VMS Software

VSI OpenVMS Alpha Version 8.4-2L2 Installation and Upgrade Manual

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Preface

1. About VSI

VMS Software, Inc., (VSI) is an independent software company licensed by Hewlett Packard Enterprise to develop and support the OpenVMS operating system. VSI seeks to continue the legendary development prowess and customer-first priorities that are so closely associated with the OpenVMS operating system and its original author, Digital Equipment Corporation. To this end, we have called up an onshore team of veteran OpenVMS developers, many harking back to the core DEC team responsible for the technical excellence that has been the hallmark of OpenVMS. Furthermore, as the name implies, our entire marketing, sales, R&D, and development staff are completely dedicated to one thing: enhancing and supporting OpenVMS, and its dedicated customers, into the future.

2. Intended Audience

This manual is intended for anyone responsible for installing or upgrading OpenVMS Alpha, and for the startup, shutdown, and backup operations required on HPE Alpha servers.

Users of this manual are expected to obtain and reference any additional documentation specific to their hardware. Users are expected to know how to identify the various devices involved in their installation and be familiar with the console commands that are available on their system.

3. About VSI OpenVMS Alpha V8.4-2L2

VSI OpenVMS Alpha Version 8.4-2L2 is an Alpha operating system release that has been solely developed and marketed by VMS Software, Inc. Hewlett Packard Enterprise (HPE) will not provide support and does not warranty any VSI OpenVMS Alpha versions.

Please disregard any reference in this manual that implies HPE support for any VSI OpenVMS Alpha version.

4. Typographical Conventions

The following conventions are used in this manual:

Convention	Meaning
Ctrl/*x*	A sequence such as **Ctrl/*x*** indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 *x*	A sequence such as **PF1 *x*** indicates that you must first press and release the key labeled PF1 and then press and release another key (***x***) or a pointing device button.
Enter	In examples, a key name in bold indicates that you press that key.
...	A horizontal ellipsis in examples indicates one of the following possibilities:− Additional optional arguments in a statement have been omitted.− The preceding item or items can be repeated one or more times.− Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.

Convention	Meaning
( )	In command format descriptions, parentheses indicate that you must enclose choices in parentheses if you specify more than one. In installation or upgrade examples, parentheses indicate the possible answers to a prompt, such as: `Is this correct? (Y/N) [Y]`
[ ]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for directory specifications and for a substring specification in an assignment statement. In installation or upgrade examples, brackets indicate the default answer to a prompt if you press **Enter** without entering a value, as in: `Is this correct? (Y/N) [Y]`
|	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are optional; within braces, at least one choice is required. Do not type the vertical bars on the command line.
{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold type	Bold type represents the name of an argument, an attribute, or a reason. In command and script examples, bold indicates user input. Bold type also represents the introduction of a new term.
italic type	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error *number*), in command lines (/PRODUCER=*name*), and in command parameters in text (where *dd* represents the predefined code for the device type).
UPPERCASE TYPE	Uppercase type indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
`Example`	This typeface indicates code examples, command examples, and interactive screen displays. In text, this type also identifies website addresses, UNIX command and pathnames, PC-based commands and folders, and certain elements of the C programming language.
–	A hyphen at the end of a command format description, command line, or code line indicates that the command or statement continues on the following line.
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radixes—binary, octal, or hexadecimal—are explicitly indicated.

5. VSI Encourages Your Comments

You may send comments or suggestions regarding this manual or any VSI document by sending electronic mail to the following Internet address: <docinfo@vmssoftware.com>.

6. How to Order Additional Documentation

For information about how to order additional documentation, email the VSI OpenVMS information account: <info@vmssoftware.com>. We will be posting links to documentation on our corporate website http://www.vmssoftware.com soon.

Chapter 1. Getting Started

This chapter describes the steps that you need to perform before installing or upgrading your HPE AlphaServer to VSI OpenVMS Alpha Version 8.4-2L2.

1.1. Supported Upgrade Paths

If you are upgrading to VSI OpenVMS Version 8.4-2L2, your HPE Alpha server must be running one of the following HPE or VSI OpenVMS Alpha versions prior to the upgrade:

• HPE OpenVMS Alpha Version 7.3-2

• HPE OpenVMS Alpha Version 8.3

• HPE OpenVMS Alpha Version 8.4

• VSI OpenVMS Alpha Version 8.4-2L1

Note

For a complete list of layered products provided in the VSI OpenVMS Alpha V8.4-2L2 kit, please refer to the *VSI OpenVMS Alpha Version 8.4-2L2 Cover Letter and Guide to Media*.

1.2. Supported Alpha Servers

For a list of hardware supported in VSI OpenVMS Alpha V8.4-2L2, please refer to the *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs*.

1.3. Alpha System Shutdown

VMS systems, whether clustered or stand-alone nodes, should be shut down using the SYSMAN utility. Alternatively, system managers may invoke the VMS Shutdown command procedure directly. Be advised that system shutdown can be quite complex and modifications to these procedures should be carefully considered and thoroughly tested. For example, beware of the following scenario.

The VMS Shutdown command procedure, SYSHUTDWN.COM, is invoked via the command:

```
$ @SYS$SYSTEM:SHUTDOWN
```

This procedure does not stop processes using the network until very late in the shutdown process. However, if you modify SYSHUTDWN.COM and invoke network shutdown (i.e. TCPIP$SHUTDOWN) from within this command procedure, and you are connected to the system from an SSH Terminal (or, if using DECnet, a SET/HOST session) the network shutdown may cause your terminal session or your system itself to hang.

Simply avoid doing this, or run your procedure with /DETACH, or better yet, use the SYSMAN utility to shutdown your system, as this utility is designed to avoid these types of problems.

1.4. Alpha System Preparation

You need to have access to the system console. Depending on your system, this may require installing a serial communication cable (null-modem cable) between your system's console port and a portable laptop computer or other suitable device capable of acting as a terminal or terminal-emulator (PuTTY, Kermit, Hyperterm, etc.). Directly connecting a physical terminal (i.e. VT220 etc.) is also an option,

but most users will prefer the convenience of having online access to documentation and other information on a laptop computer.

More advanced systems are likely to have remote management ports and management processors that provide for console access. You may need to set up and enable network access methods, such as TCP/IP and Telnet or SSH to access these systems. As always, refer to your system documentation.

You need to be familiar with your computer system and console command environment. Specifically, you must be able to identify the physical location and logical name of the device where the distributed VSI OpenVMS Alpha Version 8.4-2L2 installation or upgrade kit image resides, and the target drive containing the system to be upgraded. The upgrade or installation kit may be on a CD drive, a local VMS disk, or an Infoserver-enabled system that serves a CD image. If you burn a physical CD with the upgrade image, systems that do not have a built-in CD reader may require temporary installation of a portable USB-CD drive. There are numerous subtle console command variations among system models, so be sure to become comfortable with your console environment before proceeding.

VSI recommends that you record the installation procedure. A transcript is helpful if a problem occurs during installation. If you are using terminal emulation software, set the software to log the session. Otherwise, set up your system to record the installation procedure on either a hardcopy terminal or a printer attached to the console terminal.

In general, your system should be running the latest revision of firmware. Contact your hardware vendor if you need to verify or update firmware revisions. System Firmware is no longer provided on the operating system distribution media.

1.4.1. Firmware on Alpha Systems

OpenVMS Alpha performs a firmware check each time the system is booted. When you boot the OpenVMS Alpha operating system CD, the system automatically checks the version of console firmware that is running on your computer. The system also provides information about how to update the firmware.

If you do not have the *required* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-F-FIRMREV, Firmware rev. nnn is below the absolute
minimum of nnn.
Please update your firmware to the recommended revision nnn,
Alpha Systems Firmware Update Vn.n.
```

If you do not have the *recommended* version of console firmware, the system displays a message similar to the following:

```
%SYSBOOT-W-FIRMREV, Firmware rev.nnn is below the recommended
minimum of nn.
Please update your firmware to the recommended revision,
which can be found on the firmware CD labeled:
Alpha Systems Firmware Update Vn.n.
```

Contact your hardware vendor for the latest HPE AlphaServer firmware.

1.5. Device-Naming Conventions

Various console operations will ask for a *device name* for the source drive and one for the target drive. When specifying those device names, note the following naming conventions:

• When the source drive is a local CD drive, the device name is similar to the following:

  DQA0 (IDE drive) or DNA0 (USB drive)

For a device name, such as DQA0:, note the following conventions:
- *DQ* is the device code.
- *A* is the device controller designation.
- *0* is the unit number of the device.

- When the target drive is a local disk, the device name is similar to the following:

  DKA0:

- When the source drive is a virtual CD drive served by the Infoserver, the device name is similar to the following:

  DAD1:

- On systems configured in certain OpenVMS Cluster or HS*x* environments, the device naming convention is similar to the following:

  DUA20.14.0.2.0

  The values you specify identify components such as the boot device, controller, unit number of the boot device, HS*x* controller node number, and channel numbers. Because these values vary depending on your specific hardware configuration, see the owner, operator, and technical service manuals that came with your computer for detailed information.

1.6. Selecting the Install/Upgrade/Backup Option

Now that you have reviewed key terms, examined hardware and software requirements, and learned how to use the menu system included on the OpenVMS operating system media, you can do the following:

IF ...	THEN GO TO...
You want to install the operating system in an OpenVMS Cluster environment	Chapter 2, *Preparing to Install in an OpenVMS Cluster Environment*, and then Chapter 3, *Installing the OpenVMS Operating System*. Perform postinstallation tasks described in Chapter 7, *After Installing or Upgrading the OpenVMS Operating System*.
You want to install the operating system in a nonclustered environment	Chapter 3, *Installing the OpenVMS Operating System*. Perform postinstallation tasks described in Chapter 7, *After Installing or Upgrading the OpenVMS Operating System*.
You want to upgrade the operating system in an OpenVMS Cluster environment	Chapter 4, *Before Upgrading the OpenVMS Operating System*, Chapter 5, *Preparing to Upgrade in an OpenVMS Cluster Environment*, and then Chapter 6, *Upgrading the OpenVMS Operating System*. Perform postupgrade tasks described in Chapter 7, *After Installing or Upgrading the OpenVMS Operating System* .
You want to upgrade the operating system in a standalone environment	Chapter 4, *Before Upgrading the OpenVMS Operating System*, and then Chapter 6, *Upgrading the OpenVMS Operating System*. Perform postupgrade tasks described in Chapter 7, *After Installing or Upgrading the OpenVMS Operating System*.
You want only to back up or restore your system disk	Appendix A, *Backing Up and Restoring the System Disk*.

Chapter 2. Preparing to Install in an OpenVMS Cluster Environment

This chapter contains information to review and steps to perform before installing OpenVMS in an OpenVMS Cluster environment. If you are not installing your operating system in an OpenVMS Cluster environment, go to Chapter 3, *Installing the OpenVMS Operating System* for information about installing your system.

2.1. Preinstallation Tasks

Use the following checklist to ensure that you perform all necessary tasks prior to installing your system in an OpenVMS Cluster environment. For more information, see OpenVMS operating system and OpenVMS Cluster documentation.

Table 2.1. Preinstallation Checklist

Task	Section
• Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 2.2, "Mixed-Version Support in OpenVMS Cluster Systems"
• Have information ready to provide at the system prompt during an installation.	Section 2.3, "Required OpenVMS Cluster Information"
• Make sure the target system disk is not mounted elsewhere in the cluster.	Section 2.4, "Dismounting the Target System Disk Elsewhere in the Cluster"
• Begin the installation.	Chapter 3, *Installing the OpenVMS Operating System*

2.2. Mixed-Version Support in OpenVMS Cluster Systems

VSI provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster systems: *warranted support* and *migration support*.

Warranted support means that VSI has fully qualified the two specified versions coexisting in an OpenVMS Cluster and will address all problems identified by customers using this configuration.

Migration support means that VSI has qualified the versions for use together in temporary configurations that are migrating servers in a staged fashion to a newer version of OpenVMS Alpha, or OpenVMS Integrity. Problem reports submitted against these configurations will be answered by VSI. However, in exceptional cases, VSI may request that you move to a warranted configuration as part of the solution. Migration support helps customers to move to warranted OpenVMS Clusters. For the minimum version supported for an upgrade to OpenVMS Version 8.4-2L2, see Section 1.1, "Supported Upgrade Paths" .

OpenVMS Alpha Version 8.4-2L2 warranted support combinations with OpenVMS Integrity versions and OpenVMS Alpha versions are shown in the following figures:

Figure 2.1. OpenVMS Alpha Version 8.4-2L2 Warranted Cluster Support with Alpha and Integrity Servers

		AlphaServer				
		v7.3-2	v8.2	v8.3	v8.4	V8.4-2L1 V8.4-2L2
Integrity Server	v8.2	Warranted	Warranted	Migration	Migration	Migration
	v8.2-1	Warranted	Warranted	Migration	Migration	Migration
	v8.3 v8.3-1H1	Migration	Migration	Warranted	Migration	Migration
	v8.4	Migration	Migration	Migration	Warranted	Warranted
	V8.4-1H1	Migration	Migration	Migration	Warranted	Warranted
	V8.4-2	Migration	Migration	Migration	Warranted	Warranted
	V8.4-2L1	Migration	Migration	Migration	Warranted	Warranted

For pairs enclosed in the dashed line, refer to HPE documentation at: http://h41379.www4.hpe.com/doc/84final/ba322_90087/ch02s03.html.

Figure 2.2. OpenVMS Alpha Version 8.4-2L2 Warranted Cluster Support with AlphaServers

		AlphaServer				
		v7.3-2	v8.2	v8.3	v8.4	V8.4-2L1 V8.4-2L2
AlphaServer	v7.3	Warranted	Migration	Migration	Migration	Migration
	v8.2	Migration	Warranted	Migration	Migration	Migration
	v8.3	Migration	Migration	Warranted	Migration	Migration
	v8.4	Migration	Migration	Migration	Warranted	Warranted
	V8.4-2L1 V8.4-2L2	Migration	Migration	Migration	Warranted	Warranted

For pairs enclosed in the dashed line, refer to HPE documentation at: http://h41379.www4.hpe.com/doc/84final/ba322_90087/ch02s03.html.

Only two architectures are supported in the same OpenVMS Cluster. System disks are architecture specific and can be shared only by systems of the same architecture. An Alpha system and an Integrity

system cannot boot from the same system disk. When you configure an OpenVMS Cluster to take advantage of cross-architecture booting, make sure that at least one system from each architecture is configured with a disk that can be used for installations and upgrades. For more information, see the *Guidelines for OpenVMS Cluster Configurations* and *HP OpenVMS Cluster Systems* manual.

Important

Considerations for Mixed-Producer OpenVMS Clusters

With the release by VSI of OpenVMS V8.4-1H1 for Integrity servers and OpenVMS V8.4-2L1 for Alpha servers, an OpenVMS cluster may contain OpenVMS operating system versions supplied by two distinct suppliers (or producers, in the terminology of the OpenVMS License Management Facility). Those suppliers are Hewlett Packard Enterprise (HPE) and VSI.

If your cluster is a mixed-producer cluster, you must install the VSI OpenVMS patch kit VMS841H1I_LMF-V0100. Refer to *Appendix A* in the *VSI OpenVMS Alpha Version 8.4-2L2 New Features and Release Notes* for information on acquiring the patch kit from VSI.

For more more information, contact VSI at: support@vmssoftware.com

2.3. Required OpenVMS Cluster Information

If your system will be a member of an OpenVMS Cluster, gather the following cluster information before beginning the installation. You will be prompted to enter the information after you boot the system disk.

Required Information	Explanation
Type of configuration	Configuration types (CI, DSSI, SCSI, local area, or mixed-interconnect) are distinguished by the interconnect device that the Integrity or Alpha server computers in the OpenVMS Cluster use to communicate with one another.
DECnet node name and node address	To obtain the DECnet node name and node address for the computer on which you are installing the OpenVMS operating system, consult the network or system manager. If you install DECnet-Plus for OpenVMS (Phase V) software and do not plan to use DECnet Phase IV for OpenVMS addresses, then you do not need to provide this information.
Allocation class value	During the installation procedure, you might be asked for the allocation class value (ALLOCLASS) of the computer on which you are installing the OpenVMS operating system. For example: `Enter a value for this_node ALLOCLASS parameter:` In an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves DSSI, CI, or SCSI disks to other cluster members, or if volume shadowing will be used on this system or in the cluster. In either case, the ALLOCLASS value must be a number from 1 to 255 and cannot be a number in use by another system in the cluster. After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.

Required Information	Explanation
	VSI recommend that you thoroughly review the chapter on cluster storage devices in the *HP OpenVMS Cluster Systems* manual. This manual also includes the rules for specifying allocation class values.
Whether you want a quorum disk	To help you determine whether you need a quorum disk in the cluster, see the *HP OpenVMS Cluster Systems* manual.
Location of the page and swap files	On a nonclustered system, the page and swap files are on one or more local disks, but on a clustered system, the files might be on one or more local or clustered disks. See the *HP OpenVMS Cluster Systems* manual to help you determine where the page and swap files will be located for the system on which you are installing the OpenVMS operating system software.
Systems that will be a *MOP server*[a], *disk server*, or tape server	If you are going to set up either a local area or a mixed-interconnect cluster, you need to make these determinations.
Cluster group number and cluster password[b]	If you are going to set up a local area or mixed-interconnect cluster that is LAN-based (Gigabit Ethernet), use the following rules to determine the cluster group number and password: • Cluster group number—A number in the range from 1 to 4095 or from 61440 to 65535. • Cluster password—Must be from 1 to 31 alphanumeric characters in length and can include dollar signs ($) and underscores(_).

[a]Servers that use the Maintenance Operations Protocol (*MOP*).

[b]Cluster group number and password are required by any cluster nodes that use the local area network for cluster communications. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

2.4. Dismounting the Target System Disk Elsewhere in the Cluster

Before installing OpenVMS on a target drive in an OpenVMS Cluster, make sure the target system disk is not mounted elsewhere in the cluster. The target system disk must be dismounted clusterwide (except on the system from which the installation is being performed) and must remain so during the installation. For instructions on dismounting cluster disks, refer to Section 5.5.2.2, "Notes and Restrictions" and see Section 5.5.2.3, "Preparing Your System for a Rolling Upgrade".

Chapter 3. Installing the OpenVMS Operating System

This chapter explains how to install the VSI OpenVMS Alpha operating system and includes the procedures for booting the VSI OpenVMS Alpha operating system CD.

Note

Before you install the OpenVMS operating system, ensure that the correct version of firmware is running in your computer. For information about Alpha system firmware, see Section 1.4.1, "Firmware on Alpha Systems".

This chapter is organized into sections and steps that describe the major tasks for installing OpenVMS, in the order in which these tasks must be performed. Section 3.2, "Installation Tasks" includes a checklist that you can use to make sure you perform all the installation tasks described in this chapter.

3.1. Accessing the VSI OpenVMS Alpha Operating System

VSI OpenVMS Alpha is provided on CD-ROM in a physical media kit and is also available via electronic download from VMS Software, Inc.

- To install or upgrade from CD-ROM, see Section 3.3, "Booting the OpenVMS Operating System Media".

- To create a CD from a downloaded distribution image, see the section called "Downloading the Distribution Image from VSI". If you do not choose to create a CD from the downloaded image, you will need to select a local disk to place the image on and then prepare the local disk as a bootable device.

Note

The VSI OpenVMS Alpha Version 8.4-2L2 distribution includes patch kits that you may want to install. Please consult this manual and the *VSI OpenVMS Version 8.4-2L2 Cover Letter and Guide to Media* to determine if any or all of these patches may be required for your system.

Downloading the Distribution Image from VSI

1. As a VSI customer, you should have received information regarding setting up a customer account. Contact your VSI sales representative if you have not received this information.

2. Visit **www.vmssoftware.com** and log into your customer account using the provided username and password. Select the appropriate menu item for downloading images.

3. Review the End User License Agreement (EULA). You will be asked to enter identification details and to accept the terms of the EULA.

4. Click on the button to download VSI OpenVMS Alpha 8.4-2L2 to your local system. The actual downloaded file will be named similar to: *OpenVMS Alpha 8.4-2L2 ISO.ZIP* or a self-extracting zip file with a shorter name such as: *ALPHA0842L2.ZIPEXE*. This is quite a large file, so plan accordingly.

5. Using the same procedure, download copies of the *VSI OpenVMS Alpha Version 8.4-2L2 Cover Letter and Guide to Media*, the *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs*, and the *VSI OpenVMS Alpha Version 8.4-2L2 Installation and Upgrade Manual*.

6. If you are using a self-extracting ZIPEXE file, continue. If you are using a regular ZIP file and do not have a copy of *UNZIP* for OpenVMS, download **UNZIP.EXE** for your local system.

7. If you intend to install layered products, download both *Layered Products* disk image zip files also.

8. Be sure to have any license keys (PAKS) required for your installation. You can install licenses later, but it is generally easier to do so during the upgrade.

9. Once the downloads have completed, you can log out of your customer account.

10. Once you have downloaded the ISO image, you can create a bootable device in one of three ways:

Method 1 Burn a CD using the ISO image contained in the zip file (and others for layered products).

Method 2 Use the ISO image as a Virtual Device to upgrade from a local VMS disk.

Method 3 Create a bootable kit disk on a Local Device.

Note

If you have any problems downloading and burning a CD, we ask that you try Method 2 or Method 3 before seeking support. Always use a high-quality blank CD.

Method 1: Burn an Alpha CD

1. Choose a system that has a CD reader/writer and related utilities.

2. Transfer the zip file/s (and if needed, the UNZIP utility) to that system. If you use FTP, be sure to specify BINARY or IMAGE mode before issuing your GET command.

3. Install the UNZIP utility if needed. We recommend putting it in SYS$UPDATE. This is not needed if you are starting with a self-extracting ZIPEXE file.

   To unzip a ZIPEXE file on OpenVMS, just execute the file: **$ RUN ALPHA0842L2.ZIPEXE** to extract the IMG file, then skip ahead to step 5 to burn your CD.

   Define a symbol: **$ UNZIP :== SYSUPDATE:UNZIP.EXE**
   To get help: **$ UNZIP -h**
   Typical command: **$ UNZIP -V zipfilename -d ddcu:[directory]**

Note

Various browsers and file transfer utilities may rename files if a version of the file already exists on your system. Simply beware of this when reading through the examples below.

4. UNZIP the downloads to create local files using the typical command syntax shown above. Substitute your filename, device and directory as needed.

5. Using your burner utility, burn the IMG file onto a CD.

6. Proceed with the upgrade.

Note

On Alpha systems, you can configure boot devices *only* by shutting down the system and entering commands at the console.

See Section 8.1, "Booting Operations" for a complete description of booting your Alpha server.

See Section 8.2.2, "Setting and Showing Boot Devices" and Section 8.2.3, "Setting Boot Flag Parameters" for instructions on setting the console flags and default device to boot the CD.

Method 2: Use the ISO Image as a Virtual Disk

1. Transfer the zip file/s (and if needed, the UNZIP utility) to that system. If you use FTP, be sure to specify BINARY or IMAGE mode.

2. Install the UNZIP utility if needed. We recommend putting it in SYS$UPDATE.

   Define a symbol: **$ UNZIP :== SYSUPDATE:UNZIP.EXE**
   To get help: **$ UNZIP -h**
   Typical command: **$ UNZIP -V zipfilename -d ddcu:[directory]**

Note

Various browsers and file transfer utilities may rename files if a version of the file already exists on your system. Simply beware of this when reading through the examples below.

3. UNZIP the downloads into their local IMG files.

4. Start the LD (logical disk) utility if needed. The command: **$ SHOW DEV LD** will determine if the utility is running. To start the utility, enter: **$ @SYS$STARTUP:LD$STARTUP**

5. Use LD to create a virtual disk whose content is the IMG file.

   $ LD CONNECT *file***.IMG** where *file* is the name of your kit image file.

   %LD-I-UNIT, Allocated device is LDA1

   Mount the device:

   $ MOUNT/OVER=ID LDA1

   %MOUNT-I-MOUNTED, label mounted on _LDA1:

   If you are installing the Operating System (not layered products), prepare a destination disk:

   $ MOUNT/FOREIGN/OVER=ID ddcu

   %MOUNT-I-MOUNTED, label mounted on destdevice

   Move the installation kit to the destination device:

   $ BACKUP/IMAGE LDA1: destdevice:/INIT

Note

When performing this backup, you may see informational messages regarding volume structure and files that are marked NOBACKUP. These messages can be safely ignored.

   $ DISMOUNT destdevice

   $ MOUNT/OVER=ID destdevice

   If you are using the Virtual Disk methods for installing layered products, you can access the product kits directly from the Virtual Disk via: **$ DIR LDA1:[README]**

   When you are done with the Virtual Disk, dismount it and disconnect via:

$ DISMOUNT LDA1
$ LD DISCONNECT LDA1

You may choose to delete the ZIP and IMG files.

Note

On Alpha systems, you can configure boot devices *only* by shutting down the system and entering commands at the console.

See Section 8.1, "Booting Operations" for a complete description of booting your Alpha server.

See Section 8.2.2, "Setting and Showing Boot Devices" and Section 8.2.3, "Setting Boot Flag Parameters" for instructions on setting the console flags and default device to boot the destination disk that you have created.

Method 3: Create a bootable kit disk on a Local Device

1. Copy the kit from the VSI ftp download site to a source disk on your system (for example, 1DGA9913).

2. Identify the target disk you want to upgrade (for example, 1DGA50:). The target disk must be running HPE OpenVMS Alpha v7.3-2, v8.3, v8.4, or V8.4-2L1.

3. Mount a disk to use as your kit disk (for example, 1DGA23)

   $ MOUNT/FOREIGN 1DGA23:

4. Back up the source disk to the kit disk you just mounted as follows:

   $ BACKUP/IMAGE 1DGA9913:[KITS.PAKS.ALPHA]ALPHA0842L2_KIT.BCK/SAV 1DGA23:

5. Dismount the kit disk you just created as follows:

   $ DISMOUNT/NOUNLOAD 1DGA23:

6. Shutdown the system by executing the SYS$SYSTEM:SHUTDOWN command procedure as follows:

   $ @SYS$SYSTEM:SHUTDOWN

7. Boot disk 1DGA23: then mount the target disk you want to upgrade, 1DGA50:, and proceed with the upgrade.

3.2. Installation Tasks

Use the following checklist to ensure that you perform all necessary installation tasks.

Table 3.1. Installation Checklist

Task	Section
• Boot the OpenVMS operating system media.	Section 3.3, "Booting the OpenVMS Operating System Media"
• Install the OpenVMS operating system onto a system disk.	Section 3.4, "Installing the OpenVMS Operating System onto a System Disk"
• Boot the OpenVMS system disk.	Section 3.5, "Booting the New OpenVMS System Disk"

Task	Section
• Join the OpenVMS Cluster (optional).	Section 3.6, "Joining an OpenVMS Cluster"
• Run AUTOGEN.	Section 3.7, "Running AUTOGEN"
• Reboot the operating system after AUTOGEN completes (this should occur automatically).	Section 3.8, "Rebooting After AUTOGEN"
• Log in to the SYSTEM account.	Section 3.9, "Logging In to the SYSTEM Account"
• Perform postinstallation tasks, as necessary.	Section 3.10, "Postinstallation Tasks"

3.3. Booting the OpenVMS Operating System Media

The OpenVMS Version 8.4-2L2 operating system includes procedures and tools (such as the PCSI utility) that enable you to install the operating system easily. These tools are available once you boot the system properly. First, you must boot the OpenVMS Alpha CD.

3.3.1. Booting the OpenVMS Alpha CD

This section explains how to boot the OpenVMS Alpha operating system CD, either from your local CD drive, as described in Section 3.3.1.2, "Booting from the Local Drive", or from a CD drive served by the Infoserver, as described in Section 3.3.1.3, "Booting from the Infoserver" . First, you need to identify the name of the CD drive, as explained in Section 3.3.1.1, "Determining the Boot Device". For more information about booting operations, see Section 8.1, "Booting Operations".

3.3.1.1. Determining the Boot Device

To boot the operating system CD, you need to determine the identity of the CD drive. Follow these steps:

1. Insert the operating system CD into the local CD drive.

2. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output (for example, DKA400). If you are booting from the Infoserver, look for a device listed with its hardware address, as in the last line of the following example (EWA0):

    ```
    >>> SHOW DEVICE
    dva0.0.0.1000.0     DVA0                              RX23
    dka200.2.0.5.0      DKA200                            RZ28M   1004
    dka300.3.0.5.0      DKA300                            RZ29B   0016
    dka400.4.0.5.0      DKA400                            RRD42   442E
    ewa0.0.0.3.0        EWA0          00-00-F8-1F-70-3D
    ```

    For additional information, refer to the hardware manuals that accompanied your HPE AlphaServer system.

3.3.1.2. Booting from the Local Drive

To boot the operating system CD from the local CD drive, enter the boot command in the following format:

BOOT -FLAGS 0,0 *source-drive*

Substitute the device name of the CD drive for *source-drive*, such as dqa0, as listed in the SHOW DEVICE display example in Section 3.3.1.1, "Determining the Boot Device". In this case, you would enter the following command and press **Enter**:

```
>>>  BOOT -FLAGS 0,0 DKA400
```

Note

If there are multiple devices with the same names, please use the full name of the device. For example, the following devices are listed:

```
dga5003.1001.0.1.0
dga5003.1002.0.1.0
```

In this case, use the full name of the selected device:

```
dga5003.1001.0.1.0
```

3.3.1.3. Booting from the Infoserver

To boot the operating system CD using either the Infoserver hardware or the Infoserver utility, follow these steps. To use the Infoserver utility, certain configuration steps are required initially (one time only), as described in Section 9.1, "About the OpenVMS Infoserver Utility"; note that the operating system CD must be mounted systemwide.

1. Make sure that your operating system CD is being served from either the Infoserver hardware or the Infoserver utility. If you are using the Infoserver utility, certain configuration steps are required (one time only); see Section 9.1, "About the OpenVMS Infoserver Utility".

2. At the console prompt, enter the boot command in the following format:

    ```
    >>>BOOT -FLAGS 0,0 -FILE APB_2L2084 lan-device-name
    ```

    Substitute the name of the local area network device for $lan\text{-}device\text{-}name$, such as EIA0 (or EWA0), as listed in the SHOW DEVICE display example in Section 3.3.1.1, "Determining the Boot Device".

    The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the Infoserver. This file is the name of the APB program used for the initial system load (ISL) boot program.

3. The Infoserver ISL program then displays the following menu:

    ```
    Network Initial System Load Function Version 1.2
    FUNCTION          FUNCTION
      ID
      1     -         Display Menu
      2     -         Help
      3     -         Choose Service
      4     -         Select Options
      5     -         Stop
     Enter a function ID value:
    ```

4. Respond to the prompts as follows, pressing **Enter** after each entry:

    a. Enter 3 for the function ID.

    b. Enter 2 for the option ID.

    c. Enter the service name (ALPHA0842L2 is the default service name for the Infoserver hardware; to learn the Infoserver utility service name, ask your system or network manager).

    A sample display follows:

```
      Enter a function ID value: 3
        OPTION          OPTION
          ID
          1    -        Find Services
          2    -        Enter known Service Name

      Enter an Option ID value: 2
      Enter a Known Service Name: ALPHA0842L2
```

Note

If you boot the OpenVMS Alpha operating system CD from an Infoserver but lose your connection during the installation procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

IF ...	THEN ...
You previously chose the INITIALIZE option	1. Boot the OpenVMS Alpha operating system CD again from the network. 2. Choose the install option (1) on the menu and perform the installation again, as described in this chapter.
You previously chose the PRESERVE option	1. Boot the OpenVMS Alpha operating system CD again from the network. 2. Enter the DCL environment by choosing option 8 on the menu. 3. Mount the device containing your backup copy of the target disk and the device that is your target disk. 4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix A, *Backing Up and Restoring the System Disk* for complete information about using MOUNT and BACKUP commands to restore a system disk.) 5. Log out from the DCL environment. 6. Choose the install option (1) on the menu and perform the installation again, as described in this chapter.

3.4. Installing the OpenVMS Operating System onto a System Disk

After booting the operating system media, you can create an operating system disk by using option 1 (see Section 3.4.2, "Installing OpenVMS Using Option 1 of the Operating System Menu") of the menu provided by the operating system media. The procedure for installing an OpenVMS Integrity servers system is similar to that for installing OpenVMS Alpha operating systems.

3.4.1. Responding to Prompts During Installation

At different points during the installation, you must respond to prompts that ask you to supply specific information. This manual and the help text available during the installation procedure tell you how to obtain most of this information and how to make decisions when responding to specific prompts.

To repeat an explanation provided by the installation procedure, type a question mark (?) at the prompt. To change or correct a response made to an earlier question, enter the caret (^) character as many times

as needed. Entering this character might take you back more than one question. To return to the main menu, press **Ctrl/Y**, which aborts the installation.

VSI recommends that you review the following summary before you begin the installation so that you understand beforehand the types of information you need to provide.

During the installation, the procedure prompts you for the following information:

- The name of the target drive, and the LAN device (if booting is served by an Infoserver).

- Whether you want to select the INITIALIZE or PRESERVE option (as described in Section 3.4.2, "Installing OpenVMS Using Option 1 of the Operating System Menu").

- A volume label for the target disk (if you choose not to use the default volume label).

- A password for the SYSTEM account.

- Whether you want to form or join an OpenVMS Cluster system and, if so, what kind (as described in Chapter 2, *Preparing to Install in an OpenVMS Cluster Environment*) .

- DECnet node name and address (or values for the system parameters, SCSNODE and SCSSYSTEMID).

Note

If you install the DECnet-Plus for OpenVMS software, but you want to use addresses compatible with DECnet Phase IV software, you still need to provide this information. These settings identify your system by name and number in a DECnet or cluster environment. If you supply a DECnet Phase IV address, the procedure automatically calculates the SCSSYSTEMID value. If necessary, consult the network or system manager to obtain this information.

- Information listed on Product Authorization Keys (PAKs) for your OpenVMS licenses. To register your licenses, you must enter the information listed on the PAK for each license. You may register your licenses after installing OpenVMS.

- Optional operating system components that you want to install. You can install all components (by default), or you can select specific components from this list:

  - DECwindows Motif for OpenVMS (a graphical user interface)

    If you install this product, you must also include the DECwindows Server Support component. If you are not installing DECwindows as part of the OpenVMS installation now, but you plan to install it later, install the DECwindows Server Support component now.

  - TCP/IP Services for OpenVMS

  - Either DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)

    If you install either DECnet implementation, you must also include the Support for DECnet component. If you are not installing DECnet-Plus or DECnet Phase IV now, but you plan to install one of them later, you should install the Support for the DECnet-Plus or DECnet Phase IV component now. (The same support component applies to both implementations of DECnet.)

  For a list of component options included with the OpenVMS operating system, see the Component Options and Suboptions Example .

3.4.2. Installing OpenVMS Using Option 1 of the Operating System Menu

A few seconds after you boot the operating system CD several informational messages followed by the OpenVMS banner appear. After that, other informational messages appear, followed eventually by the operating system main menu, as shown in the following example. The duration of messages depend on the system type and attached hardware.

```
*****************************************************************

  You can install or upgrade the OpenVMS ALPHA operating system
    or you can install or upgrade layered products that are
     included on the OpenVMS ALPHA distribution media (CD).

  You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

   Please choose one of the following:

       1)  Upgrade, install or reconfigure OpenVMS ALPHA
           Version V8.4-2L2
       2)  Display layered products that this procedure
           can install
       3)  Install or upgrade layered products
       4)  Show installed products
       5)  Reconfigure installed products
       6)  Remove installed products
       7)  Find, Install or Undo patches; Show or
           Delete Recovery Data
       8)  Execute DCL commands and procedures
       9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)
```

To install the OpenVMS operating system, follow these steps:

1. **Select Option 1 on the Menu**: Respond to the menu prompt by entering 1, as in the following example.

   ```
   Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 1
   ```

   The OpenVMS operating system kit might contain patch kits. If it does, information similar to the following is displayed:

   ```
       The following PATCH kits are present on the OpenVMS ALPHA
       distribution media.

