BEA WebLogic Server Virtual Edition

Installation and Configuration Guide

Version 9.2 v1.0
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CHAPTER 1

Installing and Configuring WLS-VE: Main Steps

The following steps summarize the overall process for installing BEA WebLogic Server Virtual Edition™ (see Figure 1-1). Subsequent sections of this document provide details about how to carry out these main steps:

1. Prepare for installation:

   - Ensure that your environment meets the WebLogic Server Virtual Edition (WLS-VE) requirements. See "Verifying That Your Environment Supports WLS-VE" on page 2-2.
   - Design your WLS-VE solution. Consider whether your applications are appropriate for a virtualized solution and determine your file storage solution and capacity requirements. See "Determining Appropriate Applications for WLS-VE" on page 2-3, "Designing a File Storage Solution" on page 2-3, and "Planning System Capacity" on page 2-5 in Chapter 2, "Preparing for the Installation."
   - Download the WLS-VE installation program.

     You can download an installer that runs on a Windows platform or one that runs on a Linux platform. Regardless of which installer you download, WLS-VE appliances always run directly on a hypervisor platform.

     See "Downloading WLS-VE" on page 2-6.

2. Prepare NFS shares and SMB shares for installation.

   WLS-VE requires the BEA license files and patches to reside on an NFS file server below a directory that is exported as an NFS share. BEA recommends that WLS-VE configuration and startup utilities also reside on an NFS share. You can also use the NFS share to temporarily store a copy of the WLS-VE ISO image, which is the boot image for WLS-VE. The `BEA_HOME_MOUNT` parameter in the `<domain_dir>/bin/startWLSVE.[sh/cmd]` file defines the NFS share that is used to store the BEA license file and patches.

   If you install WLS-VE from a Windows machine, use SMB to access the directory on the NFS server.

   See "Understanding WLS-VE Directories" on page 2-8 and "NFS Security Measures" on page 5-2.

3. On the system on which you want to run the WLS-VE installer, map or mount the shared directory.

   On Windows, configure the drive-letter mapping to reconnect at logon. The shortcuts that the WLS-VE installer creates will function only if the utilities are available from the same drive letter.

   On Linux, if your UNIX environment supports auto-mounting you might not need to mount the shared directory from your Linux host.

4. Run the WLS-VE installer.

   See "Using the Installation Program" on page 3-1.

5. Give the hypervisor software access to the WLS-VE ISO image.

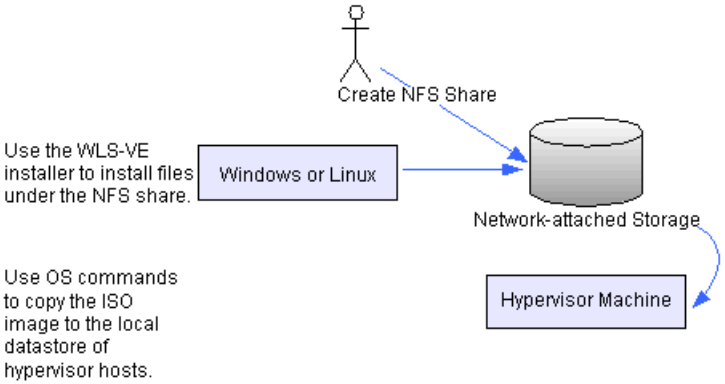
   See Chapter 4, "Copying the ISO Image."

6. Run the LiquidVM Configuration Wizard to provide the startup utility with the information it needs to connect to VMware Virtual Center and an ESX Server host. See Chapter 6, "Configuring LiquidVM Connection Parameters."

7. Run the Domain Configuration Wizard to create a WebLogic Server domain and the server instances in the domain. See Chapter 7, "Configuring and Starting WLS-VE Domains."

8. Edit the start scripts for the WebLogic Server instances in your domain, using `<domain_dir>/bin/startWLSVE.[sh/cmd]` as a template. See "Creating WLS-VE Domains" on page 7-3.

Figure 1-1 Example Installation



CHAPTER 2

Preparing for the Installation

The following sections describe actions to take before you run the installation program:

Understanding Machine Roles

Installing and using WLS-VE involves multiple machines. It is important to understand the roles and requirements of each.

- Launcher machine. You use this machine to run the WLS-VE installation program and initiate the creation of virtual machines on the ESX machine.
- NFS server. A machine using NFS to provide disk access. The launcher machine can also serve this role if it hosts the desired disk.
- ESX machine. A machine with VMware installed and with CPUs available for creation of virtual machines.

- VirtualCenter machine. You run VMware VirtualCenter on this machine, using it to monitor and control VMware. The VirtualCenter machine can be the same as the ESX machine.

For information about the system requirements for these machines, see "Verifying That Your Environment Supports WLS-VE" on page 2-2.

Verifying That Your Environment Supports WLS-VE

Before planning any WLS-VE implementation, you need to verify that the product will run on your company's computer system.

The installer, configuration wizard, and launcher can run on these platforms:

- Linux ia32, Linux x64, Windows ia32, Windows x64, or Linux or Windows guest OS on ESX Server 3.0.

Note: LiquidVM itself is a 32-bit VM (meaning that it cannot have a Java heap larger than 4GB)

- LiquidVM runs on ESX Server 3.0.0 or higher.

WebLogic Server 9.2 supports the following configurations:

- Supported Web Servers, Browsers, and Firewalls
- Supported Database Configurations
- Supported Interoperability Tools

Note: This release of WLS-VE does not support BSD NFS servers, such as FreeBSD, OpenBSD, NetBSD or derivatives.

Planning Your Virtualized Installation

This section describes some aspects you should consider in planning your WLS-VE installation:

- "Determining Appropriate Applications for WLS-VE" on page 2-3
- "Designing a File Storage Solution" on page 2-3
- "Planning System Capacity" on page 2-5

Determining Appropriate Applications for WLS-VE

For most applications, deploying and serving from WLS-VE is indistinguishable from WebLogic Server: WLS-VE is no more CPU-intensive, memory-intensive, or network-intensive than WebLogic Server. On the other hand, certain applications will not run as well in a virtualized environment as in a non-virtualized one. Consider the following factors in deciding whether using WLS-VE is appropriate for your applications:

- A key feature of WLS-VE is that it frees applications from the need for an operating system. Consequently, this first release of WLS-VE is solely focused on pure Java applications. If your application requires execution of any non-BEA native code in order to work, it will not work in a virtualized environment with this release.
- Applications that, due to their resource consumption, probably need a full physical machine themselves are not good candidates to virtualize. As a general rule, any application that require more than 3.5 GB (roughly) of heap is not a good candidate for virtualization. This is because WLS-VE is currently designed to run on 32-bit systems, which have a maximum physical memory of 4 GB. Since Java needs around some memory for its native code and generated Java code, a heap of more than 3.5 GB might not leave enough memory for those processes, resulting in out of memory exceptions and system failure.
- Applications that launch startup scripts or classes that attempt to start additional processes on the same machine but outside the JVM (such as a database, a Perl script, or monitoring software) will not work in a virtualized environment with this release. For example, you cannot start a Perl script by invoking `System.exec` from your WebLogic Server
- Applications that use file stores extensively (or that frequently write files directly to the file system) could experience some performance degradation because the current version WLS-VE requires a Network File System (NFS) file server for reading and writing files. Generally, input and output with a local disk is faster than with a file server.
- Applications that require a local GUI will not run on WLS-VE as it does not provide a platform for displaying a window. If you need to run a GUI-based program in conjunction with and application running on WLS-VE (for example, one of the BEA JRockit Mission Control tools), you must run it on a separate machine running a normal OS.

Designing a File Storage Solution

How will the application and data be stored? What sort of storage solution—or combination of storage solutions—will best support your version of WLS-VE? What affect does running on VMware have on how you set up your storage? Because of the importance of non-local storage

to WLS-VE, these are critical questions you need to address before you can successfully run this product. This section describes WLS-VE's requirements for storage and offers ideas for successfully implementing these solutions.

Understanding the WLS-VE Storage Architecture

The underlying implementation in VMware is a large file. This is not something of which the virtual machine (that is, LiquidVM) is aware. To the VM, VMware's underlying storage architecture looks like a normal physical disk drive and therefore, it performs the corresponding I/O instructions necessary to write to a physical disk drive, VMware detects these I/O instructions and transforms them into corresponding writes to the large file. As the representation of the virtual disk is a file, writes to this file will at some point be stored on physical storage somewhere. The location of this storage is under the control of the VMware administrator; as is the normal OS case, the administrator has three choices: the ESX machine's physical hard disk, a disk-partition on a SAN, or a large file on a NAS.

Storage Requirements

Due to its virtualized nature, the storage requirements for WLS-VE somewhat differ from those you need to address for non-virtualized WebLogic Server. The basic requirement is accessibility of storage locations: for some of its data storage activities, WLS-VE requires exclusive access, while for other activities, it assumes that other processes might access the data (as in a standard file system).

Storage for Exclusive File Access

WLS-VE requires exclusive access to a storage system for the following activities:

- To read the ISO image that contains LiquidVM executables and WLS classes.
- To write internal, temporary files that are used to maintain runtime state, caches, etc.

To store its exclusive data, WLS-VE needs to use the virtual disk that is made available by the hypervisor layer. Generally, a SAN implementation is optimal for WLS-VE as it usually performs at a higher level than a NAS due to NAS requiring a higher protocol overhead than a SAN. Moreover, it is more expensive to reference a file somewhere in a NAS's potentially deep directory structure than it is to just access a certain block on a certain disk partition, as a SAN stores data. Finally, a SAN requires less state on the storage side, another argument in its favor.

Storage for Shared File Access

Use an NFS client for files that require or expect shared access; for example:

- Monitoring applications that want to read log files
- Files that contain domain and application configuration data

LiquidVM can access only (virtual) disk drives and (virtual) network cards, which are configured by the LiquidVM launcher when creating a WLS-VE instance.

WLS-VE ISO Image Considerations

BEA recommends that you store the ISO image on an SAN. The ISO image is a CD drive that appears as a large file in VMware. It also differs from normal local disks because it is read-only. This implies that no one can modify it; hence, multiple different machines can have simultaneous access to the same ISO image without violating its exclusivity, thus reducing disk footprint.

No Encryption for NFS Traffic

Currently, communication between the NFS client and the NFS server is not secure. The NFS client authenticates itself to the NFS server by using user-provided credentials, but this traffic is not encrypted, which makes it vulnerable to security breaches. Please refer to "NFS Security Measures" on page 5-2 for details on how to work around this situation.

Planning System Capacity

How much system capacity to plan for is greatly dependent on the applications you are running on WLS-VE. The following information will help you make decisions about your minimal capacity requirements as they apply to WLS-VE. You will need to factor in the needs of your application to fully determine the appropriate capacity. This section provides guidelines to help you:

- Determine Disk Space Requirements
- Determine the Number of Physical Machines
- Determine Physical Memory Requirements

Determine Disk Space Requirements

How much disk space you will need to configure depends upon the size of your application and the amount of data you anticipate processing. At a minimum, you need to provide enough disk space for writing images when hibernating an instance of WLS-VE, which is generally an amount equal to your Java heap plus some native memory (for a large application, 300MB might be a reasonable amount of native memory, but the amount of memory you should reserve is very

workload dependent). In addition, of course, you also need to plan for database requirements and other storage needs.

Be sure to reserve sufficient space for the domain on the NFS server. How much data the domain needs is very application-dependent. Before taking a server into production you should check the size of the domain in a development environment and make sure you have at least that much space left on the production server. Normally, the storage space requirements for most applications running on top of WebLogic Server are modest. The storage requirements for the domain are identical for normal WebLogic Server and WebLogic Server Virtual Edition.

Determine the Number of Physical Machines

Determining how many physical cores your implementation requires is based upon your actual system needs; that is, how many virtual CPUs does your environment require to handle your data load? By rule, you can only have one virtual CPU per logical core; for example, a hyperthreaded, dual core hardware can support four virtual CPUs or two virtual CPUs for each hyperthreaded core; were the cores not hyperthreaded, they would each support a single virtual CPU, or a total of two virtual CPUs on the hardware. Thus, if you believe you will need 50 virtual CPUs, you need to plan for 50 physical cores, in whatever combination is most appropriate for your budget and your physical layout.

Determine Physical Memory Requirements

Much like disk space requirements, physical memory requirements depend significantly on the applications you are running on the machine. Because WLS-VE is currently available only as a 32-bit application, the maximum amount of physical memory available to the virtual machine is 4 GB. Ideally, you should plan to allow enough heap space to run your application, without making it resort to swapping or paging during processing, plus some additional memory for native application code and generated Java code. If you don't allow enough space for Java to run, you will quickly encounter out of memory exceptions and system failure.

Downloading WLS-VE

You can download WebLogic Server Virtual Edition from the BEA Web site at `http://commerce.bea.com`.

DVD Distribution

If you purchased your software from your local sales representative, you will find the following items in the product box:

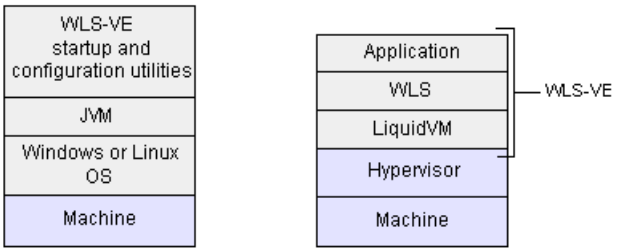
- DVDs containing the product software for Windows and Linux
- The following printed documents:
  - *BEA Software License and Limited Warranty* pamphlet
  - *Customer Support Quick Reference and Other Important Information* card
  - A flyer that provides a list of URLs for the online documentation for each product

Windows and Linux Installers

You can download an installer that runs on a Windows platform or one that runs on a Linux platform. The Windows installation program enables you to install WLS-VE, configure WebLogic Server domains, and configure and start WLS-VE appliances from a Windows machine. The Linux installation program enables you to complete these tasks from a Linux machine.

Regardless of which installer you download, WLS-VE always runs directly on a hypervisor platform (see Figure 2-1).

Figure 2-1 Utilities Run on OS, WLS-VE Runs on Hypervisor



Understanding User Access Credentials

To successfully use WLS-VE, you need two sets of log-in credentials: one for WebLogic Server and one for VMware Virtual Infrastructure Client 2.0 (which includes VMware VirtualCenter). You also need read/write permission on your NFS server.

WebLogic Server Credentials

The WebLogic Server credentials control access to a server domain. You enter these credentials into the system during domain configuration (that is, when you create your virtual server; see Creating WLS-VE Domains). These credentials are encrypted and then stored in the domain

directory. For information about specifying credentials when starting WLS, see Provide User Credentials to Start and Stop Servers; you should also read the section titled Boot Identity Files.

VMware VirtualCenter Credentials

The VMware VirtualCenter credentials control access to VMware VirtualCenter, the GUI application used to monitor and manage individual virtual machines (for more information, please refer to Chapter 10, "Working with WLS-VE Using VirtualCenter"). You enter these credentials into the system when configuring LiquidVM, as described in Chapter 6, "Configuring LiquidVM Connection Parameters.". These credentials are stored in the file `bea.lvm.info`, which resides in your home directory (for Windows users, this is your personal directory directly beneath `Documents and Settings/`).

Note: For important information about your VirtualCenter password, please see VMware VirtualCenter Security Measures.

NFS Server

Because you need to add and remove files from the NFS server, you will you also need permission to read and write directories on the NFS server.

