

# HP OpenVMS Version 8.2-1 for Integrity Servers Upgrade and Installation Manual

OpenVMS I64 Version 8.2-1

This manual supersedes the *HP OpenVMS Version 8.2 Upgrade and Installation Manual*.



**Manufacturing Part Number: BA322-90032**

**September 2005**

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The HP OpenVMS documentation set is available on CD-ROM.

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# Preface

## Intended Audience

This manual is intended for anyone responsible for installing or upgrading the HP OpenVMS for Integrity servers operating system (OpenVMS I64), and for the startup, shutdown, and backup operations required on Integrity servers running this software.

## When to Use This Manual

Use this manual if you need to install or upgrade the OpenVMS operating system software yourself or if you need to perform certain startup, shutdown, or backup operations. If you received factory-installed software (FIS) with your Integrity server, refer to the release notes provided with the software, and use this manual for any information not covered in those release notes.

## Document Structure

This manual is organized as follows:

- Chapter 1 defines key terms and provides information about hardware and software components. Review this chapter before performing any installation or upgrade.
- Chapter 2 provides preliminary information.
- Chapter 3 explains how to install the OpenVMS I64 operating system.
- Chapter 4 describes how to prepare your system for an upgrade.
- Chapter 5 supplements Chapter 4 with additional tasks you must perform before upgrading an OpenVMS Cluster system.
- Chapter 6 describes how to upgrade the operating system.
- Chapter 7 describes the tasks you must perform after installing or upgrading the operating system.
- Appendix A provides an overview of the utilities available with HP Integrity servers, and explains how to configure the system console, how to configure boot options, and how to boot the OpenVMS operating system.
- Appendix B explains how to set up and perform network booting for upgrades using the InfoServer software.
- Appendix C explains how to boot the Fibre Channel storage device.
- Appendix D explains how to back up and restore the system disk.
- Appendix E discusses the OpenVMS internationalization data kit (VMSI18N) and how to install it.
- Appendix F explains how to prepare your OpenVMS system and your PC to run the OpenVMS Management Station server and client software.
- Appendix G explains how to remove the OpenVMS operating system from your disk.
- Appendix H explains alternate methods of initializing an OpenVMS I64 system disk and includes information about diagnostic partitions on OpenVMS I64 system disks.
- The Glossary defines key terms used in this manual.

## Related Documents

Before installing, upgrading, or using the OpenVMS operating system on your computer, be sure you have access to the following documents. Most of the documents listed here are from the OpenVMS Version 8.2 documentation set; although they have not been revised, they remain valid for OpenVMS I64 Version 8.2-1.

- *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers* and any other cover letters included with your kit.
- *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*, which describes enhancements and new features included in this release of the OpenVMS I64 operating system and important supplementary information.
- *HP OpenVMS Version 8.2 Release Notes*, which includes release notes that also apply to OpenVMS I64 Version 8.2-1 (all notes that are not marked Alpha only).
- *HP OpenVMS Cluster Systems and Guidelines for OpenVMS Cluster Configurations*, if you plan to install your system in an OpenVMS Cluster environment.
- The most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems* (if you plan to install and customize DECwindows Motif for OpenVMS software).
- *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*, which provides information about CDSA software.
- *HP Open Source Security for OpenVMS, Volume 3: Kerberos*, which provides information about Kerberos software.
- *Installing Availability Manager on OpenVMS Alpha Systems and Running DECams and the Availability Manager Concurrently*, which provides information about Availability Manager software and is available at the following Web site:

<http://www.hp.com/products/openvms/availabilitymanager>

- For documentation related to the Performance Data Collector (TDC), refer to the following Web site:  
<http://www.hp.com/products/openvms/tdc/>
- The following networking software documents (if you plan to install and configure DECnet-Plus for OpenVMS, DECnet Phase IV for OpenVMS, or TCP/IP Services for OpenVMS software):
  - *HP TCP/IP Services for OpenVMS Installation and Configuration*
  - *DECnet-Plus for OpenVMS Installation and Basic Configuration*

Documentation for the networking products listed above is included on the OpenVMS Online Documentation CD. Hardcopy documentation must be purchased separately.

- The hardware manuals that are supplied with your Integrity server. These manuals provide detailed information about your system hardware, including the operation of the system unit, the drives, and the monitor.

During the course of installing, upgrading, or using the OpenVMS operating system on your computer, you could refer to the following documents as well:

- *HP OpenVMS License Management Utility Manual*, which contains detailed information about registering your software licenses.
- *HP OpenVMS System Manager's Manual* and the *HP OpenVMS System Management Utilities Reference Manual*, which contain information about system management operations and utilities that you might need to use when you install, upgrade, customize, and maintain your OpenVMS system. The *HP*

*OpenVMS System Management Utilities Reference Manual: M-Z* provides complete information about using the POLYCENTER Software Installation utility PRODUCT command to add or remove files, install other software, and related operations.

- *HP Volume Shadowing for OpenVMS*, which you might need if you are installing or upgrading the OpenVMS operating system on a shadowed system disk.
- *HP OpenVMS Management Station Installation Guide*, which provides information about getting started, setting up, and using OpenVMS Management Station.

For additional information about HP OpenVMS products and services, refer to the following Web site:

<http://www.hp.com/go/openvms>

For information about managing nPartitions on midrange or HP Integrity Superdome servers, refer to the *HP System Partitions Guide, Administration for nPartitions*.

For the latest hardware documentation for HP Integrity servers, refer to the following Web site:

<http://docs.hp.com/en/hw.html>

## Reader's Comments

HP welcomes your comments on this manual.

Please send comments to either of the following addresses:

Internet: [openvmsdoc@hp.com](mailto:openvmsdoc@hp.com)

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OSSG Documentation Group  
ZK03-4/U08  
110 Spit Brook Road  
Nashua, NH 03062-2698

## How to Order Additional Documentation

Visit the following World Wide Web address for information about how to order additional documentation:

<http://www.hp.com/go/openvms/doc/order>

## 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.
Return	In examples, a key name in bold indicates that you press that key.

Convention	Meaning
...	A horizontal ellipsis in examples indicates one of the following possibilities: <ul style="list-style-type: none"> <li>– Additional optional arguments in a statement have been omitted.</li> <li>– The preceding item or items can be repeated one or more times.</li> <li>– Additional parameters, values, or other information can be entered.</li> </ul>
.	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.
( )	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: <code>Is this correct? (Y/N) [Y]</code>
[ ]	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 OpenVMS 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 Return without entering a value, as in: <code>Is this correct? (Y/N) [Y]</code>
	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.
<b>bold type</b>	Bold type represents the introduction of a new term. It also represents the name of an argument, an attribute, or a reason. In command and script examples, bold indicates user input.
<i>italic type</i>	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error <i>number</i> ), in command lines ( <code>/PRODUCER=<i>name</i></code> ), and in command parameters in text (where <i>dd</i> 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 URLs, 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.



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<b>Convention</b>	<b>Meaning</b>
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radices—binary, octal, or hexadecimal—are explicitly indicated.

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# 1 Getting Started

This chapter defines key terms and describes preliminary procedures you must perform before installing or upgrading your OpenVMS I64 system.

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**NOTE** Throughout this book, OpenVMS DCL commands are in uppercase, while HP Integrity servers console commands are in lowercase.

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## 1.1 Key Terms

Table 1-1 lists a few key terms you need to know before you install or upgrade the system:

**Table 1-1** Definitions of Terms

Term	Definition
<b>HSx device</b>	A self-contained, intelligent, mass storage subsystem that lets computers in an <b>OpenVMS Cluster</b> environment share disks. The disk on which you install or upgrade the operating system can be connected to one of these systems (for example, an HSV or HSG).
<b>InfoServer</b>	A general-purpose disk storage server. On OpenVMS I64 systems, the InfoServer is a software application. Systems connected to the same local area network (LAN) can <b>boot</b> the OpenVMS operating system from a virtual drive (instead of the local drive) using the InfoServer software.
<b>Local drive</b>	A drive on your computer system, such as a CD, DVD, or disk drive (hard drive), that is connected directly to the computer. If you have a standalone computer, it is likely that all drives connected to the computer system are local drives.
<b>Operating system media</b>	The OpenVMS for Integrity Servers <b>Operating Environment</b> (OE) DVD included with your OpenVMS distribution kit, which contains the OpenVMS operating system and the installation and other procedures described in this manual.
<b>Source drive</b>	The drive that holds the operating system DVD during an upgrade or installation. This can be a local drive or an InfoServer virtual drive. The drive contains the operating system DVD, or a copy of it.
<b>System disk</b>	The disk from which OpenVMS is booted. During an installation or upgrade, this is the source drive. After installation, the target drive is booted and becomes the system disk.
<b>Target drive</b>	The drive that holds the target system disk during the upgrade or installation. Note: the target drive must be a hard drive.

---

## 1.2 Getting to Know Your Integrity Server

The OpenVMS operating system is now supported on a wide variety of Itanium-based HP Integrity servers, including:

- Entry-class servers: rx1600, rx1620, rx2600, rx2620, and rx4640
- Midrange servers: rx7620 and rx8620
- High-end servers: Superdome

The hardware, firmware, and software supported might vary significantly from system to system. Integrity servers come in many different configurations. The hardware, utilities, and hardware configuration procedures might differ significantly across models, and even across versions of the same model. This manual provides basic information about the firmware, hardware, and utilities offered on Integrity servers. This information is not meant to replace the hardware documentation. For the most up-to-date and relevant information for your particular model, refer to the hardware documentation for your Integrity server. The hardware documentation includes model-specific illustrations to guide you. The latest version of documentation for your server can be found online at the following Web sites:

<http://docs.hp.com/en/hw.html>

<http://docs.hp.com>

<http://www.hp.com/support/itaniumservers>

Refer also to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes* and the *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers* for the latest information about firmware and software requirements and for considerations for your Integrity server.

### 1.2.1 Entering Commands at Integrity Server Console Interfaces

When entering commands for the Integrity server, if you press the Delete key on a VTxxx terminal (or press the key you have mapped to send the DEL/RUBOUT character code in your terminal emulator), the last character typed is not deleted, as would be expected on an OpenVMS Alpha system. Integrity server facilities use Ctrl/H to delete the last character typed. For information about how to remap a terminal to use Ctrl/H instead of DEL/RUBOUT, refer to Section A.1.3.

### 1.2.2 Integrity Server Tools

Integrity servers include multiple interfaces for working with various aspects of the server or **server complex**. The **Management Processor (MP)**, which is also known on entry-class Integrity servers as **Integrated Lights-Out (iLO)**, is available on most systems. It provides a service interface that allows access to all hardware and, in a complex, all **nPartitions**. MP is always available, even when the main power source is turned off (MP can operate on standby power). On **cell-based servers** (rx7620, rx8620, and HP Integrity Superdome), MP is available whether or not nPartitions are configured or booted in the server complex. You can navigate from MP to and from the operating system (if it is booted).

The **Extensible Firmware Interface (EFI)** provides support for operating system loaders and allows you to configure the firmware and control the booting environment. EFI is accessible only when the operating system is not booted. On cell-based servers, each nPartition has a separate EFI console interface. EFI provides support for managing nPartitions. The EFI interface is available from an nPartition console only when the nPartition is in an active state but has not booted an operating system.

You can move from the EFI interface to MP and back again. Similarly, you can move from MP to the operating system and back.

### 1.2.3 Cell-Based Server Terminology

A cell-based server—such as the HP rx7620, rx8720, or HP Integrity Superdome server—is a hardware complex that can run one or more operating systems and that supports dividing hardware resources into nPartitions. Thus, it enables you to configure a complex into one large system or into several smaller systems.

All processors and memory are contained in cells, each of which can be assigned for exclusive use by an nPartition. An nPartition defines a subset of the server hardware resources that is used as an independent system environment. An nPartition has its own EFI system boot interface and each nPartition boots and reboots independently. Each nPartition provides both hardware and software isolation so that hardware or software faults in one nPartition do not affect other nPartitions within the same server complex.

By using HP software-based nPartition management tools, you can configure nPartition definitions for a server without physically modifying the server hardware configuration. The main administration tools for nPartitions are the Partition Manager, which provides a graphical interface, and the nPartition Commands, which provide a command-line interface. Versions of these interfaces are provided on HP-UX and Microsoft® Windows® systems. nPartition Commands are also available on Linux® systems. MP and EFI can also perform nPartition administrative tasks. Slightly different tool sets and capabilities are available on different server models. For more information, refer to your hardware documentation. In addition, refer to the *HP System Partitions Guide: Administration for nPartitions*.

---

## 1.3 Examining Software and Hardware Components

Before beginning an installation or upgrade, be sure you have all the required hardware and software components, as described in the following sections.

### 1.3.1 Hardware Components

Before you begin an installation or upgrade, do the following:

- Be sure the hardware has been installed and checked for proper operation. For detailed information, refer to the hardware manuals you received with your Integrity server system.  
  
For your console terminal, you will need a standard PC-to-PC file transfer cable (also known as a null modem cable; 9-pin female connectors at each end) to connect a PC, laptop, or similar device that includes terminal emulation software. For information about setting up your system console, refer to Section A.2.
- Be sure you know how to turn on and operate the components of your system, including the system unit, console, monitor, drives, terminals, and printers. If necessary, read the hardware manuals that came with these components.
- Make sure you record the installation procedure. You will need a transcript 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. (Refer to your hardware manuals for more details about connecting those components to your system.)

## 1.3.2 Software Components

Before you begin an installation or upgrade, do the following:

- Be sure you have all the items listed on the bill of materials contained in the distribution kit. If your distribution kit is incomplete, notify HP Customer Support and request priority shipment of any missing items.
- Before installing the OpenVMS operating system software, review all cover letters and release notes.

## 1.3.3 OpenVMS for Integrity Servers Operating Environment (OE) DVD

Included in your OpenVMS I64 kit is the OpenVMS for Integrity Servers OE DVD, which you use to install the operating system or to perform operations such as backing up the system disk. The DVD is labeled similar to the following:

---

DVD Label:	HP OpenVMS Version 8.2-1 for Integrity Servers Operating Environment
Volume Label:	I640821

---

The DVD label is the printed label on the OE DVD. The volume label is the machine-readable name that the OpenVMS I64 operating system uses to access and identify the DVD.

## 1.3.4 Firmware on Integrity Server Systems

HP Integrity servers include several firmware components (varying with system type), any of which might need updating. For the minimum versions recommended, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes* and the *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers*.

To update entry-class (rx1600, rx1620, rx2600, rx2620, or rx4640) Integrity server firmware, follow the instructions provided in this section and in your hardware documentation; for cell-based servers, you must contact HP Customer Support.

To update your firmware, you must do the following:

1. Determine the current firmware versions on your Integrity server (refer to Section 1.3.4.1).
2. Create a firmware update CD on any system equipped with a CD-recordable drive (refer to Section 1.3.4.2).
3. Update the firmware on your Integrity server (refer to Section 1.3.4.3).

### 1.3.4.1 Checking Firmware Version

To determine the firmware version in place on your Integrity server, use the **Extensible Firmware Interface (EFI) `info fw`** command at the EFI Shell> prompt, as in the following example (for cell-based servers, check the firmware at the nPartition console). If MP is available, use the MP `sysrev` command. For more information, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes* and your hardware documentation.

```
Shell> info fw
```

---

**NOTE** The `info fw` command at the EFI> Shell prompt cannot be used while OpenVMS is running. You can use the MP interface to check firmware on your system while OpenVMS is running.

---

---

**NOTE** EFI Shell commands are not case sensitive. However, in this manual, EFI and other Integrity server interface commands are displayed in lowercase to help distinguish them from OpenVMS DCL commands.

---

### 1.3.4.2 Creating a Firmware Update CD

To create a firmware update CD for your entry-class Integrity server, you need a CD-recordable drive and software, plus a blank CD-R disk. (For updating firmware on a cell-based server, you must contact HP Customer Support.)

---

**NOTE** The following instructions are for recording a CD on an OpenVMS system. You can record the CD on any system or PC, such as a Microsoft Windows computer, a Linux system, or an HP-UX system.

---

1. Go to the following Web site:

<http://www.hp.com/support/itaniumservers>

2. Select the appropriate server in the list provided. The support page for the selected server appears.
3. Select **Download drivers and software**.
4. Select **Cross operating system (BIOS, Firmware, Diagnostics, etc)**.
5. Locate the appropriate ISO-image firmware file (look for the latest update; previous versions might also be listed along with the latest), select the link for that file and read the instructions for the file included in the release notes, and then download the ISO-image firmware (zip-compressed) file to your system.
6. Unzip the firmware file into the corresponding .ISO file. The .ISO file is a block copy of the firmware disk for the Integrity server system. On OpenVMS systems, you can obtain the INFO-ZIP utility from the OpenVMS Freeware CD and use the UnZip utility provided with INFO-ZIP. The following example shows the command for unzipping an .ISO image of the latest firmware for an rx2600 system (the file name changes with each update of the firmware available on the Web site):

```
$ UNZIP PF_CPEAKSYS0nnn.ZIP
Archive: SYS$SYSROOT:[SYSMGR]PF_CPEAKSYS0nnn.ZIP
  inflating: PF_CPEAKSYS0nnn.ISO
```

7. Record the data on the CD, specifying the .ISO file as the source for the CD.

---

**NOTE** OpenVMS software includes the CD recording tool CDRECORD. For online help, enter the @SYS\$MANAGER:CDRECORD HELP command at the OpenVMS DCL prompt. For source files, check the OpenVMS Open Source Tools CD supplied with your OpenVMS I64 OE DVD. For more information about the software, visit the following Web site:

<http://www.hp.com/go/openvms/freeware/>

---

### 1.3.4.3 Updating Your Firmware from the Firmware Update CD

You update the firmware of an entry-class Integrity server from the firmware update CD created in the preceding section. For instructions, refer to the release notes provided for the firmware you downloaded. To access the release notes, go to the Web page from which you downloaded the firmware (see step 5 in the preceding section).

---

**IMPORTANT** To update Integrity server firmware on cell-based servers, contact HP Customer Support.

---

### 1.3.5 Device-Naming Conventions

When you perform specific operations, you are asked to specify 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 DVD drive, the device name is similar to the following:

DQA0

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

DKA0 :

Note the following device name conventions:

- *DQ* or *DK* is the device code of the boot device.
- *A* is the boot device controller designation.
- *0* is the unit number of the boot device.

- When the source drive is a virtual DVD drive served by the InfoServer, the device name is typically the following:

DAD1

- On OpenVMS systems configured in certain OpenVMS Cluster or HSx 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, HSx controller node number, and channel numbers. Because these values vary depending on your specific hardware configuration, refer to the owner, operator, and technical service manuals that came with your computer for detailed information.

---

## 1.4 Using the Operating System Menu

The following sections describe how to use the operating system menu to install, upgrade, and modify your system disk, and perform other related tasks.

The OpenVMS operating system main menu displays automatically when you boot the OpenVMS operating system from the operating system **media** (for instructions on how to boot from the operating system media, refer to Section 3.2). From the menu, you can choose options to perform any of the following tasks:

- Install or upgrade the operating system from the operating system media.
- Display a list of products that can be installed from the operating system media.
- Install or upgrade **layered products** from the operating system media.
- Show which products are installed on your system.
- Reconfigure layered products installed on your system.



- Remove products.
- Enter the 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.

The following is a sample display of the OpenVMS main menu:

```
OpenVMS I64 Operating System, Version 8.2-1

(c) Copyright 1976-2005 Hewlett-Packard Development Company, L.P.

Installing required known files...

Configuring devices...

*****
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 operating system 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 I64 Version 8.2-1
2) Display products and patches that this procedure can install
3) Install or upgrade layered products and patches
4) Show installed products
5) Reconfigure installed products
6) Remove installed products
7) Execute DCL commands and procedures
8) Shut down this system

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

Review the following sections to understand how the menu works. You will then be prepared to choose appropriate menu options when you are asked to do so before, during, and after an installation or upgrade.

### 1.4.1 Using the Install, Upgrade, or Reconfigure OpenVMS Option (1)

Select option 1 from the operating system main menu to install, upgrade, or reconfigure your OpenVMS software. Selecting option 1 implements a POLYCENTER Software Installation (PCSI) utility concept called a **platform**. The OpenVMS platform contains:

- The OpenVMS operating system
- The required **Kerberos**, **Common Data Security Architecture (CDSA)**, **Performance Data Collector** (base), and **Availability Manager** (base) products
- The optional **DECwindows Motif for OpenVMS**, **DECnet-Plus**, **DECnet Phase IV**, and **TCP/IP Services for OpenVMS** products

Including the optional products in the OpenVMS platform allows you to install or upgrade these products along with the OpenVMS operating system.

When you choose to upgrade the system disk, and the OpenVMS software on the disk is the same version, you are given options to reinstall or to reconfigure the OpenVMS system or reconfigure the OpenVMS platform.

Before installing or upgrading OpenVMS, refer to the information in the following chapters, as appropriate:

- Chapter 2, “Preparing to Install in an OpenVMS Cluster Environment,” on page 37
- Chapter 3, “Installing the OpenVMS Operating System,” on page 41
- Chapter 4, “Before Upgrading the OpenVMS Operating System,” on page 73
- Chapter 5, “Preparing to Upgrade in an OpenVMS Cluster Environment,” on page 85
- Chapter 6, “Upgrading the OpenVMS Operating System,” on page 93

---

**NOTE** Before installing or upgrading 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 or upgrade is being performed) and must remain so during the installation or upgrade.

---

When you select option 1 from the operating system main menu, the system asks whether you want to preserve or initialize the system disk. The display is similar to the following:

```
There are two choices for Installation/Upgrade:
```

```
INITIALIZE - Removes all software and data files that were  
previously on the target disk and installs OpenVMS I64.
```

```
PRESERVE -- Installs or upgrades OpenVMS I64 on the target disk  
and retains all other contents of the target disk.
```

```
* Note: You cannot use PRESERVE to install OpenVMS I64 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]
```

#### 1.4.1.1 INITIALIZE Option

When you specify the INITIALIZE option, the following operations take place:

- All software and data files that already exist on the target disk are removed.
- The operating system is installed.

Specify the INITIALIZE option and perform a full installation under any of the following conditions:

- If your computer is new (it has never had any version of any operating system running on it, including factory-installed software).
- If your computer is already running a version of the OpenVMS operating system and you want to overwrite the entire contents of the system disk (the operating system, application software, and user files).
- If you want to keep an existing system disk and install OpenVMS on a different disk.

- If you are running the OpenVMS operating system but cannot upgrade. For example, if you changed the names of system directories on the system disk, the upgrade procedure will not work correctly. Therefore, unless you restore the system disk to its original directory structure, you must reinstall the operating system using the INITIALIZE option.

**NOTE** During initialization of an OpenVMS I64 target system disk, the installation process creates a **diagnostic partition**, visible only at the console prompt. For more information about this partition and options you can take, refer to Appendix H.

The installation procedure initializes the target disk with volume expansion (INITIALIZE/LIMIT). This renders the disk incompatible with versions of OpenVMS prior to Version 7.2. In most cases, this does not present a problem. However, if you intend to mount the new disk on a version of OpenVMS prior to Version 7.2, you must perform the alternate method of initialization described in Appendix H. Note that as a result of this alternate method, your new system disk might include a relatively large minimum allocation size (as defined by /CLUSTER\_SIZE). As a result, small files will use more space than necessary. Therefore, perform these steps *only* for system disks that must be mounted on versions of OpenVMS prior to Version 7.2.

#### 1.4.1.2 PRESERVE Option

When you specify the PRESERVE option, the following operations take place:

IF ...	THEN ...
The OpenVMS operating system is <i>not</i> already installed on the target disk	<ul style="list-style-type: none"> <li>• The operating system is <i>installed</i>.</li> <li>• All other contents of the target disk are retained.</li> </ul>
The OpenVMS operating system <i>is</i> installed on the target disk	<p>The operating system is <i>upgraded</i>, as follows:</p> <ul style="list-style-type: none"> <li>• Old operating system files and new files are merged or replaced.</li> <li>• All other contents of the target disk are retained.</li> </ul>

**NOTE** If you intend to choose the PRESERVE option (because there are certain files on the disk that you want to retain), HP recommends that you first make a backup copy of your system disk. If there is any problem during the installation or upgrade that might affect the integrity of the disk, you will have the backup copy as a safeguard.

If you choose the PRESERVE option and choose a target disk that already contains the OpenVMS Version 8.2-1 software, you are provided with the option to either reconfigure or reinstall the OpenVMS operating system:

- Reconfigure the operating system if you want to change the options you chose to include when the operating system was installed.
- Reinstall the operating system if you think that your system files might have become corrupted.

For additional configuration information, refer to Section 7.10.

## 1.4.2 Using the Display Products and Patches Option (2)

When you select option 2 from the operating system main menu, the following information is displayed:

- The version of OpenVMS and versions of the required components and optional products that can be installed or upgraded when you select option 1 from the main menu.
- The layered product kits that are available for installation when you select option 3 from the operating system main menu. The DECwindows graphical user interface and HP networking products are shown again, along with other layered products.

---

**NOTE** The two lists of products (the products that can be installed or upgraded and the layered product kits available for installation) might be the same or very similar. Generally, products that can be installed or upgraded along with the OpenVMS operating system should be installed or upgraded with the OpenVMS operating system.

---

The following is an example of a display:

```
The following versions of the OpenVMS operating system,
required components, and optional products
are available on the OpenVMS Distribution media.
They can be installed by selecting choice 1:
```

```
HP I64VMS VMS version V8.2-1
HP I64VMS AVAIL_MAN_BASE V8.2-1
HP I64VMS CDSA version V2.1-nn
HP I64VMS KERBEROS version V2.1-nn
HP I64VMS TDC_RT V2.1-nn
HP I64VMS DWMOTIF version V1.5
HP I64VMS DECNET_PLUS version V8.2-1
HP I64VMS DECNET_PHASE_IV version V8.2-1
HP I64VMS TCPIP version V5.5-nn
```

```
The following Layered Product kits are available on the OpenVMS
Distribution media (CD/DVD). They can be installed by selecting
choice 3. If already installed, they can be reconfigured by
selecting choice 5, or removed by selecting choice 6.
```

```
-----
PRODUCT                                KIT TYPE      KIT FORMAT
-----
HP I64VMS AVAIL_MAN_BASE V8.2-1      Full LP       Sequential
HP I64VMS CDSA V2.1-nn          Full LP       Sequential
HP I64VMS DECNET_PHASE_IV V8.2-1      Full LP       Sequential
HP I64VMS DECNET_PLUS V8.2-1      Full LP       Sequential
HP I64VMS DWMOTIF V1.5          Full LP       Sequential
HP I64VMS KERBEROS V2.1-nn      Full LP       Sequential
HP I64VMS TCPIP V5.5-nn         Full LP       Sequential
HP I64VMS TDC_RT V2.1-nn        Full LP       Sequential
-----
```

```
7 items found
```

```
Press Return to continue...
```

### 1.4.3 Using the Install or Upgrade Layered Products Option (3)

Use option 3 of the operating system main menu for normal installations or upgrades of the layered products. Note that you can install or upgrade the DECwindows graphical user interface and HP networking products along with the OpenVMS operating system by selecting option 1 from the main menu.

When you select option 3, the POLYCENTER Software Installation utility allows you to choose whether to install layered products or to register layered products that are on the target disk but are not in the Product Database. If you attempt to reinstall the same version of a product that is already installed, the product is reinstalled. Note that any patches that were applied to the product are removed. If you want to reconfigure, select the reconfigure option (5) from the main menu.

As shown in the following example, you are also prompted for a target disk and asked whether you want brief or detailed descriptions. The procedure presents a list of products and allows you to select any or all of these products. Alternatively, you can exit without installing or upgrading any products. (This particular example includes notes about installing DECwindows Motif and DECnet.)

---

**NOTE** The layered products listed include CDSA, Kerberos, TDC, and Availability Manager, which are required, and DECwindows, DECnet Phase IV, DECnet-Plus, and TCP/IP Services for OpenVMS, which are optional.

You can install (or upgrade to) the new implementation of TCP/IP Services for OpenVMS (Version 5.5) as part of the OpenVMS upgrade. If you want to install Version 5.5 separately, choose the following product (option 5 in the example that follows):

HP I64VMS TCPIP V5.5

---

```
Do you want to INSTALL or REGISTER? (INSTALL/REGISTER/?) [INSTALL] INSTALL
*****
```

```
If you choose to install or upgrade DECwindows Motif,
please note the following:
```

- o If you did not select the OpenVMS DECwindows server support and workstation files options, DECwindows Motif will not run. You must add these options to use DECwindows Motif.

```
If you choose to install or upgrade DECnet-Plus or DECnet Phase IV,
please note the following:
```

- o If you did not select the OpenVMS DECNET option, neither version of DECnet will run. You must add this option to use DECnet.

```
Press Return to continue...
```

```
*****
```

```
The installation 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
-

You must enter the device name for the target disk on which the layered product(s) installation will be performed.

Enter device name for target disk: [DKB300] (? for choices) **DKB300**  
DKB300: is labeled V82SYS.

The install 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] **NO**

- 1 - HP I64VMS CDSA V2.1-nn Layered Product
- 2 - HP I64VMS DECNET\_PLUS V8.2-1 Layered Product
- 3 - HP I64VMS DECNET\_PHASE\_IV V8.2-1 Layered Product
- 4 - HP I64VMS DWMOTIF V1.5 Layered Product
- 5 - HP I64VMS TCPIP V5.5-nn Layered Product
- 6 - HP I64VMS AVAIL\_MAN\_BASE V8.2-1 Layered Product
- 7 - HP I64VMS KERBEROS V2.1-nn Layered Product
- 8 - HP I64VMS TDC\_RT V2.1-nn Layered Product

9 - All products listed above

10 - Exit

Choose one or more items from the menu separated by commas: **5**

---

**NOTE** When you boot the OpenVMS operating system DVD and select the option to install layered products, that installation procedure does not run the Installation Verification Procedure (IVP) for layered products. Because the operating system is booted from the DVD and the layered products are installed on a different device (the target drive), the IVPs cannot execute correctly. However, you can run the IVP for each layered product after you boot the target system (refer to the layered product installation documents for information about running the IVP).

---

#### 1.4.4 Using the Show Installed Products Option (4)

Use option 4 of the operating system main menu to display a list of products that have been installed on a selected target disk by the POLYCENTER Software Installation utility. Products that were installed by VMSINSTAL or other installation methods will not appear in this display unless they have been registered in the POLYCENTER Software Installation utility's product database.

The following is a sample display of the prompts and information that appear when you select option 4:

You must enter the device name for the system disk for which you want to display installed products.

If you enter an invalid device or one which is not a system disk an error will occur.

(Enter "^" and press Return to return to main menu.)

Enter device name for system disk: [DKB300] (? for choices) **DKB300**  
%MOUNT-I-MOUNTED, V82SYS mounted on \_DKB300:

The default is an 80-column display that does not include Maintenance (patches) or Referenced by information.

Do you want the full, 132-column display? (Yes/No) [No] **NO**

PRODUCT	KIT TYPE	STATE
HP I64VMS AVAIL_MAN_BASE V8.2-1	Full LP	Installed
HP I64VMS CDSA V2.1-nn	Full LP	Installed
HP I64VMS DECNET_PLUS V8.2-1	Full LP	Installed
HP I64VMS DWMOTIF V1.5	Full LP	Installed
HP I64VMS KERBEROS V2.1-nn	Full LP	Installed
HP I64VMS OPENVMS V8.2-1	Platform	Installed
HP I64VMS TCPIP V5.5-nn	Full LP	Installed
HP I64VMS VMS V8.2-1	Oper System	Installed
HP I64VMS TDC_RT V2.1-nn	Full LP	Installed

9 items found

Do you wish to display product history? (Yes/No) [No] **YES**

PRODUCT	KIT TYPE	OPERATION	DATE AND TIME
HP I64VMS AVAIL_MAN_BASE V8.2-1	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS CDSA V2.1	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS DECNET_PLUS V8.2-1	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS DWMOTIF V1.5	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS KERBEROS V2.1-nn	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS OPENVMS V8.2-1	Platform	Install	25-JUN-2005 18:04:23
HP I64VMS TCPIP V5.5-nn	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS VMS V8.2-1	Oper System	Install	25-JUN-2005 18:04:23
HP I64VMS TDC_RT V2.1-nn	Full LP	Install	25-JUN-2005 18:04:23
HP I64VMS AVAIL_MAN_BASE V8.2-1	Full LP	Remove	25-JUN-2005 18:04:23
HP I64VMS CDSA V2.1-nn	Full LP	Remove	25-JUN-2005 18:04:23
HP I64VMS DECNET_PHASE_IV V8.2	Full LP	Remove	25-JUN-2005 18:04:23
HP I64VMS DWMOTIF V1.5	Full LP	Remove	25-JUN-2005 18:04:23
HP I64VMS OPENVMS V8.2-1	Platform	Remove	25-JUN-2005 18:04:23
HP I64VMS VMS V8.2-1	Oper System	Remove	25-JUN-2005 18:04:23
HP I64VMS KERBEROS V2.1-nn	Transition	Remove	25-JUN-2005 18:04:23
HP I64VMS KERBEROS V2.1-nn	Transition	Reg Product	25-JUN-2005 17:20:44
HP I64VMS CDSA V2.1	Full LP	Install	27-AUG-2004 21:07:15
HP I64VMS DECNET_PHASE_IV V8.2	Full LP	Install	27-AUG-2004 21:07:15
HP I64VMS DWMOTIF V1.5	Full LP	Install	27-AUG-2004 21:07:15
HP I64VMS OPENVMS V8.2	Platform	Install	27-AUG-2004 21:07:15
HP I64VMS TCPIP V5.4-18	Full LP	Install	27-AUG-2004 21:07:15
HP I64VMS VMS V8.2	Oper System	Install	27-AUG-2004 21:07:15

20 items found

Press Return to continue...

---

**NOTE** The products listed in the product history vary from system to system, depending on the actual history of the system. For definitions of the kit types, refer to the *HP POLYCENTER Software Installation Utility Developer's Guide*.

---

## 1.4.5 Using the Reconfigure Installed Products Option (5)

Use option 5 to reconfigure layered products, including the DECwindows graphical user interface and HP networking products. This allows you to change the product choices you made during a previous installation or upgrade.

You can reconfigure a product only if all of the following conditions are true:

- The product is available for installation while your system is booted from the operating system media. For information about displaying products that are available for installation, refer to Section 1.4.2 (option 2 from the main menu).
- The product is installed. For information about displaying installed products, refer to Section 1.4.4 (option 4 from the main menu).
- The version of the product that is available for installation is the same as the version of the product that is installed.

When you select option 5 of the operating system main menu, the procedure prompts you for a target disk name and asks whether you want brief or detailed descriptions about the reconfiguration options. The procedure then lists the products you can configure. You can select any or all of these products, or you can exit without reconfiguring products.

The following is a sample display of the prompts and information that appear when you select option 5:

The reconfiguration 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
```

You must enter the device name for the target disk on which the layered product(s) reconfiguration will be performed.

```
Enter device name for target disk: [DKB300] (? for choices) DKB300
DKB300: is labeled V82SYS.
```

The reconfigure 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]NO
```

```
1 - HP I64VMS CDSA V2.1-nn          Layered Product
2 - HP I64VMS DECNET_PLUS V8.2-1   Layered Product
3 - HP I64VMS DWMOTIF V1.5         Layered Product
4 - HP I64VMS TCPIP V5.5-nn        Layered Product
5 - HP I64VMS AVAIL_MAN_BASE V8.2-1 Layered Product
6 - HP I64VMS KERBEROS V2.1-nn     Layered Product
7 - HP I64VMS TDC_RT V2.1-nn       Layered Product

8 - All products listed above
```



9 - Exit

Choose one or more items from the menu separated by commas:

## 1.4.6 Using the Remove Installed Products Option (6)

Option 6 allows you to remove products that were installed or registered with the POLYCENTER Software Installation (PCSI) utility.

---

**IMPORTANT** Do not remove the **system-integrated products (SIPs)**: Availability Manager, CDSA, Kerberos, and the Performance Data Collector base software (TDC\_RT). These products are tightly bound with the operating system. Attempts to remove any of these products will not work cleanly and could create undesirable side effects.

---

---

**NOTE** When you remove a product that was registered using a transition kit (in other words, a product that has been installed using VMSINSTAL or some method other than PCSI), some of the product's directories, files, or other objects are not removed. Transition kits typically do not contain all the directories, files, and other objects that make up the product.