   ------------------------------------ ----------- ----------
   PRODUCT                              KIT TYPE    KIT FORMAT
   ------------------------------------ ----------- ----------
   VSI AXPVMS TCPIP_NFS_PAT V5.7-ECO5A  Patch       Compressed
   VSI AXPVMS TCPIP_SSH_PAT V5.7-ECO5D  Patch       Compressed
   ------------------------------------ ----------- ----------

   2 products found >

       Please consult the OpenVMS ALPHA Installation and
       Upgrade Manual, the Release Notes, and the Cover
       Letter to determine if any or all of these patches
       may be required for your system.
   ```

If you have not already done so, determine whether you need to install any patches.

The initial display from the procedure also includes information about how to respond to prompts (as described in Section 3.4.1, "Responding to Prompts During Installation"):

```
***************************************************************
    This procedure will ask a series of questions.

        () - encloses acceptable answers
        [] - encloses default answers

Type your response and press the <Return>key.  Type:

        ? - to repeat an explanation
        ^ - to change prior input (not always possible)
        Ctrl/Y - to exit the installation procedure
```

2. **Create the System Disk**: The procedure allows you to begin creating the system disk. First it displays the following information, followed by the prompt asking whether you want to initialize or preserve the disk:

```
 There are two choices for installation/upgrade:

    Initialize - Removes all software and data files that were
        previously on the target disk and installs OpenVMS
        ALPHA.

    Preserve - Installs or Upgrades OpenVMS ALPHA on the target
        disk and retains all other contents of the target disk.

    * Note: You cannot use preserve to install OpenVMS ALPHA on
        a disk on which any other operating system is installed.
        This includes implementations of OpenVMS for other
        architectures.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE] INITIALIZE
```

Respond to the INITIALIZE or PRESERVE prompt as follows:

IF ...	THEN ...
Your disk is new	Type INITIALIZE and press **Enter**.
You want to remove all files from an existing system disk	Type INITIALIZE and press **Enter**.
You want to retain OpenVMS files on an existing disk	Press **Enter** to accept the default (PRESERVE); go to Chapter 6, *Upgrading the OpenVMS Operating System*.

Note

You cannot install OpenVMS on a disk where another operating system is installed. For example, you cannot take a UNIX disk, select the PRESERVE option, and then install OpenVMS on the disk. The UNIX disk is not structured in the format that OpenVMS requires.

3. **Specify the System Disk (Target Disk)**: The procedure next asks you for the name of the target disk. If you do not know the name of the disk, enter a question mark (?). The procedure displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

```
    You must enter the device name for the target disk on which
    OpenVMS ALPHA will be installed.
```

```
Enter device name for target disk: (? for choices)  DKB400
```

If this is the first installation on this system, no default device is indicated, as in this example. A default device name is listed if this is not the first installation (for example, [DKB400] or, for a Fibre Channel disk device, [1DGA567]).

If you select a device that is not available or that cannot be used for some other reason, the procedure displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:

```
MKA500 is not a disk device
```

4. **Specify the Volume Label**: If you select a device that can be used, the procedure then informs you of the volume label currently assigned to this device and asks whether you want to keep that label. If you choose not to keep that label, you are prompted for a new label, as shown in the following example. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
$1$DGA5001: is now labeled 842L2ALPHA.
```

```
Do you want to keep this label? (Yes/No)[Yes]
```

You can keep the label already assigned to the disk, accept the default label assigned by the system, or specify a different volume label (with a limit of 12 characters that can include A to Z, 0 through 9, the dollar sign ($), hyphen (-), and underscore (_) characters).

Note

OpenVMS requires that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk having the same label as the system disk is mounted, various OpenVMS components do not function as intended or a node might crash during boot.

5. **Specify On-Disk Structure Level**: After you enter the volume label for the target system disk, when you selected INITIALIZE, you are asked whether you want to initialize the target system disk with On-Disk Structure Level 2 (ODS-2) or Level 5 (ODS-5).

```
    The target system disk can be initialized with
    On-Disk Structure Level 2 (ODS-2) or Level 5 (ODS-5).
    (? for more information)

    Do you want to initialize with ODS-2 or ODS-5? (2/5/?)
```

Note

VSI recommends that your system disk be initialized in ODS-5 format, unless you plan to use software that requires ODS-2.

A system disk in ODS-5 format can store everything; if you choose to have your disk in ODS-2 format, the procedure asks you to provide an ODS-5 disk for the data repository.

For details about ODS-2 and ODS-5 file systems, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*. A brief summary follows.

- ODS-2

ODS-2 allows for compatibility with OpenVMS VAX and Alpha systems that use ODS-2 disks. Choose ODS-2 if you do not need the new features of ODS-5 disks, including the support of applications ported from other operating systems (such as UNIX, Linux, and MS Windows).

- ODS-5

  - ODS-5 supports file names that are longer, have a wider range of legal characters, and allow for mixed-case file names. This feature permits use of file names similar to those in a Microsoft Windows or UNIX environment.

  - ODS-5 supports hard links to files, access dates, and files whose names differ only by case.

  - ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.

  - Systems running OpenVMS VAX Version 7.2 and higher can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file names are seen in uppercase on OpenVMS VAX systems.)

Select ODS-2 or ODS-5 by entering 2 or 5 at the prompt.

6. **Enable Hard Links (ODS-5 Only)**: If you select ODS-5, the procedure asks whether you want to enable hard links (if you selected ODS-2, skip to the next step). Enter YES or NO to indicate your choice.

```
Hard links can be enabled on ODS-5 disks.(? for more information)

Do you want to enable hard links? (Yes/No/?) NO
```

Both ODS-2 and ODS-5 support aliases, which are additional names for a file or directory. Only ODS-5 supports hard links. One of the main differences with hard links enabled is the way the DCL DELETE command works. With hard links enabled, if you enter the DELETE command to delete a file that has one or more aliases associated with it, the command only deletes the alias by which the file is being accessed. The actual file continues to exist and is accessible by any remaining alias. The file is deleted only when the last remaining alias is deleted. Without hard links enabled, the DELETE command deletes both the alias by which the file is being accessed and the file itself. Any other aliases remain but the file is no longer accessible because it is no longer present. Thus, the remaining aliases are unusable. If enabling hard links has any drawbacks, they are minor and probably of concern only in rare circumstances. For example, if disk quotas are in effect, though owners of a file can delete any links to a file in a directory they can access, hard links in other users' directories might cause a file to be retained, and the file size continues to be charged against that owner's disk quota.

In general, be aware that enabling hard links does change the file system's behavior and that applications and management practices should respond accordingly (instead of being alias-specific, for example).

For more information about hard links, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7. **Confirm Target System Disk Choices**: The procedure displays your target system disk choices and asks you to confirm that they are correct. In the following example, the choices made were to initialize the disk with ODS-5 and with hard links.

```
You have chosen to install OpenVMS ALPHA on a new disk.

The target system disk, $1$DGA5001:, will be initialized
with structure level 5 (ODS-5).
Hard links will NOT be enabled.
The disk will be labeled 842L2ALPHA.
```

```
Any data currently on the target system disk will be lost.

Is this OK? (Yes/No) YES

Initializing and mounting target....

Creating page and swap files....
```

8. **Specify SYSTEM Account Information (Initialized Disks Only)**: If you are initializing the target disk, you are prompted for SYSTEM account information. Before you respond to the prompt asking you to enter a password for the SYSTEM account, note the following:

- Passwords must be at least 8 characters in length (but must not exceed 31 characters). Valid characters for the password include A through Z, 0 through 9, the dollar sign ($), and underscore (_). Passwords must contain at least one alphabetic character (A through Z). The system converts all characters to uppercase, so the case of characters you enter does not matter.

- Press **Enter** after you enter the password. (The password does not display as you type it.)

- After you enter the password, the procedure checks to make sure it meets the requirements for a valid password.

- Reenter the password for verification.

The following is a sample display:

```
You must enter a password for the SYSTEM account.

The password must be a minimum of 8 characters in length,
and may not exceed 31 characters. It will be checked and
verified. The system will not accept passwords that can
be guessed easily.

The password will not be displayed as you enter it.
```

```
Password for SYSTEM account:
```

```
Re-enter SYSTEM password for verification:
```

If you reenter the password incorrectly or if the procedure determines that the password is too easy for another user to guess, the procedure displays an error message and allows you to specify a valid password.

9. **Declare OpenVMS Cluster Membership**: The procedure now asks whether your system will be part of an OpenVMS Cluster. The display is similar to the following:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No)
```

You should answer YES if the system will be a member of an OpenVMS Cluster. Answering YES to this question causes SYS$MANAGER:CLUSTER_CONFIG.COM to run automatically when your newly installed system is first booted. The CLUSTER_CONFIG procedure asks a series of questions about the cluster. Your response to this question determines how the VAXCLUSTER system parameter is set. (The VAXCLUSTER system parameter is set for OpenVMS Integrity server systems as well as Alpha and VAX systems; it is not specific to OpenVMS VAX systems.) For more information, see the *Guidelines for OpenVMS Cluster Configurations*.

If you answer YES to the cluster question, the display is similar to the following:

```
When your new system is first booted you will be required
to answer additional questions in order to configure the
```

```
    OpenVMS Cluster.
```

If you answer NO to the cluster question, the system can still be a member of an OpenVMS Cluster. However, in this case you must explicitly configure the node into the cluster after the installation is completed. For more information, see Section 2.1, "Preinstallation Tasks".

For more information about cluster configuration, see the *HP OpenVMS Cluster Systems* manual.

10. **Declaring System as OpenVMS Galaxy Instance**: The procedure next asks whether your system will be an instance in an OpenVMS Galaxy. The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No)
```

Your answer to this question determines how the GALAXY system parameter is set.

11. **Set SCSNODE System Parameter**: The procedure now asks you to specify a value for the first of two system parameters, the SCSNODE parameter. (Step 12 describes the output and prompts for the second system parameter, SCSSYSTEMID.) SCSNODE is a name that can be from one to six letters or numbers; it must include at least one letter. If this system is part of an OpenVMS Cluster, SCSNODE must be unique within the cluster. If you are using DECnet Phase IV for OpenVMS or DECnet-Plus for OpenVMS with DECnet Phase IV addresses, then SCSNODE must be the same as your DECnet node name.

The following is an example of the display and a valid response:

```
    For your system to operate properly, you must set two
    parameters: SCSNODE and SCSSYSTEMID.

    SCSNODE can be from 1 to 6 letters or numbers. It must
    contain at least one letter.

    If you plan to use DECnet, SCSNODE must be the DECnet
    Phase IV node name, or the DECnet-Plus (Phase V) node
    synonym.

    If you have multiple OpenVMS systems, the SCSNODE on each
    system must be unique.

Enter SCSNODE: biloxi
```

12. **Declare Use of DECnet; Setting SCSSYSTEMID System Parameter**: The next prompt asks whether you plan to use DECnet. It also informs you that the SCSYSTEMID system parameter is based on the DECnet Phase IV address. SCSSYSTEMID must also be unique within an OpenVMS Cluster.

```
    If you plan to use DECnet, SCSSYSTEMID must be set based on
    the DECnet Phase IV address.

    Do you plan to use DECnet (Yes/No) [YES]:  YES
```

If you answer YES, the information about the DECnet Phase IV addresses is displayed along with a prompt for a DECnet Phase IV address. Enter a valid DECnet Phase IV address, as in the following example:

```
DECnet Phase IV addresses are in the format

        DECnet_area_number.DECnet_node_number

    DECnet_area_number is a number between 1 and 63.
    DECnet_node_number is a number between 1 and 1023.
```

```
        If you plan to use DECnet WITHOUT Phase IV compatible
        addresses, enter 0.0.
```

Enter DECnet (Phase IV) Address: **[1.1] 1.37**

A display such as the following informs you of the value assigned to SCSSYSTEMID:

SCSSYSTEMID will be set to 1061.

```
        This was calculated as follows:

            (DECnet_area_number * 1024) + DECnet_node_number
```

If you are not using DECnet, or if you enter 0.0 as the DECnet Phase IV address, you are prompted to enter a SCSSSYSTEMID in the range of 1 to 65535. If this is a *standalone system*, the default of 65534 is acceptable. However, if this system is part of an OpenVMS Cluster, you must enter a SCSSYSTEMID that is unique within the cluster. The following is a sample display:

```
        The system cannot calculate SCSSYSTEMID from an address
        that is not compatible with DECnet Phase-IV.
        You will have to choose a value for SCSSYSTEMID.


        If you plan to use LAT software, you may have to add
        /NODECNET to any CREATE LINK commands in
        SYS$MANAGER:LATSYSTARTUP.COM.

        Please choose a SCSSYSTEMID between 1 and 65535. If you have
        multiple OpenVMS systems, the SCSSYSTEMID on each system
        must be unique.
```

Enter SCSYSTEMID [65535]: **12345**

13. **Set Local Time Zone**: Now the procedure asks you to configure the local time zone. For local time zone support to work correctly, the installation procedure must set the time zone that accurately describes the location you want to be your default time zone. Usually, this is the time zone in which your system is running. In addition, the procedure asks you to set the OpenVMS time differential factor (TDF).

    The procedure displays the main time zone menu. You can select the time zone in either of two ways:

    • Select the number in the main time zone menu that best represents the time zone desired. (If multiple time zones exist for the selection you make, you must select the exact time zone from another menu.)

    • Use a search option that allows you to bypass the time zone menu and search by name (partial or full).

    If you select one of the numbers in the time zone menu, the corresponding time zone is selected. At any prompt, you can enter a question mark (?) for help information.

Note

An asterisk (*) next to a number indicates that more than one time zone exists for that selection. If you select such a number, an additional menu displays choices that allow you to select the appropriate time zone. For example, if you choose the United States (US) time zone from the main time zone menu, a second menu displays the specific time zones within the United States.

The following example shows how you would select the Eastern time zone for the United States by using the menu number:

```
Configuring the Local Time Zone

TIME ZONE SPECIFICATION -- MAIN Time Zone Menu
"*" indicates a menu


  0* GMT
  1* AFRICA       17) EST        33) IRAN        49) PORTUGAL
  2* AMERICA      18) EST5EDT     34) ISRAEL      50) PRC
  3* ANTARCTICA  19* ETC         35) JAMAICA     51) PST8PDT
  4* ARCTIC      20* EUROPE      36) JAPAN       52) ROC
  5* ASIA        21) FACTORY     37) KWAJALEIN   53) ROK
  6* ATLANTIC    22) GB-EIRE     38) LIBYA       54) SINGAPORE
  7* AUSTRALIA   23) GB          39) MET         55) TURKEY
  8* BRAZIL      24) GMT-0      40* MEXICO       56) UCT
  9* CANADA      25) GMT        41* MIDEAST      57) UNIVERSAL
 10) CET         26) GMT0        42) MST        58* US
 11* CHILE       27) GMTPLUS0    43) MST7MDT     59) UTC
 12) CST6CDT     28) GREENWICH   44) NAVAJO      60) W-SU
 13) CUBA        29) HONGKONG    45) NZ-CHAT     61) WET
 14) EET         30) HST         46) NZ          62) ZULU
 15) EGYPT       31) ICELAND    47* PACIFIC
 16) EIRE       32* INDIAN      48) POLAND


Press "Return" to redisplay, enter "=" to search or "?" for
help, or Select the number above that best represents the
desired time zone: 58

US Time Zone Menu
"*" indicates a menu

  0* RETURN TO MAIN TIME ZONE MENU
  1) ALASKA       5) EAST-INDIANA    9) MICHIGAN      13) SAMOA
  2) ALEUTIAN     6) EASTERN        10) MOUNTAIN
  3) ARIZONA      7) HAWAII         11) PACIFIC-NEW
  4) CENTRAL      8) INDIANA-STARKE 12) PACIFIC

Press "Return" to redisplay, enter "=" to search or "?" for
help, or Select the number above that best represents the
desired time zone: 6

You selected US /EASTERN as your time zone.
Is this correct? (Yes/No) [YES]:
```

To use the search option instead of menu numbers to select the time zone, enter an equals sign (=) at the menu prompt instead of a number. You can enter one or more words or partial words immediately after the equals string, or you can enter the equals sign alone, in which case the procedure prompts you for the words or partial words of the time zone you want to select. After you enter that information, the procedure displays all matching time zones, and you can then select the appropriate one.

The following example shows how you would select the Eastern time zone for the United States by using the search option:

```
  Configuring the Local Time Zone
```

```
TIME ZONE SPECIFICATION -- MAIN Time Zone Menu
"*" indicates a menu

   0*  GMT
   1*  AFRICA        17)  EST        33)  IRAN        49)  PORTUGAL
   2*  AMERICA       18)  EST5EDT    34)  ISRAEL      50)  PRC
   3*  ANTARCTICA    19*  ETC        35)  JAMAICA     51)  PST8PDT
   4*  ARCTIC        20*  EUROPE     36)  JAPAN       52)  ROC
   5*  ASIA          21)  FACTORY    37)  KWAJALEIN   53)  ROK
   6*  ATLANTIC      22)  GB-EIRE    38)  LIBYA       54)  SINGAPORE
   7*  AUSTRALIA     23)  GB         39)  MET         55)  TURKEY
   8*  BRAZIL        24)  GMT-0      40*  MEXICO      56)  UCT
   9*  CANADA        25)  GMT        41*  MIDEAST     57)  UNIVERSAL
  10)  CET           26)  GMT0       42)  MST         58*  US
  11*  CHILE         27)  GMTPLUS0   43)  MST7MDT     59)  UTC
  12)  CST6CDT       28)  GREENWICH  44)  NAVAJO      60)  W-SU
  13)  CUBA          29)  HONGKONG   45)  NZ-CHAT     61)  WET
  14)  EET           30)  HST        46)  NZ          62)  ZULU
  15)  EGYPT         31)  ICELAND    47*  PACIFIC
  16)  EIRE          32*  INDIAN     48)  POLAND


Press "Return" to redisplay, enter "=" to search or "?" for
help, or Select the number above that best represents
the desired time zone: =EAST

Search for Time Zone by Full or Partial Name

     "*" indicates a menu

    1)  BRAZIL / EAST
    2)  CANADA / EAST-SASKATCHEWAN
    3)  CANADA / EASTERN
    4)  CHILE / EASTERISLAND
    5)  MIDEAST / RIYADH87
    6)  MIDEAST / RIYADH88
    7)  MIDEAST / RIYADH89
    8)  PACIFIC / EASTER
    9)  US / EAST-INDIANA
   10)  US / EASTERN

Press "Return" to redisplay this menu,
enter "=" to search for a new zone,
enter "0" to return to the Main Time Zone Menu, enter "?"
for help, or Select the number above that best represents the
desired time zone: 10

You selected US / EASTERN as your time zone.
Is this correct? (Yes/No) [YES]:
```

The procedure then prompts you for the TDF.

For more information about local time zone support, see the *OpenVMS System Manager's Manual, Volume 1: Essentials.*

14. **Set Time Differential Factor (TDF)**: The procedure now provides information about and prompts you to enter the time differential factor (TDF). The TDF is the difference between your system time and Coordinated Universal Time (UTC), which is an international standard (similar

to Greenwich Mean Time) for measuring time of day. The procedure supplies a default for TDF, which is generally the correct response. If the time zone you selected supports daylight saving time, the procedure asks you whether daylight saving time is currently in effect. The following example shows TDF information and prompts displayed by the procedure:

```
Configuring the Time Differential Factor (TDF)


Default Time Differential Factor for standard time is -5:00.
Default Time Differential Factor for daylight saving time
is -4:00.

The Time Differential Factor (TDF) is the difference between
your system time and Coordinated Universal Time (UTC).
UTC is similar in most respects to Greenwich Mean Time (GMT).

The TDF is expressed as hours and minutes, and should be
entered in the hh:mm format.  TDFs for the Americas will be
negative(-3:00, -4:00, etc.); TDFs for Europe, Africa, Asia
and Australia will be positive (1:00, 2:00, etc.).
```

```
This time zone supports daylight saving time.
Is this time zone currently on daylight saving time? (Yes/No):
YES

Enter the Time Differential Factor [-4:00]:

    NEW SYSTEM TIME DIFFERENTIAL FACTOR = -4:00

Is this correct? [Y]:
```

For more information about TDF support, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*. Once OpenVMS has been installed and booted from the system disk, you can determine whether your system is set for daylight saving time by using the following DCL command to display the translation for the daylight saving time logical:

```
$ SHOW LOGICAL *TIMEZONE*
"SYS$TIMEZONE_DAYLIGHT_SAVING"="1"
```

15. **Register Licenses (Optional at this time)**: After setting the TDF, the procedure asks whether you want to register any Product Authorization Keys (PAKs), as in the following display:

```
If you have Product Authorization Keys (PAKs) to register,
you can register them now.
Do you want to register any Product Authorization Keys? (Yes/No)
[Yes]
```

You can register the PAKs now by responding YES to the prompt, or later by responding NO. You register licenses later by following the directions in Section 7.3, "Registering Your Licenses".

To register your licenses now, be sure you have the following before proceeding:

• A copy of the Product Authorization Key (PAK) for each license that you are registering.

• The *OpenVMS License Management Utility Manual*, which contains complete, detailed information about the licensing procedure.

VSI OpenVMS Alpha licensing options enable the operating system as well as layered products, as described in the *VSI OpenVMS Version 8.4-2L2 Software Product Description and QuickSpecs (DO-DVASPQ-01A)*.

For more information about licensing terms and policies, contact VSI at info@vmssoftware.com [mailto:info@vmssoftware.com] to determine which licensing option is appropriate for your business needs.

When you answer YES to the prompt to register your licenses now, the installation procedure launches the SYS$UPDATE:VMSLICENSE.COM procedure, which displays the following options menu:

```
VMS License Management Utility Options:

    1. REGISTER a Product Authorization Key
    2. AMEND an existing Product Authorization Key
    3. CANCEL an existing Product Authorization Key
    4. LIST Product Authorization Keys
    5. MODIFY an existing Product Authorization Key
    6. DISABLE an existing Product Authorization Key
    7. DELETE an existing Product Authorization Key
    8. COPY an existing Product Authorization Key
    9. MOVE an existing Product Authorization Key
   10. ENABLE an existing Product Authorization Key
   11. SHOW the licenses loaded on this node
   12. SHOW the unit requirements for this node

   99. Exit this procedure

   Type '?' at any prompt for a description of the
   information requested. Press Ctrl/Z at any prompt
   to return to this menu.

Enter one of the above choices [1]
```

Select the REGISTER option and enter each license key until you have successfully registered all required PAKs. After you register all your licenses, exit the License Management procedure by entering 99 at the prompt.

16. **Install Windowing, Networking, and Related Products**: The procedure now asks whether you want to install the optional DECwindows GUI (DECwindows Motif for OpenVMS) and networking software (DECnet and TCP/IP) included with OpenVMS. The software that you choose to install (including the required software) is installed along with the OpenVMS operating system. You can change the default values for these products later in the installation procedure.

```
Do you want to install DECwindows Motif for OpenVMS
Alpha V1.7-F? (Yes/No) [YES]
```

If you want to install the OpenVMS graphical user interface and you have the hardware that supports it and the license to use it, answer YES; otherwise, answer NO.

You may install any of the optional software products separately after the OpenVMS installation completes.

Note

Beginning with OpenVMS Version 8.3, DECwindows client files are made available through the DWMOTIF_SUPPORT kit. (Prior to Version 8.3, the client files were included directly with the

OpenVMS operating system kit.) The OpenVMS installation procedure installs this kit automatically. The DWMOTIF_SUPPORT kit name is listed during the installation.

The OpenVMS installation menu offers the choice to install DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS networking software. You cannot have both installed on your system at the same time. You can also choose to install neither DECnet product; however, certain products that depend on DECnet might be adversely affected.

If you have installed DECnet-Plus and TCP/IP on your system, you can run DECnet applications over your TCP/IP network. For more information about DECnet over TCP/IP, see the *DECnet-Plus for OpenVMS Network Management* manual.

The software products display is similar to the following:

```
Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided
with the OpenVMS operating system kit. DECnet Phase IV
applications are supported by DECnet-Plus.

    DECnet Phase IV is also provided as an option.

    If you install DECnet-Plus and TCP/IP you can run DECnet
    applications over a TCP/IP network.  Please see the OpenVMS
    Management Guide for information on running DECnet
    over TCP/IP.

    Do you want to install DECnet-Plus for OpenVMS Alpha
    V8.4-D?(Yes/No) [Yes]
```

If you answer NO to the DECnet-Plus prompt, you are prompted to install DECnet Phase IV:

```
Do you want to install DECnet Phase IV for OpenVMS
Alpha V8.4-2L2?(Yes/No) [Yes]
```

Finally, you are asked whether you want to install TCP/IP Services for OpenVMS:

```
Do you want to install TCP/IP Services for OpenVMS
V5.7-13ECO5F?(Yes/No) [Yes] Y
```

17. **Choose Descriptive Help Text (Optional)**: After you respond to the prompt for TCP/IP Services for OpenVMS, the final stages of the installation proceed. First, the procedure asks whether you want detailed descriptions:

```
    The installation can provide brief or detailed descriptions.
    In either case, you can request the detailed descriptions
    by typing ?.

Do you always want detailed descriptions? (Yes/No) [No]
```

If you answer YES, the procedure displays additional explanatory text with each prompt.

Note

Because of limitations in the OpenVMS Alpha CD boot environment, OpenVMS Alpha kits are not validated when installed from the distribution CD. On OpenVMS Alpha server systems, signed PCSI kits that you install susbsequently (including any signed kits on the distribution media) are validated. In addition, on OpenVMS Alpha server systems, the DCL command PRODUCT SHOW HISTORY displays the validation status of installed products.

18. **Select Product Component Options (Accept All Defaults or Select Individually)**: The procedure displays a message such as the following, indicating that it is ready to install the operating system:

```
The following product has been selected:
    VSI AXPVMS OPENVMS 8.4-2L2          Platform (product suite)


Configuration phase starting ...

You will be asked to choose options, if any, for each selected
product and for any products that may be installed to satisfy
software dependency requirements.

Configuring VSI AXPVMS OPENVMS 8.4-2L2: OPENVMS and related
products Platform

    Copyright 2015-2017 VMS Software, Inc.

    VMS Software, Inc.

Do you want the defaults for all options? [YES]
```

When selecting options, note the following:

- If you want all the default values, press **Enter**.

  If you want to select options individually, answer NO. The procedure then prompts you for each option and suboption shown in Component Options and Suboptions Example.

- Review the list of options and compare them with the requirements for your system. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend on the installation of other components.

- If you are not sure whether you want certain options, request help by entering a question mark (?) at the prompt for that option.

- After you select all the options you want, you can view your selections and make changes (if necessary).

- After you boot the new system disk and log in, you can obtain information about individual system files by entering HELP SYS_FILES at the dollar sign prompt ($).

Note

Unless you have specific reasons to do otherwise, VSI recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

If you answer YES to accept the defaults for all options, the procedure displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the procedure prompts you for each option and suboption.

```
Do you want the defaults for all options? [YES]

    Availability Manager (base) for OpenVMS Alpha

    CDSA for OpenVMS Alpha
```

```
        KERBEROS for OpenVMS Alpha

        SSL for OpenVMS Alpha (based on OpenSSL V0.9.8)

        SSL1 V1.0 for OpenVMS Alpha (based on OpenSSL V1.0.2)

        Performance Data Collector (base) for OpenVMS Alpha

        HP Binary Checker for OpenVMS Alpha
```

19. **Finish Installation onto System Disk – Review and Confirm Options**: When you have answered all the prompts and selected the options you want installed, the procedure displays information about the products you have selected. The procedure allows you to review your selections and make changes if necessary, then installs the product, provides informational messages, and returns you to the original menu.

First, you are asked whether you want to review the options:

```
Do you want to review the options? [NO]
```

If you answer YES, the procedure displays all the selected options and suboptions, similar to Component Options and Suboptions Example. If you answer NO, the installation continues as described with the sample script (beginning with "Execution phase starting ...") that follows.

```
DECdtm Distributed Transaction Manager
    Support for DECnet-Plus or DECnet for OpenVMS
    Programming Support
        Debugger Utility
        Image Dump Utility
        Macro libraries
        Macro-32 Migration Compiler
        TLB intermediary form of STARLET
      C Object Libraries
      C Header Files
        VMS text libraries of Ada declarations
    RMS Journaling Recovery Utility
    System Programming Support
        Delta Debugger
        System Dump Analyzer Utility
        Miscellaneous Symbol Table Files
        Phone Utility
      Error Log Generator Utility
      XPG4 Internationalization Utilities
        World Wide PostScript Printing Subsystem
    Bliss Require Files
    Example Files
    Message Facility Files (HELP/MESSAGE)
    Translated Image Support
    UETP Files
    DECwindows Server Support
    Delete any obsolete OpenVMS files
    Delete files archived by OpenVMS remedial kits
```

The component options listed in Component Options and Suboptions Example are included within the OpenVMS Version 8.4-2L2 operating system. Depending on the products you chose to install with the operating system, additional components are included as well. After the procedure displays all selected options and suboptions, you are prompted as follows:

```
Are you satisfied with these options? [YES]
```

If you answer NO to this question, you are allowed to selectively configure options and suboptions, even if you did not do so previously. When you finish, you are asked again whether you are satisfied with the options you selected. When you answer YES to indicate you are satisfied with the selections, the installation begins installing OpenVMS onto the target disk. The following is a sample display:

Note

If you perform two installations at the same time to systems connected by MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 10-MAY-2017 14:58:40
Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 10-MAY-2017 14:58:45
Remote System Conflicts with
Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the message is not present when the system reboots with its actual node name.

```
The following products will be installed to destinations:
VSI AXPVMS AVAIL_MAN_BASE V8.4-2L2  DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS CDSA V2.4-320A            DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS DECNET_PHASE_IV V8.4-2L2 DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS DWMOTIF V1.7-F            DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS DWMOTIF_SUPPORT V8.4-2L2 DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS HPBINARYCHECKER V1.1-A   DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS KERBEROS V3.1-152B        DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS OPENVMS V8.4-2L2          DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS SSL V1.4-502A             DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS SSL1 V1.0-2KA             DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS TCPIP V5.7-13ECO5F        DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS TDC_RT V2.3-1220          DISK$BILOXISYS:[VMS$COMMON.]
VSI AXPVMS VMS V8.4-2L2              DISK$BILOXISYS:[VMS$COMMON.]

Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...
80%...90%
%PCSI-I-PRCOUTPUT, output from subprocess follows ...
% - Execute SYS$MANAGER:TCPIP$CONFIG.COM to proceed with
    configuration of
%   HP TCP/IP Services for OpenVMS.
%

Portion done: 100%
```

Depending on the options you selected, certain messages such as the preceding TCP/IP message might be displayed at this point.

20. **Final Installation Confirmation and Information Messages:** The installation continues, displaying the products that have been installed and post-installation tasks that might need to be performed. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4-2L2.

```
The following products have been installed:
```

```
        VSI AXPVMS AVAIL_MAN_BASE V8.4-2L2      Layered Product
        VSI AXPVMS CDSA V2.4-320A               Layered Product
        VSI AXPVMS DECNET_PHASE_IV V8.4-2L2     Layered Product
        VSI AXPVMS DWMOTIF V1.7-F               Layered Product
        VSI AXPVMS DWMOTIF_SUPPORT V8.4-2L2     Layered Product
        VSI AXPVMS HPBINARYCHECKER V1.1-A       Layered Product
        VSI AXPVMS KERBEROS V3.1-152B           Layered Product
        VSI AXPVMS OPENVMS V8.4-2L2             Platform (product
                                                suite)
        VSI AXPVMS SSL V1.4-502A                Layered Product
        VSI AXPVMS SSL1 V1.0-2KA                Layered Product
        VSI AXPVMS TCPIP V5.7-13ECO5F           Layered Product
        VSI AXPVMS TDC_RT V2.3-1220             Layered Product
        VSI AXPVMS VMS V8.4-2L2                 Operating System


  VSI AXPVMS OPENVMS V8.4-2L2: OPENVMS and related products
      Platform VSI AXPVMS KERBEROS V3.1-152B
         Configure and set up Kerberos
         If Kerberos will be run on this system, but has not been
         used previously, you need to perform the following steps.

           o Run the Kerberos configuration procedure:
              @SYS$STARTUP:KRB$CONFIGURE.COM

           o Add the following line to SYS$MANAGER:SYSTARTUP_VMS.COM:
              $ @SYS$STARTUP:KRB$STARTUP

           o Add the following line to SYS$MANAGER:SYLOGIN.COM:
              $ @SYS$MANAGER:KRB$SYMBOLS

         Press RETURN to continue:

      VSI AXPVMS SSL V1.4-502A: SSL V1.4 for OpenVMS Alpha
      (Based on OpenSSL 0.9.8ze)
         There are post installation tasks that you must complete
         after upgrading from previous SSL versions
         including verifying startup command procedures and
         logical names.
         Refer to SYS$HELP:SSL014.RELEASE_NOTES for more
         information.

      VSI AXPVMS SSL1 V1.0-2KA: SSL1 for OpenVMS AXP V1.0-2K
      (Based on OpenSSL 1.0.2K)
         There are post-installation tasks that you must complete.
         After upgrading from previous SSL1 versions
         Refer to SYS$HELP:SSL100-2K.RELEASE_NOTES for more
         information.

      VSI AXPVMS TDC_RT V2.3-1220: The Performance Data Collector
      (base) for OpenVMS Users of this product require the
      following privileges:
           (CMKRNL,LOG_IO,WORLD,PHY_IO,SYSPRV,SYSLCK)
         Users of this product require the following process
         resource limits:
           WSQUO minimum 6000
         A read-me file is available in
           SYS$COMMON:[TDC]TDC_README.TXT
         Release notes are available in
```

```
      SYS$COMMON:[TDC]TDC_RELEASE_NOTES.TXT

   VSI AXPVMS HPBINARYCHECKER V1.1-A: HP Binary Checker
     Release notes for HP Binary Checker available

   VSI AXPVMS TCPIP V5.7-13ECO5F: VSI TCP/IP Services
   for OpenVMS.
      VSI AXPVMS SSL1 V1.0-2KA: SSL1 for OpenVMS AXP V1.0-2K
      (Based on OpenSSL 1.0.2K)
        There are post-installation tasks that you must
        complete.
        After upgrading from previous SSL1 versions
        Refer to SYS$HELP:SSL100-2K.RELEASE_NOTES for more
        information.
      Check the release notes for current status of the product.
```

21. **Installation Completes and Returns to OpenVMS Menu**: The installation procedure is now complete. The procedure displays information about the special startup procedure that runs when the newly installed system is first booted. It then prompts you to press **Return** (**Enter**) to continue. After you do so, you are returned to the OpenVMS operating system menu. The following is a sample display:

```
The installation is now complete.

    When the newly installed system is first booted, a special
    startup procedure will be run.  This procedure will:

        o  Configure the system for standalone or OpenVMS
           Cluster operation.
        o  Run AUTOGEN to set system parameters.
        o  Reboot the system with the newly set parameters.

    You may shut down now or continue with other operations.

  Process AXPVMS_INSTALL logged out at 18-APR-2017 12:14:09.75

Press Return to continue...

    ************************************************************

    You can install or upgrade the OpenVMS ALPHA operating
    system or you can install or upgrade layered products
    that are included on the OpenVMS ALPHA distribution
    media (CD/DVD).

    You can also execute DCL commands and procedures to
    perform "standalone" tasks, such as backing up the
    system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS ALPHA
            Version 8.4-2L2
        2)  Display layered products that this procedure
            can install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
```

```
     6)   Remove installed products
     7)   Find, Install or Undo patches; Show or Delete
          Recovery Data
     8)   Execute DCL commands and procedures
     9)   Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)
```

22. **Shut Down the System**: Unless you want to perform other operations prior to booting the new system disk, choose the shutdown option (9) on the OpenVMS main menu to shut down the operating system, as shown in the following example. If you want to install layered products that have not been installed yet, VSI recommends doing so during the postinstallation phase, as described in Section 6.7, "Running Alpha Layered Products".

