the DNS settings you define in the Development Client are applied.

- ◆ **DNS Server IP Addresses:** The fact name for this setting is
`resource.provisioner.autoprep.adapters[0].DNSServers`
or

```
resource.provisioner.autoprep.adapters[1].DNSServers.
```

This is a list of DNS servers that are available to the VM. You can add one or more DNS server IP addresses to this list if you want to. The setting is ignored if the *DNS from DHCP* check box is selected.

- ◆ **DNS Domain:** This fact is not currently supported.
- ◆ **Primary WINS Server:** This fact is not currently supported.
- ◆ **Secondary WINS Server:** This fact is not currently supported.
- ◆ **DNS Suffixes:** This fact is not currently supported.
- ◆ **NetBIOS:** This fact is not currently supported.

5.2 Applying Autoprep Facts

The PlateSpin Orchestrate Server applies the Autoprep facts by launching the `vmprep` job when the facts are defined. This job runs automatically and applies the appropriate facts to a VM in the following situations:

- ◆ When a *Personalize* action is run on any VM. (See [Table 2-1 on page 22](#)).
- ◆ When a VM clone is created by initiating the *Clone* action on a VM template.

NOTE: The *Use Autoprep Job* check box in the VM Client or the *Use Autoprep* check box in the Development Client must be selected if Autoprep facts are to be used when the *Clone* action is initiated.

- ◆ When a VM clone is created by initiating a *Provision* action on a VM template.

5.2.1 Example Autoprep Scenarios

Scenario 1: You want to create 25 dynamic VM instances to test job provisioning. You will never use these instances again, so you will not personalize them.

You create a VM template by right-clicking a VM, then you select *Create Template*. When the VM Template is created in the Explorer Tree, you define its Autoprep facts in the *Info/Groups* page by entering an asterisk in the *MAC Address* field, and then you select the *Use DHCP* check box. This lets the Development Client autogenerate the MAC address and retrieve network data from the DHCP server.

When the Autoprep facts are defined, you provision this template. You right-click the template object and select *Provision*, then in the Provision VM dialog box, you specify that you want to provision (create) 25 new VM instances from this template. Provisioning automatically applies the Autoprep facts from the template.

Scenario 2: You have created three VM clones in your grid and you want to provision those clones. You want to ensure that the MAC address and other key network information for each clone is unique, even though each clone is a copy of the same OS image. These clones are to be detached later and used for such things as mail servers and Web servers. When the clones were first created, Autoprep facts were applied, but now you have changed those facts by adding static IP addresses, subnet masks, and gateway addresses for each. Each clone must be “personalized” because of this change to basic network identifiers.

To personalize, you select each Clone object, then define the adapter-specific settings on the *Info/Groups* page by entering IP addresses, subnet masks, and gateway addresses for each adapter. When you have defined the autoprep facts on each VM clone, you right-click each Clone object in turn and select *Personalize* to apply the new network configuration.

For more information, see [“Changing a Virtual Machine Template Clone to an Instance” on page 27](#) and [“Personalize” on page 28](#).

5.2.2 How Autoprep Works

The `vmprep` job always runs when you clone or provision from a VM template. The job prepares the first disk image of the VM with the defined Autoprep settings. On a Linux system, most of these settings are stored in configuration files in the `/etc/hosts` or `/etc/sysconfig` directories. The `vmprep` job identifies the first listed disk for the VM, attempts to find the root partition for that disk, then mounts that partition and starts scanning the configuration files to make the necessary changes to the VM configuration file settings.

Generally, the `vmprep` job looks at each Autoprep fact independently, with the following exceptions:

- ♦ If the `resource.provisioner.autoprep.adapters.MACaddress` fact is undefined, Autoprep assumes an asterisk, and autogenerates a MAC address for the template or clone.
- ♦ If the `resource.provisioner.autoprep.adapters.UseDHCP` fact is undefined, Autoprep looks at `resource.provisioner.autoprep.adapters.IPAddress` fact. If both are undefined, Autoprep assumes it can use DHCP. If the IP address is defined, Autoprep assumes the address is static, and accepts the entered address.
- ♦ If the first network adapter does not specify a gateway, but the second network adapter does specify a gateway, the first network adapter is configured to use the gateway from the second network adapter.

