

Installation and Upgrade Guide

Lab Manager 3.0



Lab Manager Installation and Upgrade Guide

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About This Book

The *Lab Manager Installation and Upgrade Guide* includes installation, upgrade, and configuration tasks for VMware® Lab Manager.

Intended Audience

The guide is intended for experienced developers and testers of software applications. This document assumes the user has some familiarity with these topics:

- Virtual machine technology
- Basic concepts of distributed, multitiered systems
- Current development and testing practices
- Windows and Linux operating systems

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Introducing Lab Manager and the Installation Process

1

VMware Lab Manager provides a solution to manage virtual machines in the test lab infrastructure. You can capture a complex and running software environment and share it instantly across your organization. See the *Lab Manager User's Guide* for a full overview of the product.

This chapter includes these topics:

- [“Understanding Lab Manager in the VMware Infrastructure Environment”](#) on page 7
- [“Guidelines for Installing a VirtualCenter Server and Lab Manager Server Software”](#) on page 9

Understanding Lab Manager in the VMware Infrastructure Environment

Lab Manager is an application that resides on and uses the VMware Infrastructure product.

The Lab Manager Server system provides centralized deployment and management of configurations of virtual machines against a collection of resource pools that the VirtualCenter Server provides.

VMware ESX provides resources to run the virtual machines. Lab Manager manages the ESX hosts through the VirtualCenter Server and the Lab Manager agent installed on those hosts.

VMware VirtualCenter Server is a control point for the datacenter and provides datacenter services such as access control, performance monitoring, and configuration. VirtualCenter also provides advanced VMware Infrastructure capabilities described in [“Using VMware Infrastructure Capabilities”](#) on page 8. ESX hosts continue to function even if the VirtualCenter Server becomes unreachable (for example, the network connection is severed).

Using Clusters, Hosts, Resource Pools, and Datastores

In the VirtualCenter Server, you can view, configure, and manage the following key elements:

- Computing and memory resources called hosts, clusters, and resource pools
- Storage resources called datastores
- Networks
- Virtual machines

See the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

Hosts, clusters, and resource pools provide flexible ways to organize the aggregated computing and memory resources in the virtual environment and link them back to the underlying physical resources.

- A host represents the aggregate computing and memory resources of a physical x86 server.
- A cluster acts and can be managed much like a host. It represents the aggregate computing and memory resources of a group of physical x86 servers sharing the same network and storage arrays.
- Resource pools are partitions of computing and memory resources from a single host or a cluster. With VMware Distributed Resource Scheduler, these pools can be hierarchical and nested.

Using VMware Infrastructure Capabilities

Lab Manager uses VMware Infrastructure capabilities such as VMware VMotion™, VMware DRS, and VMware High Availability (HA). These are distributed services that enable efficient and automated resource management and high virtual machine availability.

Lab Manager works with virtual machines registered with VirtualCenter and VMware Infrastructure admission controls. For more information about VirtualCenter, see the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

Guidelines for Installing a VirtualCenter Server and Lab Manager Server Software

Review these guidelines:

- Use clusters with the same hardware to gain the greatest benefits from VMware HA, VMware DRS, and VMware VMotion.
- Install Lab Manager Server software on a virtual machine.
- VMware recommends shared storage. A larger number of hosts with shared storage allows Lab Manager to take advantage of VMware Infrastructure capabilities. If you store virtual machine files on local (not shared) storage, you can only deploy the virtual machines on the local ESX host.
- Install VirtualCenter Server software on a virtual machine. See the technical white paper, *Running VirtualCenter in a Virtual Machine*, in the Technical Resources section of the VMware Web site.
- Do not install the Lab Manager Server software on a physical or virtual machine that contains VirtualCenter Server software. If you have Lab Manager Server and VirtualCenter Server software installed in separate virtual machines, these virtual machines can reside on the same ESX host.
- If the Lab Manager Server system runs in a virtual machine on an ESX host under Lab Manager control, certain operations affect all virtual machines, such as **Undeploy all VMs** and **Redeploy all VMs**. These operations do not affect virtual machines on the same ESX host that are outside of Lab Manager control.

For information about these operations, see the *Lab Manager User's Guide*.



CAUTION VirtualCenter users must not manipulate port groups that Lab Manager creates because of potential consequences on fenced configurations. If Lab Manager port group changes occur in the VirtualCenter Server, a fenced configuration might leak traffic onto a public network. Lab Manager undeploys all virtual machines associated with that network to mitigate the damage.

For information about network fencing, configurations, and undeploy operations, see the *Lab Manager User's Guide*.

Preparing to Install Lab Manager

2

This chapter describes the overall installation process, requirements, and recommendations for a Lab Manager Server system. This chapter includes these topics:

- [“Overview of Lab Manager Installation Process”](#) on page 12
- [“VMware Infrastructure Requirements and Recommendations”](#) on page 12
- [“Lab Manager Server Requirements”](#) on page 14
- [“Installing IIS and .NET Framework on Lab Manager Server”](#) on page 16
- [“Web Console Access Requirements”](#) on page 17
- [“Datastore Requirements”](#) on page 18
- [“Network Requirements”](#) on page 19
- [“Security Recommendations and Requirements”](#) on page 22

Overview of Lab Manager Installation Process

The installation process takes about 20 minutes and involves the tasks described in [Table 2-1](#).

Table 2-1. Installation Tasks and Descriptions

Task	Description
Setting up VMware Infrastructure 3	Set up ESX 3.5 Update 1 and VirtualCenter 2.5 Update 1. VMware recommends that you set up at least two ESX hosts before setting up the Lab Manager Server system.
Preparing to install Lab Manager	Prepare your target system and make sure it meets all software and hardware requirements.
Creating the Lab Manager Server system	Install the Lab Manager Server software.
Initializing and configuring Lab Manager	Configure resources, networking, and other areas in the Initialization wizard.
Backing up the password encryption key	Back up the key that affects passwords for the VirtualCenter Server, ESX hosts, and SMTP server.

VMware Infrastructure Requirements and Recommendations

Lab Manager supports VMware Infrastructure 3 Standard and VMware Infrastructure 3 Enterprise. Lab Manager does not work with VMware Infrastructure 3 Foundation or VMware ESXi 3.5.