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)  9
     Shutting down the system
        SYSTEM SHUTDOWN COMPLETE
```

After you complete the installation and shut down the system, you can boot your new operating system disk, as explained in the following section.

3.5. Booting the New OpenVMS System Disk

After you have successfully installed the OpenVMS operating system, the next step is to set up the new system disk as the default boot device. To set up the OpenVMS system disk as the default boot device and then boot it, see the following section.

3.5.1. Booting the OpenVMS Alpha System Disk

For booting the OpenVMS Alpha system disk, first designate the new system disk as the default boot device by performing the steps in Section 3.5.1.1, "Specifying the Default Boot Device on OpenVMS Alpha Systems". Then, to boot the disk, perform the steps in Section 3.5.1.2, "How to Boot the New System Disk".

3.5.1.1. Specifying the Default Boot Device on OpenVMS Alpha Systems

Before you boot the new system disk, perform the following steps:

1. You need to be at the console prompt to perform step 2. If you are not at the console prompt, halt the system by pressing:

    • **Ctrl/P** on the console keyboard

    • **Break** on the console keyboard

    • **Halt** on the server front panel

    When the system is halted, the console prompt ">>>" should appear.

    For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

2. At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

    SET BOOTDEF_DEV *target-drive*

Substitute the device name of the system disk for `target-drive`. The SET BOOTDEF_DEV command tells the system which disk to boot from. For example, if the system disk has the device name DKA400, enter the following command and press **Enter**:

```
>>>   SET BOOTDEF_DEV DKA400
```

If the system disk is connected to a hierarchical storage device (HS*x*), the format for specifying that drive is different.

For more information about setting and showing the default boot device, consult the *Alpha Systems' Console World Wide ID Manager for Fibre Channel devices* manual or see ftp:// ftp.hp.com/pub/alphaserver/firmware/other/wwidmgr_v13.pdf.

3.5.1.2. How to Boot the New System Disk

To boot the system disk, enter the following command and press **Enter**:

```
>>>   BOOT -FLAGS 0,0
```

When the system starts booting, the initial informational messages displayed are similar to the following:

```
OpenVMS (TM) Alpha Operating System, Version XE5F-F4N
    Copyright 2017 VMS Software, Inc.

    Installing required known files...

    Configuring devices...

(c) Copyright 2015-2017 VMS Software, Inc.
```

3.5.2. Next Steps

When you boot OpenVMS from a new system disk, a special startup procedure runs that does the following:

• Gives you the opportunity to configure the system for standalone or OpenVMS Cluster operation (see Section 3.6, "Joining an OpenVMS Cluster").

• Runs AUTOGEN to evaluate your hardware configuration, estimate typical workloads, and set system parameters (see Section 3.7, "Running AUTOGEN").

• Reboots your system with the new parameters (see Section 3.8, "Rebooting After AUTOGEN").

After the system is rebooted with the new parameters, you can log into your SYSTEM account, as explained in Section 3.9, "Logging In to the SYSTEM Account".

3.6. Joining an OpenVMS Cluster

At installation, you are prompted to determine if the node will join an OpenVMS cluster. If you answered as NO, and if the node will not be a cluster member, you can skip to Section 3.7, "Running AUTOGEN".

If you answered NO to the question about joining an OpenVMS Cluster, but you do intend to add this node to a new or existing OpenVMS Cluster, you can do so only after the system has rebooted (at the end of this phase of the installation). You must manually run the cluster configuration utility. On an OpenVMS Alpha system, you can manually add your node to an OpenVMS Cluster by entering the following command:

```
$@SYS$MANAGER:CLUSTER_CONFIG
```

For more information about cluster configuration, see the *HP OpenVMS Cluster Systems* manual or the *Guidelines for OpenVMS Cluster Configurations* manual.

If you answered YES to the question about joining an OpenVMS Cluster, the system now prompts you for information about your configuration. Table 3.2, "Prompts for OpenVMS Cluster Configurations"vlists the OpenVMS Cluster prompts and suggested responses.

These prompts appear if you answered YES to the question about joining an OpenVMS Cluster or if you manually run SYS$MANAGER:CLUSTER_CONFIG.COM or SYS$MANAGER:CLUSTER_CONFIG_LAN.COM. Note that, depending on your responses and the particular cluster configuration, some prompts are not displayed.

Table 3.2. Prompts for OpenVMS Cluster Configurations

Question	How to Respond
Will this node be a cluster member (Y/N)?	Enter Y.
What is the node's DECnet node name?	Enter the DECnet node name (for example, MYNODE). The DECnet node name can be from one to six alphanumeric characters in length and cannot include dollar signs ($) or underscores (_). This is the name you specified in step 11 of the installation procedure.
What is the node's DECnet node address?	Enter the DECnet node address; for example, 2.2. This is the address you specified in step 12 of the installation procedure.
Will the Ethernet be used for cluster communications (Y/N)? (Alpha only)	Enter N for an OpenVMS *CI-only cluster* or *DSSI-only cluster*. Otherwise, enter Y.[a]
Enter this cluster's group number:[b]	Enter a number in the range of 1 to 4095 or from 61440 to 65535.
Enter this cluster's password:[b]	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and can include dollar signs ($) and underscores (_).
Reenter this cluster's password for verification:	Reenter the password.
Will MYNODE be a disk server (Y/N)?	Enter Y if you want local disks to be served to the cluster (mandatory for local area and mixed-interconnect configurations). See the *HP OpenVMS Cluster Systems* manual for information about served cluster disks.
Will MYNODE serve RFxx disks (Y)? (Alpha only)	Enter a response appropriate for your DSSI configuration, if such disks are available.
Enter a value for MYNODE's ALLOCLASS parameter.	In an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves DSSI or CI disks to other cluster members, or if volume shadowing will be used on this system. In either case, the ALLOCLASS value must be a number from 1 to 255. VSI recommend that you thoroughly review the chapter on cluster storage devices in the *HP OpenVMS Cluster Systems* manual. This manual also includes the rules for specifying allocation class values.

Question	How to Respond
Does this cluster contain a quorum disk (Y/N)?	For CI-only, SCSI, local area, and mixed-interconnect configurations, enter Y or N, depending on your configuration. For most DSSI systems, enter Y. However, if you are adding a two-system DSSI configuration to an existing cluster (in which case you might not need a quorum disk), you can answer N. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. For information about quorum disks, see the *HP OpenVMS Cluster Systems* manual.

[a]The Ethernet might not be required for communication within a *local area OpenVMS Cluster system* configured with FDDI devices. Within certain Digital Storage Systems Interconnect (*DSSI*) or computer interconnect (*CI*) mixed-interconnect configurations, neither the Ethernet nor FDDI are required for communication. If your configuration fits either scenario, you can answer NO (N) to this question.

[b]Cluster group number and password are required by any cluster nodes that use the local area network. In a cluster that uses mixed interconnects, if any of the interconnects require the cluster number and password, then you must set the cluster number and password for all nodes.

3.7. Running AUTOGEN

At this point, the system automatically runs AUTOGEN to evaluate your hardware configuration and estimate typical workloads. AUTOGEN then sets system parameters, the sizes of page, swap, and dump files, and the contents of VMSIMAGES.DAT. When AUTOGEN finishes and your system reboots, the installation procedure is complete.

The installation procedure displays messages similar to the following:

```
AUTOGEN will now be run to compute the new system parameters.
    The system will then shut down and reboot, and the installation
    or upgrade will be complete.

    After rebooting you can continue with such system management
    tasks as:

            Configuring networking software (TCP/IP Services,
            DECnet, other)
            Using SYS$MANAGER:CLUSTER_CONFIG.COM to create an
            OpenVMS Cluster
            Creating FIELD, SYSTEST and SYSTEST_CLIG accounts
            if needed

%AUTOGEN-I-BEGIN, GETDATA phase is beginning.
%AUTOGEN-I-NEWFILE,  Previous contents of SYS$SYSTEM:CLU$PARAMS.DAT
  have been copied to SYS$SYSTEM:CLU$PARAMS.OLD.  You may wish to
  purge SYS$SYSTEM:CLU$PARAMS.OLD.
%AUTOGEN-I-NEWFILE,  Previous contents of SYS$SYSTEM:CLU$PARAMS.DAT
  have been copied to SYS$SYSTEM:CLU$PARAMS.OLD.  You may wish to
  purge SYS$SYSTEM:CLU$PARAMS.OLD.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:PARAMS.DAT has
  been created.
        You may wish to purge this file.
%AUTOGEN-I-END, GETDATA phase has successfully completed.
%AUTOGEN-I-BEGIN, GENPARAMS phase is beginning.
%AUTOGEN-I-NEWFILE, A new version of SYS$MANAGER:VMSIMAGES.DAT
  has been created.

        You may wish to purge this file.
%AUTOGEN-I-NEWFILE, A new version of SYS$SYSTEM:SETPARAMS.DAT
```

```
    has been created.
        You may wish to purge this file.
%AUTOGEN-I-END, GENPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, GENFILES phase is beginning.
Computed size: 778;  current size: 8202
%SYSGEN-I-CREATED, SYS$SYSROOT:[SYSEXE]SYS$ERRLOG.DMP;2 created
Computed size: 25165800;  current size: 4604
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS;1 extended

        Extending SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS to 25165800
        blocks will take approximately 120 seconds. Please wait ...
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS;1 extended
                                    ... done.
Computed size: 2600874;  current size: 0
%SYSGEN-I-CREATED, $1$DGA5001:[SYS0.SYSEXE]SYSDUMP.DMP;1 created
%SYSGEN-I-EXTENDED, $1$DGA5001:[SYS0.SYSEXE]SYSDUMP.DMP;1 extended
Computed size: 124000;  current size: 1000
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]SWAPFILE.SYS;1 extended

%AUTOGEN-I-REPORT, AUTOGEN has produced some informational
        messages which have been stored in the file
        SYS$SYSTEM:AGEN$PARAMS.REPORT.
        You may wish to review the information in that file.

%AUTOGEN-I-END, GENFILES phase has successfully completed.
%AUTOGEN-I-BEGIN, SETPARAMS phase is beginning.
%%%%%%%%%%  OPCOM  18-APR-2017 13:14:51.30  %%%%%%%%%%
Message from user SYSTEM on BILOXI
%SYSGEN-I-WRITECUR, CURRENT system parameters modified by process
  ID 00000023 in to file SYS$SYSROOT:[SYSEXE]ALPHAVMSSYS.PAR;2

%AUTOGEN-I-SYSGEN, parameters modified
%AUTOGEN-I-END, SETPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, REBOOT phase is beginning.

The system is shutting down to allow the system to boot with the
generated site-specific parameters and installed images.
```

Note

After booting and running AUTOGEN, several messages are displayed at DECwindows startup. For information about these messages and how to avoid them, see the *HP DECwindows Motif for OpenVMS Release Notes*.

3.8. Rebooting After AUTOGEN

After AUTOGEN finishes, the system automatically shuts down and displays messages similar to the following:

```
The system will automatically reboot after the shutdown and the
upgrade will be complete.

        SHUTDOWN -- Perform an Orderly System Shutdown
                on node BILOXI

%SHUTDOWN-I-BOOTCHECK, performing reboot consistency check...
%SHUTDOWN-I-CHECKOK, basic reboot consistency check completed
```

After installation, the OpenVMS Alpha system is automatically restarted. If the Alpha system does not reboot automatically, you must manually do so. For example, if the system disk is DKA400, enter the following command and press **Enter**:

```
>>> BOOT DKA400
```

When the system reboots, it displays informational messages and accounting information indicating that your OpenVMS operating system has finished booting and is now ready for use.

3.9. Logging In to the SYSTEM Account

The following two sections explain how to log in to the SYSTEM account from a character-cell terminal and from a workstation.

3.9.1. Logging In from a Character-Cell Terminal

Log in from a character-cell terminal by entering the user name SYSTEM followed by the password. The display is similar to the following:

```
Welcome to OpenVMS (TM) Alpha Operating System, Version V8.4-2L2


Username: system
Password:

Welcome to OpenVMS (TM) Alpha Operating System, Version V8.4-2L2
```

 If you forget your password for an OpenVMS Alpha SYSTEM account, see Section 8.1.7, "Booting in an Emergency".

3.9.2. Logging In from a Workstation

If you installed the DECwindows Motif for OpenVMS software on your workstation, do the following after the login window is displayed on your screen:

1. Enter the user name SYSTEM, press **Tab**, and then enter the password.

2. Press **Enter** or click **OK** with your mouse.

3. At this point, you can create a DECterm session or initiate other management functions. For information about creating a DECterm session, see the *DECwindows Motif for OpenVMS Applications Guide*.

3.10. Postinstallation Tasks

After you have successfully installed the OpenVMS operating system and logged in to the SYSTEM account, you must perform certain postinstallation tasks before you can use the system. For complete information, see Chapter 7, *After Installing or Upgrading the OpenVMS Operating System*.

Chapter 4. Before Upgrading the OpenVMS Operating System

This chapter describes which tasks you should perform prior to beginning an upgrade. Section 4.1, "Preupgrade Tasks" includes a checklist that you can use to make sure you perform all the tasks described in this chapter.

4.1. Preupgrade Tasks

Use the following checklist to ensure that you perform all necessary tasks prior to upgrading your system.

Table 4.1. Preupgrade Checklist

Task	Section
• Review relevant documentation.	Section 4.2, "Documentation References"
• Review notes, cautions, and restrictions about the following:	Section 4.3, "Notes, Cautions, and Restrictions"
• Upgrade paths to Version 8.4-2L2	
• Update license requirements	
• Components you choose not to install	
• Upgrade issues after the system disk directory structure has been changed	
• Remove older versions of DECram for OpenVMS **Note** The OpenVMS Alpha upgrade procedure checks for older versions of SSL and removes them if found.	Section 4.4, "Remove Older Versions of DECram for OpenVMS"
• Prepare the system disk.	Section 4.6, "Preparing the System Disk"
• Ensure that you have a recent FEEDBACK.DAT file.	Section 4.7, "Ensuring You Have a Recent FEEDBACK.DAT File"
• Perform required actions before upgrading in a volume shadowing environment.	Section 4.8, "Shadowing Environment"
• Back up the current system disk.	Section 4.9, "Backing Up the System Disk"
• Shut down the system.	Section 4.10, "Finishing Preupgrade Tasks"

4.2. Documentation References

In addition to reviewing the information in this chapter, you might need to refer to the following sources of information:

• *VSI OpenVMS Alpha Version 8.4-2L2 Cover Letter and Guide to Media*

- *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs*

- *OpenVMS Cluster System* manual

- *Guidelines for OpenVMS Cluster Configurations*

- *OpenVMS System Manager's Manual, Volume 2* for information about using AUTOGEN, modifying the system parameters file (MODPARAMS.DAT), and related operations

- *OpenVMS System Management Utilities Reference Manual*, for information about using system management utilities such as SYSMAN and ANALYZE/DISK_STRUCTURE

- *OpenVMS Guide to System Security*, for information about reestablishing your security environment after the upgrade

4.3. Notes, Cautions, and Restrictions

This section provides important information that can affect the success of your upgrade. Review the cautions, restrictions, and notes carefully before you begin the upgrade.

4.3.1. Components You Choose Not to Install

If you choose not to install optional OpenVMS networking software (DECnet or TCP/IP) or the DECwindows/Motif GUI during the upgrade, the upgrade procedure removes these products from the system disk.

Note

Unless you have specific reasons to do otherwise, VSI recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

4.4. Remove Older Versions of DECram for OpenVMS

Beginning with OpenVMS Version 8.2, DECram for OpenVMS becomes an integral part of the OpenVMS operating system. Before upgrading to OpenVMS Alpha Version 8.4-2L2, you must manually remove earlier versions of DECram for OpenVMS that were customer installed. The upgrade procedure cannot automatically remove DECram for OpenVMS.

If an old version of DECram for OpenVMS is installed, the upgrade procedure might abort. If the upgrade does complete, DECram for OpenVMS might cause errors or work improperly. This section explains how to remove an older version of DECram for OpenVMS from your operating system.

Before you shut down the operating system that you plan to upgrade, follow these steps to remove DECram for OpenVMS (if you have already shut down your operating system, you must reboot before continuing).

Important

Perform these steps *only* on versions of OpenVMS Alpha prior to 8.2.

1. Check for a POLYCENTER software installation (PCSI) utility DECram for OpenVMS installation by logging on to a privileged account and entering the following command:

```
$   PRODUCT SHOW PRODUCT DECRAM
```

If the resulting display shows that DECram is not found on the system, skip to step 3; otherwise, proceed to step 2.

2. If the SHOW PRODUCT display shows that DECram for OpenVMS is installed, enter the following command to remove the product:

```
$   PRODUCT REMOVE DECRAM
```

Once this command has completed successfully, you are finished; you do not need to perform the next steps. If the product removal fails, go on to step 3.

3. Check for files on your system from a VMSINSTAL utility DECram for OpenVMS installation by entering the following commands:

```
$ DIRECTORY SYS$SYSDEVICE:[SYS*.SYS$LDR]SYS$MDDRIVER.EXE
$ DIRECTORY SYS$SYSDEVICE:[SYS*.SYSEXE]MDMANAGER.EXE
$ DIRECTORY SYS$SYSDEVICE:[SYS*.SYSMGR]MDRECOVER.EXE
$ DIRECTORY SYS$SYSDEVICE:[SYS*.SYSHLP]DECRAM$HELP.HLB
$ DIRECTORY SYS$SYSDEVICE:[SYS*.SYSTEST]DECRAM$IVP.COM
```

If files are found, use the commands in step 4 to remove them. If no files are found, skip to step 5.

4. Remove the files found in step 3 by entering the appropriate DELETE commands (the /NOCONFIRM/NOLOG qualifiers are optional):

```
$ DELETE/NOCONFIRM/NOLOG-
_$ SYS$SYSDEVICE:[SYS*.SYS$LDR]SYS$MDDRIVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG-
_$ SYS$SYSDEVICE:[SYS*.SYSEXE]MDMANAGER.EXE;*
$ DELETE/NOCONFIRM/NOLOG-
_$ SYS$SYSDEVICE:[SYS*.SYSMGR]MDRECOVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG-
_$ SYS$SYSDEVICE:[SYS*.SYSHLP]DECRAM$HELP.HLB;*
$ DELETE/NOCONFIRM/NOLOG-
_$ SYS$SYSDEVICE:[SYS*.SYSTEST]DECRAM$IVP.COM;*
```

5. In addition, remove the DECram for OpenVMS startup file from the startup database by entering the following commands:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> STARTUP SET DATABASE STARTUP$STARTUP_LAYERED
SYSMAN> STARTUP REMOVE FILE MDRECOVER.EXE
```

Ignore any "-STARTUP-E-FILNOTFND, STARTUP file MDRECOVER.EXE not found" errors. To exit from SYSMAN, press **Ctrl/Z** or enter EXIT.

4.5. Saving Archived Files from Being Deleted by the Upgrade

By default, the OpenVMS upgrade deletes files that were archived as *filename.type_*OLD by OpenVMS remedial kits. If you do not want to delete these files, you can save them by performing one of the following actions:

• When the script asks whether you want the defaults for all options, answer NO. (This script is shown in the example in Step 18.) Step through the options and answer NO to the option for deleting files archived by remedial kits. This action saves all such files.

- Before beginning the upgrade, rename any _OLD files that you want to save. Files that you do not rename will be deleted.

Note that the upgrade does not delete all files with a file extension ending in _OLD. Rather, it deletes only those _OLD files that were archived by OpenVMS remedial kits.

Note

OpenVMS patches save these _OLD files in VMS$REMEDIAL_OLD_FILES.TXT in the SYS $UPDATE directory. All files listed in this file are supposed to have _OLD appended to their names; however, some patch kits add the files without this extension. If the upgrade procedure detects files without _OLD appended, it displays a message similar to the following:

```
%UPGRADE-I-FIXUP, appending _OLD to file names in
 PCSI$DESTINATION:[SYSUPD] VMS$REMEDIAL_OLD_FILES.TXT
    [SYSUPD]VMSKITBLD.DAT
    [SYSHLP]XFC$SDA.HLP
    [SYS$LDR]SYSTEM_SYNCHRONIZATION.EXE-OLD
    [SYS$LDR]SYS$XFCACHE.DSF
    [SYS$LDR]SHELL9K.EXE_STB
    [000000]VSI-AXPVMS-VMS-V0842-1-2.PCSI$DESCRIPTION
```

4.6. Preparing the System Disk

This section describes the tasks you should perform to prepare the system disk for the upgrade.

4.6.1. Checking the Directory Structure and Preserving Your Security Protections

If you changed the directory structure on your system disk, the upgrade procedure does not work correctly. Restore your system disk to a standard directory structure before you attempt an upgrade.

The OpenVMS upgrade procedure provides new files and directories in the directory [VMS $COMMON...]. If you have any special protections and access control lists (ACLs), you need to reapply them to reestablish the security environment you currently have. For more information about creating and maintaining a secure environment, see the *OpenVMS Guide to System Security*.

4.6.2. Checking the SYSCOMMON Directories

For the upgrade to be successful, the SYSCOMMON directories in all system roots must be aliases (or hard links) for the VMS$COMMON directory. To check whether this is the case, enter the following commands if you are booted from the system disk that you are upgrading, and compare the displayed file identifiers to ensure that they are all the same:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING-
_$ SYS$SYSDEVICE:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING-
_$ SYS$SYSDEVICE:[SYS*]SYSCOMMON.DIR
```

If you did not boot from the system disk that you are upgrading, mount the disk to be upgraded and specify the actual device name in the command. For example, if the system disk to be upgraded is mounted on DKA100, you would use commands similar to the following:

```
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING-
```

```
_$ DKA100:[000000]VMS$COMMON.DIR
$ DIRECTORY/FILE_ID/NOHEADING/NOTRAILING-
_$ DKA100:[SYS*]SYSCOMMON.DIR
```

Output from the first command should list a single file. Output from the second command should list one file for each system root on the disk. Check whether the file ID is the same for all of the listed files and take action as follows:

- If all the file IDs are the same, continue with the procedure described in the next section.

- If all the file IDs are not the same, this system disk does not have the directory structure that OpenVMS requires, and the upgrade will not succeed. For assistance on resolving this, contact your software support representative.

4.6.3. Purging Duplicate Files from the System Disk

To free up disk space and file headers, purge the system disk of duplicate files. VSI recommends that you enter the following commands, as shown:

```
$ PURGE/LOG/BEFORE=TODAY SYS$SYSDEVICE:[000000...]*.LOG
$ PURGE/LOG SYS$SYSTEM:PAGEFILE*.SYS
$ PURGE/LOG SYS$SYSTEM:SWAPFILE*.SYS
$ PURGE/LOG SYS$SYSTEM:DUMPFILE*.SYS
```

Check the system disk for application and system dump files by entering the following command:

```
$ DIRECTORY/SIZE/DATE SYS$SYSDEVICE:[000000...]*.DMP
```

If any .DMP files are found, use your discretion and delete them. All the files being purged by the preceding commands will survive an upgrade but might no longer be needed and might take up a significant amount of disk space.

4.6.4. Examining the System Disk

Examine and repair (if necessary) the system disk using the ANALYZE/DISK_STRUCTURE command. (See the *OpenVMS System Management Utilities Reference Manual* for more information about this command.) Use the following procedure:

1. Analyze the system disk for inconsistencies and errors in the file structure by entering the following command:

    ```
    $ ANALYZE/DISK_STRUCTURE SYS$SYSDEVICE
    ```

    Ignore the following message:

    ```
    %ANALDISK-I-OPENQUOTA, error opening QUOTA.SYS
    ```

2. If you find any other errors on the system disk, repair the errors by entering the following command:

    ```
    $ANALYZE/DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
    ```

    Repeat steps 1 and 2 until no errors (other than the one shown in step 1) are returned.

4.6.5. Checking the Size of the System Disk

It is difficult to determine in advance how many blocks of disk space you need for the upgrade. It depends on how many files you have on the target disk already and on how many components you select during the upgrade procedure. However, the following information will help:

- The *maximum* amount of disk space you need is approximately 18,000,000 blocks, but your system might use substantially less.

- After you select the components you want installed on the system for the upgrade, the upgrade procedure calculates whether you have enough disk space, displaying the number of available blocks and the number required for the upgrade. If the procedure determines that your disk does not have enough space to perform the upgrade, it displays a message to alert you and allows you to terminate the upgrade so you can create more disk space and try the upgrade again.

Note

If the files on your system disk are badly fragmented, you might not be able to complete an upgrade, even when the amount of disk space appears to be sufficient. VSI recommends that you back up and restore the system disk prior to upgrading. Restoring the system disk from an image backup defragments the disk. For information about backing up and restoring your system disk, see Appendix A, *Backing Up and Restoring the System Disk*.

To see how much space you have on the system disk, enter the following command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

4.6.6. Returning Authorization and AGEN$INCLUDE Files to the System Disk

If you place authorization and AGEN$INCLUDE files on disks other than the system disk, the upgrade procedure will not find these files. This is because the other disks are not mounted during the upgrade. In addition, the logical names you set up to point to these files are not defined during the upgrade. The following sections explain how to make these files available to the upgrade procedure.

4.6.6.1. Authorization Files

OpenVMS allows you to relocate certain system files (mostly authorization files) off the system disk. You do this by copying the files to another location and then defining logical names as documented in the file SYS$MANAGER:SYLOGICALS.TEMPLATE. The logical names are defined in SYS$STARTUP:SYLOGICALS.COM.

When you boot your system from the OpenVMS operating system media, the logical names pointing to these files are not defined, and the disks where they are located are not mounted. Because of this, the upgrade cannot access the relocated files, possibly resulting in an incorrect or incomplete upgrade. The upgrade might finish without error, but the files might not be in place as expected.

Before upgrading your system, check the definitions of these logical names on your system. (If a file has not been relocated, the corresponding logical name might not be defined. This is acceptable.) If any logical name points to a location or file name other than the location and file name listed in Table 4.2, "Logical Names for Relocated Authorization Files", return the file to the default location and file name. To prevent the system from referencing the files located off the system disk, either delete the associated logical name (using the DCL command DEASSIGN/SYSTEM/EXEC), or shut down the operating system and reboot from the operating system media. After the upgrade and before booting the operating system, you can move these files back to their original locations off the system disk, using the DCL option (8) from the OpenVMS operating system menu.

Note

Some files listed in Table 4.2, "Logical Names for Relocated Authorization Files", such as SYS$SYSTEM:VMS$PASSWORD_HISTORY.DATA and SYS$LIBRARY:VMS

$PASSWORD_POLICY.EXE, might not exist on your system, depending on certain configuration settings. For information about these files, see the *OpenVMS Guide to System Security*.

Table 4.2. Logical Names for Relocated Authorization Files

Logical Name	Location and File Name
LAN$NODE_DATABASE	SYS$SYSTEM:LAN$NODE_DATABASE.DAT
LMF$LICENSE	SYS$SYSTEM:LMF$LICENSE.LDB
NETNODE_REMOTE	SYS$SYSTEM:NETNODE_REMOTE.DAT
NETNODE_UPDATE	SYS$MANAGER:NETNODE_UPDATE.COM
NETOBJECT	SYS$SYSTEM:NETOBJECT.DAT
NETPROXY	SYS$SYSTEM:NETPROXY.DAT
NET$PROXY	SYS$SYSTEM:NET$PROXY.DAT
RIGHTSLIST	SYS$SYSTEM:RIGHTSLIST.DAT
SYSUAF	SYS$SYSTEM:SYSUAF.DAT
SYSUAFALT	SYS$SYSTEM:SYSUAFALT.DAT
SYSALF	SYS$SYSTEM:SYSALF.DAT
VMSMAIL_PROFILE	SYS$SYSTEM:VMSMAIL_PROFILE.DATA
VMS$AUDIT_SERVER	SYS$MANAGER:VMS$AUDIT_SERVER.DAT
VMS$OBJECTS	SYS$SYSTEM:VMS$OBJECTS.DAT
VMS$PASSWORD_DICTIONARY	SYS$LIBRARY:VMS$PASSWORD_DICTIONARY.DATA
VMS$PASSWORD_HISTORY	SYS$SYSTEM:VMS$PASSWORD_HISTORY.DATA
VMS$PASSWORD_POLICY	SYS$LIBRARY:VMS$PASSWORD_POLICY.EXE

4.6.6.2. AGEN$INCLUDE Files

If you use the AGEN$INCLUDE feature in SYS$SYSTEM:MODPARAMS.DAT to include files containing additional parameter settings, and the files that are being included are not on the system disk, then do the following before upgrading:

1. Move the files to the system disk.

2. Update the AGEN$INCLUDE entries to reflect the new locations of these files. For these entries, do not use logical names that you defined in SYS$STARTUP:SYLOGICALS.COM or elsewhere for your normal startup procedure. When you boot the system from the OpenVMS operating system media for an upgrade, your normal startup procedure is not run, and so these logical names are not defined for the upgrade. In addition, when you first boot the upgraded system, a special startup procedure is used.

After the upgrade is complete, you can move these included files back to their original locations. If you do so, remember to reset the AGEN$INCLUDE entries in SYS$SYSTEM:MODPARAMS.DAT.

4.6.7. Verifying System Parameters

Verify (and modify if necessary) system parameters. (For information about verifying and modifying system parameters, see the *OpenVMS System Manager's Manual, Volume 2*.) During an upgrade, AUTOGEN initially generates parameter values based on parameter defaults. However, during the GETDATA phase, AUTOGEN modifies parameter values based on entries stored in SYS $SYSTEM:MODPARAMS.DAT. In addition, AUTOGEN analyzes feedback information stored in the AGEN$FEEDBACK.DAT file and, if the data is valid, adjusts any related parameter values

accordingly. (AUTOGEN considers data as valid if the system has been up at least for 24 hours and the feedback is no more than 30 days old.) To ensure that your feedback data is up to date, follow the instructions in Section 4.7, "Ensuring You Have a Recent FEEDBACK.DAT File".

Important

Any system parameters that you modified and *did not* enter in the SYS$SYSTEM:MODPARAMS.DAT file are lost during the upgrade. To retain these parameters, enter their names and the values that you have in use for them in SYS$SYSTEM:MODPARAMS.DAT. When AUTOGEN runs after the upgrade, it uses the values in SYS$SYSTEM:MODPARAMS.DAT.

For example, if the current value of GBLPAGES is 30000, and you modified GBLPAGES by 128 pages above the default, add the following line to SYS$SYSTEM:MODPARAMS.DAT:

```
MIN_GBLPAGES=30128!Increased by 128 by PLM for product
z 12/12/04
```

AUTOGEN compares the computed value of GBLPAGES with this MIN_ value (30128). If the computed value is less than the specified MIN_ value, AUTOGEN increases the value of GBLPAGES to the MIN_ value. Each time AUTOGEN runs, it makes the same comparison and adjusts the value of GBLPAGES, but never below the minimum indicated by MIN_GBLPAGES.

Important

If you modify system parameters, note the following:

- In general, you should allow AUTOGEN to calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.

- Whenever possible, use MIN_*parameter* values (such as MIN_GBLPAGES) to set the minimum value that can be set for a parameter by AUTOGEN. AUTOGEN increases the value if necessary. It also adjusts related parameters, unless they are hardcoded, in which case information is provided in the AGEN$PARAMS.REPORT file. Use MAX_*parameter* values to set a maximum value when you need to limit a parameter to a known maximum value.

- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lowercase or uppercase.

- VSI recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point serves as a comment starter and can appear anywhere on a line. The following is an example illustrating the modifications recommended in the preceding bulleted items:

```
SWAPFILE=0 ! don't re-size the SWAPFILE on AUTOGEN runs
MIN_gblsections=750  ! required for DECwindows MOTIF
MIN_NPAGEDYN=2750000 ! set npagedyn to a min of 2.75
million
```

For more information about using AUTOGEN as recommended, see Section 7.23, "Running AUTOGEN to Tune the System".

If your system was upgraded previously, a new SYS$SYSTEM:MODPARAMS.DAT file was created then. This file has comments and possibly duplicated entries that were created during that upgrade. If you upgrade again, SYS$SYSTEM:MODPARAMS.DAT can become unnecessarily large and potentially confusing. VSI recommends that you edit and reorganize SYS$SYSTEM:MODPARAMS.DAT before you upgrade again.

Note

On a cluster system disk, the MODPARAMS.DAT file should exist in SYS$SYSROOT:[SYSEXE] for each root. You must edit MODPARAMS.DAT as necessary for each root.

4.7. Ensuring You Have a Recent FEEDBACK.DAT File

Before upgrading your system, VSI recommends that you have a recent AGEN$FEEDBACK.DAT file. This file is in SYS$SPECIFIC:[SYSEXE] (that is, in [SYS*x*.SYSEXE], where *x* is the root; for example, SYS0 or SYS1). In OpenVMS Cluster systems, this file should exist in each node's SYS $SPECIFIC directory. When the system (or each system in a cluster) is rebooted after the upgrade, AUTOGEN runs. If a recent AGEN$FEEDBACK.DAT file is available, it is used. The data in this file helps AUTOGEN set system parameters for your specific applications and workload.

Note

If you do not have a current AGEN$FEEDBACK.DAT file, AUTOGEN might calculate system parameters that do not reflect your system's requirements. In that case, multiple cycles of running AUTOGEN and rebooting might be necessary before all layered products can be started. In some cases, successful startup can require additional entries in MODPARAMS.DAT. This should not be necessary if a current AGEN$FEEDBACK.DAT file is available.

If you do not have the AGEN$FEEDBACK.DAT file on your system, VSI recommends that you create a current AGEN$FEEDBACK.DAT file during a time when your system is running under a typical workload. To ensure the greatest data reliability, the system should be running for more than 24 hours but less than 30 days. Enter the following command:

```
$ RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
```

This runs very quickly and should not affect the performance of your system while it executes.

You can also specify the SAVE_FEEDBACK option when you execute the SYS$SYSTEM:SHUTDOWN.COM procedure; however, the data captured might not fully reflect the typical workload on your system.

Important

If you start AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations. However, if the feedback information reflects system up time of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN includes warnings in the AGEN $PARAMS.REPORT file to alert you to potential problems with the feedback data. If you wrongly assume the feedback is valid, the parameter settings might vary significantly from your expectations.

If you specify FEEDBACK (or NOFEEDBACK), AUTOGEN uses (or does not use) the feedback regardless of the data's reliability. AUTOGEN proceeds through the SETPARAMS phase (if you specified SETPARAMS, SHUTDOWN, or REBOOT as the end phase) and sets system parameters to the values it computed.

If you specify CHECK_FEEDBACK, AUTOGEN checks the validity of the feedback data. If AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It stops at the TESTFILES phase and issues a warning in the report that parameters have not been changed. You must read the report and decide whether the calculated values

---

are acceptable. You can either use them (by running the AUTOGEN SETPARAMS phase) or rerun AUTOGEN with valid feedback data.

4.8. Shadowing Environment

Because you cannot upgrade the operating system on a shadowed system disk (the upgrade will fail), you need to disable shadowing of the system disk and perform other operations before you can upgrade the operating system.

There are several methods for creating a nonshadowed target disk. This section describes how to change one of your *existing* shadowed system disks in a multiple-member shadow set to a nonshadowed disk that you can use as your target disk for the upgrade.

If you have a larger configuration with disks that you can access physically, you might want to use a copy of the system disk as your target disk. *Volume Shadowing for OpenVMS* manual describes two methods you can use to create this copy (using volume shadowing commands or BACKUP commands) and how to disable volume shadowing.

4.8.1. Setting the Boot Device

Be sure your system is set to boot by default from the disk you intend to upgrade. For OpenVMS Alpha systems, use the SHOW BOOTDEF_DEV and SET BOOTDEF_DEV console commands to accomplish this task. (For more information, see Chapter 8, *Booting and Shutting Down Your OpenVMS Alpha System*.)

4.8.2. Creating a Nonshadowed Target Disk

Perform the steps described in this section to change one of your existing shadowed system disks to a nonshadowed disk.

Important

If you simply use a MOUNT/OVERRIDE=SHADOW_MEMBERSHIP command to mount the volume to be upgraded, volume shadowing can overwrite the newly upgraded disk with information from a prior volume that has not been upgraded.

1. Shut down all systems booted from the shadowed system disk.

2. Perform a conversational (interactive) boot (see Section 8.1.3, "Performing a Conversational (Interactive) Boot") on the system disk you have chosen for your target disk. For OpenVMS Alpha systems, for example, enter the following command:

    ```
     >>> BOOT -FLAGS 0,1 DKA100
    ```

3. At the SYSBOOT> prompt, enter the following command to disable volume shadowing of the system disk:

    ```
    SYSBOOT> SET SHADOW_SYS_DISK 0
    ```

4. Enter the CONTINUE command to resume the boot procedure. For example:

    ```
    SYSBOOT> CONTINUE
    ```

5. After the boot completes, go to Section 4.10, "Finishing Preupgrade Tasks".

You now have a nonshadowed system disk that you can use for the upgrade.

4.9. Backing Up the System Disk

VSI strongly recommends that you make a backup copy of the system disk and, if your configuration allows it, upgrade the backup copy. Then, if there are problems, you still have a working system disk.

Note

OpenVMS Engineering has encountered cases where recovery from a failed upgrade has been difficult, expensive, or impossible because no backup of the preupgrade system disk was available. Various hardware or software failures or a power failure can make a partially upgraded system disk unusable. A backup copy might be the only route to recovery. The minimal time required to make a backup is a very wise investment.

To back up the system disk, follow these steps:

1. Shut down the system (see Section 8.3.1, "Shutting Down the System").

2. Boot the operating system media, following the instructions in Section 8.1, "Booting Operations".

3. Use the menu system to enter the DCL environment (option 8).

4. Mount the system device and the target device on which you will make the backup copy. (If you are backing up to tape, skip to the next step.) For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands. The /OVERRIDE qualifier used in this example allows you to mount the system disk without entering its volume label. The /FOREIGN qualifier is required for the target disk when you use the BACKUP /IMAGE command.

   ```
   $$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
   $$$ MOUNT /FOREIGN DKA100:
   ```

5. To back up the system disk to a magnetic tape, enter the following commands, where MTA0: is the magnetic tape drive and *label* is the volume label. Note that the BACKUP command automatically mounts the tape and begins the backup to it.

   ```
   $$$ INITIALIZE MTA0:  label
   $$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
   $$$ BACKUP /IMAGE /LOG DKA0: MTA0: label.BCK
   ```

6. To back up to a device other than a magnetic tape drive, enter the BACKUP command. For example, if your system disk is on DKA0: and your target disk is on DKA100:, use the following command (the colons are required):

   ```
   $$$BACKUP /IMAGE /LOG DKA0: DKA100:
   ```

   The /IMAGE qualifier causes the Backup utility to produce a functionally equivalent copy of the system disk, which is also bootable. The /LOG qualifier causes the procedure to display the specification of each save set file being processed. To compare the backed up files to the source files, use the /VERIFY qualifier. If any discrepancies are detected, the Backup utility displays an error message indicating the discrepancies.

7. Log out from the DCL environment.

8. Shut down the system by selecting option 9 on the menu.

For more complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, see Appendix A, *Backing Up and Restoring the System Disk*. For more information about the Backup utility, see the *OpenVMS System Management Utilities Reference Manual*.

4.10. Finishing Preupgrade Tasks

Continue the preupgrade tasks as follows, depending on whether you are upgrading in a standalone or OpenVMS Cluster environment:

IF ...	THEN ...
You are upgrading a standalone system	1. Review the checklist at the beginning of this chapter to verify that you have performed the necessary tasks. 2. Log in to the SYSTEM account. 3. Enter the following command: `$ @SYS$SYSTEM:SHUTDOWN` 4. When the procedure asks whether an automatic system reboot should be performed, enter N (NO). 5. Go to Chapter 6, *Upgrading the OpenVMS Operating System* to begin the upgrade procedure.
You are upgrading an OpenVMS Cluster system	1. Review the checklist at the beginning of this chapter to verify that you have performed the necessary tasks. 2. Go to Chapter 5, *Preparing to Upgrade in an OpenVMS Cluster Environment*

Chapter 5. Preparing to Upgrade in an OpenVMS Cluster Environment

This chapter describes how to prepare to upgrade in an OpenVMS Cluster environment. If you are not upgrading in an OpenVMS Cluster environment, go to Chapter 6, *Upgrading the OpenVMS Operating System*.

5.1. Preupgrade Tasks for OpenVMS Cluster Environments

Note

Be sure you have performed the preupgrade tasks described in Chapter 4, *Before Upgrading the OpenVMS Operating System* before you upgrade your OpenVMS Cluster system.

Use the checklist in Table 5.1, "Preupgrade Checklist for OpenVMS Cluster Environments" to ensure that you perform all necessary tasks prior to upgrading your system in an OpenVMS Cluster environment.

Table 5.1. Preupgrade Checklist for OpenVMS Cluster Environments

Task	Section
• Review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 5.2, "Documentation to Review"
• Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 5.3, "Mixed-Version and Mixed-Producer Support in an OpenVMS Cluster Environment"
• If you are adding a new OpenVMS computer system to an existing OpenVMS Cluster, choose one of two options for upgrading.	Section 5.4, "Adding a New System to an OpenVMS Cluster"
• Perform the preliminary tasks required for the type of upgrade:	Section 5.5, "Types of Upgrades":
• Concurrent upgrade	• Section 5.5.1, "Concurrent Upgrade"
• Rolling upgrade	• Section 5.5.2, "Rolling Upgrade"
• Begin the upgrade.	Chapter 6, *Upgrading the OpenVMS Operating System*

5.2. Documentation to Review

When you upgrade the operating system in an OpenVMS Cluster environment, be sure you review any relevant OpenVMS Cluster information contained in the following documents.

OpenVMS Version 8.4-2L2 Documents

- *VSI OpenVMS Alpha Version 8.4-2L2 Cover Letter and Guide to Media*

- *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs*

- *HP OpenVMS Cluster Systems* manual

- *Guidelines for OpenVMS Cluster Configurations*

Be sure to consult your network or system manager as well.

Earlier OpenVMS Documents

The complete HPE OpenVMS Version 8.4 documentation set is available at: http://
h41379.www4.hpe.com/doc/os84_index.html. Information in these documents remains valid except
where superseded by the OpenVMS documents listed previously.

5.3. Mixed-Version and Mixed-Producer Support in an OpenVMS Cluster Environment

VSI provides two levels of support for mixed-version and mixed-architecture OpenVMS Cluster
systems: warranted support and migration support. For information regarding these support
combinations, please refer to Section 2.2, "Mixed-Version Support in OpenVMS Cluster Systems".

In addition, OpenVMS clusters may now contain OpenVMS operating system versions supplied by
two distinct suppliers, Hewlett Packard Enterprise (HPE) and VSI. Please refer to Section 2.2, "Mixed-
Version Support in OpenVMS Cluster Systems" for more information about this cluster configuration.

5.4. Adding a New System to an OpenVMS Cluster

To add a new OpenVMS Version 8.4-2L2 Alpha to an OpenVMS cluster, all existing Alpha nodes
in the cluster must be running OpenVMS Alpha Version 7.3-2, 8.2 or 8.4. Any node in the cluster
that is running an older version of OpenVMS must be upgraded appropriately before you can add a
Version 8.4-2L2 node.

Alternatively, any OpenVMS Alpha that needs to be upgraded can be removed temporarily from
the cluster and added back after it has been upgraded. This allows you to form a supported cluster
immediately, adding nodes back into the cluster as they are upgraded. Note that, depending on the
number of nodes being added, you might need to adjust the EXPECTED_VOTES system parameter
to reflect the number of voting nodes and any quorum disk votes (if a quorum disk is being used).
In addition, for any node being removed from the cluster, you should specify the REMOVE_NODE
option during system shutdown so that the quorum for the remaining nodes is correctly adjusted.

5.5. Types of Upgrades

Two types of cluster upgrades are available: a *concurrent upgrade* and a *rolling upgrade*. The type of
upgrade you use depends on whether you want to maintain the availability of the cluster during the
upgrade and whether you have more than one system disk. Review this chapter and then perform the
preliminary tasks for the upgrade procedure (concurrent or rolling) that best suits your configuration.

5.5.1. Concurrent Upgrade

This section describes the process of a concurrent upgrade and preparing for it.

5.5.1.1. How a Concurrent Upgrade Works

During a concurrent upgrade, you must shut down the entire cluster and upgrade each system disk.
No one can use the cluster until you upgrade each system disk and reboot each computer. When the
cluster reboots, each computer will run the upgraded version of the OpenVMS operating system.

If all systems in the OpenVMS Cluster environment are booted from one system disk, you must perform a concurrent upgrade.

5.5.1.2. Preparing Your System for a Concurrent Upgrade

To prepare for a concurrent upgrade, follow these steps:

1. Log in locally to the SYSTEM account.

    If you have more than one system disk, make sure that you have performed the preupgrade tasks on each system disk that you are upgrading. Make sure the target system disk is not mounted on any other node in the cluster and remains dismounted during the upgrade. It should be mounted only on the system that is performing the upgrade. (For information about dismounting disks, see Section 5.5.2.3, "Preparing Your System for a Rolling Upgrade".) Then go to Chapter 6, *Upgrading the OpenVMS Operating System* and perform an upgrade on each system disk. You do not have to reboot the operating system media for each upgrade. You only need to choose option 1 on the menu for each upgrade.

2. Shut down all systems by entering the following command on each system (*satellite node*s first, then the boot nodes):

    ```
    $ @SYS$SYSTEM:SHUTDOWN
    ```

3. When the procedure asks whether an automatic system reboot should be performed, enter N (NO).

4. After all satellite nodes have shut down, select the CLUSTER_SHUTDOWN option.

5. When the shutdown procedure is finished on all nodes, halt the system by pressing:

    - **Ctrl/P** on the console keyboard

    - **Break** on the console keyboard

    - **Halt** on the server front panel

    When the system is halted, the console prompt ">>>" should appear.

    For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

6. If you have only one system disk for your cluster, go to Chapter 6, *Upgrading the OpenVMS Operating System* to begin the upgrade procedure.

    After the upgrade is complete, you are instructed to reboot each computer in the OpenVMS Cluster environment before beginning other post upgrade procedures.

5.5.2. Rolling Upgrade

This section describes the rolling upgrade process, preparing for it, special and notes and restrictions.

5.5.2.1. How a Rolling Upgrade Works

A rolling upgrade allows you to have a mixed-version cluster. During a rolling upgrade, you keep some of the computers in the cluster running and available while you upgrade others. You must have more than one system disk. You upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster.

5.5.2.2. Notes and Restrictions

The following restrictions apply to rolling upgrades. For additional compatibility issues and restrictions information, see the *VSI OpenVMS Version 8.4-2L2 Cover Letter and Guide to Media* and the *VSI OpenVMS Version 8.4-2L2 New Features and Release Notes*.

- The system being upgraded must not attempt to access any disk that is being accessed by one or more of the remaining OpenVMS Cluster systems.

- The remaining OpenVMS Cluster systems must not attempt to access the target disk of the system being upgraded.

  If the target disk being upgraded is locally attached to the system performing the upgrade, then it is not accessible to the remaining OpenVMS Cluster systems. (The OpenVMS system booted from the operating system media does not MSCP serve local disks.) VSI recommends that, whenever possible, you perform the upgrade on a local disk or that you perform a concurrent upgrade.

  During the upgrade, be sure that the target disk you select, as well as any disk you access from the DCL menu option, is either a local disk or one that is not being accessed by any of the remaining OpenVMS Cluster members. Make sure the target system disk is not mounted on any other node in the cluster and remains dismounted during the upgrade. It should be mounted only on the system that is performing the upgrade. (For information about dismounting disks, see Section 5.5.2.3, "Preparing Your System for a Rolling Upgrade".)

Note

Any attempt to access the target system disk from the remaining OpenVMS Cluster members will corrupt the target disk. Even if the target system disk is mounted only by a remaining cluster member and no file access is performed, the target disk will probably be corrupted. If a disk is corrupted in this way, the only supported recovery is to restore the backup copy of the corrupted disk.

- VSI recommends that all Alpha computers in a cluster run the same (preferably the latest) version of the OpenVMS Alpha operating system, and that all Integrity servers run the same version of the OpenVMS Integrity operating system.

- You cannot perform a rolling upgrade if all systems boot from a single system disk. Perform a concurrent upgrade instead.

- The upgrade procedure affects the queuing system as follows:

  - The queuing system is not active on the system you are upgrading; do not attempt to execute a START/QUEUE/MANAGER command.

  - You cannot create a queue database on the operating system CD (because it is not writable).

  - The queue manager process on other nodes in the cluster can continue to run during the upgrade if the queue database is not on the disk being upgraded.

5.5.2.3. Preparing Your System for a Rolling Upgrade

To prepare for a rolling upgrade, follow these steps:

1. Log in to any node where the target disk is mounted as a data disk rather than as the system disk. (That disk must be the one on which you already performed the preupgrade tasks described in Chapter 4, *Before Upgrading the OpenVMS Operating System*.)

2. Check the votes and make adjustments to maintain the proper quorum so the cluster can continue to operate throughout the upgrade. (*HP OpenVMS Cluster Systems* manual describes this procedure in detail.)

3. Use the DCL command DISMOUNT/CLUSTER to dismount the data disk. (You can also perform this operation using the SYSMAN utility.)

Note that you can ignore messages from nodes where the specified data disk is being used as the system disk.

4. Verify that the data disk has been dismounted successfully by entering the following commands:

```
$ MCR SYSMAN
SYSMAN> SET ENVIRONMENT/CLUSTER
SYSMAN> DO SHOW DEVICE  disk-name
```

Examine the display to be sure the disk is not mounted on any nodes as a data disk. Noting the value listed in the Trans Count field can help you make that determination: A value of less than 50 indicates that the disk is mounted as a data disk rather than as the system disk; a much larger value (for example, 300) indicates that the disk most likely is the system disk.

5. If the disk is still mounted on any nodes as a data disk, use the SYSMAN utility to dismount the disk; otherwise, exit the SYSMAN utility.

6. Log in to each node that boots from the system disk you are upgrading and use the following command to shut down the node (shut down satellite nodes first):

```
$ @SYS$SYSTEM:SHUTDOWN
```

   a. When the procedure asks whether an automatic system reboot should be performed, enter N (NO).

   b. After all satellite nodes have shut down, select the REMOVE_NODE option.

If a proper quorum is not maintained at any time during the upgrade procedure, the shutdown procedure hangs the cluster. If the cluster hangs during a shutdown, you can use the Interrupt Priority C (IPC) facility to adjust quorum from the system console of a system that is still a cluster member.

From an OpenVMS Alpha cluster member, press **Ctrl/P**. The IPC facility displays help information about IPC commands. Enter the commands at the console:

```
$ Ctrl/P
>>> D SIRR C
>>> C
Interrupt Priority C

Commands:

  C device    Cancel Mount Verification
  Q           Adjust Quorum
  CTRL-Z      Exit IPC
  CTRL-P      Prompt for Crash
IPC> Q
IPC> Ctrl/Z
```

From an OpenVMS Integrity cluster member, pressing **Ctrl/P** puts the system directly into the IPC facility, which displays help information about IPC commands. To adjust quorum, enter the commands shown in the following example. Note that if systems are booted with XDELTA, pressing **Ctrl/P** brings the OpenVMS Integrity system into XDELTA. The IPC facility is not available in this case.

```
$ Ctrl/P
Interrupt Priority C

Commands:

  C device    Cancel Mount Verification
```

```
  Q             Adjust Quorum
  CTRL-Z        Exit IPC
  CTRL-P        Prompt for Crash
IPC> Q
IPC> Ctrl/Z
```

You can also adjust quorum using Availability Manager. The method is equivalent to that used by IPC except you do not have to use the console (this assumes the Data Analyzer is running on a system outside the OpenVMS Cluster, which is recommended). For more information, see the *Availability Manager User's Guide* or the *DECamds User's Guide*.

After the shutdown procedure is finished on all nodes, go to Chapter 6, *Upgrading the OpenVMS Operating System* to begin the upgrade procedure.

Caution

During the upgrade, it is very important that the system disk being upgraded is accessed *only* by the node on which the upgrade is being performed. If the disk can be accessed from other nodes in the cluster, for example, through an HSC or HSJ device, you *must* ensure that this does not happen. Even if the disk is only mounted and no file access is performed, the disk can still become corrupted.

Ensure that any users who might mount disks know that they must not access the system disk being upgraded. Also make sure that any procedures that might mount the disk do not run during the upgrade. If you have automatic procedures that periodically check and remount disks, it would be wise to disable them during the upgrade.

Chapter 6. Upgrading the OpenVMS Operating System

This chapter explains how to upgrade the OpenVMS operating system from a local CD drive and includes information about reinstalling or reconfiguring your system.

This chapter is organized into sections that describe the major tasks for upgrading OpenVMS, in the order in which these tasks must be performed. Section 6.1, "Upgrade Tasks" includes a checklist that you can use to make sure you perform all the upgrade tasks described in this chapter.

6.1. Upgrade Tasks

Use the checklist in Table 6.1, "Upgrade Checklist" to ensure that you perform all necessary upgrade tasks.

Table 6.1. Upgrade Checklist

Task	Section
• Boot the OpenVMS operating system media.	Section 6.2, "Booting the OpenVMS Alpha Upgrade Image"
• Use option 1 of the operating system menu to upgrade your OpenVMS operating system, respond to the prompts, and shut down the system when the upgrade completes.	Section 6.3, "Performing the Upgrade", Section 6.4, "Completing the Upgrade"
• Reboot your system. (The steps vary according to the type of upgrade you are performing.)	Section 6.5, "What to Do After Shutdown"
• Perform postupgrade tasks, as necessary.	Chapter 7, *After Installing or Upgrading the OpenVMS Operating System*

6.2. Booting the OpenVMS Alpha Upgrade Image

To get started, boot the OpenVMS Alpha Upgrade Image.

Boot a local CD drive or a local OpenVMS disk as described inSection 6.2.2, "Booting from the Local CD or Disk Drive".

Boot a CD or virtual disk served by the Infoserver, as described in Section 6.2.3, "Booting from the Infoserver".

First, you need to identify the name of the CD drive, the local VMS disk or the network device (for Infoserver boot) as explained in Section 6.2.1, "Determining the Upgrade Image Boot Device". For more information about booting operations, see Chapter 8, *Booting and Shutting Down Your OpenVMS Alpha System*.

6.2.1. Determining the Upgrade Image Boot Device

To boot the Upgrade Image from a physical CD, local VMS Disk or CD drive served by the Infoserver, you need to determine the identity of the specific boot device. Follow these steps:

1. Enter the SHOW DEVICE command at the console prompt (>>>) and look for the correct drive listed in the output.

2. For a physical CD, look for "CD-" in the right column.

    ```
    >>> SHOW DEVICE

    > dga43.1001.0.7.0        $1$DGA43                      HSG80 V87F
    > dga520.1001.0.7.0       $1$DGA520                     HSG80 V87F
    > dkc0.0.0.9.0            DKC0        COMPAQ BD14687B52 HPBC
    > dkc100.1.0.9.0          DKC100      COMPAQ BD14687B52 HPBC
    > dqa0.0.0.105.0          DQA0                      CD-224E 9.5B
    > dva0.0.0.0.0            DVA0
    > eia0.0.0.2004.1         EIA0                  00-02-A5-F0-28-D4
    > eib0.0.0.2005.1         EIB0                  00-02-A5-F0-28-D5
    > pga0.0.0.7.0            PGA0        WWN 1000-0000-c924-43b1
    > pgb0.0.0.8.0            PGB0        WWN 1000-0000-c93e-c94a
    > pka0.7.0.6.0            PKA0                    SCSI Bus ID 7
    > pkb0.7.0.106.0          PKB0                    SCSI Bus ID 7
    > pkc0.7.0.9.0            PKC0                    SCSI Bus ID 7
    > P00>>>
    ```

3. For a local VMS Disk (for example, DKC100: or 1DGA520:), look for the corresponding device name in the center column.

4. If you are booting from the Infoserver, look for a device listed with its hardware address, as in the line with (EIA0) in the preceding example.

For additional information, see the *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs* and the hardware manuals that you received with your Alpha computer.

6.2.2. Booting from the Local CD or Disk Drive

To boot the upgrade image from the local CD or disk drive, enter the boot command in the following format:

BOOT -FLAGS 0,0 *source-drive*

Substitute the full device name of the CD or local disk drive for *source-drive*, such as dqa0 or dga520, as listed in the SHOW DEVICE display example in Section 6.2.1, "Determining the Upgrade Image Boot Device".

In this case for the CD, you would enter the following command and press **Enter**:

```
>>> BOOT -FLAGS 0,0 dqa0.0.0.105.0
```

6.2.3. Booting from the Infoserver

To boot the operating system CD using either the Infoserver hardware or the Infoserver utility, follow these steps. To use the Infoserver utility, certain configuration steps are required initially (one time only), as described in Section 9.1, "About the OpenVMS Infoserver Utility". Note that the operating system CD must be mounted systemwide.

1. At the console prompt, enter the boot command in the following format:

    ```
    >>> BOOT -FLAGS 0,0 -FILE APB_2L2084 lan-device-name
    ```

    Substitute the name of the local area network device for *lan-device-name*, such as EIA0 (or EIB0), as listed in the SHOW DEVICE display example in Section 6.2.1, "Determining the Upgrade Image Boot Device".

    The APB file name is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the Infoserver. This file is the name of the APB program used for the initial system load (ISL) boot program.

2. The Infoserver ISL program then displays the following menu:

```
Network Initial System Load Function
Version 1.2

    FUNCTION          FUNCTION
      ID
      1      -        Display Menu
      2      -        Help
      3      -        Choose Service
      4      -        Select Options
      5      -        Stop

  Enter a function ID value:
```

3. Respond to the prompts as follows, pressing **Enter** after each entry:

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA0842L2 is the default service name for the Infoserver hardware; to learn the service name of the Infoserver utility, ask your system or network manager).

   A sample display follows:

```
  Enter a function ID value: 3
   OPTION            OPTION
     ID
     1      -        Find Services
     2      -        Enter known Service Name

  Enter an Option ID value: 2
  Enter a Known Service Name: ALPHA0842L2
```

Note

If you boot the OpenVMS Alpha operating system CD from an Infoserver system but lose your connection during the upgrade procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

1. Boot the OpenVMS Alpha operating system CD again from the network.

2. Enter the DCL environment by choosing option 8 on the menu.

3. Mount the device containing your backup copy of the target disk and the device that is your target disk.

4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix A, *Backing Up and Restoring the System Disk* for complete information about using MOUNT and BACKUP commands to restore a system disk.)

5. Log out from the DCL environment.

6. Perform the upgrade again by choosing the upgrade option (1) on the menu and following the procedures described in this chapter.

6.3. Performing the Upgrade

The following sections describe how to upgrade from the operating system media.

6.3.1. Upgrading the System Using Option 1 of the Operating System Menu

A few seconds after you boot the operating system CD (OpenVMS Alpha) , several informational messages followed by the OpenVMS banner appear. After that, other informational messages appear, followed eventually by the operating system main menu. The duration of messages depend on the system type and attached hardware. To upgrade the OpenVMS operating system, choose option (1) on the menu, as in the following example:

```
*************************************************************

    You can install or upgrade the OpenVMS ALPHA operating system
    or you can install or upgrade layered products that are
    included on the OpenVMS ALPHA distribution media (CD).

    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS ALPHA
            Version 8.4-2L2
        2)  Display layered products that this procedure can
            install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete
            Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

    Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 1
```

6.3.2. Selecting INITIALIZE or PRESERVE

The procedure displays the following information and prompts:

```
The following PATCH kits are present on the OpenVMS ALPHA
    distribution media.

------------------------------------ ----------- ----------
PRODUCT                              KIT TYPE     KIT FORMAT
------------------------------------ ----------- ----------
VSI AXPVMS TCPIP_NFS_PAT V5.7-ECO5A  Patch        Compressed
VSI AXPVMS TCPIP_SSH_PAT V5.7-ECO5D  Patch        Compressed
------------------------------------ ----------- ----------

2 products found

    Please consult the OpenVMS ALPHA Installation and Upgrade
    Manual, the Release Notes, and the Cover Letter to determine
```

```
        if any or all of these patches may be required for your system.

Press Return to continue...


        ***********************************************************


        This procedure will ask a series of questions.

                () - encloses acceptable answers
                [] - encloses default answers

        Type your response and press the <Return> key.  Type:

                ? - to repeat an explanation
                ^ - to change prior input (not always possible)
                Ctrl/Y - to exit the installation procedure

        There are two choices for installation/upgrade:

        Initialize - Removes all software and data files that were
            previously on the target disk and installs OpenVMS ALPHA.

        Preserve -- Installs or Upgrades OpenVMS ALPHA on the target
            disk and retains all other contents of the target disk.

      * Note: You cannot use preserve to install OpenVMS ALPHA on a
              disk on which any other operating system is installed.
              This includes implementations of OpenVMS for other
              architectures.

Do you want to INITIALIZE or to PRESERVE? [PRESERVE]
```

Since you are performing an upgrade, press **Enter** (or **Return**) to accept the default (PRESERVE).

6.3.3. Specifying the Target Disk

Next the procedure asks for the name of the target disk. If you enter a question mark (?), the system displays a list of devices on your system. Select the appropriate disk and respond to the prompt. For example:

```
You must enter the device name for the target disk on which
OpenVMS ALPHA will be installed.

Enter device name for target disk: (? for choices) $1$DGA43
```

If you select a device that is not available or that cannot be used for some other reason, the system displays information indicating why the device cannot be used. For example, if you enter MKA500, a tape device, a message similar to the following is displayed:

```
MKA500 is not a disk device
```

Caution

If the selected target disk includes .EXE or .COM files installed by a previous upgrade or installation in one or more system-specific root directories in SYS$COMMON, the upgrade procedure tells you that when you boot from a root that contains any of these files, they are used instead of the files provided by the newer version of OpenVMS. This can make the upgraded system unbootable or cause errors after booting. Unless VSI support has advised you to keep one or more of these files where they are, you must delete, rename, or move these files from the system-specific root directory. The procedure

lists the names and locations of these files. Record these if you are not using a hardcopy terminal. The procedure gives you the option of terminating the upgrade so that you can do what is necessary for these files: select option 8 ("Execute DCL commands and procedures") on the OpenVMS main menu and enter the appropriate DCL commands.

6.3.4. Selecting Reinstallation and Reconfiguration Options

If you are using the OpenVMS Version 8.4-2L2 operating system media and you selected a target disk that already has Version 8.4-2L2 installed, you are presented with several configuration options. A sample display follows.

```
Version 8.4-2L2 of the OpenVMS Alpha operating system
is already installed on $1$DGA43:.

Please choose one of the following:

    1)  Reconfigure the OpenVMS platform.
    2)  Reconfigure the OpenVMS operating system.
    3)  Reinstall the OpenVMS operating system.
    4)  Return to the Main Menu (abort the upgrade/installation).

    Enter a "?" for more information.
```

If you enter a question mark (?), the following information is displayed:

```
o Reconfigure the OpenVMS platform.

  This action will allow you to change your selections of which
  products you installed along with the OpenVMS operating system
  installation.

  This will NOT change any options in the OpenVMS operating system,
  nor will it reinstall any operating system files.

o Reconfigure the OpenVMS operating system.

  This action will allow you to change your choices about which
  options you included for the OpenVMS operating system.

  This will NOT change any options for the products you installed
  along with the OpenVMS operating system installation, nor will
  it reinstall or upgrade any of them.

o Reinstall the OpenVMS operating system.

  This action will cause ALL operating system  files to be replaced.
  You can also change your choices about which options you included
  for the OpenVMS operating system.

  This will NOT change any options for the products you installed
  along with the OpenVMS operating system installation, nor will
  it reinstall or upgrade any of them.

  Reinstall will take longer than Reconfigure.  Reinstall may be
  appropriate if you suspect that files in the operating system,
  or in the windowing and network products have become corrupted.
```

```
If you want to reinstall or upgrade any of the products you
installed along with the OpenVMS operating system installation,
choose "Install or upgrade layered products" (option 3)
from the main menu.

If you want to change your choices about which options you
included for any of the products you installed along with the
OpenVMS operating system installation, choose
"Reconfigure installed products" (option 5) from the main menu.
```

Next the menu is redisplayed:

```
    Please choose one of the following:

        1)   Reconfigure the OpenVMS platform.
        2)   Reconfigure the OpenVMS operating system.
        3)   Reinstall the OpenVMS operating system.
        4)   Return to the Main Menu
             (abort the upgrade/installation).


Enter choice or ? for help: (1/2/3/4/?)
```

6.3.5. Checking for Recovery Data

When you specify the /SAVE_RECOVERY_DATA qualifier with the PRODUCT INSTALL command, the PCSI utility saves information that can be used for removing patches and mandatory update kits at a later time. The PRODUCT UNDO PATCH command removes the patches and kits. (The /SAVE_RECOVERY_DATA qualifier and PRODUCT UNDO PATCH command were first added to OpenVMS Alpha in Version 7.3-2.)

The upgrade procedure, after entering the PRODUCT INSTALL command, checks the target disk for recovery data that was saved by the PCSI utility during patch installations. If no recovery data is present, the upgrade continues. If recovery data is present and all the data found applies only to the OpenVMS operating system, the upgrade procedure deletes the data and continues. The data is deleted because it becomes invalid after the upgrade and the disk space freed up might be needed during the upgrade. (The procedure does not display the deletion of the files because earlier patches to OpenVMS are always removed as part of the upgrade.) If any of the recovery data applies to products other than the OpenVMS operating system, then the upgrade procedure displays a message similar to the following:

```
The target system has recovery data from PRODUCT operations which
used the /SAVE_RECOVERY_DATA qualifier.  This data must be deleted
to continue the OpenVMS upgrade.

Please examine the following display.

If you wish to delete this data and continue the OpenVMS upgrade,
answer YES to the question "Do you want to continue?"

If you do not wish to delete this data, answer NO.  A NO answer
will preserve the recovery data and abort the OpenVMS upgrade.

The following patch recovery data has been selected:

RECOVERY DATA SET 001 created 10-MAY-2017 15:23:39.69
------------------------------------ ----------------------------
```

```
PATCH                                   APPLIED TO
--------------------------------  ----------------------------
JAK VMS RM1 V1.0                  JAK VMS RMTEST V1.0
--------------------------------  ----------------------------


  * If you continue, recovery data for the patches listed above
  * will be deleted. The deletion of recovery data does not affect
  * the installation status of patches applied to products that are
    not
  * participating in this operation. However, continuing with this
  * operation prevents you from uninstalling these patches at a
  * future time by use of the PRODUCT UNDO PATCH command.


Do you want to continue? [YES]
```

If you answer YES (the default), the recovery data sets are deleted and the OpenVMS upgrade continues.

```
Deleting RECOVERY DATA SET 001 ...
```

If you answer NO, the recovery data sets are not deleted and the OpenVMS upgrade aborts.

```
Do you want to continue? [YES] NO
%PCSIUI-I-USERABORT, operation terminated by user request


You chose to retain recovery data on the target system disk.
The OpenVMS upgrade cannot continue.


Please correct the situation that prevents you from deleting the
recovery data and then retry the upgrade.
```

6.3.6. Specifying the Volume Label

After you specify the target disk and, if applicable, check for recovery data, the procedure informs you of the volume label currently assigned to the target disk you specified and asks whether you want to keep that label. As shown in the following example, if you choose not to keep the label, you are prompted for a new label. The OpenVMS operating system uses the volume label to identify and reference the disk. Make sure the label you use is unique; problems occur if the same label is used by different disk volumes.

```
$1$DGA43: is now labeled 842L2ALPHA.

Do you want to keep this label? (Yes/No) [Yes] NO

Enter volume label for target system disk: [ALPHASYS] AXP842L2
OpenVMS ALPHA will be upgraded on $1$DGA43:
```

You can accept the default label assigned by the system or specify a different volume label. (The label name has a limit of 12 characters that can include A to Z, 0 to 9, the dollar sign ($), hyphen (-), and underscore (_) characters).

Note

OpenVMS requires that the volume labels for all disks on your system or OpenVMS Cluster have unique labels. If a disk that has the same label as the system disk is mounted, various OpenVMS components will not function as intended or a node might crash during boot.

If you change the volume label for a disk in an OpenVMS Cluster, be sure to change the command that mounts the disk on other nodes in the cluster; otherwise, the disk will not mount on those nodes once they are rebooted.

6.3.7. Specifying the On-Disk Structure Level

If the target disk is currently initialized with On-Disk Structure Level 2 (ODS-2), the procedure informs you and gives you the option to convert the disk to On-Disk Structure Level 5 (ODS-5), as in the following example. If the target disk is currently initialized with ODS-5, the upgrade continues without displaying information about the disk structure. You are not asked whether to convert the system disk's structure or whether to enable hard links.

Note

If your disk is initialized with ODS-5 with hard links not enabled. You can enable them after the upgrade by executing the following commands:

```
$ SET VOLUME/VOLUME_CHARACTERISTICS=HARDLINKS SYS$SYSDEVICE
$ ANALYZE DISK_STRUCTURE/REPAIR SYS$SYSDEVICE
```

```
 The target system disk is currently at On-Disk Structure Level 2
 (ODS-2). It can be converted to On-Disk Structure Level 5 (ODS-5).

Do you want to convert the target system disk to ODS-5? (Yes/No/?)
```

If you answer YES, the disk will be converted to ODS-5. The procedure informs you that you can use the BACKUP/CONVERT command to convert ODS-5 disks back to ODS-2 format; for more information, see the *OpenVMS System Management Utilities Reference Manual*.

Note

VSI recommends that your system disk be structured in ODS-5 format unless you use software that requires ODS-2. A brief comparison of ODS-2 and ODS-5, including advantages and disadvantages, follows this note.

A system disk in ODS-5 format can store everything; if you choose to have your disk in ODS-2 format, the procedure asks you to provide an ODS-5 disk for the data repository.

A brief summary of ODS-2 and ODS-5 file systems follows; for more information, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

- ODS-2

  ODS-2 allows for compatibility with OpenVMS VAX and Alpha systems that use ODS-2 disks. Choose ODS-2 if you do not need the new features of ODS-5 disks, including the support of applications ported from other operating systems (such as UNIX, Linux, and MS Windows) available with ODS-5 disks.

- ODS-5

  - ODS-5 supports file names that are longer and have a wider range of legal characters. This feature permits use of file names similar to those in a Windows or UNIX environment.

  - ODS-5 supports hard links to files, access dates, and files whose names differ only by case.

  - ODS-5 volumes cannot be mounted on any version of OpenVMS prior to Version 7.2.

  - Systems running OpenVMS VAX Version 7.2 and higher can mount ODS-5 volumes but cannot create or access files that have extended names. (On OpenVMS VAX systems, lowercase file name characters are seen in uppercase.)

If you choose not to change to ODS-5, the upgrade continues and the target disk is mounted. For example:

```
Do you want to convert the target system disk to ODS-5? (Yes/No/?)
NO


...OpenVMS Alpha will be upgraded on $1$DGA43:
```

If you choose to change to ODS-5, you are given the option to enable hard links. (For more information about hard links, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.) The upgrade then continues.

```
Do you want to convert the target system disk to ODS-5? (Yes/No/?)
YES


  $1$DGA43: has been converted to ODS-5.


  You can use the BACKUP/CONVERT command to convert ODS-5 disks
  back to ODS-2 format. For more information, refer to the
  OpenVMS System Management Utilities Reference Manual.


  Hard links can be enabled on ODS-5 disks. WBEM Services for
  OpenVMS does not require hard links.
  (? for more information)
  (***Enabling hard links can take from 5-10 minutes to an hour
  or more.***)

Do you want to enable hard links? (Yes/No/?)  YES
```

If you choose to enable hard links, the procedure automatically executes an ANALYZE/ DISK_STRUCTURE/REPAIR operation to correctly set the reference (link) counts. ANALYZE/ DISK/REPAIR counts the number of directory entries that reference each file, and sets the link count if it is incorrect. This operation can take from 5 to 10 minutes to an hour or more, depending on the complexity of the system disk configuration, the number of layered products installed, and the number of user files. During the process, messages similar to the following are displayed:

```
  Hard links have been enabled on $1$DGA43:.


  The newly enabled hard links are not correct and need to be
  updated.
  The Analyze/Disk_Structure utility will now be run to do this.


  This can take from 5 - 10 minutes to an hour or more.
  It is a normal requirement when hard links are enabled on an
  existing disk.

%ANALDISK-I-COUNT, 1000 hard link updates completed
%ANALDISK-I-COUNT, 2000 hard link updates completed
%ANALDISK-I-COUNT, 3000 hard link updates completed
%ANALDISK-I-COUNT, 4000 hard link updates completed
%ANALDISK-I-COUNT, 5000 hard link updates completed
%ANALDISK-I-COUNT, 6000 hard link updates completed

  OpenVMS ALPHA will be upgraded on $1$DGA43:.
```

6.3.8. Warning About Removal of the DECRAM Command

When upgrading from versions of OpenVMS prior to 8.3, the procedure displays a message similar to the following that warns you that the DCL command DECRAM is being removed to prevent conflict with the DECRYPT command:

```
Beginning with OpenVMS V8.3, the DCL commands ENCRYPT and DECRYPT
are provided as part of OpenVMS.

Because "DECRYPT" conflicts with the existing command "DECRAM",
this upgrade will remove the DECRAM command.

If you use the command DECRAM interactively or in command
procedures, please see the release notes for more information.
```

The DECRYPT command (introduced with OpenVMS Version 8.3) overwrites the default definition of DECR, which you might have been using to run DECram. You should update any command procedures that use the DECRAM command so that they use the foreign command style of DCL to run DECram:

```
$ DECRAM == "$MDMANAGER"
```

This change affects only the use of the DCL command; all other aspects of the DECram product remain the same.

6.3.9. Setting OpenVMS Cluster Membership Information

The procedure now asks whether your system will be part of an OpenVMS Cluster. For example:

```
Will this system be a member of an OpenVMS Cluster? (Yes/No) YES
```

If you answer YES to this question, the procedure will ask whether your system will use IP for Cluster Communications.