Understanding WLS-VE Directories

From within WLS-VE, WLS-VE will see the directory structure described in Table 2-1:

Table 2-1 WLS-VE Directory Structure

Directory	Contents	Notes
`/appliance`	The contents of the WLS-VE ISO image	Specified in the `bea.lvm.info` file as something like `diskDatastorePath=[storage_elephant] /training/wlsve921_77815.iso` For more information on `/appliance`, see "The Installation Directory for the WLS-VE ISO Image."
`/bea`	• `license.bea` • patches	Specified in the `BEA_HOME_MOUNT` property in the WLS-VE start-up script. For more information on `/bea`, see "The BEA Home Directory."

Table 2-1 WLS-VE Directory Structure

Directory	Contents	Notes
`/domain`	• server-root directory • log files • application classes	Specified in the `DOMAIN_MOUNT` property in the WLS-VE startup script.
`/tmp`		WLS requires a `/tmp` directory in order to boot.

Physically, these directories must be in different locations:

- `/appliance` is on the local disks of the hypervisor hosts.
- `/bea` is on the NFS server.
- `/domain` is on the NFS server but on a different share than `/bea`.

Creating and Sharing Directories

With WLS-VE, the BEA license file (`license.bea`) and the patch directory must reside on an NFS file server below a directory that is exported as an NFS share. When you start a WLS-VE appliance, the WLS-VE classes on the hypervisor use NFS to connect to the shared directory and look up the BEA license and any installed patches. The classes also use NFS to look up the WLS-VE domain configuration data (see Figure 2-2).

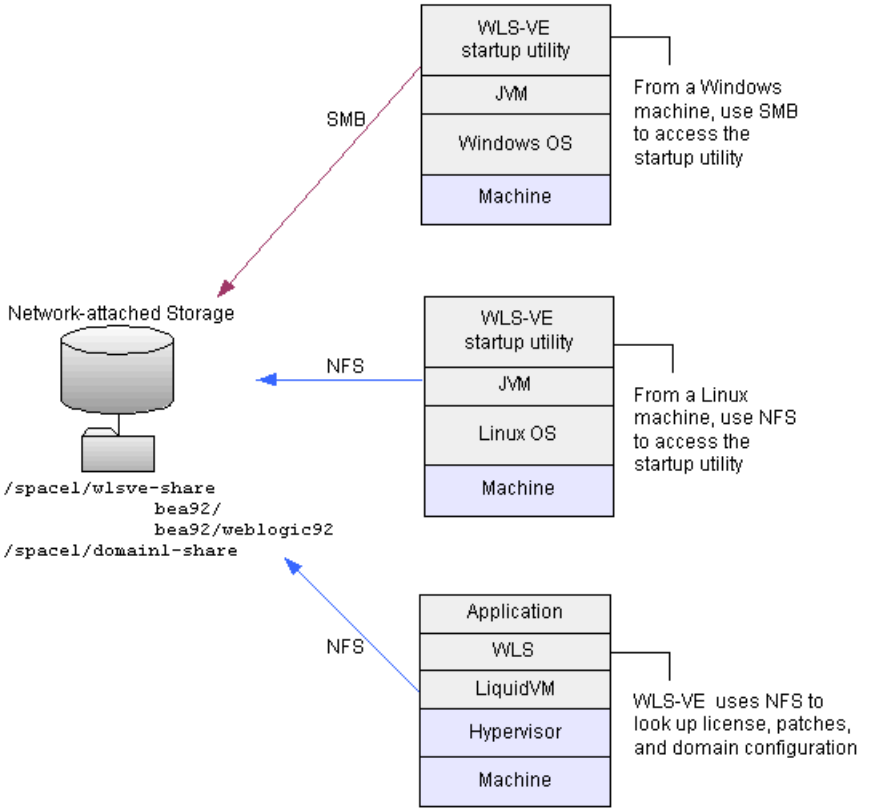
To create and share directories for WLS-VE:

1. On an NFS server, export a directory as an NFS share. Because WLS-VE is installed below the share, WLS-VE administrators will need both read and write access.

   Note: BEA recommends that you also create an additional read/write NFS share for each WLS-VE domain that you plan to host in your operations center. You do not need to create these domain directories to install WLS-VE, but you will need them to run WLS-VE after the installation process. By creating separate shares for each domain directory, you can control which systems and users are able to access the secure data that is in each WebLogic Server domain. See "Securing NFS" on page 2-12.

2. If you want to install, configure, or start WLS-VE from a Windows machine, export the directory as an SMB (Samba) share.

Figure 2-2 Using SMB and NFS



Example Configuration of Directory Shares

For example, create the following directory structure on an NFS file server named `myFileServer`:

```
/space1/wlsve-share
                    bea92/
                    bea92/weblogic92
/space1/domain1-share
/space1/domain2-share
```

where:

- **`wlsve-share`** is exported as an NFS share. If you want to install WLS-VE from a Windows machine, also export this directory as an SMB share.
- `bea92` is the directory that you use as the BEA Home directory
- `bea92/weblogic92` is the directory that you use as the product installation directory
- **`domain1-share`** and **`domain2-share`** are two additional NFS shares that you create to contain two separate WebLogic Server domains.

Example of Accessing Directory Shares from Windows

If you want to use a Windows machine to install to the directory structure described in "Example Configuration of Directory Shares" on page 2-11:

1. After you export `/space1/`**`wlsve-share`** as an SMB share, on a Windows machine, map the `W:` drive to `\\myFileServer\wlsve-share`.
2. On the same Windows machine, run the WLS-VE installation program. When the installer asks you to specify a location for the BEA home directory, enter `W:\bea92`.

   The installer will install the BEA home directory in `W:\bea92` (on `myFileServer` the namespace will be `/space1/wlsve-share/bea92`). It will also offer to create the product installation directory and ISO image files under this share.

After you complete the installation process and configuration process, to start a WLS-VE appliance, log on to the Windows machine and use the startup commands that the WLS-VE installer created on the Start menu. Or from a command prompt, change to the `W:\bea92` directory and invoke the startup scripts.

Alternative Installation Approach

The previous example installs WLS-VE in a directory on your NFS share. This is the simplest approach, but can be time consuming. As an alternative, you can:

1. Install WLS-VE on your local launcher machine, using a local directory for your BEA Home directory.
2. Copy the WLS-VE license file (`license.bea`) and the patch directories (`patch_weblogic`*`NNN`*) from the BEA Home on your local machine into a directory on your NFS share.
3. Edit your WLS-VE startup scripts so that the `BEA_HOME_MOUNT` variable points to the BEA directory on your NFS share into which you copied the WLS-VE license file and the patch directories. See"Creating WLS-VE Domains" on page 7-3.

Securing NFS

Ensure that unauthorized users cannot snoop network traffic, mount the WLS-VE NFS shares, or access the WLS-VE directories on the NFS server's local disk. Any attacker with read access to a WLS-VE domain directory can use the data in the directory to decrypt the WLS-VE boot password, gain administrative privileges, and compromise the entire domain. For more information, see "NFS Security Measures" on page 5-2.

WLS-VE Installation Directories

The following sections describe details about the WLS-VE installation program and the files and directories that the installer creates:

The BEA Home Directory

The BEA Home directory serves as a repository for your BEA license file and other files that facilitate any future upgrades or installation of patches. WLS-VE requires this directory to be on an NFS file server and to be accessible to the WLS-VE installer through an NFS mount.

During installation of your BEA software, the WLS-VE installer prompts you to choose an existing BEA Home directory or specify a path to create a new one. If you already have a BEA Home directory on an NFS server, you can choose the existing directory. If you choose to create a new directory, the installation program automatically creates it at the specified path name.

Sharing the BEA Home Directory with Other BEA Products

The BEA Home directory can be considered a *central support directory* for all of the BEA products installed on your system. For example, if you use WebLogic Server, WebLogic Workshop, and WLS-VE, you could maintain a single BEA Home directory for all products, but to support WLS-VE, the WLS-VE license file (`license.bea`) and the patch directories (`patch_weblogic`*nnn*) need to be copied to a directory residing on an NFS server.

If you do not want to configure NFS mounts on the systems that host other BEA products, you can maintain multiple BEA Home directories: one on an NFS server for WLS-VE and another on the local file systems that host the other BEA products.

Structure of the WLS-VE BEA Home Directory

Table 2-2 describes the files and directories in the BEA Home directory.

Table 2-2 BEA Home Directory Description

Component	Description
`jrockit<`*version*`>` directory	Contains the software for the BEA JRockit JDK installed with your software. The JDK provides the Java run-time environment (JRE) for the WLS-VE configuration, startup, licensing, and installation utilities.
`logs` directory	Contains a history file of installation and uninstallation for the BEA Home directory.
`tools` directory	Contains the LiquidVM Configuration Wizard and WLS-VE startup utilities.
`utils` directory	Contains installation utilities. The `utils.jar` file contains code that supports the `UpdateLicense` utility.
`weblogic<`*version*`>`	Contains the BEA WebLogic Configuration Wizard and Template Builder, the Domain Upgrade Wizard, the WebLogic Scripting Tool, and other files that are used to support the WLS-VE configuration, startup, licensing, and installation utilities.

Table 2-2 BEA Home Directory Description (Continued)

Component	Description
`license.bea` file	An XML file that contains the license keys for all the BEA products installed in the BEA Home directory. Licenses are release specific. You must have a valid license file for the version of BEA products you are using. **Note:** Do not edit the `license.bea` file manually. Doing so may cause operating problems for the currently installed BEA products, or result in problems later when BEA products are installed for maintenance upgrades.
`registry.xml` file	A registry file that contains a persistent record of all BEA products installed on the target system. This registry contains product-related information, such as version number, patch or service pack number, and location of the installation directory. **Note:** Do not edit this file manually. Doing so may cause operating problems for the currently installed BEA products, or result in installation problems when future BEA products or maintenance upgrades are installed. For more information about the BEA registry file, see "Using the BEA Registry API" in *ISV Partners' Guide* at the following URL: `http://e-docs.bea.com/common/docs92/isv/detect.html`
`UpdateLicense(.cmd/.sh)`	A command file (Windows) or a shell script (Linux) that updates the current `license.bea` file with new license sections. The result is a merged license that contains both the existing and new license sections.

The WLS-VE Product Installation Directory

The product installation directory for WLS-VE contains the BEA WebLogic Configuration Wizard and Template Builder, the Domain Upgrade Wizard, and the WebLogic Scripting Tool.

During installation of your BEA software, the WLS-VE installer prompts you to choose a product installation directory. Typically, you locate this directory below the BEA Home directory, but you can locate it outside the BEA Home directory as long it is located on an NFS file server and is accessible to the WLS-VE installation, configuration, and startup utilities through an NFS or SMB mount.

Structure of the WLS-VE Product Installation Directory

Table 2-3 describes the files and directories in the WLS-VE product installation directory.By default, the directory itself is named `weblogic<version>`.

Table 2-3 Product Installation Directory Structure

This directory . . .	Contains . . .
`beehive`	Files used to support the BEA utilities in the product installation directory.
`common`	Scripts used for setting environment attributes for the utilities and template JAR files used by the Configuration Wizard and WLST offline when creating domains.
`javelin`	A 100% Java/JSP compiler that is used by the component products for compiling.`java` and other source files generated by development tools.
`patches`	Contains the BEA patches that have been installed.
`platform`	Files used to support the BEA utilities in product installation directory.
`server`	Files used to support the BEA utilities in product installation directory. **Note:** This directory contains `weblogic.jar` because the JAR file contains classes that are used to upgrade domains and to assist with the installation of patches. While `weblogic.jar` also contains WebLogic Server classes, your WLS-VE license does not support running these WebLogic Server classes (instead, a WLS-VE license enables you to run the WLS-VE classes that are in the ISO image file).
`uninstall`	Code required to uninstall the BEA Products software
`workshop`	Files used to support the BEA utilities in product installation directory.

The Installation Directory for the WLS-VE ISO Image

The WLS-VE ISO image contains the LiquidVM and WebLogic Server classes that you use to host your business applications. Each physical machine that hosts an instance of WLS-VE needs access to this ISO image file.

During installation of your BEA software, the WLS-VE installer offers to install the ISO image on your NFS server. After the installation process, you can move the ISO file to the local disk of each WLS-VE host machine, or to a SAN or NAS that can be accessed from each WLS-VE host machine. See Chapter 4, "Copying the ISO Image.".

The WLS-VE Windows Shortcuts

When you install your BEA Products software as an Administrator on a Windows system, the installation program offers to creates shortcut entries on the Start Menu. You can select from the following options:

- **All Users Start menu folder**

  Selecting this option provides all users registered on the machine with access to the installed software. However, only users with Administrator privileges can create shortcuts in the All Users folder. Therefore, if a user without Administrator privileges uses the Configuration Wizard to create domains, Start menu shortcuts to the domains are not created. In this case, users can manually create shortcuts in their local Start menu folders, if desired. Press `ALT+Y` on the keyboard to select the All Users Start Menu.

- **Local user's Start menu folder**

  Selecting this option ensures that other users registered on this machine will not have access to the Start menu entries for this installation. Press `ALT+N` on the keyboard to select the Local User's start menu.

Note: The installer offers to create shortcuts only if you are performing an initial installation.

To ensure that the shortcuts work across Windows sessions, make the mapping of the drive letter to the SMB share reconnect at logon. The pathnames that are encoded in the shortcuts include the drive letter that you map to the SMB share when you install WLS-VE (see "Understanding WLS-VE Directories" on page 2-8). For example, if you install WLS-VE in `W:\mySMBshare\wls-ve`, then the pathnames in the shortcuts start with `W:\`. If you use a different drive letter on subsequent Windows session, the shortcuts will not function.

The BEA Products folder that the WLS-VE installer creates (**Start→Programs→BEA Products**) contains following shortcut files:

- *Tools*—contains shortcuts for the following utilities:
  - *Configuration Wizard*—Creates new WLS-VE domains or updates existing ones. See Creating WebLogic Domains Using the Configuration Wizard.
  - *Domain Template Builder*—Guides you through the process of creating custom domain and extension templates based on existing domains. See Creating Templates Using the Domain Template Builder.
  - *Domain Upgrade Wizard*—Upgrades a domain from a previous release of WebLogic Server (such as WebLogic Serve 8.1) to WLS-VE 9.2. You do not need to upgrade domains that are currently running on WebLogic Server 9.2. See "Upgrading and Promoting Domains" on page 7-8.
  - *LiquidVM Configuration Wizard*—Provides the WLS-VE startup utility with the information it needs to connect to VMware Virtual Center and an ESX Server host. See Chapter 6, "Configuring LiquidVM Connection Parameters."
  - *WebLogic Scripting Tool*—A command-line scripting interface that system administrators and operators use to monitor and manage WLS-VE instances and domains. See WebLogic Scripting Tool.
- *Online Documentation*—provides a link to the WLS-VE online documentation on the e-docs Web site.
- *Smart Update*—launches the Smart Update program, which checks for any updates available for installed BEA products, and installs the updates as required.
- *Uninstall BEA Products*—launches the uninstallation program. For more information, see Chapter 9, "Uninstalling the Software."