Lab Manager requires:

- One or more ESX 3.5 Update 1 servers from the ESX hardware compatibility guides.
- One VirtualCenter 2.5 Update 1 system.

See [“Guidelines for Installing a VirtualCenter Server and Lab Manager Server Software”](#) on page 9.

For all VMware Infrastructure requirements, see the VMware Infrastructure documentation set and ESX hardware compatibility guides at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html.

Keep in mind the following recommendations for using ESX hosts in a Lab Manager environment:

- For guidelines about areas such as memory use, read the *Performance Tuning Best Practices for ESX Server 3* technical white paper on the VMware Web site.

- The host CPU is the same across all hosts in the Lab Manager environment.

CPU homogeneity makes virtual machines more mobile for Lab Manager deployment and allows Lab Manager to derive benefits from features such as VMotion, VMware DRS, and VMware HA.

If you do not have a homogenous CPU setup across hosts, ESX Server prevents you from deploying suspended virtual machines on one host to another host that is not compatible with the virtual machine CPU. (To resolve the issue, discard the suspended state.) For information about virtual machines in a suspended state, see the *Lab Manager User's Guide*.

- To take advantage of virtual machine migration, VMware recommends that all hosts have more CPUs than the number of virtual CPUs on a typical virtual machine in Lab Manager.

- Use SAN storage.

The minimum requirement is a local SCSI drive with a supported SCSI adapter, but this hardware setup does not allow you to share virtual machines across systems.

- Have a minimum of 500MB available in the `/var` partition.
- Have 120MB available in the `/usr` partition.
- Multiple physical NICs grouped together.

This allows the NIC team to increase performance by distributing the traffic across those physical network adapters and provide passive failover in the event of hardware failure or network outage.

For best performance and security, use different virtual switches for the ESX service console and virtual machine port groups.

- VMware recommends allocating at least 1GB of RAM to the VirtualCenter Server. Lab Manager generates more activity within the VirtualCenter Server than the daily interaction between the VirtualCenter Server and the VI Client.
- Set up the VMkernel network for NFS virtual machine and media datastores, and for using VMotion and DRS. See VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html.

For best performance, use different virtual switches for the VMkernel port group and virtual machine port groups.

Lab Manager Server Requirements

You can install Lab Manager software in a virtual machine. Do not install the Lab Manager Server software on a physical or virtual machine that contains VirtualCenter Server software. If you have the Lab Manager Server and VirtualCenter Server software installed in separate virtual machines, these virtual machines can reside on the same ESX host. See [“Guidelines for Installing a VirtualCenter Server and Lab Manager Server Software”](#) on page 9.

Operating System and Framework

- Microsoft Windows Server 2003 32-bit Enterprise Edition (Service Pack 1 or higher) or Standard Edition (Service Pack 1 or higher)

Lab Manager only supports English (United States) regional settings.

- Internet Information Services (IIS) 6.0

See [“Installing IIS and .NET Framework on Lab Manager Server”](#) on page 16.

- Microsoft .NET Framework 2.0 (Service Pack 1 or higher)

You must install IIS before you install .NET Framework.

CPU Speed

- 550MHz minimum
- (Recommended) 1GHz or faster

Processor

Pentium III, Pentium 4, Xeon, Opteron, or Athlon processor

Hard Disk

- 40GB minimum
- (Recommended) RAID 0 or RAID 5 for performance benefits

Memory

- 512MB minimum
- (Recommended) 1GB or more

Network

- At least one unbound Ethernet card:
 - NIC with static IP address
 - Physically connected NIC (no wireless cards)
- (Recommended) Gigabit Ethernet
- Machine cannot run on a Windows domain controller
- Fully qualified domain name (FQDN).

Certain features of Lab Manager require an FQDN. This requirement does not mean that the Lab Manager Server system resides in a domain.

An FQDN starts with the computer name followed by the DNS suffix (for example, `computer_name.mydomain.com`). VMware recommends that you avoid using an IP address because complications might arise at a later time if you change that address. For example, changing the IP address requires regenerating the certificate because the certificate depends on this FQDN.

CD/DVD Drive

For the Lab Manager Server system, you might need a CD or DVD drive to put the Windows Server 2003 CD-ROM into while configuring IIS and Microsoft .NET Framework. See [“Installing IIS and .NET Framework on Lab Manager Server”](#) on page 16.

System Clock

Ensure that the system clocks are in sync with the clocks on all machines involved in the Lab Manager deployment (Lab Manager Server system, VirtualCenter system, ESX hosts, client machines accessing the Web console, file servers, and so on). This synchronization allows support staff to quickly pinpoint issues in logs.

See [“Installing and Configuring NTP on VMware ESX Server”](#) in the VMware knowledge base.

Installing IIS and .NET Framework on Lab Manager Server

You must have IIS installed and enabled on the Lab Manager Server system. (See [“Operating System and Framework”](#) on page 14.) Install IIS before you install Microsoft .NET Framework 2.0 (Service Pack 1 or higher).

During the installation procedure, you might need to insert the Windows Server 2003 boot disk into the CD or DVD drive of the server.

To install IIS

- 1 Choose **Start > Settings > Control Panel > Add or Remove Programs**.
- 2 In the left pane of the Add or Remove Programs dialog box, click the **Add/Remove Windows Components** icon.

The Windows Components wizard starts.

- 3 Select the **Application Server** component.
- 4 Click **Details**.
- 5 Select the **Internet Information Services (IIS)** option.
- 6 Click **OK** and **Next** to install the components.

To install the .NET Framework

- 1 Open the Microsoft Web site.
- 2 Search for the .NET Framework.

For example, to search for the Service Pack 1 download, enter **.NET 2.0 SP1 download x86** in the **Search** field.

- 3 Download and install .NET Framework.

Verifying the Version of an Existing .NET Framework Installation

If you already have .NET Framework installed before you set up Lab Manager, verify the version.

To verify the version of an existing .NET Framework installation

- 1 Choose **Start > Control Panel > Add or Remove Programs**.
- 2 Click the **Microsoft .NET Framework 2.0 Service Pack 1** program and click the link for support information.

If you do not see version 2.1.21022 or higher listed for the .NET Framework, install it.

Web Console Access Requirements

The following are requirements for machines where a client opens a browser to access the Lab Manager Web console:

- Microsoft Internet Explorer or Mozilla Firefox.
For specific information about which Web browsers are supported on which client operating systems, see the appendix section of the *Lab Manager User's Guide*.
- Make sure that the machines have routable access to the Lab Manager Server system and ESX hosts.
- Use a 1024 x 768 or higher resolution monitor.