5.3 Known Autoprep Limitations

There are some limitations that you need to be aware of when you use Autoprep:

- ♦ Currently, the *Gateway IP Address* setting under the *Autoprep Network Adapter 0* and the *Autoprep Network Adapter 1* sections of the *Info/Groups tab* for a VM object and VM template object is available in a list box.

Because the Linux VM OS accepts only one default gateway, it accepts only the first setting in the list as the actual gateway IP address. The other settings are ignored.

- ♦ The hostname setting is required when you use the VCenter Provisioning Adapter to do any autoprepping of Linux VMs. Use the following syntax to supply the hostname setting:
`resource.provisioner.autoprep.linuxglobal.ComputerName`
- ♦ If you have a VM template with two network cards, only the first card is considered active and therefore it is the only card configured with Autoprep.

To work around this issue, set the fact manually in the Facts/Constraints editor or associate a new policy on the template with the following syntax:

```
<policy>
<resource>
<fact name="provisioner.autoprep.adapters[1].Active" value="true"
type="Boolean" />
</resource>
</policy>
```

- ♦ The *Personalize* action is not supported for vCenter VMs, but it does work for VMs created with the vSphere Provisioning Adapter Add-on for PlateSpin Orchestrate 2.0.2.

Virtual Machine Technologies and Actions

A

The tables in this section contain information about the different PlateSpin[®] Orchestrate VM Management technologies, PlateSpin Orchestrate provisioning adapters, and actions you can perform on and with a VM.

This section contains the following:

- ♦ [Section A.1, “Virtual Machine Technologies,” on page 47](#)
- ♦ [Section A.2, “Xen Hypervisor on SLES 10 SP2 or SLES 11 Host,” on page 49](#)
- ♦ [Section A.3, “VMware Virtual Center,” on page 50](#)
- ♦ [Section A.4, “Microsoft Hyper-V Hypervisor,” on page 52](#)
- ♦ [Section A.5, “VMware ESX VM Hypervisor \(Experimental\),” on page 53](#)

A.1 Virtual Machine Technologies

The following table represents the available actions using VMs with PlateSpin Orchestrate:

Table A-1 VM Technologies with Host Operating System, Guest Operating System, and Provisioning Adapter

Hypervisor	Host Operating System	Guest Operating System	PlateSpin Orchestrate Provisioning Adapter
Xen 3.2	SUSE [®] Linux Enterprise Server (SLES) 10 SP2	<ul style="list-style-type: none">♦ SLES 9♦ SLES 10♦ RHEL 4♦ RHEL 5♦ Other Linux♦ Windows Server¹ 2003♦ Windows Server 2008¹♦ Windows XP¹	xen30

Hypervisor	Host Operating System	Guest Operating System	PlateSpin Orchestrate Provisioning Adapter
Xen 3.3	SLES 11	<ul style="list-style-type: none"> ◆ SLES 9 ◆ SLES 10 ◆ SLES 11 ◆ RHEL 4 ◆ RHEL 5 ◆ Other Linux ◆ Windows Server 2003 ¹ ◆ Windows XP ¹ ◆ Windows Server 2008 ¹ 	xen30
VMware Virtual Center 2.x ²	Subject to the VMware support matrix	<ul style="list-style-type: none"> ◆ SLES 8 ◆ SLES 9 ◆ SLES 10 ◆ RHEL 4 ◆ RHEL 5 ◆ Other Linux ◆ Windows Server 2003 ◆ Windows XP 	vcenter
VMware Server 1.x ³	Subject to the VMware support matrix	<ul style="list-style-type: none"> ◆ SLES 9 ◆ SLES 10 ◆ RHEL 4 ◆ RHEL 5 ◆ Other Linux ◆ Windows Server 2003 ◆ Windows XP 	vmserver

¹ Windows VMs running on the Xen hypervisor require a VM host CPU with the Intel VT or AMD-V technology available and enabled.

² The vcenter provisioning adapter does not support VMware Virtual Center 1.x.

³ The vmserver provisioning adapter does not work with the VMware Server 2.x hypervisor. Novell considers the PlateSpin Orchestrate provisioning technology used in conjunction with VMware Server as “experimental” because it has not yet been fully tested.

A.2 Xen Hypervisor on SLES 10 SP2 or SLES 11 Host

The Xen hypervisor runs on SLES 10 SP2 and SLES 11 host machines with the PlateSpin Orchestrate Xen Provisioning Adapter (xen30). The following table represents the PlateSpin Orchestrate VM actions and whether or not PlateSpin Orchestrate can perform that action on the guest operating system.