CHAPTER 3

Using the Installation Program

The following sections describe how to start the installation program on Windows and Linux platforms:

Note: You cannot reinstall any BEA product on top of a previously installed version of the same product—in the same BEA Home directory or in the same file location. You can, however, add products and product components to an existing installation. For example, you can install WebLogic Server during one installation, and WLS-VE during a separate installation. However, to reinstall the same version of one of the products, you must first uninstall the previous installation, as described in Chapter 9, "Uninstalling the Software."

Starting the Installation Program on Windows Platforms

The following sections describe how to start the installation program on a Windows platform:

- "Starting in Graphical Mode" on page 3-2
- "Starting in Console Mode" on page 3-3

See "Starting the Installation Program in Silent Mode" on page 3-7 for information about using the installation program in silent mode.

Note: If you are installing the software on a Windows system that supports more than one monitor, you must disable all but one monitor before starting the installation program.

Starting in Graphical Mode

Graphical-mode installation is an interactive, GUI-based method for installing your software. To start the graphical-mode installation process on a Windows platform, follow these steps:

1. Log in to the Windows system.
2. Go to the directory where you have downloaded the installation program.

3. Double-click the installation file:

   ```
   wls-ve921_win32.exe
   ```

   The installation program begins to install the software.

The installation program asks you to specify locations for:

- The BEA Home directory. See "The BEA Home Directory" on page 2-12.
- The product installation directory. See "The WLS-VE Product Installation Directory" on page 2-14.
- The ISO image installation directory. See "The Installation Directory for the WLS-VE ISO Image" on page 2-16.
- Windows shortcuts. See "The WLS-VE Windows Shortcuts" on page 2-16.

Starting in Console Mode

Console-mode installation is an interactive, text-based method for installing your software from the command line. To start the console-mode installation process on a Windows platform, follow these steps:

1. Log in to the target Windows system.
2. Launch the installation by entering the following command:

   ```
   wls-ve921_win32.exe -mode=console
   ```

   Note: You can also include the `-log=`*`full_path_to_log_file`* option in the command line to create a verbose installation log. For example:

   ```
   wls-ve921_win32.exe -mode=console -log=C:\logs\server_install.log
   ```

   For more information, see "Generating a Verbose Installation Log" on page 3-8.

After a few moments, a BEA Installer window opens and the installation program begins to install the software. It is normal for the installation program to pause for a fairly long time, especially toward the end. The installation program is still working when this occurs.

The installation program asks you to specify locations for:

- The BEA Home directory. See "The BEA Home Directory" on page 2-12.
- The product installation directory. See "The WLS-VE Product Installation Directory" on page 2-14.

- The ISO image installation directory. See "The Installation Directory for the WLS-VE ISO Image" on page 2-16.
- Windows shortcuts. See "The WLS-VE Windows Shortcuts" on page 2-16.

Starting the Installation Program on Linux Platforms

The following sections describe how to start the WLS-VE installation program on Linux platforms:

- Starting Graphical-Mode Installation
- Starting Console-Mode Installation

See "Starting the Installation Program in Silent Mode" on page 3-7 for information about using the installation program in silent mode.

Note: The WLS-VE installation program bundles its own JRE.

Starting Graphical-Mode Installation

Graphical-mode installation is an interactive, GUI-based method for installing your software. To run graphical-mode installation, your console must support a Java-based GUI such as X-Windows and 8-bit color depth (256 colors).

If the installation program determines that your system cannot support graphical-mode installation, it automatically starts running in console mode. For details, see Chapter 5, "Running the Installation Program in Console Mode."

To start the graphical-mode installation process, follow these steps:

1. Log in to the target Linux system.
2. Launch the installation by entering the following commands:

   ```
   chmod a+x wls-ve921_linux32.bin
   ./wls-ve921_linux32.bin
   ```

   Note: You can also include the `-log=`*`full_path_to_log_file`* option in the command line to create a verbose installation log. For example:

   ```
   wls-ve921_linux32.bin -log=/home/logs/BEA_install.log
   ```

   For more information, see "Generating a Verbose Installation Log" on page 3-8.

   The installation program begins to install the software.

The installation program asks you to specify locations for:

- The BEA Home directory. See "The BEA Home Directory" on page 2-12.
- The product installation directory. See "The WLS-VE Product Installation Directory" on page 2-14.
- The ISO image installation directory. See "The Installation Directory for the WLS-VE ISO Image" on page 2-16.

Starting Console-Mode Installation

Console-mode installation is an interactive, text-based method for installing your software from the command line. To start the console-mode installation process, follow these steps:

1. Log in to the target Linux system.
2. Launch the installation by entering the following command:

   ```
   chmod a+x wls-ve921_linux32.bin
   ./wls-ve921_linux32.bin -mode=console
   ```

   Note: You can also include the `-log=`*`full_path_to_log_file`* option in the command line to create a verbose installation log. For example:

   ```
   wls-ve921_linux32.bin -mode=console
   -log=/home/logs/BEA_install.log
   ```

   For more information, see "Generating a Verbose Installation Log" on page 3-8.

It is normal for the installation program to pause for a fairly long time, especially toward the end. The installation program is still working when this occurs.

The installation program asks you to specify locations for:

- The BEA Home directory. See "The BEA Home Directory" on page 2-12.
- The product installation directory. See "The WLS-VE Product Installation Directory" on page 2-14.
- The ISO image installation directory. See "The Installation Directory for the WLS-VE ISO Image" on page 2-16.

Starting the Installation Program in Silent Mode

On either Linux or Windows, you can run the installation program in silent mode. During installation in silent mode, the installation program reads the settings for your configuration from an XML file that you create prior to beginning the installation. Silent mode eliminates the need to respond to prompts from the installation program. The installation program does not display any configuration options during the installation process. Silent-mode installation works on both Windows and UNIX systems. Using silent-mode installation implies that you consent to the BEA License Agreement. You neither see a copy of the BEA Software License Agreement nor have any means of accepting the terms of the agreement.

To run the installation program in silent mode:

1. Create a `silent.xml` file that defines the configuration settings required for the installation program. See "Creating the silent.xml File" on page 3-7.
2. Launch the installation program with this command on Windows:

   ```
   wls-ve921_win32.exe -mode=silent -silent_xml=path_to_silent.xml
   ```

   Or this command on Linux:

   ```
   chmod a+x wls-ve921_linux32.bin
   ./wls-ve921_linux32.bin -mode=silent -silent_xml=path_to_silent.xml
   ```

   Here, *`path_to_silent.xml`* is the full pathname of the `silent.xml` file.

For more detailed information about silent mode installation, see Running the Installation Program in Silent Mode in the *WebLogic Installation Guide*.

Creating the silent.xml File

Your `silent.xml` file needs to define the configuration settings required for the installation program. The required information is included in a set of data-value elements in the `silent.xml` file, for example:

```
<data-value name="BEAHOME" value="/space1/BM/9210509"/>
```

The required settings are described in Table 3-1. For a sample `silent.xml` file, see Listing 3-1.

Table 3-1 data-value Settings in silent.xml

data-value name Attribute	Description
BEAHOME	The BEA Home directory. See "The BEA Home Directory" on page 2-12.
USER_INSTALL_DIR	The product installation directory. See "The WLS-VE Product Installation Directory" on page 2-14.
ISO_DIR	The ISO image installation directory. See "The Installation Directory for the WLS-VE ISO Image" on page 2-16.

Listing 3-1 Sample silent.xml File for Silent Mode Installation

```
<bea-installer>
  <input-fields>
    <data-value name="BEAHOME" value="/space1/BM/9210509"/>
    <data-value name="USER_INSTALL_DIR"
                value="/space1/BM/9210509/weblogic92"/>
    <data-value name="ISO_DIR" value="/space1/BM/9210509/wlsve_iso"/>
  </input-fields>
</bea-installer>
```

Startup Options

The following sections describe optional features of the WLS-VE installation program:

- "Generating a Verbose Installation Log" on page 3-8
- "Specifying Temporary Disk Space" on page 3-9

Generating a Verbose Installation Log

If you launch the installation from the command line or from a script, you can specify the `-log` option to generate a verbose installation log. The installation log stores messages about events that occur during the installation process, including informational, warning, error, and fatal messages.

Note: You may see some warning messages in the installation log. However, unless a fatal error occurs, the installation program completes the installation successfully. The installation user interface indicates the success or failure of each installation attempt, and the installation log file includes an entry indicating that the installation was successful.

Syntax

To create a verbose log file during installation, include the `-log=`*`full_path_to_log_file`* option in the command line. For example:

```
wls-ve921_win32.exe -log=C:\logs\server_install.log
```

The path must specify a file. You cannot create a folder simply by including a name for it in a pathname; your path should specify only existing folders. If your path includes a nonexistent folder when you execute the command, the installation program does not create the log file.

Specifying Temporary Disk Space

The BEA installation program uses a temporary directory into which it extracts the files necessary to install the software on the target system. During the installation process, your temporary directory must contain sufficient space to accommodate the compressed Java run-time environment (JRE) bundled with the installation program and an uncompressed copy of the JRE that is expanded into the temporary directory. The extracted files are deleted from the temporary directory at the end of the installation process.

By default, the installation program uses the following temporary directories:

- Windows platforms—directory referenced by the `TMP` system variable
- Linux platforms—system-dependent temporary directory

Note: If you do not have enough temporary space to run the installation program, you are prompted to specify an alternate directory or exit the installation program.

To make sure that you have adequate temporary space, you may want to allocate an alternate directory for this purpose. To do so, follow the instructions provided in the following table.

Table 3-2 Setting Up Disk Space

Platform	Perform this step . . .
Windows	Do one of the following: • Set the `TMP` system variable to a directory of your choice. • If starting the installation program from the command line, include the `-Djava.io.tmpdir=`*`tmpdirpath`* option, replacing *`tmpdirpath`* with the full path of the directory that you want to designate as a temporary storage area for the BEA Products installation program. For example: `wls-ve921_win32.exe -mode=console -Djava.io.tmpdir=D:\Temp`
Linux	Enter the following option on the command line when you start the installation program: `-Djava.io.tmpdir=`*`tmpdirpath`* Here, *`tmpdirpath`* is the full path of the directory that you want to designate as a temporary storage area for the BEA Products installation program.

What's Next?

Move or copy the ISO image file to the local disks of hypervisor hosts. See Chapter 4, "Copying the ISO Image".

Use the LiquidVM Configuration Wizard to specify how LiquidVM connects to VMware. See Chapter 6, "Configuring LiquidVM Connection Parameters."

Use the WebLogic Server Domain Configuration Wizard to create a domain and server instances, then edit the startup scripts for the servers. See Chapter 7, "Configuring and Starting WLS-VE Domains."

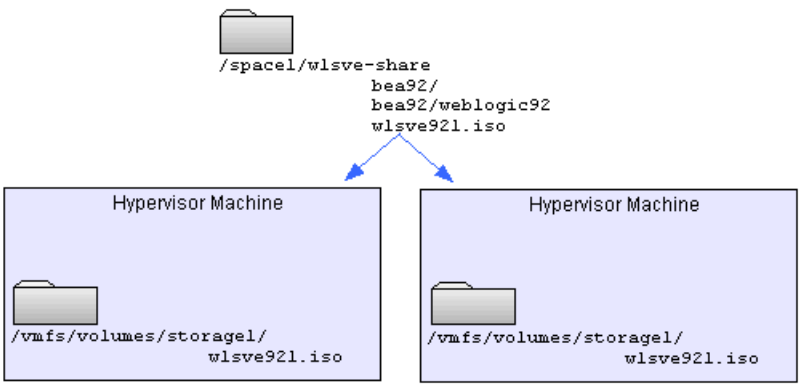
For additional information about the files and shortcuts that the installation program created, see "WLS-VE Installation Directories" on page 2-12.

For specific information about this WLS-VE release, see the *BEA WebLogic Server Virtual Edition Release Notes*.

Copying the ISO Image

The WLS-VE ISO image is the boot image for WLS-VE. It contains the LiquidVM and WLS-VE classes that run on hypervisor software and host your Java applications. To give ESX Server access to these classes, after you install WLS-VE, copy the ISO image to a datastore on each ESX Server that will run WLS-VE. BEA recommends that you copy to a datastore that is on the ESX Server's SAN. (See Figure 4-1.) Copying to a local disk may disable some VMware functionality, such as VMotion. Datastores on NFS will experience degraded performance when booting WLS-VE.

Figure 4-1 Copy the ISO Image to Datastores for Each ESX Server



To copy the WLS-VE ISO image to a datastore on local disk or SAN, use the following secure copy (scp) command syntax:

```
scp source-file username@esxhost:/vmfs/volumes/datastore/path/
```

where:

- *source-file* is the relative or absolute path and file name of the WLS-VE ISO image file.
- *username* is the name of a user in your network who has write privileges on the hypervisor host machine.
- *esxhost* is the name of an ESX Server host.
- /vmfs/volumes/ is the directory within the VMware file system under which ESX Server stores datastores.
- *datastore* is the name of a datastore.
- *path* is one or more optional directory levels.

Note: The Linux operating system includes an scp client. For Windows, you can install (or download for free) third-party utilities that include scp clients.

Remember the pathname that you specify. When you use the LiquidVM Configuration Wizard to configure virtual machines, you specify this location. Note that the syntax in ESX Server for specifying this path is:
[*datastore*] */path/file*

For example, use the following scp command to copy the WLS-VE ISO image from the current directory to the default storage1 datastore (VMware creates the storage1 datastore when you install ESX Server):

```
scp wlsve921.iso myusername@myESXHost:/vmfs/volumes/storage1/
```

With the above example, the path name that you specify in the LiquidVM Configuration Wizard is:

```
[ storage1 ] /wlsve921.iso
```

CHAPTER 5

Configuring System Security

Before you attempt to use WLS-VE, you need to establish a level of security to protect the integrity of your data and the safety of your transactions. This section describes the most critical security measures you should take before working with WLS-VE. These are:

WLS Security Measures

To ensure the most secure environment for running WLS-VE, BEA recommends that you take the basic security measures required for a non-virtualized implementation of WebLogic Server. These measures are:

- Secure the WebLogic Server host
- Secure network connections
- Secure your database
- Secure the WebLogic Security Service
- Secure any applications you plan to run

Please refer to Securing a Production Environment for complete information on setting up basic WLS security. Also see the manufacturer's security documentation for any application you plan to run on WLS-VE.

NFS Security Measures

WARNING: The following information is of critical importance. Please read this section in its entirety.

WebLogic Server VE requires you to store WebLogic Server domain directories on NFS file servers and to create mount points that WebLogic Server VE uses to read and write domain data. The domain directories can contain sensitive data that must be protected in order to secure your WLS-VE environment.

To guard against attack, BEA recommends all of the following actions:

- To prevent attackers from snooping data as it travels through the network between WebLogic Server VE and the domain directory, ensure that both the NFS server and WebLogic Server VE instances are behind firewall protection and that only trusted authorized users have access to that portion of the network.
- To prevent unauthorized systems from mounting WebLogic Server VE domain directories, do both of the following:
  - On the NFS server, restrict the list of host names (or NFS client names) that are allowed to access the WebLogic Server VE domain directories that you have exported: only WebLogic Server VE hosts should be able to access these directories.
  - To ensure that the host names of WebLogic Server VE hosts are not spoofed, protect the DNS server that the NFS-server host uses.
- Ensure that only trusted authorized users have access to the system that hosts the NFS server.
- To prevent unauthorized users from accessing domain directories through the NFS server's local file system, use standard OS file protections on the system that hosts the NFS server.