Internet Explorer requires some specific options.

To set Internet Explorer options

- 1 In an Internet Explorer browser window, select **Tools > Internet Options**.
- 2 In the **Security** tab, click **Custom Level**.
- 3 Enable the following options and click **OK**:
 - **Download signed ActiveX controls**
 - **Run ActiveX controls and plug-ins**
 - **Allow META REFRESH**
 - **Active scripting**
 - **Allow paste operations via script**
- 4 Click the **Advanced** tab.
- 5 Enable the **Play animations in web pages** option and click **OK**.
- 6 If you are using Internet Explorer on a Windows 2003 computer, open the Control Panel and click **Add or Remove Programs**.
- 7 Click **Add/Remove Windows Components**.
- 8 Disable the **Internet Explorer Enhanced Security Configuration** option.

Datastore Requirements

Virtual machines and media files can reside on VMFS and NFS datastores. For more information about datastores and media stores, see the *Lab Manager User's Guide*.

VMware recommends shared storage (NFS, iSCSI, or Fiber Channel). VMware also recommends using a small number of large SAN VMFS partitions rather than a large number of small partitions.

The following are VMFS datastore requirements:

- The datastore must have enough space for the chain of delta disks generated from virtual machine operations. The chain cannot span multiple datastores.

For various changes, Lab Manager freezes the original delta disk and creates a new one. The chain length indicates how scattered the virtual machine image is across the directories of a datastore.

For information about chains and delta disks, see the *Lab Manager User's Guide*.

- A VMFS datastore must be configured in the ESX system.

You must set up VMFS partitions outside of Lab Manager through VirtualCenter. See the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

The following are NFS datastore requirements:

- The NFS server must be accessible in read-write mode by all ESX hosts.
- The NFS server must allow read-write access for the root system account.
- An NFS datastore must be configured in the ESX system.

To use a datastore for media, you must configure it as a media store in Lab Manager. You can use the same datastore for media and virtual machine storage, as long as you use different directories.

To enable a datastore for media and add it as a Lab Manager media store, see the *Lab Manager User's Guide*.

Network Requirements

The Lab Manager Server system includes many components that need to communicate with each other. The following sections describe routing, domain, and firewall requirements.

Configuring Routing

The following are network connectivity requirements:

- Lab Manager client machines accessing the Web console must have routable access to the Lab Manager Server system and ESX hosts. If these servers are behind a firewall and not directly accessible, you can use a virtual private network (VPN). See [“Configuring Firewall Settings”](#) on page 20.
- The connection from Lab Manager to VirtualCenter must be a direct HTTP connection without a proxy server.
- Do not use a Network Address Translation (NAT) device between the Lab Manager Server system and ESX hosts. The device breaks the communication between the Lab Manager Server system and the agent Lab Manager installs on each ESX host.
- The Lab Manager Server system is not required to reside on the same subnet as the ESX hosts.
- The Lab Manager Server system requires a static IP address.
- The Lab Manager Server system and ESX hosts need access to the media storage but are not required to reside on the same subnet.
- ESX hosts need access to NFS virtual machine storage.

Configuring Domains and Permissions

Because the Lab Manager Server system and ESX hosts must mount shares for virtual machine import and export operations, these systems require matching DNS and DNS suffix information.

Configuring Firewall Settings

Lab Manager communicates between its servers and clients through network ports. ESX software sets up default ports. See the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html.

For information about configuring communication between VirtualCenter components, see the VMware Infrastructure 3 *Quick Start Guide*.

To ensure successful communication, make sure the ports listed in [Table 2-2](#) are not blocked by a firewall.

Table 2-2. Lab Manager Network Port Requirements

Systems	Network Ports
Client browser to access Lab Manager Server system	TCP port 443
Client browser to access ESX hosts	TCP ports 902 and 903
Lab Manager Server system and ESX hosts to access SMB share (import and export operations only)	TCP ports 139 and 445, UDP ports 137 and 138
ESX hosts to access NFS media datastores or NFS virtual machine datastores	TCP port 2049
Lab Manager Server system to access Lab Manager agent on ESX hosts	TCP port 5212
Lab Manager Server system to access ESX host agent on ESX hosts	TCP port 443
Lab Manager Server system to access the VirtualCenter Server system	TCP port 443
Lab Manager Server system to communicate with virtual router on some ESX hosts (for fenced configurations)	TCP port 514
Lab Manager Server system to access LDAP Server	TCP port 389 for LDAP, TCP port 636 for LDAPS

During the installation process, ensure that port conflicts do not exist. To determine ports in use, run the `netstat -b` command from the command line.

Gathering Network Information for Installation

Before you begin the installation, gather the following information about your network if you plan on using static IP addressing:

- Block of unused IP addresses
- IP address for the primary and (optional) secondary DNS server
- Subnet mask
- IP address for the network gateway
- Lab Manager Server DNS suffix

IP Addresses for Virtual Machines

Reserve a range of IP addresses for virtual machines on each physical network that Lab Manager will use. This range is in addition to the IP addresses required for each Lab Manager Server system and ESX host. IP addresses for virtual machines are allocated from the pool of IP addresses you reserve. The number of virtual machines running and requiring IP addresses varies with the number and complexity of configurations deployed at any one time.

For a minimum environment, you need at least 100 IP addresses. You can always add more addresses later. For a large installation, VMware recommends allocating at least 200 IP addresses.

[Table 2-3](#) provides examples of the network information you need for a single physical network using a static IP pool.

Table 2-3. Static IP Pool Information

IP and Network Component	Example
IP address block for virtual machines	10.6.1.10 — 10.6.1.199
Subnet mask for virtual machines	255.255.255.0
Gateway for virtual machines	10.6.1.1
DNS server 1	10.6.1.200
DNS server 2 (optional)	10.6.1.201
DNS suffix	vmware.com

Security Recommendations and Requirements

Review the recommendation for installing SSL certificates and requirement for certain policies in a high-security environment.

VMware recommends using an SSL certificate on the Lab Manager Server system.

Installing or Customizing the SSL Certificate

VMware recommends installing an SSL certificate from a trusted certification authority that validates the server identity. Generate the SSL certificate with the domain name or IP address for accessing the Lab Manager Server.