---

When you select option 6, you are prompted for a target disk name and whether you want brief or detailed descriptions about the remove options. The procedure then lists the products you can remove. You can select any or all of these products, or you can exit without removing any products.

The following is a sample display of the prompts and information that appear when you select option 6:

The removal 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

You must enter the device name for the target disk on which the layered product(s) removal will be performed.

Enter device name for target disk: [DKB300:] (? for choices) **DKB300**

DKB300: is labeled V82SYS.

The remove 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] **NO**

1 - HP I64VMS CDSA V2.1-nn	Layered Product
2 - HP I64VMS DECNET_PLUS V8.2-1	Layered Product
3 - HP I64VMS DWMOTIF V1.5	Layered Product
4 - HP I64VMS OPENVMS V8.2-1	Platform (product suite)

```

5 - HP I64VMS TCPIP V5.5-nn          Layered Product
6 - HP I64VMS VMS V8.2-1           Operating System
7 - HP I64VMS AVAIL_MAN_BASE V8.2-1 Layered Product
8 - HP I64VMS KERBEROS V2.1-nn     Layered Product
9 - HP I64VMS TDC_RT V2.1-nn       Layered Product

10 - All products listed above
11 - Exit

```

Choose one or more items from the menu separated by commas

### 1.4.7 Using the Execute DCL Option (7)

When you select option 7, you get access to a subset of DCL commands (such as `SHOW DEVICE`, `MOUNT`, and `BACKUP`) to perform specific preinstallation and maintenance operations. Note, however, that this is a restricted DCL environment in that certain DCL commands (such as `PRODUCT`) and certain utilities (such as `VMSINSTAL`) will not function as expected because you are booting from read-only or write-locked media, and because a full system startup has not been performed.

A triple dollar sign prompt (\$\$\$) indicates that you are in this restricted DCL environment, as shown in the following example:

```
$$$ SHOW DEVICE
```

To exit the DCL environment and return to the main menu, enter the `LOGOUT` command.

### 1.4.8 Using the Shut Down Option (8)

When you select option 8 from the operating system main menu, your system shuts down and you are returned to the console prompt (`P00>>>`). The system displays a message similar to the following:

```

Shutting down the system

SYSTEM SHUTDOWN COMPLETE

**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED

**** Hit any key to cold reboot ****
P00>>>

```

---

## 1.5 Making the Install/Upgrade/Backup Selection

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, and then Chapter 3. Perform postinstallation tasks described in Chapter 7.

---

IF ...	THEN GO TO...
You want to install the operating system in a nonclustered environment	Chapter 3. Perform postinstallation tasks described in Chapter 7.
You want to upgrade the operating system in an OpenVMS Cluster environment	Chapter 4, Chapter 5, and then Chapter 6. Perform postupgrade tasks described in Chapter 7.
You want to upgrade the operating system in a standalone environment	Chapter 4, and then Chapter 6. Perform postupgrade tasks described in Chapter 7.
You want only to back up or restore your system disk	Appendix D.

---

Getting Started

**Making the Install/Upgrade/Backup Selection**

## 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 for information about installing your system.

---

### 2.1 Preinstallation Tasks for OpenVMS Cluster Environments

Use the checklist in Table 2-1 to ensure that you perform all necessary tasks prior to installing your system in an OpenVMS Cluster environment.

**Table 2-1 Preinstallation Checklist**

Task	Section
<input type="checkbox"/> Review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 2.2
<input type="checkbox"/> Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 2.3
<input type="checkbox"/> Have information ready to provide at the system prompt during an installation.	Section 2.4
<input type="checkbox"/> Make sure the target system disk is not mounted elsewhere in the cluster.	Section 2.5
<input type="checkbox"/> Begin the installation.	Chapter 3

---

### 2.2 Review OpenVMS Cluster Documentation and Other Sources of Information

Before installing the operating system in an OpenVMS Cluster environment, be sure you review any relevant OpenVMS Cluster information contained in the following documents:

#### ***OpenVMS Version 8.2-1 Documents***

- The *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers* and the Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*

#### ***OpenVMS Version 8.2 Documents***

Although not revised for OpenVMS Version 8.2-1, the following documents remain valid:

- *HP OpenVMS Version 8.2 Release Notes* (all notes that are not marked Alpha only)
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*

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

---

## 2.3 Mixed-Version Support in OpenVMS Cluster Systems

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

**Warranted support** means that HP 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 HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX, OpenVMS Alpha, or OpenVMS I64. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs. The OpenVMS Version 8.2-1 release includes no configurations specific to migration support.

For the minimum version supported for an upgrade to OpenVMS I64 Version 8.2-1, refer to Section 4.3.1.

Warranted cluster support is provided for OpenVMS I64 Version 8.2-1 in combination with one or more of the following:

- OpenVMS I64 Version 8.2
- OpenVMS Alpha Version 8.2
- OpenVMS Alpha Version 7.3-2

---

### NOTE

System disks are architecture specific and can be shared only by systems of the same architecture. An Alpha and I64 system, or an Alpha and VAX system, cannot boot from the same system disk. However, cross-architecture satellite booting is supported. (For this release of OpenVMS I64, satellite booting is not supported.) 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, refer to the *Guidelines for OpenVMS Cluster Configurations* and *HP OpenVMS Cluster Systems*.

Only two architectures are supported in the same OpenVMS Cluster: OpenVMS I64 and OpenVMS Alpha, or OpenVMS Alpha and OpenVMS VAX, but not OpenVMS I64 and OpenVMS VAX.

---

For more information, refer to the OpenVMS Technical Software Support Service Web site at:

<http://www.hp.com/go/openvms/support>

In addition, refer to the following Web site for the OpenVMS Operating System Support Chart:

<http://www.hp.com/go/openvms/supportchart>

Before introducing an OpenVMS Version 8.2-1 system into an existing OpenVMS Cluster, you might need to install certain patch kits (also known as remedial kits) on cluster members running earlier versions of OpenVMS. For a complete list of required patch kits, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

For information about supporting the Performance Data Collector base software (TDC\_RT) in OpenVMS Clusters, refer to Section 7.7.4.4.

---

## 2.4 OpenVMS Cluster Information You Will Need

If during the installation you answer YES to the system prompt asking whether your system will be a member of an OpenVMS Cluster, you need to provide the following 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 VAX, Alpha, or Integrity server computers in the OpenVMS Cluster use to communicate with one another. Note that HP Integrity servers do not support CI, DSSI, or MEMORY CHANNEL devices.
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	<p>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:</p> <p>Enter a value for <i>this_node</i> ALLOCLASS parameter:</p> <p>Note that in an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves disks to other cluster members or if the node will be using volume shadowing. In either case, the ALLOCLASS value must be a number from 1 to 255, and each node must have a unique ALLOCLASS value.</p> <p>After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.</p> <p>For the rules on specifying allocation class values, refer to the <i>HP OpenVMS Cluster Systems</i> manual.</p>
Whether you want a quorum disk	To help you determine whether you need a quorum disk in the cluster, refer to the <i>HP OpenVMS Cluster Systems</i> manual.

---

---

Required Information	Explanation
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 are on one or more local or clustered disks. Refer to the <i>HP OpenVMS Cluster Systems</i> 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 <b>MOP servers</b> <sup>1</sup> , <b>disk servers</b> , and tape servers	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 <sup>2</sup>	If you are going to set up a local area cluster or a mixed-interconnect cluster that is LAN-based, use the following rules to determine the cluster group number and password: <ul style="list-style-type: none"><li>• Cluster group number—A number in the range from 1 to 4095 or 61440 to 65535.</li><li>• Cluster password—Must be from 1 to 31 alphanumeric characters in length and can include dollar signs (\$) and underscores(_).</li></ul>

---

1. Servers that use the Maintenance Operations Protocol (MOP).
2. 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.

---

## 2.5 Dismount 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 5.5.2.3.

---

## 2.6 Beginning the Installation

After you have completed all the tasks in this chapter, go to Chapter 3 to begin the installation.



## 3 Installing the OpenVMS Operating System

This chapter explains how to install the I64 operating system. It includes sample output similar to what you might see during an installation and explains how to respond to the prompts.

If you purchased a system with the operating system preinstalled, then most of the information in this chapter does not apply. The first time you power up your preinstalled system, you are prompted to enter only the information necessary to customize your installation. Refer to the documentation provided with your system.

---

**NOTE** Before you install the OpenVMS operating system, ensure that the correct version of firmware is running in your computer. For information about Integrity server system firmware, refer to Section 1.3.4.

---

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 3.1 includes a checklist that you can use to make sure you perform all the installation tasks described in this chapter.

---

### 3.1 Installation Tasks

Use the checklist in Table 3-1 to ensure that you perform all necessary installation tasks.

**Table 3-1** Installation Checklist

	<b>Task</b>	<b>Section</b>
<input type="checkbox"/>	Boot the OpenVMS OE DVD.	Section 3.2
<input type="checkbox"/>	Install the OpenVMS operating system onto a system disk.	Section 3.3
<input type="checkbox"/>	Boot the OpenVMS I64 system disk.	Section 3.4
<input type="checkbox"/>	Join the OpenVMS Cluster (optional).	Section 3.5
<input type="checkbox"/>	Run AUTOGEN.	Section 3.6
<input type="checkbox"/>	Reboot the operating system after AUTOGEN completes (this should occur automatically).	Section 3.7
<input type="checkbox"/>	Log in to the SYSTEM account.	Section 3.8
<input type="checkbox"/>	Perform postinstallation tasks, as necessary.	Chapter 7

## 3.2 Booting the OpenVMS I64 OE DVD

The OpenVMS Version 8.2-1 operating system includes procedures (such as the POLYCENTER Software Installation utility) that enable you to install the operating system easily. First, you must boot the OpenVMS OE DVD from your local DVD drive. For this release of OpenVMS, HP does not support booting the operating system from the network.

Before you can boot your OpenVMS DVD, you must make sure your console is configured correctly. You must use a serial device for the console. OpenVMS does not support VGA graphics or USB keyboards as console devices for booting. For information about configuring your system console, refer to Section A.2. HP recommends that you load and use the most current system firmware. For more information about system firmware, refer to Section 1.3.4 and the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*. For information about other required and optional tasks to be performed before or after booting the system, refer to Appendix A.

---

**CAUTION** To boot your OpenVMS I64 operating system on a cell-based server (Superdome, rx8620, or rx7620), note the following:

- The ACPI configuration must be set correctly. For more information, refer to Section A.5.1.
- The nPartition on which OpenVMS I64 is booted must have all memory configured as interleaved memory (memory that may be mapped across more than one cell). For more information about cell memory and general notes on nPartition booting, refer to Section A.4.1 and refer to your hardware documentation.

---

You can boot the OpenVMS I64 OE DVD by following these steps. To boot the DVD on a cell-based server, a DVD device must be accessible for the nPartition that OpenVMS is being installed on.

1. Make sure your Integrity server is powered on. If your system has an attached external device, make sure it is turned on and operational.
2. Insert the DVD into the drive.
3. Cycle power.
4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. Note that the EFI boot menu is timed; press any key to stop the countdown timer.

For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn:* corresponds to the Integrity server DVD drive (such as *fs0:*). Note that if you have navigated to a particular file system, the EFI Shell prompt would reflect that file system; for example, if the current file system is *fs0:*, the EFI Shell prompt would be *fs0:>*.

```
Shell>fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an fs device listing that includes the letters “CDROM”, as in the following line, where *fsn* is the file system associated with the drive, which is usually fs0: (instead of "fsn", you might see something similar to "V8.2-1"; instead of Ata, you might see Scsi, depending on the server model):

```
fsn : Acpi(HWP0002,400)/Pci(4|1)/Ata(Primary,Master)/CDROM(Entry0)
```

You can use the following command to display the mapping of various EFI device names to OpenVMS device names, where *fsn* is the device you want to check (such as fs0):

```
Shell>fsn:\efi\vms\vms_show dev -fs
```

On most Integrity servers, the DVD drive is DQA0:. On systems that include a SCSI bus, such as the Integrity Superdome server, the DVD drive is DKA0:. For more information about the `vms_show` command, refer to the *HP OpenVMS System Management Utilities Reference Manual*.

---

**NOTE** Remember that by default EFI interprets the Delete (or Backspace) key differently than do OpenVMS Alpha systems or Microsoft Windows computers. Use Ctrl/H to delete the last character entered. For more information, refer to Section A.1.3.

---

When the DVD boots properly, the OpenVMS operating system banner appears, followed by the operating system menu. You can now install your OpenVMS I64 operating system onto the target disk; refer to Section 3.3. If the methods documented in this section do not succeed to boot the DVD, refer to Section A.4.2.1.

---

**NOTE** When booting OpenVMS from the installation DVD for the first time on any OpenVMS I64 system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

---

---

## 3.3 Installing the OpenVMS Operating System onto a System Disk

After booting the operating system DVD, you can create an operating system disk by using option 1 of the menu provided by the operating system media. The procedure for installing an OpenVMS I64 system is similar to that for installing OpenVMS Alpha operating systems. Exceptions are summarized in Section 3.3.1 and noted in the installation instructions in Section 3.3.3.

### 3.3.1 Differences between I64 and Alpha Installations

If you are unfamiliar with OpenVMS Alpha installations, skip to the next section. If you have not installed an OpenVMS I64 system before and are familiar with OpenVMS Alpha installations, the main differences between installations of these two systems onto a system disk include the following:

- The OpenVMS I64 procedure does not ask whether your system will be an instance in an OpenVMS Galaxy; OpenVMS I64 does not support OpenVMS Galaxy.
- When installing OpenVMS I64 onto the system disk the first time, you are advised to set up the system with a boot option for the system disk (and to set it as the default boot device); you can allow the installation procedure to assist you in setting up and validating a boot entry, or you can use the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility to perform this operation. Whereas on Alpha systems

you can configure boot devices only by shutting down the system and entering commands at the console, on I64 systems you can configure boot devices either before you shut down the system (using the installation procedure or the OpenVMS I64 Boot Manager utility) or after you shut down the system (using EFI Utilities for OpenVMS or EFI itself).

### 3.3.2 Responding to Prompts During the 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. Note that entering this character might take you back more than one question. To return to the main menu, press Ctrl/Y.

HP 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 system prompts you for the following information:

- The names of the source drive and target drive.
- Whether you want to select the INITIALIZE or PRESERVE option (as described in Section 1.4.1).
- 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 Section 2.4).
- 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 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. Note that if you supply a DECnet Phase IV address, the system 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 can 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 plan to install it later, you should install the DECwindows Server Support component now.

- OpenVMS Management Station

If you need to create a kit to install the PC component of the **OpenVMS Management Station** software, then you must include the OpenVMS Management Station Software PC files component.

- 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, refer to Figure 3-1 on page 60.

### 3.3.3 Installing OpenVMS Using Option 1 of the Operating System Menu

After booting the OpenVMS operating system DVD, install the OpenVMS operating system by following these steps:

1. **Select Option 1 from the Menu:** When you boot the OpenVMS operating system DVD (as instructed in Section 3.2), the initial HP copyright message and other messages are displayed, followed by the operating system main menu that is shown in the following example. Choose option 1 to install the operating system, as shown. Note that after the initial copyright message, the procedure might take a few minutes before the OpenVMS operating system menu appears.

```
.
.
.
Installing required known files...

Configuring devices...

*****

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 operating system 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 I64 Version 8.2-1
    2) Display products and patches that this procedure can install
    3) Install or upgrade layered products and patches
    4) Show installed products
    5) Reconfigure installed products
    6) Remove installed products
    7) Execute DCL commands and procedures
    8) Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 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 I64 distribution media.

PRODUCT	KIT TYPE	KIT FORMAT
DEC I64VMS TCPIP_ECO V5.n-nnn	Patch	Sequential

1 item found

Please consult the OpenVMS I64 Upgrade and Installation 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 documented in detail in Section 3.3.2):

```
*****
The installation 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 I64.

PRESERVE -- Installs or upgrades OpenVMS I64 on the target disk and retains all other contents of the target disk.

\* NOTE: You cannot use preserve to install OpenVMS I64 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]

Respond to the INITIALIZE or PRESERVE prompt as follows:

IF ...	THEN ...
Your system disk is new	Enter INITIALIZE and press Enter (or Return).

---

IF ...	THEN ...
You want to remove all files from an existing system disk	Enter INITIALIZE and press Enter (or Return).
You want to retain certain files on an existing disk	Press Enter (or Return) to accept the default (PRESERVE).

---

**NOTE** During initialization of an OpenVMS I64 target system disk, the installation process creates a diagnostic partition, visible only at the console prompt. For more information about this partition and the options you can take, refer to Appendix H.

The installation procedure initializes the target disk with volume expansion (INITIALIZE/LIMIT). This renders the disk incompatible with versions of OpenVMS prior to Version 7.2. In most cases, this does not present a problem. However, if you intend to mount the new disk on a version of OpenVMS prior to Version 7.2, you must perform the alternate method of initialization described in Appendix H. Note that as a result of this alternate method, your new system disk might include a relatively large minimum allocation size (as defined by /CLUSTER\_SIZE). As a result, small files use more space than necessary. Therefore, perform these steps *only* for system disks that must be mounted on versions of OpenVMS prior to Version 7.2.

---

**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 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 I64 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, [\$1\$DGA567]).

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

**4. Specify the Volume Label:** If you select a device that can be used, the system 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.

DKB400: is now labeled V82\_nnn.

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

Enter volume label for target system disk: [I64SYS] **I64821B**

You can keep the label already assigned to the disk, accept the default label assigned by the system (for I64 systems, I64SYS), 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** HP strongly recommends 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.

---

**5. Specify On-Disk Structure Level:** After you enter the volume label for the target system disk, 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). If you selected PRESERVE instead of INITIALIZE, you are not asked about the on-disk structure level.

```
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/?)
```

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

- ODS-2  
ODS-2 allows for full compatibility with all OpenVMS VAX systems and with OpenVMS Alpha systems prior to Version 7.2.
- 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 if Desired (ODS-5 Only):** If you selected 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/?) YES
```

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 issue 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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

7. **Confirm Target System Disk Choices:** The procedure displays your target system disk choices, and you are asked 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. The volume label is I64821B.

```
You have chosen to install OpenVMS I64 on a new disk.
```

```
The target system disk, DKB400:, will be initialized
with structure level 5 (ODS-5).
Hard links WILL be enabled.
It will be labeled I64821B.
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 system prompt asking you to enter a password for the SYSTEM account, note the following:

- Passwords must be at least 8 characters in length (but not exceeding 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 is insignificant.
- Press Enter (or Return) 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 system determines that the password is too easy for another user to guess, the system 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 I64 systems as well as Alpha and VAX systems; it is not specific to OpenVMS VAX systems). For more information, refer to the *Guidelines for OpenVMS Cluster Configurations* manual.

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, refer to Section 3.5.

For detailed information about cluster configuration, refer to the *HP OpenVMS Cluster Systems* manual.

10. **Set SCSNODE System Parameter:** The system now asks you to specify a value for the first of two system parameters, the SCSNODE parameter. (Step 11 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: **I64CSI**

11. **Declare Use of DECnet; Setting SCSSYSTEMID System Parameter:** The next prompt asks whether you plan to use DECnet. It also informs you that the SCSSYSTEMID 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 (Y/N) [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]: **63.180**

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

SCSSYSTEMID will be set to 64692.

This was calculated as follows:

$(\text{DECnet\_area\_number} * 1024) + \text{DECnet\_node\_number}$

If you are not using DECnet, or if you enter 0.0 as the DECnet Phase IV address, you are prompted to enter a SCSSYSTEMID 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:LATSYSSTARTUP.COM.

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

Enter SCSSYSTEMID [65535]: **12345**

12. **Set Local Time Zone:** Now the system 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 system 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* SYSTEMV
8* BRAZIL	24) GMT-0	40* MEXICO	56) TURKEY
9* CANADA	25) GMT	41* MIDEAST	57) UCT
10) CET	26) GMT0	42) MST	58) UNIVERSAL
11* CHILE	27) GMTPLUS0	43) MST7MDT	59* US
12) CST6CDT	28) GREENWICH	44) NAVAJO	60) UTC
13) CUBA	29) HONGKONG	45) NZ-CHAT	61) W-SU
14) EET	30) HST	46) NZ	62) WET
15) EGYPT	31) ICELAND	47* PACIFIC	63) ZULU
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: **59**

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* SYSTEMV   |
| 8* BRAZIL     | 24) GMT-0     | 40* MEXICO    | 56) TURKEY    |
| 9* CANADA     | 25) GMT       | 41* MIDEAST   | 57) UCT       |
| 10) CET       | 26) GMT0      | 42) MST       | 58) UNIVERSAL |
| 11* CHILE     | 27) GMTPLUS0  | 43) MST7MDT   | 59* US        |
| 12) CST6CDT   | 28) GREENWICH | 44) NAVAJO    | 60) UTC       |
| 13) CUBA      | 29) HONGKONG  | 45) NZ-CHAT   | 61) W-SU      |
| 14) EET       | 30) HST       | 46) NZ        | 62) WET       |
| 15) EGYPT     | 31) ICELAND   | 47* PACIFIC   | 63) ZULU      |
| 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 EASTERN / US 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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

13. **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. The procedure also asks whether the system's time zone supports daylight saving time. 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): Y
```

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

```
NEW SYSTEM TIME DIFFERENTIAL FACTOR = -4:00
```

```
Is this correct? [Y]:
```

For more information about TDF support, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

14. **Register Licenses (Optional at this time):** After setting the TDF, the system 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.

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 will register.
- The *HP OpenVMS License Management Utility Manual*, which contains complete, detailed information about the licensing procedure.

For the OpenVMS I64 operating system, a single Operating Environment (OE) license grants the right to use all the components bundled in the purchased OE. Each OE is offered with per-processor licenses (PPL). The License Management utility supports these OpenVMS I64 licensing practices. The OpenVMS Unlimited User License is included with the Foundation Operating Environment (FOE) and, therefore, is included with the other OEs available.

When you answer YES to the prompt to register your licenses now, the installation procedure invokes 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.

15. **Install Windowing and Networking Products:** The system asks whether you want to install the following windowing and networking products. Some of this software is required, as noted; some is optional.

- Availability Manager base software (required)
- CDSA (required)
- Kerberos (required)
- Performance Data Collector (base software, TDC\_RT) (required)
- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (choose only one)
- TCP/IP Services for 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.

---

**NOTE**

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 choose to install neither DECnet product; however, certain products that depend on DECnet might be affected.

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

---

The software products display is similar to the following and includes the prompts for DECwindows Motif and DECnet-Plus (because the first four products listed are required, you are not prompted to install these). Note that the Performance Data Collector in the list of products to be installed is TDC\_RT, the run-time variant (base software).

You can install the following products along with the OpenVMS operating system:

- o Availability Manager (base) for OpenVMS I64 (required part of OpenVMS)
- o CDSA for OpenVMS I64 (required part of OpenVMS)
- o KERBEROS for OpenVMS I64 (required part of OpenVMS)
- o Performance Data Collector for OpenVMS I64 (required part of OpenVMS)
- o DECwindows Motif for OpenVMS I64
- o DECnet-Plus for OpenVMS I64
- o DECnet Phase IV for OpenVMS I64
- o HP TCP/IP Services for OpenVMS

If you want to change your selections, you can do so later in the installation by answering "NO" to the following question:

"Do you want the defaults for all options?"

Do you want to install DECwindows Motif for OpenVMS I64 V1.5?  
(Yes/No) [YES] **Y**



Beginning with OpenVMS V7.1, the DECnet-Plus kit is provided with the OpenVMS operating system kit. HP strongly recommends that DECnet users install DECnet-Plus. DECnet Phase IV applications are supported by DECnet-Plus.

DECnet Phase IV is also provided as an option. Support for DECnet Phase IV is available through a Prior Version Support Contract.

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 I64 V8.2-1?  
(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 I64 V8.2-1?  
(Yes/No) [YES]

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

Do you want to install HP TCP/IP Services for OpenVMS V5.5-nn?  
(Yes/No) [YES] Y

- 16. Choose Descriptive Help Text if Desired:** After you respond to the prompt for TCP/IP Services for OpenVMS, the final stages of the installation proceed. First, the system 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 system displays additional explanatory text with each prompt.

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

The following product has been selected:  
HP I64VMS OPENVMS V8.2-1 Platform (product suite)

Configuration phase starting ...

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

HP I64VMS OPENVMS V8.2-1: OPENVMS and related products Platform

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

When selecting options, note the following:

- If you want all the default values, press Enter (or Return).  
If you want to select options individually, answer NO. The system then prompts you for each option and suboption shown in Figure 3-1 on page 60.
- 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).
- OpenVMS Management Station software is automatically installed on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use that product. After the installation is complete, you can prepare your OpenVMS system and your PC to run OpenVMS Management Station by following the procedures described in Appendix F.
- If you decide after the installation to change which OpenVMS operating system options you want installed on your system, you must reconfigure the installation as described in Section 1.4.1.2 and Section 7.10.
- After you boot the new system disk and log in, you can obtain information about individual system files by entering HELP SYSTEM\_FILES at the dollar sign prompt (\$).

---

**NOTE**

Unless you have specific reasons to do otherwise, HP 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.

Note also that, for OpenVMS I64 installations, the availability of certain options depends on the OE you have purchased. For example, OpenVMS Management Station is available with the Enterprise Operating Environment (EOE) and the Mission Critical Operating Environment (MCOE).

---

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

```
You are installing the Performance Data Collector runtime
environment for use ONLY with Version 8.2-1 of OpenVMS
on Integrity server platforms.
```

```
Note that a full kit that provides runtime environments for all
OpenVMS configurations supported by the Performance Data Collector,
and that includes a Software Developers Kit, can be downloaded from
```

URL:

`http://www.hp.com/products/openvms/tdc/`

%TDC-I-NOSTRT, The TDC startup and IVP procedures will not be run

Insert the following line in SYS\$MANAGER:SYSTARTUP\_VMS.COM:

```
@sys$startup:tdc$startup.com
```

Availability Manager (base) for OpenVMS I64 (required part of OpenVMS)

CDSA for OpenVMS I64 (required part of OpenVMS)

KERBEROS for OpenVMS I64 (required part of OpenVMS)

Performance Data Collector for OpenVMS (required part of OpenVMS)

HP I64VMS DWMOTIF V1.5: DECwindows Motif

If a Local Language Variant is installed, refer to the Installation Guide.

Do you want to continue? [YES]

If you answer NO, the installation takes you back to the main menu. If you answer YES and you chose to install DECnet Phase IV, the procedure displays additional text similar to the following before continuing. If you did not install DECnet Phase IV, the installation continues to the next step.

```
HP I64VMS DECNET_PHASE_IV V8.2-1: DECNET_PHASE_IV
```

Support addendum to the DECnet Phase IV service contract required

Do you want to continue? [YES]

If you answer NO, the installation takes you back to the main menu. If you answer YES, the installation continues as described in the next step.

**18. Finish Installation onto System Disk – Review and Confirm Options:** When you have answered all the prompts and selected the options you want installed, the system displays information about the products you have selected. The system 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 system displays all the selected options and suboptions, similar to the example in Figure 3-1. If you answer NO, the installation continues as described with the sample script (beginning with "Execution phase starting ...") that follows.

### Figure 3-1 Component Options and Suboptions

```

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 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
OpenVMS Management Station Software -- PC files
Utilities
  Phone Utility
  Error Log Generator Utility
  XPG4 Internationalization Utilities
  World Wide PostScript Printing Subsystem
Bliss Require Files
Example Files
Message Facility Files (HELP/MESSAGE)
UETP Files
DECwindows Server Support
  DECwindows workstation files
  Video fonts
    100 dots-per-inch video fonts
  Euro base support
    Euro 100 dots-per-inch video fonts
Delete any obsolete OpenVMS files
Delete files archived by OpenVMS remedial kits

```

The component options listed in Figure 3-1 are included within the OpenVMS Version 8.2-1 operating system. Depending on the products you chose to install with the operating system, additional components are included as well. After the system 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:

Execution phase starting ...

The following products will be installed to destinations:

HP I64VMS AVAIL_MAN_BASE V8.2-1	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS CDSA V2.1-nn	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS DECNET_PLUS V8.2-1	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS DWMOTIF V1.5	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS KERBEROS V2.1-nn	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS OPENVMS V8.2-1	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS TCPIP V5.5-nn	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS TDC_RT V2.1-nn	DISK\$I64SYS:[VMS\$COMMON.]
HP I64VMS VMS V8.2-1	DISK\$I64SYS:[VMS\$COMMON.]

Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%

\*\*\*\* DECwindows Motif application and run-time support files DETECTED \*\*\*\*

\*\*\*\* DECwindows device support files DETECTED \*\*\*\*

...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, messages such as the preceding DECwindows and TCP/IP messages might be displayed at this point.

**19. Final Installation Confirmation and Information Messages:** The installation continues, displaying the products that have been installed and relevant information:

The following products have been installed:

HP I64VMS AVAIL_MAN_BASE V8.2-1	Layered Product
HP I64VMS CDSA V2.1-nn	Layered Product
HP I64VMS DECNET_PLUS V8.2-1	Layered Product
HP I64VMS DWMOTIF V1.5	Layered Product
HP I64VMS KERBEROS V2.1-nn	Layered Product
HP I64VMS OPENVMS V8.2-1	Platform (product suite)
HP I64VMS TCPIP V5.5-nn	Layered Product
HP I64VMS TDC_RT V2.1-nn	Layered Product
HP I64VMS VMS V8.2-1	Operating System

HP I64VMS OPENVMS V8.2-1: OPENVMS and related products Platform

HP I64VMS KERBEROS V2.1-nn

Configure the OpenVMS Kerberos clients & servers

If Kerberos will be in use on this system  
and a current Kerberos configuration will

not be used, please take the time to run the following command after the installation has completed (and after rebooting the system if this is an OpenVMS Installation or Upgrade):

```
@SYS$STARTUP:KRB$CONFIGURE.COM
```

After configuration, two system files need to be modified. The following line should be added to SYS\$MANAGER:SYSTARTUP.COM

```
$ @SYS$STARTUP:KRB$STARTUP
```

The following line must be added to SYS\$MANAGER:SYLOGIN.COM:

```
$ @SYS$MANAGER:KRB$SYMBOLS
```

The MIT Kerberos 5 documentation has been provided as it was received from MIT. This documentation may differ slightly from the OpenVMS Kerberos implementation as it describes the Kerberos implementation in a Unix environment. The documents are:

```
KRB$ROOT:[DOC]IMPLEMENT.PDF
KRB$ROOT:[DOC]LIBRARY.PDF
KRB$ROOT:[DOC]ADMIN-GUIDE.PS
KRB$ROOT:[DOC]INSTALL-GUIDE.PS
KRB$ROOT:[DOC]KRB425-GUIDE.PS
KRB$ROOT:[DOC]USER-GUIDE.PS
```

HP I64VMS TDC\_RT V2.1-nn: 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 5000

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

HP I64VMS DWMOTIF V1.5: DECwindows Motif

System reboot is required.

If using a language variant, reboot after upgrade of language variant.

Installation Verification Procedure can be run after reboot.

HP I64VMS TCPIP V5.5-nn: HP TCP/IP Services for OpenVMS.

Check the release notes for current status of the product.

20. **Configure and Validate Boot Options if Desired:** At this point, you are asked whether you will use the system disk you just created (in this case, DKB400:) to boot this system:

```
Will DKB400 normally be used when you boot this system
from the system disk you have just intalled? (Yes/No)
```

If your newly installed system disk will normally be booted on this system and this device, and if you want the installation procedure to assist you in setting up or validating boot options on the EFI console in the EFI Boot Manager menu, answer YES.

If you do not want the installation procedure to assist you in setting up or validating boot options on the EFI console, answer NO. If you answer NO, you can set up and validate boot options later (as explained in Section A.5.2). You can boot the system disk manually now (as explained in Section 3.4).

HP recommends that you allow the installation procedure to assist you in setting up and validating boot options. Alternatively, you are given the opportunity to use the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) to check or set boot options. In either case, you can add your system disk as the first boot option in the EFI Boot Manager menu.

---

**NOTE** To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility (BOOT\_OPTIONS.COM). (Use of the utility is optional for other devices but mandatory for Fibre Channel devices.) HP recommends using the utility to add shadowed system disks in a multiple-member shadow set to the EFI boot device list and dump device list. Be sure to add all members to both lists. For information about the OpenVMS I64 Boot Manager utility, refer to Section A.5.2. For more information about configuring and booting Fibre Channel devices, refer to Appendix C.

---

- **If you answer NO**, the following message is displayed:

```
If there is an existing boot option that was used to boot this
system disk, you may be able to use it. Otherwise, you will have
to use the EFI Shell the first time that you boot the newly
installed system. After booting, use the OpenVMS I64 Boot Manager
to create a Boot Option. To do this log in to a privileged
account and execute this command:
```

```
$ @SYS$MANAGER:BOOT_OPTIONS
```

The system then informs you that the installation is complete and prompts you to press Return to continue, at which point it returns you to the OpenVMS main menu. You can select option 7 (“Execute DCL commands and procedures”) from the OpenVMS main menu and enter the command at the DCL prompt (\$\$\$) to invoke the OpenVMS I64 Boot Manager utility.

- **If you answer YES**, the installation procedure determines whether a boot entry already exists for the system disk (in this example, DKB400):

— **If an entry is found**, a message similar to the following is displayed:

```
The EFI Boot Manager menu includes the following boot option(s)
for DKB400:
```

```
EFI Boot Options list:      Timeout = 0 secs.
```

```
-----
01. DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) "OpenVMS on DKB400: PKA0.1"
-----
1 entries found.
```

In this example, one boot option is found. If multiple entries are found and if they are all SCSI devices, the procedure displays the following message and then notifies you that the installation is complete. You are given the opportunity to invoke the OpenVMS I64 Boot Manager to validate the boot option for your system.

Please use the OpenVMS I64 Boot Manager to ensure that you have a valid boot option for the system you have just installed.

When one entry is found, or when multiple Fibre Channel entries are found, the procedure displays the following information and prompt:

```
Validating will ensure that the system you have just installed
will boot correctly.
```

```
Do you want to validate the boot option(s)? (Yes/No) [Yes]
```

Validate the boot option by entering YES or by pressing Enter (or Return) at the prompt. The validation process is displayed, as in the following example, in which the found entry fails to boot and is then fixed and validated:

```
Validate EFI Boot Options list:      Timeout = 0 secs.
-----
01. DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) OpenVMS on DKB400: PKA0.1
efi$bcfg: Option Failed. Fixing Boot Entry automatically.

efi$bcfg: Entry 1 Boot0001 removed.
efi$bcfg: DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) (Boot0001) Option
successfully added
-----
1 entries validated.
```

— **If no existing entry is found**, you are asked whether you want to add a boot option:

```
Do you want to add a boot option? (Yes/No) [Yes]
```

Answer YES or press Enter (or Return) to add a boot option. A message like the following confirms that the boot option was added successfully:

```
efi$bcfg: dkb400: (Boot0001) Option successfully added.
```

```
The boot option is called "OpenVMS on DKB400: ";
it is the first entry in the Boot Options menu, and is
configured (by default) to boot from SYS0.
```

If you answer NO, you are given the opportunity to run the OpenVMS I64 Boot Manager, as described next.

At this point, whether you answered NO or YES to the initial prompt (Will DKB400: normally be used when you boot this system from the system disk you have just installed?), the following message and prompt are displayed:

```
If you want to run the OpenVMS I64 Boot Manager to examine,
change or validate entries in the EFI Boot Manager menu, you
can do so at this time.
```

```
Alternatively you can run the OpenVMS I64 Boot Manager
after the installation or upgrade completes. To do this choose
```



the DCL option from the main menu and then execute this command:

```
$$$ @SYS$MANAGER:BOOT_OPTIONS
```

You can also execute this command from a properly privileged account after booting your OpenVMS I64 system.

Do you want to run the OpenVMS I64 Boot Manager now? (Yes/No) [No]

If you answer YES, the procedure invokes the OpenVMS I64 Boot Manager. (For more information about using this utility, refer to Section A.5.2 and the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*). When you finish and exit the utility, a message indicates the installation is complete and provides other information (see the next step).

If you answer NO, a message indicates the installation is complete and is followed by other information (see the next step).

**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 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 I64VMS\_INSTALL logged out at 15-JUN-2005 14:45:49.54

Press Return to continue...