VMware VirtualCenter Security Measures

If you plan to use VMware's VirtualCenter, you should follow all of the security practices recommended by VMware. See the VMware Infrastructure Documentation for more information.

You should use SSL to connect to VirtualCenter, as described in "Setting Up VMware and Enabling SSL" on page 10-2.

In addition to taking the security measures recommended by VMware, you should also secure your VirtualCenter password by removing it (actually, the encrypted representation of it) from the `bea.lvm.info` file. While the password is stored in an encrypted form to provide a high level of security, you still run the risk of it being compromised. To remove it from the `.info` file, do the following:

1. Go to your home directory (or `//Documents and Settings/`*`myDirectory`* on Windows) and open the `bea.lvm.info` file.
2. Locate the statement `PASSWORD=`.
3. Delete the string of characters following the `=`.

Once the password is removed from the `.info` file, you will need to supply it every time you try to create or start a WLS-VE instance.

CHAPTER 6

Configuring LiquidVM Connection Parameters

After you install WebLogic Server Virtual Edition, you need to configure LiquidVM, using the LiquidVM Configuration Wizard to specify how it connects to VMware VirtualCenter. This wizard runs either in a GUI-driven, graphic mode or a command line-based console mode. Configuring LiquidVM is a critical step because this is where you identify the file system locations of all WLS-VE components. An improperly configured LiquidVM will not run. This procedure is described in these topics:

Before You Begin

Before you run the LiquidVM Configuration Wizard, you need to know the configuration data listed in Table 6-1:

Table 6-1 LiquidVM Configuration Data

Configuration Data	Description
VirtualCenter login credentials: • User Name • Password	These should be provided to you by your VMware administrator (see "VMware VirtualCenter" on page 3-3). Please refer to "VMware VirtualCenter Security Measures" on page 5-2 for critical security information about your VirtualCenter password.
VirtualCenter server	The fully-qualified host name of the server that hosts the VirtualCenter you are running.
ESX Host name (ESX Compute Resource)	This is the IP address or fully-qualified name of your ESX server.
The ESX datacenter name	The datacenter is where all of the servers, clusters, and machines for this WLS-VE implementation reside.
ESX resource pool	This is optional parameter specifies the default VMware resource pool into which LiquidVM should place new VMs. You can override this parameter using the `VI_RESOURCE_POOL` parameter in your WLS-VE startup scripts. A VMware resource pool is a mechanism provided by VMware that allows you to allocate resources dynamically across a large set of servers. Please see the VMware documentation for more information on resource pools.
ISO image	This is the ISO file, reachable from the ESX host, that contains the LiquidVM and WebLogic Server classes that you use to host your business applications. Each physical machine that hosts an instance of WLS-VE needs access to this ISO image file. This image is installed during installation of your BEA software, and copied to the ESX server as described in Chapter 4, "Copying the ISO Image."
ISO image datastore	The ISO image resides in a VMware Virtual Infrastructure datastore. The datastore name is always enclosed in square brackets; for example, `[Storage1]`. This combined with the path to the ISO image datastore to provide an NFS datastore path: `[ISOImageDataStore] /myNFS/MyISODirectory/myISO.iso`

Table 6-1 LiquidVM Configuration Data

Configuration Data	Description
VMware certificate (`rui.crt`)	This is the public key certificate from VirtualCenter used to verify that the virtual machine really is itself when bringing up the HTTPS connection. You can obtain this public key certificate from the VirtualCenter machine and LiquidVM will store it for you in a keystore. On Windows, the certificate file is located at `C:\Documents and Settings\All Users\Application Data\VMware\VMware VirtualCenter\SSL\rui.crt`
VMware network	This optional parameter specifies the VMware virtual network to use. If not set, LiquidVM uses the first available VMware network. To view the available virtual networks in your VMware VirtualCenter client, select **Inventory**>**Networks**. You can override the virtual network in the `VI_NETWORK_NAME` parameter of your WLS-VE startup scripts. Please see the VMware documentation for more information on virtual networks.

Configuring LiquidVM in the Graphic Mode

To run the LiquidVM Configuration Wizard in the graphic (GUI) mode, use this procedure. Be sure to read Before You Begin so that you gain familiarity with the data required to configure LiquidVM.

Note: If you are a Linux user and don't have access to a GUI, please use the procedure described in Configuring LiquidVM in the Console Mode

1. Open the **Start** menu and select **All Programs**>**BEA Products**>**Tools**>LiquidVM **Configuration Wizard**.

   On Linux, be sure that you have set the DISPLAY environment variable and enter the command:

   ```
   <BEA_HOME>/tools/virtualization/control_1.0/bin/lvm_configwizard.sh
   ```

   The Configuration Wizard runs and the Virtual Center Information Window appears

2. Enter the following information:

   – VirtualCenter server—the IP address or fully-qualified name of the server on which VirtualCenter is running.

   – VirtualCenter User Name and Password—the login credentials supplied by your administrator.

– Select **Secure connection to VC** to use SSL for communication with VirtualCenter (recommended).

3. Click **Next**.
   – If you have not used this VirtualCenter before, you will have to provide a certificate for that VirtualCenter server. The LiquidVM Configuration Wizard security certificate window appears.
   – If your VirtualCenter server has been provided to LiquidVM before, the datacenter information window appears. Proceed to step 6.
4. Enter the VMware certificate (`rui.crt`)'s filename (`rui.crt`) and, if necessary, its path. Use **Browse**, if necessary. On Windows, this certificate is stored on the machine that runs VirtualCenter in the directory: `c:\Documents and Settings\All Users\ApplicationData\VMware\VMwareVirtualCenter\SSL\rui.crt`.

   If you are not running this Configuration Wizard on the same host on which VirtualCenter was installed, you need to copy the certificate file from the VirtualCenter machine to this machine (that is, the machine running the Configuration Wizard before running the wizard).
5. Click **Next**.

   The datacenter information window appears.
6. Enter the following information:
   – The ESX datacenter name, which you can obtain from the datacenter administrator.
   – The **ESX compute resource** (or ESX Host name (ESX Compute Resource)), which is the name of the ESX host as displayed from within VirtualCenter.
   – The ESX resource pool (optional).
7. Click **Next**.

   The LiquidVM disk location window appears.
8. Select the VMware network.
9. Enter the ISO image name and ISO image datastore and path, in the format shown; that is:

   `[<storage name>] <path>/filename.iso`

   Remember to include the square brackets.
10. Click Finish.

After a few moments, the successful configuration confirmation window appears.

11. Click **Close** to close the Configuration Wizard.

Upon successfully configuring LiquidVM, the Configuration Wizard creates a file in your home directory named `bea.lvm.info`, which contains all of the information you provided running the wizard. WLS-VE will read this file upon launch to determine the location of critical files. For more information on the `bea.lvm.info` file, see The bea.lvm.info File.

Configuring LiquidVM in the Console Mode

Console-mode installation is an interactive, text-based method for configuring your software from the command line. This mode is useful for Linux users who don't have a GUI display or don't want to otherwise use the graphic configuration mode described in Configuring LiquidVM in the Graphic Mode. Be sure to read Before You Begin so that you understand the data required to configure LiquidVM.

To complete the console-mode configuration process, respond to the prompts by entering the text representing your choice (filepath, server name, etc.) or by pressing Enter to accept the default. To exit the configuration process, press CTRL-C in response to any prompt.

To configure LiquidVM from the console, use this procedure.

1. Open a UNIX/Linux command shell and navigate to `<BEA_HOME>/tools/virtualization/control_1.0>/bin`.
2. Enter `lvm_configwizard.sh` or `.cmd`

   The system responds:

   ```
   LiquidVM Configuration Wizard for ESX (text-mode)
   -------------------------------------------------
   Collecting information VMware Virtual Infrastructure environment...

   Virtual center server
   ```

3. Enter either the IP address or the fully-qualified name (that is, you must include the domain name) of the VirtualCenter server. Press Enter.

   The system responds:

   ```
   Use secure connection (https) to virtual center? [Y/n]
   ```

4. Enter y to use HTTPS to connect to the VirtualCenter Server.

   The system responds:

```
Virtual center username
```

5. Enter the appropriate VirtualCenter User Name. This should be provided to you by you VMware administrator (see "VMware VirtualCenter" on page 3-3). Press Enter.

   The system responds:

   ```
   Do you want to provide the password for your virtual center user? if you
   do the password will be stored in the configuration file encrypted, if
   you don't you will be asked for the password every time you launch a
   LiquidVM. [Y/n]
   ```

6. If you enter yes, the system responds:

   ```
   Virtual center password (you will not see what you type)
   ```

7. Enter the Password you want to use to control access to VirtualCenter. This should be provided to you by you VMware administrator (see "VMware VirtualCenter" on page 3-3).

   Note: If you have already set up a password for the VirtualCenter server and want to use that one, simply press Enter.

Press Enter and follow the appropriate instructions in Table 6-2.

Table 6-2 Server Authentication Procedure

If...	The system responds...	Go to...

You have not used this VirtualCenter before, you will have to provide a certificate for that Virtual Center server	`A certificate is used to authenticate the Virtual Center server. The certificate is typically found on the VC-machine at: c:\Documents and Settings\All Users\ApplicationData\VMware\VMware VirtualCenter\SSL\rui.crt`
	`Copy this certificate to the machine from where you are running LiquidVM and specify the location below. The certificate will be used to create a keystore on this machine.`
	`Virtual center certificate (path to the file)`
		step 8

You have not used this VirtualCenter before	`Found certificate for the virtual center named` *`server.domain.name`*`.`
	`VMware Datacenter`
	Where *`server.domain.name`* is the name of the server you are using.
		step 9

8. Enter the VMware certificate (`rui.crt`) file name (it will have the filetype `.crt`) and path to its location. Press Enter

   The system responds:

   ```
   Looking up datacenters...
   VMware Datacenter
   [numbered list of available datacenters]
   Please select one of the above numbers
   ```

9. Enter the number that corresponds to the name of your VMware datacenter (The ESX datacenter name). Press Enter.

   The system responds:

   ```
   Looking up compute resources (hosts) in datacenter [datacenter name]...
   Default VMware Compute Resource (ESX Host or Cluster)
   [numbered list of available resources]
   Please select one of the above numbers
   ```

10. Enter the number that corresponds to the name of your ESX Host name (ESX Compute Resource). Press Enter.

    The system responds:

    ```
    Looking up resource pools in [ESX host name]...
    VMware Resource Pool (or type any for default resource pool)
    ```

11. Enter the name of the ESX resource pool, if any.

    The system responds:

    ```
    Looking up VMware Networks available to [ESX host name]...
    VMware Network (or type any to use any available)
    [numbered list of available virtual networks]
    Please select one of the above numbers [default: <any>]
    ```

12. Enter the number that corresponds to the VMware network to use.

    The system responds:

    ```
    ISO-image datastore [default: storage1]
    ```

13. Enter the ISO image datastore. Press Enter.

    The system responds:

    ```
    Now you should provide the path on storage1 where to find the wlsve.iso
    An example of a path is wlsve/wlsve921.iso
    ISO-image path:
    ```

14. Enter the path to the ISO image datastore. Press Enter.

The system responds:

```
Checking path...
```

The system responds:

```
Datastore for new VMs
```

15. Enter the datastore name where the WLS-VE Vmware configuration files should be stored. Press Enter.

    The system responds with this confirmation message:

    ```
    The LiquidVM configuration has now completed successfully.
    Configuration data has been stored in the 'bea.lvm.info' file
    ```

Upon successfully configuring LiquidVM, the Configuration Wizard creates a file in your home directory named `bea.lvm.info`, which contains all of the information you provided running the wizard. WLS-VE will read this file upon launch to determine the location of critical files and other configuration information. For more information on the `bea.lvm.info` file, see The bea.lvm.info File.

The bea.lvm.info File

As indicated above, once the LiquidVM Configuration Wizard successfully runs, it creates a file named `bea.lvm.info` and stores it in your home directory (for Windows users, that's `//Documents and Settings/`*`yourHome`*; for example `C:/Documents and Settings/jtsmith`). This file contains all of the configuration information you entered while running the wizard. Listing 6-1 shows an example of a `bea.lvm.info` file.

Listing 6-1 Sample bea.lvm.info File

```
#BareMetal ESX-launcher configuration information
#Wed Mar 14 12:54:06 MDT 2007
keystorePassword=4f2e0e4edd112535
username=Administrator
diskDatastorePath=[storage1] training/wlsve921_77815.iso
vchost=cleese.bea.com
version=4
keystore=C\:\\Documents and Settings\\jtsmith\\bm_cleese.bea.com.keystore
esxhost=okra.bea.com
```

```
datacenter=ARC QA Infra
password=794f81c07b912561ec2f14fae0a01daf776d284b31cebd9a
```

Note: Please refer to VMware VirtualCenter Security Measures for critical security information regarding the `password=` property in the `bea.lvm.info` file.

`bea.lvm.info` is read by the WLS-VE launcher (`java_esx`) at startup to glean your LiquidVM configuration specifics. The WLS-VE launcher looks for `bea.lvm.info` in the location specified by the `LVM_INFO` environment variable (your home directory by default). This file contains information about VirtualCenter and default information about which ESXServer to start new WLS-VE instances on. None of this information is typically specific to the machine that ran the Configuration Wizard so you can copy it between different launching machines; however, since the launcher will search for this file in your home directory, if you move it from there (or if you rename it), you will need to set the environment variable `LVM_INFO` to the path to the copy.

Troubleshooting a LiquidVM Configuration

For information about how to troubleshoot problems that may result from how your LiquidVM instance is configured, see Troubleshooting WLS-VE Problems in Chapter 11, "Diagnostics and Troubleshooting.". That chapter also describes what steps you need to take to submit an issue to BEA Support.

CHAPTER 7

Configuring and Starting WLS-VE Domains

This chapter contains the procedures and ancillary information necessary for successfully using WLS-VE. It shows how to create, start, and stop virtualized servers in a WebLogic Server domain, start and run this product, and how to use its features. It also describes conditions that must be met before you attempt to use the product. In some cases, WLS-VE procedures are identical to the same procedures in non-virtualized WebLogic Server. In those cases, the chapter will provide a brief description of the functionality and links to the relevant WebLogic Server documentation.

This chapter contains information on these subjects:

Before You Begin

This section describes requirements for running WLS-VE successfully. You will probably have completed these sorts of tasks as a general practice; however, verifying that they are already met before you begin will reduce problems later on.

Ensure Proper Components are in Place

Before attempting to run WLS-VE, ensure the following:

- ESX artifacts (clusters, disk mount, and so on) exist.
- NFS servers are up and running and configured properly for exporting the directories WLS-VE instances will need.

  Note: Please review important security information about the NFS servers in "NFS Security Measures" on page 5-2.

- Load balancers and Web servers have been configured.
- The WLS-VE ISO Image is available from VMware Virtual Infrastructure. BEA recommends that the ISO image reside in a datastore that is on each ESX Server's local disk or on a SAN. Normally, you copy it there during installation. See Chapter 4, "Copying the ISO Image."
- WLS-VE is installed along with any WLS patches/Liquid VM updates that might be required. The BEA license file and patch directory must be installed on the NFS server.
- Determine the IP addresses for your virtual machines.

Comparing Startup, Configuration, and Logging Options to Non-virtualized WLS

If you have experience using non-virtualized WebLogic Server, you might want to use some of the configuration techniques common to that product. If so, you need to be aware that some of them will not work with WLS-VE.