If you do not install the SSL certificate, VMware generates one, but SSL security warnings appear in the browser.

You can use OpenSSL to generate a custom SSL certificate with a different name than the one VMware generates. VMware recommends generating the custom certificate on the Lab Manager Server system.

To use OpenSSL to generate a custom SSL certificate

- 1 Download and install OpenSSL on the Lab Manager Server system.
- 2 Create a file named `OpenSSLVMware.cfg` in a working directory.

The following is a what a sample file might look like:

```
# Conf file that vpx uses to generate SSL certificates.
[ req ]
default_bits           = 1024
default_keyfile        = rui.key
distinguished_name     = req_distinguished_name

#Don't encrypt the key
encrypt_key            = no
prompt                 = no

string_mask = nombstr

[ req_distinguished_name ]
countryName            = US
stateOrProvinceName   = CA
localityName           = CA
o.organizationName     = VMware, Inc.
ou.organizationalUnitName = VMware, Inc.
commonName             = machine1
emailAddress           = support@vmware.com
```

- 3 Store the `openssl.exe`, `libeay32.dll`, and `ssleay32.dll` files in the working directory.
- 4 From the working directory, change the `commonName` entry in the `OpenSSLVMware.cfg` files to the machine host name.

- 5 From the command prompt in the working directory, type the following:

```
openssl req -new -x509 -keyout "OpenSSLVMware.key" -out
           "OpenSSLVMware.crt" -days 730 -config "<working
           directory>\OpenSSLVMware.cfg"
openssl pkcs12 -export -out "OpenSSLVMware.pfx" -in "OpenSSLVMware.crt"
           -inkey "OpenSSLVMware.key" -name OpenSSLVMware -passout
           pass:<password>
```

This process generates a `.pfx` file.

- 6 Remove any outdated certificate from IIS and import the new `.pfx` file into IIS. Microsoft IIS documentation offers instructions on removing and importing certificates.

Windows Security Policy Requirements

The default security policy settings for the Lab Manager Server operating system support Lab Manager operations. If you manipulated security policies to support a high-security environment, you must modify the policy settings to support Lab Manager.

To modify security policy settings to support Lab Manager

- 1 On the desktop of the target Lab Manager Server system, choose **Start > All Programs > Administrative Tools > Local Security Policy**.
- 2 In the left pane, navigate to **Security Options** under **Local Policies**.
- 3 In the right pane, double-click **Microsoft network server: Digitally sign communications (always)**.
- 4 Select **Disabled** and click **OK**.
- 5 In the right pane, double-click **Microsoft network server: Digitally sign communications (if client agrees)**.
- 6 Select **Disabled** and click **OK**.

- 7 In the right pane, double-click **Network Security: LAN Manager authentication level**.
- 8 Select **Send NTLM response only**.
- 9 Click **OK**.

Installing Lab Manager

Installing Lab Manager involves installing the Lab Manager Server software, performing initialization tasks, and logging in to the Lab Manager Web console. This chapter includes these topics:

- [“Installing the Lab Manager Server Software”](#) on page 25
- [“Initializing and Configuring Lab Manager”](#) on page 26
- [“Backing Up the Password Encryption Key”](#) on page 32
- [“Uninstalling Lab Manager”](#) on page 32

Installing the Lab Manager Server Software

Default and custom options are available for the Lab Manager Server installation.

The software installs an instance of Microsoft SQL Server 2005 Express Edition for use with Lab Manager.

To install the Lab Manager Server software

- 1 On the target Lab Manager Server system, run the `VMware-labmanager-server-3.0.0.<build number>.exe` file.

The installer checks to make sure your system meets the installation prerequisites. If your system does not meet any of the prerequisites, click the link in the **Message #** column for more information about how to resolve the issue.

- 2 Review the Welcome screen.
- 3 Accept the license agreement.

- 4 Click **Change** to change the program files directory for Lab Manager.
- 5 Accept the default VMwareLMWeb and VMwareLMUser passwords, or enter your own passwords.

Lab Manager creates these accounts as part of the installation and generates a random password for them. If your network has a restrictive password policy, enter passwords that meet your policy's requirements.
- 6 Select the IP address for Lab Manager traffic.

If you have more than one active NIC with a static IP address, you can choose which one to use.
- 7 If the software cannot detect a fully qualified domain name (FQDN), enter one when prompted.

For information on FQDN, see ["Network"](#) on page 15.
- 8 Select the Web site for Lab Manager, or choose **Default Web Site**.
- 9 Enter the SSL port number for the Web site.

The default is 443.
- 10 Click **Install**.
- 11 Click **Finish**.

Initializing and Configuring Lab Manager

You can perform this task from the Lab Manager Web console on any computer with access to the Lab Manager Server system. The first time you access the Web console, a security certificate warning might appear. To avoid this warning, use an FQDN or install an SSL certificate. See ["Installing or Customizing the SSL Certificate"](#) on page 22.

To initialize and configure Lab Manager

- 1 From any machine with network access to the Lab Manager Server system, open a browser and navigate to `http://<Lab_Manager_Server_domain_name_or_IP_address>`.

The Web Initialization wizard starts.
- 2 Select your location.
- 3 Enter the capacity license key.
- 4 Review the overview information.

- 5 Enter the following VirtualCenter information and click **Next**:
 - VirtualCenter Server IP address or host name
 - Port number
The default is 443.
 - User name and password
See [“Credential Requirements for Connecting to the VirtualCenter Server from Lab Manager”](#) on page 29.
 - System name for this Lab Manager installation
If you have multiple installations of Lab Manager, make sure each installation has a unique system name.

You cannot change this name at a later time. See [“Choosing a Lab Manager System Name”](#) on page 30.
 - An installation ID
- 6 Enter the resource pool information:
 - a Select a dedicated resource pool for Lab Manager.
This can be a host or cluster. See [“Resource Pools”](#) on page 32.
 - b (Optional) Change the display name for the resource pool in the Lab Manager environment.
- 7 Prepare the ESX hosts that provide compute power to the selected resource pool:
 - a Select or deselect the check box that specifies whether to use the same user name and password for all hosts.
 - b If you use the same user name and password for all hosts, enter the user name and password.
 - c Select the check boxes for hosts to prepare and enter individual user names and passwords if necessary.
- 8 Select the check boxes for datastores to enable.
- 9 Set up a default physical network:
 - a Enter a name for the network.
 - b (Optional) Type a description.
 - c (Optional) Type a VLAN identifier.