Table A-2 VM Actions Supported for SLES 10 SP2 or SLES 11 Host Using the Xen Hypervisor

PlateSpin Orchestrate Managed VM Action	SLES 9 Guest	SLES 10 Guest	RHEL 4 Guest	RHEL 5 Guest	Other Linux Guest	Windows Guest
Provision	X	X	X	X	X	X
Clone	X	X	X	X	X	X
Shutdown	X	X	X	X	X	X
Destroy	X	X	X	X	X	X
Suspend	X	X	X	X	X	X
Pause	X	X	X	X	X	X
Resume	X	X	X	X	X	X
Create Template	X	X	X	X	X	X
Move Disk Image ¹	X	X	X	X	X	X
Hot Migrate ²	X	X	X	X	X	X
Checkpoint	X	X	X	X	X	X
Restore	X	X	X	X	X	X
Install Orchestrate Agent	X	X	X	X		X
Make Standalone	X	X	X	X	X	X
Check Status	X	X	X	X	X	X
Personalize	X	X	X	X		
Save Config	X	X	X	X	X	X
Cancel Action	X	X	X	X	X	X
Check Host Assignment	X	X	X	X	X	X
Launch Remote Desktop	X	X	X	?	X	X

¹ A “move” is the relocation of VM disk images between two storage devices when the VM is in a not running state (this includes VMs that are suspended with a checkpoint file). This function does not require shared storage; the move is between separate repositories.

² A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage.

A.2.1 Additional Xen Provisioning Adapter Information

The following characteristics were added to the Xen Provisioning Adapter, effective with the 2.0.2 release:

- ♦ The VM Builder running on a SLES 11 VM host now supports three additional VM OS types:
 - ♦ openSUSE 11
 - ♦ SLED 11
 - ♦ SLES 11

These OS types are not available for build when you use the VM Builder running on a SLES 10 SP2 VM host. These OS types can only be built and provisioned to a SLES 11 VM host.

- ♦ VMs that were supported on SLES 10 SP2 are supported on SLES11, that is, if the VM was built on SLES 10 SP2, the provisioning adapter supported of that VM on SLES 10S P2 are also possible when the VM runs on SLES11.
- ♦ Although VM migration from a SLES 11 VM host to a SLES 10 SP2 VM host is not supported, VM migration is supported in the following scenarios:
 - ♦ VM on a SLES 10 SP2 VM host migrating to a SLES 11 VM host
 - ♦ VM on a SLES 10 SP2 VM host migrating to a SLES 10 SP2 VM host
 - ♦ VM on a SLES 11 VM host migrating to a SLES 11 VM host
- ♦ Virtual machines built on SLES 10 SP2 can be provisioned on either SLES 10 SP2 or SLES 11 VM hosts.
- ♦ Virtual machines (regardless of OS type) built on SLES 11 cannot be provisioned on a SLES 10 SP2 VM host.

A.3 VMware Virtual Center

The following tables represent the PlateSpin Orchestrate VM actions and whether or not PlateSpin Orchestrate can perform that action on the guest operating system.

IMPORTANT: The PlateSpin Orchestrate Server supports only one VMware Virtual Center server per grid.

Table A-3 PlateSpin Orchestrate VM Actions Supported Guest Operating Systems Using VMware Virtual Center

PlateSpin Orchestrate Managed VM Action	SLES 8	SLES 9	SLES 10	RHEL 4	RHEL 5	Other Linux	Windows
Provision	X	X	X	X	X	X	X
Clone	X	X	X	X	X	X	X
Shutdown	X	X	X	X	X	X	X
Destroy	X	X	X	X	X	X	X
Suspend	X	X	X	X	X	X	X
Pause							

PlateSpin Orchestrate Managed VM Action	SLES 8	SLES 9	SLES 10	RHEL 4	RHEL 5	Other Linux	Windows
Resume							
Create Template	X	X	X	X	X	X	X
Move Disk Image ¹	X	X	X	X	X	X	X
Hot Migrate ²	X	X	X	X	X	X	X
Warm Migrate ³	X	X	X	X	X	X	X
Checkpoint	X	X	X	X	X	X	X
Restore	X	X	X	X	X	X	X
Install Orchestrate Agent	X	X	X	X	X	X	X
Make Standalone	X	X	X	X	X	X	X
Check Status	X	X	X	X	X	X	X
Save Config	X	X	X	X	X	X	X
Cancel Action	X	X	X	X	X	X	X
Check Host Assignment	X	X	X	X	X	X	X
Launch Remote Desktop	X	X	X	X	X	X	X

NOTE: Host operating systems are dependent on the VMware Virtual Center support matrix.