- Some customers want to run a script to configure their environment before running WLS. You can do this only on the normal OS before starting the WLS-VE instance, not on the WLS-VE instance itself.

- When you create a domain with the Domain Configuration Wizard, specify the password. WLS encrypts it and stores it in the domain directory in the `boot.properties` and `SerializedSystemIni.dat` files. You cannot specify credentials at an interactive prompt, because WLS-VE does not offer one.
- To track the progress of WLS-VE, look at the log files stored in the NFS share. You'll find at least two different log files that might be of interest to you for tracking progress. The first one is the standard WebLogic Server log that is available in its normal location in the domain directory `<domain>/servers/<myserver>/logs/...` The other one is the LiquidVM Console Log. The Console Log is normally stored in the current working directory as seen from inside the WLS-VE instance. By default, that is `/domain` (that is, your domain directory on the NFS server). The default name of the file is `<vmname>`.Use your favorite tools (for example, `tail`) to monitor these log files.
- When using the WLS Domain Configuration Wizard, you should specify the Administration Server network address. The wizard will only display local addresses so, if your Administration Server will be a WLS-VE instance or on other host, you will have to type it in yourself. If you specify the Administration Server in the wizard, the `startWLSVE.sh` startup script that was created will include that Administration Server as a parameter.

Creating WLS-VE Domains

To create a domain and WLS-VE servers ("virtualized servers"), use this procedure.

Note: This procedure assumes the following:

- You have a supported configuration of BEA WebLogic Server 9.2 installed on your launcher machine, running on Windows or Linux.
- You have access to an NFS server.

1. Run the WLS Domain Configuration Wizard by using one of the procedures described in Table 7-1:

Table 7-1 Configuration Wizard Start-up Modes

To start the Configuration Wizard in the...	Do this...
Console Mode	• Open a command-line shell and navigate to the `\common\bin` subdirectory of `<WEBLOGIC_HOME>` directory (for example, `c:\bea\weblogic92\common\bin`). • From the command line, enter: `./config.sh` (or `config.cmd` for Windows)
Graphical Mode	On the Windows desktop, click **Start** and select **Start>Programs>BEA Products>Tools>Configuration Wizard** On Linux, set the DISPLAY environment variable, navigate to the `/common/bin` subdirectory of `<WEBLOGIC_HOME>` directory (for example, `/bea/weblogic92/common/bin`) and enter `./config.sh`

The Configuration Wizard launches.

2. Follow the prompts in the Configuration Wizard as you would for creating a new WLS domain (see Creating a New WebLogic Domain); however, since you are configuring a domain for WLS-VE, when you reach the Select Domain Source window, you must select **Generate a domain configured automatically to support the following BEA products:** and ensure that **WebLogic Server VE Extensions** is checked (this is a required selection and should already by checked).

3. Specify the Administration Server network address. The Configuration Wizard will only display local addresses so, if your Administration Server will be a WLS-VE instance or on another host, you will have to type it in yourself. If you specify the Administration Server in the wizard, the `startWLSVE_Admin.sh` startup script that was created will include that Administration Server as a parameter.

   Note: Unlike with non-virtualized WebLogic Server, you cannot reuse an IP address for multiple servers

4. Complete the Configuration Wizard per the requirements of your implementation. Create any needed Managed Servers on the Configure Managed Servers page of the Configuration Wizard, specifying for each Managed Server a name and optionally specifying a listen address, listen port, SSL listen port, and whether SSL is enabled. Note that since WLS-VE

does not support the Node Manager, there is no need to configure any Node Manager-related options in the Configuration Wizard.

Be sure to note where you create your domain (assuming you can put this domain on the NFS server) and what you named your Managed Servers.

Note: If you are going to boot the Administration Server on a virtual machine, **Start Admin Server** on the Creating a Domain window should remain unchecked.

5. In your local file system, navigate to `<DOMAIN-DIR>/bin/`and locate the file `startWLSVE.sh` (or `.cmd` on Windows) as described here:

Table 7-2 Creating Start-up Scripts

For...	Do this...
The Administration Server	Make a copy of this script named `startWLSVE_Admin.sh` (or `.cmd`).
Each Managed Server	Make separate copies of `startWLSVE.sh` (or `.cmd`) for each Managed Server you plan to have and name them `startWLSVE_Managed_`*nn*`.sh` (or `.cmd`), where *nn* is a sequential number identifying the individual Managed Server; for example `startWLSVE_Managed__01`, `startWLSVE_Managed__02`, and so on.

The `bin/startWebLogic.cmd` and `startWebLogic.sh` files are not valid for WLS-VE.

6. Edit the start-up scripts `startWLSVE_Admin.sh` (or `.cmd`) and `startWLSVE_Managed_`*nn*`.sh` (or `.cmd`) by setting the properties required for your implementation. At the minimum, you must set the following values:

   – Set `IP_ADDRESS` to a valid IP address. This must be an address that no one else will be attempting to use when you are trying to run your machine. Otherwise, you will receive a "Configured IP [...] in use by MAC" Error. You test an IP address for availability using `ping`; if there is no response to `ping` at that address, it is probably available. Check with your network administrator.

   – Set `DOMAIN_MOUNT` to the NFS mount for this domain. Specify this property like this:

     `DOMAIN_MOUNT=`*`IPA.DD.RE.SS:/full/path/to/domain`*`,uid=`*`nnnnn`*`,gid=`*`nnnnn`*

     where `gid` is the group identifier and `uid` the user identifier (see Configuring Group and User Names for an explanation of these identifiers); for example:

     ```
     DOMAIN_MOUNT=131.18.110.61:/space1/servers/bea_home/user_projects/do
     mains/product-1,uid=10016,gid=10000
     ```

– Set BEA_HOME_MOUNT to the location of your <BEA_HOME> on your NFS server. Specify this property like this:

  BEA_HOME_MOUNT=*IPA.DD.RE.SS:/full/path/to/BEA_HOME*,uid=*nnnnn*,gid=*nnnnn*

  where gid is the group identifier and uid the user identifier (see Configuring Group and User Names for an explanation of these identifiers); for example:

  ```
  BEA_HOME_MOUNT=131.18.110.61:/space1/servers/bea_home,uid=10016,gid=10000
  ```

– Set TMP_MOUNT to the location where the WLS-VE instance will store temporary files. Specify this property like this:

  TMP_MOUNT=*IPA.DD.RE.SS:/full/path/to/temp_directory*,uid=*nnnnn*,gid=*nnnnn*

  where gid is the group identifier and uid the user identifier (see Configuring Group and User Names for an explanation of these identifiers); for example:

  ```
  TMP_MOUNT=131.18.110.61:/space1/servers/server_temp,uid=10016,gid=10000
  ```

Additionally, for each Managed Server, verify that the ADMIN_URL is pointing to the IP address of the Administration Server (for the Administration Server, ADMIN_URL must be blank).

Note: The start-up scripts do not and should not include a path reference to the WebLogic Server classes. WLS-VE uses the WebLogic Server classes that are located in the WLS-VE ISO image.

Note: To create a Managed Server in your WLS-VE domain, it is not enough to create a start-up script; you must also create the Managed Server instance in the domain, as described in step 4.

7. Verify that the servers start successfully by going to the <DOMAIN_DIR>/bin/directory and entering the start-up command; for example:

   startWLSVE_Admin.sh (or .cmd on Windows)

   OR

   startWLSVE_Managed_*nn*.sh (or .cmd on Windows)

   The server output will appear at <DOMAIN_DIR>/WLS-<*servername*>/log, unless you have specified a different location using the LVM_CONSOLE_LOG environment variable.

Note: The message `JVM is booted` does not mean that your server is fully running. It means that your virtual machine has been started and that your server startup process has been initiated.

Other VM Configuration Properties

In addition to the required configuration properties for the Administration Server and Managed Servers, you can configure other aspects of your VM by setting any of the properties shown in the start-up script. Please refer to Additional Configuration Tasks for details.

Configuring Group and User Names

When LiquidVM boots, it has to mount the `BEA_HOME` and `DOMAIN` directories, which are located on an NFS server. Any time you mount an NFS share, you provide a user and group name. When you attempt to read or write below the NFS share, the NFS server compares the user/group ID (`uid` and `gid`, respectively) with the access control list for the file or directory that you requested. You have to ensure that the user and group ID that you supply in the mount command has sufficient privileges to read and write in the domain directory. Note that if the domain directory is one or more directory levels below the share, the `uid` and `gid` must be able to read all of the directories from the share down to the domain directory. It must be able to read and write in the domain directory itself.

To ensure that read and write permissions are set up properly, run the Domain Configuration Wizard from the same OS user account that you plan to use to mount shares.

For example:

1. On an NFS server named myNFSServer, you export the `/myShare` directory as an NFS share. On the machine on which you ran the WLS-VE installer, you log in as user “pat” and run the Domain Configuration Wizard to create a domain in `/myShare/user_domains/base_domain`

2. Then, you get the `uid` and `gid` for “pat.” To do this, use the UNIX command `id`. Your `uid`(s) and `gid`(s) will be displayed. For this example, let’s say that they're 1112 and 1115.

3. When you edit the `/myShare/user_domains/base_domain/bin/startWLSVE_Admin.sh` startup script, for the `DOMAIN_MOUNT` variable, specify:

   ```
   set
   DOMAIN_MOUNT=myNFSServer.mycompany.com:/myShare/user_domains/base_domai
   n,uid=1112,gid=1115
   ```

   Pat's `uid` and `gid` must have read privileges for `myShare` and `user_domains`. They must have read and write privileges for `base_domain` and everything below it.

DemoIdentity Keystore Warning

When you install WLS-VE, the installer generates a DemoIdentity keystore that includes a certificate for the host that runs the installer. This is not the host from which you will run the product. The installer then stores this certificate on the ISO. If SSL is used, this certificate is the default if no other certificate is specified.

When you launch WLS-VE, it will use a different IP address than the installation machine. WebLogic Server will generate a warning that the hostname is not the same as the host for the certificate. You can ignore this warning and the machine will run normally.

Upgrading and Promoting Domains

Generally, upgrading and promoting virtualized domains requires the same steps used for upgrading and promoting non-virtualized domains. The main steps in this process are:

1. Plan the upgrade.

   In this step, you need to inventory the application environment, verify supported configuration information, review the compatibility information, and create an upgrade plan

2. Prepare to upgrade.

   In this step, you undeploy any deployed applications, shut down all servers in the application environment, back up the application environment, install any required BEA products, prepare the remote Managed Server domain directories, and set up the environment

3. Upgrade your application environment.

4. Complete post-upgrade procedure.

For detailed instructions on these steps, please see Upgrading WebLogic Application Environments.

Due to its virtualized nature, when you upgrade WLS-VE, depending upon your required upgrade scenario, you will have to modify the standard upgrade procedure to address important virtualization issues. Those are described below.

Upgrade from a Non-virtualized WebLogic Server 9.2 to WLS-VE 9.2

When you upgrade an application from a non-virtualized implementation of WebLogic Server 9.2 to WLS-VE 9.2, you will need to make some modifications to the application code to ensure successful operation.

- Use the Domain Configuration Wizard to create an empty WLS-VE domain, copy the `<DOMAIN-DIR>/bin/startWLSVE.sh` or `.cmd` file, and edit the start file to work with your domain, as described in "Creating WLS-VE Domains" on page 7-3.
- Any Java commands that boot a server need to be changed from `java` to `java_esx`.
- Applications must continue to be able to run in a non-virtualized environment after they have been modified to work in the virtualized environment.
- If the application has hardcoded `localhost` as the host name, you must change the host name to the LiquidVM IP address.

  Note: If your application uses Pointbase, you will need to change `localhost` to the IP address of Pointbase.

- If your application uses default values for the host in the WLST `connect()` command, you will need to change it so that the hostname can be passed in.

Upgrade from an Earlier Version of WebLogic Server to WLS-VE 9.2

You cannot migrate an application directly from an earlier version of WebLogic Server (for example, version 8.1) directly to WLS-VE 9.2. Instead, you need to follow the upgrade procedures outlined in Upgrading WebLogic Application Environments.

Moving a WebLogic Server VE Domain To a Production Environment

Moving a WLS-VE domain into a production environment follows the same procedure used to move any development domain into production. The critical concerns here relate to added security and performance requirements in a production environment. See Securing a Production Environment for suggestions on securing your production environment. You also need to understand the NFS security issues described in "NFS Security Measures" on page 5-2. As with any migration, be sure to migrate the VM and any files stored on NFS server at the same time.

Starting WLS-VE

As defined earlier, WLS-VE is WebLogic Server plus LiquidVM, which is BEA JRockit on BEA's BareMetal technology. When you start LiquidVM, it will simultaneously boot the associated server. You can start a WLS-VE instance either from the command line or from VMware VirtualCenter running on the ESX host.

Note: You *cannot* start a WLS-VE server instance from the WebLogic Server Administration Console, nor can you use the Administration Console to resume or suspend a WLS-VE server instance. You can and should use the Administration Console to shut down a WLS-VE server instance.

From the Command Line

To start WLS-VE from the command line:

1. Open a command-line shell and navigate to `<DOMAIN_DIR>/bin/.`
2. Use one of the commands shown in Table 7-3.

Table 7-3 WLS-VE Start-up Commands

To	Enter
Start a WLS-VE Administration Server	`startWLSVE_Admin.sh` (or `.cmd` on Windows)
Start a WLS-VE Managed Server	`startWLSVE_Managed_`*`nn`*`.sh` (or `.cmd` on Windows) where *nn* is a sequential number identifying the individual Managed Server

From VirtualCenter

After you have started WLS-VE from the command line at least once, you can start it from the VMware VirtualCenter:

1. Launch VirtualCenter.
2. In the Inventory panel of VirtualCenter, drill down to and select the virtual machine associated with the machine you want to start.
3. Do one of the following:

– Click 

– In the Commands panel, select **Power On**.

– Right-click the mouse to open a context menu and select **Power On**.

As WLS-VE starts up, a progress meter appears in the Recent Tasks panel.

Once WLS-VE has successfully started, the task status changes to **Completed**.

Note: Please see DemoIdentity Keystore Warning for important information about a WLS-VE startup warning.

Stopping WLS-VE

Stopping WLS-VE should be carefully considered as the ripple effects of an improper shutdown can cause unexpected results. Ideally, you should shut down WLS-VE only by using one of following methods:

- Use the WebLogic Server Administration Console for the machine and request the server to gracefully shutdown.
  – For information on shutting down a server, see Shut Down a Server Instance and Control Graceful Shutdowns in the Administration Console Online Help.
  – For information on gracefully shutting down the Managed Servers in a cluster, see Shut Down Servers in a Cluster in the Administration Console Online Help.
- Use WLST scripts to request the server to gracefully shutdown. For more information, see Shutdown in the WLST Command and Variable Reference.

Note: You should not shut down WLS-VE by using the following methods:

- Clicking  in VirtualCenter
- Pressing Ctrl-C

Additional Configuration Tasks

Since WLS-VE contains both a JVM and a virtualized WebLogic Server instance, you can configure both devices by using the same configuration flags used by their non-virtualized editions. Usually, you can do this from the WebLogic Server administration console. Please refer to System Administration for BEA WebLogic Server 9.2 for complete information on how to:

- Configure a WebLogic Server environment

- Configure server security
- Configure system resources
- Configure and deploy applications
- Configure WebLogic Server environments for high availability

Tuning LiquidVM

The JVM should already be well-tuned for most WebLogic Server applications but you can configure and tune a machine's Java behavior by setting the necessary Java options in the start-up script for the domain in question. Simply enter the standard J2SE start-up options or BEA JRockit's non-standard `-X` and `-XX` options at the `JAVA_OPTIONS=` statement.