- d Choose the IP addressing modes for the network.
 - **Static - IP Pool** allows Lab Manager to pull static IP addresses from the IP address pool.
 - **DHCP** allows Lab Manager to pull IP addresses from a DHCP server.
 - **Static - Manual** allows you to specify an IP address.See [“Static IP and DHCP Networking”](#) on page 31.
 - e If you chose a static IP addressing mode, provide the following information:
 - Subnet mask, default gateway, primary DNS, secondary DNS (optional), and DNS suffix (optional).
 - IP addresses for the IP pool.

Type an IP address or IP address range and click **Add**.
 - Default network fencing policy for the network.

For details on Lab Manager fencing, see the *Lab Manager User’s Guide*.
 - f Choose the virtual switch to which you want to bind each host.
- 10 Create the first Lab Manager administrator account with a user name, password, and email address.
 - 11 Choose whether to enable SupportLink, a feature that sends usage data to VMware and improves product support.

If you enable SupportLink, enter a company name and administrator email address.

If you are outside of the U.S. and you enable SupportLink, you must consent to the possible transfer of data outside of the country where the installation takes place.
 - 12 Review optional configuration tasks you might want to perform after logging in to the Web console the first time and click **Finish**.

See the *Lab Manager User’s Guide*.
 - 13 When the Web console login page appears, type the user name and password of the Lab Manager administrator account and click **Login**.

Credential Requirements for Connecting to the VirtualCenter Server from Lab Manager

To set up a connection with the VirtualCenter Server, Lab Manager requires a user who is part of a role in VirtualCenter with at least the privileges listed in [Table 3-1](#). As with other roles in VirtualCenter, you can assign Windows users or VirtualCenter users to this role.

If the connection to the VirtualCenter Server is set up with VirtualCenter administrator credentials, the user already has the proper credentials to make this connection.

Lab Manager requires the user to have certain permissions on objects. Any change in the role of this user to another VirtualCenter role with fewer privileges hinders Lab Manager operations. For example, assigning the user to the **No Access** role in VirtualCenter for an object, such as a resource pool, blocks the visibility of this object in a Lab Manager environment. For information about roles and setting object permissions, see VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html.

The privileges in [Table 3-1](#) appear in the **Edit Role** dialog box of the VI Client:

Table 3-1. Required Privileges for Connecting to the VirtualCenter Server

VI Client Privilege Category	Required Privileges
Global	<ul style="list-style-type: none"> ■ Enable Methods ■ Disable Methods
Folder	<ul style="list-style-type: none"> ■ Create Folder ■ Delete Folder ■ Rename Folder ■ Move Folder
Datastore	<ul style="list-style-type: none"> ■ Browse Datastore ■ File Management
Network	<ul style="list-style-type: none"> ■ Remove
Host	<ul style="list-style-type: none"> ■ Inventory <ul style="list-style-type: none"> ■ Modify Cluster ■ Configuration <ul style="list-style-type: none"> ■ System Management ■ Network Configuration ■ Local Operations <ul style="list-style-type: none"> ■ Add host to VirtualCenter

Table 3-1. Required Privileges for Connecting to the VirtualCenter Server (Continued)

VI Client Privilege Category	Required Privileges
Virtual Machine	<ul style="list-style-type: none"> ■ Inventory <ul style="list-style-type: none"> ■ Create ■ Move ■ Remove ■ Interaction <p>Select all options. For example, select Power On, Power Off, and all other options.</p> ■ Configuration <p>Select all options. For example, select Rename, Add Existing Disk, and all other options.</p> ■ Provisioning <ul style="list-style-type: none"> ■ Clone ■ Deploy Template ■ Clone Template ■ Read Customization Specifications ■ Modify Customization Specification ■ Allow Disk Access ■ Allow Read-only Disk Access ■ Allow Virtual Machine Download ■ Allow Virtual Machine Files Upload
Resource	<ul style="list-style-type: none"> ■ Assign Virtual Machine To Resource Pool ■ Apply Recommendation ■ Migrate ■ Relocate ■ Query VMotion

Choosing a Lab Manager System Name

If you have multiple installations of Lab Manager, make sure each installation has a unique system name. This name is used for the following:

- Creating virtual switches and port groups
- Creating the directory to store all virtual machines on each datastore
- Identifying ESX hosts under Lab Manager control
- Creating a folder in the **Virtual Machines & Templates** view of VirtualCenter

Static IP and DHCP Networking

You can use static IP or DHCP networking in Lab Manager for each virtual machine NIC.

To avoid setting up an IP range, use DHCP to obtain IP addresses from a DHCP server. DHCP does not work with network fencing, a feature which allows multiple users to work with live instances of the same virtual machine configuration on the same network. For details on fencing, see the appendix section of the *Lab Manager User's Guide*.

To use a static IP address, you can enter an IP address manually or use the static IP pool. The pool requires you to specify an IP range, DNS suffix, gateway, netmask, and DNS information. There is no limit on the total number of IP addresses you can add. The static IP pool works with network fencing.

Every virtual machine using the **Static - IP Pool** addressing mode for a NIC connected to a physical network requires an IP address from the physical network's IP pool. This IP address stays with the virtual machine through the various operations in Lab Manager. When you delete all instances of the virtual machine with this IP address, Lab Manager releases the IP address to the IP pool.

If you deploy a configuration in fenced mode, Lab Manager allocates additional IP addresses from the physical network's IP pool, unless you use the **Block Traffic In and Out** option, and assigns them as external IP addresses for each virtual machine in the configuration. You can use the external IP address to access a virtual machine from outside the fenced configuration (for example, from your desktop).

When you undeploy this configuration, Lab Manager releases the external IP addresses. You can control the length of time Lab Manager reserves released external IP addresses before returning them to the IP pool. See "[Lab Manager Preferences](#)" in the *Lab Manager User's Guide*.

For fenced configurations (except those using the **Block Traffic In and Out** option) Lab Manager creates a virtual router that requires two IP addresses. The addresses for a virtual router return to the IP pool when you undeploy the configuration.