In the 2.0.2 release of PlateSpin Orchestrate, the VMware Virtual Center Provisioning Adapter supports only VMware Virtual Center 2.x. Virtual Center 1.x is not supported in this release.

¹ A “move” is the relocation of VM disk images between two storage devices when the VM is in a not running state (including VMs that are suspended with a checkpoint file). This function does not require shared storage; the move is between separate repositories.

² A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage.

³ A “warm migrate” is the migration of a suspended VM to another host and starting it there with brief resulting downtime (measured in seconds). This function requires shared storage.

A.3.1 Additional VMware Virtual Center Provisioning Adapter Information

The `vcenterDiscovery.policy` file includes fixed paths the to `vxpdp.exe` file:

```

    <fact name="vcenter.path.vpxd">
      <list>
        <listelement value="C:\Program
Files\VMware\Infrastructure\VirtualCenter Server\vpxd.exe" />
        <listelement value="C:\Program Files\VMware\VMware VirtualCenter
2.0\vpxd.exe" />
        <listelement value="C:\Program Files\VMware\VMware
VirtualCenter\vpxd.exe" />
      </list>
    </fact>

```

If you have installed Vcenter in a location other than those listed as default in the policy file, you can copy one of the three existing `listelement` values, modify the path to point to their installation location for the `vpxd.exe` process, and then append this new item to the end of the `vcenter.path.vpxd` list.

For example, if `vpxd.exe` is installed at `D:\foo\bar\VMware\VMware VirtualCenter2.0\vpxd.exe`, you could modify the XML policy file as follows:

```

    <fact name="vcenter.path.vpxd">
      <list>
        <listelement value="C:\Program
Files\VMware\Infrastructure\VirtualCenter Server\vpxd.exe" />
        <listelement value="C:\Program Files\VMware\VMware VirtualCenter
2.0\vpxd.exe" />
        <listelement value="C:\Program Files\VMware\VMware
VirtualCenter\vpxd.exe" />
        <listelement value="D:\foo\bar\VMware\Infrastructure\VirtualCenter
Server\vpxd.exe" />
      </list>
    </fact>

```

A.4 Microsoft Hyper-V Hypervisor

The following table represents the PlateSpin Orchestrate VM actions and whether or not PlateSpin Orchestrate can perform that action on the guest operating system.

Table A-4 PlateSpin Orchestrate VM Actions Supported on Guest Operating Systems Managed by Hyper-V

PlateSpin Orchestrate Managed VM Action	SLES 10	Windows 2000	Windows 2003	Windows 2008
Provision	X	X	X	X
Pause	X	X	X	X
Resume	X	X	X	X
Suspend	X	X	X	X
Shutdown	X	X	X	X
Shutdown Agent	X	X	X	X
Restart	X	X	X	X
Hot Migrate ¹				

PlateSpin Orchestrate Managed VM Action	SLES 10	Windows 2000	Windows 2003	Windows 2008
Warm Migrate ²				
Move Disk Images ³	X	X	X	X
Resync State	X	X	X	X
Save Config	X	X	X	X
Apply Config				
Create Template				
Delete / Destroy Resource	X	X	X	X
Checkpoint	X	X	X	X
Restore	X	X	X	X
Remove Template Dependency				
Install Agent				
Personalize				
Cancel Action	X	X	X	X
Check Host Assignment	X	X	X	X
Launch Remote Desktop				

¹ A “move” is the relocation of VM disk images between two storage devices when the VM is in a not running state (including VMs that are suspended with a checkpoint file). This function does not require shared storage; the move is between separate repositories.

² A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage.

³ A “warm migrate” is the migration of a suspended VM to another host and starting it there with brief resulting downtime (measured in seconds). This function requires shared storage.