\*\*\*\*\*

You can install or upgrade the OpenVMS I64 operating system or you can install or upgrade layered products that are included on the OpenVMS I64 operating system 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 I64 Version 8.2-1
- 2) Display products and patches that this procedure can install
- 3) Install or upgrade layered products and patches
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Execute DCL commands and procedures

```
8) Shut down this system
```

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

22. **Shut Down the System:** Unless you want to perform other operations prior to booting the new system disk, choose the shutdown option (8) from 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, HP recommends doing so during the postinstallation phase, as described in Section 7.12.

```
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 8
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 Section 3.4. Make sure you remove the DVD from the drive before booting the system disk.

---

## 3.4 Booting the New OpenVMS System Disk

The following steps explain how to boot your new OpenVMS I64 system disk. For more information about this and special booting operations, refer to Section A.4

---

**NOTE** Make sure you remove the DVD from the DVD/CD drive before booting the system disk.

---

**NOTE** OpenVMS I64 does not support network booting of system disks (OpenVMS I64 cannot be an OpenVMS Cluster satellite). The system disk must be mounted locally or on a SAN storage device.

---

Take the following actions to boot the new system disk, depending on whether you have configured your system with a boot option for your system disk (as explained in step 20 in Section 3.3.3):

- **If you have configured your system with a boot option for your system disk**, your system disk appears as a boot option in the EFI Boot Manager menu. Select your system disk and press Enter (or Return). If your system disk is the first option in the EFI Boot Manager menu, it might boot automatically after the 10-second countdown.
- **If you have not configured your system with a boot option for your disk**, follow these steps:
  1. Press Enter or any other key (you might see text that instructs you to "hit any key to cold reboot"). The machine displays several boot-related messages and then displays the EFI Boot Manager menu.

- Go to the EFI Shell prompt by selecting the EFI Shell [Built-in] option from the EFI Boot Manager menu. (This might be selected automatically if you do not make a selection before the EFI countdown completes.) A display similar to the following appears. An explanation of the two types of devices shown (**blk** and **fs**) follows the example.

```

Loading.: EFI Shell [Built-in]
EFI Shell version 1.10 [14.61]
Device mapping table
fs  { fs0 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig8FCF6F11-...
     { fs1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part4,Sig8FCF6F10-...)
     blk0 : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
blk  { blk1 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
     { blk2 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig8FCF6F11-...
     { blk3 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part2,Sig8FCF6F10-...
     { blk4 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part3,Sig8FCF6F11-...
     { blk5 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part4,Sig8FCF6F10-...
     { blk6 : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part5,Sig8FCF6F10-...)
Shell>
  
```

**fs**            The fs devices are file-structured logical partitions on physical disks that are included with your Integrity server system. One or more fs device exists for each volume with a bootable **partition** or diagnostic partition. Generally, fs0: corresponds to the target disk on which you installed OpenVMS I64 (unless the DVD was not removed, in which case fs1: corresponds to the target disk). For example, if the target disk is DKA0, then fs0: most likely corresponds to the target disk. On the other hand, if the target disk is a DKA100 or DKB200 or similar, the corresponding EFI device depends on what partitions are configured on the target disk.

**blk**            The blk devices are block devices. Multiple blk devices exist for each volume that has a bootable partition or diagnostic partition. These devices may include the DVD device as well as the diagnostic partitions on OpenVMS system disks. Diagnostic partitions are intended and reserved for use by HP Services. (For more information about this partition, refer to Appendix H.)

- To boot the OpenVMS I64 system disk, enter the following command at the EFI Shell prompt, where *fsn:* is the device associated with the system disk (probably fs0:):

```
Shell> fsn:\efi\vms\vms_loader.efi
```

The OpenVMS I64 operating system now starts booting. A display similar to the following appears, followed by the prompt for user name and password:

```

HP OpenVMS Industry Standard 64 Operating System, Version 8.2-1
(c) Copyright 1976-2005 Hewlett-Packard Development Company, L.P.
  
```

Note that HP Integrity servers maintain a system event log (SEL) within system console storage, and OpenVMS I64 automatically transfers the contents of the SEL into the OpenVMS error log. On certain machines, during a successful boot operation while using a console, you might see a message indicating that the **Baseboard Management Controller (BMC)** SEL is full. You can safely continue when the BMC SEL is full by following the prompts; OpenVMS processes the contents of the SEL.

### 3.4.1 Next Steps

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

- Allows you to configure the system for standalone or OpenVMS Cluster operation (refer to Section 3.5).
- Runs AUTOGEN to evaluate your hardware configuration, estimate typical work loads, and set system parameters (refer to Section 3.6).
- Reboots your system with the new parameters (refer to Section 3.7)

After the system is rebooted with the new parameters, you can log in to your SYSTEM account, as described in Section 3.8. You can also set up EFI to boot your system automatically from your target disk, as explained in Section A.5.2. Appendix A includes additional information regarding setting up and booting HP Integrity servers.

---

## 3.5 Joining an OpenVMS Cluster

If you answered YES to the question about joining an OpenVMS Cluster, the system now asks a series of questions about your configuration (SCSI, local area, or mixed interconnect). If you answered NO to this question, the system immediately runs AUTOGEN, as described in Section 3.6. If you answered NO, you can still set up or join an OpenVMS Cluster after the installation is completed by manually running the cluster configuration utility. You can do this by entering the following command:

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

For detailed information about cluster configuration, refer to the *HP OpenVMS Cluster Systems* manual or the *Guidelines for OpenVMS Cluster Configurations* manual.

Table 3-2 lists 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. 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 (_).
What is the node's DECnet node address?	Enter the DECnet node address; for example, 2.2.
Enter this cluster's group number <sup>1</sup> :	Enter a number in the range of 1 to 4095 or 61440 to 65535.

**Table 3-2 Prompts for OpenVMS Cluster Configurations (Continued)**

Question	How to Respond
Enter this cluster's password <sup>1</sup> :	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). Refer to the <i>HP OpenVMS Cluster Systems</i> manual for information about served cluster disks.
Enter a value for MYNODE's ALLOCLASS parameter.	In an OpenVMS Cluster environment, the allocation class value cannot be zero if the node serves disks to other cluster members or if the node will be using volume shadowing. In either case, the ALLOCLASS value must be a number from 1 to 255, and each node must have a unique ALLOCLASS value. For more information about setting ALLOCLASS for clusters, refer to the <i>HP OpenVMS Cluster Systems</i> manual.
Does this cluster contain a quorum disk (Y/N)?	If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to the <i>HP OpenVMS Cluster Systems</i> manual for information about quorum disks.

1. 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.

## 3.6 Running AUTOGEN

At this point, the system automatically runs AUTOGEN to evaluate your hardware configuration and estimate typical work loads. 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:

```
Decompressing the System Libraries
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.
```

## Rebooting after AUTOGEN

```
%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$SYSTEM:SETPARAMS.DAT has been created.
    You may wish to purge this file.
%AUTOGEN-I-END, GENPARAMS phase has successfully completed.
%AUTOGEN-I-BEGIN, GENFILES phase is beginning.
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]PAGEFILE.SYS;1 extended
%SYSGEN-I-EXTENDED, SYS$SYSROOT:[SYSEXE]SWAPFILE.SYS;1 extended
%SYSGEN-I-CREATED, SYS$SYSROOT:[SYSEXE]SYSDUMP.DMP;1 created

%AUTOGEN-I-REPORT, AUTOGEN has produced some informational messages that
    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.
%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, refer to the *HP DECwindows Motif for OpenVMS Release Notes*.

---

---

**NOTE** The system libraries included with OpenVMS I64 are in expanded format. HP recommends keeping the libraries in expanded format; compressing them can hinder system performance. However, you can compress any of the libraries, if necessary. To compress (or decompress) libraries, use the OpenVMS Library Decompression utility (LIBDECOMP.COM). For complete information, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

---

---

## 3.7 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
installation will be complete.
```

```
SHUTDOWN -- Perform an Orderly System Shutdown
           on node I64CSI
```

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

After shutdown of an OpenVMS I64 system, it will reboot automatically if you have set the system disk boot option accordingly; otherwise, you must boot the system manually, as described in Section 3.4.

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. For example:

```
%SET-I-INTSET, login interactive limit = 64, current interactive value = 0
SYSTEM      job terminated at 15-JUN-2005 14:51:23.47
Accounting information:
Buffered I/O count:          2177      Peak working set size:    6848
Direct I/O count:           1358      Peak page file size:     179552
Page faults:                 1805      Mounted volumes:         0
Charged CPU time:           0 00:00:13.37  Elapsed time:           0 00:01:06.20
```

---

## 3.8 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.

### 3.8.1 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:

```
OpenVMS I64 Operating System, Version 8.2-1

Username: SYSTEM
Password:
.
.
.

OpenVMS I64 Operating System, Version 8.2-1
```

If you forget your password, follow the instructions in Section A.4.10 to perform an emergency startup.

### 3.8.2 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:

## Postinstallation Tasks

1. Enter the user name SYSTEM followed by the password.
2. Select **OK**.
3. At this point, you can create a DECTerm session or initiate other management functions. For information about creating a DECTerm session, refer to the *DECwindows Motif for OpenVMS Applications Guide*.

---

### 3.9 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, go to Chapter 7.



# 4 Before Upgrading the OpenVMS Operating System

This chapter describes which tasks you should perform prior to beginning an upgrade. Section 4.1 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 checklist in Table 4-1 to ensure that you perform all necessary tasks prior to upgrading your system.

**Table 4-1 Preupgrade Checklist**

Task	Section
<input type="checkbox"/> Review relevant documentation.	Section 4.2
<input type="checkbox"/> Review notes, cautions, and restrictions about the following: <ul style="list-style-type: none"> <li>• Upgrade paths to Version 8.2-1</li> <li>• Update license requirements</li> <li>• Components you choose not to install</li> <li>• Upgrade issues after the system disk directory structure has been changed</li> <li>• Licenses and possible reinstallation requirements for layered products</li> </ul>	Section 4.3
<input type="checkbox"/> Check for appropriate versions of software and remove older versions as directed.	Section 4.4
<input type="checkbox"/> Perform required actions before upgrading in a volume shadowing environment.	Section 4.5
<input type="checkbox"/> Save files that you do not want deleted by the upgrade procedure.	Section 4.6
<input type="checkbox"/> Prepare the system disk.	Section 4.7
<input type="checkbox"/> Ensure that you have a recent FEEDBACK.DAT file.	Section 4.8
<input type="checkbox"/> Back up the current system disk.	Section 4.9
<input type="checkbox"/> Shut down the system.	Section 4.10

## 4.2 Documentation to Review Before Upgrading Your System

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

### ***OpenVMS Version 8.2-1 Documents***

- The *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers* and the Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*

### ***OpenVMS Version 8.2 Documents***

Although not revised for OpenVMS Version 8.2-1, the following documents remain valid:

- *HP OpenVMS Version 8.2 Release Notes* (all notes that are not marked Alpha only)
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*
- *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* (specifically, the chapter entitled "Managing System Parameters"), for information about using AUTOGEN, modifying the system parameters file (MODPARAMS.DAT), and related operations
- *HP OpenVMS System Management Utilities Reference Manual*, for information about using system management utilities such as SYSMAN and ANALYZE/DISK\_STRUCTURE
- *HP 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 Upgrade Paths

The following subsections describe the various types of upgrades to OpenVMS I64 Version 8.2-1.

#### 4.3.1.1 Direct Upgrade Paths

You can upgrade *directly* to OpenVMS I64 Version 8.2-1 from only the following versions of OpenVMS I64:

- Version 8.2

#### 4.3.1.2 Cluster Concurrent Upgrades

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

### 4.3.1.3 Cluster Rolling Upgrades

During a cluster rolling upgrade, you upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster. There must be more than one system disk. The systems that are not being upgraded remain available.

The following OpenVMS I64 and OpenVMS Alpha versions are supported in mixed-version clusters that include OpenVMS I64 Version 8.2-1 (OpenVMS VAX systems are not supported with OpenVMS I64 systems in the same cluster):

- OpenVMS I64 Version 8.2
- OpenVMS Alpha Version 8.2
- OpenVMS Alpha Version 7.3-2

For more information about mixed-version OpenVMS Clusters, refer to Section 2.3. In a mixed-architecture cluster, you need to install an LMF patch on any OpenVMS Version 7.3-2 Alpha members.

If you are upgrading in a cluster environment, rolling upgrades are supported from Version 8.2 to Version 8.2-1 of the OpenVMS I64 operating system. For more information about upgrading clusters, refer to Chapter 5.

## 4.3.2 Update License Requirements

---

**IMPORTANT** To upgrade to OpenVMS I64 Version 8.2-1, you must have an appropriate license.

---

HP software licenses grant the right to use the current version of a product or any previous version of the product at the time of purchase.

---

**NOTE** When you initially purchase the OpenVMS software and license, HP 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, refer to the *HP OpenVMS License Management Utility Manual*.

---

If you need an Update License, please contact your HP Services representative.

## 4.3.3 Components You Choose Not to Install

If you choose not to install optional OpenVMS software during the upgrade, the upgrade procedure removes existing files for those components from the system disk. For more information about checking for appropriate versions of software on your system and for certain products requiring that you manually remove older versions, refer to Section 4.4.

## 4.3.4 Files and Directories

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 Version 8.2-1 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, refer to the *HP OpenVMS Guide to System Security* manual.

### 4.3.5 Licenses and Layered Products

The upgrade procedure is designed so that you do not need to reinstall most layered products after the upgrade. However, you might need to reinstall certain layered products because of product-specific installation procedures.

The upgrade procedure leaves your OpenVMS license and layered product licenses intact. You do not need to reinstall these licenses after you upgrade.

---

## 4.4 Check for Appropriate Versions of Software

Before upgrading, check that the appropriate versions of software are running on your system. Look for older versions of software that should be removed. For more information, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

---

## 4.5 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 chapter 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. *HP Volume Shadowing for OpenVMS* describes two methods you can use to create this copy (using volume shadowing commands or BACKUP commands) and how to disable volume shadowing.

### 4.5.1 Setting the Boot Device

Be sure your system is set to boot by default from the disk you intend to upgrade. HP recommends using the the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility to add shadowed system disks in a multiple-member shadow set to the EFI boot device list and dump device list. Be sure to add all members to both lists. For more information about setting boot options and using this utility, refer to Section A.5.2.

### 4.5.2 Creating a Nonshadowed Target Disk

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

---

**CAUTION** 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 (refer to Section A.4.6) on the system disk you have chosen for your target disk. For example, at the EFI Shell prompt, enter the following command, where *fsn:* is the device associated with the system disk (such as *fs1:*):

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

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, log in to the system.

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

---

## 4.6 Saving Files That You Do Not Want Deleted by the Upgrade

Archived files that were saved with the `_OLD` extension and any files you might have added or modified in the `SYS$EFI.SYS` boot partition are deleted by the upgrade procedure. You can save these files from being deleted, as explained in the following subsections.

### 4.6.1 Saving Archived Files

By default, the upgrade procedure deletes files that were archived as *filename.extension\_OLD* by OpenVMS remedial kits. If you do not want these files deleted, you can rename them before you perform the upgrade. Alternatively, you can have the upgrade procedure save them by responding to the prompts as explained in Section 6.4.2.

### 4.6.2 Saving Files Added or Modified in the `SYS$EFI.SYS` Boot Partition

When you upgrade the system disk, the upgrade removes the old `SYS$LOADABLE_IMAGES:SYS$EFI.SYS` file and replaces it with a new one. `SYS$LOADABLE_IMAGES:SYS$EFI.SYS` is the storage area for the boot partition used by the Integrity server EFI console. Any files that were in this partition before the upgrade are lost. Thus, in the unlikely event that you have added or modified files in the boot partition (you would have used EFI commands to make these changes), you must first store copies of these files off of the system disk before completing the upgrade, and then copy them back to the partition after the upgrade is complete. Be careful not to confuse these files with any boot options that you might have added or modified in the EFI Boot Manager menu; the boot options are entirely separate from the boot partition and are not removed by upgrades.

Note that the upgrade procedure displays a message warning you about the possibility of losing the files. If you have not saved the files, you can stop the procedure at that point and save them. Refer to Section 6.3.7.

## 4.7 Preparing the System Disk

The following sections describe how to prepare the system disk for the upgrade. Operations include the following:

- Examining the system disk
- Checking the SYSCOMMON directories
- Checking the size of the system disk
- Returning authorization and AGEN\$INCLUDE files to the system disk
- Verifying system parameters

### 4.7.1 Examining the System Disk

Examine and repair (if necessary) the system disk using the ANALYZE/DISK\_STRUCTURE command. (Refer to the *HP OpenVMS System Management Utilities Reference Manual: A-L* 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
```

### 4.7.2 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.

### 4.7.3 Checking the Size of the System Disk

It is difficult to determine in advance how many blocks of disk space you will 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 will need is approximately 675,000 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. HP recommends that you back up and restore the system disk prior to upgrading. Restoring the system disk from an image backup will defragment the disk. For information about backing up and restoring your system disk, refer to Appendix D.

---

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

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

### 4.7.4 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. The following sections explain how to make these files available to the upgrade procedure.

#### 4.7.4.1 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\$SYSTEM:SYLOGICALS.TEMPLATE. The logical names are defined in SYS\$STARTUP:SYLOGICALS.COM. You can modify this file during an upgrade.

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, 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.

**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

#### 4.7.4.2 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 re-set the AGEN\$INCLUDE entries in SYS\$SYSTEM:MODPARAMS.DAT.



## 4.7.5 Verifying System Parameters

Verify (and modify if necessary) system parameters as follows. (Refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* for more information about modifying system parameters.) 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 uses this new value as a base, compares it with collected data, and increases the value of GBLPAGES if necessary. Each time AUTOGEN runs, it makes the same comparison and adjusts the value of GBLPAGES, but never below the minimum indicated by MIN\_GBLPAGES.

During an upgrade, everything is set back to the default. Use current feedback.

---

**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.
- HP 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:

```
! the following changes made by K.Newcomb on 9/20/03
!  
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, refer to Section 7.20.

---

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. HP 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.

---

---

## 4.8 Ensuring You Have a Recent FEEDBACK.DAT File

Before upgrading your system, HP recommends that you have a recent AGEN\$FEEDBACK.DAT file. This file is in SYS\$SPECIFIC:[SYSEXE] (that is, in [SYSx.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 work load.

---

**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, HP recommends that you create a current AGEN\$FEEDBACK.DAT file during a time when your system is running under a typical work load. 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 work load on your system.

---

**IMPORTANT** If you invoke 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.

---

---

## 4.9 Backing Up the System Disk

HP 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, do the following:

1. Shut down the system (described in Section A.6.2).
2. Boot the operating system DVD, following the instructions in Section A.4.2.
3. Use the menu system to enter the DCL environment (option 7).
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 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 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 error message.

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 8 from the menu.

Finishing Preupgrade Tasks

8. Boot either from the original system disk or from the backup copy.

For more complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, refer to Appendix D. For more information about the Backup utility, refer to the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

---

## 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 <b>standalone system</b>	<ol style="list-style-type: none"><li>1. Log in to the SYSTEM account.</li><li>2. Enter the following command: <pre>\$ @SYS\$SYSTEM:SHUTDOWN</pre></li><li>3. When the procedure asks whether an automatic system reboot should be performed, enter N (NO).</li><li>4. Go to the checklist at the beginning of this chapter to verify that you have performed the necessary tasks.</li><li>5. Go to Chapter 6 to begin the upgrade procedure.</li></ol>
You are upgrading an <b>OpenVMS Cluster system</b>	<ol style="list-style-type: none"><li>1. Review the checklist at the beginning of this chapter to verify that you have performed the necessary tasks.</li><li>2. Go to Chapter 5.</li></ol>

---

# 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.

---

## 5.1 Preupgrade Tasks for OpenVMS Cluster Environments

---

**NOTE** Be sure you have performed the preupgrade tasks described in Chapter 4 before you upgrade your OpenVMS Cluster system.

---

Use the checklist in Table 5-1 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
<input type="checkbox"/> Review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 5.2
<input type="checkbox"/> Familiarize yourself with mixed-version, mixed-architecture, and migration support in OpenVMS Cluster systems.	Section 5.3
<input type="checkbox"/> If you are adding a new OpenVMS computer system to an existing OpenVMS Cluster, choose one of two options for upgrading.	Section 5.4
<input type="checkbox"/> Perform the preliminary tasks required for the type of upgrade you want to perform: <ul style="list-style-type: none"><li>• Concurrent upgrade</li><li>• Rolling upgrade</li></ul>	Section 5.5 <ul style="list-style-type: none"><li>• Section 5.5.1</li><li>• Section 5.5.2</li></ul>
<input type="checkbox"/> Begin the upgrade.	Chapter 6

---

---

## 5.2 Review Documentation

When you upgrade the operating system in an OpenVMS Cluster environment, be sure the following information is available to review:

***OpenVMS Version 8.2-1 Documents***

- The *Cover Letter for HP OpenVMS Version 8.2-1 for Integrity Servers* and the Software Product Descriptions included with your distribution kit
- *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*

### **OpenVMS Version 8.2 Documents**

Although not revised for OpenVMS Version 8.2-1, the following documents remain valid:

- *HP OpenVMS Version 8.2 Release Notes* (all notes that are not marked Alpha only)
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*

---

## **5.3 Mixed-Version Support in an OpenVMS Cluster Environment**

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

Warranted support means that HP has fully qualified two specified versions coexisting in an OpenVMS Cluster and will address all problems identified by customers using these configurations.

Migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS. Problem reports submitted against these configurations will be answered by HP. However, in exceptional cases, HP may request that you move to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs. The OpenVMS Version 8.2-1 release includes no configurations specific to migration support.

Warranted cluster support is provided for OpenVMS I64 Version 8.2-1 in combination with one or more of the following:

- OpenVMS I64 Version 8.2
- OpenVMS Alpha Version 8.2
- OpenVMS Alpha Version 7.3-2

---

**NOTE** System disks are architecture specific and can be shared only by systems of the same architecture. An Alpha and I64 system, or an Alpha and VAX system, cannot boot from the same system disk. However, cross-architecture satellite booting is supported. (For this release of OpenVMS I64, satellite booting is not supported.) 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, refer to the *Guidelines for OpenVMS Cluster Configurations* and *HP OpenVMS Cluster Systems* manuals.

Only two architectures are supported in the same OpenVMS Cluster: OpenVMS I64 and OpenVMS Alpha, or OpenVMS Alpha and OpenVMS VAX, but not OpenVMS I64 and OpenVMS VAX.

---

For more information, refer to the OpenVMS Technical Software Support Service Web site at:

<http://www.hp.com/go/openvms/support>

In addition, refer to the following Web site for the OpenVMS Operating System Support Chart:

<http://www.hp.com/go/openvms/supportchart>

Before introducing an OpenVMS Version 8.2-1 system into an existing OpenVMS Cluster, you might need to install certain patch kits (also known as remedial kits) on cluster members running earlier versions of OpenVMS. For a complete list of required patch kits, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

For information about supporting the Performance Data Collector base software (TDC\_RT) in OpenVMS Clusters, refer to Section 7.7.4.4.

---

## 5.4 Adding a New System to an OpenVMS Cluster

To add a new computer running OpenVMS Version 8.2-1 to an existing OpenVMS Cluster configuration, each node in the cluster must be running OpenVMS Alpha Version 7.3-2 or higher or OpenVMS I64 Version 8.2 or higher. Any node in the cluster that is running an older version of OpenVMS must be upgraded appropriately before a Version 8.2-1 node can be added.

Alternatively, any OpenVMS Alpha or I64 node that needs to be upgraded can be temporarily removed from the cluster and added back after it has been upgraded. This allows you to form the Version 7.3-2/8.2-1 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.

---

**NOTE** Currently, OpenVMS Clusters supports a maximum of two architectures. Therefore, an OpenVMS Cluster that contains both Alpha and VAX nodes cannot have an I64 node added to it.

---

---

## 5.5 Types of Upgrades

Two types of cluster upgrades are available: **concurrent** and **rolling**. 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 following:

- How a concurrent upgrade works
- Preparing your system for a concurrent upgrade

### 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:

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, refer to Section 5.5.2.3.) Then go to Chapter 6 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 from the menu for each upgrade.

2. Shut down all systems by entering the following command on each system (satellites 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. Choose the CLUSTER\_SHUTDOWN option.
5. When the shutdown procedure is finished on all nodes, halt each system by pressing either Ctrl/P or the Halt button. For more information about halting your computer, refer to Section A.6.1.
6. If you have only one system disk for your cluster, go to Chapter 6 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 postupgrade procedures.

## 5.5.2 Rolling Upgrade

This section describes the following:

- How a rolling upgrade works
- Notes and restrictions
- Preparing your system for a rolling upgrade

### 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. Refer to the *HP OpenVMS Version 8.2-1 New Features and Release Notes* for additional compatibility issues and restrictions.



- The system being upgraded does 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 do 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.) HP 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, refer to Section 5.5.2.3.)

---

**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.

---

- HP 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 I64 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 DVD (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.)
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* 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:

## Types of Upgrades

```
$ 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. Use the following command to shut down any nodes that boot from the system disk you are upgrading (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. Choose 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 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 and enter the commands at the console, as shown:

```
$ Ctrl/P
>>> D SIRR C
>>> C
IPC> Q
IPC> Ctrl/Z
```

From an OpenVMS I64 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 I64 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
```

After the shutdown procedure is finished on all nodes, go to Chapter 6 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.

---



# 6 Upgrading the OpenVMS Operating System

This chapter explains how to upgrade the OpenVMS operating system from a local DVD 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 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 to ensure that you perform all necessary upgrade tasks.

**Table 6-1 Upgrade Checklist**

Task	Section
<input type="checkbox"/> Boot the OpenVMS operating system DVD.	Section 6.2
<input type="checkbox"/> 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, Section 6.4
<input type="checkbox"/> If you did not allow the upgrade procedure to create a boot option for your upgraded system disk, add a boot option now, if desired.	Section A.5.2
<input type="checkbox"/> Reboot your system. (The steps vary according to the type of upgrade you are performing.)	Section 6.5
<input type="checkbox"/> Perform postupgrade tasks, as necessary.	Chapter 7

---

## 6.2 Booting the OpenVMS I64 Operating System DVD

The OpenVMS Version 8.2-1 operating system includes procedures (such as the POLYCENTER Software Installation utility) that allow you to easily upgrade the operating system. You can boot from a local DVD drive or from the network. For instructions on booting from a virtual DVD drive over the network, refer to Appendix B.

To boot a local OpenVMS I64 OE DVD, follow these steps. To boot the DVD on a cell-based server, a DVD device must be accessible for the nPartition that OpenVMS is being installed on.

1. Make sure your Integrity server is powered on. If your system has an attached external device, make sure it is turned on and operational.

2. Insert the DVD into the drive.
3. Cycle power.
4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. Note that the EFI boot menu is timed; press any key to stop the countdown timer.

For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn*: corresponds to the Integrity server DVD drive (such as fs0:). Note that if you have navigated to a particular file system, the EFI Shell prompt would reflect that file system; for example, if the current file system is fs0:, the EFI Shell prompt would be fs0:>.

```
Shell>fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an fs device listing that includes the letters “CDROM”, as in the following line, where *fsn* is the file system associated with the drive, which is usually fs0: (instead of "*fsn*", you might see something similar to "V8.2-1"; instead of Ata, you might see Scsi, depending on the server model):

```
fsn : Acpi(HWP0002,400)/Pci(4|1)/Ata(Primary,Master)/CDROM(Entry0)
```

You can use the following command to display the mapping of various EFI device names to OpenVMS device names, where *fsn* is the device you want to check (such as fs0:):

```
Shell>fsn:\efi\vms\vms_show dev -fs
```

On most Integrity servers, the DVD drive is DQA0:. On systems that include a SCSI bus, such as the Integrity Superdome server, the DVD drive is DKA0:. For more information about the `vms_show` command, refer to the *HP OpenVMS System Management Utilities Reference Manual*.

---

**NOTE** Remember that by default EFI interprets the Delete (or Backspace) key differently than do OpenVMS Alpha systems or Microsoft Windows computers. Use Ctrl/H to delete the last character entered. For more information, refer to Section A.1.3.

---

When the DVD boots properly, the OpenVMS operating system banner appears, followed by the operating system menu. You can now upgrade your OpenVMS I64 operating system on the target disk (refer to Section 6.3). If the methods documented in this section do not succeed to boot the DVD, refer to Section A.4.2.1.

---

**NOTE** When booting OpenVMS from the installation DVD for the first time on any OpenVMS I64 system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

---

---

## 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 DVD Menu

After you boot the operating system DVD (OpenVMS I64 OE DVD), the HP copyright banner and several messages appear, followed eventually by the operating system main menu. Choose the upgrade option (1) from the menu displayed on the screen, as in the following example:

```
Installing required known files...

Configuring devices...
.
.
.
*****

You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 operating system 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 I64 Version 8.2-1
    2) Display products and patches that this procedure can install
    3) Install or upgrade layered products and patches
    4) Show installed products
    5) Reconfigure installed products
    6) Remove installed products
    7) Execute DCL commands and procedures
    8) Shut down this system

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

### 6.3.2 Choosing INITIALIZE or PRESERVE

The procedure displays the following information and prompts:

```
*****

The installation 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 I64.

Preserve -- installs or upgrades OpenVMS I64 on the target disk and retains all other contents of the target disk.

\* NOTE: You cannot use preserve to install OpenVMS I64 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])

For 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 I64 will be installed.

Enter device name for target disk: [DKB300] (? for choices) **DKB400**

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

### 6.3.4 Checking for Recovery Data

If you specify the /SAVE\_RECOVERY\_DATA qualifier with the PRODUCT INSTALL command, the POLYCENTER Software Installation (PCSI) utility saves information that can be used to remove patches and mandatory update kits at a later time. Use the PRODUCT UNDO PATCH command to remove 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; they were backported to OpenVMS Alpha Version 7.2-2, 7.3, and 7.3-1.

The upgrade procedure now checks the disk for recovery data saved by the PCSI utility. Any recovery data must be removed before the upgrade can continue because this data becomes invalid after the upgrade. 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 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 8-APR-2005 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.

Do you want to continue? [YES]

Deleting RECOVERY DATA SET 002 ...

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.

### 6.3.5 Specifying the Volume Label

After you specify the target disk and, if applicable, check for recovery data, the system 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.

DKB400: is now labeled I64SYS.

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

Enter volume label for target system disk: [I64SYS] **I64821**

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** HP strongly recommends 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.

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.

---

### 6.3.6 Specifying the On-Disk Structure Level

If the target disk is currently initialized with On-Disk Structure Level 2 (ODS-2), the system 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.

```
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).
(? for more information)
```

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

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

- ODS-2  
ODS-2 allows for full compatibility with all OpenVMS VAX systems and with OpenVMS Alpha systems prior to Version 7.2.
- 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 I64 will be upgraded on DKB400:.
```

If you choose to change to ODS-5, you are given the option to enable hard links. (For more information about hard links, refer to the *HP 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**

DKB400: 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. (? 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 counts. 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 DKB400:.

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 I64 will be upgraded on DKB400:.

### 6.3.7 Choosing Whether to Save Files in the SYS\$EFI.SYS Boot Partition

The upgrade procedure displays the following message warning you about the possibility of losing any files that have been added or modified in the boot partition (SYS\$LOADABLE\_IMAGES:SYS\$EFI.SYS). The procedure advises you to save them now and restore them after the upgrade completes. In the unlikely event that you have added or modified such files, you can stop the upgrade procedure and save them, as explained following this example. Do not confuse these files with any boot options that you might have added or modified in the EFI Boot Manager menu; the boot options are entirely separate from the boot partition and are not removed by upgrades.

If you have never added or updated any files in the SYS\$EFI.SYS boot partition, the following message does not apply to you. Answer YES to the next question and continue the upgrade.

NOTE: Most users are not expected to have added or updated files in the SYS\$EFI.SYS boot partition. EFI-level information, such as boot options, is entirely separate from the partition. It is not necessary to re-enter such information.

The OpenVMS file `SYS$LOADABLE_IMAGES:SYS$EFI.SYS` is the storage area for the boot partition used by the Integrity server EFI console when you boot. This upgrade will replace this file.

You may have placed or modified files in the boot partition using commands from the EFI Shell prompt. Because `SYS$EFI.SYS` is the storage area for the boot partition and this file will be replaced, anything that you might have placed or modified in the boot partition will be lost. If you have placed or modified files in the boot partition, you will have to re-enter the files or modifications after this upgrade. Therefore:

BEFORE continuing with this upgrade: Make copies of these files outside of `SYS$EFI.SYS`, such as in the boot partition of another bootable disk. (If you already have such copies, you need not make additional copies.)

AFTER completing this upgrade: Restore the necessary information in the new `SYS$EFI.SYS`. You will use commands at the EFI Shell prompt to make and restore the files you have placed or modified in the boot partition

If you need to make copies of changes you have made in `SYS$EFI.SYS`, answer NO to the next question "Do you want to continue".

If you did NOT add or update any files in the `SYS$EFI.SYS` boot partition, or if you have already made copies of them, answer YES to the next question.

A future version of OpenVMS I64 is expected to support and to preserve user files in `SYS$EFI.SYS`. Currently, this action is not supported.

Do you want to continue? (Yes/No) [Yes]

If you do not have such files in the boot partition, or if you have already saved these files, then answer YES to the prompt asking whether you want to continue.

If you have such files and you want to save them now, answer NO so that you can save them. The upgrade procedure takes you to the OpenVMS operating system main menu. Select option 8 to shut down the system. Access the EFI console (if you are using a multiple-partitioned server, be sure to access the appropriate console) and use the EFI console `cp` command to copy these files off of the system disk. Then reboot the DVD to complete the upgrade. After the upgrade completes, copy those files back to the boot partition on the newly upgraded system disk.

### 6.3.8 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) **NO**

Unlike an installation, answering YES to this question does *not* cause the `SYS$MANAGER:CLUSTER_CONFIG.COM` procedure to be run. However, correct cluster membership information is required by the upgrade procedure. Note that you can run `SYS$MANAGER:CLUSTER_CONFIG.COM` 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, refer to *Guidelines for OpenVMS Cluster Configurations*.

### 6.3.9 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 information about setting the time zone information, refer to Section 3.3.3.

For more information about TDF and local time zone support, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

### 6.3.10 Selecting Reinstallation and Reconfiguration Options

If you are using the OpenVMS I64 Version 8.2-1 OE DVD and you selected a target disk that already has Version 8.2-1 installed, you are presented with several configuration options. A sample display follows. See also the example in Section 7.10.

```
Version 8.2-1 of the OpenVMS operating system is already installed
on DKB400:.
```

```
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 and patches" (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/?)

For additional configuration information, refer to Section 7.10.

### 6.3.11 Upgrading Windowing and Networking Products

The procedure now presents information about software that you can install along with the OpenVMS operating system. Some of this software is required, as noted; some is optional. The procedure asks whether you want to install the following HP windowing and networking software products:

- Availability Manager (base) for OpenVMS (required)
- CDSA (required)
- Kerberos (required)
- Performance Data Collector (base) for OpenVMS (required)
- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS or DECnet Phase IV for OpenVMS (but not both)
- TCP/IP Services for OpenVMS

Both the required and optional software is included with the OpenVMS operating system. You can change the default values for these products later in the installation/upgrade procedure.

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 CDSA, Kerberos, DECwindows Motif, DECnet-Plus, and TCP/IP Services for OpenVMS in the following example. For some of the windowing and networking products, earlier versions might be installed that still work on OpenVMS Version 8.2-1. 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 8.2-1. If you choose to keep the currently installed version, you should verify what level of support for this version is available from HP.

Some windowing and networking products might have versions installed that do not work on OpenVMS Version 8.2-1. In this case, you are not given a choice to upgrade—the software is upgraded automatically. In the following example, earlier versions of the Availability Manager and the Performance Data Collector base software are currently installed on the system; the messages indicate that they will be upgraded.

The display is similar to the following:

If necessary, the following products will be upgraded along with the OpenVMS operating system:

- o Availability Manager (base) for OpenVMS I64 (required part of OpenVMS)
- o CDSA for OpenVMS I64 (required part of OpenVMS)
- o KERBEROS for OpenVMS I64 (required part of OpenVMS)
- o Performance Data Collector (base) for OpenVMS I64 (required part of OpenVMS)
- o DECwindows Motif for OpenVMS I64
- o DECnet-Plus for OpenVMS I64
- o DECnet Phase IV for OpenVMS I64
- o HP TCP/IP Services for OpenVMS

If you want to add or delete these products, you can do so later in the upgrade by answering NO to the following question:

"Do you want the defaults for all product options?"

Availability Manager (base) for OpenVMS I64 (required part of OpenVMS) is installed on your system. It will be upgraded.