Resource Pools

A resource pool is a logical structure that allows delegation of control over the resources of a host. Resource pools compartmentalize all resources in a cluster. You can create multiple resource pools as direct children of a host or cluster and configure them. You can then delegate control over them to other individuals or organizations. The managed resources are CPU and memory from a host or cluster. Virtual machines execute in, and draw their resources from, resource pools.

See VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html and the administration chapter of the *Lab Manager User's Guide*.

Backing Up the Password Encryption Key

Lab Manager creates the `system-infos.bin` file during the installation for password encryption. This file is a key that affects passwords for the VirtualCenter Server, ESX hosts, and SMTP server. To ensure you do not lose passwords, back up this file located in the directory where you installed the Lab Manager Server software.

Uninstalling Lab Manager

Uninstalling Lab Manager involves detaching resource pools, unpreparing the ESX hosts, and removing the Lab Manager Server software.

Some entries for the instance of SQL Server 2005 Express Edition installed with the Lab Manager Server software remain when you uninstall the software. You can remove these entries if necessary.

To uninstall Lab Manager

- 1 Log in to the Lab Manager Web console.
- 2 In the left pane, click **Resources**.
- 3 On the **Hosts** tab, move the pointer over the host name and choose **Unprepare** from the menu.

Repeat this process for each host.

- 4 On the **Resource Pools** tab, move the pointer over the resource pool name and choose **Disable** from the menu.

Repeat this process for each resource pool.

- 5 On the **Resource Pools** tab, move the pointer over the resource pool name and choose **Detach** from the menu.

Repeat this process for each resource pool.

- 6 Log out of the Lab Manager Web console.
- 7 On the Lab Manager server, choose **Start > Control Panel > Add or Remove Programs**.
- 8 Select the **VMware Lab Manager** program and click **Change/Remove**.
- 9 Choose **Remove**.
- 10 Select the **Remove the database** check box to uninstall Lab Manager and remove its database.
If you plan to upgrade or reinstall Lab Manager, do not remove the database.
- 11 Click **Remove**.
- 12 Click **Finish**.

To remove the SQL Server 2005 Express Edition entries installed with the Lab Manager Server software

- 1 On the Lab Manager server, choose **Start > Control Panel > Add or Remove Programs**.
- 2 Click **Remove** for these entries:
 - **Microsoft SQL Server 2005** (including the VSM instance if prompted)
 - **Microsoft SQL Server Native Client**
 - **Microsoft SQL Server Setup Support Files (English)**
 - **Microsoft SQL Server VSS Writer**

When you remove the SQL Server components, error messages, such as **Registry enumeration failed**, might appear. These messages do not affect the removal process.

4

Upgrading Lab Manager

You can upgrade Lab Manager from version 2.5.x only. This chapter includes the following topics:

- [“Supported Upgrades”](#) on page 35
- [“Before Upgrading”](#) on page 36
- [“Upgrading and Configuring Lab Manager”](#) on page 41
- [“Understanding the Upgrade”](#) on page 44

Supported Upgrades

You can upgrade from Lab Manager 2.5.x to Lab Manager 3.0. If you are using Lab Manager 2.4, you must first upgrade to Lab Manager 2.5.x before you can upgrade to Lab Manager 3.0.

[Table 4-1](#) lists the versions of Lab Manager that you can upgrade.

Table 4-1. Versions of Lab Manager That You Can Upgrade to Lab Manager 3.0.

Version	Build Number
2.5	2.5.0.397
	2.5.0.405
2.5.1	2.5.1.547
2.5.2	2.5.2.124
	2.5.2.131
2.5.3	2.5.3.666

To determine your current version of Lab Manager, open the Lab Manager Web console and click **About** in the left pane.

Before Upgrading

Because Lab Manager 3.0 has different requirements than Lab Manager 2.5.x, you must complete certain tasks to meet these requirements before you can install Lab Manager 3.0. For more information about Lab Manager 3.0 requirements, see [Chapter 2, “Preparing to Install Lab Manager,”](#) on page 11.

The upgrade process requires downtime for your virtual machines, so read through the entire process and plan tasks before you begin.

The tasks are:

- [“Installing a VirtualCenter Server”](#) on page 36
- [“Undeploying Virtual Machines and Removing Managed Servers”](#) on page 37
- [“Backing Up the Lab Manager Database”](#) on page 37
- [“Uninstalling the Managed Server Agent Software”](#) on page 38
- [“Uninstalling the Program Files for Lab Manager Server”](#) on page 38
- [“Installing the Lab Manager Server Software”](#) on page 39
- [“Upgrading ESX Server”](#) on page 40
- [“Configuring a VirtualCenter Server”](#) on page 41

Installing a VirtualCenter Server

Install VirtualCenter 2.5 Update 1 as described in the VMware Infrastructure 3 documentation.

See the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

Do not add any ESX hosts to the VirtualCenter Server at this point. You can add them later. See [“Configuring a VirtualCenter Server”](#) on page 41.

If you are already using VirtualCenter Server to manage, Lab Manager ESX hosts (managed servers), remove the hosts before proceeding.

Undeploying Virtual Machines and Removing Managed Servers

Before you can upgrade to Lab Manager 3.0, you must undeploy all the virtual machines running under Lab Manager 2.5.x.

To ensure that Lab Manager saves the memory state of your virtual machines before you undeploy them, choose **Preferences** from the Lab Manager Web console. Click the **Defaults** tab and choose **Save Memory State**.

To undeploy all virtual machines from all managed servers

- 1 From the Lab Manager web console, choose **Manage > Servers**.
- 2 Move the pointer over a managed server name and choose **Disallow Deployments**.
- 3 Move the pointer over the same managed server name and choose **Undeploy all VMs**.
- 4 Repeat these steps for each managed server.

If you are unable, to undeploy certain virtual machines, Lab Manager displays an error. Use the **Force Undeploy** command to undeploy the virtual machines and use the VI Client to power off and remove each virtual machine from its ESX host.

After undeploying all virtual machines, remove the managed servers from the Lab Manager Server system.

To remove all managed servers from the Lab Manager Server system

- 1 From the Lab Manager web console, choose **Manage > Servers**.
- 2 Move the pointer over a managed server name and choose **Remove**.
- 3 Repeat these steps for each managed server.