A.5 VMware ESX VM Hypervisor (Experimental)

The following table represents the PlateSpin Orchestrate VM actions and whether or not PlateSpin Orchestrate can perform that action on the guest operating system.

NOTE: Novell considers the PlateSpin Orchestrate provisioning technology used in conjunction with VMware ESX as “experimental” because it has not yet been fully tested.

Table A-5 PlateSpin Orchestrate VM Actions Supported Operating Systems Using ESX

PlateSpin Orchestrate Managed VM Action	SLES 9	SLES 10	RHEL 4	RHEL 5	Windows 2003
Provision	X	X	X	X	X

PlateSpin Orchestrate Managed VM Action	SLES 9	SLES 10	RHEL 4	RHEL 5	Windows 2003
Pause					
Resume					
Suspend	X	X	X	X	X
Shutdown	X	X	X	X	X
Shutdown Agent	X	X	X	X	X
Restart	X	X	X	X	X
Move Disk Image ¹	X	X	X	X	X
Hot Migrate ²	X	X	X	X	X
Warm Migrate ³	X	X	X	X	X
Resync State	X	X	X	X	X
Save Config	X	X	X	X	
Apply Config					
Create Template					
Delete / Destroy Resource	X	X	X	X	X
Checkpoint	X	X	X	X	X
Restore	X	X	X	X	X
Remove Template Dependency					
Install Agent	X	X	X	X	X
Personalize	X	X	X	X	X
Cancel Action	X	X	X	X	X
Check Host Assignment	X	X	X	X	X
Launch Remote Desktop	X	X	X	X	X

¹ A “move” is the relocation of VM disk images between two storage devices when the VM is in a not running state (including VMs that are suspended with a checkpoint file). This function does not require shared storage; the move is between separate repositories.

² A “hot migrate” (also called a “live migrate”) is the migration of a running VM to another host and starting it there with minimal resulting downtime (measured in milliseconds). This function requires shared storage.

³ A “warm migrate” is the migration of a suspended VM to another host and starting it there with brief resulting downtime (measured in seconds). This function requires shared storage.

Documentation Updates

B

This section contains information about documentation content changes that were made in this *PlateSpin Orchestrate Virtual Machine Management Guide* after the initial release of PlateSpin Orchestrate 2.0. The changes are listed according to the date they were published.

The documentation for this product is provided on the Web in two formats: HTML and PDF. The HTML and PDF documentation are both kept up-to-date with the changes listed in this section.

If you need to know whether a copy of the PDF documentation that you are using is the most recent, the PDF document includes a publication date on the title page.

The documentation was updated on the following dates:

- ♦ [Section B.1, “November 17, 2009,” on page 55](#)
- ♦ [Section B.2, “July 9, 2009,” on page 55](#)
- ♦ [Section B.3, “June 17, 2009 \(2.0.2 Release\),” on page 55](#)

B.1 November 17, 2009

Updates were made to the following sections:

Location	Update
Chapter 5, “Understanding Autoprep,” on page 41	New content.

B.2 July 9, 2009

Updates were made to the following sections:

Location	Update
Section A.1, “Virtual Machine Technologies,” on page 47	Added information to the VMware Server footnote to indicate that this is an “experimental” provisioning adapter.
Section A.5, “VMware ESX VM Hypervisor (Experimental),” on page 53	Moved this section to the end of the appendix and added an explanatory note to indicate that PlateSpin Orchestrate uses an “experimental” provisioning technology to work with the VMware ESX VM Hypervisor.

B.3 June 17, 2009 (2.0.2 Release)

Updates were made to the following sections:

Location	Update
Section 1.1.1, "Configuring Policies for Virtual Center," on page 9	Added important note to alert users about limitation of one Virtual Center Server installation per PlateSpin Orchestrate grid.
Chapter 4, "Troubleshooting Provisioning Actions," on page 35	Added a new section, "Multiple instances of the same Xen VM running when located on shared storage" on page 38.
Appendix A, "Virtual Machine Technologies and Actions," on page 47	Added various changes to indicate support for SLES 11.
Section A.2.1, "Additional Xen Provisioning Adapter Information," on page 50	New content.
Section A.3, "VMware Virtual Center," on page 50	Added important note to alert users about limitation of one Virtual Center Server installation per PlateSpin Orchestrate grid.
Section A.3.1, "Additional VMware Virtual Center Provisioning Adapter Information," on page 51	New content.