```
Will this system use IP for Cluster Communications ?  (Yes/No) NO
```

If the system being upgraded is member of an existing cluster, answering YES to this question causes the SYS$MANAGER:CLUSTER_CONFIG.COM procedure to run automatically when your upgraded system is first booted. However, correct cluster membership information is required by the upgrade procedure. Note that you can run this procedure manually to configure or reconfigure your system as a member of an OpenVMS Cluster. For more information about configuring a member of an OpenVMS Cluster, see the *Guidelines for OpenVMS Cluster Configurations* manual.

6.3.10. Setting OpenVMS Galaxy Information

The procedure next asks whether your system is an instance in an OpenVMS Galaxy. The display is similar to the following:

```
Will this system be an instance in an OpenVMS Galaxy? (Yes/No) NO
```

If you answer YES to this question, and you also answered YES to the OpenVMS Cluster question, then information about required remedial kits is displayed. Your answer to this question determines how the system parameter GALAXY is set.

6.3.11. Rebranding Licenses to VSI

Now that VSI owns ongoing development of OpenVMS, we have rebranded licenses for VSI OpenVMS to list "VSI" as the license Producer for the OS and the layered products VSI supports. If existing customers are updating to the VSI OpenVMS, their existing HPE branded licenses will continue to work after the upgrade. When you perform an upgrade from HPE OpenVMS Alpha to VSI OpenVMS Alpha, the PCSI installed product database, excluding any HPE patch entries, will be re-branded. This occurs one time only and is required to assure consistency for license management functions.

An example of the rebranding display follows:

```
The target disk contains a Hewlett-Packard Enterprise
branded OPENVMS platform (producer DEC, CPQ, or HP). The
Platform, the Operating System, and all System Integrated
Products must be rebranded as VMS Software, Inc. (producer VSI),
and all Layered Products must have their dependencies
updated from DEC/CPQ/HP to VSI.

------------------- Rebranding started -------------------

Identifying VSI Layered Products and per-product
  workarounds...
Cataloging System Integrated Products vs.
  Layered Products vs. Patches...
Extracting all existing PDFs from the PCSI database...
Determining interdependence of Layered Products...
Converting all PDFs to VSI ownership and/or dependence...
Saving and then removing the existing PCSI database...
Creating a new database by registering the OPENVMS
  Platform and Patches...
Registering all remaining Layered Products and Patches...
Ensuring validity of the resulting PCSI database...

     ---------------- Rebranding finished ----------------
```

6.3.12. Updating Time Zone Information

For local time zone support to work correctly, the time zone that accurately describes the location you want to be considered as your default time zone must be set. In addition, your system must be configured correctly to use a valid OpenVMS time differential factor (TDF).

If the installation procedure determines that time zone information is incomplete, it prompts you to set the correct default time zone and TDF for your system. For more information about TDF and local time zone support, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

6.3.13. Upgrading Windowing, Networking, and Related Products

The procedure now presents information about the optional DECwindows GUI (DECwindows Motif for OpenVMS), and networking (DECnet and TCP/IP) products that will be upgraded along with the OpenVMS operating system. As noted by the procedure, you can change the default values for these products later in the installation procedure.

Note

Beginning with OpenVMS Version 8.3, DECwindows client files are made available through the DWMOTIF_SUPPORT kit. (Prior to Version 8.3, the client files were included directly with the OpenVMS operating system kit.) The OpenVMS installation procedure installs this kit automatically. The DWMOTIF_SUPPORT kit name is listed during the installation.

Required versions of some of the windowing and networking products might already be installed on the system. If so, you will see a message to this effect, as seen for most of the products in the previous example. For some of the windowing and networking products, earlier versions might be installed that still work on OpenVMS Version 8.4-2L2. In this case, you will see a message indicating the software is

already installed and asking whether you want to install the newer version. You can keep the currently installed version or upgrade to the newer version supplied with OpenVMS Version 8.4-2L2. If you choose to keep the currently installed version, you should verify what level of support for this version is available from VSI.

Some windowing and networking products might have versions installed that do not work on OpenVMS Version 8.4-2L2. In this case, you are not given a choice to upgrade—the software is upgraded automatically. (On OpenVMS Alpha upgrades, if older versions of SSL for OpenVMS are found, the procedure removes them.)

6.4. Completing the Upgrade

The following sections describe the remaining steps that you need to perform to complete the upgrade.

6.4.1. Selecting Descriptive Help Text

The procedure next prompts you as follows:

```
The installation operation can provide brief or detailed
descriptions. In either case, you can request the detailed
descriptions by typing ?.

Do you always want detailed descriptions? (Yes/No) [No]

The system was booted from a device containing the OpenVMS
Alpha distribution.
Validation of signed kits is not supported in this restricted
environment.
```

If you answer YES, the procedure displays additional explanatory text with each prompt.

6.4.2. Selecting Product Component Options

As you begin the upgrade procedure, the procedure asks whether you want all the default values (meaning all the files and subgroups of files for each component included in the operating system). The display is similar to the following:

```
The following product
has been selected:
    VSI AXPVMS OPENVMS V8.4-2L2           Platform (product suite)

Configuration phase starting ...

You will be asked to choose options, if any,
for each selected product and for any products
that may be installed to satisfy software
dependency requirements.

Configuring VSI AXPVMS OPENVMS V8.4-2L2: OPENVMS and related
products Platform

 Copyright 2015-2017 VMS Software, Inc.

Do you want the defaults for all options? [YES]
```

During an upgrade, the PCSI utility defines default values as the values that you selected when you last installed or upgraded the OpenVMS operating system on your system. Therefore, before you respond to the prompt, note the following:

- If you accept the default values, you receive the same components that you selected when you last installed or upgraded the system (instead of *all* the components currently available) plus any new components that were not in the previous version of the OpenVMS operating system.

- If you want to include or exclude any components differently than you did in the last installation or upgrade, you must answer NO and then respond to the prompts for *each* option, even those that you are not changing.

- If you want to review the current defaults first, answer NO. Then answer YES when the procedure asks whether you want to view the values.

  If you review the defaults and are satisfied, answer YES to the prompt asking whether you are satisfied with the values. If you want to make changes, answer NO to that question and then answer YES when the procedure asks whether you want to reenter the values.

When you select component options, also note the following:

- Whether you choose all the default values or select individual files, the procedure allows you to view your selections and make changes.

- If you are not sure whether you want certain component options, you can request help by entering a question mark (?) at the prompt for that component (or group of components).

- You should review the list of options and compare them with the requirements for your procedure. If you are selecting components individually, be sure that you include all components necessary to support the needs of your users. Note also that certain components depend upon the installation of other components.

- If you decide after the upgrade to change which OpenVMS operating system components you want installed on your system, you must reconfigure the installation as described in Section 6.4.2, "Selecting Product Component Options".

- After you boot the upgraded system disk and log in, you can obtain information about individual system files by entering HELP SYS_FILES at the dollar sign prompt ($).

Note

Unless you have specific reasons to do otherwise, VSI recommends that you accept the defaults and install all OpenVMS options. OpenVMS and layered products have various dependencies on many of these options. Even if you think you do not need certain options, some OpenVMS or layered product operations might not work correctly if other OpenVMS options are not installed.

If you answer YES to accept the defaults for all options, the procedure displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the procedure prompts you for each option and suboption.

```
 Availability Manager (base) for OpenVMS Alpha

    CDSA for OpenVMS Alpha

    KERBEROS for OpenVMS Alpha

    SSL for OpenVMS Alpha (based on OpenSSL V0.9.8)

    SSL1 V1.0 for OpenVMS Alpha (based on OpenSSL V1.0.2)

    Performance Data Collector (base) for OpenVMS Alpha

    HP Binary Checker for OpenVMS Alpha
```

6.4.3. Component and Product Installation Confirmation Messages

When you have answered all the prompts and selected the components you want installed, the procedure allows you to review your selections and make changes, and then displays information about the various components and products that were installed, as shown in the following sample display in which the review is not chosen. You might see an %UPGRADE-I-FIXUP message, which indicates that obsolete files on the system were incorrectly saved by remedial kits. The "fixup" allows them to be correctly removed.

Note

If you perform two installations at the same time to OpenVMS Alpha systems connected via MEMORY CHANNEL, you might see a message similar to the following every 5 seconds:

```
%PMA0 CPU00: 06-DEC-2016 14:58:40 Remote System Conflicts
with Known System - REMOTE NODE
%PMA0 CPU00: 06-DEC-2016 14:58:45 Remote System Conflicts
with Known System - REMOTE NODE
```

Disregard the message. The installation or upgrade will proceed normally and the messages will not be present when the system reboots with its real node name. The version numbers in this example do not necessarily reflect the version numbers of the products actually shipped with OpenVMS Version 8.4-2L2.

You are prompted if you want to review all of your previously selected options. Answering yes generates a list similar to the following:

```
Do you want to review the options? [NO] YES

VSI AXPVMS OPENVMS V8.4-2L2: OPENVMS and
     related products Platform
    VSI AXPVMS VMS V8.4-2L2: OpenVMS Operating System
      DECdtm Distributed Transaction Manager: YES
      Support for DECnet-Plus or DECnet (Phase IV) for OpenVMS: YES
      Programming Support: YES
        Debugger Utility: YES
        Image Dump Utility: YES
        Macro libraries: YES
        Macro-32 Migration Compiler: YES
        TLB intermediary form of STARLET: YES
        C Object Libraries: YES
        C Header Files: YES
        VMS text libraries of Ada declarations: YES
      RMS Journaling Recovery Utility: YES
      System Programming Support: YES
        Delta Debugger: YES
        System Dump Analyzer Utility: YES
        Miscellaneous Symbol Table Files: YES
      Utilities: YES
        Phone Utility: YES
        Error Log Generator Utility: YES
        XPG4 Internationalization Utilities: YES
        World Wide PostScript Printing Subsystem: YES
      Bliss Require Files: YES
      Example Files: YES
      Message Facility Files (HELP/MESSAGE): YES
```

```
      Translated Image Support: YES
    UETP Files: YES
    DECwindows Server Support: YES
      VSI AXPVMS DWMOTIF_SUPPORT V8.4-2L2: DECwindows
      Server Support
        DECwindows workstation files: YES
        Video fonts: YES
          100 dots-per-inch video fonts: YES
        Euro base support: YES
          Euro 100 dots-per-inch video fonts: YES
    Delete any obsolete OpenVMS files: YES
    Delete files archived by OpenVMS remedial kits: YES
Availability Manager (base) for OpenVMS Alpha
  VSI AXPVMS AVAIL_MAN_BASE V8.4-2L2: VSI Availability
    Manager
  Base OS Drivers
CDSA for OpenVMS Alpha
  VSI AXPVMS CDSA V2.4-320A
KERBEROS for OpenVMS Alpha
  VSI AXPVMS KERBEROS V3.1-152B
SSL for OpenVMS Alpha (based on OpenSSL V0.9.8)
  VSI AXPVMS SSL V1.4-502A: SSL V1.4 for OpenVMS Alpha
   (Based on OpenSSL 0.9.8ze)
    Run the installation verification procedure (IVP)?: YES
SSL1 V1.0 for OpenVMS Alpha (based on OpenSSL V1.0.2)
  VSI AXPVMS SSL1 V1.0-2KA: SSL1 for OpenVMS AXP V1.0-2K
   (Based on OpenSSL 1.0.2K)
    Run the installation verification
       procedure (IVP)?: YES
Performance Data Collector (base) for OpenVMS Alpha
  VSI AXPVMS TDC_RT V2.3-1220: The Performance Data
  Collector (base) for OpenVMS
HP Binary Checker for OpenVMS Alpha
  VSI AXPVMS HPBINARYCHECKER V1.1-A: HP Binary Checker
DECwindows Motif for OpenVMS Alpha: YES
  VSI AXPVMS DWMOTIF V1.7-F: DECwindows Motif
    Install Low Bandwidth X (LBX) Support: YES
    Install the DECwindows Motif Version 1.7
    client software: YES
      Install New Desktop: YES
        Install Manual (reference) pages for
        the New Desktop: YES
        Make the New Desktop the default desktop: YES
      Install traditional DECwindows Desktop: YES
      Programming Support for the C Language: YES
      Programming Support for the Pascal Language: YES
      Programming Support for the FORTRAN Language: YES
      Programming Support for the New Desktop: YES
      Programming examples: YES
        Sound example files: YES
        Programming examples for DECwindows: YES
        Programming examples for the New Desktop: YES
      Translated Image Support: YES
DECnet-Plus for OpenVMS Alpha: NO [Unselectable]
DECnet Phase IV for OpenVMS Alpha: YES
  VSI AXPVMS DECNET_PHASE_IV V8.4-2L2: DECNET_PHASE_IV
TCP/IP Services for OpenVMS: YES
  VSI AXPVMS TCPIP V5.7-13ECO5F: VSI TCP/IP
```

```
     Services for OpenVMS.  Applications: YES

Are you satisfied with these options? [YES] yes

Execution phase starting ...

The following products will be installed to destinations:

VSI AXPVMS AVAIL_MAN_BASE V8.4-2L2  DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS CDSA V2.4-320A            DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS DECNET_PHASE_IV V8.4-2L2 DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS DWMOTIF V1.7-F            DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS DWMOTIF_SUPPORT V8.4-2L2 DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS HPBINARYCHECKER V1.1-A   DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS KERBEROS V3.1-152B       DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS OPENVMS V8.4-2L2         DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS SSL V1.4-502A            DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS SSL1 V1.0-2KA            DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS TCPIP V5.7-13ECO5F       DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS TDC_RT V2.3-1220         DISK$AXP842L2:[VMS$COMMON.]
VSI AXPVMS VMS V8.4-2L2             DISK$AXP842L2:[VMS$COMMON.]

The following products will be removed from destinations:

VSI AXPVMS AVAIL_MAN_BASE V8.4      DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS CDSA V2.4-320            DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS DECNET_PHASE_IV V8.4     DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS DWMOTIF V1.7             DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS DWMOTIF_SUPPORT V8.4     DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS HPBINARYCHECKER V1.1     DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS KERBEROS V3.1-152        DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS OPENVMS V8.4             DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS SSL V1.4-331             DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS TCPIP V5.7-13            DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS TDC_RT V2.3-20           DISK$AXP842L1:[VMS$COMMON.]
VSI AXPVMS VMS V8.4                 DISK$AXP842L1:[VMS$COMMON.]

Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%
```

6.4.4. Upgrade Completes and Returns to OpenVMS Operating System Menu

The upgrade procedure is now complete. The procedure displays information about the special startup procedure that runs when the newly installed system is first booted. It then prompts you to press **Return** (**Enter**) to continue. After you do so, you are returned to the OpenVMS operating system menu. The following is a sample display:

```
  The upgrade is now complete.

  When the newly upgraded system is first booted, a special
  startup procedure will be run.  This procedure will:

    o  Run AUTOGEN to set system parameters.
    o  Reboot the system with the newly set parameters.


  You may shut down now or continue with other operations.
```

```
      Process AXPVMS_INSTALL logged out at 20-DEC-2016 14:45:49.54

Press Return to continue...

      *************************************************************

You can install or upgrade the VSI OpenVMS Alpha operating system

You can also execute DCL commands and procedures to perform
"standalone" tasks, such as backing up the system disk.

   Please choose one of the following:

   1)  Upgrade, install or reconfigure OpenVMS Alpha
       Version 8.4-2L2
   2)  Display layered products that this procedure can install
   3)  Install or upgrade layered products
   4)  Show installed products
   5)  Reconfigure installed products
   6)  Remove installed products
   7)  Find, Install or Undo patches; Show or Delete recovery data
   8)  Execute DCL commands and procedures
   9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?)
```

6.4.5. Shutting Down the System

Unless you want to perform any other operations prior to booting the upgraded disk, shut the system down by choosing the shutdown option (9) on the menu:

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 9
    Shutting down the system
        SYSTEM SHUTDOWN COMPLETE
```

6.5. What to Do After Shutdown

After an OpenVMS Alpha system shuts down, you can make the newly upgraded system disk the default boot device, if necessary, and then boot the system disk. For Alpha operating system, AUTOGEN runs automatically, after which the system shuts down again and automatically reboots. If you are doing a concurrent or rolling upgrade in an OpenVMS Cluster environment, do not boot any other cluster members now.

Now go to Section 7.1, "Postinstallation and Postupgrade Tasks" and check for any postupgrade tasks that need to be performed before the system and cluster can be used. Once you have completed all required postupgrade tasks, you can reboot and then use other cluster members.

6.6. VSI OpenVMS Alpha V8.4-2L2 PAKs and Licensing

When you purchase OpenVMS Alpha V8.4-2L2, VSI provides Product Authorization Keys (PAKs) for both Alpha V8.4-2L2 operating system and all products included in the kit.

To enable the OpenVMS Alpha V8.4-2L2 product set, you need to download and execute the *single* PAK file as follows: You can rename this file if you wish.

1. Boot your OpenVMS Alpha system.

2. Log in to the SYSTEM account.

3. Enter:

   ```
   $ Copy/log <device>:[000000]VSI-supplied-filename.TXT-
   _$ ddru:[directory]
   ```

4. Enter:

   ```
   $ @ddru:[directory]VSI-supplied-filename.TXT
   ```

After you run the procedure, your licenses have been loaded. No further action is needed. To confirm the system has loaded the licenses, enter:

```
$ SHOW LICENSE
```

The system displays the current licenses.

Note

When you initially purchase the OpenVMS software and license, VSI provides a Product Authorization Key (PAK) that is required to enable the License Management Facility (LMF) to register the license and to validate and authorize subsequent use of the product. A PAK does not provide license or new version rights. For more information about licensing and the License Management Facility, see the *OpenVMS License Management Utility Manual*.

6.7. Running Alpha Layered Products

The upgrade procedure leaves your OpenVMS license and layered product licenses intact. You do not need to reinstall these licenses after you upgrade, and you should not have any licensing issues running a previously installed HPE Layered Product on the VSI OpenVMS Alpha V8.4-2L2 operating system.

Note

VSI has identified an issue regarding the reinstallation of an HPE layered product on a VSI operating system. It is possible that reinstalling an HPE layered product will result in the HPE layered product failing to reinstall. This happens because layered products packaged as PCSI kits generally have a dependency on the producer of the operating system and/or an OS minimum version.

In this case, VSI will provide L1/L2 support for the HPE layered products, and L1/L2/L3 support for the VSI operating system. In the event that we determine a code change or product upgrade is needed for an HPE layered product, our most likely response will be "wait for the VSI version".

Chapter 7. After Installing or Upgrading the OpenVMS Operating System

After you have installed or upgraded the OpenVMS operating system, you must perform several important tasks to prepare the system for operation. See the following checklist that you can use to make sure you perform all the postinstallation or postupgrade tasks necessary for your system.

7.1. Postinstallation and Postupgrade Tasks

Use the following checklist to ensure that you perform all necessary postinstallation or postupgrade tasks. Unless indicated otherwise, these tasks are applicable as both postinstallation and postupgrade tasks.

Table 7.1. Postinstallation and Postupgrade Checklist

Task	Section
• For a newly installed system disk, you can back up the disk. (At this point, you could reinstall OpenVMS onto the disk instead.) For a newly upgraded system disk, if it is *not* going to be a shadow set member, back up the system disk as a safeguard before proceeding with the next steps. If your newly upgraded system disk is going to be a shadow set member, you can re-form it in a later step. As an optional precaution, you can back up the system disk as well.	Section 7.2, "Backing Up Your System Disk"
• Register any licenses that were not registered during the installation; for an upgrade, register any new licenses.	Section 7.3, "Registering Your Licenses"
• *New installations only (optional):* Set system parameters to enable *volume shadowing*.	Section 7.4, "Set System Parameters for Volume Shadowing (Optional)"
• *Upgrades only*: Tune BAP system parameters.	Section 7.5, "Tuning BAP System Parameters (Upgrade Only)"
• If you set system parameters to enable volume shadowing or removed hardcoded BAP system parameters, run AUTOGEN and reboot.	Section 7.6, "Running AUTOGEN to Set System Parameter Changes"
• If you want to form a shadow set for a system disk, you can do this now or later. If you upgrade a disk in a volume shadowing environment, re-form the shadow set.	Section 7.7, "Forming the Shadow Set"
• *New installations, some upgrades:* Perform the following tasks that generally apply to new installations only but could also apply after an upgrade:	Section 7.8, "Customizing the System (New Installations, Some Upgrades)"
• Create proxy files, if required.	Section 7.8.1, "Creating Network Proxy Authorization Files"
• Set up the queue manager and start the default batch and print queues.	Section 7.8.2, "Setting Up the Queue Manager and Default Queues "

Task	Section
• Configure a multihead system, if applicable.	Section 7.8.3, "Configuring a Multihead System (Optional)"
• Configure DECnet if it was installed. After an upgrade, perform only if DECnet was added during the upgrade.	Section 7.8.4, "Configuring DECnet "
• Configure TCP/IP Services for OpenVMS if it was installed. After an upgrade, configure TCP/IP Services only if it was added during the upgrade.	Section 7.8.5, "Configuring TCP/IP Services for OpenVMS"
• If you are using neither DECnet nor TCP/IP Services, install and configure third-party networking software, if necessary. Networking software is required to download patches and for certain layered products.	Section 7.8.6, "Installing and Configuring Third-Party Networking Software"
• Initialize or configure the following products, as needed:	Section 7.9, "Initializing or Configuring Other Installed Components"
• Initialize CDSA.	Section 7.9.1, "Initializing CDSA (Optional)"
• Configure Availability Manager.	Section 7.9.2, "Configuring the Availability Manager Base Software (Optional)"
• Configure Kerberos.	Section 7.9.3, "Configuring Kerberos (Optional)"
• Configure SSL for OpenVMS.	Section 7.9.4, "Configuring SSL for OpenVMS (Optional)"
• Initialize and run the Performance Data Collector base software (TDC_RT).	Section 7.9.5, "Initializing and Running the Performance Data Collector Base Software (Optional)"
• Install OpenVMS Debugger clients on a PC.	Section 7.9.6, "Installing OpenVMS Debugger Clients on a PC (Optional) "
• Create or edit a system-specific or clusterwide login welcome message SYS $MANAGER:WELCOME.TXT (optional).	Section 7.10, "Creating a System-Specific Login Welcome Message (Optional)"
• *Upgrades only:* Examine command procedures for which the upgrade may have provided new template files.	Section 7.11, "Examining Your Command Procedures (Upgrades Only)"
• Add and remove operating system files (optional).	Section 7.12, "Adding and Removing Operating System Files (Optional)"
• Expand the system libraries using LIBDECOMP.COM (optional).	Section 7.13, "Expanding the System Libraries (Optional)"
• Download and apply any relevant OpenVMS or networking patches that are available (optional but recommended).	Section 7.14, "Installing Patches (Optional but Recommended)"
• *New installations, some upgrades:* Install and configure layered products.	Section 7.15, "Installing and Configuring Layered Products (New Installations, Some Upgrades)"
• *New installations, some upgrades:* Create print queues.	Section 7.16, "Creating Print Queues (New Installations, Some Upgrades)"
• Update SYSTARTUP_VMS.COM to have layered products, print queues, and other products or devices start at boot.	Section 7.17, "Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues"

Task	Section
• *Installations and possibly upgrades:* Create user accounts.	Section 7.18, "Creating Accounts (New Installations, Some Upgrades)"
• Run the User Environment Test Package (*UETP*) to test the system (optional).	Section 7.19, "Testing the System with UETP (Optional)"
• Back up the system disk and start a systematic routine for backing up the application, data, and user disks.	Section 7.20, "Backing Up the Customized System Disk and Initiating Systematic Backups"
• If the system disk was pulled out of the shadow set and all the appropriate postupgrade steps recommended in this chapter thus far were performed on that disk, then re-form the shadow set once again.	Section 7.21, "Reforming the Shadow Set as Final Postupgrade Backup"
• *Upgrades only:* Reboot cluster members, if applicable.	Section 7.22, "Rebooting Cluster Members (Upgrades Only)"
• Tune your operating system: After the system has run for at least 24 hours with users or a typical application workload on the system, run AUTOGEN to collect feedback. If necessary, modify the MODPARAMS.DAT file.	Section 7.23, "Running AUTOGEN to Tune the System"
	Section 7.24, "Modifying System Parameters"

7.2. Backing Up Your System Disk

Unless your newly installed or upgraded system disk will be part of a shadow set, VSI recommends that you back up the system disk before performing the tasks described in this chapter. If you encounter problems while performing any of these tasks, having a backup copy of the system disk ensures that you can restore it to a known condition without having to repeat the installation or upgrade.

If your system disk will be part of a multiple-member shadow set, then a backup is not necessary. Either form or re-form the shadow set, as described in Section 4.8, "Shadowing Environment"; this creates a backup copy of the newly installed or upgraded system disk through the shadow copy operation. Remember to dismount any added shadow set members after the shadow copy has completed, complete any steps described in this chapter that you need to perform and, when you are finished, re-form the shadow set.

If your newly installed or upgraded system disk will not be in a shadow set, back up the system disk by performing the following steps. (For a newly installed system disk, it might be just as easy to reinstall the operating system.)

1. Shut down the system as described in Section 8.3.1, "Shutting Down the System".

2. Boot the operating system media, as described in Section 3.3, "Booting the OpenVMS Operating System Media".

3. Use the OpenVMS operating system menu to enter the DCL environment (option 8).

4. Mount the system device and the target device on which you are making the backup copy. (If you are backing up to tape, skip to the next step.) For example, if your system disk is on DKA0: and the target device is on DKA100:, you might use the following commands (colons are required). The /OVERRIDE qualifier used in this example enables you to mount the system disk without entering its volume label. The /FOREIGN qualifier is required for the target disk when you use the BACKUP /IMAGE command.

    ```
    $$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
    $$$ MOUNT /FOREIGN DKA100:
    $$$ BACKUP /IMAGE /LOG DKA0: DKA100:
    ```

The /IMAGE qualifier causes the Backup utility to produce a functionally equivalent copy of the system disk, which is also bootable. The /LOG qualifier causes the procedure to display the specification of each save set file being processed. To compare the backed up files to the source files, use the /VERIFY qualifier. If any discrepancies are detected, the Backup utility displays an error message.

5. To back up the system disk to a magnetic tape, enter the following commands, where MTA0: is the magnetic tape drive and *label* is the volume label. Note that the BACKUP command automatically mounts the tape and begins the backup to it.

   ```
   $$$ INITIALIZE MTA0: label
   $$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
   $$$ BACKUP /IMAGE /LOG DKA0: MTA0: label.BCK
   ```

6. Log out from the DCL environment.

7. Shut down the system by selecting option 9 on the menu.

8. Boot from the disk on which you either upgraded or installed OpenVMS.

In addition to backing up the system disk now before you customize it, you should back up your system disk again after you successfully complete your customization tasks and install layered products.

For more complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media and that enables you to back up a shadowed disk without disabling the shadow set, see Section 4.8, "Shadowing Environment". For more information about the Backup utility, see the *OpenVMS System Management Utilities Reference Manual*.

7.3. Registering Your Licenses

If you did not register your OpenVMS licenses during the installation, you must do so before you can use the OpenVMS operating system. You must also register the licenses for OpenVMS layered products. If your operating system came preinstalled, you must register licenses. The licenses are not preinstalled. If you plan to form a volume shadow set for your newly installed system disk, you must enter and load the VOLSHAD license.

If you have upgraded your operating system, register any new OpenVMS or layered product licenses.

For information about registering licenses, see the following documents:

• *OpenVMS License Management Utility Manual*

• *VSI OpenVMS Version 8.4-2 Cover Letter and Release Notes*

To register licenses, use the OpenVMS License utility as follows:

1. Start the OpenVMS License utility by entering the following command at the OpenVMS system prompt. (You can also use the LICENSE REGISTER command.)

   ```
   $ @SYS$UPDATE:VMSLICENSE
   ```

2. The utility displays a menu screen similar to the following. Select the REGISTER option (press **Enter** or enter 1 at the prompt), and enter each license key until you have successfully registered all required PAKs.

   ```
   VMS License Management Utility Options:

       1. REGISTER a Product Authorization Key
       2. AMEND an existing Product Authorization Key
   ```

```
         3. CANCEL an existing Product Authorization Key
         4. LIST Product Authorization Keys
         5. MODIFY an existing Product Authorization Key
         6. DISABLE an existing Product Authorization Key
         7. DELETE an existing Product Authorization Key
         8. COPY an existing Product Authorization Key
         9. MOVE an existing Product Authorization Key
        10. ENABLE an existing Product Authorization Key
        11. SHOW the licenses loaded on this node
        12. SHOW the unit requirements for this node

        99. Exit this procedure

        Type '?' at any prompt for a description of the
        information requested. Press Ctrl/Z at any prompt
        to return to this menu.

    Enter one of the above choices [1]
```

3. After each license is successfully registered, the procedure asks whether the license should be loaded. Answer YES.

4. After you have registered and loaded all your licenses, exit the License Management procedure by entering option 99.

7.4. Set System Parameters for Volume Shadowing (Optional)

If you plan to form a shadowed system disk, you must add system parameters to the SYS$SYSTEM:MODPARAMS.DAT file. Add the following lines to the bottom of the MODPARAMS.DAT file:

```
SHADOWING=2             !Enable volume shadowing
SHADOW_SYS_DISK=1       !Enable shadowing of the system disk
SHADOW_SYS_UNIT=n       !Optional: default is 0, which creates DSA0
SHADOW_MAX_COPY=4       !Allow up to 4 shadow copies or merges going
                         on at the same time
ALLOCLASS=x             !This number must be non-zero;
                        !it must be used if local non-FC devices are
                         going to be
                        !shadow set members
```

If a nonzero ALLOCLASS value is already in use for your system, do not change the ALLOCLASS value. For more information about these and other system parameters you can set for volume shadowing, see the *Volume Shadowing for OpenVMS* manual. For more information about setting ALLOCLASS for clusters, see the *HP OpenVMS Cluster Systems* manual.

7.5. Tuning BAP System Parameters (Upgrade Only)

OpenVMS Alpha Version 7.1 and later contains system parameters that control the operation of bus-addressable pool (BAP).

The CIPCA, CIXCD, KFMSB, and Qlogic ISP 1020 (KZPSM-AA) adapters are some of the adapters that use bus-addressable pool to improve performance. BAP is a non-paged dynamic, physical-address-filtered memory pool used to overcome I/O bus and 32-bit adapter physical addressing limits.

The following table lists the BAP system parameters and their default values:

System Parameter	Default Value
NPAG_BAP_MIN	0
NPAG_BAP_MAX	0
NPAG_BAP_MIN_PA	0
NPAG_BAP_MAX_PA	-1

The default values of these parameters enable the system to boot with any configuration. When AUTOGEN is run on a configured system, it resets these parameters to values that should enhance performance for the current system configuration.

If this is an upgrade of OpenVMS, or if the system fails to boot after a hardware change and displays a message that refers to incorrect BAP parameters, VSI recommend that you perform the following steps:

1. To begin the conversational boot, use the BOOT command in the following format:

    BOOT -FLAGS 0,1 [*device-name*]

    For *device-name*, substitute the device name of your system disk drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press the **Enter** key:

    ```
    >>> BOOT -FLAGS 0,1 DKA400
    ```

2. At the SYSBOOT> prompt, enter the following:

    ```
    NPAG_BAP_MIN 0
    NPAG_BAP_MAX 0
    NPAG_BAP_MIN_PA 0
    NPAG_BAP_MAX_PA -1
    ```

3. This should enable the system to boot. Once completed, enter the following command:

    ```
    $  RUN SYS$SYSTEM:AGEN$FEEDBACK.EXE
    ```

4. The command entered in the preceding step creates a file that will contain the BAP values for the system in its current configuration. To see what they are, enter the following command (the BAP parameters in AGEN$FEEDBACK.DAT do not include the NPAG_ prefix):

    ```
    $  SEARCH SYS$SYSTEM:AGEN$FEEDBACK.DAT BAP
    ```

5. Check MODPARAMS.DAT for any hardcoded BAP values by entering the following command:

    ```
    $  SEARCH SYS$SYSTEM:MODPARAMS.DAT BAP
    ```

Important

If any BAP parameters are defined in MODPARAMS.DAT, VSI strongly recommends removing them. Their presence in MODPARAMS.DAT could be the source of the current boot problem or might be a source of one in the future if a change is made to the adapter card configuration in the system.

If you make changes to adapters in the future and the system boots successfully, immediately run AUTOGEN, by entering the following command:

```
$  @SYS$UPDATE:AUTOGEN GETDATA SETPARAMS NOFEEDBACK
```

7.6. Running AUTOGEN to Set System Parameter Changes

If you modified MODPARAMS.DAT to enable or modify shadowing parameters (see Section 7.24, "Modifying System Parameters"), or if you removed hardcoded BAP system parameters (see Section 7.5, "Tuning BAP System Parameters (Upgrade Only)"), then run AUTOGEN and reboot the system by performing the following steps. This makes the changes take effect.