Backing Up the Lab Manager Database

VMware recommends backing up the Lab Manager 2.5.x database as a precaution. The backup is only necessary to revert to Lab Manager 2.5.x before the upgrade is complete. The upgrade process automatically transfers the database contents to the new installation.

You can only restore the database backup in a Lab Manager 2.5.x environment.

To back up the database

From the command prompt on the Lab Manager 2.5.x Server system, use this sample command or your own backup method:

```
OSQL -S localhost\vlm -E -Q "backup database labmanager TO  
DISK='c:\lm_backup.bak'"
```

This sample command creates the `lm_backup.bak` file on the `C:\`.

Uninstalling the Managed Server Agent Software

You must uninstall the Lab Manager 2.5.x agent software from every managed server that Lab Manager controls.

To uninstall the managed server agent software

- 1 Log in as root to the ESX console.
- 2 At the prompt, type:
uninstall-agent.sh
- 3 Repeat these steps for each managed server.

Uninstalling the Program Files for Lab Manager Server

Before you can upgrade to Lab Manager 3.0, you must uninstall the program files for the Lab Manager 2.5.x Server.

To uninstall Lab Manager Server 2.5.x

- 1 Log out of the Lab Manager Web console.
- 2 On the Lab Manager server, choose **Start > Control Panel > Add or Remove Programs**.
- 3 Select the **VMware Lab Manager** program and click **Change/Remove**.
- 4 Select **Remove Program Files only**.

This selection preserves the Lab Manager 2.5.x database for use with Lab Manager 3.0.

- 5 Click **Finish**.

Installing the Lab Manager Server Software

Default and custom options are available for the Lab Manager Server installation.

The software installs an instance of Microsoft SQL Server 2005 Express Edition for use with Lab Manager.

To install the Lab Manager Server software

- 1 On the target Lab Manager Server system, run the `VMware-labmanager-server-3.0.0.<build number>.exe` file.

The installer checks to make sure your system meets the installation prerequisites. If your system does not meet any of the prerequisites, click the link in the **Message #** column for more information about how to resolve the issue.

- 2 Review the Welcome screen.
- 3 Accept the license agreement.
- 4 Click **Change** to change the program files directory for Lab Manager.
- 5 Accept the default VMwareLMWeb and VMwareLMUser passwords, or enter your own passwords.

Lab Manager creates these accounts as part of the installation and generates a random password for them. If your network has a restrictive password policy, enter passwords that meet your policy's requirements.

- 6 Select the IP address for Lab Manager traffic.
If you have more than one active NIC with a static IP address, you can choose which one to use.
- 7 If the software cannot detect a fully qualified domain name (FQDN), enter one when prompted.

For information on FQDN, see [“Network”](#) on page 15.

- 8 Select the Web site for Lab Manager, or choose **Default Web Site**.
- 9 Enter the SSL port number for the Web site.

The default is 443.

- 10 Select the **Migrate the existing database to the latest version** check box.
This selection migrates the Lab Manager 2.5.x database for use with Lab Manager 3.0.
- 11 Click **Install**.
- 12 Click **Finish**.

Upgrading ESX Server

Lab Manager 3.0 supports ESX 3.5 Update 1 hosts only. Upgrade all ESX 3.0.x hosts to ESX 3.5 Update 1. Upgrade all ESX 3.5 hosts to ESX 3.5 Update 1. If your hosts are already running ESX 3.5 Update 1, you can skip this section.

Upgrading ESX Server 3.0.x to ESX Server 3.5 Update 1

To upgrade Lab Manager Managed Servers, use the procedures included in the ESX Server 3.5 and VirtualCenter 2.5 *Upgrade Guide* available at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html.

Some of the information included in that document is not relevant to Lab Manager. Use the following information, in conjunction with the *Upgrade Guide*, to upgrade ESX Servers in a Lab Manager environment.

- The backup and restore strategies described in the VMware Infrastructure 3 *Upgrade Guide* cannot be used in the Lab Manager environment (with the exception of the VirtualCenter Backup section). Use the recommended [Lab Manager backup strategies](#) instead.
- Upgrading from ESX Server 3.0.x to ESX Server 3.5 is considered a minor upgrade.
- Lab Manager datastores and virtual machines already use VMFS3 and do not need to be upgraded.
- Only in-place upgrades are supported with Lab Manager. Migration upgrades are not supported.
- Of the four stages described in the VMware Infrastructure 3 *Upgrade Guide*, you only need to complete stages 1 (if you are already using VirtualCenter) and 2A. Stages 2B and 3 do not apply in a Lab Manager environment. Do not perform stage 4 at this time. You can upgrade VMware Tools within virtual machines from the Lab Manager Web console.
- To upgrade ESX Server, you can use the graphical installer, the text-based installer, or `esxupdate`.

- Upgrading ESX Server software directly from ESX Server 3.0.x to ESX Server 3.5 Update 1 using a .zip file upgrade is not supported. Limitations in the `esxupdate` utility prevent such upgrades.

You can upgrade ESX Server software versions in the 3.0.x series using sequential .zip upgrades. First upgrade the software from version 3.0.x to 3.5, then upgrade the version 3.5 installation to Update 1. See the knowledge base article [ESX Server 3.5.0 Might Require Manual RPM Installation After Upgrading from ESX Server 3.0.1 or 3.0.2](#) before using this method to upgrade existing software installations.

Upgrades using ISO-based installation methods, such as installing from a CD, are not affected by this limitation and occur normally.

Configuring a VirtualCenter Server

In VirtualCenter, create a datacenter for Lab Manager use and add your ESX 3.5 Update 1 hosts to it. Lab Manager only supports a single datacenter.

See the VMware Infrastructure 3 documentation at http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

Upgrading and Configuring Lab Manager

You can perform this task on the Lab Manager Server system or any system with access to the Lab Manager Server system.

The first time you access the console, a security certificate warning might appear. To avoid this warning, use an FQDN or install an SSL certificate. See [“Installing or Customizing the SSL Certificate”](#) on page 22.

To upgrade and configure Lab Manager

- 1 From any machine with network access to the Lab Manager Server system, open a browser and navigate to `http://<Lab Manager Server IP address or name>`
The Web Upgrade wizard starts.
- 2 Review the introductory information and select **I understand the above requirements**.
- 3 Enter the capacity license key.

4 Enter the following VirtualCenter information:

- VirtualCenter IP address or host name.
- (Optional) Port number.
- User name and password.