Listing 7-1 shows a snippet of the Administration Server start-up script, `startWLSVE.cmd`, with `JAVA_OPTIONS=` highlighted.

Listing 7-1 startWLSVE.cmd Code Snippet

```
@ECHO OFF
SETLOCAL
.
.
.
set PRE_CLASSPATH=
set POST_CLASSPATH=
set JAVA_OPTIONS=
set JAVA_PROPERTIES=
```

For example, suppose you want to start the machine so that LiquidVM uses a garbage collector (that is, a memory management system) optimized for application throughput. You would do this by setting `JAVA_OPTIONS` thusly:

```
JAVA_OPTIONS="-xgcprio:throughput"
```

You can string together as many valid options as you need; however, you must place them within quotation marks and separate them with a single space. For example, the following code:

```
JAVA_OPTIONS="-xgcprio:throughput -xgcreport -Xss:512k"
```

tells the JVM to:

- Start WLS-VE with its JVM using a garbage collector optimized for application throughput (”-xgcprio:throughput”).
- Generate an end-of-run report that shows garbage collection statistics (“-xgcreport”).
- Set the thread stack size (memory areas allocated for each Java thread for their internal use) to 512 KB (“-Xss:512k”).

See the BEA JRockit Reference Manual for a list of valid LiquidVM start-up options and instructions for using them. For LiquidVM tuning and configuration guidelines, see *Tuning Basics and Memory Management Basics* in the BEA JRockit *Diagnostics Guide*.

WLS-VE Configuration Properties

In addition to JVM behavior, you can also configure WLS-VE behavior by setting other parameters in the start-up script. The properties you can set are listed in Table 7-4.

Table 7-4 WLS-VE Start-up Options

Property	Description
SERVER_NAME	The WLS server name. In VMware SERVER_NAME is called WLS-(SERVER_NAME)
ADMIN_URL	The address Administration Server URL. This value must be set if you are configuring a Managed Server.
PRODUCTION_MODE	Set to true if this is production mode.
WLS_USER	The username used to access WLS. This value is set by the WLS Configuration Wizard.
WLS_PW	The password to use to access WebLogic Server. This value is set by the WLS Configuration Wizard.
PRE_CLASSPATH	Classpath to prepend to the standard classpath
POST_CLASSPATH	Classpath to append to the standard classpath
JAVA_HEAP_SIZE	The size of the Java heap, in megabytes.
JAVA_OPTIONS	Other options passed straight to the JVM

Table 7-4 WLS-VE Start-up Options

Property	Description
JAVA_PROPERTIES	Other Java properties on the form -Dproperty=val that will be passed straight to the JVM. This is similar to the JVM_OPTIONS but should only be used for properties.
CPUS	The number of CPUs to use (1,2,...)
IP_ADDRESS	The IP address for the server. If this property is not set, the server will use DHCP to dynamically get an IP address.
LVM_CONSOLE_LOG	The console log's path inside LiquidVM. This defaults to /domain/<WLS=<SERVER_NAME>.log
VI_NETWORK_NAME	The name of the VMware network this instance should use.
VI_COMPUTE_RESOURCE	The VMware Virtual Infrastructure Compute Resource to use. This is a host or a hosts running ESX Server.
VI_RESOURCE_POOL	The VMware Virtual Infrastructure Resource Pool that the host will use.
LVM_INFO	The default settings for LiquidVM including defaults for your virtualization environment. VI_COMPUTE_RESOURCE and VI_RESOURCE_POOL can be specified to override pieces of these settings.
LVM_NETMASK	The subnet mask for your network. You need to set this value if you are not using DHCP or you are not using default settings for netmask. The default netmask is 255.255.255.0
LVM_GATEWAY	The octet (###.###.###.###) for the gateway between your current network and one you want to access. You need to set this value if you are not using DHCP or you are not using default settings for netmask. The standard gateway is the static IP address masked with the set netmask, with a 1 in the lowest octet; for example if my netmask is standard 255.255.255.0 and my static IP is 172.23.80.102 then my default gateway is 172.23.80.1. If my netmask is 255.255.0.0 and the same static IP address then the gateway is 172.23.0.1.

Deploying an Application to WLS-VE

Deploy applications on WLS-VE the same way you deploy them on non-virtuali.zed WebLogic Server. Application deployment generally involves the following tasks:

- Preparing applications and modules for deployment
- Configuring applications for production deployment
- Exporting an application for deployment to new environments
- Deploying applications and modules with `weblogic.Deployer`
- Redeploying applications in a production environment
- Managing deployed applications

These tasks are detailed in Deploying Applications on BEA WebLogic Server 9.2.

CHAPTER 8

Installing and Updating License Files

Your BEA software requires a valid product license to run. The following sections explain how to acquire, install, and update your product license:

About BEA Product Licenses

BEA products use an XML-format license file called `license.bea`, which is installed in the BEA Home directory. Your BEA software checks this file at run time to determine which product components you are authorized to use.

Licenses are release specific. For example, to use WLS-VE 9.2, you must have a WLS-VE 9.2 license file.

BEA licenses the number of WLS-VE instances that you can run concurrently in your organization. Unlike WebLogic Server licensing, WLS-VE licensing neither restricts the IP address nor limits the number of CPUs of the host machine. For example, if you purchase a license for a single instance of WLS-VE, you can run a WLS Administration Server and deploy your applications onto the Administration Server. You can run this WLS-VE instance on a machine with any IP address and with any number of CPUs. You can shut down this instance and restart it on another machine with a different IP address and a different number of CPUs. If you

purchase a license for 10 instances, you can run a WLS Administration Server and up to 9 Managed Servers concurrently.

The types of license files that can be used as the `license.bea` file and the technical restrictions that they impose are described in the following table.

Note: See the End User License Agreement for specific license terms and conditions.

Table 8-1 BEA Products License File Types

License Type	Description
Evaluation	• Enables all WLS-VE product features. • Permits client connections from a maximum of five IP addresses. IP addresses are tracked from the time the server is started. When you restart the server, the count is reset. • Is installed in the BEA Home directory as `license.bea`.
Production	• Used in full-scale production environments. • Enables all WLS-VE product features. • Permits client connections from an unlimited number of IP addresses. • Must be purchased separately. For information about purchasing a production license, contact your sales representative or visit the BEA corporate Web site at `http://www.bea.com`.

When you install your software, an evaluation license file (`license.bea`) is installed on your system. The evaluation license expires in 60 days. By default, your software uses the evaluation license installed with the product so that you can start using it immediately. Subsequently, when you install additional BEA products that include a `license.bea` file, the installation program automatically adds the new product licenses to the `license.bea` file.

Note: The `license.bea` file conforms to the XML grammar definition. The XML definition (`<?xml version="1.0" encoding="UTF-8"?>`) must be at the very beginning of the `license.bea` file. There cannot be any spaces or line breaks before the XML definition.

For a description of the product offerings supported by the BEA Products license files, see the *Licensing* page at the following URLs:

- `http://e-docs.bea.com/common/docs92/interm/license.html` (WebLogic Server)

Updating Your license.bea File

When you install your BEA software, the installation program generates an evaluation `license.bea` file for use with the software and installs it in the BEA Home directory. If you are installing your software in an existing BEA Home, the installation program automatically adds the evaluation license included with your product distribution to the existing `license.bea` file.

In some cases, however, you must update the `license.bea` file separately, independent of the installation process. For example, you must update your license file if at least one of the following is true:

- You purchase a product for production use and you receive a production license to replace your evaluation license.
- You want to upgrade production systems to a new release of the software. After installing the current release of the software, you must upgrade your license to the current version. To do so, see "Upgrading Licenses from Previous Software Releases" on page 8-5.
- You want to consolidate existing production licenses for different BEA products onto a single machine.

In each of these cases, you will receive a new license file from BEA, the contents of which must be included in the `license.bea` file in the target BEA Home directory. To facilitate the license update process, BEA provides an `UpdateLicense` utility that merges the new license into the existing license in the BEA Home directory, and deletes any expired or duplicate entries.

The `UpdateLicense` merge process is not intended to modify the license attributes for any component or feature in the license files being merged.

Important Considerations for Updating Your license.bea File

When determining how to update your `license.bea` file, you should consider the following:

- If you want to merge the functionality enabled by both your new license and your existing license, you must use the `UpdateLicense` utility. For instructions, see "Updating license.bea Using the UpdateLicense Utility" on page 8-4.
- You may choose to replace an existing `license.bea` file with a new `license.bea` file, but if you do so, you run the risk of losing the product usage rights enabled by your existing license file.

Note: Do not edit the `license.bea` file manually. Doing so may cause operating problems for the currently installed BEA products, or result in problems later when BEA products are installed for maintenance upgrades.

Updating license.bea Using the UpdateLicense Utility

To update your `license.bea` file, perform the following procedure:

1. Save the license update file that you received through e-mail, with a name other than `license.bea`, in the target BEA Home directory. For example, save the file as `new_license.bea`. Use this file as the *`license_update_file`* in step 4 of this procedure.

   WARNING: Do not overwrite or change the name of the existing `license.bea` file.

2. Open a command prompt (or shell) and go to the target BEA Home directory.

3. Update your `PATH` variable so that it contains the JDK that the WLS-VE installer installed. For example:

   – On a Windows system:

   ```
   set PATH=BEA_HOME\JDK\bin;%PATH%
   ```

   – On a Linux system:

   ```
   PATH=BEA_HOME/JDK/bin:$PATH
   export PATH
   ```

   In this command, *`JDK`* represents the directory in which the WLS-VE installer installed the JDK, for example, `jdk150_06`.

4. Merge the license update file into your existing license by entering one of the following commands:

   – On a Windows system:

   ```
   UpdateLicense license_update_file
   ```

   – On a Linux system:

   ```
   sh ./UpdateLicense.sh license_update_file
   ```

   `license_update_file` represents the name to which you saved the license update file in step 1.

5. Save a copy of your updated `license.bea` file in a safe place outside your BEA software and application installation directories.

   Although no one else can use your license file, you should save a copy of it in a place that is protected from both malicious and innocent tampering.

Upgrading Licenses from Previous Software Releases

The format of the `license.bea` file changes with each release of BEA Products software. To upgrade a `license.bea` file from a previous release to a license for the current release, complete the following steps:

1. Log in to the BEA eLicense Web site at `http://elicense.bea.com`.

   Note: You need a BEA eLicense account to log in to this Web site. If you do *not* have a BEA eLicense account, click the Register link on the Customer Support site to register for one.

2. In the left navigation area of the Web page, click Upgrade/Downgrade and follow the instructions on the page. If the license you want to upgrade is not listed, click the Add a Missing License link. The BEA Licensing team will research the missing license for you.

   You will receive an upgraded license file through e-mail. To update the `license.bea` file on your system, see "Updating license.bea Using the UpdateLicense Utility" on page 8-4.

Installing Licenses for Use with Promotional DVD Distributions

In some cases, BEA distributes software for promotional purposes on DVD. Such DVDs include installers that do not automatically generate an evaluation license key. Instead, the DVD folio directs you to a BEA Web site, where you can obtain an evaluation license file after you supply a code from the DVD folio. The license file you obtain allows you to begin using the software immediately, and entitles you to the same usage rights described for the evaluation license in Table 8-1, "BEA Products License File Types," on page 8-2.

When you receive this license file from BEA, complete the following steps:

1. Save the license file using the name `license.bea`. Make sure that the filename does not include a suffix, such as `.txt`.
2. Copy the `license.bea` file into the BEA Home directory in which your BEA Products software was installed. For example, `W:\bea`.

CHAPTER 9

Uninstalling the Software

The following sections provide procedures for uninstalling the software:

About the Uninstallation Program

The following sections describe how to uninstall your BEA software on Windows and Linux systems. You can uninstall the software using graphical or console mode. To run the graphical-mode uninstallation program, your console must support a Java-based GUI. If the uninstallation program determines that your system cannot support a Java-based GUI, it automatically starts running in console mode.

The uninstallation program removes the WLS-VE product installation directory *unless* one of the following is true:

- The product installation directory contains user-created configuration or application files—*the uninstallation program does not delete user-created configuration files, application files, or domains*.
- The complete installation was not uninstalled. If an individual component is uninstalled, only the installation directory for that component is removed; the installation directories for other components are unaffected.
- The uninstallation program was invoked from within the product directory structure—specifically, from within the `uninstaller` directory.

The uninstallation program does not remove the BEA Home directory associated with the installation, the JDK that the WLS-VE utilities use, any user-created domains, or any ISO image files that you copied to the local disks of hypervisor hosts.

Uninstalling Your Software in Graphical Mode

Use the following procedure to uninstall the complete product installation, or individual components, in graphical mode:

1. Shut down any servers that are running.
2. Start the uninstallation program as described in Table 9-1.

Table 9-1 Starting the Uninstallation Program in Graphical Mode

To start the uninstallation program on this platform . . .	Perform the following steps . . .
Windows	1. From the Windows Start menu, choose Start→Programs→BEA Products→Uninstall BEA Products. The BEA Products Uninstaller Welcome window is displayed. 2. Proceed to step 3.
Linux	1. Go to the following directory: *WL_HOME*/uninstall Here *WL_HOME* represents the directory in which you installed your WebLogic Server software. 2. Enter ./uninstall.sh at the prompt. The BEA Products Uninstaller Welcome window is displayed. **Note:** If your system supports a graphical user interface, the uninstallation program starts in graphical mode. If your system does not support a graphical user interface, the uninstallation program starts in console mode. If console mode is started, see "Uninstalling Your Software in Console Mode" on page 9-4 for instructions.

3. Click **Next** to start the uninstall program.

   The Choose Components window is displayed.

4. Select the components to uninstall by selecting or clearing the appropriate check boxes. Then click **Next**. By default, all installed components are selected, indicating that they will be removed.

   The Server component contains the BEA WebLogic Configuration Wizard and Template Builder, the Domain Upgrade Wizard, the WebLogic Scripting Tool, and other files that are used to support the WLS-VE configuration, startup, licensing, and installation utilities.

   The ServerVE component contains the WLS-VE configuration and startup utilities and the WLS-VE ISO image that the installer created (not any copies of the ISO image that you create after running the installer).

5. Optionally, click **Details** to view the log file that lists the uninstalled components.
6. Click **Done** in the **Uninstalling BEA Products** window to exit the uninstallation program.

Uninstalling Your Software in Console Mode

Use the following procedure to uninstall the complete product installation, or individual components, using the command-line interface:

1. Shut down any servers that are running.
2. Start the uninstallation program as described in Table 9-2.

Table 9-2 Starting the Uninstallation Program in Console Mode

To start the uninstallation program on this platform . . .	Perform the following steps . . .
Windows	1. Open a Command Prompt window and go to the following directory: *WL_HOME*\uninstall Here *WL_HOME* represents the directory in which you installed your WebLogic Server software, typically C:\bea\weblogic<*version*>. 2. Enter the following command at the prompt: uninstall -mode=console The Welcome text is displayed.
Linux	1. Go to the following directory: *WL_HOME*/uninstall Here *WL_HOME* represents the directory in which you installed WebLogic Server. 2. At the prompt, enter the following command: sh ./uninstall.sh -mode=console The Welcome text is displayed.