CDSA for OpenVMS I64 (required part of OpenVMS) V2.1-355 is already installed on your system. An upgrade is not required.

KERBEROS for OpenVMS I64 (required part of OpenVMS) V2.1-75 is already installed on your system. An upgrade is not required.

Performance Data Collector (base) for OpenVMS I64 (required part of OpenVMS) is installed on your system. It will be upgraded.

DECwindows Motif for OpenVMS I64 V1.5 is already installed on your system. An upgrade is not required.

DECnet-Plus for OpenVMS I64 is installed on your system. It will be upgraded.

DECnet Phase IV for OpenVMS I64 is not installed on your system. It will not be installed.

HP TCP/IP Services for OpenVMS V5.5-11  
is already installed on your system. An upgrade is not required.

---

## 6.4 Completing the Upgrade

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

### 6.4.1 Choosing Descriptive Help Text

The system 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]
```

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

### 6.4.2 Saving Archived Files

By default, the OpenVMS upgrade deletes files that were archived as *filename.extension\_OLD* by OpenVMS remedial kits. If you do not want to delete these files, you can save them by taking one of the following steps:

1. When the script asks whether you want the defaults for all options, answer NO. (This script is shown in the example in Section 6.4.3.) Step through the options and answer NO to the option for deleting files archived by remedial kits. This action saves all such files.
2. Before beginning the upgrade, rename any *\_OLD* files that you want to save. Files that you do not rename are deleted.

Note that the upgrade does not delete all files with an 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$LDR]SHELL9K.EXE_STB  
[000000]HP-I64VMS-VMS-V0820-1-2.PCSI$DESCRIPTION
```

---



### 6.4.3 Selecting Product Component Options

As you begin the upgrade procedure, the system 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:
    HP I64VMS OPENVMS V8.2-1      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.

```
HP I64VMS OPENVMS V8.2-1: OPENVMS and related products Platform
```

```
COPYRIGHT 1976, 20-JUN-2005
```

```
Hewlett-Packard Development Company, L.P.
```

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

During an upgrade, the POLYCENTER Software Installation 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 system 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 system 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 system 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.

- OpenVMS Management Station software is installed automatically on your OpenVMS system disk when you accept all the default values. If you do not accept the default values, you must select the OpenVMS Management Station component (server and client files) if you plan to use that product. After the upgrade is complete, you can then prepare your OpenVMS system and your PC to run OpenVMS Management Station by following the procedures described in Appendix F.
- 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 7.10.
- After you boot the upgraded system disk and log in, you can obtain information about individual system files by entering HELP SYSTEM\_FILES at the dollar sign prompt (\$).

---

**NOTE** Unless you have specific reasons to do otherwise, HP 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 system displays a message similar to the following, the contents of which depend on the products you chose to install. If you answer NO, the system prompts you for each option and suboption.

```
You are installing the Performance Data Collector runtime
environment for use ONLY with Version 8.2-1 of OpenVMS
on Integrity server platforms.
```

```
Note that a full kit that provides runtime environments for all
OpenVMS configurations supported by the Performance Data Collector,
and that includes a Software Developers Kit, can be downloaded from
URL:
```

```
http://www.hp.com/products/openvms/tdc/
```

```
%TDC-I-NOSTRT, The TDC startup and IVP procedures will not be run
```

```
Insert the following line in SYS$MANAGER:SYSTARTUP_VMS.COM:
```

```
@sys$startup:tdc$startup.com
```

```
Availability Manager (base) for OpenVMS I64 (required part of OpenVMS)
```

```
CDSA for OpenVMS I64 (required part of OpenVMS)
```

```
KERBEROS for OpenVMS I64 (required part of OpenVMS)
```

```
Performance Data Collector (base) for OpenVMS I64 (required part of OpenVMS)
```

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

For a list of component options included with the OpenVMS Version 8.2-1 operating system, refer to Figure 3-1 on page 60.

## 6.4.4 Component and Product Installation Confirmation Messages

When you have answered all the prompts and selected the components you want installed, the system 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.

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

```
Execution phase starting ...
```

```
%PCSI-W-VERRES, version types W through Z are reserved for HP internal use  
-PCSI-W-VERINS, the installation of product HP I64VMS AVAIL_MAN_BASE V8.2-1  
-PCSI-W-VERREM, will remove current product HP I64VMS AVAIL_MAN-BASE V8.2
```

```
%PCSI-W-VERRES, version types W through Z are reserved for HP internal use  
-PCSI-W-VERINS, the installation of product HP I64VMS OPENVMS V8.2-1  
-PCSI-W-VERREM, will remove current product HP I64VMS OPENVMS V8.2
```

```
The following products will be installed to destinations:
```

```
HP I64VMS AVAIL_MAN_BASE V8.2-1      DISK$I64821:[VMS$COMMON.]  
HP I64VMS DECNET_PLUS V8.2-1        DISK$I64821:[VMS$COMMON.]  
HP I64VMS OPENVMS V8.2-1            DISK$I64821:[VMS$COMMON.]  
HP I64VMS TDC_RT V2.1-nn            DISK$I64821:[VMS$COMMON.]  
HP I64VMS VMS V8.2-1                DISK$I64821:[VMS$COMMON.]
```

```
The following products will be removed from destinations:
```

```
HP I64VMS AVAIL_MAN_BASE V8.2        DISK$I64821:[VMS$COMMON.]  
HP I64VMS DECNET_PLUS V8.2          DISK$I64821:[VMS$COMMON.]  
HP I64VMS OPENVMS V8.2              DISK$I64821:[VMS$COMMON.]  
HP I64VMS TDC_RT V2.1-69            DISK$I64821:[VMS$COMMON.]  
HP I64VMS VMS V8.2                  DISK$I64821:[VMS$COMMON.]
```

```
Portion done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%
```

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

```
HP I64VMS AVAIL_MAN_BASE V8.2-1      Layered Product  
HP I64VMS DECNET_PLUS V8.2-1        Layered Product  
HP I64VMS OPENVMS V8.2-1            Platform (product suite)  
HP I64VMS TDC_RT V2.1-nn            Layered Product  
HP I64VMS VMS V8.2-1                Operating System
```

```
The following products have been removed:
```

```
HP I64VMS AVAIL_MAN_BASE V8.2        Layered Product  
HP I64VMS DECNET_PLUS V8.2          Layered Product  
HP I64VMS OPENVMS V8.2              Platform (product suite)  
HP I64VMS TDC_RT V2.1-69            Layered Product  
HP I64VMS VMS V8.2                  Operating System
```

```
HP I64VMS OPENVMS V8.2-1: OPENVMS and related products Platform
```

```
HP I64VMS TDC_RT V2.1: 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 4000
```

```
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
```

## 6.4.5 Configuring and Validating Boot Options

At this point during an OpenVMS I64 upgrade, you are asked whether you plan to use the system disk you just upgraded (in this case, DKB400:) to boot this system:

```
Will DKB400 normally be used when you boot this system  
from the system disk you have just intalled? (Yes/No)
```

If your newly upgraded system disk will normally be booted on this system and this device, and if you want the upgrade procedure to assist you in setting up or validating boot options on the EFI console in the EFI Boot Manager menu, answer YES.

If you do not want the upgrade procedure to assist you in setting up or validating boot options on the EFI console, answer NO. If you answer NO, you can set up and validate boot options later (refer to Section A.5.2). You can boot the system disk manually now (refer to Section A.4.5).

---

**NOTE** To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility (BOOT\_OPTIONS.COM). (Use of the utility is optional for other devices but mandatory for Fibre Channel devices.) HP recommends using this utility to add members of a multiple-member shadow set to the boot device list and the dump device list. Be sure to add all members to both device lists. For information about the OpenVMS I64 Boot Manager utility, refer to Section A.5.2. For information about configuring and booting Fibre Channel devices, refer to Appendix C.

---

- **If you answer NO**, the following message is displayed:

```
If there is an existing boot option that was used to boot this  
system disk, you may be able to use it. Otherwise, you will have  
to use the EFI Shell the first time that you boot the newly  
installed system. After booting, use the OpenVMS I64 Boot Manager  
to create a Boot Option. To do this log in to a privileged  
account and execute this command:
```

```
$ @SYS$MANAGER:BOOT_OPTIONS
```

The system then informs you that the upgrade is complete and prompts you to press Return to continue, at which point it returns you to the OpenVMS main menu. You could select option 7 (“Execute DCL commands and procedures”) from the OpenVMS main menu and enter the command at the DCL prompt (\$\$\$) to invoke the OpenVMS I64 Boot Manager utility.

- **If you answer YES**, the installation procedure determines whether a boot entry already exists for the system disk (DKB400:):
  - **If an entry is found**, a message similar to the following is displayed:

The EFI Boot Manager menu includes the following boot option(s)  
for DKB400:

```
EFI Boot Options list:      Timeout = 0 secs.
-----
01. DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) "OpenVMS on DKB400: PKA0.1"
-----
1 entries found.
```

In this example, one boot option is found. If multiple entries are found and if they are all SCSI devices, the procedure displays the following message and then notifies you that the upgrade is complete. Noted that you are given the opportunity to invoke the OpenVMS I64 Boot Manager to validate the boot option for your system.

Please use the OpenVMS I64 Boot Manager to ensure that you  
have a valid boot option for the system you have just installed.

When one entry is found, as in the example given, or if multiple Fibre Channel entries are found, the procedure displays the following information and prompt:

```
Validating will ensure that the system you have just installed
will boot correctly.
```

```
Do you want to validate the boot option(s)? (Yes/No) [Yes]
```

Validate the boot option by entering YES or by pressing Enter (or Return) at the prompt. The validation process is displayed, as in the following example, in which the found entry fails to boot and is then fixed and validated:

```
Validate EFI Boot Options list:      Timeout = 0 secs.
-----
01. DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) OpenVMS on DKB400: PKA0.1
efi$bcfg: Option Failed. Fixing Boot Entry automatically.

efi$bcfg: Entry 1 Boot0001 removed.
efi$bcfg: DKB400 PCI(0|20|1|0) Scsi(Pun1,Lun0) (Boot0001) Option
successfully added
-----
1 entries validated.
```

— **If no existing entry is found**, you are asked whether you want to add a boot option:

```
Do you want to add a boot option? (Yes/No) [Yes]
```

Answer YES or press Enter (or Return) to have the procedure add a boot option for you. You then see a message confirming that the boot option was added successfully:

```
efi$bcfg: dkb400: (Boot0001) Option successfully added.
```

```
The boot option is called "OpenVMS on DKB400: ";
it is the first entry in the Boot Options menu, and is
configured (by default) to boot from SYS0.
```

If you answer NO, you are given the opportunity to run the OpenVMS I64 Boot Manager, as described next.

At this point, whether you answered NO or YES to the initial prompt (“Will DKB400: normally be used when you boot this system from the system disk you have just installed?”), the following message and prompt are displayed:

If you want to run the OpenVMS I64 Boot Manager to examine, change or validate entries in the EFI Boot Manager menu, you can do so at this time.

Alternatively you can run the OpenVMS I64 Boot Manager after the installation or upgrade completes. To do this choose the DCL option from the main menu and then execute this command:

```
$$$ @SYS$MANAGER:BOOT_OPTIONS
```

You can also execute this command from a properly privileged account after booting your OpenVMS I64 system.

```
Do you want to run the OpenVMS I64 Boot Manager now? (Yes/No) [No]
```

If you answer YES to this prompt, the procedure invokes the OpenVMS I64 Boot Manager. (For more information about using this utility, refer to Section A.5.2 and the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*). When you finish and exit the utility, a message is displayed indicating the installation is complete, followed by other information and then the operating system menu (refer to Section 6.4.6).

If you answer NO, a message is displayed indicating the installation is complete, followed by other information and the operating system menu (refer to Section 6.4.6).

## 6.4.6 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 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 I64VMS_INSTALL logged out at 15-JUN-2005 14:45:49.54
```

```
Press Return to continue...
```

```
*****
```

```
You can install or upgrade the OpenVMS I64 operating system or you can install or upgrade layered products that are included on the OpenVMS I64 operating system 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 I64 Version 8.2-1
- 2) Display products and patches that this procedure can install

- 3) Install or upgrade layered products and patches
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Execute DCL commands and procedures
- 8) Shut down this system

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

### 6.4.7 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 (8) from the menu:

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

SYSTEM SHUTDOWN COMPLETE
```

---

## 6.5 What to Do After the Shutdown

After the system shuts down, you can add and validate a boot option for the newly upgraded system disk, using the OpenVMS I64 Boot Manager utility. Then boot the newly upgraded system disk. 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 Chapter 7 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.





# 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. Section 7.1 includes a 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 checklist in Table 7-1 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
<input type="checkbox"/> For a newly installed system disk, you can back up the disk. (At this point, you could just as well reinstall OpenVMS onto the disk instead.)  For a newly upgraded system disk, if it is <i>not</i> 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, re-form the shadow set. As an optional precaution, you can back up the system disk as well.	Section 7.2
<input type="checkbox"/> Register any licenses that were not registered during the installation; for an upgrade, register any new licenses.	Section 7.3
<input type="checkbox"/> <i>New installations only (optional):</i> Set system parameters to enable <b>volume shadowing</b>	Section 7.4
<input type="checkbox"/> If you want to form a shadow set for a newly installed system disk, you can do this now or later. If you upgraded a disk in a volume shadowing environment, re-form the shadow set.	Section 7.5
<input type="checkbox"/> <i>New installations, some upgrades:</i> Perform the following tasks that generally apply to new installations only but could also apply after an upgrade:	
<input type="checkbox"/> Create proxy files, if required.	Section 7.6.1
<input type="checkbox"/> Set up the queue manager and start the default batch and print queues.	Section 7.6.2
<input type="checkbox"/> Configure a multihead system, if applicable.	Section 7.6.3

**Table 7-1 Postinstallation and Postupgrade Checklist (Continued)**

Task	Section
<input type="checkbox"/> Configure DECnet if it was installed. After an upgrade, perform only if DECnet was added during the upgrade.	Section 7.6.4
<input type="checkbox"/> 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 7.6.5
<input type="checkbox"/> 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 7.6.6
<input type="checkbox"/> Update SYSTARTUP_VMS.COM to have networking software and other products start at boot. After an upgrade, do this only if software was added during the upgrade.	Section 7.6.7
<input type="checkbox"/> Initialize or configure the following optional products, as needed:	
<input type="checkbox"/> Initialize CDSA.	Section 7.7.1
<input type="checkbox"/> Configure Availability Manager.	Section 7.7.2
<input type="checkbox"/> Configure Kerberos.	Section 7.7.3
<input type="checkbox"/> Initialize and run the Performance Data Collector base software (TDC_RT).	Section 7.7.4
<input type="checkbox"/> Prepare your OpenVMS system and your PC to run OpenVMS Management Station, and follow procedures in Appendix F.	Section 7.7.5
<input type="checkbox"/> Create or edit a system-specific or clusterwide login welcome message SYS\$MANAGER:WELCOME.TXT (optional).	Section 7.8
<input type="checkbox"/> <i>Upgrades only:</i> Examine command procedures for which the upgrade may have provided new template files.	Section 7.9
<input type="checkbox"/> Add and remove operating system files (optional).	Section 7.10
<input type="checkbox"/> Download and apply any relevant OpenVMS or networking patches that are available (optional but recommended).	Section 7.11
<input type="checkbox"/> <i>New installations, some upgrades:</i> Install and configure layered products.	Section 7.12
<input type="checkbox"/> <i>New installations, some upgrades:</i> Create print queues.	Section 7.13
<input type="checkbox"/> Update SYSTARTUP_VMS.COM to have layered products, print queues, and other products or devices start at boot.	Section 7.14
<input type="checkbox"/> Create user accounts.	Section 7.15
<input type="checkbox"/> Run the <b>User Environment Test Package (UETP)</b> to test the system (optional).	Section 7.16

**Table 7-1 Postinstallation and Postupgrade Checklist (Continued)**

Task	Section
❑ Back up the system disk and start a systematic routine for backing up the application, data, and user disks.	Section 7.17
❑ 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 7.18
❑ <i>Upgrades only:</i> Reboot cluster members, if applicable.	Section 7.19
❑ Tune your operating system: After the system has run for at least 24 hours with users or a typical application work load on the system, run AUTOGEN to collect feedback and, if necessary, modify the MODPARAMS.DAT file.	Section 7.20 Section 7.21

## 7.2 Backing Up Your System Disk

If your system disk will be a shadow set member or a single-member shadow set, HP 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 might not be necessary, as explained in Section 7.5. However, HP still recommends that you perform a backup. The changes you make to the system disk, as recommended in this chapter, might affect all members of the shadow set. If problems arise from these changes, having a clean backup of your system disk can save you from having to repeat the installation. For a newly installed system disk, you can back up the system disk here, but it might be just as easy to reinstall the operating system if problems are encountered.

To back up the system disk:

1. Shut down the system (described in Section A.6.2).
2. Boot the operating system DVD, as described in Section 3.2.
3. Use the OpenVMS operating system menu to invoke the DCL environment (option 7).
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. 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 to a device other than a magnetic tape drive, enter the BACKUP command to back up the system disk to the target device. 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 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 error message.

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.

```
$$$ INITIALIZE MKA600: label
$$$ MOUNT /OVERRIDE=IDENTIFICATION DKA0:
$$$ BACKUP /IMAGE /LOG DKA0: MKA600:label.BCK
```

6. Log out from the DCL environment.
7. Shut down the system by selecting option 8 from the menu.
8. Boot from either the original system disk or the backup copy.

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 allows you to back up a shadowed disk without disabling the shadow set, refer to Appendix D. For more information about the Backup utility, refer to the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

---

## 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. Note that for Integrity server systems, a single OE license grants the right to use all the components bundled in the purchased OE. Each OE is offered with per-processor licenses (PPL).

For information about registering licenses, refer to the following:

- *HP OpenVMS License Management Utility Manual*
- *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes* and the *HP Operating Environments for OpenVMS for Integrity Servers Software Product Description (SPD 82.34.xx)*.

To register licenses, use the OpenVMS License utility as follows:

1. Invoke 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 Return] 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 (New Installations Only; 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 and unique per node in the cluster;
                    !it must be used if local non-FC devices are going to be
                    !shadow set members
```

In an OpenVMS Cluster, specify a unique ALLOCLASS value for each node. If a non-zero 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, refer to the *HP Volume Shadowing for OpenVMS* guide. For more information about setting ALLOCLASS for clusters, refer to the *HP OpenVMS Cluster Systems* manual.

After you have modified the MODPARAMS.DAT file as recommended, perform an AUTOGEN and reboot as follows:

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 minimum 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 REBOOT NOFEEDBACK
```

This command makes the parameter changes permanent so that they are used on subsequent reboots. The system will shut down and reboot automatically.

---

## 7.5 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, several system parameters must be set as explained in Section 7.4.

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, you can then 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             918150  1   31
$11$DKB200:   (NODE1)   Mounted  0             918150  1   31
```

2. Enter a command in the following format:

```
MOUNT/CONFIRM/SYSTEM DSA $n$ : /SHADOW=(upgraded-disk:,new-member:) volume-label
```

In this format:

- *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 you just upgraded or installed OpenVMS on.
- *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

```
$ MOUNT/CONFIRM/SYSTEM DSA54: /SHADOW=( $\$11\$DKB200$ :, $\$11\$DKB100$ :) I64082

%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label I64A082
  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,  $\$11\$DKB100$ ).

To add a shadowed system disk in a multiple-member shadow set to the EFI boot device list and dump device list, HP recommends using the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility. Be sure to add all members to both lists.

---

---

## 7.6 Customizing the System (New Installations, Some Upgrades)

You can customize the system to meet your site-specific needs. In addition, if your Integrity server 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 7.6.1)
2. Set up the queue manager, configure shared files (when multiple system disks are present), and start the default batch and print queues (Section 7.6.2)
3. Configure your multihead system if applicable (Section 7.6.3)
4. Configure DECnet if it was installed or added during an upgrade (Section 7.6.4)

5. Configure TCP/IP Services for OpenVMS if it was installed or added during an upgrade (Section 7.6.5)
6. If neither DECnet nor TCP/IP Services for OpenVMS is being used, install and configure third-party networking software if necessary (Section 7.6.6)
7. Update SYSTARTUP\_VMS.COM to have networking software (and, optionally, any other additional products you have installed) start at boot (Section 7.6.7)

For instructions on customizing the system, review the following documentation. Note that other customization tasks are described later in this chapter.

- The release notes, for notes and restrictions that might be relevant to your customization plans
- The *HP OpenVMS System Manager's Manual*, for instructions on customizing and using your system

## 7.6.1 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 (as described in Section 7.6.1).

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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. For more information about the Authorize utility, refer to the *HP OpenVMS System Management Utilities Reference Manual: A-L*.

## 7.6.2 Setting Up the Queue Manager and Default Queues

The initial installation of OpenVMS does not create the queue manager or any queues. HP recommends that you create the queue manager and your default batch and print queues now. When you install layered products (as described in Section 7.12), some of these products expect such queues to be present or try to create queues themselves.

To set up the queue manager and a batch queue, enter the following commands at the OpenVMS DCL prompt:



```
$ START QUEUE /MANAGER /NEW_VERSION  
$ INITIALIZE /QUEUE /START /BATCH SYS$BATCH
```

---

**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 *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

As noted, the queue manager automatically starts 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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

### 7.6.3 Configuring a Multihead System (Optional)

A multihead configuration consists of a single system (such as an HP 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:

1. After installing the DECwindows Motif software on your system, log in to your system.
2. 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
```

3. 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, refer to the most recent version of the *DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems*.

### 7.6.4 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.

If you installed DECnet-Plus for OpenVMS software, refer to 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, refer to the *DECnet for OpenVMS Guide to Networking*.

---

**NOTE** Support for DECnet Phase IV is available only under the HP Prior Version Support Program. Contact HP Services for additional information.

---

If you plan to run DECnet Phase IV for OpenVMS software, note the following:

- After you register the license for the DECnet Phase IV for OpenVMS software, execute the interactive command procedure SYS\$MANAGER:NETCONFIG.COM to automatically configure your system for networking. For instructions on using NETCONFIG.COM, refer to the *DECnet for OpenVMS Guide to Networking*. After all commands have been performed, the procedure asks whether you want the DECnet software started. If the license has been loaded, answer YES.
- Edit the commands in SYS\$COMMON:[SYSMGR]SYSTARTUP\_VMS.COM (as instructed in Section 7.6.7) that pertain to networking so that the DECnet Phase IV for OpenVMS software starts automatically when your system is booted. For instructions on starting DECnet Phase IV, follow the instructions in the current version of SYS\$MANAGER:SYSTARTUP.COM. (Note that if DECnet-Plus is installed, it automatically starts; you do not have to edit SYSTARTUP\_VMS.COM.)

### 7.6.5 Configuring HP TCP/IP Services for OpenVMS

If you plan to run TCP/IP Services for OpenVMS software, note the following:

- After you register and load the license for TCP/IP Services for OpenVMS software, configure your system for networking by executing the interactive command procedure SYS\$MANAGER:TCPIP\$CONFIG.COM. Be sure to consult Chapter 3 of the *HP TCP/IP Services for OpenVMS Installation and Configuration* manual for specifics about configuring TCP/IP Services for OpenVMS, and to Chapter 4 of that manual for specifics about 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 7.6.7) so that the TCP/IP Services software starts automatically when your system is rebooted.

---

**NOTE** Do not configure TCP/IP Services for OpenVMS without first starting the queue manager.

---

### 7.6.6 Installing and Configuring Third-Party Networking Software

You will 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. Refer to the appropriate vendor's product documentation.

### 7.6.7 Updating SYSTARTUP\_VMS.COM

This step applies mainly to new installations or to upgrades in which networking software or other products were added. HP recommends that you have your networking software start automatically at system boot. You might want other products you have added to start automatically as well. To make this happen, edit the SYS\$MANAGER:SYSTARTUP\_VMS.COM file. This startup file provides startup commands for HP networking software and also includes startup commands for networking software provided by several other

vendors. To enable automatic startup of any of these products, remove the exclamation point (!) and extra dollar sign (\$) that precedes the line that starts the software (in other words, change \$!\$ to \$). If you are running DECnet-Plus, DECnet is already set up to start automatically each time you boot your system.

For more information about updating SYSTARTUP\_VMS.COM and starting networking software, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. Relevant information about networking software is also included in the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*. For starting third-party networking software, refer to the appropriate vendor's product documentation.

---

## 7.7 Initializing or Configuring Installed Optional Components

Initialize and/or configure any of the following products as necessary, following the instructions in the sections indicated:

- CDSA (Section 7.7.1)
- Availability Manager (Section 7.7.2)
- Kerberos (Section 7.7.3)
- Performance Data Collector base software, TDC\_RT (Section 7.7.4)
- OpenVMS Management Station (Section 7.7.5)

### 7.7.1 Initializing CDSA (Optional)

The Common Data Security Architecture (CDSA) software is installed automatically with the operating system. However, use of CDSA is not required. If you do not plan to use CDSA or any products that depend on it, skip to the next section.

If you do plan to use CDSA, you must invoke the following command to perform a one-time configuration procedure. Invoke the command from an account that has both SYSPRV and CMKRNL privileges (for example, the SYSTEM account).

```
$ @SYS$STARTUP:CDSA$INITIALIZE
```

The following is an example of the output you might:

```
Initializing CDSA

*** Installing MDS
MDS installed successfully.

*** Installing CSSM
Module installed successfully.
*** Installing FFDL
Module installed successfully.
*** Installing 509CL
Module installed successfully.
*** Installing 509TP
Module installed successfully.
*** Installing EAYCSP
Module installed successfully.
*** Installing MAF_BSAFE
```

```
Module installed successfully.
*** Installing INSPKICLTP300
Module installed successfully.
*** Installing INTELAC
Module installed successfully.

CDSA Initialization complete

Initializing Secure Delivery

*** Installing CDSA$VALIDATE_LIBSHR
Install completed successfully.
Installing CDSA$REVOKE_LIBSHR
Install completed successfully.
*** Installing VALIDATE_SHR
Module installed successfully.
*** Installing VALIDATE_EMM_SHR
Module installed successfully.

Secure Delivery Initialization complete
```

---

**NOTE**

Do not attempt to remove CDSA from your system. The `PRODUCT REMOVE` command is not supported for CDSA even though 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 do not work cleanly and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDRF, product HP I64VMS CDSA V2.1 is referenced
  by HP I64VMS OPENVMS V8.2-1
  -PCSI-E-HRDRF1, the two products are tightly bound by this software
  dependency
  -PCSI-E-HRDRF2, if you override the recommendation to terminate the
  operation,
  -PCSI-E-HRDRF3, the referenced product will be removed, but the
  referencing
  -PCSI-E-HRDRF4, product may no longer function correctly; please review
  -PCSI-E-HRDRF5, dependency requirements for the referencing product
  Terminating is strongly recommended. Do you want to terminate? [YES]
```

---

For more information about CDSA, refer to *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture*.

### 7.7.2 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 DECams products. To display the data, you need to install either an Availability Manager or a DECams kit on a node in the local LAN. These kits are included in the OpenVMS upgrade media, or you can obtain them from the following Web site:

<http://www.hp.com/products/openvms/availabilitymanager>

The base kit files are the same files that have been provided with the OpenVMS installation kit since Version 7.2. The only change for OpenVMS Version 8.2 and higher is that these files are now 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.

For more information about how to configure and use the files in the Availability Manager base kit, refer to the section "Performing Postinstallation Tasks" in the Availability Manager installation instructions for OpenVMS (*Installing Availability Manager on OpenVMS Alpha Systems and Running DECams and the Availability Manager Concurrently*). This and other Availability Manager documents, as well as DECams documents, are available at the following Web site:

<http://www.hp.com/products/openvms/availabilitymanager>

---

**NOTE**

Although the Availability Manager base software can be removed from the system with the PRODUCT REMOVE command, HP recommends that you do not attempt to remove the software. The Availability Manager base software is installed with the operating system and is tightly bound with it. Attempts to remove it do not work cleanly and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS Availability Manager V8.2-1 is
referenced
    by HP I64VMS OPENVMS V8.2-1
    -PCSI-E-HRDRF1, the two products are tightly bound by this software
dependency
    -PCSI-E-HRDF2, if you override the recommendation to terminate the
operation,
    -PCSI-E-HRDF3, the referenced product will be removed, but the
referencing
    -PCSI-E-HRDF4, product may no longer function correctly; please review
    -PCSI-E-HRDF5, dependency requirements for the referencing product
Terminating is strongly recommended. Do you want to terminate? [YES]
```

---

### 7.7.3 Configuring Kerberos (Optional)

The Kerberos for OpenVMS software, which is based on MIT Kerberos, is automatically installed 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 HP TCP/IP Services for OpenVMS starting before Kerberos. This is required.)

\$ @SYS\$STARTUP:KRB\$STARTUP.COM

For additional setup and configuration information, refer to the *HP 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 8.2-1 kit.

---

**NOTE** Do not attempt to remove Kerberos from your system. The `PRODUCT REMOVE` command is not supported for Kerberos even though 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 do not work cleanly and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP I64VMS Kerberos V2.1 is referenced
  by HP I64VMS OPENVMS V8.2-1
  -PCSI-E-HRDRF1, the two products are tightly bound by this software
  dependency
  -PCSI-E-HRDF2, if you override the recommendation to terminate the
  operation,
  -PCSI-E-HRDF3, the referenced product will be removed, but the
  referencing
  -PCSI-E-HRDF4, product may no longer function correctly; please review
  -PCSI-E-HRDF5, dependency requirements for the referencing product
  Terminating is strongly recommended. Do you want to terminate? [YES]
```

---

### 7.7.4 Initializing and Running the Performance Data Collector Base Software (Optional)

The Performance Data Collector for HP OpenVMS (TDC) collects and manages configuration and performance data for analysis by other applications. `TDC_RT` Version 2.1 is a run-time only (base) variant of the TDC software that is automatically installed 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 remove `TDC_RT` from your system. The `PRODUCT REMOVE` command is not supported for `TDC_RT` even though there appears to be an option to remove it. `TDC_RT` is installed with the operating system and is tightly bound with it. HP or third-party applications might require `TDC_RT`. Attempts to remove it do not work cleanly and could create undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP TDC_RT V2.1-nn is referenced
  by HP I64VMS OPENVMS V8.2-1
  -PCSI-E-HRDRF1, the two products are tightly bound by this
  software dependency
  -PCSI-E-HRDF2, if you override the recommendation to terminate the
  operation,
  -PCSI-E-HRDF3, the referenced product will be removed, but the
  referencing
```

---

```
-PCSI-E-HRDF4, product may no longer function correctly; please review  
-PCSI-E-HRDF5, dependency requirements for the referencing product  
Terminating is strongly recommended. Do you want to terminate? [YES]
```

---

#### 7.7.4.1 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 allows 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 5000 pagelets.

#### 7.7.4.2 Startup File

TDC\_RT provides a startup file that should be invoked 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.

#### 7.7.4.3 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, invoke the TDC command:

```
$ TDC
```

For more information about running the application, refer to the file SYS\$COMMON:[TDC]TDC\_RT\_README.TXT. Release notes are located in the file SYS\$COMMON:[TDC]TDC\_RELEASE\_NOTES.TXT. Refer to both of these files before running the collector application.

#### 7.7.4.4 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.

For mixed-version and mixed-architecture clusters, you should obtain and install a complete Performance Data Collector kit (TDC Version 2.1) from the following Web site:

<http://www.hp.com/products/openvms/tdc>

The complete kit provides an SDK and run-time environments for all supported OpenVMS configurations. It supports installation on a clusterwide basis in mixed-version and mixed-architecture OpenVMS Clusters.

## 7.7.5 Preparing to Use OpenVMS Management Station (Optional)

If you installed the OpenVMS Management Station software on your system (either by accepting all default values or by selecting the component manually during the installation or upgrade procedure), you must perform several tasks on your OpenVMS system and your PC before you can use OpenVMS Management Station. These tasks include the following:

- Editing system files
- Starting OpenVMS Management Station on other nodes
- Verifying that you have the proper memory, disk space, media, and the required software to install and run OpenVMS Management Station on your PC
- Installing the client software on your PC
- Defining DECnet nodes (after a new installation only)

For complete information about preparing your OpenVMS system and your PC to run the OpenVMS Management Station server and client software, refer to Appendix F.

---

## 7.8 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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

## 7.9 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$SYSTARTUP.COM
[ SYSMGR ]LOGIN.COM
[ SYSMGR ]SYCONFIG.COM
[ SYSMGR ]SYLOGICALS.COM
[ SYSMGR ]SYLOGIN.COM
[ SYSMGR ]SYPAGSWPFILES.COM
[ SYSMGR ]SYSECURITY.COM
[ SYSMGR ]SYSHUTDOWN.COM
[ SYSMGR ]SYSTARTUP_VMS.COM
[ SYSMGR ]TFF$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 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.

---

## 7.10 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 `HELP SYSTEM_FILES` at the dollar sign prompt (\$).

---

---

**IMPORTANT** Unless you have a specific need to exclude operating system files from your system disk, HP 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 from 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 from the menu of options.

The following is a sample display:

Please choose one of the following:

- 1) Upgrade, install or reconfigure OpenVMS I64 Version 8.2-1
- 2) Display products and patches that this procedure can install

After Installing or Upgrading the OpenVMS Operating System  
Adding and Removing Operating System Files (Optional)

- 3) Install or upgrade layered products and patches
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Execute DCL commands and procedures
- 8) Shut down this system

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

.  
.  
.

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

.  
.  
.

Version 8.2-1 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 and patches" (option 3) 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:

HP I64VMS VMS V8.2-1 Operating System

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.

HP I64VMS OPENVMS V8.2-1: OpenVMS and related products Platform

COPYRIGHT 1976, 20-JUN-2005  
Hewlett-Packard Development Company, L.P.

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

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

Execution phase starting ...

The following product will be reconfigured:

HP I64VMS VMS V8.2-1

Portion done: 0%...10%...20%...30%...40%...50%...60%...80%...90%...100%

The following product has been reconfigured:

HP I64VMS VMS V8.2-1

.  
.  
.

Answer NO to this question, and select the options you want, as described in step 17 of the installation procedure in Section 3.3.3 (a list of component options is provided in Figure 3-1 on page 60). After you respond to the prompts, the display continues and the installation procedure completes. The following is a continuation of the sample display:

For detailed instructions on how to remove the OpenVMS operating system from your disk, refer to Appendix G.

---

## 7.11 Installing Patches (Optional but Recommended)

HP 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 patches that may be required on your system, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

To download and install OpenVMS patches, do the following:

---

**NOTE** HP strongly recommends backing up your system disk before installing patches.

---

1. Create a directory on a nonsystem disk called [PATCHES] and set default to that directory.
2. Enter the following command at the system prompt:

```
$ FTP FTP.ITRC.HP.COM
```

3. Log in as an anonymous user (user name: anonymous). The password is your email address.
4. Once you are logged in, enter the `bin` command at the `FTP>` prompt to get into binary mode, as in the following example. Binary mode is necessary for downloading patches correctly. Enter commands in this and the steps to follow in the exact case shown (lowercase or uppercase).

```
FTP> bin
200 Type is set to I.
```

5. Enter the command `PASSIVE ON`, as in the following example:

```
FTP> passive on
Passive is on.
```

6. Move to the directory containing the patches by entering the following command:

```
FTP> cd openvms_patches/i64
250 CWD command successful.
```

(For TCP/IP Services or DECnet patches, use the command `cd openvms/layered_products/i64.`)

7. Move to the directory that corresponds to the version of OpenVMS for which you want patches. For example, for OpenVMS Version 8.2-1, move to the directory `V8.2-1`.

To obtain patches for OpenVMS I64 Version 8.2-1, enter the following command (in the exact case indicated in the list; in other words, uppercase V as in “V8.2-1”, not lowercase as in “v8.2-1”):

```
FTP> cd V8.2-1
250 CWD command successful.
```

8. Search for the patch you want by using the `ls` command, specifying a few unique letters of the patch name in uppercase (all patch names are in uppercase) surrounded by asterisks. For example, to look for a patch named `VMS821I_MX2-V0100`, enter the following command:

```
FTP> ls *MX2*
227 Entering Passive Mode (192,151,52,14,235,168)
150 Opening ASCII mode data connection for file list.
VMS821I_MX2-V0100.ZIPEXE
VMS821I_MX2-V0100.txt

226 Transfer complete.
47 bytes received in 00:00:00.00 seconds (45.90 Kbytes/s)
```

The patch to be downloaded has the `.ZIPEXE` extension.