1. Run AUTOGEN by entering the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN GETDATA TESTFILES NOFEEDBACK
   ```

2. After AUTOGEN completes, display or print the SYS$SYSTEM:AGEN$PARAMS.REPORT file and review it. This file lists changes being made to SYSGEN parameters or changes that AUTOGEN wanted to make but could not because of a hardcoded or maximum value that was specified in MODPARAMS.DAT.

3. If other changes need to be made to MODPARAMS.DAT based on a review of the AGEN $PARAMS.REPORT file, make them now and then resume at step 1.

4. Once you are satisfied with the parameter settings, enter the following AUTOGEN command:

   ```
   $ @SYS$UPDATE:AUTOGEN GENPARAMS SETPARAMS NOFEEDBACK
   ```

   This command makes the parameter changes permanent so that they are used on subsequent reboots.

5. Reboot the system by entering the following command:

   ```
   $ @SYS$SYSTEM:SHUTDOWN
   ```

For more information about AUTOGEN, see *OpenVMS System Management Utilities Reference Manual*.

7.7. Forming the Shadow Set

If you have upgraded a disk in a volume shadowing environment, you must now re-form the shadow set. If you want to form a shadow set for a newly installed system disk, you can do this now or later. To do so requires that the VOLSHAD license has been entered and loaded. In addition, you must set several system parameters, as explained in Section 7.4, "Set System Parameters for Volume Shadowing (Optional)", and then you must run AUTOGEN and reboot the system, as explained in Section 7.6, "Running AUTOGEN to Set System Parameter Changes".

Forming the shadow set with the newly installed or upgraded disk as the master causes the other disks in the shadow set to be updated with a copy of the disk. (In a single-member shadow set, although no other disks exist to be updated, the shadow set can be used to facilitate replacement of a failed drive.)

After forming the shadow set, dismount one of the shadow set members and keep it as a backup. After you perform the steps recommended in this chapter, you can place another volume into the shadow set instead of doing the final backup, or re-add the volume that was dismounted.

Form the shadow set as follows:

1. Enter the SHOW DEVICE D command to display a list of disks available on your system. For example:

   ```
   $ SHOW DEVICE D
   Device              Device   Error  Volume     Free    Trans  Mnt
   Name                Status   Count  Label      Blocks  Count  Cnt
   ```

```
$11$DKB100:   (NODE1) Online        0
$11$DKB200:   (NODE1) Mounted       0   AXP842L2   918150      1   31
```

2. Enter a command in the following format:

    MOUNT/CONFIRM/SYSTEM DSA*n*: /SHADOW=(*upgraded-disk:,new-member:*)
    volume-label

    where:

    - DSA*n*: is the virtual unit name of the shadow set, where *n* is a unique number from 0 to 999.

    - *upgraded-disk*: is the name of the shadowed system disk on which you just upgraded or installed OpenVMS.

    - *new-member*: is the name of the disk you want to add as a member of the shadow set.

    - *volume-label* is the volume label of the shadow set you just upgraded or the disk you are creating.

Note

When you form the shadow set, the contents of the new member are replaced by the contents of the disk you upgraded. Specifying the /CONFIRM qualifier reminds you of this fact, confirming that you are specifying the correct name of a disk that either is blank or contains files you no longer need.

Example

```
$ DISMOUNT $11$DKB200:
$! Dismount upgraded disk prior to forming shadow set
$ MOUNT/CONFIRM/SYSTEM DSA54: /SHADOW=($11$DKB200:,$11$DKB100:)
  ALPHA842L2

%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label AXP842L2
     Member                     Volume label  Owner UIC
     $11$DKB100:  (NODE1)        SCRATCH       [100,100]
Allow FULL shadow copy on the above member(s)? [N]: YES
```

Note

Before continuing with the next step in this chapter, after the shadow copy completes, dismount one of the shadow set members to use as a backup. Normally, this should be the unit you just added to the upgraded volume when you formed the shadow set (in the preceding example, 11DKB100:).

7.8. Customizing the System (New Installations, Some Upgrades)

You can customize the system to meet your site-specific needs. In addition, if your Integrity servers is part of an OpenVMS Cluster environment, you must prepare the cluster environment and configure the cluster. The following subsections describe the customization tasks you can perform at this time. In general, these tasks apply to new installations only; however, in some cases, they apply to upgrades. The tasks are as follows:

1. Create network proxy authorization files (Section 7.8.1, "Creating Network Proxy Authorization Files").

2. Set up the queue manager, configure shared files (when multiple system disks are present), and start the default batch and print queues (Section 7.8.2, "Setting Up the Queue Manager and Default Queues ").

3. Configure your multihead system, if applicable (Section 7.8.3, "Configuring a Multihead System (Optional)").

4. Configure DECnet if it was installed or added during an upgrade (Section 7.8.4, "Configuring DECnet ").

5. Configure TCP/IP Services for OpenVMS if it was installed or added during an upgrade (Section 7.8.5, "Configuring TCP/IP Services for OpenVMS").

6. If neither DECnet nor TCP/IP Services for OpenVMS is being used, install and configure third-party networking software, if necessary (Section 7.8.6, "Installing and Configuring Third-Party Networking Software").

7. Update SYSTARTUP_VMS.COM to have networking software (and, optionally, any other additional products you have installed) start at boot (Section 7.17, "Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues").

For instructions on customizing the system, review the following documentation:

• The release notes, for notes and restrictions that might be relevant to your customization plans

• The *OpenVMS System Manager's Manual*, for instructions on customizing and using your system

Note that other customization tasks are described later in this chapter.

7.8.1. Creating Network Proxy Authorization Files

After a new installation of OpenVMS that includes DECnet, or after an upgrade in which you have added DECnet, create your network proxy authorization files. These files include security authorization information for users using network proxy accounts. If you do not create these network authorization files before starting up your system, you might see messages such as the following during startup:

```
Message from user SYSTEM on HOMER
%SECSRV-E-NOPROXYDB, cannot find proxy database file NET$PROXY.DAT
%RMS-E-FNF, file not found
```

The NET$PROXY.DAT file is the primary network proxy authorization file. The other network authorization file to be created is NETPROXY.DAT. To create the network proxy authorization files, enter the following commands:

```
$   SET DEFAULT SYS$COMMON:[SYSEXE]
$   MC AUTHORIZE CREATE/PROXY
$   SET DEFAULT SYS$LOGIN
```

Note

Be sure you create the network proxy authorization files before starting the queue manager.

If you see messages similar to the following when you create the proxy files, you can ignore them:

```
%UAF-W-NETCHANERR, error assigning a channel to NET:
-SYSTEM-W-NOSUCHDEV, no such device available
```

For more information about network proxy accounts and files, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*. For more information about the Authorize utility, see the *OpenVMS System Management Utilities Reference Manual*.

7.8.2. Setting Up the Queue Manager and Default Queues

The initial installation of OpenVMS does not create the queue manager or any queues. VSI recommend that you create the queue manager and your default batch and print queues now. When you install layered products (as described in Section 7.15, "Installing and Configuring Layered Products (New Installations, Some Upgrades)"), some of these products expect such queues to be present or try to create queues themselves.

Note

Normally, you create a queue manager only once. The system stores the START QUEUE command in the queue database to enable the queue manager to start automatically whenever the system reboots. If the queue manager has been started before on your system, do not specify this START QUEUE command again; the /NEW_VERSION qualifier causes your system to overwrite your current queue database files.

To configure shared files on multiple system disks or off the system disk, edit the SYS $MANAGER:SYLOGICALS.COM file as described in *OpenVMS System Manager's Manual, Volume 1: Essentials*.

To set up the queue manager and a batch queue for new installations, enter the following commands at the DCL prompt.

```
$   START QUEUE /MANAGER /NEW_VERSION
$   INITIALIZE /QUEUE /START /BATCH SYS$BATCH
```

Note

If you did an upgrade of the operating system, do not specify the START QUEUE command with the / NEW_VERSION qualifier.)

As noted, the queue manager starts automatically the next time you boot your OpenVMS system. To have the SYS$BATCH queue start automatically, edit the line in the SYS $STARTUP:SYSTARTUP_VMS.COM file that starts the SYS$BATCH queue by removing the exclamation mark (!) and, if present, the extra dollar sign ($). The following example shows the line before and after editing. In that section, you can also define a default system print queue (SYS$PRINT).

Before: `$!$ START /QUEUE SYS$BATCH`

After: `$ START /QUEUE SYS$BATCH`

For more information about starting and creating queues, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.8.3. Configuring a Multihead System (Optional)

A multihead configuration consists of a single system (such as an HPE AlphaServer ES40) that supports multiple graphics options. A graphics option consists of a graphics controller (card) and a graphics display interface (monitor).

Your system can be configured automatically for multihead use if you copy the private server setup template file to a command procedure file type (.COM). The DECwindows Motif server loads this command procedure on startup or restart.

To set up your system for multihead support, perform these steps:

Note

The DECwindows Motif software must already be installed on the system prior to completing this procedure. If DECwindows is not installed, you must install the software, load the license and reboot the system prior to completing this procedure.

1. Copy the private server setup template file to a new .COM file by entering the following command:

    ```
    $ COPY SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE
    _To: SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM
    ```

2. Restart the DECwindows server by entering the following command:

    ```
    $ @SYS$STARTUP:DECW$STARTUP RESTART
    ```

For more information about customizing your DECwindows environment using the SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM file, see the most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems*.

7.8.4. Configuring DECnet

If you installed DECnet, or if you added DECnet during an upgrade, you must now configure DECnet. Follow the instructions provided for the version of DECnet you installed. The DECnet End System License and DECnet-Plus Extended Function licenses are included in the ALPHA-LP PAK that is provided with every VSI OpenVMS Alpha license purchase.

To load and register licenses, perform the steps described in Section 7.3, "Registering Your Licenses".

If you installed DECnet-Plus for OpenVMS software, see the *DECnet-Plus for OpenVMS Release Notes* and the *HP DECnet-Plus for OpenVMS Installation and Configuration* manual for information about how to configure this software using the NET$CONFIGURE procedure.

If you installed DECnet Phase IV, see the *DECnet for OpenVMS Guide to Networking* manual for information about configuring this software using the NETCONFIG command procedure.

Once you have configured DECnet Phase IV, edit SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM so that the software starts when the system reboots. (This step is not required if you are running DECnet-Plus.) You can have the software start interactively or in batch mode by making one of the following changes:

Locate and uncomment the line:

```
$!$ START/NETWORK DECNET
```

So it now appears as:

```
$ START/NETWORK DECNET
```

To start the network in a batch job (speeds up startup) locate and uncomment the line:

```
$!$ SUBMIT SYS$MANAGER:STARTNET.COM
```

So it now appears as:

```
$ SUBMIT SYS$MANAGER:STARTNET.COM
```

Important

If you intend to run both DECnet Phase IV and a TCP product, DECnet must start first. In this case, VSI recommend starting DECnet using interactive mode. For information about editing

STARTUP_VMS.COM, see Section 7.17, "Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues".

7.8.5. Configuring TCP/IP Services for OpenVMS

If you plan to run TCP/IP Services for OpenVMS software, note the following:

* Configure your system for networking by executing the interactive command procedure SYS $MANAGER:TCPIP$CONFIG.COM. Be sure to consult the *TCP/IP Services for OpenVMS Installation and Configuration* manual for specifics about configuring TCP/IP Services for OpenVMS and for configuring IPv6 support.

* After completing the configuration, edit the command pertaining to TCP/IP Services for OpenVMS in SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM (as instructed in Section 7.17, "Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues") so that the TCP/IP Services software starts automatically when your system is rebooted.

Important

Do not configure TCP/IP Services for OpenVMS without first starting the queue manager.

7.8.6. Installing and Configuring Third-Party Networking Software

You need networking software to download patches and as a requirement for certain layered products. If you are using neither DECnet nor TCP/IP Services for OpenVMS, you should install and configure third-party networking software now. See the appropriate vendor's product documentation.

7.9. Initializing or Configuring Other Installed Components

Initialize or configure any of the following products as necessary, following the instructions in the sections indicated:

* CDSA (Section 7.9.1, "Initializing CDSA (Optional)")

* Availability Manager (Section 7.9.2, "Configuring the Availability Manager Base Software (Optional)")

* Kerberos (Section 7.9.3, "Configuring Kerberos (Optional)")

* SSL for OpenVMS (Section 7.9.4, "Configuring SSL for OpenVMS (Optional)")

* Performance Data Collector base software, TDC_RT (Section 7.9.5, "Initializing and Running the Performance Data Collector Base Software (Optional)")

7.9.1. Initializing CDSA (Optional)

The Common Data Security Architecture (CDSA) software is installed, configured, and initialized automatically with the operating system installation or upgrade. CDSA is required for security features; otherwise, use of CDSA is not required.

Note that if you installed a new CDSA kit without upgrading the base operating system, you must enter the following command to initialize CDSA prior to its first use. Enter the command from an account that has both SYSPRV and CMKRNL privileges (for example, the SYSTEM account).

```
$ @SYS$STARTUP:CDSA$UPGRADE
```

The following is an example of the output you might see:

```
Module uninstalled successfully.
   .
   .
   .
CDSA-I-Init, CDSA has previously been initialized on this system.
CDSA-I-Init, Re-initializing CDSA.

CDSA-I-Init, Initializing CDSA
MDS installed successfully.
   .
   .
   .
CDSA-I-Init, CDSA Initialization complete
CDSA-I-Init, Initializing Secure Delivery
Installation completed successfully.
Installation completed successfully.
Module installed successfully.
Module installed successfully.
CDSA-I-Init, Secure Delivery Initialization complete
```

Note

Do not attempt to explicitly remove CDSA from your system. The PRODUCT REMOVE command is not supported for CDSA although there appears to be an option to remove CDSA. CDSA is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects.

For more information about CDSA, see *Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*.

7.9.2. Configuring the Availability Manager Base Software (Optional)

The Availability Manager base kit is installed automatically with the operating system; however, use of Availability Manager is not required. If you do not plan to use Availability Manager or any products that depend on it, skip to the next section.

The files in the Availability Manager base kit make up what is called the Data Collector. The Data Collector is used to collect data for the Availability Manager and DECamds products. To display the data, you need to install an Availability Manager Data Analyzer kit on an OpenVMS or Windows-based node in the local LAN. The kit is included in the OpenVMS upgrade media.

The base kit files are the same files that have been provided with the OpenVMS installation kit since Version 7.2. These files are installed as a required product rather than being an optional software product in the operating system kit. Procedures for configuring and using these files remain unchanged.

Refer to the Availability Manager Release Notes (included in the Availability Manager kit) for information about how to configure and use the base kit.

Note

Do not attempt to explicitly remove the Availability Manager from your system. The PRODUCT REMOVE command is not supported for Availability Manager although there appears to be an option to remove Availability Manager. The Availability Manager base software is installed with the operating

system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects.

7.9.3. Configuring Kerberos (Optional)

The Kerberos for OpenVMS software, which is based on MIT Kerberos, is installed automatically with the operating system; however, use of Kerberos is not required. If you do not plan to use Kerberos or any products that depend on Kerberos, skip to the next section.

To configure Kerberos, perform the following steps from a privileged OpenVMS user account (for example, SYSTEM).

1. Run the following command procedure to configure the Kerberos clients and servers:

    $ **@SYS$STARTUP:KRB$CONFIGURE.COM**

2. Add the following line to your SYLOGIN command procedure or to the LOGIN.COM of each user who will use Kerberos:

    $ **@SYS$MANAGER:KRB$SYMBOLS**

3. Edit SYS$MANAGER:SYSTARTUP_VMS.COM to remove the exclamation point from the KRB$STARTUP.COM line so that it appears as shown in the following example. (Note that SYSTARTUP_VMS.COM has VSI TCP/IP Services for OpenVMS starting before Kerberos. This is required.)

    $ **@SYS$STARTUP:KRB$STARTUP.COM**

For additional setup and configuration information, see the *Open Source Security for OpenVMS, Volume 3: Kerberos* manual. This document contains links to the MIT Kerberos documentation and is available from the OpenVMS Version 8.4-2L2 kit.

Note

Do not attempt to explicitly remove Kerberos from your system. The PRODUCT REMOVE command is not supported for Kerberos although there appears to be an option to remove Kerberos. Kerberos is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects.

7.9.4. Configuring SSL for OpenVMS (Optional)

The HP SSL for OpenVMS software is installed automatically with the operating system; however, use of SSL is not required. If you do not plan to use SSL or any products that depend on it, skip to the next section.

The SSL$STARTUP.COM command procedure has been added to VMS$LPBEGIN-050 to enable SSL to start automatically.

Add the following line to SYS$MANAGER:SYSHUTDOWN.COM:

$ **@SYS$STARTUP:SSL$SHUTDOWN.COM**

If you are upgrading and have an earlier version of SSL installed, copy your SSL $STARTUP.TEMPLATE file (located in SYS$STARTUP) to SSL$STARTUP.COM in the SYS $STARTUP directory.

Several other post-installation and post-upgrade tasks are required, as described in the SSL release notes, available in SYS$HELP:SSL*nnn*.RELEASE_NOTES, where *nnn* is the version of the SSL software, such as 013.

For more information about SSL, see *Open Source Security for OpenVMS, Volume 2: HP SSL for OpenVMS.*

Note

Do not attempt to explicitly remove SSL from your system. The PRODUCT REMOVE command is not supported for SSL although there appears to be an option to remove SSL. SSL is installed with the operating system and is tightly bound with it. Attempts to remove it might not work as expected and can create undesirable side effects.

7.9.5. Initializing and Running the Performance Data Collector Base Software (Optional)

The Performance Data Collector for VSI OpenVMS (TDC) collects and manages configuration and performance data for analysis by other applications. TDC_RT Version 2.3-20 is a run-time only (base) variant of the TDC software that is installed automatically with the OpenVMS operating system for use on specific operating system platforms.

Use of the TDC_RT software is not required. If you do not plan to use TDC_RT or any products that depend on it, you can skip to the next section.

TDC_RT does not run automatically when the system starts, but any suitably privileged user can start the software manually. This section includes information about system parameters, privileges and quotas, startup, and installation in OpenVMS Clusters.

Note

Do not attempt to explicitly remove TDC_RT from your system. The PRODUCT REMOVE command is not supported for TDC_RT although there appears to be an option to remove it. TDC_RT is installed with the operating system and is tightly bound with it. VSI or third-party applications might require TDC_RT. Attempts to remove it might not work as expected and can create undesirable side effects.

7.9.5.1. User Privileges and Quotas

Users of TDC_RT require various privileges, depending on the types of data to be collected. Online help is available when running the collector application and specifies the privileges required to collect each type of data. Enabling the following set of privileges enables collection of all data items: CMKRNL, LOG_IO, NETMBX, PHY_IO, SYSLCK, SYSPRV, WORLD.

Users of the product also require working set quotas (WSQUO) greater than 6000 pagelets.

7.9.5.2. Startup File

TDC_RT provides a startup file that should be launched during system startup. The startup file defines several logical names required for use of the product, but the startup file does not actually start the data collector.

Add the following line to SYS$MANAGER:SYSTARTUP_VMS.COM:

```
$ @SYS$STARTUP:TDC$STARTUP
```

To directly run TDC$STARTUP.COM, SYSNAM privilege is required.

7.9.5.3. Compatibility with Prior Releases

Note the following about prior releases of TDC software.

- TDC Version 1.*n*

  For users of some third-party system-management applications, TDC Version 1.*n* was distributed by web download. Applications developed using TDC Version 1.*n* will not work with TDC Version 2.*n* software until they are rebuilt using the TDC Version 2.*n*. For more information and to obtain TDC, go to: http://h41379.www4.hpe.com/openvms/products/tdc/tdc-about-23.html

  Data files created using TDC Version 1.*n* cannot be read by TDC_RT Version 2.2. Data files created using TDC_RT Version 2.2 cannot be read using TDC Version 1.*n*.

  When TDC_RT Version 2.1 or any newer version of TDC is installed, files associated with TDC Version 1.*n* are not removed. In any case, TDC_RT Version 2.1 (or later) and TDC Version 1.*n* can safely coexist on a system. You can remove the older TDC files by uninstalling TDC (use the DCL command PRODUCT REMOVE).

- TDC Version 2.2 on an earlier version of OpenVMS

  If you upgrade to OpenVMS Version 8.4-2L2 from an earlier version of OpenVMS on which TDC Version 2.2 was installed, files shared by TDC_RT Version 2.2 and TDC Version 2.2 are updated; these files are the documentation and support files listed in SYS$COMMON:[TDC]README.TXT as common to all kit variants. Unless the TDC and TDC_RT kits share the same baselevel number (for example, 102), image files installed with TDC Version 2.2 are retained in their installed locations. Most likely, the downloaded TDC Version 2.2 software will be more recent (higher baselevel number) than the TDC_RT Version 2.2 software installed with OpenVMS Version 8.4-2L2. The TDC Version 2.2 SDK (if installed) and any additional documentation files installed with TDC Version 2.2 are retained.

  Running SYS$STARTUP:TDC$STARTUP.COM causes the most recent TDC/TDC_RT Version 2.2 images to be used at runtime, regardless of whether they were installed with TDC Version 2.2 or with TDC_RT Version 2.2.

  You can remove TDC Version 2.2 without affecting the integrity of the TDC_RT Version 2.2 installation if their baselevel numbers differ.

As of OpenVMS Version 8.2, TDC and TDC_RT use the same naming scheme for image files. A build number is tagged to the image file names. For example, if the version of TDC_RT that ships with your operating system is Version 2.2-60 (where 60 is the build number), then the files that are installed will have names such as (or TDC$APISHR$A_V840-0060.EXE, where $A denotes Alpha, V840 denotes the version of OpenVMS (8.4), and 0060 is the build number. The SYS$STARTUP:TDC $STARTUP.COM startup file, which is also identical for both TDC and TDC_RT, uses this build number to determine which image files to use. When a subsequent installation is performed with software that has higher build numbers, the TDC$STARTUP.COM startup file uses the image files with the highest build number appropriate for the current platform.

7.9.5.4. Running TDC_RT

To run the collector application, users can enter the TDC command at the DCL prompt. But first, because the TDC command is not included in the system command table SYS $LIBRARY:DCLTABLES.EXE, each user must add the command to their table by entering the following command at the DCL prompt:

```
$ SET COMMAND SYS$COMMON:[TDC]TDC$DCL
```

Each user can add this SET command to their LOGIN.COM file. However, because elevated privileges are required for most data collection operations, it might not be appropriate to add this command to SYS$MANAGER:SYLOGIN.COM.

To start the collector application, enter the TDC command:

```
$ TDC
```

For more information about running the application, see the file
SYS$COMMON:[TDC]TDC_README.TXT. Release notes are located in the file
SYS$COMMON:[TDC]TDC_RELEASE_NOTES.TXT. See both of these files before running the
collector application.

7.9.5.5. Installation in OpenVMS Clusters

TDC_RT is installed in SYS$COMMON:[TDC] by default. Included are only those files required
to run the data collector with the particular operating system version it was distributed with. Once
TDC_RT is installed and SYS$STARTUP:TDC$STARTUP.COM has been run on each cluster
member, then all cluster members in a single-version, single-architecture OpenVMS Cluster should
be able to run the software.

7.9.6. Installing OpenVMS Debugger Clients on a PC (Optional)

The latest version of the OpenVMS Debugger runs on OpenVMS Alpha server system. The debug
server runs on OpenVMS, while a debug client, which is the user interface to the server, runs on
OpenVMS and on Microsoft Windows 95, Windows 98, Windows NT, Windows 2000, Windows
XP, and Windows Vista. There is no special installation procedure for the components that run
on OpenVMS. The installation guide and kit for the OpenVMS debugger client is located on the
Layered Products CD that comes with the OpenVMS binary CD set. The directory on the CD is
DEBUG_CLIENTS011. The KIT.DIR subdirectory contains the following files:

- 40COMUPD.EXE

- DEBUGX86011.EXE

For installation instructions, see the INSTALLATION_INFO.PS or INSTALLATION_INFO.TXT file
in the DOCUMENTATION subdirectory.

7.10. Creating a System-Specific Login Welcome Message (Optional)

You can use SYS$WELCOME to display a system-specific welcome message at login. The message
could inform users of scheduled down time, recent updates to the system, whom to contact about
system problems, and so forth. A template file is provided by the operating system. To create your
own SYS$WELCOME file, do the following:

1. Copy the template file using the following command:

   ```
   $ COPY SYS$MANAGER:WELCOME.TXT SYS$SPECIFIC:[SYSMGR]WELCOME.TXT
   ```

   For a clusterwide welcome message, you can copy the file to SYS$COMMON:[SYSMGR].

2. Replace the text in SYS$SPECIFIC:[SYSMGR]WELCOME.TXT with text specific to your
   system.

3. Edit SYS$MANAGER:SYSTARTUP_VMS.COM to remove the exclamation point (!) from the
   line that defines SYS$WELCOME.

If you do not want to use a node-specific welcome file, you can optionally define the logical in SYS
$MANAGER:SYSTARTUP_VMS.COM to display a message, such as in the following example:

```
$ DEFINE SYS$WELCOME "Welcome to node HOMER"
```

For more information about creating login welcome messages, see the *OpenVMS System Manager's
Manual, Volume 1: Essentials*.

7.11. Examining Your Command Procedures (Upgrades Only)

The upgrade procedure retains the site-specific versions of the following files located in the [VMS$COMMON] directory:

- [SYSMGR]LAT$SYSTARTUP.COM

- [SYSMGR]LOGIN.COM

- [SYSMGR]SYCONFIG.COM

- [SYSMGR]SYLOGICALS.COM

- [SYSMGR]SYLOGIN.COM

- [SYSMGR]SYPAGSWPFILES.COM

- [SYSMGR]SYSECURITY.COM

- [SYSMGR]SYSHUTDWN.COM

- [SYSMGR]SYSTARTUP_VMS.COM

- [SYSMGR]TFF$SYSTARTUP.COM

- [SYSMGR]WELCOME.TXT

- [SYS$STARTUP]ESS$LAST_STARTUP.DAT

The upgrade procedure might provide new templates for some of these files with the .TEMPLATE file extension. The new templates might include features that are not in your site-specific files. Check the templates against your site-specific files and edit your files as necessary.

Note

As of Version 8.3 of OpenVMS, the DCL command DECRAM has been removed because it conflicts with the new DECRYPT command (DECRYPT overwrites the default definition of DECR, which you might have been using to run DECram). You should update any command procedures that use the DECRAM command so that they use the foreign command style of DCL to run DECRAM:

```
$ DECRAM == "$MDMANAGER"
```

This change affects only the use of the DCL command; all other aspects of the DECram product remain the same.

7.12. Adding and Removing Operating System Files (Optional)

If you decide after the installation or upgrade to change which OpenVMS operating system files you want installed on your system, you can use the menu system contained on the OpenVMS operating system media to add or remove files.

Note

You can obtain information about individual system files by entering the HELP SYS_FILES command at the dollar sign prompt ($).

Important

Unless you have a specific need to exclude operating system files from your system disk, VSI strongly recommends that you accept the defaults and install all files that are part of OpenVMS. In general, limited disk space is not a good reason to exclude files; problems encountered when needed files are missing can cost much more than the cost of a larger disk.

To add or remove operating system files:

1. Mount and boot the OpenVMS operating system media.

2. Choose option 1 on the menu.

3. Choose the PRESERVE option.

4. Enter the name of the device that contains the system disk and answer the questions.

5. After you answer the question "Do you want detailed descriptions?," information regarding reconfiguring or reinstalling is displayed. Read the instructions, then choose the desired entry on the menu of options.

The following is a sample display:

```
Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS ALPHA
            Version 8.4-2L2
        2)  Display layered products that this procedure can
            install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete
            Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 1
***************************************************************
    Do you want to INITIALIZE or to PRESERVE? [PRESERVE] PRESERVE

        Version 8.4-2L2 of the OpenVMS operating system is already
        installed on the target disk. You may choose one of the
        following actions:

        o Reconfigure the OpenVMS platform.

          This action will allow you to change your selections of
          which of the windowing and network products you included
          with your OpenVMS operating system installation.

        o Reconfigure the OpenVMS operating system.

          This action will allow you to change your choices about
          which options you included for the OpenVMS operating
          system.

        o Reinstall the OpenVMS operating system.
```

```
         This action will cause ALL operating system  files to be
         replaced.
         You can also change your choices about which options you
         included for the OpenVMS operating system.

         Reinstall will take longer than Reconfigure. Reinstall
         may be appropriate if you suspect that files in the
         operating system, or in the windowing and network
         products have become corrupted.

     If you want to reinstall any of the windowing and network
     products, choose "Install or upgrade layered products"
     from the main menu.

     If you want to change your choices about which options
     you included for any of the windowing and network products,
     choose "Reconfigure installed products" (option 5) from
     the main menu.

     Please choose one of the following:

         1)   Reconfigure the OpenVMS platform.
         2)   Reconfigure the OpenVMS operating system.
         3)   Reinstall the OpenVMS operating system.
         4)   Return to the Main Menu(abort the
              upgrade/installation).


Enter choice or ? for help: (1/2/3/4/?) 2
The following product has been selected:
    VSI AXPVMS OPENVMS 8.4-2L2          Platform (product suite)

Configuration phase starting ...

You will be asked to choose options, if any, for each selected
product and for any products that may be installed to satisfy
software dependency requirements.

Configuring VSI AXPVMS OPENVMS 8.4-2L2: OPENVMS and related
products Platform

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    VMS Software, Inc.


Do you want the defaults for all options? [YES] NO
```

Answer NO to this question as shown, and select the options you want, as described in step 18 of the installation procedure in Section 3.4.2, "Installing OpenVMS Using Option 1 of the Operating System Menu" (Component Options and Suboptions Example shows a list of the component options.) After you respond to the prompts, the display continues and the installation procedure completes. The following is a continuation of the sample display:

```
Do you want to review the options? [NO]
Execution phase starting ...
```

```
The following product will be reconfigured:
    VSI AXPVMS OPENVMS 8.4-2L2
Portion done: 0%...10%...20%...30%...40%...50%...60%...80%...90%
...100%

The following product has been reconfigured:
    VSI AXPVMS OPENVMS 8.4-2L2.
```

For detailed instructions on how to remove the OpenVMS operating system from your disk, see
Appendix B, *Removing the OpenVMS Operating System.*

7.13. Expanding the System Libraries (Optional)

Libraries included with the OpenVMS Alpha operating system kit are installed in data-reduced
(compressed) format. Unless disk space is limited, VSI recommend expanding (decompressing) these
libraries to give the system faster access to them.

To expand libraries that are in data-reduced format or compress libraries that are in expanded
format, use the OpenVMS Library Decompression utility (LIBDECOMP.COM). The utility runs on
OpenVMS Alpha server system. To run the utility, enter the following command:

$ **@SYS$UPDATE:LIBDECOMP**

For more information about the utility, you can request help by entering the following command:

$ **@SYS$UPDATE:LIBDECOMP HELP**

You can list the sizes and format (reduced or expanded) of the libraries by using the following
command:

$ **@SYS$UPDATE:LIBDECOMP LIST**

For complete information about expanding and reducing system library files and using
LIBDECOMP.COM, see the *OpenVMS System Manager's Manual, Volume 2*.

The following table lists the libraries that ship on OpenVMS Version 8.4-2L2 and shows the
approximate sizes of the libraries in both data-reduced (compressed) and expanded format.

Note

File sizes are subject to change. In addition, layered products and user applications might add entries
to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in Table 7.2, "Reduced and
Expanded Sizes of Libraries " do not reflect such entries. For the most accurate information, run the
Library Decompression utility on your own system and review the output from the list function.

Table 7.2. Reduced and Expanded Sizes of Libraries

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
[SYSHLP] directory; Help library files (.HLB)				
ACLEDT.HLB Access Control List Editor help	70	102	70	103
BKM$HELP.HLB Backup Manager help	156	248	156	251

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
DBG$HELP.HLB OpenVMS Debugger help	1237	2144	1237	2164
DBG$UIHELP.HLB OpenVMS Debugger help	271	441	271	465
EDTHELP.HLB EDT Editor help	154	229	154	233
EVE$HELP.HLB EVE Editor help	676	1197	676	1177
EVE$KEYHELP.HLB EVE Keypad help	99	145	99	148
EXCHNGHLP.HLB Exchange Utility help	83	118	83	118
HELPLIB.HLB[a] DCL help	10055	18701	10830	21426
LANCP$HELP.HLB LAN Control Program help	116	169	113	163
LATCP$HELP.HLB LAT Control Program help	157	243	157	243
MAILHELP.HLB Mail Utility help	211	316	211	316
NCPHELP.HLB Network Control Program help	262	412	262	412
SDA.HLB System Dump Analyzer help	384	581	384	587
SHWCLHELP.HLB Show Cluster Utility help	88	127	88	127
SYSGEN.HLB System Generation Utility help	369	582	366	578
SYSMANHELP.HLB System Management Utility help	539	871	559	907
TPUHELP.HLB Text Processing Utility help	575	1036	575	1015
UAFHELP.HLB Authorize Utility help	253	391	249	384
[SYSLIB] directory; Macro library files (.MLB)				
LANIDEF.MLB LAN internal driver macros	196	261	196	275
LIB.MLB Operating system macros	3039	5254	3226	5515
STARLET.MLB Operating system macros	2558	3827	2595	3576
[SYSLIB] directory; Object library files (.OLB)				

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
STARLET.OLB [a] System object library and run-time library	30664	49858	69916	116397
VAXCRTL.OLB HP C RTL routine name entry points; VAX G_floating double-precision, floating-point entry points	1271	1689	Not included	
VAXCRTLD.OLB Limited support of VAX D_floating double-precision, floating-point entry points	1732	2802	Not included	
VAXCRTLDX.OLB VAX D_floating support; support for / L_DOUBLE_SIZE=128 compiler qualifier	1663	2648	Not included	
VAXCRTLT.OLB IEEE T_floating double-precision, floating-point entry points	1578	2491	Not included	
VAXCRTLTX.OLB IEEE T_floating support; support for / L_DOUBLE_SIZE=128 compiler qualifier	1596	2493	Not included	
VAXCRTLX.OLB G_floating support; support for / L_DOUBLE_SIZE=128 compiler qualifier	1422	2003	Not included	
VMS $VOLATILE_PRIVATE_INTERFACES.OLB OpenVMS bugcheck processing codes	601	873	1519	2121
[SYSLIB] directory; Text library files (.TLB)				
BASIC$STARLET.TLB BASIC language variant of the STARLET library, containing version-independent declarations for system services	3896	8129	3865	8197
ERFLIB.TLB ANALYZE ERROR device descriptions	64	85	Not included	
LIB_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1915	3535	1914	3615
NTA.TLB Windows NT definition files	34	42	34	52
STARLETPAS.TLB Pascal language variant of the STARLET library, containing version-independent declarations for system services	3817	8959	3802	8967
STARLET_RECENT_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1144	2030	1144	2058
STARLETSD.TLB Language-independent STARLET definitions used during layered product installations	4328	7758	4297	7936

Library Name/Description	OpenVMS Alpha		OpenVMS Integrity servers	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
SYS$LIB_C.TLB C language variant of the LIB library, containing internal and version-dependent declarations for system services	10544	22218	17356	35869
SYS$STARLET_C.TLB C language variant of the STARLET library, containing version-independent declarations for system services	6324	13694	6559	14130
TOTALS:	**94141**	**168857**	**132963**	**239525**

[a]Layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in this table do not reflect such additional entries.

7.14. Installing Patches (Optional but Recommended)

VSI recommends installing any relevant OpenVMS and networking patches that are available. Most patches are optional, but some layered products might require one or more patches on the system before their software is installed. For more information about VSI OpenVMS patches that might be required on your system, see the *VSI OpenVMS Alpha Version 8.4-2L2 New Features and Release Notes*, and the documentation provided for the relevant layered products. If you are upgrading a system that is running a VSI OpenVMS Alpha version, consult VSI for any VSI OpenVMS Alpha patches that your system might require.

Each patch file includes an associated digital signature file (also referred to as a manifest) that is used to validate the patch file. This validation involves authenticating the originator (VSI, in this case) and verifying the contents of the file.

Note

VSI strongly recommends backing up your system disk before installing patches.

7.15. Installing and Configuring Layered Products (New Installations, Some Upgrades)

The OpenVMS operating system kit includes several layered products. These include the System Integrated Product (SIP) kits for the following products that are installed automatically:

- Availability Manager (base) for OpenVMS (required)

- CDSA for OpenVMS (required)

- Kerberos for OpenVMS (required)

- SSL for OpenVMS (required)

- Performance Data Collector base software, TDC_RT (required)

- HP Binary Checker for OpenVMS

These layered products also include the SIP kits for the following products that you can install optionally as part of the OpenVMS operating system installation:

- DECwindows Motif for OpenVMS

- DECnet-Plus for OpenVMS

- DECnet Phase IV for OpenVMS

- TCP/IP Services for OpenVMS

These layered products are included in the operating system media and can be installed using either the steps shown in this section or the alternative procedure described in Section 7.15.1, "Alternative Procedure". Other layered products—whether provided by VSI on other CDs in the operating system distribution, in the Software Product Library CD set, or on a CD provided by a third-party company —should be installed using the steps shown in Section 6.7, "Running Alpha Layered Products".

Kits installed from the OpenVMS Alpha operating system distribution CD are not validated; this restriction is due to space limitations of the distribution CD.) On the OpenVMS Alpha server system, signed PCSI kits that you install subsequently are validated (including signed kits on the distribution media).

Note

To use menu option 3, the target system must have the identical version of the OpenVMS operating system as the operating system media. If you need to install layered products on a target system that has a different version of the operating system, use the alternative procedure.

To use option 3 of the operating system menu, follow these steps:

1. Before you install any layered products, be sure you back up the system disk.

2. If you are not already booted from the operating system media, shut down the system and boot the operating system media. For instructions on how to shut down the OpenVMS Alpha system, see Section 1.3, "Alpha System Shutdown".

3. To view a list of products that can be installed, choose option 2 on the menu. If the layered product that you want to install is not listed in the display, install the product by using the alternative procedure described in Section 7.15.1, "Alternative Procedure", or see the documentation you received with the layered product. Note that VSI does not support VMSINSTAL, PRODUCT INSTALL, or other PRODUCT commands from the DCL option on the operating system menu.

4. To install layered products, choose option 3 on the menu. For more instructions, see Section 6.7, "Running Alpha Layered Products".

5. After the installation completes, shut down the system by selecting option 9 on the menu. When you boot the target system, the layered products you installed will be present.

For additional information about installing layered products, see the *OpenVMS System Manager's Manual*.

7.15.1. Alternative Procedure

Use this alternative procedure to install the following products:

- Layered products on a target system that has a different operating system version than that of the operating system media (CD)

- Layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on)

- SIP kits (as an alternative to using menu option 3 of the operating system menu on the media)

- Products on the Layered Products, Freeware, System Tools, and e-Business Integration and Infrastructure CDs

- Third-party software products (such as database products, accounting software, and so forth)

For a list of layered products you can install, see the Software Product Descriptions included with your operating system kit. Note that some products require a license key (PAK) from VSI.

Follow these steps:

1. Before you install all your layered products, be sure you back up the system disk. In addition, ensure that a license has been loaded for the software. Note also that most layered products require changes to SYSGEN parameters or AUTHORIZE values, and to system files such as SYLOGICALS.COM, SYLOGIN.COM, and SYSTARTUP_VMS.COM. For more information, see the following:

   - Installation guides for these layered products

   - *OpenVMS System Manager's Manual, Volume 1: Essentials*

   - Section 7.24, "Modifying System Parameters" in this manual

   - Section 7.17, "Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues" in this manual

2. After your target system disk runs AUTOGEN and boots (if necessary), mount the OpenVMS operating system media. For example, if the device with the operating system media is DKA400:, use the following command:

   ```
   $ MOUNT/OVERRIDE=IDENTIFICATION DKA400
   ```

3. Locate the directories and files containing the available layered products. For example, if the device name is DKA400:, enter the following command:

   ```
   $ DIRECTORY /NOHEAD/NOTRAIL DKA400:[*.KIT]
   ```

   You can use the PRODUCT FIND command to locate kits by using the PCSI utility. For example:

   ```
   $ PRODUCT FIND * /SOURCE=DKA400:[*.KIT]
   ```

4. To install layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on), enter the @SYS$UPDATE:VMSINSTAL command and then specify the device name and directory at the prompt. For example:

   ```
   $ @SYS$UPDATE:VMSINSTAL
   * Where will the distribution volumes be mounted:
     DKA400:[DIAA032.KIT]
   ```

   To install layered products that require the PCSI utility (indicated in the directories by file names with file types of .PCSI or .PCSI$COMPRESSED), use the PRODUCT INSTALL command to specify the device name and directory.

7.16. Creating Print Queues (New Installations, Some Upgrades)

If you have a large number of print queues to add and you need to get the system in use quickly, you can set up one print queue per area or work group and then add the other print queues later, after the

user accounts are added (Section 7.18, "Creating Accounts (New Installations, Some Upgrades)"). For more information about adding print queues, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.17. Updating SYSTARTUP_VMS.COM to Start Layered Products and Print Queues

After installing and configuring any layered products and adding new print queues, you should update the SYSTARTUP_VMS.COM file to start these products and print queues. For more about updating the SYSTARTUP_VMS.COM file, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.18. Creating Accounts (New Installations, Some Upgrades)

During installation, DEFAULT and SYSTEM accounts are created automatically. You should create additional user accounts now. If you plan to have VSI service representatives test your system or if you plan to run testing software such as UETP, you must create accounts for each representative and a SYSTEST (standalone system) or SYSTEST_CLIG (OpenVMS Cluster system) account to run UETP.

For complete information about creating and managing user accounts and about creating accounts for VSI service representatives and UETP, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.19. Testing the System with UETP (Optional)

The User Environment Test Package (UETP) is a software package that tests whether the OpenVMS operating system is installed correctly. It tests the hardware, including disk drives, tape drives, CD drives, line printers (if any), network cards, and so forth. Running UETP is optional; VSI recommend that you run UETP after an installation or if new hardware was added as part of an upgrade.

Before using UETP, you must create a SYSTEST (standalone system) or SYSTEST_CLIG (OpenVMS Cluster system) account. You should also create an account for VSI service representatives to use. You can use the CREATE_SPECIAL_ACCOUNTS.COM file to create these accounts, as explained in *OpenVMS System Manager's Manual, Volume 1: Essentials*.

For complete information about using UETP, see the *OpenVMS System Manager's Manual, Volume 2*.

7.20. Backing Up the Customized System Disk and Initiating Systematic Backups

After you customize the OpenVMS operating system to your satisfaction and perform the other steps recommended thus far in this chapter that are relevant to your system, protect your work by making a standalone backup copy of the system disk to tape. To do so, follow the instructions in Section 7.2, "Backing Up Your System Disk". If you are going to be saving to disk, specify a disk that will not be (or is not) part of a shadow set.

For complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, see Section 4.9, "Backing Up the System Disk".

VSI also recommends creating a systematic routine for backing up the application, data, and user disks. For more information, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

7.21. Reforming the Shadow Set as Final Postupgrade Backup

If your system disk participates in a volume shadowing environment, re-form the shadow set again to generate another shadow copy onto the other disks in the set. To do so, follow the instructions in Section 4.8, "Shadowing Environment".

7.22. Rebooting Cluster Members (Upgrades Only)

If you are performing a rolling upgrade in an OpenVMS Cluster environment and have completed all the postupgrade tasks required thus far for your upgraded system disk, reboot each system that boots from that system disk.

For more information about booting your system, see Section 8.1, "Booting Operations" for OpenVMS Alpha systems.

At this point, your system is ready for general use.

7.23. Running AUTOGEN to Tune the System

When you install or upgrade the OpenVMS operating system, the system executes the AUTOGEN.COM procedure to set the values of system parameters and the sizes of the page, swap, and dump files according to the system configuration.

After running your system for at least 24 hours with users or a typical application workload on the system, run the AUTOGEN.COM procedure again to tune the system properly. Run AUTOGEN as follows. (In an OpenVMS Cluster, you must follow these steps to run AUTOGEN on each cluster node.)

1. Run AUTOGEN in feedback mode, examine AGEN$PARAMS.REPORT, and reboot the system. To run AUTOGEN in feedback mode, use the following command:

    ```
    $ @SYS$UPDATE:AUTOGEN SAVPARAMS SETPARAMS FEEDBACK
    ```

    To view AGEN$PARAMS.REPORT on your screen, enter the following command:

    ```
    $ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
    ```

    You can print this file or examine it using the EDIT/READ_ONLY command.

    If the report includes a message similar to the following, you might need to modify the size of the page, swap, or dump file:

    ```
    %AUTOGEN-W-DSKSPC, The disk on which DKA0:[SYS0.SYSEXE]
    PAGEFILE.SYS resides would be over 95% full if it were modified
    to hold 20,000 blocks.
    ```

    For more information about AGEN$PARAMS.REPORT, see the *OpenVMS System Manager's Manual, Volume 2*.

2. Run AUTOGEN again in feedback mode two work days later and examine AGEN$PARAMS.REPORT, and then reboot the system. (For information about the importance of

having a current AGEN$FEEDBACK.DAT file, see Section 4.7, "Ensuring You Have a Recent FEEDBACK.DAT File".)

3. VSI recommend that you run AUTOGEN from the SAVPARAMS phase through the TESTFILES phase weekly thereafter until the system stabilizes (that is, until AUTOGEN finds nothing that needs to be adjusted). Make sure you run AUTOGEN when your system is running under a typical workload. Examine AGEN$PARAMS.REPORT to determine the need for additional changes.

Important

If you start AUTOGEN without specifying the execution-mode parameter (FEEDBACK, NOFEEDBACK, or CHECK_FEEDBACK), AUTOGEN uses the feedback information in its calculations. However, if the feedback information reflects system up time of less than 24 hours, or if the feedback information is more than 30 days old, AUTOGEN includes warnings in the AGEN $PARAMS.REPORT file to alert you to potential problems with the feedback data. If you wrongly assume the feedback is valid, the parameter settings might vary significantly from your expectations.

If you specify FEEDBACK (or NOFEEDBACK), AUTOGEN uses (or does not use) the feedback regardless of the data's reliability. AUTOGEN proceeds through the SETPARAMS phase (if you specified SETPARAMS, SHUTDOWN, or REBOOT as the end phase) and sets system parameters to the values it computed.

If you specify CHECK_FEEDBACK, AUTOGEN checks the validity of the feedback data. If AUTOGEN determines the feedback is suspect, then AUTOGEN ignores the feedback when computing parameter values. It stops at the TESTFILES phase and issues a warning in the report that parameters have not been changed. You must read the report and decide whether the calculated values are acceptable. You can either use them (by running the AUTOGEN SETPARAMS phase) or rerun AUTOGEN with valid feedback data.

---

4. After the system has stabilized, VSI recommend that you run AUTOGEN at least monthly to save feedback information for future use. Use the following command:

    ```
    $ @SYS$UPDATE:AUTOGEN SAVPARAMS
    ```

    If you do not maintain current feedback information for AUTOGEN, you will not have the needed information the next time you upgrade your system. As a result, you may have to reboot and rerun AUTOGEN several times to make your upgraded system operational.

For more information about running AUTOGEN, see the *OpenVMS System Manager's Manual, Volume 2*.

7.24. Modifying System Parameters

Based on your examination of AGEN$PARAMS.REPORT, you might need to modify parameter values in MODPARAMS.DAT. Read the notes in Section 7.24.1, "General Notes About Modifying System Parameters". These notes apply to modifications being made after a new installation and after an upgrade. If you are modifying system parameters after an upgrade, also see Section 7.24.2, "Modifying System Parameters After an Upgrade".

7.24.1. General Notes About Modifying System Parameters

When modifying system parameters, note the following:

- In general, let AUTOGEN calculate system parameters. You can hardcode values (such as GBLPAGES=*value*), but doing so overrides AUTOGEN and might not allow it to set an optimal value based on observed usage.

- Whenever possible, use MIN_*parameter* values (such as MIN_GBLPAGES) to set the minimum value that can be set for a parameter by AUTOGEN. AUTOGEN increases the value if necessary. It also adjusts related parameters unless they are hardcoded, in which case information is provided in the AGEN$PARAMS.REPORT file. Use MAX_*parameter* values to set a maximum value when it is necessary to limit a parameter to a known maximum value (this is rarely necessary).

- Enter numeric values as integers without commas (for example, 10000). Enter alphabetic characters in lower or uppercase.

- VSI recommends that you include comments in the MODPARAMS.DAT file indicating who changed the value, when it was done, and why it was done. An exclamation point (!) serves as a comment starter and can appear anywhere on a line. The following example illustrates the modifications recommended in the preceding bulleted items:

```
! the following changes made by K.Newcomb on 9/20/03
!
SWAPFILE=0             ! don't re-size SWAPFILE on AUTOGEN runs
MIN_gblsections=750    ! required for DECwindows MOTIF set
MIN_NPAGEDYN=2750000   ! npagedyn to a min of 2.75 million
```

For more information about the MODPARAMS.DAT file and about using AUTOGEN in general, see the *OpenVMS System Manager's Manual, Volume 2*.

7.24.2. Modifying System Parameters After an Upgrade

Review the file SYS$SYSTEM:MODPARAMS.DAT. The upgrade procedure created a new version of this file. The old version is named SYS$SYSTEM:MODPARAMS.DAT_OLD. The new MODPARAMS.DAT file contains all the parameters in the old file, plus various parameters that the upgrade procedure added to ensure that all necessary system parameters are properly propagated from the earlier version of OpenVMS. The upgrade procedure also adds comment lines to explain the source of the parameters in each section of the new MODPARAMS.DAT file.

Note that the old MODPARAMS.DAT is included in the new MODPARAMS.DAT each time an upgrade is performed. Because of this, if MODPARAMS.DAT is not reviewed and cleaned up after each upgrade, it might eventually contain many levels of duplicated parameters. For this reason, you should review MODPARAMS.DAT after each upgrade. This enables you to eliminate any duplication. You can also take this opportunity to modify any parameters, if necessary.

Based on your examination of AGEN$PARAMS.REPORT, you might need to modify parameter values in MODPARAMS.DAT.

The following subsections are examples of instances where you need to modify parameters in MODPARAMS.DAT.

7.24.2.1. System File Sizes

AUTOGEN sets the following files at sizes appropriate for your system:

- [SYSEXE]SYSDUMP.DMP

- [SYSEXE]PAGEFILE.SYS

- [SYSEXE]SWAPFILE.SYS

If you have special workloads or configurations, you can specify different sizes for these files by performing the following steps:

1. Log in to the SYSTEM account.

2. Enter the following command:

```
$ @SYS$UPDATE:AUTOGEN SAVPARAMS TESTFILES
```

3. If the file sizes displayed need to be adjusted, add symbols to the MODPARAMS.DAT file (described in detail in the *OpenVMS System Manager's Manual, Volume 2*), and repeat step 2 until you are satisfied with the file sizes.

4. When you are satisfied with the file sizes, enter the following command to ensure that the modified system files are installed when the system is rebooted:

```
$ @SYS$UPDATE:AUTOGEN GENPARAMS SETPARAMS
```

7.24.2.2. OpenVMS Cluster Parameters

If you are upgrading an OpenVMS Cluster system, note the following:

• The upgrade procedure creates a new MODPARAMS.DAT for each system root on your system disk. Normally, there is one root for each computer that boots from the system disk. You must review and adjust each of these MODPARAMS.DAT files individually.

The MODPARAMS.DAT file for the system on which you are running is located in the SYS $SYSROOT:[SYSEXE]MODPARAMS.DAT file. The MODPARAMS.DAT files for other roots on the same system disk can be found in SYS$SYSDEVICE:[SYS*x*.SYSEXE]MODPARAMS.DAT, where *x* represents the root number; for example, SYS0, SYS1, SYS2, and so forth. (Valid root numbers might include hexadecimal digits—SYSA, SYSB, and so forth.)

• Be sure the EXPECTED_VOTES value is correct. This value is the sum of all votes in the cluster. For example, if there are five computers in the cluster and each has one vote, the value is 5.

Chapter 8. Booting and Shutting Down Your OpenVMS Alpha System

This chapter explains how to halt, boot, and shut down the operating system. It also includes related information, such as setting the system for automatic booting and using the Writeboot utility. Table 8.1, "Booting, Halting and Shutdown Operations" lists various actions that needed to be performed while booting, halting and shuttingdown the Alpha system.

Table 8.1. Booting, Halting and Shutdown Operations

Action required	Section
• Booting operations, including the following:	Section 8.1, "Booting Operations"
• Booting the operating system CD locally and from an Infoserver system	Section 8.1.1, "Booting the OpenVMS Alpha Operating System CD"
• Booting manually from the system disk	Section 8.1.2, "Booting Manually from the System Disk"
• Performing a conversational (interactive) boot	Section 8.1.3, "Performing a Conversational (Interactive) Boot"
• Booting with minimum startup	Section 8.1.4, "Booting with Minimum Startup"
• Booting with the XDelta utility (XDELTA)	Section 8.1.5, "Booting with the XDelta Utility (XDELTA)"
• Booting from a different directory	Section 8.1.6, "Booting from a Different Root Directory"
• Booting in an emergency	Section 8.1.7, "Booting in an Emergency"
• Perform set, show, and WRITEBOOT operations, including the following:	Section 8.2, "Configuring Boot Behavior for Alpha Systems"
• Setting the system for automatic booting	Section 8.2.1, "Setting the System for Automatic Booting"
• Setting and showing boot devices	Section 8.2.2, "Setting and Showing Boot Devices"
• Setting boot parameters	Section 8.2.3, "Setting Boot Flag Parameters"
• Writing a new boot block	Section 8.2.4, "Writing a New Boot Block"
• Perform halt and shutdown operations	Section 8.3, "Shutdown Operations"
• Perform troubleshooting procedures (optional)	Section 8.4, "Troubleshooting Procedures"

For the latest HPE AlphaServer system documentation, consult your HPE representative or see the documents at: http://www8.hp.com/us/en/products/servers/openvms/overview.html.

8.1. Booting Operations

The following sections describe different methods of booting your OpenVMS Alpha system.

8.1.1. Booting the OpenVMS Alpha Operating System CD

If you need to boot the OpenVMS Alpha operating system CD, either to perform an installation or upgrade or to perform related operations such as mounting or backing up the system disk, perform the steps in the following sections, depending on whether you are booting locally or from the Infoserver.

8.1.1.1. Booting from the Local Drive

Boot from the local drive as follows:

1. Insert the operating system CD into the local CD drive.

2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the CD drive (for example, DKA400:)

3. Enter the boot command in the following format:

    BOOT -FLAGS 0,0 *source-drive*

    Substitute the device name of the CD drive (as listed in the SHOW DEVICE display) for *source-drive*.

    For example, if the SHOW DEVICE display lists the device name of your CD drive as DKA400, enter the following command and press **Enter**:

    ```
    >>> BOOT -FLAGS 0,0 DKA400
    ```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

*   Install or upgrade the operating system using the PCSI utility.

*   Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.

*   Shut down the system.

8.1.1.2. Booting from the Infoserver

To boot the operating system CD using either the Infoserver hardware or the Infoserver utility, follow these steps. To use the Infoserver utility, certain configuration steps are required initially (one time only), as described in Section 9.1, "About the OpenVMS Infoserver Utility"; note that the operating system CD must be mounted systemwide.

1. At the console prompt (>>>), enter the SHOW DEVICE command and scan the devices listed in the output to determine the name of the local area network device. Look for a device listed with its hardware address, as in the last line of the following example; compare this information with that provided by the table in step 2.

    ```
    >>> SHOW DEVICE
    dva0.0.0.1000.0     DVA0                         RX23
    dka200.2.0.5.0      DKA200                       RZ28M  1004
    dka300.3.0.5.0      DKA300                       RZ29B  0016
    dka400.4.0.5.0      DKA400                       RZ26L  442E
    ewa0.0.0.3.0        EWA0          00-00-F8-1F-70-3D
    ```

    For additional information, see the *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs* and the hardware manuals that you received with your Alpha computer.

2. At the console prompt, enter the following command, where `lan-device-name` is the LAN device (for example, EWA0) identified with your computer:

    ```
    >>> B -FLAGS 0,0 -FILE APB_2L2084 lan-device-name
    ```

    For information about the LAN devices your system supports, see Table 8.2, "Supported LAN Devices". Ethernet device EWA0 refers to the first EW device. Subsequent devices are named EWB0, EWC0, and so on. For most systems, you can use the SHOW CONFIGURATION console command to list LAN devices available for boot. For additional information, see the hardware manuals that you received with your Alpha computer and the *VSI OpenVMS Alpha Version 8.4-2L2 Software Product Description and QuickSpecs*. The APB file name in the previous command is the unique file name that was assigned to the APB.EXE file when it was copied from the operating system CD to the Infoserver. This file is the name of the APB program used for the initial system load (ISL) boot program.

Table 8.2. Supported LAN Devices

Alpha Computer	Ethernet Device
HPE AlphaServer DS10	EWA0, EIA0, EGA0
HPE AlphaServer DS15	EWA0, EIA0, EGA0
HPE AlphaServer DS20	EWA0, EIA0, EGA0
HPE AlphaServer DS20e	EWA0, EIA0, EGA0
HPE AlphaServer DS25	EWA0, EIA0, EGA0
HPE AlphaServer ES45	EWA0, EIA0, EGA0
HPE AlphaServer ES47	EWA0, EIA0, EGA0

3. The Infoserver ISL program then displays the following menu:

    ```
    Network Initial System Load Function
    Version 1.2
      FUNCTION          FUNCTION
        ID
        1      -        Display Menu
        2      -        Help
        3      -        Choose Service
        4      -        Select Options
        5      -        Stop
    Enter a function ID value:
    ```

4. Respond to the prompts as follows, and press **Enter** after each entry:

    a. Enter 3 for the function ID.

    b. Enter 2 for the option ID.

    c. Enter the service name (ALPHA0842L2 is the default service name for the Infoserver hardware; for the Infoserver utility, ask your system or network manager for the service name).

    A sample display follows:

    ```
    Enter a function ID value: 3
      OPTION          OPTION
        ID
        1      -        Find Services
        2      -        Enter known Service Name
    Enter an Option ID value: 2
    ```

```
Enter a Known Service Name: ALPHA0842L2
```

After you boot, the system displays a menu from which you can choose options to perform the such tasks as the following:

- Install or upgrade the operating system using the PCSI utility.

- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.

- Shut down the system.

Note

If you boot the OpenVMS Alpha operating system CD from an Infoserver but lose your connection during the installation or upgrade procedure (the system is unresponsive and pressing **Ctrl/Y** does not return you to the menu), do the following:

IF ...	THEN ...
You previously chose the INITIALIZE option	1. Reboot the OpenVMS Alpha operating system CD. 2. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.
You previously chose the PRESERVE option	1. Reboot the OpenVMS Alpha operating system CD. 2. Enter the DCL environment by choosing option 8 on the menu. 3. Mount the device containing your backup copy of the target disk and the device that is your target disk. 4. Restore the backup copy of your target disk by entering the appropriate BACKUP commands. (See Appendix A, *Backing Up and Restoring the System Disk* for complete information about using MOUNT and BACKUP commands to restore a system disk.) 5. Log out from the DCL environment. 6. Choose the install/upgrade option (1) on the menu and perform the installation or upgrade procedure again.

8.1.2. Booting Manually from the System Disk

Boot the system disk manually as follows:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is *not* running	Step 4

1. Log in to the SYSTEM account.

2. Enter the following command and press **Enter**:

   `$ @SYS$SYSTEM:SHUTDOWN`

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```

4. Halt the system by pressing:

    - **Ctrl/P** on the console keyboard

    - **Break** on the console keyboard

    - **Halt** on the server front panel

    When the system is halted, the console prompt ">>>" should appear.

    For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

5. Enter the BOOT command in the following format:

    BOOT *device-name*

    Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400, enter the following command and press **Enter**:

    ```
    >>> BOOT DKA400
    ```

    To boot from the network, enter the following command and press **Enter**:

    ```
    >>> BOOT ESA0
    ```

8.1.3. Performing a Conversational (Interactive) Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values

- Change system parameter values

- Specify another parameter file

- Specify another system startup command procedure

- Select the default system parameter file (ALPHAVMSSYS.PAR) if you modified system parameters to values that render the system unbootable

- Specify a minimum startup

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is *not* running	Step 4

1. Log in to the SYSTEM account.

2. Enter the following command and press **Enter**:

    ```
    $ @SYS$SYSTEM:SHUTDOWN
    ```

3.   Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```

4.   Halt the system by pressing:

   - **Ctrl/P** on the console keyboard

   - **Break** on the console keyboard

   - **Halt** on the server front panel

   When the system is halted, the console prompt ">>>" should appear.

5.   To begin the conversational boot, enter the BOOT command in the following format:

   BOOT -FLAGS 0,1 [*device-name*]

   for *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

   If you do not specify a device name, the system boots from the boot device assigned when you entered the SET BOOTDEF_DEV command.

6.   At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table 8.3, "SYSGEN Commands Used in the SYSBOOT Procedure". For more information about these SYSGEN commands, see the *OpenVMS System Management Utilities Reference Manual*.

7.   When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

Table 8.3. SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET *parameter-name*	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [*parameter*]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [*file-spec*]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.

For examples of using conversational booting, see Section 8.1.4, "Booting with Minimum Startup" and Section 8.1.7, "Booting in an Emergency".

8.1.4. Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.

Note

Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the BOOT command in the following format:

    BOOT -FLAGS 0,1 [*device-name*]

    For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

    ```
    >>> BOOT -FLAGS 0,1 DKA400
    ```

2. Enter the following command and press **Enter**:

    ```
    SYSBOOT> SET STARTUP_P1 "MIN"
    ```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

    ```
    SYSBOOT> SET WRITESYSPARAMS 0
    ```

4. Enter the following command to continue booting:

    ```
    SYSBOOT> CONTINUE
    ```

8.1.5. Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Alpha computers with XDELTA is the same.

The following table describes the valid values you can specify when booting with XDELTA:

Value	System Response
0	Normal, nonstop boot (default).
1	Begins a conversational boot and then displays the SYSBOOT prompt.
2	Includes XDELTA but does not take the initial breakpoint.
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from the console prompt:

```
>>> BOOT -FLAGS 0,7
```

For more information about using XDELTA, see the *OpenVMS Delta/XDelta Debugger Manual*.

8.1.6. Booting from a Different Root Directory

By default, the OpenVMS Alpha operating system is installed in the system root directory [SYS0]. However, if you have created a cluster system disk, you can use the SYS $MANAGER:CLUSTER_CONFIG.COM procedure to add a copy of the operating system to a different root directory. (See the *OpenVMS System Manager's Manual* for more information about using the SYS$MANAGER:CLUSTER_CONFIG.COM procedure.)

To boot from a different directory (for example, [SYS3]), enter the BOOT command as follows:

```
>>> BOOT -FLAGS 3,0  DKA200
```

8.1.7. Booting in an Emergency

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table 8.4, "Emergency Boot Procedures" summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table 8.4. Emergency Boot Procedures

Operation	When to Use
Booting with default system parameters	When parameter values in the parameter file have been modified so that the system is unbootable
Booting without startup and login procedures	If an error in the startup or login procedure prevents you from logging in
Booting without the user authorization file	If you have forgotten the password and cannot log in to a privileged account

8.1.7.1. Booting with Default System Parameters

If the current values stored in the parameter file have been incorrectly modified, these incorrect values might cause the system to become unbootable. With a conversational boot operation, you can reset the active values for all system parameters to the default value. (In most cases, VSI recommends that you use AUTOGEN to modify system parameters. In certain cases, however, you can use a conversational boot to modify a parameter value *temporarily*. To change a parameter value *permanently*, you must edit MODPARAMS.DAT and run AUTOGEN. For instructions, see the *OpenVMS System Manager's Manual, Volume 2*.) The default values allow you to boot the system temporarily so you can correct the problem.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

    BOOT -FLAGS 0,1 [*device-name*]

    For device-name, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

    ```
    >>> BOOT -FLAGS 0,1 DKA400
    ```

2. At the SYSBOOT> prompt, enter the following command:

    ```
    SYSBOOT> USE DEFAULT
    ```

The USE DEFAULT command specifies that default values should be used for all parameters.

3. To avoid starting all layered products on a system that is not tuned for them, possibly causing the system to hang, set the STARTUP_P1 system parameter as follows:

   SYSBOOT> **SET STARTUP_P1 "MIN"**

4. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 3:

   SYSBOOT> **SET WRITESYSPARAMS 0**

5. Enter the following command to continue booting:

   SYSBOOT> **CONTINUE**

6. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, see the *OpenVMS System Manager's Manual, Volume 2*.

7. After your system runs for at least 24 hours, run AUTOGEN in feedback mode, following the steps described in Section 7.23, "Running AUTOGEN to Tune the System". Be sure to examine the AGEN$PARAMS.REPORT, as recommended. If necessary, modify system parameters as instructed in Section 7.6, "Running AUTOGEN to Set System Parameter Changes". If you need assistance, contact your software support representative. Once you feel confident that the problem is corrected, and AUTOGEN has been run through the SETPARAMS phase, reboot the system.

Example

```
SYSBOOT> USE DEFAULT
SYSBOOT> SET STARTUP_P1 "MIN"
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
Username: SYSTEM
Password:
$ EDIT SYS$SYSTEM:MODPARAMS.DAT
[Insert line(s) to reset parameter value(s)]
```

8.1.7.2. Booting Without Startup and Login Procedures

If the system does not complete the startup procedures or does not allow you to log in, you might need to bypass the startup and login procedures. The startup and login procedures provided by VSI should always work. However, if you introduce an error when modifying the startup or login procedure, it is possible to accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

   BOOT -FLAGS 0,1 [*device-name*]

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

   >>> **BOOT -FLAGS 0,1 DKA400**

2. Enter the following command at the SYSBOOT> prompt:

```
SYSBOOT> SET/STARTUP OPA0:
```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

4. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

5. When the system is booted, the operator console displays the DCL command prompt ($). You are logged in.

6. Enter the following DCL command:

```
$ SET NOON
```

This command directs the operating system to ignore any errors that might occur. If you do not enter this command and you invoke an error, the system logs you out.

7. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedure, or to the SYSUAF.DAT file.)

Use a text editor to correct the startup or login file. Note that some system consoles might not supply a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME and DELETE commands.

8. Perform a normal startup by entering the following command:

```
$ @SYS$SYSTEM:STARTUP
```

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ @SYS$SYSTEM:STARTUP
```

8.1.7.3. Booting Without the User Authorization File

Ordinarily, the startup and login procedures provided by VSI always work; however, certain conditions can cause them to fail. A simple way to lock yourself out of the system is to set passwords to login accounts and forget them. Another way to be locked out is if one or more core system Product Authorization Key (PAK) software licenses are unavailable or expired. In such emergencies, perform a conversational emergency boot by performing the steps given in this section.

How to Perform This Task

1. Halt the system by pressing:

   - **Ctrl/P** on the console keyboard

   - **Break** on the console keyboard

   - **Halt** on the server front panel

   When the system is halted, the console prompt ">>>" should appear.

For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

2. Begin the conversational boot by entering the BOOT command in the following format:

   BOOT -FLAGS 0,1 [*device-name*]

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press **Enter**:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

   If your system has a hardware password (various systems support a password that prevents unauthorized access to the console), you need this password for logging in to the console. If you do not have this password, contact VSI customer support to reset the hardware console password.

3. Enter the following commands at the SYSBOOT> prompt:

   ```
   SYSBOOT> SET/STARTUP OPA0:
   SYSBOOT> SET WINDOW_SYSTEM 0
   SYSBOOT> SET WRITESYSPARAMS 0
   SYSBOOT> CONTINUE
   ```

   The first three commands request that:

   - OpenVMS read the system startup commands directly from the system console

   - The DECwindows system (if any) not start

   - OpenVMS not record the parameter changes for subsequent system reboots

   The last command causes the booting to continue.

4. At the DCL prompt, the system now accepts startup commands directly from the console. Enter the following two commands as shown. These commands allow a normal system startup while you are left logged in on the console. Without the SPAWN command, you would be logged out when the startup completes.

   ```
   $ SPAWN
   $ @SYS$SYSTEM:STARTUP
   ```

5. Once you log out of this session, the system completes the startup and can be used normally. Optionally, you can choose to reboot the system.

Note

Instead of using the SET/STARTUP OPA0: command, an alternative method of booting under these emergency conditions is to set the UAFALTERNATE system parameter to use the alternate authorization file rather than the standard user authorization file.

Setting the system parameter UAFALTERNATE defines the logical name SYSUAF to refer to the file SYS$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

VSI does not recommend this method. If an alternate SYSUAFALT.DAT file has been configured on your system, the UAFALTERNATE method will likely fail (assuming you do not know the password for the privileged account stored within the SYSUAFALT.DAT file). In addition, the OPA0: system console is critical to system operations and system security and allows access when the SYSUAF

---

system authorization database is unavailable or corrupted; when core product license PAKs are not registered, are expired, or are disabled; and in various system failures.

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SPAWN
$ @SYS$SYSTEM:STARTUP
```

8.2. Configuring Boot Behavior for Alpha Systems

The following sections describe how to set up automatic booting, set and show the default boot device, modify boot parameters, and create a bootable OpenVMS Alpha system disk using the Writeboot utility.

8.2.1. Setting the System for Automatic Booting

Alpha computers can boot automatically from a designated boot device. When you installed the OpenVMS Alpha operating system, you designated the system disk as the default boot device. Section 8.2.2, "Setting and Showing Boot Devices" describes how to change the default boot device.

Alpha computers can boot automatically from the default boot device under the following conditions:

- When you first turn on system power

- When system power comes on after a power failure

- After you shut down the system (if you enter Y when the shutdown procedure asks whether an automatic reboot should be performed)

- After a bugcheck or system crash

- If the system halts under program control

Set the system to boot automatically by performing one of the following steps:

IF ...	
The OpenVMS Alpha operating system is running	Step 1
The OpenVMS Alpha operating system is *not* running	Step 4

1. Log in to the SYSTEM account.

2. Enter the following command and press **Enter**:

   $ **@SYS$SYSTEM:SHUTDOWN**

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press **Enter** for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```

4. Halt the system by pressing:

   - **Ctrl/P** on the console keyboard

   - **Break** on the console keyboard

   - **Halt** on the server front panel

   When the system is halted, the console prompt ">>>" should appear.

   For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

5. If you have an SMP system with multiple CPUs, enter the following command at the console prompt (>>>) to stop the other CPUs:

   >>> **INITIALIZE**

6. Enter the following command to show whether the system has been set to boot automatically:

   >>> **SHOW AUTO_ACTION**

   The system displays one of the following:

   - Restart

   - Boot

   - Halt

7. Enter the SET AUTO_ACTION command if you want to change the automatic booting behavior. VSI recommends that AUTO_ACTION be set to RESTART. This forces the system to attempt to write a crash dump to the dump file, and after the dump write completes, the system tries to reboot itself automatically. For example, the following command sets the system to reboot automatically:

   >>> **SET AUTO_ACTION RESTART**

8. After you set this variable, VSI recommends that you set the boot device and operating system flags as well, using the SET BOOTDEF_DEV and SET BOOT_OSFLAGS commands described in the following sections.

8.2.2. Setting and Showing Boot Devices

Use the SET BOOTDEF_DEV command to tell the system which drive you want to boot from (that drive becomes the default boot device). Use the SHOW BOOTDEF_DEV command to display the current default boot device.

Note that when you set this variable, VSI recommends that you set the operating system boot parameters as well, using the SET BOOT_OSFLAGS command.

At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

SET BOOTDEF_DEV *device-name*

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400 on an Alpha computer, enter the following command and press **Enter**:

>>> **SET BOOTDEF_DEV DKA400**

The next time you boot the system, you can enter the BOOT command without specifying a device name (because DKA400 is now the default boot device). For example:

```
>>> BOOT
```

Note

If you have not used the SET BOOTDEF_DEV command to set the drive to boot from and you enter the BOOT command without specifying a device name, the system displays an error message.

Use the SHOW BOOTDEF_DEV command to find out what drive was specified in the last SET BOOT command. For example:

```
>>> SHOW BOOTDEF_DEV
```

To cancel the drive specified in a previous SET BOOTDEF_DEV command, enter the following command and press **Enter**:

```
>>> SET BOOTDEF_DEV
```

8.2.3. Setting Boot Flag Parameters

By default, when you boot the operating system, the flags parameter is set to 0. If you want to define parameters to enable specific functions during the booting process, use the SET BOOT_OSFLAGS console command.

The following is a list of values you can specify with the SET BOOT_OSFLAGS command.

Note

VSI recommends that you keep the BOOT_OSFLAGS parameter at the default value 0 unless you have a specific need to change it (for example, to troubleshoot a system boot problem).

Hexadecimal Value	System Response
1	Allows a conversational boot (the system displays the SYSBOOT> prompt).
2	Maps XDELTA to a running system.
4	Stops the boot procedure at the initial system breakpoint.
8	Performs a diagnostic *bootstrap*.
10	Stops the boot procedure at the bootstrap breakpoints.
20	Omits header from secondary bootstrap image.
80	Prompts for the name of the secondary bootstrap file.
100	Halts the system before the secondary bootstrap.
2000	Marks corrected read data error pages as bad.
10000	Displays extensive, detailed debug messages during the boot process.
20000	Displays selected user-oriented messages during the boot process.

The following examples show how to use the SET BOOT_OSFLAGS command:

- The following command specifies the root directory as 0 and the parameter as 1, which sets the system to perform a conversational boot from the [SYS0] directory when you enter the BOOT command:

```
>>> SET BOOT_OSFLAGS 0,1
```

• The following command specifies the root directory as 1 and the parameter as 0, which sets the system (for example, the second host in a two-system shared SCSI/FIBRE-CHANNEL bus OpenVMS Cluster configuration) to boot from the [SYS1] directory (instead of [SYS0]) when you enter the BOOT command:

```
>>> SET BOOT_OSFLAGS 1,0
```

• The following example specifies the root directory as 0 and the parameters as 1, 2, 4, and 20000 (for a total hexadecimal value of 20007). As a result, when you enter the BOOT command, the system performs a conversational boot from the [SYS0] directory with XDELTA, stops at the initial system breakpoint, and displays relevant user messages.