3. Press Enter or type `next` to proceed to the next panel of the uninstallation program.

   Note: Instead of typing complete words when you want to enter `[Exit]`, `[Previous]`, and `[Next]`, you can use the following one-letter shortcuts: `x`, `p`, and `n`, respectively.

   The Choose Components to uninstall panel is displayed.

4. Select the components you want to uninstall. The available components are displayed as follows:

   ```
   Check the BEA Products components you want to uninstall.

   Release 9.2.1.0
       +----WebLogic Server [1] v
       |    +----Server [1.1] v
       |    +----ServerVE [1.2] v

   Enter number exactly as it appears in brackets to toggle selection OR
    [Exit][Previous][Next]>
   ```

   The `Server` component contains the BEA WebLogic Configuration Wizard and Template Builder, the Domain Upgrade Wizard, the WebLogic Scripting Tool, and other files that are used to support the WLS-VE configuration, startup, licensing, and installation utilities.

   The `ServerVE` component contains the WLS-VE configuration and startup utilities and the WLS-VE ISO image that the installer created (not any copies of the ISO image that you create after running the installer).

   By default, all installed components are selected, indicating that they will be removed.

5. Press Enter or type `next` to proceed with the uninstallation process.
6. When the uninstallation process is complete, press Enter or type `exit` to complete the uninstallation and exit the uninstallation program.

Deleting the ISO Image File

The WLS-VE ISO image contains the LiquidVM and WLS-VE classes that run on hypervisor software and host your applications. Each physical machine that hosts the hypervisor software on which you run WLS-VE either has its own copy of ISO on its local disk or else it accesses the ISO image from a SAN or NAS.

To delete the WLS-VE ISO image:

1. Shut down any instances of WLS-VE that are running.

2. Do any of the following:

- From VMware Virtual Infrastructure Client, browse or search datastores for the `wlsve.iso` file. Then use Virtual Infrastructure Client commands to delete the file.
- Use a secure FTP (`sftp`) client to establish a session with each hypervisor's host machine. Then use the `sftp rm` command to delete the `wlsve.iso` file.
- Use a secure shell (`ssh`) client to establish a session with each hypervisor's host machine. Then use the `ssh rm` command to delete the `wlsve.iso` file.

  For example:

  ```
  ssh root@myESXHost
  root@myESXHost's password:
  ...
  myESXHost:home/pat/>rm /vmfs/volumes/storage1/myCDs/wlsve.iso
  ```

  The Linux operating system includes an `sftp` and `ssh` client. For Windows, you can install (or download for free) third-party utilities that include the clients.

Reinstalling Your Software

You cannot reinstall the same version of any BEA product on top of a previously installed version of the same product—in the same BEA Home directory or in the same file location. You can, however, add products and product components to an existing installation.

To reinstall the same version of one of the product components or the entire BEA Products distribution in the same location, you must first uninstall the previous installation.

CHAPTER 10

Working with WLS-VE Using VirtualCenter

The VMware VirtualCenter, a component of VMware Infrastructure 2.0, is a graphical view into WLS-VE. It allows you to provision virtual machines and monitor performance of physical servers and virtual machines. VirtualCenter can optimize resources, ensure high availability to all applications running on virtual machines and improve the responsiveness of your IT environment with virtualization-based distributed services.

This section provides an overview of VirtualCenter to help you familiarize yourself with its components and some of its uses. This section is not intended as a VirtualCenter user guide beyond functionality that is specific to WLS-VE. For complete information on this product, we strongly recommend that you refer to the VMware Infrastructure Documentation at `http://www.vmware.com/support/pubs/vi_pubs.html`

This chapter contains information on these subjects:

Setting Up VMware and Enabling SSL

For information about installing VMware VirtualCenter, see the VMware *Installation and Upgrade Guide*.

To use SSL with VirtualCenter (which is strongly recommended), you must install the VMware Web Service. The VMware Web Service is installed by default when you choose the typical installation for VirtualCenter. For information about how to set up the VMware Web Service and verify that it is operating correctly, see the VMware *Installation and Upgrade Guide*. See also the *Developing Client Applications* chapter of the *VMware Infrastructure SDK Programming Guide*.

Starting (and Stopping) WLS-VE

You can start an existing WLS-VE instance from VirtualCenter one of three ways:

- Click the Play button.
- Click **Power On** in the Commands box.
- Right-click a machine on the Hosts and Clusters list and select **Power On** from the context menu that appears.

If you stop WLS-VE, you risk losing any underlying server connections, with no guarantee that these connections will be restored when the machine is restarted. For this reason, **stopping** WLS-VE **using VirtualCenter is not recommended**. If you must stop WLS-VE, follow the instructions for doing so in Stopping WLS-VE.

For more detailed information on starting (and stopping) a machine from VirtualCenter, please refer to Starting WLS-VE.

Editing VM Properties

You can edit the properties of a running virtual machine on the fly from within VirtualCenter. To do so, either:

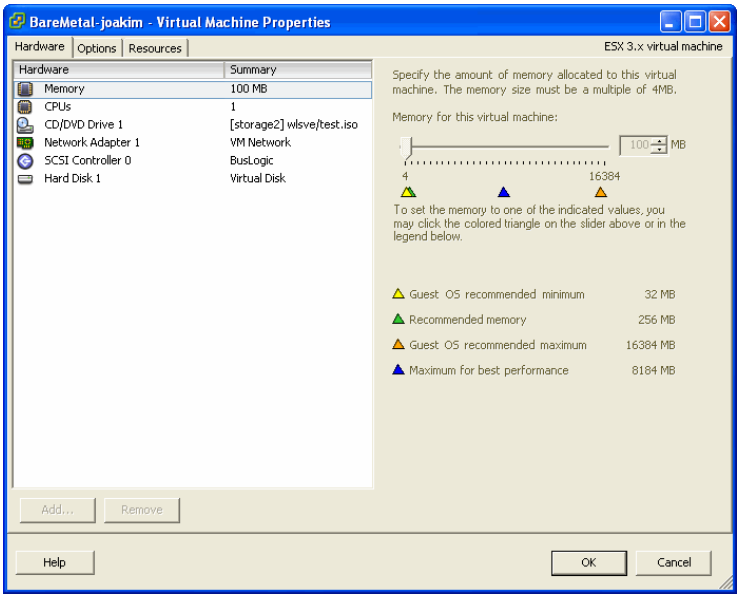
- Click **Edit Settings** in the Commands box

  OR

- Right-click a machine on the Hosts and Clusters list and select **Edit Settings** from the context menu that appears.

The Virtual Machine Properties window appears (Figure 10-1).

Figure 10-1 Virtual Machine Properties Window



This window is divided into three tabs, each providing access to certain groups of properties that you can edit, as described in Table 10-1. Unless otherwise specified, you can edit any of the values on these tabs so long as those properties are enabled for your VM.

Table 10-1 Virtual Machine Properties Tabs

Tab	Properties
Hardware	These properties can be changed: • **Memory**: Amount of memory allocated to the VM • **CPUs**: the number of virtual processors used by this machine These properties cannot be changed: • **CD/DVD Drive**: The path and filename of the machine's `.iso` file (there can be more than one drive) • **Network Adapter**: the device status, adapter label, and device type used by this machine (there can be more than one network adapter) • **SCSI Controller**: information about the SCSI controller, if any is used • **Hard Disk**: information about the virtual hard disk used by this machine, including disk size, disk file name, device node, and operational mode (there can be more than one hard disk)
Options	• **General**: information about the VM in use, including its name, configuration file, working location, and guest operating system • **VMware Tools**: identifies which VMware power controls are available to this machine and allows the user to select any scripts to run with the machine • **Power Management**: allows the user to define how the VM should behave when the guest operating system is placed on standby • **Advanced**: allows the user to set such advanced properties as whether or not to expose the No flag, enable logging, and set advanced configuration parameters
Resources	• **CPU**: allows the user to allocate resources to the CPU • **Memory**: allows the user to allocate memory resources • **Disk**: allows the user to reallocate hard disk resources • **Advanced CPU**: allows the user to permit or deny sharing of physical CPU cores when the host supports hyperthreading and to select physical processor affinity for the VM

For details on how to use the Virtual Machine Properties window to edit VM settings, please refer to the VMware document, *Basic System Administration*, at:

`http://www.vmware.com/pdf/vi3_admin_guide.pdf`

Pausing a VM

Pausing, or hibernating, a VM causes it to stop running while allowing all other processes to continue. You can pause a VM either by clicking the Pause button or by right-clicking a running machine in the Hosts & Clusters list and selecting Suspend from the context menu that appears.

You should be very careful when pausing a VM and only use this function when absolutely necessary. When you pause a VM instance while you have open connections to the server, you risk losing these connections when you awaken the VM. The resultant unpredictable behavior might cause these connections to be reset.

Working with the Console Tab

While most of the VirtualCenter tabs are fairly straightforward in their use, the Console tab does support certain functions specific to WLS-VE. This section describes those functions.

Inactive Keyboard

When you click in the Console tab, most keys on your keyboard will disabled and your mouse pointer will disappear. You can use the key sequences listed in Table 10-2 to perform certain functions when the console is open:

Table 10-2 VirtualCenter Console Tab Key Sequences

Press...	To...
Ctrl-Break	Force a stack trace.
Ctrl-C	To shut down LiquidVM.
Ctrl-Alt	Reactivate your mouse pointer.
F1	Display environmental information.
F10	Collect application profile data. To use this key: • First, ensure that you have applied a load to the application. • Press F10 once to start a data collection. • Press F10 a second time to display the information you collected.

Console Log

Text written to the console also gets written to a log file. This log file is normally stored in the current working directory as seen from inside the WLS-VE instance. By default, that is `/domain` (that is, your domain directory on the NFS server). The default name of the file is `<vmname>.log`. You can change the name of the log file by setting the parameter `LVM_CONSOLE_LOG` in the startup script (see WLS-VE Configuration Properties for instructions on setting properties in the start-up script).

Pre-console Log

Before the LiquidVM has a network connection it cannot write to the log file because it needs a network connection to do so. If something were to fail during initialization, you might still want to see what happened without having to use Virtual Infrastructure Client. WLS-VE supports such monitoring with the help of the WLS-VE launcher. After the WLS-VE is launched, the launcher continues to monitor the log-in process for five seconds and then requests the data written to the console during those first five seconds. This request uses the VMware communication channels that don't require networking to be set up, hence the WLS-VE launcher will get machine log even if networking initialization has failed.

CHAPTER 11

Diagnostics and Troubleshooting

This section describes what to do when things go wrong. It describes how to deal with problems that occur in both the server and the JVM and problems endemic to WLS-VE specifically. It also describes how to obtain information about your WLS-VE instance and provide that information to BEA's Support organization. This chapter includes information on the following subjects:

Troubleshooting WLS-VE Problems

This section provides information you will find helpful in solving problems that might occur with WLS-VE. Generally, you handle WebLogic Server and LiquidVM (the BEA JRockit component) problems the same way you would for their non-virtualized versions. You should follow BEA Support's instructions for information collection, augmented with those in Reporting a Problem to BEA Support. For BEA JRockit, you can use the standard tools available with BEA JRockit Mission Control—such as the JRockit Runtime Analyzer and Memory Leak Detector—to help you diagnose problems and collect relevant information about runtime activity.

This section contains information on the following subjects:

- Troubleshooting WebLogic Server Issues
- Troubleshooting LiquidVM Issues

Troubleshooting Common WLS-VE Issues

Problems with WLS-VE not specifically associated with WebLogic Server or with LiquidVM, can probably be traced to configuration errors. This section will help you identify the problem and figure out what caused it and how to resolve it. If you cannot find the solution here, collect the necessary information about your system, as described in Reporting a Problem to BEA Support, and open a case with BEA Support.

The most common error conditions you might encounter are:

- "Could not find the disk" Error
- "Could not lookup NFS server" Error
- "Could not ping NFS server" Error
- "(Mount Daemon) not registered" Error
- "Error stating root" Error
- "Failed to open conslog" Error
- The Server Shuts Down Soon After Startup I
- The Server Shuts Down Soon After Startup II
- "looking up myserver" Error
- "multiple gid provided only one allowed" Error
- "uid=# must be a number" Error
- "netSend failed: -3" Error
- "Configured IP [...] in use by MAC" Error

"Could not find the disk" Error

Symptom: When you launch your instance and you get the following output in your OS console window:

```
Starting WLS-MyServer. connect...configure...create...
Could not find the disk: [storage2] wlsve/isoName.iso
```

Problem: When the virtual machine was created, VMware could not find the ISO image that you need to boot up WLS-VE.

Solution:

Check that you have uploaded the WLS-VE ISO image to the ESX server (see Copying the ISO Image to ESX Server Datastores for more information).

Check the `bea.lvm.info` file in your home directory that it points to that same location. You can do this either by manually editing the `bea.lvm.info` file in your favorite editor or by rerunning the LiquidVM configuration wizard (`tools\virtualization\control_1.0\bin\lvm_configwizard.cmd` or `.sh`), as described in User Access Credentials.

Confirm that the ISO image exists, using the LiquidVM configuration wizard:

1. Select VM Host.
2. Select the Configuration tab and note the Datastore Name.
3. Select Browse Datastore and confirm that `wlsve921.iso` is available in your datastore.

"Could not lookup NFS server" Error

Symptom: When you launch your instance, you get the following output in your OS console window:

```
WARNING: Could not lookup NFS server foobar
         Could be ok if LiquidVM network topology is different.
To ignore warnings. Set environment variable LVM_ACCEPT_WARNING=true.
LiquidVM start-up aborted.
```

Problem: Probably caused by a non-existent NFS server being provided or a different network topology on the launching machine where your WLS-VE instance will start,. You can ignore the warning.

Solution: Verify that the server exists then check `DOMAIN_MOUNT`, `BEA_MOUNT`, `TMP_MOUNT` in the start-up script and ensure that the server name is spelled correctly.

This check is done on the launching OS; the check could be wrong, because LiquidVM will start from another machine that might have access to other pieces of the network. If this is the case, to

ignore the warning, set the environment variable `LVM_ACCEPT_WARNING=true`. This will preempt the check.

"Could not ping NFS server" Error

Symptom: When you launch your instance, you get the following output in your OS console window:

```
WARNING: Could not ping NFS server named myserver
   Maybe this is ok - because network topology may be different for LiquidVM
To ignore warnings. Set environment variable LVM_ACCEPT_WARNING=true.

LiquidVM start-up aborted.
```

Problem: Probably caused by a non-existent (or misspelled) NFS server being provided or a different network topology on the launching machine where your WLS-VE instance will start,. You can ignore the warning.

Solution: Verify that the server exists then check `DOMAIN_MOUNT`, `BEA_MOUNT`, `TMP_MOUNT` in the start-up script and ensure that the server name is spelled correctly.

This check is done on the launching OS; the check could be wrong, because LiquidVM will start from another machine that might have access to other pieces of the network. If this is the case, to ignore the warning set the environment variable `LVM_ACCEPT_WARNING=true`. This will preempt the check.