If the patch is an UPDATE patch or a TCP/IP patch, you may want to enter the hash command as shown in the following example so that you can verify that the download is happening (hash displays # symbols on the screen as the file is being downloaded).

```
FTP> hash
Hash mark printing on (1024/hash mark).
```

9. When find the patch file, use the get command to download the file, as in the following example. Remember that case is important and that all patch file names are in uppercase.

```
FTP> get VMS821I_MX2-V0100.ZIPEXE
227 Entering Passive Mode (192,6,165,75,248,228)
150 Opening BINARY mode data connection for VMS821I_MZX2-V0100.ZIPEXE
(36218732 bytes).
#####
.
.
.
#####
#####
226 Transfer complete.
local: USER5:[PATCHES]VMS82I_MX2-V0100.ZIPEXE;1
remote: VMS821I_MX2-V0100.ZIPEXE
2238464 bytes received in 00:00:01.29 seconds (1.65 Mbytes/s)
```

10. Repeat steps 8 and 9 until you have downloaded all the patches you need.
11. When you are finished, press Ctrl/Z to exit FTP and return to the DCL prompt. The patches are downloaded as compressed files. To decompress them, use the RUN command, as in the following example:

```
$ RUN VMS821I_MX2-V0100.ZIPEXE
```

This decompresses the patch into either a .PCSI file or .A file.

12. Install .PCSI or .A patches as follows:
  - a. To install .PCSI patches, use the following POLYCENTER Software Installation (PCSI) utility command:

```
$ PRODUCT INSTALL *
```

If more than one file is available, the command lists the installable products (patches) in a numbered menu. Select the patch you want to install. If only one file is available, the command displays the patch being selected for installation. In either case, you are prompted to confirm that you want to install the selected patch.

You then have the option of saving directories, files, and libraries that are replaced, modified, or deleted by the installation of this patch. Saving this recovery data facilitates removing it later (using the PRODUCT UNDO PATCH command). If you do not save this recovery data, you cannot remove the patch. However, you are given the option of renaming replaced files (by adding \_OLD to the file name extension).

- b. To install .A patches, use the following VMSINSTAL command:

```
$ @SYS$UPDATE:VMSINSTAL
```

You might see a list of processes running on the system and be asked whether you want to continue. Usually, it is safe to answer YES. You then are asked whether you are satisfied with the backup of your system disk. HP recommends that you have a current backup available in case problems occur with the installation.

Then you are asked where the distribution volumes are to be mounted. Provide a disk and directory reference for the patch (DKA100:[PATCHES]) to be installed.

Finally, you are asked the name of the patch to be installed. This is the file name of the patch, *not* including the extension. (For example, if the patch file name is DIAA.A, just specify DIAA.) You then see informational messages and might be prompted for additional information during the installation.

13. After the patch is installed, delete the .PCSI or .A file, leaving the compressed file in case you need it again.

---

## 7.12 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 can be installed as part of the OpenVMS operating system installation:

- Availability Manager (base) for OpenVMS (required)
- CDSA for OpenVMS (required)
- Kerberos for OpenVMS (required)
- Performance Data Collector base software, TDC\_RT (required)
- DECwindows Motif for OpenVMS
- DECnet-Plus for OpenVMS
- DECnet Phase IV for OpenVMS
- TCP/IP Services for OpenVMS

Other layered products—such as the Advanced Server for OpenVMS, programming languages, database software, and accounting software—are not provided with the operating system media. If these or any of the layered products included with the operating system media were not installed during the installation (or upgrade), you can install them separately by using option 3 of the main menu of the OpenVMS operating system media. Alternatively, you can install these products using the procedure described in Section 7.12.1.

In addition to the SIPs, the OpenVMS I64 OE DVD includes kits for various products that are part of the OpenVMS OEs. HP does not support installing these OE product kits while booted from the OE DVD. To install these OE products, you must use the procedure described in Section 7.12.1.

---

**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 menu 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 system, refer to Section A.6.
3. To view a list of products that can be installed, choose option 2 from 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 7.12.1, or refer to the documentation you received with the layered product. Note that HP does not support VMSINSTALL, PRODUCT INSTALL, or other PRODUCT commands from the DCL option on the DVD operating system menu.
4. To install layered products, choose option 3 from the menu. For more instructions, refer to Section 1.4.3.
5. After the installation completes, shut down the system by selecting option 8 from the menu. When you boot the target system, the layered products you installed will be present.

For additional information about installing layered products, refer to the *HP OpenVMS System Manager's Manual*.

### 7.12.1 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 (DVD).
- Layered products that require VMSINSTALL (indicated in the directories by save-set file names with file types of .A, .B, and so on)
- OpenVMS I64 OE products
- 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

For a list of layered products you can install, refer to the Software Product Descriptions included with your operating system kit. Note that some products require a license key (PAK) from HP.

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, refer to the following:
  - Installation guides for these layered products
  - *HP OpenVMS System Manager's Manual, Volume 1: Essentials*
  - Section 7.21 in this manual
  - Section 7.14 in this manual
2. After your target system disk runs AUTOGEN and boots, mount the OpenVMS operating system DVD. For example, if the DVD device 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 DVD 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 POLYCENTER Software Installation 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 DVD 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 POLYCENTER Software Installation utility (indicated in the directories by file names with file types of .PCSI or .PCSI\$COMPRESSED), use the PRODUCT INSTALL command to specify the DVD device name and directory. Following is an example of the PRODUCT INSTALL command on an I64 system:

```
$ PRODUCT INSTALL FORTRAN /SOURCE=DKB400:[I64_FORT075.KIT]
```

---

## 7.13 Creating Print Queues (New Installations, Some Upgrades)

If you want to add new print queues to the system, do so now. 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 7.15). For more information about adding print queues, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

Print queues need to be re-created each time the system starts up. To have this done automatically, add the commands that create print queues to either the SYSTARTUP\_VMS.COM file or to a user-created file located in SYS\$STARTUP and called from the SYSTARTUP\_VMS.COM file.

---

## 7.14 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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

## 7.15 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 HP 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 HP service representatives and UETP, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

## 7.16 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; HP recommends 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 HP service representatives to use. You can use the CREATE\_SPECIAL\_ACCOUNTS.COM file to create these accounts, as explained in *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

For complete information about using UETP, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

---

## 7.17 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 do so, follow the instructions in Section 7.2.

For complete information about backup operations, including a description of an alternative method that does not require booting from the operating system media, refer to Appendix D.

HP also recommends creating a systematic routine for backing up the application, data, and user disks. For more information, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

## 7.18 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 7.2.

## 7.19 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, refer to Appendix A.

---

## 7.20 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 work load 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 20000 blocks.
```

For more information about AGEN\$PARAMS.REPORT, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

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, refer to Section 4.8.)
  3. HP recommends 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 work load. Examine AGEN\$PARAMS.REPORT to determine the need for additional changes.
- 

**IMPORTANT** If you invoke 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, HP recommends that you run AUTOGEN at least weekly 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, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

---

## 7.21 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 7.21.1. These notes apply both to modifications being made after a new installation or after an upgrade. If you are modifying system parameters after an upgrade, also refer to Section 7.21.2.

### 7.21.1 General Notes about Modifying System Parameters

In modifying system parameters, note the following:

- In general, 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 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.

## Modifying System Parameters

- HP 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 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 the MODPARAMS.DAT file and about using AUTOGEN in general, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

### 7.21.2 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 allows 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.

#### 7.21.2.1 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 work loads 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 *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*), 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
```

### 7.21.2.2 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\$SYSTEM: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.



# A Setting Up the Console, Booting, and Shutting Down Your System

This appendix briefly describes the configuration and management tools that might be available on HP Integrity servers, and explains how to set up the system console, configure boot options, boot the OpenVMS I64 operating system, and shut down the operating system. The appendix also includes brief troubleshooting procedures.

Specifically, this appendix contains the following information:

- Hardware/firmware configuration and management interfaces and their features
- Setting up your system console
- Overview of using the Extensible Firmware Interface (EFI)
- Booting operations, including the following:
  - Booting the OE DVD from the local drive (for network booting information, refer to Appendix B; for Fibre Channel booting information, refer to Appendix C)
  - Booting manually from the system disk
  - Performing a conversational (interactive) boot
  - Booting with minimum startup
  - Booting with the XDelta utility (XDELTA)
  - Booting from a different root directory
  - Booting in an emergency
- Configuring and managing boot operations such as the following:
  - Setting the system for automatic booting
  - Setting and showing boot devices
  - Setting boot parameters
  - Writing a new boot block
- Halting and shutting down operations
- Troubleshooting procedures

---

**NOTE**

Any information about Integrity server hardware and utilities is provided in this manual for your convenience and is not intended to replace the hardware documentation included with your Integrity server system or the latest documentation available on the Web. HP Integrity servers come in many different configurations. Hardware, utilities, and certain hardware configuration procedures might differ significantly across models, and even across versions of the same model. Please refer to your hardware documentation for the most up-to-date information specific to your particular model and version. Note that the hardware documentation includes model-specific illustrations to guide you. The latest version of documentation for your server can be found at the following Web sites:

<http://docs.hp.com/en/hw.html>

<http://docs.hp.com>

<http://www.hp.com/support/itaniumservers>

---

## A.1 Configuration and Management Utilities for HP Integrity Servers

This section provides a brief overview of the configuration and management utilities that are typically available for your Integrity server system. For more information, refer to the appropriate hardware documentation.

### A.1.1 Overview of Utilities and Console Options

The main interfaces that are typically available for configuring and managing your HP Integrity server environment are the Extensible Firmware Interface (EFI) and the Management Processor (MP). On entry-class Integrity servers, MP has been replaced by the **Integrated Lights-Out (iLO)** Management Processor, which includes all the functionality of MP plus additional features. On some models, the Baseboard Management Control (BMC) utility is provided. Cell-based servers include additional management tools.

EFI is the main boot and preboot interface; it is the core interface to the system firmware and console commands on all models. BMC is provided on entry-class HP Integrity servers (although on a few systems the interface itself is hidden). BMC provides basic management capabilities and access to EFI. MP (or iLO) is available on most systems; on some systems it is available only if the necessary console hardware has been installed and configured. In addition to providing access to EFI, MP provides advanced management functionality (beyond that which is available through BMC), including remote management, network console and Web-based access, and enhanced diagnostic capabilities. Both BMC and MP (iLO) can operate on standby power—even when the Integrity server's main power switch is turned to the off position.

EFI is the base console environment. You can either use MP (iLO) or BMC to interact with the capabilities of the console interface.

The OpenVMS I64 installation and upgrade procedures assist you in adding a boot option for your newly installed or upgraded system disk. Before you can boot your OpenVMS system, your console must be configured correctly, as explained in Section A.2.

The following briefly describes some of the main features of EFI, MP, and BMC.

- Extensible Firmware Interface (EFI)

EFI is a menu and command-line interface between the operating system and the system firmware. The EFI interface is available only when the operating system is not booted; on cell-based servers, the interface is available from an nPartition console when the nPartition is in an active state but has not booted an operating system. To configure EFI boot options while the operating system is running, OpenVMS provides the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility. Changes made by this utility do not take effect until the system is rebooted.

The EFI Boot Manager, like the OpenVMS I64 Boot Manager, provides support for operating system loaders and allows you to configure the firmware and control the booting environment for your OpenVMS operating system. A FAT partition on the boot disk stores the system loader. The Boot Configuration



menu (or in some versions of EFI, the Boot Option Maintenance Menu) allows you to add or delete a boot option, change the boot order, select the active console, and more. After you power up the server, the EFI boot manager presents different ways to bring up the system, depending on how you have set up the boot options. For example, you can boot to the EFI Shell. When you select the EFI Shell command-line interface option, you can enter commands at the EFI Shell prompt. For more information about EFI options and commands, refer to Section A.3 and refer to the appropriate hardware documentation.

---

**NOTE** In some HP documents, you might see the acronym **POSSE** used in place of or in combination with EFI. EFI is an Intel specification of an interface between firmware and the operating system. **POSSE (Pre-OS System Environment)** is the HP implementation of EFI that extends the EFI Shell and EFI Boot Manager to include additional features for managing hardware and system boot options.

---

- Management Processor (MP)

MP (or on entry-class Integrity servers, iLO) provides both local and remote access for controlling the system console, reset/power management, and transfer of control (TOC) capabilities. It also allows you to monitor tasks and display detailed information about various internal subsystems. On cell-based servers, MP is a complex-wide tool and is always available, even if nPartitions are not configured or booted in the server complex. In contrast, EFI does not operate as a complex-wide tool and is only available when the nPartition is in an active state but has not booted an operating system; each nPartition has its own EFI interface. MP allows you to select the partition for which you want EFI access. You can access all hardware and nPartitions in the complex. The following is a brief summary of MP's main features:

- Console connectivity

As a console interface, MP allows you to interact with EFI and to power the server on or off; ultimately, it can function as the OPA0: terminal port on OpenVMS.

- Virtual Front Panel (VFP)

MP provides a virtual front panel that you can use to monitor the front panel LEDs from a remote location.

- Command interface

MP provides an extensive menu system and a command-line interface.

- Multiple, simultaneous viewers

Multiple users can access the MP console or a particular nPartition console. Only one user at a time is allowed interactive access. All other users have read-only access. (Output from the interactive user is reflected to the read-only users currently accessing the console.) Access to MP can be restricted by password-protected user accounts.

- Availability/standby power

MP is available whenever the system is connected to a power source, even if the server's main power switch is in the off position.

- Accessibility

MP is accessible in several ways, including by direct monitor connection using a terminal, PC, laptop or desktop computer connected to the MP serial port; by modem through an EIA-232 port; or by Telnet or Web browser on the LAN. MP is accessible through Secure Shell (SSH), which is provided by TCP/IP Services for OpenVMS. This method of access is more secure than any of the other methods.

- Console log

MP records recent output from the system console. The `c1` command enables you to view the recorded information.

— Event logs

MP includes event logs that include information about system events and booting. The `s1` command displays the contents of system status logs.

On some systems, such as the rx1600, MP is optional. For more information about MP options and commands, refer to the appropriate hardware documentation.

---

**NOTE** MP provides much more functionality than BMC and might be more appropriate for your needs. On some systems, MP is an optional component and on others it is built into the system.

---

- Baseboard Management Controller (BMC)

BMC is more limited in functionality than MP. BMC allows you to control some management features built into the system board, such as diagnostics, configuration, and hardware management. BMC provides a console connection on some systems. As with MP, BMC allows you to interact with EFI; it can function as the OPA0: terminal port on OpenVMS. BMC also operates on standby power. However, BMC is accessible only through the serial port on the back of the system. BMC commands allow you to control the BMC interface, view logs, get help, display firmware revisions, reset the system, turn the system locator LED on or off, and change the BMC password.

BMC is not provided on cell-based Integrity servers. On some systems, such as the rx4640, the BMC user interface is hidden but is still present and functional. For more information about BMC commands, refer to the appropriate hardware documentation.

## A.1.2 Configuration and Management Utilities on Cell-Based Servers

For the more complex environments provided by cell-based Integrity servers, a wider variety of tools is provided. Systems with multiple nPartitions provide a separate EFI interface for each nPartition. MP provides access to, and allows management across, the complex and each nPartition EFI interface.

In addition to MP and EFI (cell-based servers do not provide BMC), these systems offer Partition Manager and other tools that vary from system to system and operating system to operating system. The Partition Manager (`parmgr`) utility provides a graphical interface for managing nPartitions and complex hardware. It centralizes all nPartition management functions in one place, providing the system manager with the tools to dynamically reconfigure, power on, power off, create, delete, and modify nPartitions to ensure smooth and well-controlled operation. Partition Manager can be run on HP-UX or Microsoft Windows systems. You can use either version of Partition Manager to manage nPartitions for OpenVMS Version 8.2-1. Partition Manager is a free product that you can download from the following Web site (PARMGR must be uppercase as shown):

<http://www.docs.hp.com/en/PARMGR2/download.html>

For more information about Partition Manager, refer to the *HP System Partitions Guide: Administration for nPartitions*.

For more information about these and other tools available for configuring or managing Integrity servers, refer to the appropriate hardware documentation.

### A.1.3 Using the Delete or Backspace Key with Integrity Server Utilities

The EFI environment and the MP and BMC console interfaces on Integrity server systems interpret the Delete (or Backspace) key as do UNIX systems, which is different from the way OpenVMS Alpha systems or Microsoft Windows systems interpret them. While the OpenVMS operating system uses the ASCII DEL/RUBOUT character (7F hexadecimal) to delete the last character typed in a command line, the Integrity server facilities use Ctrl/H. When you enter commands for the Integrity server, if you press the Delete key at a VTxxx terminal (or press the key you have mapped to send the DEL/RUBOUT character code in your terminal emulator), the last character typed is not deleted.

You can remap a terminal so that the Delete key removes the last character typed by adding the following command to your login command procedure (generally, LOGIN.COM):

```
$ SET TERMINAL/BACKSPACE=DELETE
```

This command remaps Ctrl/H to DEL. The driver does not remap these keys if the terminal is in one of the following states:

- Terminal attribute is set to PASSALL
- Terminal attribute is set to PASTHRU
- IO\$\_READALL
- IO\$\_READPBLK
- Ctrl/V is entered, which tells the driver to pass the next character and skip the remap check.

Alternatively, you can set up your terminal emulator so that the Backspace key deletes the last character typed. However, for the key to work properly on OpenVMS, you must still issue the SET TERMINAL command described earlier.

---

## A.2 Selecting Your OpenVMS Console for the Integrity Server System

For a console terminal, you need a laptop, PC, or similar device that has terminal emulation software. OpenVMS supports serial console devices only; OpenVMS does not support using a VGA graphics display as a console device. To connect your console terminal to your Integrity server, you need a standard PC-to-PC file transfer cable (also known as a 9-pin null-modem serial cable). The serial port on the server system is typically set to 9600 baud, 8-bit, no parity, and stop bit 1 (check your hardware documentation: the settings can vary, depending on the port and access method). Set up your terminal emulation software accordingly, and specify VT100 mode.

---

**NOTE** For connections that require the three-connector cable (M-cable) included with your server, make sure you connect your PC-to-PC cable to the connection port labeled “Console” on the three-connector cable. All three connection ports on that cable are DB9 9-pin connectors, but only the port labeled “Console” will work. The other two connection ports are for remote (modem) and UPS connections only.

---

OpenVMS requires that you select the correct console device from an EFI firmware selection menu. The console cable must be connected to the port for the device selected. If you are already using the system console, you can skip this section. If you have ordered a machine with OpenVMS preinstalled, your console

selections have been chosen for you, but you might want to change these default console selections. If you have changed your system configuration, or if you are installing OpenVMS on a new (uninstalled) Integrity server or reinstalling OpenVMS using the INITIALIZE option (removing all the software and data files that were previously installed on the target system disk), you may need to select the correct console. If the correct console is not selected, OpenVMS might use an unexpected device as the console, and as a result, your system might appear to be hanging, or OpenVMS either will fail to boot or will boot with output sent to the wrong location.

If MP is present on your system, HP recommends using MP for your system console. With some servers, the MP console is preselected for your Integrity server. You still might need to select the correct console device to use the MP serial port for the console because the Integrity server might not initially know where to perform console I/O operations. If you intend to set up LAN or remote access for an MP console interface, you must initially use the serial port for console operations when you set up the Integrity server for the first time. (Refer to your hardware documentation for instructions on setting LAN or remote access for the MP console interface.)

To set up the correct console, follow these steps:

---

**NOTE** The process for selecting the correct console might vary for each Integrity server model and for each version of the EFI firmware.

---

1. **Decide what console you want to use.** Depending on your system configuration, OpenVMS can use one of the following types of consoles:

- System serial port
- MP serial port (if present)

Be sure you select the console you want to use. OpenVMS uses a default console that you might not want to use. Select only one console type. Selecting more than one type might bring unexpected results.

2. **Power on the system; if using an MP serial port, log in to MP and access EFI.** If you are setting the system serial port as your system console, skip to the next step. If you are setting the MP serial port as your system console, and you have just powered on your Integrity server, the MP console interface prompts you to log in. (By default, both user name and password are set to Admin. For security purposes, you should change the password immediately. Refer to your hardware documentation for more information.)

---

**NOTE** To see the MP login user name and password prompts, you might need to press Enter one or more times on your console keyboard. If this does not work, then try pressing Ctrl/B.

If you see only the MP password prompt, press Enter to get to the MP login prompt.

If the login prompt still fails to appear, the system might be powered off. (When you powered on the system, you might have pressed the power button twice, which turns it on and then off.)

If you see a message similar to the following, another user has the console (only one user can write to the console although multiple users can view it).

```
[Read only - use Ctrl-Ecf for console write access]
```

To gain control of the console from the other user, press Ctrl/E, release the key combination, and then immediately type the letters cf. Alternatively, you can have the other user log off.

Note that the system will not work if it has MP firmware older than version E02.22. For information about updating the MP firmware, refer to Section 1.3.4 and refer to your hardware documentation.

---

When the MP> prompt appears, move to the EFI interface by using the `co` (console mode) command.

On Integrity servers without nPartitions, the `co` command brings you directly to the EFI Boot Manager screen; if you do not enter a command before the EFI countdown timer expires (10 seconds by default), the EFI Shell> prompt appears. (When the operating system is running, the `co` command brings you to the console port of the operating system.)

On cell-based servers, unless you are using a single-partition user account, the `co` command first brings you to a console menu that lists the available nPartitions. You must then select the appropriate nPartition to access the EFI Boot Manager console for that nPartition. The following example shows a console menu (menus and displays such as this may vary from system to system):

```
Partitions available:
```

```
#   Name
---  ----
1)  MIA1
2)  MIA2
3)  TESTING
4)  LAN
5)  AMYS
6)  ACCNTS
Q)  Quit
```

```
Please select partition number:
```

If the `co` command results in a screen that is unexpected or difficult to interpret, pressing Enter might help.

For more information about determining which nPartition to access, refer to the *HP System Partitions Guide, Administration for nPartitions* or the appropriate hardware documentation.

- 3. Access the initial EFI Boot menu.** When you power on the Integrity server or move to console mode from MP, the EFI Boot Manager begins loading. Several messages should indicate so. If you are using the MP serial port and you do not see any messages, the system might be powered off (MP is "alive" even when the system is powered off, as long as the power cord is connected). Make sure you power on the system. Wait until you see the EFI Boot Manager screen with the boot menu. The default menu option is highlighted, as shown in the following example of a boot menu.

---

**NOTE** The appearance of EFI Boot Manager screens and menus differ from version to version of the firmware. This boot menu example is what might be seen with the latest version of the EFI firmware.

---

Boot Menu

```
EFI Shell [Built-in]
Internal Bootable DVD
-----
Boot Configuration
System Configuration
Security Configuration
```

4. **Access the EFI Boot Configuration menu.** From the initial EFI Boot menu, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu). To move to an option, use the up or down arrow keys. (With some terminal emulators, you might have to use the letter v to scroll down or the caret (^) to scroll up.) Press the Enter key to toggle the selection. If you do not select an option within the default 10-second countdown, EFI moves to the default option—the EFI Shell in the example given in step 3, in which case the EFI Shell> prompt appears. Exit the EFI Shell to return to the Boot Configuration menu. If lines from the preceding screen linger to obscure the EFI Shell prompt, press Enter to bring the EFI Shell prompt into view.
5. **Configure the Console Input, Console Output, and Console Error Devices.** If you have the latest EFI firmware, select the Console Configuration option from the Boot Configuration menu to list the console input, console output, and console error device options. Some versions of EFI list the three console device options directly in the Boot Option Maintenance Menu. Configure each of the console options one at a time, as follows:

---

**NOTE**

For OpenVMS, the input, output, and error console all must point to the same serial-line console device. New systems might be shipped with multiple devices selected for each of the console types, so you must make sure only one device is selected for each.

OpenVMS does not support booting using a USB keyboard or a VGA graphics display device. The system might boot with these devices but you does not display any visible indication that the system is booting. You might receive a warning when the system begins to boot. You might also see other errors in later stages of the boot. Additionally, you might lose output that you normally see during booting.

---

- a. **Select the Console Input Device.** EFI displays a list of devices available for console input. Select only one device from this list, and deselect any unused devices. The following is a sample list of devices, annotated with explanatory text below the list. (This example shows the devices for an entry-class Integrity server; the procedure and display differ on cell-based servers.)

<b>System Serial Port</b>	{	Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi) Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100) Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+) Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
<b>MP Console</b>	{	Acpi(HWP0002,700)/Pci(1 1)/Uart(9600 N81)/VenMsg(PcAnsi) Acpi(HWP0002,700)/Pci(1 1)/Uart(9600 N81)/VenMsg(Vt100) Acpi(HWP0002,700)/Pci(1 1)/Uart(9600 N81)/VenMsg(Vt100+) Acpi(HWP0002,700)/Pci(1 1)/Uart(9600 N81)/VenMsg(VtUtf8)
<b>VGA Device</b>	▶	Acpi(HWP0002,700)/Pci(2 0)

**System Serial Port**

These four lines indicate any of the valid devices that you can define for the console using the system serial port. Any line that has the letters Uart but not the letters Pci is one of the system serial ports. Notice the lines are almost identical except for the text following the VenMsg portion, which indicates the terminal emulation protocol. Thus, each of the four entries is the same device with different emulation protocols.

**MP Console**

These four lines (the HWP lines) appear only on systems that have an MP port. Any lines that include both Uart and Pci are MP serial port devices. As with the serial port devices, these four lines are the same device with different emulation protocols.

**VGA Device**

This is the graphic console device. Do not select this. OpenVMS does not support VGA graphics as a console output device for booting.

Select a device using the protocol appropriate for your terminal emulator (in most cases, VT100+ is the best choice). Remember that you should select only one device line. OpenVMS does not operate if more than one device is selected.

- b. **Save your settings to NVRAM.**
- c. **Select the Console Output Device.** Repeat steps a and b to configure the console output device. Select the same device selected for the console input device.
- d. **Select the Console Error Device.** Repeat steps a and b to configure the console error device (also referred to as the standard error device). Select the same device selected for the console input and output devices.

**6. Perform a Cold Reset if required.** Your system might require a cold reset. Newer versions of EFI do not require a cold reset. Refer to your hardware documentation for more information.

At this point, you can boot the OpenVMS I64 DVD to install the operating system onto a system disk. Follow the instructions in Chapter 3 (specifics for booting are provided in this appendix).

---

**NOTE** Any time new potential console devices are added to a system, or anytime NVRAM on a system is cleared, review your console selections. When you change serial devices, you must also make changes to the input, output, and error console device options to ensure proper operation.

---

## A.3 Overview of Using EFI

EFI is the basic interface between the operating system and firmware on all Integrity server systems; it is similar to SRM on Alpha systems. EFI provides a boot option menu and the ability to configure boot options. EFI is accessible when the operating system is not booted. On cell-based servers, EFI is available when the nPartition is in an active state but has not booted an operating system. Each nPartition will have its own EFI interface and system boot environment that allows you to interact with the nPartition before an operating system has booted on it.

When you first power on a new Integrity server system, you see a series of diagnostic messages followed by the EFI Boot Manager screen (unless MP is available, in which case you see the MP login screen). However, if your Integrity server came with the OpenVMS I64 operating system factory installed (FIS), then the OpenVMS I64 operating system is the first option and it boots automatically.

---

**NOTE** On some systems that include MP, you might first see the MP login screen. In addition, on cell-based servers, you initially must select the console for the nPartition you want to access. As noted previously, the behavior of Integrity server systems can vary significantly from model to model as well as from version to version of the firmware.

---

To select an option from the EFI Boot Manager menu, use the up or down arrow key to highlight an item (or for some (with some terminal emulators, you might have to use the letter v to scroll down and the caret (^) to scroll up), and then press Enter to activate the selection. You can use EFI to configure numerous options for your Integrity server and OpenVMS operating system.

For the first boot of a system on which OpenVMS is not preinstalled, you probably need to use EFI to get started. When you select the EFI Shell, the console displays much activity before the EFI Shell prompt appears. If you do not see the EFI Shell> prompt, press Enter. (Note also that the EFI Shell prompt might change, as explained in Section A.3.1.)

The EFI boot menu lists boot options. Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device. You can add boot options to the boot menu. The OpenVMS installation procedure (as well as the upgrade procedure) can assist you in adding and validating a boot option for your newly installed system disk. The procedure uses the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility to add and validate boot options. You can use this utility directly at the OpenVMS DCL prompt. HP recommends using either of these methods for configuring boot options rather than using EFI. The OpenVMS I64 Boot Manager utility is easier to use than EFI and allows you to configure the most pertinent options for your system (while OpenVMS is running), including the following:

- Display boot options known to the EFI Boot Manager.
- Add a boot option to the EFI Boot Manager so that your system disk boots automatically when the system is powered on or rebooted.
- Remove or change the position of a boot option in the EFI Boot Manager list.
- Validate and fix the boot option list.
- Change how long EFI pauses before booting or rebooting.

Use of this utility is optional for most devices but is required for configuring boot options on Fibre Channel devices. HP recommends using this utility to add members of a multiple-member shadow set to the boot list and dump device list. (Be sure to add all members to both lists.) For instructions on how to use the utility, refer to Section A.5. For more information about configuring Fibre Channel devices with this utility, refer to Appendix C. For information about using the OpenVMS I64 Boot Manager utility to display boot options,



refer to Section A.5.2.2. For information about setting the pause length, refer to Section A.5.2.3. The OpenVMS I64 Boot Manager utility also allows you to configure Dump Off the System Disk (DOSD) devices and debug devices; for more information about this, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

### A.3.1 General Notes about Using EFI

Note the following:

- **Using EFI on Cell-Based Servers:** Remember that on an Integrity server with nPartition support, a separate EFI interface exists for each nPartition. Be sure to access the appropriate nPartition console.

To determine which nPartition EFI interface you are using, use the `info sys` command at the EFI Shell prompt. This lists the local nPartition number and details about active cells. For processor details, use the `info cpu` command. (You can also use MP to provide information about the nPartition you are using, as described in the *HP System Partitions Guide, Administration for nPartitions*.)

You can use the MP console interface to access any nPartition's EFI console. Press Ctrl/B to move from EFI (or from your OpenVMS session) to the MP interface. Log in to MP if you are prompted. A menu then displays the names of all available nPartitions. Select from this list the nPartition that you want to access. To gain console write access for an nPartition console, press Ctrl/E and enter the letters `cf`. You can use the MP `pd` command to set a default nPartition for MP login; this helps to ensure you are brought to the intended nPartition (for example, to help prevent you from accidentally reconfiguring an nPartition you do not own).

To return to the EFI console (when OpenVMS is not booted), enter the `co` command at the MP> prompt.

- **Navigating EFI File System Directories:** To switch to a different file system, enter the file system name. The following example shows how to switch to fs3: from the current location (top level of the EFI Shell):

```
Shell> fs3:
fs3:\>
```

Note that the prompt is now `fs3:\>`. The EFI Shell prompt changes to reflect the file system currently accessed. The `Shell>` prompt is displayed again if you reset the system. Also note that the file system number might change when remapped after hardware changes are made to the server (for example, after an I/O drive is added to the server and the nPartition boots or the `map -r` command is issued).

- **File Structure of EFI File Systems:** The file structure of an fs disk is identical to MS-DOS and the commands to move around the structure are similar to MS-DOS commands. For example, to move to directory `efi` on disk `fs0:`, enter the `cd` command:

```
fs0:\> cd efi
fs0:\efi>
```

To display the contents of the `efi` directory, use the `dir` command.

- **EFI Commands for OpenVMS:** Most commands that you issue for OpenVMS purposes at the EFI Shell prompt are issued from `\efi\vms` on the file system associated with the system disk. You can enter such commands directly from the top level by specifying `\efi\vms` in the path for subsequent commands, or by first moving to `\efi\vms` and entering the commands without the path specification. The first example that follows shows how to enter commands from the top level. The second example shows how to move to `\efi\vms` before issuing the commands. The `vms_show` command displays the equivalent OpenVMS device name for devices mapped by EFI, and the `vms_set` command can be used to set a debug or dump device. These EFI commands for OpenVMS, known as EFI Utilities for OpenVMS, are usable only when the operating system is not running. To display and set EFI-mapped devices while the

operating system is running, use the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM), as described in Section A.5. The EFI Utilities for OpenVMS are described in the *HP OpenVMS System Management Utilities Reference Manual*.

**Example 1.** From top level:

```
fs0:\> \efi\vms\vms_show device
.
.
.
fs0:\> \efi\vms\vms_set dump_dev dga3730
```

**Example 2.** Moving first to \efi\vms:

```
fs0:\> cd \efi\vms
fs0:\efi\vms> vms_show device
.
.
.
fs0:\efi\vms> vms_set dump_dev dga3730
```

---

**NOTE** The directory structure and contents of the OpenVMS system disk differs from those of the OpenVMS I64 OE DVD. Note also that the **bootstrap** on the system disk is located at \efi\vms\vms\_loader.efi, while on the DVD it is at \efi\boot\bootia64.efi. (These two files are identical in content.)

---

- **EFI Aliases:** You can define aliases for EFI commands that are easier to remember. For example, to define the alias `dir` for the `ls` command, use the `alias` command as follows:

```
fs0:\> alias dir "ls"
```

To define an alias for the command that boots OpenVMS from `fs0:`, type the following command:

```
fs0:\> alias bvms "fs0:\efi\vms\vms_loader.efi"
```

---

**NOTE** Setting an alias to point to a specific device can lead to unexpected results. For example, if you insert a DVD in the DVD/CD drive, `fs0:` now points to the DVD/CD drive. HP recommends using the OpenVMS I64 Boot Manager utility to set your system disk as a boot device for EFI, as explained in Section A.5.

---

To list the aliases currently defined, enter the `alias` command:

```
fs0:\> alias
dir      : ls
bvms     : fs0:\efi\vms\vms_loader.efi
```

- **Boot Device List:** Any changes in storage configuration after the system is booted to EFI (such as inserting a DVD into a DVD removable drive or adding SCSI drives on storage enclosures) is not automatically detected by the EFI Shell environment. To have the EFI Shell recognize the device, you must reconnect the device driver (on cell-based servers, use the EFI `search` command; on other servers, use the EFI `reconnect` command).

The EFI shell environment creates default mappings for all the device handles that support a recognized file system. After you change the system configuration or add a new device, you must regenerate these mappings. For information about reconnecting devices and regenerating mappings, refer to Section A.4.2.1 and refer to your hardware documentation or to the Web site listed at the end of this section.

- **Moving between EFI and MP:** To move from MP interface to EFI, type `co` (for Console) at the MP> prompt. If you are in command mode (at the MP:CM> prompt), first press Ctrl/B to return to the MP> prompt.

To move from the EFI to MP, press Ctrl/B (this assumes MP is present and configured).

For more information about using EFI, refer to the documentation provided for your Integrity server. Extensive information can also be found at the following Web site:

<http://developer.intel.com/technology/efi/help/efidocs.htm>

---

## A.4 Booting Operations

This section describes various methods for booting your OpenVMS I64 operating system.

---

**NOTE** To boot your OpenVMS I64 operating system, you must be using a serial device for the console. OpenVMS does not support VGA graphics (nor USB keyboards) as console devices for booting. For information about setting up the console on your Integrity server, refer to Section A.2.

---

---

**NOTE** HP Integrity servers maintain a system event log (SEL) within system console storage, and OpenVMS I64 automatically transfers the contents of the SEL into the OpenVMS error log. During a successful boot operation while using a console, you might see a message indicating that the BMC SEL is full. You can safely continue when the BMC SEL is full by following the prompts; OpenVMS processes the contents of the SEL.

HP recommends that the latest system firmware be loaded and used. For more information about updating the system firmware, refer to Section 1.3.4. For midrange and high-end Integrity servers, contact HP Customer Support to update your firmware.

---

### A.4.1 Overview of Booting on a Cell-Based Server

This section gives an overview of booting the nPartition hardware and booting OpenVMS on an nPartition.

#### A.4.1.1 Booting the nPartition Hardware

Each nPartition runs its own firmware and has its own system boot environment. You can boot an nPartition independently of any other nPartitions in the same server complex.

The nPartition boot process includes two phases: the cell boot phase and the nPartition boot phase. Note that these phases occur only as part of the hardware boot process, not as part of the operating system boot.

## Booting Operations

1. Cell boot phase—This phase occurs when cells are powered on or reset. The main activities during this phase are the power-on-self-test activities. During this phase, cells operate independently of other cells in the complex. Cells do not necessarily proceed through this phase at the same pace, because each cell may have a different amount of hardware to discover and test, or cells might be reset or powered on at different times.
2. nPartition boot phase—This phase occurs when an nPartition has been booted, after its cells have completed their self tests. During this phase, “nPartition rendezvous” occurs, in which each cell contacts the other active cells in the nPartition and selects a core cell that is responsible for managing the rest of the nPartition boot process. A processor on the core cell runs the nPartition EFI system boot environment. When the operating system boot process is initiated, the core cell passes control to the operating system loader.