See [“Credential Requirements for Connecting to the VirtualCenter Server from Lab Manager”](#) on page 29.

Lab Manager 3.0 uses the same installation ID as Lab Manager 2.5.x and uses “VM” as the system name. For information about how the system name is used, see [“Choosing a Lab Manager System Name”](#) on page 30.

5 Review the information about VMFS datastores.

Lab Manager attempts to remount your Lab Manager 2.5.x VMFS datastores. If it cannot mount a datastore, this page displays an error. Use the VI Client to add the datastore to VirtualCenter and click **Retry**.

6 Enter the resource pool information:

- a Select a dedicated resource pool for Lab Manager.

This can be a host or cluster. See [“Resource Pools”](#) on page 32.

- b (Optional) Change the display name for the resource pool in the Lab Manager environment.

7 Prepare the ESX hosts that provide computing power to the selected resource pool:

- a Select or deselect the check box that specifies whether to use the same user name and password for all hosts.
- b If you use the same user name and password for all hosts, enter the user name and password.
- c Select the check boxes for hosts to prepare and enter individual user names and passwords if necessary.

8 Select the check boxes for additional datastores you want to enable.

The wizard preselects the datastores Lab Manager 2.5.x uses. You can choose to enable additional datastores for Lab Manager 3.0.

9 Review the information about NFS datastores.

Lab Manager attempts to remount your Lab Manager 2.5.x NFS datastores. If it cannot mount a datastore, this page displays the datastore and information about how to view the logs.

Use the information in the logs to troubleshoot the problem. You may have to use the VI Client to remove a duplicate datastore from VirtualCenter, or you may have to verify that the NFS server is properly configured and accessible. After you resolve the problem, click **Retry**.

10 Set up a default physical network:

- a Type a name for the network.

The name can contain only alphanumeric characters (a–z, A–Z, 0–9), hyphens, underscores, or periods.

- b Choose the virtual switch to which you want to bind each host.

Lab Manager 3.0 uses the Lab Manager 2.5.x values for all other network settings (for example, subnet mask, default gateway, primary DNS, and IP addressing modes).

11 Configure the LDAP connection:

- **Server** – Host name or IP address of the LDAP server.
- **Port** – If the LDAP server is listening on a nondefault port, enter the port number here.

The default port is **389**.

- **Base Distinguished Name** – The base distinguished name, or base DN, identifies the location in the LDAP directory where Lab Manager connects.

VMware recommends connecting at the root, in which case you enter the domain components only, for example: **DC=vmware,DC=com**.

- **User Name/Password/Confirm Password** – Enter a user name to connect to the LDAP server and enter and confirm the password.

See the *Lab Manager User's Guide*.

- 12 Click **Test LDAP Upgrade**.
 - If Lab Manager cannot connect to the LDAP server, modify the connection settings and try again.
 - If Lab Manager can connect to the LDAP server, but cannot find a match for all the LDAP users from Lab Manager 2.5.x, a list of the missing users displays. If these users still exist, you can add them later. See the *Lab Manager User's Guide*.
- 13 Click **Finish**.
- 14 When the Web console login page appears, type the user name and password of the Lab Manager administrator account.

Understanding the Upgrade

After the upgrade, Lab Manager 2.5.x users will have access to the same configurations, virtual machine templates, media, and virtual machines. Lab Manager administrators, however, should be aware of how Lab Manager 2.5.x information is mapped to Lab Manager 3.0.

Organizations

In Lab Manager 3.0, users belong to organizations. Resources (resource pools, hosts, datastores, media stores, and physical networks) are dedicated to an organization or shared between organizations. By assigning users to organizations, you can control which resources they can access.

In an upgrade scenario, Lab Manager 3.0 creates a Default organization and assigns all users and resources to this organization. If you want to take advantage of the benefits of this feature, you can edit the Default organization or create new organizations. For more information about organizations, see the *Lab Manager User's Guide*.

Users and Groups

The upgrade process adds all Lab Manager 2.5.x users (LDAP and non-LDAP) to the Default organization.

If you specified **LDAP Allowed Groups** in Lab Manager 2.5.x, the upgrade also adds those groups to the Default organization.

Roles and Rights

Lab Manager 2.5.x had only two roles: administrators and users (nonadministrators). Lab Manager 3.0 includes more built-in roles and allows you to assign rights to these roles (or create custom roles) on a detailed level. The upgrade process maps Lab Manager 2.5.x roles to Lab Manager 3.0 roles.

Table 4-2. Mapping Users from Lab Manager 2.5.x to Lab Manager 3.0

Lab Manager 2.5.x Role	Hide Template Management from User Setting	Hide High I/O Operations from User Setting	Lab Manager 3.0 Role
Administrator	NA	NA	Administrator
User	not selected	not selected	Template Creator
User	selected	not selected	Application Owner
User	not selected	selected	Template Creator (customized to remove high I/O rights)
User	selected	selected	Application Owner (customized to remove high I/O rights)

For more information about roles and rights in Lab Manager 3.0, see the *Lab Manager User's Guide*. Because the administrator role in Lab Manager 3.0 is powerful, VMware recommends assigning a new role to some users who were administrators in Lab Manager 2.5.x.

Sharing

Lab Manager 2.5.x objects (virtual machine templates, configurations, and media files) were either shared with all users in the installation, or private. Lab Manager 3.0 allows much greater control over sharing.

Objects that were private in Lab Manager 2.5.x remain private in Lab Manager 3.0. Objects that were shared in Lab Manager 2.5.x are shared with all users in the Lab Manager 3.0 Default organization, with Full Control access rights.

Media Storage

Lab Manager 3.0 does not support SMB media storage. If you stored media images (CD/DVD and floppy images) on an SMB server for use with Lab Manager 2.5.x, you cannot access those images from Lab Manager 3.0. You must set up a media store on an NFS or VMFS media store. See the *Lab Manager User's Guide*.

Networking

In Lab Manager 3.0, physical networks are resources that can be assigned to an organization. The network information you provide in the upgrade wizard, combined with the network settings information from Lab Manager 2.5.x, is used to create the physical network assigned to the Default organization.

Lab Manager 3.0 supports multiple physical networks. For information about creating additional physical networks and assigning those networks to organizations and virtual machines, see the *Lab Manager User's Guide*.

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