"(Mount Daemon) not registered" Error

Symptom: When you launch your instance, you get the following output in your OS console window and/or in the VM's Console tab in VirtualCenter:

```
Baremetal hostname: "172.23.82.203"  IP address: 172.23.82.203
000000 [rpcconn   WRN] program 100005 (Mount Daemon) not registered
000001 [rpcconn   WRN] Is Mount Deamoen (needed for NFS) running on host
nfserver.foo.com?
000002 [rpcconn   WRN] pmapGetPort returned: 22
000003 [nfsconn   WRN] Error setting up connection to mountd: 22
000004 [nfs       WRN] Failed to mount: snfsserver.foo.com:/share/Temp
```

Problem: One of the following has happened:

- The server name you have provided as the NFS server exists, but there is no NFS server running on that server.

- Your network configuration is incorrect.

Solution: Do the following:

1. Check your `DOMAIN_MOUNT`, `BEA_HOME_MOUNT`, `TMP_MOUNT` to verify that you actually picked servers that you know have a NFS-server service running. If this is correct:
2. Check your static IP address, your gateway (`LVM_GATEWAY`) and your netmask (`LVM_NETMASK`) and verify that they are correct.

"Error stating root" Error

Symptom: When you launch your instance you get the following output in your OS console window and/or in the VM's Console tab in VirtualCenter:

```
Starting WLS-AdminServer. connect...configure...start...booting...
VM-log:
Baremetal hostname: "172.23.82.203"  IP address: 172.23.82.203
000000 [nfs       WRN] nfsReadSuperBlock: Error stating root (116)
000001 [vfs       WRN] Error reading super block
000002 [vfsx      WRN] Failed to read super block
000003 [mount     WRN] Could not mount nfs at /domain (-1)
000004 [mount     WRN] Failed to process mount points
```

Problem: The user credentials you have provided for the NFS domain directory do not have the necessary rights to create files in the domain directory. You have specified a user that lacks rights to access this NFS-share

Solution: Check your `DOMAIN_MOUNT` and verify that the `uid` and `gid` are correct.

"Failed to open conslog" Error

Symptom: When you launch your instance, you get the following output in your OS console window and/or in the VM's Console tab in VirtualCenter:

```
Starting WLS-AdminServer. connect...configure...start...booting...
VM-log:
Baremetal hostname: "172.23.82.203"  IP address: 172.23.82.203
000000 [console   WRN] Failed to open conslog [WLS-AdminServer.log] error:
Permission denied
```

Problem: The user credentials you have provided for the NFS domain directory do not have the necessary rights to create files in the domain directory. Either you have specified the wrong user or the access rights on the domain directory are wrong.

Solution: Check your domain mount and verify that the `uid` and `gid` are correct. Check that the user or group has the necessary rights to the domain directory on the NFS server (use `chmod`, `chown`, and `chgrp` to change the ownership and rights, as appropriate).

The Server Shuts Down Soon After Startup I

Symptom: The server shuts down soon after startup and a log file named `WLS-<servername>.log` appears in your domain directory. In that file, you find the following:

```
<22-Mar-2007 19:46:36 o'clock CET> <Info> <Security> <BEA-090065> <Getting
boot identity from user.>
Enter username to boot WebLogic server:000257 [procfs    WRN] Implement
console read
<22-Mar-2007 19:46:36 o'clock CET> <Error> <Security> <BEA-090782> <Server
is Running in Production Mode and Native Library(terminalio) to read the
password securely from commandline is not found.>
<22-Mar-2007 19:46:36 o'clock CET> <Notice> <WebLogicServer> <BEA-000388>
<JVM called WLS shutdown hook. The server will force shutdown now>
<22-Mar-2007 19:46:36 o'clock CET> <Alert> <WebLogicServer> <BEA-000396>
<Server shutdown has been requested by <WLS Kernel>>
<22-Mar-2007 19:46:36 o'clock CET> <Notice> <WebLogicServer> <BEA-000365>
<Server state changed to FORCE_SHUTTING_DOWN>
```

Note: If your server shuts down soon after startup and the preceding was not the error message you received, see The Server Shuts Down Soon After Startup II.

Problem: You didn't provide a user name and password either in the security directory of the Administration Server's root directory or in the script `WLS_USERNAME`, `WLS_PASSWORD`. Keep in mind that WLS-VE does not support normal keyboard input, so you cannot enter a username and password on the keyboard.

Solution: Add the password to the security directory of the Administration Server's root directory (see Creating a Boot Identity File for an Administration Server in the WebLogic Server 9.2 document, *Managing Server Startup and Shutdown*) or add username and password in the startup script and relaunch your WLS-VE server.

The Server Shuts Down Soon After Startup II

Symptom: The server shuts down soon after startup and a log file named `WLS-<servername>.log` appears in your domain directory. In that file, you find the following:

```
<22-Mar-2007 18:23:39 o'clock CET> <Critical> <WebLogicServer> <BEA-000362>
<Server failed. Reason:
Unable to start WebLogic Server!
Exception occurred while reading the license file.
Please make sure you have a valid license.bea
license...
```

Problem: The `BEA_HOME_MOUNT` points to a directory that is not a BEA home. For some reason, you don't have a file named `license.bea` in the directory specified.

Solution: Ensure that your `BEA_HOME_MOUNT` points to the right directory (that is, a BEA home directory).

"looking up myserver" Error

Symptom: You receive the following error message on the VirtualCenter console:

```
000000 [rpcconn   WRN] Error looking up myserver
000001 [rpcconn   WRN] Error getting address for host myserver
000002 [nfsconn   WRN] Error setting up connection to mountd: 22
000003 [nfs       WRN] Failed to mount myserver:/share/Temp
```

Problem: You have specified only the short name for the NFS server; that is, you didn't specify a domain name, too (for example, you just specified `myserver`, instead of `myserver.foo.com`). When the WLS-VE instance starts up, it doesn't belong to your domain and hence it will not know to ask for `myserver.foo.com` when you say `myserver`. This causes the name lookup to fail.

Solution: Either specify the NFS server with its fully-qualified name (`myserver.foo.com`) or specify the NFS server using its IP address.

"multiple gid provided only one allowed" Error

Symptom: When you launch your instance, you get the following output in your OS console window:

```
NFS syntax should be on the form: nfsserver:/nfs/path,uid=#,gid=#
ERROR: Illegal nfs path:
       myserver.bea.com:/share/Temp/smith/dom,gid=506,gid=502
       multiple gid provided only one allowed
LiquidVM start-up aborted.
```

Problem: You have typed the `gid` twice; you probably meant for the first one to be `uid` and not `gid`.

Solution: Remove the wrong `gid` from the start-up script. You might also want to add a `uid=#` too, if that was what you intended.

"uid=# must be a number" Error

Symptom: When you launch your instance, you get the following output in your OS console window:

```
NFS syntax should be on the form: nfsserver:/nfs/path,uid=#,gid=#
ERROR: Illegal nfs path:
       myserver.bea.com:/share/Temp/jsmith/dom2,uid=jsmith,gid=502
       uid=# # must be a number but is : jsmith
LiquidVM start-up aborted.
```

Problem: You have specified a username instead of a `uid` for user credentials to NFS. NFS only understands a `uid` *number*.

Solution: Change your `*_MOUNT` in the start-up script to use a `uid` number instead of the username string.

"netSend failed: -3" Error

Symptom: You receive the following error message on the Virtual Center console:

```
000000 [rpcconn    WRN] netSend failed: -3
000000 [rpcconn    WRN] Rpc call failed
000000 [rpc        WRN] Rpc request failed: 3
000000 [rpc        WRN] rpcDoReqeust returned 3
000000 [rpc        WRN] rpcCall 3 returned 8549398
```

Problem: Your network configuration is incorrect.

Solution: In the start-up script, check your static IP address, your gateway, and your netmask and verify that they are correct. If they aren't, obtain the correct information and enter it in the respective property.

"Configured IP [...] in use by MAC" Error

Symptom: When you attempt to start a server, you receive this message:

```
000000 [net   WRN] Configured IP [172.18.134.55] in use by MAC: 00:50:56:a0:
06:96
000001 [net   WRN] Network stack initialization FAILED: 98
```

Problem: Someone else is already using the IP address you have specified.

Solution: Another running VM might be using the same IP address. Do the following:

- Verify that you typed the IP address correctly.
- Verify that none of your running VMs already use that IP address.

If neither of the above is the case, someone else is using your IP address. Since finding out who that might be is difficult, contact your system administrator to obtain another IP address.

Troubleshooting WebLogic Server Issues

Server-related problems that can befall WLS-VE are the same sort of problems you might encounter running non-virtualized WebLogic Server. This section provides an overview of the kinds of WebLogic Server problems you should watch for when running WLS-VE. It includes information on these subjects:

- Performance Issues
- Server Failure
- Clustering Issues
- Other WebLogic Server Problems

Performance Issues

Often, a problem with WebLogic Server is the result of poor tuning. For example, pool sizes (such as pools for JDBC connections, Stateless Session EJBs, and MDBs) that don't maximize concurrency for the expected thread utilization can adversely affect performance. Similarly, applications that handle large amounts of data per request will experience a boost in performance if the chunk size—that is, a unit of memory that the WebLogic Server network layer uses to read data from and write data to sockets—the size on both the client and server sides can be increased, a process called tuning the chunk size.

You can find well-tested tuning and performance guidelines in *WebLogic Server Performance and Tuning*.

Server Failure

A server instance can fail and different events can lead to this failure. Often one failure condition leads to another. Loss of power, hardware malfunction, operating system crashes, network partitions, and unexpected application behavior can all contribute to the failure of a server instance. Even in a clustered environment, server instances may fail periodically and you must be prepared for the recovery process. See Avoiding and Recovering From Server Failure in *Managing Server Startup and Shutdown* for information on dealing with server failure.

Clustering Issues

A number of cluster problems can affect the performance of WebLogic Server. These problems can occur for many reasons, including licensing and versioning errors, multicast addressing problems, errors or misspellings in start-up commands, and even a poorly-tuned memory management systems. You can find guidelines for troubleshooting cluster problems in Troubleshoot Common Problems in *Using WebLogic Server Clusters*.

Other WebLogic Server Problems

Other, non-specific problems can also occur with WebLogic Server. When these problems occur, they usually generate an error message with an associated error code. The Index of Messages by Message Range provides descriptions, possible causes, and corrective actions for all WebLogic Server error conditions.

Troubleshooting LiquidVM Issues

Problems that don't originate with WebLogic Server may occur in LiquidVM and are typical to the kinds of problems you might encounter in non-virtualized JVMs. Problems such as these are documented in the BEA JRockit Diagnostics Guide (BEA JRockit is the JVM component of LiquidVM). This document provides information for either resolving the problem yourself or mining the necessary information required to open a case with BEA Support.

The sort of LiquidVM problems you might encounter when running WLS-VE are:

- System crashes occur when the entire system shuts down involuntarily and usually without warning. See Troubleshooting BEA JRockit Crashes.
- System freezes occur when the application stops answering requests but the process is still there. See BEA JRockit is Freezing.

- Slow startups usually occurs when BEA JRockit's optimizing compiler must run extensively to ensure that the most efficient code possible is compiled. See BEA JRockit Starts Slowly.
- Poor performance usually occurs when your application experiences poor throughput. This usually indicates that the memory management system has not been tuned for optimal performance. See Too Few Transactions are Executing Per Minute.
- Occasional slow response times usually indicate that transactions are taking too long to execute, a bottleneck most often caused by garbage collection pause times lasting too long. See Individual Transactions are Taking Too Long.
- Performance degrading after the application has been running is characterized by your application, although working fine early in its run but, after a while reporting the wrong results, throwing exceptions where it shouldn't, or it simply crashing or hanging at roughly the same time each time you run. See BEA JRockit's Performance is Degrading Over Time.

Note that in most UNIX operating systems there is a file descriptor limit that limits the number of files and sockets you can have open. LiquidVM does not have such limits so there is no need (and no way) to set a file descriptor limit.

For complete information on BEA JRockit problem determination and resolution, please see Diagnosing and Resolving Problems in the BEA JRockit Diagnostics Guide.

Handling Suspend Files

When WLS-VE crashes, the VM goes into a state of suspension. A pause button will appear on the VirtualCenter and information about the crash will be written to the console. When a suspend file is created, do the following:

1. `tar-gzip` the suspend file. You will find it on the VM's home directory; it will have a filetype of `.vmss`.
2. Copy the `tgz` file from the ESX server to your normal environment (for example, your `My Documents/` folder).
3. Upload the `tgz` file to BEA Support.

Be aware that you might not realize that your machine has actually crashed when it suspends. You should avoid the temptation to resume execution, as you might lose critical information that would be helpful in diagnosing the problems causing the crash. You should also be aware that suspend files are huge and might not be easy for you to copy from the ESX server.

Displaying Version Information

A critical piece of information that Support will need to help diagnose any problems you report to them is the version number. You can find this number in the file `LVM_VERSION`, which is located in the `tools/virtualization/control_1.0/` directory of your `LVM_HOME` directory:

```
<BEA_HOME>/<WLSVE_HOME>/<LVM_HOME>/tools/virtualization/control_1.0/LVM_VERSION
```

Open this file to find the version number; for example:

```
LiquidVM R1.0_77103
```

Reporting a Problem to BEA Support

If you determine that you need to file a trouble report, this section discusses what you need to do before opening the case to ensure that you supply the support personnel assigned to your issue as complete picture of what is wrong as possible. The more information you can provide, the more quickly will the support staff be able to resolve your issue. This section includes information on these subjects:

- Trouble Reporting Process Overview
- Identify Your Problem Type
- Verify That You're Running a Supported Configuration
- Collect Enough Information to Define Your Issue

Trouble Reporting Process Overview

When you encounter a problem with WebLogic Server Virtual Edition and can't resolve it using the information provided in the relevant BEA documentation, you need to collect the information that best describes your problem and open a case with BEA Support. If you have a service agreement with BEA, the normal process is to contact your Level 1 service provider, who will make the initial attempts to correct the problem. If the case cannot be solved by the Level 1 staff, it is escalated to the Level 2 staff, who will draw on their particular expertise to get your JVM running again. For serious problems, the issue will be handled by the Level 3 staff (the WebLogic Server Virtual Edition developers)

Identify Your Problem Type

Is your machine crashing? Is it running slowly or returning unpredictable results? These are the kind of symptoms that indicate a problem with WebLogic Server Virtual Edition. Being able to identify what kind of problem you are experiencing will help you know what kind of information you need to include when you open the trouble report.

Verify That You're Running a Supported Configuration

Before submitting a bug, verify that the environment where the problem arises is a supported configuration. Please see Verifying That Your Environment Supports WLS-VE.

Collect Enough Information to Define Your Issue

In addition to testing with the latest update release, use the following guidelines to prepare for submitting a trouble report:

1. Collect as much relevant data as possible. For example, generate a thread-dump in the case of a deadlock, or locate the core file (where applicable) and `hs_err` file in the case of a crash. In all cases it is important to document the environment and the actions performed just before the problem is encountered.
2. Where applicable, try to restore the original state and reproduce the problem using the documented steps. This helps to determine if the problem is reproducible or an intermittent issue.
3. If the issue is reproducible, try to narrow the problem. In some cases, a bug can be demonstrated with a small standalone test case. Bugs demonstrated by small test cases will typically be easy to diagnose when compared to test cases that consists of a large complex application.
4. Search the bug database to see if the bug, or similar bugs, have been reported. If the bug has already been reported, the bug report may have further information. For example, if the bug has already been fixed it will indicate the release that the bug was fixed in. The bug may also contain information such as a work around or include comments in the evaluation that explain, in further detail, the circumstances that cause the bug to arise.

If you conclude that the bug has not already been reported, then it is important to submit a new bug.