```
>>> SET BOOT_OSFLAGS 0,20007
```

To display the parameters you have just set, use the SHOW BOOT_OSFLAGS command. For example:

```
>>> SHOW BOOT_OSFLAGS
BOOT_OSFLAGS = 0,20007
```

Now that the boot parameters have been set, to boot the system using the parameters you have specified, simply type BOOT or B at the prompt (>>>).

8.2.4. Writing a New Boot Block

The boot block is block 0 of the system disk. It contains the size and location of the primary bootstrap image (APB.EXE) used to boot the system. If you suspect that the boot block on your system disk is invalid, you can use the Writeboot utility (WRITEBOOT.EXE) to write a new boot block.

The Writeboot utility is copied to your system disk during the installation procedure. It enables you to create a bootable OpenVMS Alpha system disk from one that was originally created by one of the following methods:

• A nonimage backup of an Alpha system disk (possibly corrupting the boot block)

• A nonimage restore of an Alpha system disk from an image save set

The Writeboot utility also enables you to rewrite the boot block of an OpenVMS Alpha system disk to point to a new version of the OpenVMS Alpha primary bootstrap file (APB.EXE) that you have previously copied to the disk. (Note that the file must be contiguous.)

Note

The file must be contiguous and movefile operations on the file must be disabled. If the file is not contiguous, use the DCL command COPY/CONTIGUOUS (or similar) to re-create a contiguous version of the file. To disable movefile operations, use the DCL command SET FILE/NOMOVE. This prevents bootstrap failures that could result from the normal and expected operations of disk defragmentation tools.

To start the Writeboot utility, enter the following command:

```
$ RUN SYS$SYSTEM:WRITEBOOT
```

The utility prompts you as follows:

```
Update VAX portion of boot block (default is Y):
Update Alpha portion of boot block (default is Y):
```

Answer N (NO) to the VAX prompt. If you answer Y (YES) to update the Alpha boot block, the utility prompts you for the Alpha boot file:

```
Enter Alpha boot file:
```

Specify *device-name*:[VMS$COMMON.SYSEXE]APB.EXE in response to this prompt, where *device-name* indicates the device on which the system disk is mounted. The utility writes the specified information to the boot block on the system disk. For more information, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

8.3. Shutdown Operations

The following sections describe halt and shutdown operations for Alpha computers.

8.3.1. Shutting Down the System

Before you shut down the operating system, decide if you want it to reboot automatically or if you want to enter console-mode commands after the shutdown completes.

You can perform the following three types of shutdown operations:

• An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM (see Section 8.3.1.1, "Orderly Shutdown")

• An emergency shutdown with OPCCRASH.EXE (see Section 8.3.1.2, "Emergency Shutdown with OPCCRASH.EXE")

• An emergency shutdown with crash commands (see Section 8.3.1.3, "Emergency Shutdown with Crash Commands")

If you want the system to reboot automatically after the shutdown, see Section 8.2.1, "Setting the System for Automatic Booting".

8.3.1.1. Orderly Shutdown

The SHUTDOWN.COM procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN.COM command procedure, log in to the SYSTEM account, enter the following command, and press **Enter**:

```
$ @SYS$SYSTEM:SHUTDOWN
```

For more information about the SHUTDOWN.COM command procedure, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

8.3.1.2. Emergency Shutdown with OPCCRASH.EXE

If you cannot perform an orderly shutdown with the SHUTDOWN.COM procedure, run the OPCCRASH.EXE emergency shutdown program. To run the OPCCRASH.EXE program, log in to the SYSTEM account, enter the following command, and press **Enter**:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

For more information about the OPCCRASH program, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

8.3.1.3. Emergency Shutdown with Crash Commands

Use crash commands only if the system "hangs" (stops responding to any commands) and you cannot log in to the SYSTEM account to use the SHUTDOWN.COM procedure or the OPCCRASH.EXE program.

The method described here works on all Alpha computers. However, on certain systems, you can force your processor to fail (crash) by entering a specific console command. See the hardware manuals that came with your computer for that information.

To force your processor to fail, do the following:

1. Halt the system by pressing:

   - **Ctrl/P** on the console keyboard

   - **Break** on the console keyboard

   - **Halt** on the server front panel

   When the system is halted, the console prompt ">>>" should appear.

   For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

2. To examine processor registers, enter the following commands and press **Enter**:

   ```
   >>> E -N F R0
   >>> E PS
   ```

   The system displays the contents of the registers. Write down these values if you want to save information about the state of the system.

3. Enter the following commands and press **Enter**:

   ```
   >>> D PC FFFFFFFF00000000
   >>> D PS 1F00
   ```

   By depositing these values, you cause the system to write a memory dump to the system dump file on the disk.

4. Enter the following command and press **Enter**:

   ```
   >>> CONTINUE
   ```

   This causes the system to perform a bugcheck.

5. After the system reboots, log in to the SYSTEM account.

6. To examine the dump file, enter the following commands and press **Enter** after each one:

   ```
   $ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
   SDA> SHOW CRASH
   ```

   For more information about the System Dump Analyzer (SDA) utility, see the *OpenVMS System Analysis Tools Manual*.

8.4. Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

8.4.1. If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark(?) usually precedes the error message displayed on the console terminal. An example of a hardware problem is a read error on a disk.

8.4.1.1. For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Alpha computer.

2. If you get your hardware support from VMS Software Inc., contact support@vmssoftware.com. Otherwise, please contact your hardware support vendor.

8.4.1.2. For Software Problems

When the operating system is loaded into memory, a message similar to the following is displayed on the terminal screen:

```
SYSTEM   job terminated at 27-MAR-2017 15:05:03.17
```

If the system does not display this message, a software problem has probably occurred. Do the following:

1. Turn off the system. Turn it back on and try to reboot.

2. Perform a conversational boot using the default system parameters or try one of the emergency boot procedures described in Section 8.1.7, "Booting in an Emergency".

3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, see the *OpenVMS System Manager's Manual, Volume 2*.

8.4.2. Detecting and Responding to System Problems

If your system exhibits unexpected behavior, note the following:

• If the system displays a bugcheck message on the console terminal and shuts itself down, it means the system encountered a problem that made further operation impossible or dangerous. If the system does not reboot automatically, set up your system to boot automatically as explained in Section 8.2.1, "Setting the System for Automatic Booting", or reboot the system manually as explained in Section 8.1.2, "Booting Manually from the System Disk".

• If the system stops responding to your commands (that is, the system "hangs"), there is a possible failure in a system software or hardware component or a possible power failure.

• If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine whether the failure is a system problem:

• Be sure that you did not press **F1** (the **Hold Screen** key). The Hold Screen light goes on when you press either **F1** or press **Ctrl/S**.

• Press **Ctrl/T** to check the status of your process. A status line should appear, indicating the name of the program that is executing and other information. If the status line does not appear, the program you are executing might be stalled or "hanging." (If you have disabled **Ctrl/T** by entering the command SET NOCONTROL=T or have set the terminal to NOBROADCAST mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)

• Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem:

1. Force an exit from a stalled or hanging program by pressing **Ctrl/Y**. Note that when you press **Ctrl/Y**, any work performed by the program and not saved on disk is lost.

2. If the system is still unresponsive, halt the system by pressing:

   • **Ctrl/P** on the console keyboard

   • **Break** on the console keyboard

   • **Halt** on the server front panel

   When the system is halted, the console prompt ">>>" should appear.

   For more information about halting your Alpha computer, see Section 8.3, "Shutdown Operations".

3. Note in detail the sequence of events that caused the problem and notify an VSI support representative.

Chapter 9. Setting Up and Performing Network Booting for Alpha Systems

This chapter explains the steps required to enable your system to boot over the LAN using the OpenVMS Infoserver utility, a software application available on OpenVMS Alpha (Version 8.3 or later) systems.

9.1. About the OpenVMS Infoserver Utility

Infoserver network booting is supported for VSI OpenVMS Alpha V8.4-2L2. Network installation was originally supported by dedicated Infoserver hardware attached to the LAN. The dedicated hardware has been replaced by the Infoserver application running on OpenVMS on Alpha servers. This support provides the additional advantage of allowing a network administrator to upgrade multiple OpenVMS systems on the network from a single copy of an OpenVMS CD.

Because of these differences, any procedures used for Alpha systems to set up booting from the Infoserver hardware are not valid for setting up booting from the OpenVMS Infoserver utility. In addition, actions for setting up booting from the OpenVMS Integrity servers Infoserver utility differ from those required for setting up booting from an OpenVMS Alpha Infoserver utility. Table 9.1 lists the various actions that need to be performed to enable network booting using the OpenVMS Infoserver utility on OpenVMS Alpha systems. These actions need be performed only once except where noted.

Table 9.1. Procedure for Enabling Infoserver Network Booting

Actions Required	*Section*
Designate at least one OpenVMS system in the LAN as the Infoserver server. Upgrade the system if necessary (OpenVMS Alpha must be Version 8.3 or later).	Upgrade instructions in Chapter 6, *Upgrading the OpenVMS Operating System*. Prior to upgrading, review Chapter 4, *Before Upgrading the OpenVMS Operating System*, and Chapter 5, *Preparing to Upgrade in an OpenVMS Cluster Environment*.
1. Copy SYS$STARTUP:ESS$LAD_STARTUP.TEMPLATE to SYS$STARTUP:ESS$LAD_STARTUP.DAT and then modify parameters in SYS$STARTUP:ESS$LAD_STARTUP.DAT.	Section 9.2, "Setting Up Your System as an Infoserver Client".
2. Determine which network device will be used for Infoserver LAD operations.	
3. Copy SYS$STARTUP:ESS$LAST_STARTUP.TEMPLATE to SYS$STARTUP:ESS$LAST_STARTUP.DAT and then modify parameters in SYS$STARTUP:ESS$LAST_STARTUP.DAT.	
4. Add a line to SYS$MANAGER:SYSTARTUP_VMS.COM to start the SYS$STARTUP:ESS$LAD_STARTUP.COM file at startup.	
5. If you changed any SYSGEN parameters, run AUTOGEN and reboot; if you did not change SYSGEN	

parameters, skip the reboot and execute the SYS
$STARTUP:ESS$LAD_STARTUP.COM file manually.

6. Use the Infoserver control program to create a service for
   the CD drive.

Enable MOP on the boot server and then copy APB_2L2084.SYS from the OpenVMS Version 8.4-2L2 distribution media to the MOP download database (LAN$DLL, which defaults to MOM$SYSTEM). The protection on the MOP image must be W:RE.	See the LANCP chapter in *OpenVMS System Management Utilities Reference Manual*.

Note

The discussion of Infoserver booting in this manual pertains to environments where the boot clients and servers are located in the same LAN. For more complex circumstances, consult VSI Customer Support.

9.2. Setting Up Your System as an Infoserver Client

For OpenVMS Alpha systems, no extra steps are required for setting up an Infoserver client. You can boot the OpenVMS Alpha Infoserver client from the >>> prompt.

9.3. Setting Up the Infoserver Server

At least one system in the LAN must be designated as the Infoserver server. The Infoserver software comes as part of the base operating system on these systems.

The following steps are necessary to set up the Infoserver software on the designated system:

1. Copy SYS$STARTUP:ESS$LAD_STARTUP.TEMPLATE to
   SYS$SPECIFIC:[SYS$STARTUP]ESS$LAD_STARTUP.DAT (save the
   ESS$LAD_STARTUP.TEMPLATE file as a backup).

2. Edit SYS$STARTUP:ESS$LAD_STARTUP.DAT to modify parameters as needed. This file
   configures Infoserver parameters affecting the OpenVMS LASTport/Disk(LAD) server, which
   allows access to the optical drive or container file. The defaults should be sufficient for casual
   software installation and upgrade. The following is an example of the configuration file (with
   default settings):

```
!++
! ESS$LAD_STARTUP.TEMPLATE
!
! Copy this file to SYS$STARTUP:ESS$LAD_STARTUP.DAT and edit it
! to suit your local situation.
!
! This file is used by SYS$STARTUP:ESS$LAD_STARTUP.COM to set
! up the parameters for the Infoserver Application on OpenVMS
! LASTport/Disk (LAD) server.
!
! Note:
! The LAD disk block cache is structured as a number of
! fixed-size buckets. You must specify both the bucket size
! and the number of buckets for the cache.
!
! The LAD cache is allocated from non-paged pool and is in
```

```
! no way associated with the XFC cache. The total LAD cache
! size in bytes may be determined by the formula:
!
! cache-bytes = bucket-size-in-blocks * number-of-buckets * 512
!
! Be sure the SYSGEN parameters NPAGDYN/NPAGEVIR are sized
! appropriately.
!
! The following keywords with values are accepted by this
! procedure:
!
!        BUFFER_SIZE -    A number between 3 and 8 denoting the
!                         bucket size in blocks as follows:
!                         3 -   8 blocks
!                         4 -  16 blocks
!                         5 -  32 blocks
!                         6 -  64 blocks
!                         7 - 128 blocks
!                         8 - 256 blocks
!      CACHE_BUCKETS - Number of buckets
!      MAXIMUM_SERVICES - Maximum number of services (max=1024)
!      WRITE_LIMIT -    Server wide count of asynchronous writes
!--

BUFFER_SIZE = 3         ! default (8 block buckets)
CACHE_BUCKETS = 512     ! Default setting
WRITE_LIMIT = 0         ! No async writes
MAXIMUM_SERVICES = 256  ! default (typically more than enough)
```

The following table provides a short description of each of the parameters:

Parameter	Description
BUFFER_SIZE	The Infoserver block cache is structured as an array of fixed-size buffers (also called buckets). The BUFFER_SIZE parameter determines the size of each buffer or bucket. The numeric value of this parameter is an integer in the range 3 through 8, representing the bucket size in 512-byte blocks as follows. Bucket sizes larger than 32 blocks might not be appropriate for most users. The OpenVMS client segments I/O requests larger than 31 blocks into 31-block chunks, which could result in excessive I/O activity to the disk. The cache is allocated from nonpaged pool and is dedicated solely to the LAD driver.
	3 8 blocks (default)
	4 16 blocks
	5 32 blocks
	6 64 blocks
	7 128 blocks
	8 256 blocks
CACHE_BUCKETS	Determines the number of buckets in the cache. The default is 512. Numbers larger than 16384 might adversely affect performance. To reach a desirable cache size, consider increasing the BUFFER_SIZE parameter.
MAXIMUM_SERVICES	Sets the maximum number of services that can be defined at one time for the server. The value of this parameter must be a power of 2. The default and minimum value is 256 (adequate for

Parameter	Description
	most circumstances); the maximum value is 1024. Each service descriptor consumes nonpaged pool; however, unused services consume 4 bytes each.
WRITE_LIMIT	The number of asynchronous write operations that can be outstanding for the server at any time. The default is 0 (no outstanding asynchronous write operations).

Note

As indicated in the file comments, the LAD cache comes out of nonpaged pool. If you increase the cache significantly, you might need to increase the nonpaged pool SYSGEN parameters (NPAGEDYN and NPAGEVIR).

3. Determine which network device will be used for Infoserver LAD operations.You can use any network device that is visible to OpenVMS. Typically, any network device that works with DECnet or TCP/IP Services for OpenVMS should work. Use the LANCP command SHOW CONFIGURATION to determine which device to use. as described in the *OpenVMS System Management Utilities Reference Manual*.

    For this release of OpenVMS, the LASTport protocol runs on only a single network device. To enable this device, copy the SYS$STARTUP:ESS$LAST_STARTUP.TEMPLATE file to the SYS$SPECIFIC:[SYS$STARTUP]ESS$LAST_STARTUP.DAT file, and then edit the SYS $STARTUP:ESS $LAST_STARTUP.DAT file and make the following changes:

    a. Remove the comment character (!) from the line that has the following text: DEVICE = (). Within the parentheses, specify the device name. For example: DEVICE = (EIA).

    b. Comment out the line that specifies ALL_CONTROLLERS = ON (comment out a line by inserting an exclamation point (!) at the beginning of the line).

    The following example shows the SYS$STARTUP:ESS$LAST_STARTUP.DAT file with the suggested changes made (shown in **bold**):

```
!++
! This file will be used to set the appropriate LASTCP
! qualifiers.
! The following LASTCP qualifiers: ALL_CONTROLLERS,
! CHECKSUM, TRANSMIT_QUOTA, or SLOW_MODE
! can be set by using the following statement format:
! LASTCP qualifier = 1 to enable
!   e.g. SLOW_MODE = 1 enables SLOW_MODE
! LASTCP qualifier = 0 to disable
!   e.g. SLOW_MODE = 0 disables SLOW_MODE
! The remaining LASTCP qualifiers will require the appropriate
! value settings.
 DEVICE   = (EIA)    ! Uncommented; device name specified
! TIMEOUT = n minimum interval in seconds
! CIRCUIT_MAXIMUM = n maximum number of nodes
! GROUP = n Group number
! NODE_NAME = name Node name
! CONTROLLERS = ([{controller letter,}...]) Controller list
! TRANSMIT_QUOTA = n Number of transmit buffers
!--
!ALL_CONTROLLERS = ON       ! Commented out
```

4. Add the following line to the system startup file SYS$MANAGER:SYSTARTUP_VMS.COM:

    @SYS$STARTUP:ESS$LAD_STARTUP.COM

5. If you changed any SYSGEN parameters, run AUTOGEN and reboot (for information about running AUTOGEN, see Section 7.23, "Running AUTOGEN to Tune the System"). If no SYSGEN parameters were changed, you can skip the reboot and execute the SYS $STARTUP:ESS$LAD_STARTUP.COM file manually.

    After you complete these steps, the Infoserver server software is running and available to serve boot requests. The network devices are LAD0 (the LAD Server Virtual Device) and LAST0 (the LAST Transport Layer Virtual Device).

6. The Infoserver server can run on the same system as the Infoserver client. You might want to start the Infoserver client on this system, allowing the system to mount Infoserver devices. To start the Infoserver on this system, enter the following command at the DCL prompt:

    @SYS$STARTUP:ESS$STARTUP DISK

    To have the Infoserver client start at system boot, include the command in SYS$MANAGER:SYSTARTUP_VMS.COM.

7. Now that you have set up and enabled the Infoserver server, you must use the Infoserver control program to create a service for the CD drive. Follow these steps:

    a. Mount the OpenVMS distribution media systemwide. In the following example, DQA0 is the CD drive name (typically, DQA0 or DNA0 is the drive name) and ALPHA0842L2 is the volume label:

        $ **MOUNT/SYSTEM DQA0 ALPHA0842L2**

    b. Enter the following command at the DCL prompt to define the Infoserver control program as a foreign command, or enter the line in a startup or login command file:

        $ **INFOSERVER :== ESSINFOSERVER**

        Alternatively, you can enter the following command to start the program:

        $ **RUN SYS$SYSTEM:ESS$INFOSERVER**

    c. Start the Infoserver control program and create the service, as in the following example (the colon after the device name DQA0 is required):

        $ **INFOSERVER**
        INFOSERVER> **CREATE SERVICE ALPHA0842L2 DQA0:**
            INFOSERVER> **EXIT**

        The created service should now be available for any Infoserver clients in the same LAN (these clients broadcast service solicitations over the LAN).

        Started as in this example, the Infoserver control program accepts multiple commands until you exit by entering the EXIT command (or pressing **Ctrl/Z**). You can also enter a single command at the DCL prompt, returning you immediately to the DCL prompt again:

        $ **INFOSERVER CREATE SERVICE ALPHA0842L2 DQA0:**

        For more information, see the Infoserver help (at the **Infoserver** prompt, enter **HELP**) or the *OpenVMS System Management Utilities Reference Manual*.

8. On OpenVMS Alpha systems only, you must perform the following steps:

a. Enable MOP to use LANACP or DECnet on the system on which the OpenVMS Infoserver utility is being used. For information about enabling MOP, see the LANCP chapter in the *OpenVMS System Management Utilities Reference Manual*.

b. Copy the APB_2L2084.SYS file from the OpenVMS Alpha distribution media to the MOP download directory (LAN$DLL, which defaults to MOM$SYSTEM). Be sure the file is protected W:RE to allow access to the MOP software.

Appendix A. Backing Up and Restoring the System Disk

This appendix describes how to perform backup and restore operations on the system disk. You perform these tasks by entering commands from a specialized backup environment.

This specialized backup environment is required because it allows you to create an exact copy of the system disk. You cannot create an exact copy in a standard operating system environment because the OpenVMS Backup utility saves only what is on the disk at the moment the BACKUP command is executing, excluding portions of open files contained in memory or data about files not yet written back to the disk (cache).

For more information about backup operations, including procedures for backing up and restoring files and directories, see the *OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.1. Reasons for Backing Up the System Disk

The primary reason for having a backup copy of the system disk is so you can fully restore your system in case any hardware or software problem affects the integrity of your original system disk or your ability to access it. For example, use the backup copy to restore your system under the following conditions:

• When a problem occurs during an OpenVMS upgrade or update, or during the installation of other software products. If you back up the system disk before you attempt any of those procedures, you can restore the system disk and attempt the procedure again.

• When a system file that is accidentally deleted renders the system disk nonoperational. If you back up the system disk after you installed or upgraded the OpenVMS operating system and any other software products, you can restore the system disk.

• When the drive that holds the system disk malfunctions. If you have a backup copy of the system disk, you can restore it to a functioning disk and continue to use the system.

Another reason for backing up the system disk is to eliminate disk fragmentation, which occurs when files are stored non-contiguously on the disk. The BACKUP/IMAGE command creates a copy on which files are stored contiguously.

A.2. Suggested Procedures

VSI recommends the following:

• The preferred method for performing system disk backup and restore operations is to boot the operating system media, choose the DCL option from menu, and then enter the appropriate backup commands. The detailed procedures are described in Section A.4, "Backing Up the System Disk" and Section A.5, "Restoring the System Disk".

However, if you do not have access to the CD or if you want to back up a shadowed system disk without disabling the shadow set, you can use a different procedure, which is described in Section A.6, "Alternative Backup and Restore Procedure (Minimum OpenVMS Environment)".

• Store the backup media in a safe place .

• If you have an OpenVMS Cluster environment with more than one system disk, be sure the volume labels on each system disk and on backup copies of system disks are unique. Use the SET VOLUME/ LABEL command to change a volume label, if necessary.

A.3. OpenVMS Cluster Caution

If any nodes except the node used to run BACKUP are booted during the backup operations described in this appendix, your cluster will become partitioned, where nodes in the existing cluster divide into two or more independent clusters. This condition can cause data file corruption.

In addition, these backup environments do not restrict your use of DCL commands to the BACKUP command only, which further increases your risk of accidentally destroying or corrupting data on a disk. Therefore, to avoid jeopardizing the integrity of your data in any way, you should shut down the entire OpenVMS Cluster system before you back up your system disk.

A.4. Backing Up the System Disk

The following sections describe how to back up the system disk.

A.4.1. Getting Started

Before you back up the system disk, do the following:

1. In an OpenVMS Cluster environment, dismount the system disk from all systems in the cluster that have the disk mounted as a data disk (rather than as the system disk).

2. Shut down all systems booted from that disk.

3. Boot the operating system media. (For booting the VSI OpenVMS, see Section 3.3.1, "Booting the OpenVMS Alpha CD".

4. Choose the DCL option (8) on the menu. For example:

```
    ***********************************************************

    You can install or upgrade the OpenVMS ALPHA operating
    system or you can install or upgrade layered products
    that are included on the OpenVMS ALPHA distribution
    media (CD).

    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS ALPHA
            Version 8.4-2L2
        2)  Display layered products that this procedure can
            install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete
            Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

    Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 8
```

5. At the triple dollar sign prompt ($$$), enter the SHOW DEVICES command.

6.   Examine the list of devices to determine which device is the source drive (the system disk you want to back up) and which device is the target drive (the supported disk or tape device that will hold the backed up files).

A.4.2. Mounting Devices

After you determine the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any backup operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION source-drive
$$$ MOUNT/FOREIGN target-drive
```

In these commands:

• *source-drive* is the name of the drive holding the system disk .

• *target-drive* is the name of the drive that will hold the backup files.

A.4.3. Performing the System Disk Backup

When the system disk and output devices are mounted, back up the system disk by entering the BACKUP command in the following format:

```
$$$BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

Example 1

In this example, the system disk and a target disk are mounted so the BACKUP command can create a backup disk. (You can use a backup disk as a system disk.)

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN DKA300
$$$ BACKUP/IMAGE/VERIFY DKA200: DKA300:
```

Example 2

In this example, the system disk and a target tape device are mounted so the BACKUP command can create a backup tape.

```
$$$ INITIALIZE MKA300: label
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA200
$$$ MOUNT/FOREIGN MKA300
$$$ BACKUP/IMAGE/VERIFY DKA200:
     MKA300:SEP_08_BACKUP.BCK/SAVE_SET/REWIND
```

A.4.4. Changing the Disk Volume Cluster Size

The BACKUP/IMAGE command maintains a set of disk volume parameters from the input volume, altering attributes such as the disk volume cluster size as appropriate for the target device. (Cluster size refers to the basic unit of space allocation on the disk, *not* to OpenVMS Cluster environments.)

To change the disk volume cluster size, you must restore the disk contents to a disk that has been previously initialized with the desired cluster size (using BACKUP/IMAGE/NOINITIALIZE). For more information about initializing a disk and using the BACKUP command, see the *OpenVMS System Manager's Manual, Volume 1: Essentials* and the *OpenVMS System Management Utilities Reference*

Manual, and see the description of the INITIALIZE and BACKUP commands in the *OpenVMS DCL Dictionary*.

A.4.5. Logging Out, Shutting Down, and Rebooting

After you complete the backup operation:

1. Enter the LOGOUT command to exit the DCL environment and return to the menu.

2. Choose the shutdown option (9).

3. After the shutdown completes, boot from the system disk.

A.5. Restoring the System Disk

The following sections describe how to restore the system disk. Note that restoring a system disk also serves to defragment the disk. In addition, it validates the backup, ensuring that the backed up system disk is usable.

A.5.1. Getting Started

Before you can restore the system disk, follow these steps:

1. Shut down the system.

2. Boot the operating system media. (see Section 3.3, "Booting the OpenVMS Operating System Media").

3. Choose the DCL option (8) on the menu. For example:

    ```
    **********************************************************

    You can install or upgrade the OpenVMS ALPHA operating
    system or you can install or upgrade layered products
    that are included on the OpenVMS ALPHA distribution
    media (CD).

    You can also execute DCL commands and procedures to
    perform "standalone" tasks, such as backing up the
    system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS ALPHA
            Version 8.4-2L2
        2)  Display layered products that this procedure can
            install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete
            Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

    Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 8
    ```

4. At the triple dollar sign prompt ($$$), enter the SHOW DEVICES command.

---

5. Examine the list of devices to determine which device is the source drive (the drive holding the backed up files you want to restore) and which device is the target drive (the disk on which you want the files restored).

A.5.2. Mounting Devices

After you determine the source drive and target drive, mount those devices (and any other output devices you plan to use) before you perform any restore operations. Enter the MOUNT commands in the following format:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION  source-drive
$$$ MOUNT/FOREIGN target-drive
```

In these commands:

*   *source-drive* is the device holding the files you want to restore

    (Note, however, that you must use the MOUNT/FOREIGN command if the source drive is a tape device.)

*   *target-drive* is the destination

A.5.3. Performing the System Disk Restore

Enter the BACKUP command in the following format to restore the system disk:

```
$$$ BACKUP/IMAGE/VERIFY source-drive: target-drive:
```

Example 1

In this example, a backup disk and a target disk are mounted so the BACKUP command can restore the system disk from the backup disk:

```
$$$ MOUNT/OVERRIDE=IDENTIFICATION DKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY DKA300: DKA200:
```

Example 2

In this example, a backup tape and a target disk are mounted so the BACKUP command can restore the system disk from the backup tape:

```
$$$ MOUNT/FOREIGN MKA300
$$$ MOUNT/FOREIGN DKA200
$$$ BACKUP/IMAGE/VERIFY MKA300:SEP_08_BACKUP.BCK/SAVE_SET DKA200:
```

A.5.4. Logging Out, Shutting Down, and Rebooting

After you complete the restore operation, follow these steps:

1. Enter the LOGOUT command to exit the DCL environment and return to the menu.

2. Choose the shutdown option (9).

3. After the shutdown completes, boot from the system disk.

A.6. Alternative Backup and Restore Procedure (Minimum OpenVMS Environment)

This section describes an alternative method of performing backup and restore operations. This method is similar to creating a Standalone Backup directory on a disk, as supported by OpenVMS VAX systems and certain earlier versions of OpenVMS Alpha (using SYS$UPDATE.STABACKIT.COM). This method installs a Minimum OpenVMS Environment (install with no options) on another disk from which you can perform your backup and restore operations on the system disk. The Minimum OpenVMS Environment is created in the SYSE root ([SYSE]) on the disk, which runs a subset of OpenVMS and is indicated by the triple dollar sign ($$$) system prompt. Use this method under the following conditions:

- If you do not have access to the operating system media and its menu system

- If you want to back up a shadowed system disk without disabling the shadow set

Note

You can back up your running system disk by using the /IGNORE=INTERLOCK qualifier with the BACKUP command and ignoring warning messages. However, that method requires that all other use of the system be suspended, including disabling logins, stopping print and batch queues, and turning off networking software. In addition, you cannot use this method to restore files to the running system disk. Because of these limitations, VSI recommends that, if you must use an alternative backup or restore method, you use the method described in this section.

A.6.1. Preparing an Alternate System Disk

Prepare an alternate system disk as follows:

1. Log in to a privileged account on your running OpenVMS system.

2. Using the SHOW DEVICE command, identify a data disk on which you can install the operating system, with no options. This is your target disk during that installation. To install the operating system with no options on your target disk, you need the following amount of free disk space: approximately 521,552 blocks (267 MB) for OpenVMS Alpha.

   Existing data remains on the disk.

3. The target disk must be mounted privately to your process. (This prevents other users from accessing this disk during the installation and backup procedures.) Therefore, if the target disk was mounted with the /SYSTEM, /CLUSTER, /GROUP, or /SHARE qualifier, dismount that disk and mount it without those qualifiers or the /FOREIGN qualifier. For example:

   $ **MOUNT/OVERRIDE=IDENTIFICATION DKA200**

4. Enter the following command:

   $ **$ @SYS$SYSTEM:AXPVMS$PCSI_INSTALL_MIN.COM [*target-disk*]**

   (The procedure prompts you for a device name if you do not specify it on the command line.)

5. As the procedure completes the installation, the display is similar to the following:

   ```
   Configuring VSI AXPVMS OPENVMS V8.4-2L2: OPENVMS and related
   products Platform

       Copyright 2015-2017 VMS Software, Inc.

       VMS Software, Inc.

   Execution phase starting ...
   ```

```
The following product will be installed:
    VSI AXPVMS OPENVMS V8.4-2L2

Portion Done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%
..100%

The following product has been installed:
    VSI AXPVMS OPENVMS V8.4-2L2
The installation of minimum OpenVMS AXPVMS is now complete.

        BOOT -FLAGS E,0 device-name

    (Some configurations may require a boot option to boot.)
```

Caution

If your system is a cluster member, you should shut down the entire OpenVMS Cluster system before you back up your system disk. This will prevent you from creating a partitioned cluster and from jeopardizing the integrity of your data in any other way.

A.6.2. Using the Alternate System Disk

Use the alternate system disk (on which you installed the operating system with no options) to perform backup and restore operations as follows:

1. Shut down your system.

2. Boot the alternate system disk from the SYSE root.

    The system automatically logs you in to the SYSTEM account and then displays a triple dollar sign prompt ($$$).

Note

During the boot and login operations on this minimum version of the operating system, you can ignore license messages that are similar to the following:

```
%LICENSE-I-NOLICENSE, no license is active for this
software product
```

3. If your system disk is shadowed, install and load a Volume Shadowing for OpenVMS license on this data disk. Then you can back up the shadowed system disk from this data disk without disabling the shadow set.

Note

VSI recommends that you do *not* install any other licenses, including OpenVMS licenses, on this alternate system. You can use the system only from the console.

4. Mount the system disk and any output devices you plan to use during the backup or restore operations. See Section A.5.2, "Mounting Devices" for more information.

5. Perform the necessary backup or restore operations by entering the appropriate BACKUP commands. For examples of using the BACKUP command to back up the system disk, see Section A.4.3, "Performing the System Disk Backup"; for examples of using the BACKUP command to restore the system disk, see Section A.5.3, "Performing the System Disk Restore".

6. Shut down the system.

7. Boot from your original system disk.

Appendix B. Removing the OpenVMS Operating System

This appendix explains how to remove the OpenVMS operating system from your disk.

You can remove the OpenVMS operating system from your disk in the following ways:

- If the disk contains a small number of user files, copy those user files elsewhere and then reinitialize the disk.

- If the disk contains many user files, use the PRODUCT REMOVE command to remove an obsolete or extra copy of the OpenVMS operating system without removing any of the user files. You must also delete or archive certain operating system files that the PRODUCT REMOVE command cannot delete.

Follow these steps to remove OpenVMS operating system files:

1. If your system disk has multiple system-specific roots, boot the system and execute SYS$MANAGER:CLUSTER_CONFIG_LAN.COM to remove all roots except the one from which you are booted.

2. Shut down and boot from the distribution media or from a system disk other than the one from which OpenVMS is being removed. Then do one of the following:

   - If OpenVMS is not running from the distribution media, log in to a privileged account.

   - If OpenVMS is running from the distribution media, choose the option to execute DCL commands.

3. Enter the following DCL commands:

   ```
   $ DEFINE/NOLOG PCSI$SYSDEVICE target-disk
   $ DEFINE/NOLOG PCSI$SPECIFIC target-disk:[SYSx.]
   $ DEFINE/NOLOG PCSI$DESTINATION target-disk:[VMS$COMMON]
   ```

   where:

   - *target-disk* is the device name of the disk from which OpenVMS is being removed.

   - SYS*x* is the root number that you did not remove in step 1.

4. If the disk also contains layered products that were installed using the PCSI utility, VSI recommends that you remove them as well. Remove any layered products *before* using the PRODUCT REMOVE VMS command.

   Use the following command to remove all the products at once. Select the layered products you want to remove from the menu.

   ```
   $ PRODUCT REMOVE * /REMOTE
   ```

   Use the following commands to remove individual products:

   ```
   $ PRODUCT SHOW PRODUCT/REMOTE
   $ PRODUCT REMOVE product-name /REMOTE
   ```

5. Enter the following DCL command:

   ```
   $ PRODUCT REMOVE VMS /REMOTE
   ```

6. Because the PRODUCT REMOVE command does not delete certain files, review the target disk to determine whether you want to delete, move, or archive the operating system files that still remain on the disk.

Following are lists of the files that the PRODUCT REMOVE command does not delete:

- In *target-disk*:[SYS*.SYSEXE], where * is the hexadecimal number of any additional OpenVMS Cluster root on the target disk:
  - ALPHAVMSSYS.PAR
  - MODPARAMS.DAT
  - PAGEFILE.SYS
  - SWAPFILE.SYS

- In *target-disk*:[VMS$COMMON.SYSEXE]:
  - LMF$LICENSE.LDB
  - PCSI$FILE_SYSTEM.PCSI$DATABASE
  - PCSI$PROCESSOR.PCSI$DATABASE
  - PCSI$ROOT.PCSI$DATABASE
  - RIGHTSLIST.DAT
  - SYSUAF.DAT

As you examine the preceding lists of files, you might want to archive, rather than delete, the following files:

- ALPHAVMSSYS.PAR (VSI OpenVMS)
- MODPARAMS.DAT
- LMF$LICENSE.LDB
- RIGHTSLIST.DAT
- SYSUAF.DAT

Also, if you previously removed layered products, those products might have created additional files that you might want to delete, move, or archive.

7. Review the target disk for the directory structures [VMS$COMMON...] and [SYS*x*...] that remain after you remove the OpenVMS operating system. You might want to delete these directories.

The directories [SYS*x*]SYSCOMMON.DIR (in all [SYS*x*]) are aliases for the file [000000]VMS$COMMON.DIR. Do not delete these SYSCOMMON.DIR files. Instead, use the SET FILE /REMOVE command as follows:

```
$ SET FILE /REMOVE [SYS*]SYSCOMMON.DIR
```

After you execute this command and delete, move or archive all the files in [VMS$COMMON...], you can delete [000000]VMS$COMMON.DIR. Then you can delete, move, or archive the files in each [SYS*x*] directory.

Appendix C. Alternative Ways to Initialize the System Disk

The first and usual way to create a new OpenVMS system disk is to install OpenVMS with the INITIALIZE option. When you do this, the disk is initialized with volume expansion (INITIALIZE/LIMIT).

This method of initialization (using the /LIMIT qualifier) might make your target system disk incompatible with versions of OpenVMS prior to 7.2. VSI recommends that you create your system disk in the default manner unless you need to mount the disk on a version of OpenVMS prior to 7.2.

You can avoid use of the /LIMIT qualifier by initializing your target system disk before you install OpenVMS, performing the steps in Section C.1, "Alternative Method of Initialization". As a result of this alternate method, your new system disk might include a relatively large minimum allocation size (as defined by /CLUSTER_SIZE). Small files will use more space than would be used otherwise. Therefore, perform this step *only* for system disks that must be mounted on versions of OpenVMS prior to Version 7.2.

C.1. Alternative Method of Initialization

Use the following initialization method to avoid use of the /LIMIT qualifier.

Note

When you initialize your target disk using the following method, you must use the PRESERVE option during the installation of OpenVMS on the disk. If you use the INITIALIZE option, the disk is reinitialized using the defaults.

---

1. After booting the operating system media, and before installing the operating system, select Option 8 ("Execute DCL commands and procedures") on the main menu.

2. Initialize the intended target disk with the following command:

    $$$ **INIT/SYSTEM/HEADERS=150000/STRUCTURE=*ods-level disk label***

    where:

    - *ods-level* is 2 (for ODS-2) or 5 (for ODS-5).

    - *disk* is the device for the target disk (such as DKA100:).

    - *label* is the label for the target disk (you can change the label later).

    If you specified ODS-5 and you want support for hard links, include the /VOLUME_CHARACTERISTICS=HARDLINKS qualifier with the INITIALIZE command.

3. Exit DCL (log off), and then select option 1 ("Upgrade, install or reconfigure OpenVMS") on the main menu.

4. When you are asked whether to initialize or preserve the target disk, choose PRESERVE (the default).

5. Continue with the installation.

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