You can view progress of these phases by using the Virtual Front Panel (VFP) to check the nPartition boot state. Access VFP from the MP main menu.

For information about how to boot the nPartition hardware, refer to your hardware documentation.

### A.4.1.2 Booting OpenVMS I64 on an nPartition

---

**CAUTION** To successfully boot your OpenVMS I64 operating system and prevent loss of data, note the following.

- You must first ensure that the nPartition has its ACPI configuration set to the default (refer to Section A.5.1).
- OpenVMS I64 does not support the use of cell local memory (CLM). The nPartition on which OpenVMS I64 is booted must have all memory configured as interleaved memory (memory that may be mapped across more than one cell). Although you might be able to run OpenVMS I64 on an nPartition that has cell local memory configured, such a configuration is untested and is not supported. To check cell local memory configuration details, use the Partition Manager. For more information, refer to the *HP System Partitions Guide: Administration for nPartitions*. You can also use the EFI Shell `info mem` command. If the reported “NonInterleaved Memory” is less than 512 MB, the cell is configured completely as interleaved memory (the indicated amount of noninterleaved memory is used by the firmware).

---

As with all Integrity servers that run OpenVMS, you can boot OpenVMS I64 either by selecting a boot entry from the EFI Boot Manager or by invoking the system loader (VMS\_LOADER.EFI) from the EFI Shell. To boot OpenVMS I64, access the nPartition console and use either of these two methods:

- From the EFI Boot Manager, select the OpenVMS I64 boot entry from the boot options list and press Enter.
- From the EFI Shell, invoke the OpenVMS system loader by entering the following command at the EFI Shell prompt, where `fsn:` (such as `fs1:`) is the device associated with the OpenVMS I64 system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi
```

When invoking the VMS\_LOADER.EFI system loader, you must either specify its full path (as shown in this example) or invoke it from the `\efi\vms` directory. For more information, refer to Section A.3.1.

For booting the OpenVMS I64 OE DVD, the path is different. Enter the following command instead:

```
Shell>fsn:\efi\boot\bootia64.efi
```

---

**NOTE** The nPartition must be at EFI before beginning the OpenVMS I64 boot process. If the nPartition is not at EFI, you can use VFP to check the nPartition boot state. An nPartition might be inactive or cells might be powered off. If VFP indicates that all cells in the nPartition are in the boot-is-blocked (**BIB**) state, the nPartition is inactive and you must use the MP `bo` command to boot the nPartition past BIB and make it active. For more information, refer to your hardware documentation.

---

## A.4.2 Booting the OpenVMS I64 OE DVD from the Local Drive

To boot the OpenVMS I64 OE DVD, follow these steps. To boot the DVD on a cell-based server, a DVD device must be accessible for the nPartition that OpenVMS is being installed on.

1. Make sure your Integrity server is powered on. If your system has an attached external device, make sure it is turned on and operational.
2. Insert the DVD into the drive.
3. Cycle power.
4. From the main EFI boot menu (for cell-based servers, this must be the EFI boot menu for the nPartition on which OpenVMS is to be booted), select the appropriate item from the boot options list. Note that the EFI boot menu is timed; press any key to stop the countdown timer.

For some systems, the boot option to select is the Internal Bootable DVD option. If that option is not listed in your EFI boot menu, move to the Boot From a File menu and select the Removable Media Boot option, if present.

Alternatively (and this method is recommended for cell-based servers), boot the DVD drive from the EFI Shell prompt by entering the command shown in the following example, where *fsn*: corresponds to the Integrity server DVD drive (such as `fs0:`). Note that if you have navigated to a particular file system, the EFI Shell prompt would reflect that file system; for example, if the current file system is `fs0:`, the EFI Shell prompt would be `fs0:>`.

```
Shell>fsn:\efi\boot\bootia64.efi
```

To determine which device is the bootable DVD drive, examine the list of mapped devices and look for an `fs` device listing that includes the text `CDROM`, as in the following example, where *fsn* is the file system associated with the drive, which is usually `fs0:` (instead of *fsn*, you might see something like `V8.2-1`; instead of `Ata`, you might see `Scsi`, depending on the server model):

```
fsn : Acpi(HWP0002,400)/Pci(4|1)/Ata(Primary,Master)/CDROM(Entry0)
```

Use the `vms_show dev` command to display the mapping of various EFI device names to OpenVMS device names, as in the following example where *fsn* is the device you want to check (such as `fs0:`):

```
Shell>fsn:\efi\vms\vms_show dev -fs
```

For more information about the `vms_show` command, refer to the *HP OpenVMS System Management Utilities Reference Manual*.

---

**NOTE** Remember that by default EFI interprets the Delete (or Backspace) key differently than do OpenVMS Alpha or Microsoft Windows systems. Press `Ctrl/H` to delete the last character entered. For more information, refer to Section A.1.3.

---

When the DVD boots properly, the OpenVMS operating system banner appears, followed by the operating system menu. You can now install your OpenVMS I64 operating system onto the target disk; refer to Section 3.3. If the DVD fails to boot properly use the alternate method of booting described in Section A.4.2.1.

---

**NOTE** When booting OpenVMS from the installation DVD for the first time on any OpenVMS I64 system with a SAN storage device, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes.

---

### A.4.2.1 Alternate Method of Using EFI to Boot the DVD

If the DVD does not boot using the methods described above, follow these steps:

1. To ensure that EFI can access the DVD, enter the following commands at the EFI Shell prompt of a entry-class or single-cell Integrity server. Enter the commands in the order shown. (The EFI Shell prompt may not necessarily be Shell> as in this example; it could be a prompt that reflects the current file system, such as fs0:>.)

```
Shell> reconnect -r
Shell> map -r
```

For a multiple-cell nPartition on a cell-based server, use the `search all` command instead of the `reconnect -r` command, followed by the `map -r` command. Refer to your hardware documentation for more information about EFI commands.

The `reconnect -r` command discovers any devices added after booting the server. The `search all` command discovers all devices including any that were not in the boot options list or connected to the core cell's I/O chassis. (On large server systems, the `search all` command could take significant time to complete. You can reduce the search time by specifying a more directed search, such as for a specific I/O chassis connected to a cell or a specific PCI card in a chassis. For more information, refer to the help information provided for the `search` command.)

The `map -r` command remaps and rebuilds the list of known devices that have a bootable EFI system partition. For a multiple-cell nPartition on a cell-based server, if you insert the DVD after EFI is loaded, you must use the `search` command to allow EFI to detect the inserted DVD; otherwise, EFI would not recognize the DVD in the DVD drive. When EFI detects a valid, bootable DVD in the DVD drive, it maps an fs device to it and lists that device in the mapping table displayed by the `map -r` command.

2. To boot the DVD, enter the following command at the EFI Shell prompt, where `fsn:` is the Integrity server DVD drive (such as `fs0:`).

```
Shell>fsn:\efi\boot\bootia64.efi
```

If this command does not work, or if you have doubts about which device maps to the DVD drive, you can use the EFI Boot Manager menu system to boot the OE DVD, as described in the following steps:

- a. From the main EFI boot menu, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu).
- b. From the Boot Configuration menu, select the Boot From a File option.
- c. From the Boot From a File menu, select the menu item that includes the text CDROM, as in the following example, and press Enter.

---

**NOTE** The contents of the screens shown in the following examples vary according to the firmware and devices installed on your Integrity server.

---

Boot From a File. Select a Volume

```
V8.2-1 [Acpi(HWP0002,400)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)]
Load File [EFI Shell [Built-in]]
Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306EF3A2B6)]
Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306EF312E4)]
Exit
```

- d. A screen appears that shows the top-level directory structure of the DVD, similar to the screen in the following example. Select the `efi` directory.

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]
```

```
Select file or change to new directory:
```

```
n/nn/nn 06:21a<DIR> 2,048 efi
[Treat like Removable Media Boot]
Exit
```

- e. The next screen to appear shows the first level of subdirectories below the top level, similar to the following example. Select the `boot` directory (it contains the boot file).

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]
```

```
Select file or change to new directory:
```

```
n/nn/nn 06:21a<DIR> 2,048 .
n/nn/nn 06:21a<DIR> 0 ..
n/nn/nn 06:21a<DIR> 2,048 boot
n/nn/nn 06:21a<DIR> 2,048 vms
Exit
```

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- f. The next screen displays the files within the boot directory. Select the file named `bootia64.efi`.

```
EFI Boot Maintenance Manager ver n.nn[nn.nn]

Select file or change to new directory:

n/nn/nn 06:21a<DIR>      2,048 .
n/nn/nn 06:21a<DIR>      2,048 ..
.
.
.
n/nn/nn 06:21a          334,848 bootia64.efi
.
.
.

Exit
```

**A.4.3 Booting the OpenVMS I64 OE DVD from the InfoServer**

For operating system upgrades only, OpenVMS I64 Version 8.2-1 supports booting from a virtual DVD drive on the local area network (LAN) using OpenVMS I64 InfoServer software. You must perform certain configuration steps before you can use the InfoServer software for booting over the network. These steps and the instructions for performing the network boot are described in Appendix B.

**A.4.4 Booting from a Fibre Channel Device**

For instructions on booting from a Fibre Channel (FC) storage device, refer to Appendix C.

**A.4.5 Booting Manually from the Local System Disk**

HP recommends setting up your Integrity server EFI console with a boot option for your OpenVMS I64 operating system disk. In this way, booting the system disk simply requires selecting the boot option from the EFI Boot Manager boot options list. You can set the EFI boot option to boot automatically on powering on or rebooting. The OpenVMS installation and upgrade procedures can assist you in adding and validating a boot option for your system disk; you can also use the OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility, as explained in Section A.5.2.

To boot the OpenVMS I64 operating system disk manually, follow these steps:

---

**NOTE** If you have recently booted the OpenVMS I64 OE DVD, make sure you remove this DVD before booting the system disk.

OpenVMS I64 does not support network booting of system disks, nor does it support OpenVMS Cluster satellites. On Integrity server systems, the system disk must be mounted locally (on the system you are booting) or on a SAN storage device.

---

1. If OpenVMS is not running, skip to the next step. If OpenVMS is running, access the EFI console by shutting down the operating system (refer to the instructions in Section A.6).
2. Boot the system disk manually by entering the following command at the EFI Shell prompt, where `fsn:` (such as `fs1:`) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi
```



You must either specify the full path (as shown in this example) or invoke the system loader from the `\efi\vms` directory. For more information, refer to Section A.3.1.

### A.4.6 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 (IA64VMSSYS.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 I64 operating system is running.	Step 1
The OpenVMS I64 operating system is <i>not</i> running.	Step 4

1. Log in to the SYSTEM account.
2. Enter the following command:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Enter (or Return) for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE
```

4. Halt the system or nPartition. (Refer to Section A.6 for more information about how to halt your Integrity server).
5. Begin the conversational boot by entering the following command at the EFI Shell prompt, where `fsn:` is the device (such as `fs1:`) associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

6. At the `SYSBOOT>` prompt, you can enter any of the SYSGEN commands listed in Table A-1. For more information about these SYSGEN commands, refer to the *HP OpenVMS System Management Utilities Reference Manual: M-Z*.
7. When you finish using the SYSGEN commands, enter the CONTINUE command to complete the boot process.

**Table A-1**            **SYSGEN Commands Used in the SYSBOOT Procedure**

<b>Command</b>	<b>Description</b>
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 <i>parameter-name</i>	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [ <i>parameter</i> ]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [ <i>file-spec</i> ]	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.
USE DEFAULT	Specifies that default values be used for all parameters.

For examples of conversational booting, refer to Section A.4.7 and Section A.4.10.

### **A.4.7 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 following command at the EFI Shell prompt, where *fsn:* is the device (such as fs1:) associated with the system disk and the system root is [SYS0...]:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

2. Enter the following command:

```
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
```

### A.4.8 Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Integrity servers 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.

```
EFI> fs1:\efi\vms\vms_loader.efi -flags 0,7
```

The following is an example of booting with XDELTA from fs1: at the EFI> prompt:

For more information about using XDELTA, refer to the *HP OpenVMS Delta/XDelta Debugger Manual*.

### A.4.9 Booting from a Different Root Directory

By default, the OpenVMS I64 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. (Refer to the *HP OpenVMS System Manager's Manual* for more information about using the SYS\$MANAGER:CLUSTER\_CONFIG.COM procedure.)

To boot from a different root (for example, [SYS3]), enter the following command at the EFI Shell prompt, where *fsn:* (such as fs1:) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 3,0
```

## A.4.10 Emergency Booting

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table A-2 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

**Table A-2 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

### A.4.10.1 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, HP 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, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.) 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 following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

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
```

- 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, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.
- Shut down and 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)]
.
.
.
$ @SYS$UPDATE:AUTOGEN SAVPARAMS REBOOT

```

#### A.4.10.2 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 HP should always work. However, if you introduce an error when you modify the startup or login procedure, you could accidentally lock yourself out of the system.

#### How to Perform This Task

- Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

- Enter the following command at the SYSBOOT> prompt:

```
SYSBOOT> SET/STARTUP OPA0:
```

- 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
```

- Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

- When the system is booted, the operator console displays the DCL command prompt (\$). You are now logged in.

- Enter the following two DCL commands:

```

$ SPAWN
$ SET NOON

```

**Booting Operations**

The SPAWN command allows you to stay connected to the console, and the second command instructs the operating system to ignore any errors that might occur. If you do not enter these commands and you invoke an error, the system logs you out. Without the SPAWN command, you are logged out when the startup procedure completes in step 8.

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.)

Invoke a text editor to correct the startup or login file. Note that some system displays might not support 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
$ SPAWN
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ @SYS$SYSTEM:STARTUP
```

**A.4.10.3 Booting without a User Authorization File**

Ordinarily, the startup and login procedures provided by HP 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 following the steps given in this section.

**How to Perform This Task**

1. Halt the system or nPartition. (Refer to Section A.6 for more information about how to halt your Integrity server.)
2. Begin the conversational boot by entering the following command at the EFI Shell prompt, where *fsn:* (such as *fs1:*) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 0,1
```

You need your hardware system's password for logging in to the console. By default, both the user name and password are set to Admin. If you do not have this password, contact HP 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 the following:

- OpenVMS read the system startup commands directly from the system console.
- The windowing 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. These commands allow a normal system startup while you are left logged in on the console. Without the SPAWN command, you are 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.

### Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SPAWN
$ @SYS$SYSTEM:STARTUP
$
```

---

### NOTE

Instead of using the SET/STARTUP OPA0: command in emergency conditions, you can 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.

HP 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.

---

---

## A.5 Configuring and Managing OpenVMS Booting on Integrity Servers

This section explains how to configure and manage the booting behavior of your Integrity server. You can use the EFI Boot Manager (while the operating system is not running) or the OpenVMS I64 Boot Manager (while the operating system is running) to configure boot options. HP recommends using the latter.

You can configure multiple boot entries for a single operating system. On a cell-based Integrity server running multiple operating systems, you can configure boot options for all currently installed operating systems. On cell-based servers, each nPartition has a local instance of EFI that is specific to that partition. Each partition can be booted and stopped independently of other nPartitions in the system, and each partition executes its own operating system image.

On cell-based servers, to successfully boot an operating system you must first ensure that the ACPI configuration is correct for the operating system being booted, as explained in Section A.5.1. Each nPartition has its own ACPI configuration value.

---

**IMPORTANT** To configure booting on a Fibre Channel storage device, you must use the OpenVMS I64 Boot Manager utility. (For information about configuring Fibre Channel devices, refer to Appendix C.) HP also recommends using this utility to add members of a multiple-member shadow set to the boot device list and dump device list. Be sure to add all members to both lists.

---

If you have just completed the initial setup of your Integrity server, perform the following steps before continuing:

1. Power up your server system, as explained in the hardware documentation for your server. If you use the power button on the front panel, press it only once.

---

**NOTE** If you see a warning that the BMC system event log (SEL) is full, you can safely continue by following the prompts; OpenVMS processes the contents of the SEL. If you want to clear the SEL manually, refer to the instructions in the first note of Section A.4.

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, refer to Section 1.3.4.

---

2. If you have a cell-based server, check that the ACPI configuration is correct for the OpenVMS operating system. For more information, refer to Section A.5.1.
3. At the EFI Boot Manager menu, select the EFI Shell [Built-in] option. You can now boot your OpenVMS I64 system manually, or you can add a new entry to the EFI Boot Manager menu to have your system booted automatically whenever you power on your Integrity server or reboot.

This section discusses the following topics:

- Checking the ACPI configuration for nPartition booting (Section A.5.1)
- Setting automatic booting and boot flags for your system disk (Section A.5.2) (also includes how to set automatic booting using EFI commands)
- Displaying EFI boot entries and mapped OpenVMS devices, using the OpenVMS I64 Boot Manager utility (Section A.5.2.2) (also includes how to display boot entries using EFI commands)
- Setting the EFI boot option timeout value, using the OpenVMS I64 Boot Manager utility (Section A.5.2.3)
- Writing a new boot block, using the OpenVMS I64 SET BOOTBLOCK command (Section A.5.3)
- Comparing Alpha and Integrity server system boot commands (Section A.5.4)

### A.5.1 Checking the ACPI Configuration for Booting OpenVMS in an nPartition

To boot your OpenVMS I64 operating system on a cell-based server, the ACPI configuration must be set correctly. The ACPI configuration value determines, among other things, the EFI Path format used when referencing devices. If your Integrity server was factory installed, the ACPI configuration is set correctly. If the nPartition on which you want to boot your OpenVMS system had previously been running a Windows or Linux system, then enter the following command at the EFI Shell prompt to set the partition to boot correctly with OpenVMS:



```
EFI> acpiconfig default
```

To make this new value take effect, you must reset the nPartition by using the EFI Shell `reset` command:

```
EFI> reset
```

If the ACPI configuration value is not set properly, the operating system cannot boot, and booting is interrupted with a panic.

You cannot modify the ACPI configuration value for Integrity servers that do not support nPartitions (for example, the rx2600 server).

To display the current configuration value, enter the `acpiconfig` command with no arguments:

```
EFI> acpiconfig
Acpiconfig settings: default
```

---

**NOTE** The `acpiconfig` command does not necessarily report the setting that was used on the current nPartition boot stage. It reports only the current setting, which is used for the next boot of the nPartition.

---

## A.5.2 Setting Boot Options for Your System Disk

You can establish and manage boot options for your system disk in any of three ways:

- During installation or upgrade, allowing the OpenVMS I64 installation/upgrade procedure to automatically establish an EFI boot option for your system disk
- Using the OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility while the operating system is running
- Using EFI (after the system disk has been created or updated and only while the operating system is not running)

HP recommends that you allow the OpenVMS I64 installation or upgrade procedure to establish a boot option for your system disk. However, you still have the option of modifying the boot option or adding other boot options for your system disk by using the OpenVMS I64 Boot Manager utility from the OpenVMS DCL prompt (or by using EFI itself).

The OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility is a menu-based utility that allows you to configure EFI boot options for your Integrity server. It is easier to use than EFI. With this OpenVMS utility, you can perform actions such as the following:

- Add your system disk as an EFI boot option (you can optionally configure it to boot automatically on hardware startup and reboot).
- Set boot flags.
- Display the EFI boot options.
- Add, move, and remove boot options in the EFI Boot Manager menu.
- Enable or disable the EFI boot countdown timer (timeout) and set the countdown value.

This section explains how to perform most of these operations (except moving and removing boot options). For more information about the OpenVMS Boot Manager utility, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. This section also explains how to use EFI to add a boot option for automatic booting.

HP recommends that you configure your system with a boot option for your system disk. You can enable automatic reboot of the system disk by specifying your system disk as the first boot option in the EFI Boot Manager menu. When the EFI timeout (countdown) occurs (the default is 10 seconds), your system disk boots automatically.

---

**NOTE** To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility. (Use of this utility is optional for other devices but mandatory for Fibre Channel devices.) HP also recommends using this utility to add members of a multiple-member shadow set to the boot device list and dump device list. Be sure to add all members to both lists. For more information about the utility, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*. For more information about configuring and booting Fibre Channel devices, refer to Appendix C.

---

### A.5.2.1 Adding a Boot Option and Setting Boot Flags

To add a boot option and set boot flags using the OpenVMS I64 Boot Manager utility, follow these steps:

1. At the DCL prompt, enter the following command to invoke the OpenVMS I64 Boot Manager utility:

```
$ @SYS$MANAGER:BOOT_OPTIONS.COM
```

2. When the utility is invoked, the main menu is displayed. To add your system disk as a boot option, enter 1 at the prompt, as shown in the following example:

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- (1) ADD an entry to the Boot Options list
- (2) DISPLAY the Boot Options list
- (3) REMOVE an entry from the Boot Options list
- (4) MOVE the position of an entry in the Boot Options list
- (5) VALIDATE boot options and fix them as necessary
- (6) Modify Boot Options TIMEOUT setting

- (B) Set to operate on the Boot Device Options list
- (D) Set to operate on the Dump Device Options list
- (G) Set to operate on the Debug Device Options list

(E) EXIT from the Boot Manager utility

You can also enter Ctrl-Y at any time to abort this utility

```
Enter your choice: 1
```

---

**NOTE** While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To abort and return to the DCL prompt, press Ctrl/Y.

---

3. The utility prompts you for the device name. Enter the system disk device you are using for this installation. In the following example, the device name is DKA0:

```
Enter the device name (enter "?" for a list of devices): DKA0:
```

4. The utility prompts you for the position you want your entry to take in the EFI boot option list. To see a list of the current boot options, enter a question mark (?):

```
Enter the desired position number (1,2,3,...) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: ?
```

5. The list in the following example includes only one boot option. To add your boot option entry to the top of the list (the default) so that your system disk boots automatically when the server starts or the EFI countdown timer expires, enter 1:

```
EFI Boot Options list:      Timeout = 0 secs.
-----
01. VenHw(d65a6b8c-71e5-4df0-d2f009a9) "EFI Shell [Built-in]"
-----
1 entries found.

Enter the desired position number (1,2,3,...) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: 1
```

6. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or press Enter to set no flags, as in the following example:

```
Enter the value for VMS_FLAGS in the form n,n.
VMS_FLAGS [NONE]:
```

Optionally, you can use any of the standard OpenVMS boot flags such as the following:

Flags	Description
0,1	Enable SYSBOOT to change system parameters; enable conversational booting for debugging purposes.
0,2	Load XDELTA.
0,4	Take the initial EXEC_INIT breakpoint.
0,20000	Print debug messages on boot.
0,30000	Print more debug messages on boot.

7. The utility prompts you for a description to include with your boot option entry. By default, the device name is used as the description. You can enter more descriptive information as in the following example. This example shows a sample confirmation message (for devices with multiple paths, such as Fibre Channel devices, a separate confirmation message is displayed for each path). EFI\$BCFG is the name of the executor file for the OpenVMS I64 Boot Manager utility.

```
Enter a short description (do not include quotation marks).
Description ["DKA0"]: DKA0: OpenVMS V8.2-1 for PLMs System

efi$bcfg: DKA0: (BOOT003) Option successfully added
```

8. When you have successfully added your boot option, exit the utility by entering E at the prompt:

```
Enter your choice: E
$
```

**A.5.2.1.1 Using EFI to Set Automatic Booting of Your System Disk** HP recommends allowing the OpenVMS installation or upgrade procedure or the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility to set your system disk to boot automatically. However, you can use EFI. This section explains how to use EFI to set up your Integrity server firmware to automatically boot your OpenVMS I64 system from your

system disk. (HP also recommends using the OpenVMS I64 Boot Manager utility to set boot flags. Optionally, you can use the `vms_loader.efi -flags n,n` command at the EFI prompt to set any of the standard OpenVMS boot flags, as documented earlier in this appendix.)

Access the EFI Shell and type the following line at the prompt, where `fsn:` (such as `fs0:` or `fs1:`) is the device associated with the system disk:

```
Shell> bcfg boot add 1 fsn:\efi\vms\vms_loader.efi "HP OpenVMS I64"
```

This command adds the OpenVMS I64 operating system to position 1 in the EFI Boot Manager menu. The quoted text in the command line (“HP OpenVMS I64”) appears at position 1 in the EFI boot menu. You can enter any text that helps you identify the operating system disk. During system power up, the position 1 item is automatically executed after the default 10-second countdown.

Alternatively, you can add an EFI boot menu option by using the EFI menu interface:

1. Select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu).
2. Select Add a Boot Option.
3. Select the boot device and boot file.

---

**NOTE** All EFI boot options embed the disk Globally Unique ID (GUID). Therefore, if you reinstall OpenVMS or restore a system disk from an image backup, you must first delete the old boot options and then add a new boot option. To delete a boot option, use the Delete Boot Option(s) option in the Boot Configuration menu (or Boot Option Maintenance Menu).

---

Still another method to add a boot entry to the EFI Boot Manager menu is to use the EFI Utilities for OpenVMS (I64 only) `vms_bcfg` command, which accepts OpenVMS device names and also allows you to set flags. In the following example, `DKA0:` is the OpenVMS system disk being added as the first boot option:

```
Shell> \efi\vms\vms_bcfg boot add 1 dka0: -f1 0,2 "HP OpenVMS I64"
```

For more information about EFI utilities for OpenVMS (I64 only), refer to the *HP OpenVMS System Management Utilities Reference Manual*.

### A.5.2.2 Displaying EFI Boot Entries and Mapped OpenVMS Devices

The Integrity server EFI Boot Manager shows the various paths to the boot device. You can use the OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility to display the OpenVMS boot device options known to EFI.

Start the utility at the DCL prompt (`@SYS$MANAGER:BOOT_OPTIONS.COM`) and select option 2 from the main menu (the main menu is shown in Section A.5.2). The utility displays the following prompt. In this example, the listings for the `DQA0:` device are requested and displayed.

```
To display all entries in the Boot Options list, press Return.
To display specific entries, enter the entry number or device name.
(Enter "?" for a list of devices):DQA0
```

```
EFI Boot Options list:   Timeout = 20 secs.
-----
04. DQA0 PCI(0|0|2|0) ATA(Primary,Master) "DVD-ROM "
-----
1 entries found.
```

You can also display all bootable devices mapped by the EFI console and their equivalent OpenVMS device names by using the EFI Utilities for OpenVMS `vms_show` command at the EFI Shell prompt (from `\efi\vms`). For more information about EFI utilities for OpenVMS, refer to the *HP OpenVMS System Management Utilities Reference Manual*.

### A.5.2.3 Setting EFI Boot Option Countdown Timer (Timeout)

Whenever the EFI Boot Manager menu displays, it waits for you to select an option. By default, it waits 10 seconds, after which EFI boots the first boot option. If the first option is not available or does not boot, EFI waits the same duration before booting the next option in the list. The OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility allows you to change the duration for this countdown value and also to disable the countdown (so that there is no wait) and enable it.

Select option 6 from the OpenVMS I64 Boot Options main menu (the main menu is shown in Section A.5.2). The utility displays the following prompt. To change the value, enter YES and then enter the new value. In this example, the timeout value is changed to 20 seconds.

```
efi$bcfg: Boot Timeout period is 10 secs

Would you like to modify the Timeout value? (Yes/No) [NO] YES

Please enter the Timeout value in seconds: 20

efi$bcfg: Boot Timeout period is 20 secs
```

To disable the timeout so that automatic booting occurs instantaneously, enter 0 as the value, as in the following example:

```
Please enter the Timeout value in seconds: 0

efi$bcfg: Boot Timeout is Disabled
```

## A.5.3 Writing a New Boot Block

The boot block structures on the system disk contain the size and location of the boot partition and other details relevant to the bootstrap of OpenVMS I64. The size and location of the boot partition stored within the boot block structures must be maintained and must reference the current location of the OpenVMS file `SYS$EFI.SYS`.

Current versions of BACKUP maintain the boot block structures as well as the size and location of the boot partition during image operations (analogous to the similar BACKUP/IMAGE operations that maintain the boot block on OpenVMS Alpha disks). Older versions of BACKUP do not maintain these structures and do not correctly locate core OpenVMS I64 bootstrap files.

If the boot partition file `SYS$EFI.SYS` is manually replaced or relocated, you must use the DCL command `SET BOOTBLOCK` or the `SYS$SETBOOT` image to rewrite the boot block structures. The `SET BOOTBLOCK` command and `SYS$SETBOOT` are analogous to the OpenVMS Alpha Writeboot utility; they provide OpenVMS I64 with the equivalent of what the Writeboot utility provides on OpenVMS Alpha. (Do not use the OpenVMS Alpha Writeboot utility to rewrite boot block structures on an OpenVMS I64 system disk.)

The `SET BOOTBLOCK` command allows you to establish the boot block pointers necessary for the EFI console to find and bootstrap an OpenVMS I64 system disk. You must invoke this command if the target OpenVMS I64 system disk was originally created by one of the following methods:

- A version of BACKUP that does not support the OpenVMS I64 system disk structure. HP recommends that you do *not* use these versions of BACKUP for archiving or restoring an OpenVMS I64 system disk.
- A nonimage backup of an OpenVMS I64 system disk (possibly corrupting the boot block and various directory backlinks that must be manually reset). HP recommends that you do *not* use nonimage backups.
- A nonimage restore of an OpenVMS I64 system disk from an image save set. HP recommends that you do *not* use a nonimage restoration.

---

**NOTE**

If the target OpenVMS I64 system disk has an incorrectly-placed [000000]GPT.SYS file, the disk cannot be used reliably as an OpenVMS I64 system disk. Typically, the file gets incorrectly placed due to the use of an older version of BACKUP/IMAGE, a file-based BACKUP disk restoration, or an errant disk defragmentation tool (the file is set with /NOMOVE to disable move operations; defragmentation tools that do not honor this setting will corrupt the file). A correctly-located GPT.SYS file will have at least two file extents, the first beginning at LBN 0 and the last at the disk capacity minus the size of the last extent (an extent is one or more adjacent clusters allocated to a file). The size of each of the two extents varies according to the disk cluster factor on the target disk. The first extent size is currently 34 or more blocks, and the last extent 33 or more blocks. For example:

```
$ DUMP/HEADER/BLOCK=END=0 SYS$SYSDEVICE:[000000]GPT.SYS ...
Map area
  Retrieval pointers:
    Count:          36      LBN:           0
    Count:          36      LBN:      71132925
```

This example is from a disk with 71132960 blocks. The placement of the final extent is 71132924, which is calculated by subtracting 36 (the size of the last extent) from the disk capacity (71132960).

You may be able to temporarily recover from this condition and attempt to bootstrap the target OpenVMS I64 system disk by renaming GPT.SYS to GPT.BAD, and then issuing the SET BOOTBLOCK command. To correctly recover from this condition, you must INITIALIZE the target disk and then reload the disk contents using a file-based BACKUP restoration or a file-based COPY operation. No supported means exists for adding a GPT.SYS file onto an existing disk nor for adding the file during a BACKUP/IMAGE restoration operation.

---

To write the boot block structures onto an OpenVMS I64 system disk, enter the SET BOOTBLOCK command using the following format:

```
$ SET BOOTBLOCK [/PRESERVE=SIGNATURES] [/I64] [boot-partition-name]
```

You can specify the file name for the boot partition (*boot-partition-name*). If you do not specify a file or device name, the command defaults to the following file for the boot partition:

```
SYS$SYSDEVICE:[VMS$COMMON.SYS$LDR]SYS$EFI.SYS
```

The command also assumes the current architecture. To specify OpenVMS I64, include /I64 in the command line.

Use the /PRESERVE=SIGNATURES qualifier to preserve the existing GUID disk signature value and the associated root aliases. Note that using the OpenVMS Backup utility creates a new disk signature when restoring a bootable disk image.

If you reset the boot block structures, you might need to remove any EFI boot aliases that reference the disk, and then add them back again. You can use the `EFI alias` command to remove and add aliases; HP recommends using the OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility to maintain EFI console boot aliases.

---

**NOTE** The boot partition 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 equivalent) to recreate 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.

---

Alternatively, you can write a boot block by entering the following command:

```
$ RUN SYS$SYSTEM:SYS$SETBOOT
```

The utility prompts you for the required input (in a way similar to the operation of the OpenVMS Alpha Writeboot utility).

### A.5.4 Alpha and Equivalent Integrity Server System Boot Commands

The Extensible Firmware Interface (EFI) on Integrity servers performs most of the same functions that the SRM console does on Alpha processors. If you are familiar with the Alpha tool, use the following table to find EFI commands equivalent to the Alpha commands you commonly use on Alpha systems. Note that some of the commands listed might not be available on certain hardware systems.

**Table A-3 Alpha and Integrity Server EFI Command Equivalents**

Task	Alpha SRM command at P00> prompt	Integrity Server EFI command at Shell prompt
Display help information	HELP	help
Display list and version of devices found on the most recently initialized system	SHOW CONFIGURATION or SHOW VERSION	info fw
Display devices and controllers in the system, including bootable devices and mappings	SHOW DEVICE	map, vms_show devices (from \efi\vms) <sup>1</sup>
Display all system information	SHOW FRU	info all, or pci, or info io
Display memory information	SHOW MEMORY	info mem

**Table A-3 Alpha and Integrity Server EFI Command Equivalents (Continued)**

Task	Alpha SRM command at P00> prompt	Integrity Server EFI command at Shell prompt
Display volume information of the file system	SHOW DEV DKA0	vol fs0
Display hardware information about the CPU	SHOW CONFIGURATION	info cpu
Display power status	SHOW POWER	info all <sup>2</sup>
Set system dump disk	SET DUMP_DEV <i>disk1</i> , <i>disk2</i> ...	vms_set dump_dev <i>disk1</i> , <i>disk2</i> , ... (from \efi\vms) <sup>1</sup>
Set boot flags	SET BOOT_OSFLAGS 0,0	set vms_flags "0,0" <sup>1</sup>
Set boot behavior to automatic boot	SET AUTO_ACTION BOOT	bcfg boot add 1 fsx:\efi\vms\vms_loader.efi "I64" <sup>1</sup>
Change the current boot option	SET AUTO_ACTION HALT	bcfg boot mv 1 2 <sup>1</sup>

1. Similar functionality is provided by the OpenVMS I64 Boot Manager utility (BOOT\_OPTIONS.COM), invoked at the OpenVMS DCL prompt. Regarding the display of devices, BOOT\_OPTIONS.COM displays only the boot entries and also a selected dump device for DOSD and a debug device; vms\_show can display all devices mapped by the EFI console and their equivalent OpenVMS device names. The map command shows all devices currently mapped on the EFI Shell.
2. Best source of information about power status is the MP PS command.

## A.6 Halt and Shutdown Procedures

The following sections describe halt and shutdown procedures for Integrity servers and OpenVMS I64.

### A.6.1 Halting the Integrity Server to Recover from Hangs and Crashes

If your system hangs and you want to force a crash, you can use MP, if available. Use the `tc` command. Confirm your intention when prompted. The `tc` command forces a crash dump. You can reset the machine (without forcing a crash) by using the `MP rs` command.

For cell-based servers, when you enter the `tc` or `rs` command, you are first prompted to select the partition for which you want the operating system shut down.

Alternatively, when the operating system controls the console, press Ctrl/P. The next step taken by the system depends on whether XDELTA is loaded:



- If XDELTA is loaded, the system enters XDELTA after you press Ctrl/P. The system displays the instruction pointer and current instructions. You can force a crash from XDELTA by entering ;C, as in the following example:

```

$
Console Brk at 8068AD40
8068AD40!          add    r16 = r24, r16 ;; (New IPL = 3)
;C

```

- If XDELTA is not loaded, pressing Ctrl/P causes the system to respond with the “Crash? (Y/N)” prompt. Enter Y to cause the system to crash and to bring you eventually to EFI. If you enter any other character, the system continues.

## A.6.2 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. If you want the system to reboot automatically after the shutdown, first set up automatic booting, as described in Section A.5.2.

You can perform the following two types of shutdown operations, as discussed in the indicated sections:

- An orderly shutdown with SYS\$SYSTEM:SHUTDOWN.COM (refer to Section A.6.2.1)
- An emergency shutdown with OPCCRASH.EXE (refer to Section A.6.2.2)

### A.6.2.1 Orderly Shutdown

The SHUTDOWN.COM procedure shuts down the operating 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:

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

For more information about the SHUTDOWN.COM command procedure, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

On cell-based Integrity servers, two special types of nPartition reboot are supported: reboot for reconfiguration, which reboots an nPartition and enables cell configuration changes to occur, and shutdown for reconfiguration, which puts an nPartition into an inactive state.

- To perform a reboot for reconfiguration from OpenVMS I64 running on an nPartition, enter the OpenVMS @SYS\$SYSTEM:SHUTDOWN command and then answer YES to the prompt asking whether to perform an automatic system reboot.

On cell-based Integrity servers, an operating system reboot is equivalent to a reboot for reconfiguration. Performing a reboot for reconfiguration enables any cell assignment changes for the nPartition (for example, removing an active cell or activating a newly added cell).

The reboot for reconfiguration takes all cells assigned to the nPartition through a cell boot phase. The cells with a Yes use-on-next-boot attribute proceed through the nPartition boot phase to become active cells whose resources are available to software running on the nPartition.

- To perform a shutdown for reconfiguration of an nPartition running OpenVMS I64, first enter the OpenVMS @SYS\$SYSTEM:SHUTDOWN command and then answer NO to the prompt asking whether to perform an automatic system reboot. Next, access MP and use the rr command (specify the OpenVMS nPartition to shutdown for reconfiguration).

A shutdown for reconfiguration takes all cells assigned to the nPartition through a cell boot phase and then stops their boot progress at the boot-is-blocked (BIB) state. When all cells assigned to the nPartition are at the BIB state, the nPartition is inactive and no software can run on the nPartition until it is manually booted past BIB.

To boot an inactive nPartition past BIB, use the MP `bo` command and specify which nPartition to make active. Booting past the BIB state involves all cells that are assigned to the nPartition and that have a Yes use-on-next-boot attribute. The cells are taken through the nPartition boot phase to become active cells whose resources are available to software running on the nPartition.

For more information about shutting down an Integrity server or an nPartition, refer to the appropriate hardware documentation.

### A.6.2.2 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 and enter the following command:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

For more information about the OPCCRASH program, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

On cell-based Integrity servers, entering the OpenVMS `RUN SYS$SYSTEM:OPCCRASH` command results in the system dumping memory and then halting at the `P00>>>` prompt. To reset the nPartition following OPCCRASH, access the nPartition console and press any key to reboot.

Using the MP `tc` command to reset an nPartition results in the system dumping memory and then automatically resetting the nPartition.

---

## A.7 Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

### A.7.1 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. Another is a BIB condition in an nPartition on a cell-based server. You can use VFP to check the nPartition boot state. If VFP indicates that all cells in the nPartition are at BIB, the nPartition is inactive and you must use the MP `bo` command to boot the nPartition past BIB and make it active.

One way to get to the EFI Boot Manager to attempt to reboot is to use the MP `rs` command.

For more information about using VFP and MP, refer to your hardware documentation.

#### A.7.1.1 For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Integrity server.
2. Contact HP Customer Support.

### A.7.1.2 For Software Problems

When the operating system is loaded into memory, a message similar to the following appears on the terminal screen:

```
SYSTEM  job terminated at 27-JUN-2005 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 A.4.10.
3. If the system boots, run the AUTOGEN procedure. For more information about the AUTOGEN procedure, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

### A.7.2 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 A.5, or reboot the system manually as explained in Section A.4.5.
- If the system stops responding to your commands (that is, if 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 the F1 (Hold Screen) key. The Hold Screen light goes on when you press either F1 or 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 hung. (If you have disabled Ctrl/T by entering the command SET NOCONTROL=T, or if you 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, take the following steps:

1. Force an exit from a stalled or hung program by pressing Ctrl/Y. Note that pressing Ctrl/Y causes any work performed by the program and not saved on disk to be lost.
2. If the system is still unresponsive, halt it (refer to Section A.6.1 for more information.)
3. Note in detail the sequence of events that caused the problem and notify HP Customer Support.



# B Setting Up and Performing Network Booting

For operating system upgrades only, OpenVMS I64 Version 8.2-1 supports booting from a virtual DVD drive on the local area network (LAN) using OpenVMS I64 InfoServer software. This provides the additional advantage of allowing a network administrator to boot multiple systems on the network from a single copy of the distribution kit.

As discussed in Section B.1, booting from the InfoServer for OpenVMS I64 on Integrity servers requires several configuration steps unique to OpenVMS I64. Any configuration procedures performed for network booting from an OpenVMS Alpha system using the InfoServer hardware are not valid for OpenVMS I64 systems.

This appendix explains the necessary steps to perform to enable your system to boot over the LAN using the OpenVMS I64 InfoServer software. It also describes how to boot the virtual DVD drive from the network.

---

## B.1 InfoServer Booting from OpenVMS I64 Systems

InfoServer network booting for OpenVMS I64 upgrades is supported only from the following Integrity servers, which were supported with OpenVMS Version 8.2. InfoServer network booting is supported only on certain **core I/O** LAN cards (also referred to as LAN devices) on these systems.

- rx1600
- rx1620
- rx2600
- rx2620
- rx4640

Booting from the InfoServer for OpenVMS I64 on Integrity servers differs significantly from InfoServer booting for OpenVMS Alpha systems. For example, while Alpha systems use the Maintenance Operations Protocol (MOP) to request the primary bootstrap file (APB.EXE) to start the boot, the Integrity server console uses the Intel® Preboot Execution Environment (PXE) bootstrap protocol in conjunction with the TCP/IP Services for OpenVMS BOOTP server and TFTP. The Integrity server EFI console first loads the primary bootstrap file VMS\_LOADER.EFI, which is formatted for EFI compatibility. VMS\_LOADER.EFI then uses TFTP to request the primary bootstrap IPB.EXE from the **boot server**. IPB.EXE is formatted in OpenVMS ODS file structure and is needed for booting the OpenVMS I64 operating system.

Another major difference between Alpha and I64 InfoServer booting is that the InfoServer for booting an OpenVMS I64 system kit is a software application that runs on an OpenVMS system—it is not an independent hardware system like that used for OpenVMS Alpha systems. The InfoServer hardware systems

are not equipped to handle DVD drives, so HP designed the InfoServer software application to perform network boot services for OpenVMS I64 systems. Table B-1 summarizes the major differences between Alpha and I64 InfoServer booting.

**Table B-1 InfoServer Booting: Differences Between Alpha and I64 Systems**

Component	Alpha	I64
<b>Downline load protocol</b>	MOP	PXE (DHCP/BOOTP/TFTP)
<b>Boot file</b>	APB_ <i>version</i> (for example, APB_0821)	VMS_LOADER.EFI and IPB.EXE (both files are version specific)
<b>Boot server</b>	Any MOP-enabled system with the specified file	Only those BOOTP servers having the network device MAC address defined in the BOOTP database
<b>LAN server</b>	InfoServer hardware, or InfoServer software application running on OpenVMS I64 Version 8.2-1 or higher	InfoServer application running on OpenVMS I64 Version 8.2-1 or higher

Because of these differences, any procedures for setting up InfoServer booting for Alpha systems are not valid for OpenVMS I64 systems. You must set up your system as an InfoServer client. In addition, the network administrator must designate and configure an OpenVMS I64 Version 8.2-1 system in the same LAN to function as the InfoServer server. The network administrator must also configure an IP boot server (BOOTP) in the LAN and, with each new version of OpenVMS I64, update the BOOTP database to point to the newest version-specific OpenVMS boot files. Table B-2 lists the various steps that need to be performed to enable InfoServer network booting.

---

**NOTE** Most of these steps need be performed only once. Steps 2 through 4 are usually the responsibility of the network administrator. Because the OpenVMS I64 boot files are unique for each version of the operating system, the network administrator must ensure that the latest boot files are available and referenced in the BOOTP server database.

---

**Table B-2 Procedure for Enabling InfoServer Network Booting**

Step	Action	Section
1	Set up your local system as an InfoServer client. (This procedure can be repeated on any other system in the LAN that will use the InfoServer server for network booting.)	Section B.2
2	Have at least one OpenVMS I64 system in the LAN designated as the InfoServer server and upgraded to OpenVMS I64 Version 8.2-1.	Chapter 6 (Prior to performing the upgrade, be sure to review Chapter 4, and Chapter 5.)
3	Set up the InfoServer software on the OpenVMS I64 system that is to function as the InfoServer server.	Section B.3
4	Set up the TCP/IP Services for OpenVMS BOOTP server. (For each new release of OpenVMS I64, update the client entries in the BOOTP database to point to the new version-specific boot file.) The person responsible for setting up the boot server needs information about your InfoServer client.	Section B.4

---

**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 HP Customer Support.

---

## B.2 Setting Up Your Local System as an InfoServer Client

To set up your OpenVMS I64 system as an InfoServer client for network booting, you must perform the following steps. Detailed instructions are provided in the subsections that follow.

1. Determine the LAN I/O card to be used on your local Integrity server for the network boot. Report the associated OpenVMS device name and its IP address and MAC address to the network administrator responsible for setting up the BOOTP server.
2. Optionally (and recommended), add the network device as a boot option in the EFI Boot Manager menu.
3. Verify that the network device is supported by EFI as a bootable device.

---

**NOTE** The ability to boot over the network requires that the nearest switch or router be configured to autonegotiate.

---

## B.2.1 Determining the Local Network I/O Card to Be Used

Select a LAN I/O card (also referred to as a LAN I/O device or adapter) on your Integrity server. This device must be supported by your Integrity server's EFI firmware. At minimum, EFI supports the core I/O LAN cards installed in the Integrity server. Table B-3 lists the core I/O LAN devices supported on each of the Integrity servers that support network booting. On all Integrity servers, devices supported by OpenVMS are either EI or EW devices (for example, EIA0 or EWA0). The EFI firmware might also support variants of the core I/O cards, such as additional network interface cards (NICs) of the same type. It might also support other NICs that are installed in the system but not classified as core I/O cards. In any case, you can verify that the device you select is supported by EFI.

**Table B-3 Supported Core I/O LAN Cards**

Integrity Server Model	HP Device Part Number	OpenVMS Network Device Name
rx1600	i82559 (LOM) <sup>1</sup>	EIA0
	BCM5701 (LOM)	EWA0
rx1620	i82546EB (LOM)	EIA0 or EIB0
rx2600	i82559 (LOM)	EIA0
	BCM5701 (LOM)	EWA0
rx2620	i82546EB (LOM)	EIA0 or EIB0
rx4640 <sup>2</sup>	AB352A, A6825A	Single port: EWA0
	A7012A	Dual port: EIA0 or EIB0

1. LOM is a LAN on motherboard device.
2. On this model, viewing the rear panel, the core I/O LAN card is located in the first card slot on the left.

If multiple I/O cards are available on your system, you can choose more than one to serve for network booting. To list the installed LAN I/O devices known to your OpenVMS I64 system, follow these steps:

1. If your operating system is not running, access the OpenVMS DCL prompt (\$\$\$) from your OpenVMS I64 OE DVD by selecting option 7 (Execute DCL commands and procedures) of the OpenVMS operating system main menu. Otherwise, skip to the next step.
2. At the DCL prompt, enter the following command to invoke the OpenVMS I64 Boot Manager utility.

```
@SYS$MANAGER:BOOT_OPTIONS
```

3. Invoke the LANCP utility and enter the LANCP command SHOW CONFIGURATION at the LANCP prompt:



```
$$$ RUN SYS$SYSTEM:LANCP
LANCP> SHOW CONFIGURATION
```

```
LAN Configuration:
```

Device	Parent	Medium/User	Version	Link	Speed	Duplex	Size	MAC Address	Current Address	Type
EIA0		Ethernet	X-11	Up	1000	Full	1500	00-13-21-5B-85-E4	AA-00-04-00-34-4E	Intel182540
EIB0		Ethernet	X-11	Up	1000	Full	1500	00-13-21-5B-85-E5	AA-00-04-00-34-4E	Intel182540
EWA0		Ethernet	X-42	Down	1000	Full	1500	00-11-0A-43-23-D8	AA-00-04-00-34-4E	BCM5704
EWB0		Ethernet	X-42	Down	1000	Full	1500	00-11-0A-43-23-D9	AA-00-04-00-34-4E	BCM5704

This display example lists four LAN devices, two of which are available (connected), as indicated by the Link column (Up means the device is available; Down means it is not). You can use a device that is in use by other protocols. Decide which available devices you want to use for network booting and record the device's name, MAC address, and IP address. (The MAC address should be labeled on the physical device.) Once the LAN device is verified as bootable by EFI, you provide this information to the person responsible for maintaining the BOOTP server database (refer to Section B.4).

## B.2.2 Adding the Network Boot Option to the EFI Boot Manager

To add the LAN device (virtual DVD drive) as a network boot option, use the OpenVMS I64 Boot Manager utility, as follows:

1. At the DCL prompt, enter the following command to invoke the OpenVMS I64 Boot Manager utility:

```
@SYS$MANAGER:BOOT_OPTIONS
```

2. The OpenVMS I64 Boot Manager Boot Options main menu is displayed. To add a network boot option, enter 1 at the prompt:

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- (1) ADD an entry to the Boot Options list
- (2) DISPLAY the Boot Options list
- (3) REMOVE an entry from the Boot Options list
- (4) MOVE the position of an entry in the Boot Options list
- (5) VALIDATE boot options and fix them as necessary
- (6) Modify Boot Options TIMEOUT setting
  
- (B) Set to operate on the Boot Device Options list
- (D) Set to operate on the Dump Device Options list
- (G) Set to operate on the Debug Device Options list
  
- (E) EXIT from the Boot Manager utility

```
You can also enter Ctrl-Y at any time to abort this utility
Enter your choice: 1
```

---

**NOTE** While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To abort and return to the DCL prompt, press Ctrl/Y.

---

3. The utility prompts you for the device name. Enter the device name. In the following example, the device name is EIA0:.

Enter the device name (enter "?" for a list of devices): **EIA0**:

4. The utility prompts you for the position you want your entry to take in the EFI boot option list. Enter any position number other than 1. (The number 1 position sets the device for automatic rebooting, which is not desirable for upgrades.)

Enter the desired position number (1,2,3,,,) of the entry.  
To display the Boot Options list, enter "?" and press Return.  
Position [1]: **4**

5. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or accept the default (NONE) to set no flags as in the following example:

Enter the value for VMS\_FLAGS in the form n,n.  
VMS\_FLAGS [NONE]:

6. The utility prompts you for a description to include with your boot option entry. By default, the device name and MAC address is used as the description. You can enter more descriptive information, as in the following example. As shown in the display of boot entries that follows, the device name and MAC address (without dashes) are included anyway in the boot entry line.

Enter a short description (do not include quotation marks).  
Description ["EIA0"]: **I64 UPGRADE VIA NET**

efi\$bcfg: eia0 (Boot0002) Option successfully added

Using the utility to display the devices at this point (selecting 2 from the main menu), you see your device listed, as in the following example:

Enter your choice: 2

To display all entries in the Boot Options list, press Return.  
To display specific entries, enter the entry number or device name.  
(Enter "?" for a list of devices):

EFI Boot Options list: Timeout = 10 secs.

```
-----  
01. DKB0 PCI(0|20|1|1) Scsi(Pun0,Lun0) "Boot VMS from DKB0" OPT  
02. DKB200 PCI(0|20|1|1) Scsi(Pun2,Lun0) "Boot VMS from DKB200" OPT  
03. VenHw(d65a6b8c-71e5-4df0-d2f009a9) "EFI Shell [Built-in]"  
04. EIA0 PCI(0|0|2|0) Mac(0013215b85e4) "I64 Upgrade VIA NET"  
-----
```

4 entries found.

7. Exit the utility by entering E at the prompt:

Enter your choice: **E**

### B.2.3 Verifying the Network I/O Device Is Bootable by EFI

Finally, verify that the LAN device you selected for your system's InfoServer client is bootable by EFI. Verification is recommended if the selected device is not one of the core I/O LAN devices installed on your Integrity server. To verify that the selected LAN device is bootable by EFI, follow these steps:

1. Access the EFI console for your Integrity server. If your operating system is running, you must shut down your system to access EFI. (For details about accessing and using EFI, refer to your hardware documentation.)

- From the EFI main menu, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu). Make a selection before the EFI timeout expires; otherwise, the first entry of the EFI Boot Manager is selected automatically. If you are brought to the EFI Shell prompt, enter the `exit` command at the prompt to move back to the EFI main menu. If an autoboot begins, you can perform a cold reset of the Integrity server to get back to the EFI console. (For more information, refer to your hardware documentation.) Otherwise, you must wait for your system to boot and shut it down again.
- At the EFI Boot Configuration menu, select the Boot From a File option. In the Boot From a File list, look for the load file that corresponds to the LAN device you selected for network booting. This is the load file with a matching MAC address, as in the following example:

```
Load File [Acpi(HWP0002,0)/Pci(2|0)/Mac(0013215b85e4)]
```

The MAC address of the EIA0 network device selected earlier was 00-13-21-5B-85-E4, which matches the MAC address shown (without dashes). This verifies that the selected device is visible to the EFI console. If none of the Boot From a File options listed matches your selected device, then try another available device (as listed with the LANCP command `SHOW CONFIGURATION` in Section B.2.1).

- Provide the device name and its IP address and MAC address to the person responsible for setting up the BOOTP server.

---

## B.3 Setting Up the InfoServer Server

At least one system in the LAN must be designated as the InfoServer server. This is the system that hosts the physical DVD drive from which network booting is performed. This system must be running OpenVMS I64 Version 8.2-1. The InfoServer software comes as part of the base operating system on OpenVMS I64 Version 8.2-1.

The following steps are necessary to set up the InfoServer software on that system:

- Copy `SYS$STARTUP:ESS$LAD_STARTUP.TEMPLATE` to `ESS$LAD_STARTUP.DAT` (save the `ESS$LAD_STARTUP.TEMPLATE` file as a backup).
- 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 DVD drive. 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
```

Setting Up and Performing Network Booting  
 Setting Up the InfoServer Server

```

! 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	<p>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. Note that 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.</p> <table style="margin-left: 40px;"> <tr><td>3</td><td>8 blocks (default)</td></tr> <tr><td>4</td><td>16 blocks</td></tr> <tr><td>5</td><td>32 blocks</td></tr> <tr><td>6</td><td>64 blocks</td></tr> <tr><td>7</td><td>128 blocks</td></tr> <tr><td>8</td><td>256 blocks</td></tr> </table>	3	8 blocks (default)	4	16 blocks	5	32 blocks	6	64 blocks	7	128 blocks	8	256 blocks
3	8 blocks (default)												
4	16 blocks												
5	32 blocks												
6	64 blocks												
7	128 blocks												
8	256 blocks												
CACHE_BUCKETS	<p>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.</p>												

Parameter	Description
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 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).

- 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 Section B.2.1.

For this release of OpenVMS, the LASTport protocol runs on only a single network device. To enable this one device, open the SYS\$STARTUP:ESS\$LAST\_STARTUP.DAT file and make the following changes:

- Comment out the line that specifies ALL\_CONTROLLERS = TRUE (comment out a line by inserting an exclamation point (!) at the beginning of the line).
- Remove the comment (!) from the line that has the following text: DEVICE = (). Within the parentheses, specify the device name. For example: DEVICE = (EIA).

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)
! 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
```

- Add the following line to the system startup file SYS\$MANAGER:SYSTARTUP\_VMS.COM:

```
@SYS$STARTUP:ESS$LAD_STARTUP.COM
```

## Setting Up the InfoServer Server

5. If you changed any SYSGEN parameters, run AUTOGEN and reboot (for information about running AUTOGEN, refer to Section 7.20). 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. Note that 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 may 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 DVD drive. Follow these steps:

- a. Mount the OpenVMS I64 OE DVD systemwide. In the following example, DQA0 is the DVD drive name (typically, DQA0 is the drive name) and I640821 is the volume label:

```
$ MOUNT/SYSTEM DQA0 I640821
```

- 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 ::= $ESS$INFOSERVER
```

Alternatively, you can enter the following command to invoke the program:

```
$ RUN SYS$SYSTEM:ESS$INFOSERVER
```

- c. Invoke 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 I640821 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).

Invoked 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 I640821 DQA0:
$
```

The InfoServer control program commands are similar, though not identical, to those supported by the hardware InfoServer. For more information, refer to the InfoServer help (at the InfoServer prompt, type HELP) or the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

---

## B.4 Setting Up the BOOTP Boot Server

The BOOTP boot server can be on the same system or on any system in the same LAN as the InfoServer server. TFTP is required on the boot server for supplying the boot files to the client systems.

The steps necessary to set up the boot server and boot files are as follows:

---

**NOTE** All instructions and examples assume the use of TCP/IP Services for OpenVMS. Other IP products might work but have not been tested and are not supported at this time.

---

1. Make sure TCP/IP Services for OpenVMS is installed and that:
  - The BOOTP server and TFTP server are configured and started.
  - At least one IP interface is defined.
  - Optionally, make sure TELNET and FTP are configured and started.

Use the TCPIP SHOW SERVICES command to verify the servers are started (enabled), and the TCPIP SHOW INTERFACE command to display IP interface information. For more information about configuring and starting TCP/IP Services for OpenVMS components, refer to the *HP TCP/IP Services for OpenVMS Installation and Configuration* and *HP TCP/IP Services for OpenVMS Management* manuals.

---

**NOTE** If you are currently using the DHCP service, you must disable it. The BOOTP service must be enabled instead. For information about disabling or enabling services, refer to the *HP TCP/IP Services for OpenVMS Management* manual.

---

2. Set up a location for the OpenVMS I64 Version 8.2-1 boot files by creating the directory accessible by TFTP, as in the following example. (HP recommends that you create a separate boot file directory for each version of the operating system.)

```
$ CREATE/DIRECTORY TCPIP$TFTP_ROOT:[V821]
```

---

**IMPORTANT** For each subsequent upgrade of OpenVMS, you must create a separate directory for the boot files specific to the OpenVMS version and, where appropriate, modify the path specified for each client's boot files (as in step 6). To make subsequent upgrades easier, you can use systemwide or clusterwide logical names.

---

3. Copy the following two files from the DVD to the TCPIP\$TFTP\_ROOT:[V821] directory:
  - [SYSEXE]VMS\_LOADER.EFI
  - [SYSEXE]IPB.EXE
4. Gather data for each boot client (that is, each node that is going to boot the DVD over the network), including the following information for the client's network device (the client Integrity server core I/O card):
  - IP address
  - MAC address

5. Define each boot client's host name in the TCP/IP Services for OpenVMS local host database using the TCPIP SET HOST command. In the following example, *hostname* is the host name of the boot client and *ipaddress* is its IP address.

```
$ TCPIP SET HOST hostname/ADDRESS=ipaddress
```

The IP address does not have to be the actual address you plan to use for the boot client host; it must be in the same LAN as the BOOTP server and must not be currently in use. However, if you use statically assigned IP addresses, HP recommends (for simplicity) using the assigned address of the boot client's network device. (To display the assigned IP address, use the TCPIP SHOW HOST command.)

6. For each boot client, add an entry in the BOOTP database to associate the MAC address of the client's LAN device with the boot file to be loaded from the boot server, as in the following example. In this example, *hostname* is the host name of the boot client, and *MACaddress* is the client's MAC address in the format *xx-xx-xx-xx-xx*; the boot file specification need not include "TCPIP\$TFTP\_ROOT:".

```
$ TCPIP SET BOOTP hostname /HARDWARE=ADDRESS=MACaddress-  
_TCPIP> /FILE=[V821]VMSLOADER.EFI
```

You might need to specify a gateway (/GATEWAYS) and network mask (/NETWORK\_MASK). Consult your network administrator or refer to the TCP/IP Services for OpenVMS documentation.

---

**IMPORTANT** For each new version of OpenVMS I64, you must modify the client entry in the BOOTP database to point to the new, version-specific boot file.

---

Example B-1 shows the commands for setting up a boot server for a client named MOZART.

#### Example B-1 Setting Up the Boot Server MOZART and Client

```
[1] $ CREATE/DIRECTORY TCPIP$TFTP_ROOT:[V821]
[2] $ COPY DQA0:[SYSEXE]VMS_LOADER.EFI TCPIP$TFTP_ROOT:[V821]VMS_LOADER.EFI
[3] $ COPY DQA0:[SYSEXE]IPB.EXE TCPIP$TFTP_ROOT:[V821]IPB.EXE
[4] $ TCPIP SET HOST MOZART/ADDRESS=16.32.110.117
[5] $ TCPIP SET BOOTP MOZART/HARDWARE=ADDRESS=00-13-21-5B-85-E4-
   _TCPIP> /FILE=[V821]VMSLOADER.EFI
[6] $ TCPIP SHOW HOST MOZART/FULL

Host:      16.32.110.117   MOZART
                                     Hardware Address: 00-13-21-5B-85-E4
Network Mask: 255.0.0.0
File:      [V821]VMS_LOADER.EFI
.
.
.
```

The commands shown in Example B-1 perform the following functions:

1. Creates the directory TCPIP\$TFTP\_ROOT:[V821] on the system to be the TFTP and BOOTP server.
2. Copies [SYSEXE]VMS\_LOADER.EFI from the DVD to TCPIP\$TFTP\_ROOT:[V821].
3. Copies [SYSEXE]IPB.EXE from the DVD to TCPIP\$TFTP\_ROOT:[V821].
4. Adds the boot client host MOZART to the TCP/IP hosts database, specifying MOZART's IP address as 16.32.110.117.
5. Adds host MOZART as a client entry in the BOOTP database, where the MAC address of the client's LAN device is 00-13-21-5B-85-E4 (as was determined in the example for the client in Section B.2.1) and the boot file for the client is [V821]VMS\_LOADER.EFI.



6. Displays information about the client MOZART (use this command to verify that the client has been configured appropriately).

After you complete these steps, in addition to the required steps in the preceding sections, you can boot a client over the network using the InfoServer application. Instructions for performing the InfoServer boot are in Section B.5. A troubleshooting section is included in Section B.6.

## B.5 Booting from the InfoServer

After you set up the InfoServer software and boot server properly and ensure that the InfoServer service is available, you can boot the remote DVD served by the InfoServer by following these steps:

1. Make sure the DVD is mounted systemwide on the OpenVMS I64 system serving as the InfoServer, and make sure an InfoServer service for the DVD drive is available on the network and accessible from your client system (the system to be booted from the InfoServer). The service should point to the server DVD drive on which the OpenVMS I64 OE DVD is mounted. To ensure that the InfoServer service is available on the network, use the following command:

```
$ MC ESS$LADCP SHOW SERVICES
```

The following is a sample display:

```
Interrogating network for Disk services, please wait...
.
.
.
Disk services offered by node MOOSIC (LAD V3.1, Address: AA-00-04-00-AB-4E)

Service:                               Device:      Rating:  Current  Writes
I640821                                OpenVMS     65535   0        Allowed?:
.                                       No
.
.
```

In this example, the service I640821 is the virtual disk unit that corresponds to the DVD drive on the InfoServer server named MOOSIC. This is the drive from which the OpenVMS I64 OE DVD is booted. The display shows that this service is available and that a service binding to the InfoServer DVD drive is established.

2. Access EFI on your Integrity server. If you added a boot option for network (InfoServer) booting to the EFI Boot Manager options list, as recommended and described in Section B.2.2, then select the appropriate boot option from the list. To move to the option, use the up or down arrow key. (Depending on how your terminal emulator is set up, you might have to use the letter v to scroll down or the caret (^) to scroll up.) Press Enter to toggle the selection.

**NOTE** If you do not select an option within the default 10-second limit, the first option in the list is selected automatically.

If you did not add a boot option for InfoServer booting to the EFI Boot Manager options list, then you have to perform the following steps; otherwise, skip to step 3.

- a. From the EFI Boot Manager screen, select the Boot Configuration option (or in some versions of EFI, the Boot Option Maintenance Menu).
- b. From the EFI Boot Configuration menu, select the Boot From a File option.
- c. The Boot From a File menu lists the bootable devices (in EFI terminology, load files), including their MAC addresses. The composition of the list depends on how your Integrity server is set up. Select the appropriate device (search for the correct MAC address). For example, the following load file listed in the Boot From a File menu corresponds to the LAN device with MAC address 00-13-21-5B-85-E4:

```
Load File [Acpi(HWP0002,0)/Pci(2|0)/Mac(0013215b85e4)]
```

Note that each device is identified by the unique MAC address assigned to the device by the hardware vendor. Normally, the MAC address is labeled on the physical device. Refer to your hardware documentation for more information.

To further help you identify the LAN devices, you can use the EFI `pci` command, which displays all devices. Alternatively, you can try each of the LAN devices one at a time until you find the right one. Finally, you can make sure all LAN devices are connected to the appropriate network and are bootable using the InfoServer, in which case it does not matter which one you select. Note also that once you have OpenVMS running, you can display the devices and their corresponding MAC addresses by using the LANCP command `SHOW CONFIG` at the DCL prompt. The command lists the OpenVMS device names along with the MAC address and other characteristics. Likewise, with OpenVMS running, the EFI Utilities for OpenVMS `vms_show` command might provide additional information about any devices on the local system.

3. When you select the appropriate entry, you see several lines of messages and then the InfoServer boot menu (the same boot menu you would see on an Alpha system), as in the following example. The DHCP (Dynamic Host Communication Protocol) message indicates the loading of the loader image (VMS\_LOADER.EFI) that uses the EFI console to load and start the OpenVMS bootstrap (IPB.EXE). The Trivial File Transfer Protocol (TFTP) loads the bootstrap. In this example, "I64 Upgrade VIA NET" is the boot option for the InfoServer service. It was selected from the EFI Boot Manager options list (not shown).

---

**NOTE** If the InfoServer boot menu does not appear, you have probably selected the wrong LAN device. Try selecting another device. Verify the BOOTP database (refer to the *HP TCP/IP Services for OpenVMS Management* manual). Make sure the Integrity server that serves the network drive is running.

---

```
Loading.: Network Boot, 10/100
Running LoadFile()

CLIENT MAC ADDR: 00 13 21 5H 85 E4
DHCP./
CLIENT IP: 16.32.24.219   MASK: 255.0.0.0   DHCP IP: 0.240.0.0
Running LoadFile()

Starting: I64 Upgrade VIA NET
%EIA-I-BOOTDRIVER, Starting auto-negotiation
%EIA-I-BOOTDRIVER, Auto-negotiation selected 100BaseTX FDX

Network Initial System Load Function
Version 1.2
```

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

Enter a function ID value:

4. Respond to the prompts, pressing Enter (or Return) after each entry; use the default service name indicated or one suggested by the system manager:
  - a. Enter 3 for the function ID.
  - b. Enter 2 for the option ID.
  - c. Enter the service name (I640821).

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: I640821
```

After you boot, the system displays the OpenVMS menu. Follow the instructions in Section 6.3 to upgrade your OpenVMS operating system.

- 
- NOTE** If you boot the OpenVMS I64 OE DVD 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 I64 OE DVD again from the network.
  2. Enter the DCL environment by choosing option 7 from 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. (Refer to Appendix D 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) from the menu and following the procedures described in this chapter.
-

## B.6 Troubleshooting InfoServer Boot Problems

For problems using the OpenVMS I64 InfoServer software for network booting, consider the following:

1. When you attempt to boot over the network, check your console display for the following:
  - a. The IP address of the boot server that sends your EFI console the OpenVMS I64 loader file (VMS\_LOADER.EFI). If this IP address is not as expected, your client host might be in the database of the wrong boot server. Enter your client host IP address in the database of the correct boot server (refer to step 5 of Section B.4), and remove your client from the database of any other boot servers.
  - b. The version number of the IPB.EXE bootstrap file that is loaded (for this release, the version should be 8.2-1). If this version number is not the correct version of OpenVMS I64, a message indicates there is a mismatch. The boot server might be the source of the problem. Make sure that it is configured correctly. Make sure the client entry in the boot server's database has been updated to point to the current version of the loader file (refer to steps 3 and 7 of Section B.4).
  - c. Evidence that DHCP is not responding. If you do not see a message indicating autonegotiation has been started, make sure the closest network device or switch is set for autonegotiation.
2. If the network boot succeeds but your attempt to choose a service or to display services at the InfoServer menu fails, a device might be filtering the LASTport/Disk (LAD) protocol. This protocol does not provide routing functions and only works within a LAN. If filtering devices are used in an extended LAN, the devices must allow this protocol (protocol type is 80-41) to pass through unfiltered so that clients can access the InfoServer across the filtering device.

For LANCP and LANACP problems, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems* for more information.

# C Setting Up and Booting Fibre Channel Storage Devices

This appendix describes how to boot the Fibre Channel (FC) storage device on OpenVMS I64 systems. FC storage is supported on all storage arrays that are supported on OpenVMS systems.

OpenVMS I64 Version 8.2-1 supports the HP A6826A 2-port, 2-Gb Fibre Channel host-based adapter (HBA) and its variants.

The HBA requires the latest RISC firmware and EFI firmware and driver.

Fibre channel device booting supports point-to-point topology. There is no plan to support FC arbitrated loop topology.

---

## C.1 Checking the Firmware Version

Before you can boot on a FC device on OpenVMS I64 systems, the EFI bootable firmware of the flash memory of the FC HBA must be the latest supported revision.

---

**IMPORTANT** If you have an entry-class Integrity server, you can update the firmware yourself. If you have a cell-based Integrity server, you must contact HP Customer Support to update the firmware for you.

---

To flash the memory of the FC HBA on an entry-class server, update the EFI driver and RISC firmware to the latest versions available. In addition, update the NVRAM resident in the FLASH ROM on the HBA if necessary to enable the HBA factory default settings.

To update the driver and firmware, use the `efiutil.efi` utility, which is located on the HP IPF Offline Diagnostics and Utilities CD. To locate the utility on the CD, navigate to the `\efi\hp\tools\io_cards\fc2p2g` directory. The README text file provided in the same location as the utility indicates the currently supported (latest) versions of the RISC firmware and EFI driver. Instructions for obtaining the Offline Diagnostics and Utilities CD are included in Section C.2.

You can determine the versions of the driver and RISC firmware currently in place on your Integrity server in two ways, from the console during system initialization or by using the `efiutil` utility.

- The driver and RISC firmware versions are shown in the booting console message that is displayed during system initialization, as in the following example. The RISC firmware version is indicated in the format `n.nn.nnn`.

```
HP 2 Port 2Gb Fibre Channel Adapter (driver n.nn, firmware n.nn.nnn)
```

- The driver and RISC firmware versions are also shown in the display of the `efiutil info` command:

```
fs0:\efi\hp\tools\io_cards\fc2p2g\efiutil info

Fibre Channel Card Efi Utility  n.nn  (11/1/2004)
```

```
2 Fibre Channel Adapters found:
```

Adapter	Path	WWN	Driver (Firmware)
A0	Acpi(000222F0,200)/Pci(1 0)	50060B00001CF2DC	n.nn (n.nn.nnn)
A1	Acpi(000222F0,200)/Pci(1 1)	50060B00001CF2DE	n.nn (n.nn.nnn)

---

## C.2 Obtaining the IPF Offline Diagnostics and Utilities

Obtain the latest copy of the IPF Offline Diagnostics and Utilities CD by either of the following methods:

- Order the CD free of charge from the HP Software Depot site main page:

<http://www.hp.com/go/softwaredepot>

Type `ipf offline` in the Search bar and select the latest version listed (dates are indicated in the listed product names).

- Burn your own CD locally after downloading a master ISO image of the IPF Offline Diagnostics and Utilities CD from the following Web site:

<http://www.hp.com/support/itaniumservers>

1. Select your server product in the list provided. The support page for the selected server appears.
2. Select **Download drivers and software**.
3. Select **Cross operating system (BIOS, Firmware, Diagnostics, etc)**.
4. Download the Offline Diagnostics and Utilities software. Note that previous versions of the software may be listed along with the current (latest) version. Be sure to select the latest version.

Alternatively, you can select the appropriate Offline Diagnostics and Utilities link under the Description heading on this Web page. You will then be able to access the installation instructions and release notes as well as download the software. The README text file on the CD also includes information about how to install the software and update the firmware.

5. Burn the full ISO image onto a blank CD, using a CD burner and any major CD burning software. To complete the recording process, refer to the operating instructions provided by your CD burner software. Note that the downloaded CD data is a single ISO image file. This image file must be burned directly to a CD exactly as is. This will create a dual-partition, bootable CD.

---

## C.3 Configuring the Boot Device Paths on the FC

For OpenVMS I64 Version 8.2, the process of setting up a Fibre Channel boot device required using the OpenVMS I64 Boot Manager (`BOOT_OPTIONS.COM`) utility to specify values to the EFI Boot Manager. Starting with OpenVMS I64 Version 8.2-1, this process is automated by the OpenVMS I64 installation and upgrade procedures.

The OpenVMS I64 installation/upgrade procedure displays the name of a Fibre Channel disk as a boot device and prompts you to add the Boot Option. HP recommends that you accept this default. Alternatively, after the installation or upgrade completes, you can run the OpenVMS I64 Boot Manager to set up or modify a Fibre Channel boot device, as described in the following steps.

---

**NOTE** If your system is a member of the rx1600, rx2600, or rx4600 family of servers and no Fibre Channel boot device is listed in the EFI boot menu, you might experience a delay in EFI initialization because the entire SAN is scanned. Depending on the size of the SAN, this delay might range from several seconds to several minutes. Cell-based systems (the rx7620, rx8620, and the Superdome families of servers) are not affected by this delay.

When booting OpenVMS from the installation DVD for the first time on any OpenVMS I64 system, you might also experience a similar delay in EFI initialization.

---

To use the OpenVMS I64 Boot Manager utility to set up or modify a Fibre Channel device, follow these steps:

1. If your operating system is not running, access the OpenVMS DCL prompt (\$\$\$) from the OpenVMS operating system main menu by choosing Option 7 (Execute DCL commands and procedures). Otherwise, skip to the next step.
2. At the DCL prompt, enter the following command to invoke the OpenVMS I64 Boot Manager utility:  

```
$$$ @SYS$MANAGER:BOOT_OPTIONS
```
3. When the utility is invoked, the main menu is displayed. To add your system disk as a boot option, enter 1 at the prompt, as shown in the following example:

```
OpenVMS I64 Boot Manager Boot Options List Management Utility
```

- ```
(1) ADD an entry to the Boot Options list  
(2) DISPLAY the Boot Options list  
(3) REMOVE an entry from the Boot Options list  
(4) MOVE the position of an entry in the Boot Options list  
(5) VALIDATE boot options and fix them as necessary  
(6) Modify Boot Options TIMEOUT setting
```

- ```
(B) Set to operate on the Boot Device Options list  
(D) Set to operate on the Dump Device Options list  
(G) Set to operate on the Debug Device Options list
```

```
(E) EXIT from the Boot Manager utility
```

```
You can also enter Ctrl-Y at any time to abort this utility  
Enter your choice: 1
```

---

**NOTE** While using this utility, you can change a response made to an earlier prompt by entering the caret (^) character as many times as needed. To abort and return to the DCL prompt, press Ctrl/Y.

---

4. The utility prompts you for the device name. Enter the system disk device you are using for this installation. In the following example, the device is a multipath Fibre Channel device named \$1\$DGA1:.

```
Enter the device name (enter "?" for a list of devices): $1$DGA1:
```

## Configuring the Boot Device Paths on the FC

5. The utility prompts you for the position you want your entry to take in the EFI boot option list. Enter 1, as in the following example:

```
Enter the desired position number (1,2,3,,,) of the entry.  
To display the Boot Options list, enter "?" and press Return.  
Position [1]: 1
```

6. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or accept the default (NONE) to set no flags as in the following example:

```
Enter the value for VMS_FLAGS in the form n,n.  
VMS_FLAGS [NONE]:
```

7. The utility prompts you for a description to include with your boot option entry. By default, the device name is used as the description. You can enter more descriptive information, as in the following example:

```
Enter a short description (do not include quotation marks).  
Description ["$1$DGA1"]: $1$DGA1 OpenVMS V8.2 System
```

```
efi$bcfg: $1$dga1 (Boot0001) Option successfully added  
efi$bcfg: $1$dga1 (Boot0002) Option successfully added  
efi$bcfg: $1$dga1 (Boot0003) Option successfully added  
efi$bcfg: $1$dga1 (Boot0004) Option successfully added
```

8. After you successfully add your boot option, exit the utility by entering E at the prompt.

```
Enter your choice: E
```

9. Log out from the DCL level and shut down the I64 system.

For more information about this utility, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.



# D 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. You access this environment through the menu that is displayed when you boot the OpenVMS I64 OE DVD, or through an alternative method that does not require the DVD.

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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

---

## D.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 noncontiguously on the disk. The BACKUP/IMAGE command creates a copy on which files are stored contiguously.

---

## D.2 Suggested Procedures

HP 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 D.4 and Section D.5.

**OpenVMS Cluster Caution**

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 D.6.

- 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.

### D.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, HP recommends that you shut down the entire OpenVMS Cluster system before you back up your system disk.

### D.4 Backing Up the System Disk

The following sections describe how to back up the system disk.

#### D.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. (Section A.4 explains how to boot the OpenVMS I64 OE DVD.)
4. Choose the DCL option (7) from the menu. For example:

```
*****
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 operating system 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 I64 Version 8.2-1

- 2) Display products and patches that this procedure can install
- 3) Install or upgrade layered products and patches
- 4) Show installed products
- 5) Reconfigure installed products
- 6) Remove installed products
- 7) Execute DCL commands and procedures
- 8) Shut down this system

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

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).

## D.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.

## D.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:APR_06_BACKUP.BCK/SAVE_SET/REWIND
```

## D.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, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials* and the *HP OpenVMS System Management Utilities Reference Manual: A-L*, and refer to the description of the INITIALIZE and BACKUP commands in the *HP OpenVMS DCL Dictionary*.

## D.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 (8).
3. After the shutdown completes, boot from the system disk.

---

## D.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.

### D.5.1 Getting Started

Before you can restore the system disk:

1. Shut down the system.
2. Boot the operating system media. (Section A.4 explains how to boot the OpenVMS I64 OE DVD.)
3. Choose the DCL option (7) from the menu. For example:

```
You can install or upgrade the OpenVMS I64 operating system
or you can install or upgrade layered products that are included
on the OpenVMS I64 operating system 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 I64 Version 8.2-1
- 2) Display products and patches that this procedure can install
- 3) Install or upgrade layered products and patches
- 4) Show installed products
- 5) Reconfigure installed products

- 6) Remove installed products
- 7) Execute DCL commands and procedures
- 8) Shut down this system

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

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).

## D.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

## D.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:APR_06_BACKUP.BCK/SAVE_SET DKA200:
```

## D.5.4 Logging Out, Shutting Down, and Rebooting

After you complete the restore operation:

1. Enter the LOGOUT command to exit the DCL environment and return to the menu.

2. Choose the shutdown option (8).
3. After the shutdown completes, boot from the system disk.

---

## D.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). Supported by both OpenVMS Alpha and I64 systems, 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, HP recommends that, if you must use an alternative backup or restore method, you use the method described in this section.

---

### D.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 4,150,000 blocks

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. For OpenVMS I64, enter the following command:

```
$ @SYS$SYSTEM:I64VMS$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:

```
HP I64VMS OPENVMS V8.2-1: OpenVMS and related products platform

      COPYRIGHT (c) 20-JUN-2005
      Hewlett-Packard Development Company, L.P.

Execution phase starting ...

The following product will be installed:
  HP I64VMS VMS V8.2-1

Portion Done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%

The following product has been installed:
  HP I64VMS VMS V8.2-1
  .
  .
  .
The installation of minimum OpenVMS I64 is now complete.

Use EFI or the boot option you just created or validated (if any)
to boot minimum OpenVMS.  If you use EFI remember to set VMS_FLAGS
to E,0 before booting, and to reset VMS_FLAGS to 0,0 (or as
required by your system).

      BOOT -FLAGS E,0 device-name

(Some configurations may require a boot option to boot.)
```

---

**CAUTION** If your system is a cluster member, HP recommends that you 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.

---

## D.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. For OpenVMS I64 systems, you can add the alternate system disk as a boot option in the EFI Boot Manager menu by using the OpenVMS I64 Boot Manager (BOOT\_OPTIONS.COM) utility, as described in step 20 of Section 3.3.3. When prompted, set the flags as e,0. Alternatively, boot the alternate system disk manually by entering the following command at the EFI Shell prompt, where *fsn:* (such as fs1:) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags e,0
```

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** HP 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. Refer to Section D.5.2 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, refer to Section D.4.3; for examples of using the BACKUP command to restore the system disk, refer to Section D.5.3.
6. Shut down the system.
7. Boot from your original system disk.



# E Installing the OpenVMS Internationalization Data Kit

The OpenVMS internationalization data kit (VMSI18N kit) provides locale data and iconv code converters for international software, utilities, and HP C international run-time routines.

The HP C RTL provides capabilities to allow application developers to create international software. The HP C RTL obtains information about a language and a culture by reading this information from locale files. This kit contains all of the supported locale files.

The kit also contains a set of Unicode codeset converters that allows conversion between any supported codeset (including DEC Multinational Character Set and Microsoft Code Page 437) to any Unicode encoding (UCS-2, UCS-4, or UTF-8).

If you are using these C RTL capabilities, you must install the VMSI18N kit on your system. This kit is provided on the OpenVMS media set as your OpenVMS kit. For the location of this kit, refer to the *HP OpenVMS Version 8.2-1 for Integrity Servers New Features and Release Notes*.

Prior to installation, review the release notes for the VMSI18N kit.

To install this saveset, follow the standard OpenVMS installation procedures. Use VMSI18N as the name of the kit. In the following example, *dev* is the device name and *dir* is the directory location of the kit.

```
$ PRODUCT INSTALL VMSI18N /SOURCE=dev:[dir]
```

Note that you can install any of the following categories of locales:

- European and U.S.
- Japanese
- Korean
- Thai
- Chinese
- Unicode

In the following installation example, the European and U.S., Japanese, and Unicode support options are selected.

```
$ PRODUCT INSTALL VMSI18N /SOURCE=DKB200:[VMSI18N_I640821.KIT]
```

```
The following product has been selected:
  HP I64VMS VMSI18N V8.2-1 Layered Product
```

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

```
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.
```

```
HP I64VMS VMSI18N V8.2-1
```

```
Do you want the defaults for all options? [YES] NO
```

## Installing the OpenVMS Internationalization Data Kit

```
European and U.S. support [YES] YES  
Japanese support [YES] YES  
Korean support [YES] NO  
Thai support [YES] NO  
Chinese support [YES] NO  
Unicode support [YES] YES  
Do you want to review the options? [NO] NO  
Execution phase starting ...
```

```
The following product will be installed to destination:  
HP I64VMS VMSI18N V8.2-1 DISK$I64SYS:[VMS$COMMON.]
```

```
Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
```

```
The following product has been installed:  
HP I64VMS VMSI18N V8.2-1 Layered Product
```

```
$
```

# F Preparing to Use OpenVMS Management Station

This appendix explains how to prepare your OpenVMS system to run the OpenVMS Management Station server software and how to prepare your PC to run the OpenVMS Management Station client software. This appendix also includes other related information.

OpenVMS Management Station is a powerful Microsoft Windows based management tool for system managers and others who perform management tasks on OpenVMS systems. It allows system managers to organize the systems they need to manage in ways that are meaningful to them and their environment. OpenVMS Management Station provides a comprehensive user interface that allows system managers to manage OpenVMS user accounts, printers, and storage on those systems and across multiple systems. For example, if you have an account on three different OpenVMS Cluster systems, OpenVMS Management Station allows you to easily update a process quota, add a privilege, and so forth, for each instance of the account.

OpenVMS Management Station consists of the client software, which is installed on a PC from which all management operations are performed, and the server software, which is installed on any OpenVMS system that is to be managed.

During the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk.

You can download the PC client file from the following Web site:

<http://www.hp.com/go/openvms/argus>

If the TNT\$\* server files have been deleted from SYS\$SYSTEM, you can recover the server files by reinstalling the OpenVMS operating system or by downloading and installing the appropriate kit from this Web site.

After you ensure that OpenVMS Management Station software is installed on your system, follow the procedures described in this appendix.

---

## F.1 Preparing Your OpenVMS System

You must prepare your OpenVMS system to run the server software so that your system can properly interact with the PC running the client software. The procedures include the following:

- Set up in a mixed-architecture cluster environment (if applicable).
- Start the server on other nodes.
- Update the printer and storage database.
- Edit the system files.
- Allow OpenVMS Management Station to control the printer and storage environment.
- Keep your printer environment up to date.
- Check if running third-party TCP/IP stacks.

- Determine and report problems.

### F.1.1 Setting Up in a Mixed-Architecture Cluster Environment

The OpenVMS Management Station server creates several configuration files:

- TNT\$UADB.DAT
- TNT\$ACS.DAT
- TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL
- TNT\$MONITOR.DAT
- TNT\$MONITOR.TNT\$MONITOR\_JOURNAL
- TNT\$EMERGENCY\_MOUNT.COM

In a common-environment cluster with one common system disk, you use a common copy of each of these files located in the SYS\$COMMON:[SYSEXE] directory on the common system disk, or on a disk that is mounted by all cluster nodes. No further action is required.

However, to prepare a common user environment for an OpenVMS Cluster system that includes more than one common system disk, you must coordinate the files on those disks.

The following rules apply:

- Disks holding common resources must be mounted early in the system startup procedure, such as in the SYLOGICALS.COM procedure.
- You must ensure that the disks are mounted with each cluster reboot.

Follow these steps to coordinate files:

1. Decide where to locate the files. In a cluster with multiple system disks, system management is much easier if the common system files are located on a single disk that is not a system disk.
2. Copy the following files from SYS\$COMMON:[SYSEXE] to a directory on a disk other than the system disk: TNT\$UADB.DAT, TNT\$ACS.DAT, TNT\$MONITOR.DAT, TNT\$MONITOR.TNT\$MONITOR\_JOURNAL, TNT\$EMERGENCY\_MOUNT.COM, and TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL.
3. Edit the file SYS\$COMMON:[SYSMGR]SYLOGICALS.COM *on each system disk* and define logical names that specify the location of the cluster common files.

#### Example

To place the files on \$1\$DJA15, define logical names as follows:

```
$ DEFINE/SYSTEM/EXEC TNT$ACS -  
_ $ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$ACS.DAT
```

TNT\$EMERGENCY\_MOUNT.COM is created in SYS\$SYSTEM or in the directory pointed to by the TNT\$ACS logical, if the logical exists.

```
$ DEFINE/SYSTEM/EXEC TNT$UADB -  
_ $ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$UADB.DAT
```

```
$ DEFINE/SYSTEM/EXEC TNT$JOURNAL -  
_ $ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$JOURNAL.TNT$TRANSACTION_JOURNAL
```

```
$ DEFINE/SYSTEM/EXEC TNT$MONITOR -
```

```
__$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$MONITOR.DAT  
  
$ DEFINE/SYSTEM/EXEC TNT$MONITORJOURNAL -  
__$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$MONITOR.TNT$MONITOR_JOURNAL
```

4. To ensure that the system disks are mounted correctly with each reboot, follow these steps:
  - a. Copy the SYS\$EXAMPLES:CLU\_MOUNT\_DISK.COM file to the [VMS\$COMMON.SYSMGR] directory, and edit the file for your configuration.
  - b. Edit SYLOGICALS.COM and include commands to mount, with the appropriate volume label, the system disk containing the shared files.

### Example

If the system disk is \$1\$DJA16, include the following command:

```
$ @SYS$SYSDVICE:[VMS$COMMON.SYSMGR]CLU_MOUNT_DISK.COM -  
__$ $1$DJA16: volume-label
```

## F.1.2 Starting the Server on Other Nodes

If you plan to run OpenVMS Management Station on more than one node in an OpenVMS Cluster without rebooting, you need to start the software on those nodes.

Use SYSMAN to start the server as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

Or you can log in to each node that shares the SYS\$COMMON: directory and enter the following command:

```
$ @SYS$STARTUP:TNT$STARTUP.COM
```

If you are performing an upgrade or a reinstallation and OpenVMS Management Station is already running on the node, add the RESTART parameter to the startup command, as follows:

```
$ @SYS$STARTUP:TNT$STARTUP.COM RESTART
```

## F.1.3 Error Log Information

OpenVMS Management Station writes error log information to the file TNT\$SERVER\_ERROR.LOG. This error log is created in the SYS\$SPECIFIC:[SYSEXE] directory. If you start the OpenVMS Management Station server on multiple nodes in a cluster, which is recommended, multiple server error logs are generated.

## F.1.4 Updating the Printer and Storage Database

When you install OpenVMS Management Station, the installation starts the OpenVMS Management Station server on the installation node. If this installation is an upgrade, the server converts the existing OpenVMS Management Station database to the latest V3.\* format. If this is a new installation, the server creates an initial version of the database file TNT\$ACS.DAT and invokes the update functions automatically.

To complete the database, start the OpenVMS Management Station server on each node in your cluster. The instances of the server communicate with each other to determine device, queue, and volume information, and the server must be running on each node for this communication to take place.

## F.1.5 Editing the System Files

To start the OpenVMS Management Station server from your system startup files, insert one of the following commands into your system startup procedures (probably SYS\$MANAGER:SYSTARTUP\_VMS.COM) after both the Queue Manager and network are started but immediately before the ENABLE AUTOSTART/QUEUES command.

---

**NOTE** Remove any other invocations of TNT\$STARTUP you might have added in previous releases of the OpenVMS Management Station.

OpenVMS Management Station cannot start until the network has started. If you start your network using a batch process, OpenVMS Management Station might start before the batch process completes and the network is started.

---

Command	Parameter 1	Parameter 2	Description
@TNT\$STARTUP	blank	n/a	Starts the server. Does not start printer queues or mount volumes.
@TNT\$STARTUP	RESTART	n/a	Shuts down a running server, then starts the server. Does not start printer queues or mount volumes.
@TNT\$STARTUP	BOOT	blank	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station.
@TNT\$STARTUP	BOOT	ALL	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station.
@TNT\$STARTUP	BOOT	PRINTERS	Starts the server. Starts any printer queues that are not yet started and are managed by OpenVMS Management Station. Does not mount volumes managed by OpenVMS Management Station.
@TNT\$STARTUP	BOOT	STORAGE	Starts the server. Mounts any volumes that are not yet mounted and are managed by OpenVMS Management Station. Does not start any printer queues.

---

Note that the effect of TNT\$STARTUP BOOT, with no second parameter, has not changed from earlier releases. This command starts any printer queues that are not yet started and are managed by OpenVMS Management Station, but it does not mount any volumes.

Add the following command line to the system shutdown file, SYS\$MANAGER:SYSHUTDOWN.COM:

```
$ @SYS$STARTUP:TNT$SHUTDOWN.COM
```

## F.1.6 Controlling the Printer and Storage Environment

It is not necessary to remove your existing queue startup and volume mount DCL procedures immediately. The OpenVMS Management Station server recognizes that you started a queue or mounted a volume with your command procedures and assumes that you want it that way.

As you become familiar with the server's management ability, you can remove or comment out the DCL commands and procedures that perform these tasks and allow OpenVMS Management Station to control your printer and storage environment.

In addition, the OpenVMS Management Station server periodically (every 24 hours) generates a DCL command procedure that includes the commands to mount all of the volumes managed by OpenVMS Management Station. If you are familiar with DCL, you can look at this command procedure to see what actions OpenVMS Management Station performs for you. In the event of an unforeseen system problem or a corrupt server database (SYS\$SYSTEM:TNT\$ACS.DAT), you can use this command procedure to mount the volumes.

The name of the generated file is TNT\$EMERGENCY\_MOUNT.COM. TNT\$EMERGENCY\_MOUNT.COM is created in SYS\$SYSTEM or in the directory pointed to by the TNT\$ACS logical, if that logical name exists.

The OpenVMS Management Station server limits TNT\$EMERGENCY\_MOUNT.COM to seven versions.

## F.1.7 Keeping Your Printer Environment Up to Date

The OpenVMS Management Station server installation creates a file named SYS\$STARTUP:TNT\$UTILITY.COM. This command procedure scans the OpenVMS system and updates the database of known printers, queues, and related devices.

### F.1.7.1 When Is the Database Updated?

The database is updated:

- As part of the OpenVMS Management Station installation.
- When you specifically invoke TNT\$UTILITY.COM.
- At periodic intervals as a server background thread. Two logical names control how often this server thread runs:

Logical Name	Description
TNT\$PRINTER_RECON_INTERVAL	How often the thread should run, in minutes, from when the server was last started on this node. If you do not define this logical, the default value is 1440 minutes (24 hours).
TNT\$PRINTER_RECON_INTERVAL_MIN	The minimum number of minutes that must elapse before the thread should run again, starting from when the database was last updated. If you do not define this logical, the default value is 60 minutes (1 hour).

You can think of these logicals as meaning “run the thread this often (TNT\$PRINTER\_RECON\_INTERVAL), but make sure this much time has elapsed since the database was last updated (TNT\$PRINTER\_RECON\_INTERVAL\_MIN).”

Because you can run TNT\$UTILITY.COM yourself, and because the OpenVMS Management Station server also updates the database, the TNT\$PRINTER\_RECON\_INTERVAL\_MIN logical prevents the database from being updated more frequently than is actually needed.

If you want to change the defaults for one of these logicals, define the logical on all nodes on which the OpenVMS Management Station server is running.

### F.1.7.2 Do You Need to Run TNT\$UTILITY.COM Manually?

If you use OpenVMS Management Station to make all of the changes to your printer configuration, the configuration files are immediately modified to reflect the changes and you probably do not need to specifically run the TNT\$UTILITY.COM procedure.

However, if you or someone else uses DCL to make a change—for example, if you use the DELETE /QUEUE command to delete a queue—the configuration files are not synchronized. In this case, the OpenVMS Management Station client advises you to run the TNT\$UTILITY.COM procedure to resynchronize the database.

Run the following procedure on one node in the cluster to make the database match your system:

```
$ @SYS$STARTUP:TNT$UTILITY.COM UPDATE PRINTERS
```

For example, if you or someone else uses DCL to delete a queue, you need to delete that queue from the database. The TNT\$UTILITY.COM procedure assumes that your system is set up and running the way that you want it to, so you should fix any problems before you run TNT\$UTILITY.COM.

### F.1.7.3 What Are the Requirements for Running TNT\$UTILITY.COM?

You need the SYSNAM privilege to run TNT\$UTILITY.COM.

The TNT\$UTILITY.COM procedure connects to the OpenVMS Management Station server on the current OpenVMS system to determine device and queue information. Therefore, the OpenVMS Management Station server must be running on the node where you run TNT\$UTILITY.COM.

The OpenVMS Management Station server then connects to the other OpenVMS Management Station servers in the OpenVMS Cluster to determine device and queue information. It is generally a good idea to keep the OpenVMS Management Station server running on the other nodes in an OpenVMS Cluster to keep the database up to the minute.

However, if the OpenVMS Management Server is not able to connect to the OpenVMS Management Station server on a given node, it uses the known information about that OpenVMS node from the database. That is, in the absence of a valid connection to that OpenVMS node, the information in the database is assumed to be correct.

## F.1.8 Keeping Your Storage Environment Up to Date

The TNT\$UTILITY.COM utility accepts parameters (UPDATE STORAGE) to update the storage database. However, the storage database is updated dynamically every time you use the OpenVMS Management Station client to perform a storage management operation. Therefore, you do not need to run TNT\$UTILITY.COM to update the storage database.

## F.1.9 Enabling Disk Quotas

Before installing OpenVMS Management Station, you might have disabled disk quotas on the SYSTEM disk. If so, reenable the quotas and then rebuild to update quota information by entering the following commands:

```
$ RUN SYS$SYSTEM:DISKQUOTA
DISKQUOTA>ENABLE
DISKQUOTA>REBUILD
DISKQUOTA>EXIT
```



## F.1.10 Caching Storage Configuration Data

OpenVMS Management Station uses two logical names to determine how often to refresh cached (in-memory) storage configuration data.

- `TNT$PURGE_CYCLE_LATENCY`—Determines how often (in seconds) to wait after purging stale device reports before purging again. This value affects how frequently the clusterwide data (maintained by a master server) is updated in memory.

```
min = 180
default = 1800 (30 minutes)
max = 18000 (5 hours)
```

- `TNT$LOCAL_SURVEY_LATENCY`—Determines the delay (in seconds) from one node-specific device survey to the next. This value is independent of clusterwide surveys requested by the master server when performing a purge.

```
min = 6
default = 60 (1 minute)
max = 600 (10 minutes)
```

For both logical names, smaller values result in the OpenVMS Management Station server consuming more CPU cycles in periodic purges or surveys.

If you do not accept the defaults, you might find that larger OpenVMS Cluster systems perform better with values on the high end of the allowed range.

If you do not define these logicals, the OpenVMS Management Station server uses the default values. If you do define these logical names, the values are used only if they are within the accepted range.

## F.1.11 Running Third-Party TCP/IP Stacks

TCP/IP Services for OpenVMS Version is the only supported TCP/IP stack. Additional stacks have not been tested. However, TCP/IP stacks that are 100 percent compliant with the QIO interface for TCP/IP Services for OpenVMS should also work. (Contact your TCP/IP vendor for additional information and support issues.)

For the best chance of success, check the following:

- Make sure that the QIO service (for example, UCXQIO) is enabled.
- For TCPware (from Process Software Corporation), also make sure that the TCPware `UCX$IPC_SHR.EXE` is an installed image.
- Also for TCPware, make sure you are running a version of TCPware that correctly implements a DEC C-compatible socket interface.

## F.1.12 Determining and Reporting Problems

If you encounter a problem while using OpenVMS Management Station, please report it to HP. Depending on the nature of the problem and the type of support contract you have, you can take one of the following actions:

- If your software contract or warranty agreement entitles you to telephone support, call HP.
- If the problem is related to OpenVMS Management Station documentation, use the Internet address listed in the preface of this manual to send us your comments.

### F.1.13 Removing the OpenVMS Management Station Server

When you execute the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk. If this server software is later reinstalled using another kit (for example, a kit downloaded from the Web or a patch kit), you have the option to remove OpenVMS Management Station. If you use the POLYCENTER Software Installation utility to remove OpenVMS Management Station from the OpenVMS system, the following files are not removed:

- TNT\$ACS.DAT
- TNT\$JOURNAL.TNT\$TRANSACTION\_JOURNAL
- TNT\$SERVER\_ERROR.LOG
- TNT\$UADB.DAT
- TNT\$EMERGENCY\_MOUNT.COM

Do not delete these files unless you have already removed OpenVMS Management Station.

---

## F.2 Preparing Your PC

During the OpenVMS installation or upgrade procedure, you selected the OpenVMS Management Station client software files to be installed on your OpenVMS system disk (or you added them later using the DCL command `PRODUCT INSTALL TNT`). After you prepare your OpenVMS system to run the server software, you must prepare your PC to run the client software.

### F.2.1 Required Memory and Disk Space

Your PC requires 20 MB of free disk space to install the OpenVMS Management Station client software.

### F.2.2 Distribution Files

The OpenVMS Management Station client kit, TNT032-D.EXE for Intel systems (Microsoft Windows 2000 and Windows XP), can be downloaded from the following Web site:

<http://www.hp.com/go/openvms/argus>

### F.2.3 Required Software

Microsoft Windows 2000 or Windows XP must be installed on each PC on which you want to install the OpenVMS Management Station client.

The version of the Microsoft Management Console (MMC) included in this baselevel requires files provided by Microsoft Internet Explorer, Version 3.02 or higher, which must be present on the system.

### F.2.4 Time Required for Installation

The time required to install the OpenVMS Management Station client software is approximately 5 minutes.

## F.2.5 Copying the Client File to the PC

The client file TNT032-D.EXE can be downloaded from the following Web site:

<http://www.hp.com/go/openvms/argus>

Copy the client file to a temporary directory on the PC using either of the following procedures:

- Create a file share to the OpenVMS system and copy the file.
- Use FTP on the PC to copy the file from the OpenVMS system.

## F.2.6 Installation Directory

The installation procedure allows you to select the installation directory and suggests `\Program Files\OpenVMS Mgmt Station\` as the default.

## F.2.7 Installation Procedure

Run the TNT032-D.EXE file from a temporary directory. This is a self-extracting executable file that automates the OpenVMS Management Station installation.

## F.2.8 Recovering from Errors

If an error occurs during installation, you will receive an error message describing the problem. This information can help you determine the cause of the problem. An error can occur during the installation if one or more of the following conditions exist:

- The operating system version is incorrect.
- Disk space and memory necessary for successful installation are inadequate.

---

## F.3 After Installing the Client Software on Your PC

When you create an OpenVMS Cluster or OpenVMS Node object in an OpenVMS Management Domain, you select the transport you want to use for all connections to that system. You can choose DECnet Phase IV for OpenVMS or TCP/IP.

OpenVMS Management Station uses this transport for all communications between the PC and this system, or between any other OpenVMS system that is running the OpenVMS Management Station server and this system.

---

**NOTE** For primary servers, the OpenVMS Management Station client supports only TCP/IP connections. That is, the connection between the PC and the OpenVMS system uses only TCP/IP. Therefore, at least one OpenVMS system *must* be running TCP/IP.

---

You do need to make sure that your PC can connect to the primary-server systems, as described in the following sections. OpenVMS Management Station connects your PC to the primary-server system and then routes management operations to the target systems.

## F.4 Defining TCP/IP Nodes

Your hosts file or name server must be able to resolve the IP name or address of all primary-server systems. If you can successfully ping the primary-server systems from your PC, then this condition is met.

---

## F.5 Uninstalling Version 2.1 of the OpenVMS Management Station Client

Version 3.2 (or higher) of the OpenVMS Management Station client is not dependent on Version 2.1 and does not share any files with this earlier version. After installing the Version 3.2 (or higher) client, you can uninstall the Version 2.1 client software.

---

## F.6 Uninstalling OpenVMS Management Station

If you need to uninstall the OpenVMS Management Station client software, make sure you first exit OpenVMS Management Station. The uninstallation fails if OpenVMS Management Station is currently running.

If you run the OpenVMS Management Station Help, the following files might be created:

- VMSMGMT.FTS
- VMSMGMT.GID
- VMSPRINT.FTS
- VMSPRINT.GID
- VMSSCOPE.FTS
- VMSSCOPE.GID
- VMSSTORE.FTS
- VMSSTORE.GID
- VMSACNT.FTS
- VMSACNT.GID

The OpenVMS Management Station Uninstall program does not delete these files. To complete the uninstall:

1. Delete these files.
2. Delete the OpenVMS Management Station directory.

Note that the OpenVMS Management Station Uninstall program does not uninstall the MMC support files.

---

## **F.7 Getting Started with OpenVMS Management Station**

All information about getting started, setting up, and using OpenVMS Management Station is contained in online help and the *HP OpenVMS Management Station Overview and Release Notes*.



# G 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. Note that 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.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.
  - *SYSx* 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 POLYCENTER Software Installation utility, HP 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:
  - `IA64VMSSYS.PAR` (OpenVMS I64 systems)
  - `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:

- `IA64VMSSYS.PAR` (OpenVMS I64 systems)
- `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 `[SYSx...]` that remain after you remove the OpenVMS operating system. You might want to delete these directories.

Note that the directories `[SYSx]SYSCOMMON.DIR` (in all `[SYSx]`) 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 `[SYSx]` directory.



# H Alternative Ways to Initialize the System Disk

The usual way to create a new OpenVMS system disk is to install OpenVMS with the INITIALIZE option. When you do this, the installation process responds as follows:

- The disk is initialized with volume expansion (INITIALIZE/LIMIT).

This method of initialization (using the /LIMIT qualifier) may make your target system disk incompatible with versions of OpenVMS prior to 7.2. HP 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, following the steps described in Section H.1.

- On OpenVMS I64 systems only, a diagnostic partition is created.

The diagnostic partition is visible only from the console; it corresponds to the contents of SYS\$MAINTENANCE:SYS\$DIAGNOSTICS.SYS on the system disk. The partition is intended and reserved for use by HP Services (it is used with the HP IPF Offline Diagnostics and Utilities CD provided with the purchase of your Integrity server). For more information about offline diagnostics, refer to your hardware documentation and the following Web site:

<http://docs.hp.com/hpux/diag>

HP recommends creating the system disk with this partition and not removing it. However, it is not required for operation of OpenVMS.

If you do not want the diagnostic partition, you can prevent its creation by initializing the disk before installing OpenVMS, following the steps described in Section H.1. Alternatively, if you have already created the system disk and the partition, you can remove it by following the steps described in Section H.2.

---

## H.1 Alternative Method of Initialization

Use the following initialization method to avoid use of the /LIMIT qualifier or, for OpenVMS I64, to prevent creation of the diagnostic partition.

---

**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 7 (“Execute DCL commands and procedures”) from the main menu.
2. Initialize the intended target disk with the following command:

## Removing the Diagnostic Partition File

```
$ INITIALIZE /SYSTEM /HEADERS=150000 /STRUCTURE=ods-level target-disk target-label
```

where:

*ods-level* is 2 (for ODS-2) or 5 (for ODS-5)

*target-disk* is the device for the target disk (such as DKA100:)

*target-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.

If you are using this method of initialization to prevent creation of a diagnostic partition, and you do not intend to mount the disk on an OpenVMS system prior to version 7.2, include the /LIMIT qualifier with the INITIALIZE command. If you do not use the /LIMIT qualifier, your new system disk might be initialized with a relatively large minimum allocation size. This can cause small files to use more space than necessary.

3. Exit DCL (log off), and then select option 1 (“Upgrade, install or reconfigure OpenVMS”) from 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.

---

## H.2 Removing the Diagnostic Partition File

To remove the diagnostic partition on an OpenVMS I64 system disk and to recover the disk space occupied, delete the file SYS\$MAINTENANCE:SYS\$DIAGNOSTICS.SYS and then reset the boot block. This file can contain hardware diagnostics but is not essential for operations. To delete the file, enter the following command:

```
$ DELETE SYS$MAINTENANCE:SYS$DIAGNOSTICS.SYS
```

Reset the boot block by invoking the SET BOOTBLOCK command at the DCL prompt, as in the following example, where *target-disk* is the device on which your target system disk is mounted:

```
$ SET BOOTBLOCK /PRESERVE=SIGNATURE target-disk: [VMS$COMMON.SYS$LDR]SYS$EFI.SYS
```

---

## Glossary

This glossary defines key terms in the context of an OpenVMS computing environment.

**Advanced Server for OpenVMS** Supported on OpenVMS Alpha systems only, an OpenVMS-based network operating system compatible with Microsoft networking technology. Allows OpenVMS systems to be file and print servers for Windows desktop users. These users can use Microsoft products and utilities such as Windows Explorer to access file and print resources. Also provides a flexible system for network administration and security. This product supports OpenVMS ODS-5 disk volumes and Extended File Specifications. *See also* *PATHWORKS for Advanced Server (OpenVMS)*.

**Availability Manager** A system management tool that enables the system manager to monitor one or more OpenVMS nodes on an extended local area network (LAN) from an OpenVMS, Windows 2000, or Windows XP system. Availability Manager helps system managers and analysts target a specific node for analysis. The tool collects system and process data from multiple nodes simultaneously; it analyzes the data and displays the output. The Availability Manager (base) software installed with OpenVMS provides the data collection components that allow the system to be monitored by the Availability Manager and by DECamsd.

**Baseboard Management Controller (BMC)** A utility provided with HP Integrity servers that allows you to control some management features built into the system board, such as diagnostics, configuration, and hardware management. It enables you to interact with the Extensible Firmware Interface (EFI) and to boot the OpenVMS operating system. *See also* *Extensible Firmware Interface (EFI)*, *Management Processor (MP)*.

**BIB** Boot-is-blocked. The state of a cell (on a cell-based Integrity server) that is powered on but not allowed to boot. When all cells assigned to an nPartition are at the BIB state, the nPartition is inactive and no software can run on the nPartition until it is manually booted past BIB. *See also* *cell*, *nPartition*.

**boot, bootstrap** The process of loading system software into a processor's main memory. This guide uses the term *boot* to refer to this process.

**boot server** A TCP boot server (TCP/IP Services for OpenVMS BOOTP server) is the host that centralizes configuration and management of an IP address database, such as is used for OpenVMS InfoServer clients. *See also* *InfoServer*.

**cell** Also known as a cell board: a circuit board that is the basic building block of an nPartition in a server complex (such as any HP midrange and high-end Integrity servers). A cell consists of a symmetric multiprocessor and memory. *See also* *cell-based server*, *nPartition (node partition)*, *server complex*, *virtual partition*.

**cell-based server** A hardware complex that can run one or more operating systems and that supports dividing hardware resources into nPartitions. All processors and memory are contained in cells, each of which can be assigned for exclusive use by an nPartition. *See also* *cell*, *nPartition (node partition)*, *server complex*, *virtual partition*.

**Common Data Security Architecture (CDSA)** A multiplatform, Open Source security infrastructure. CDSA provides a stable, standards-based programming interface that enables applications to access operating system security services. With CDSA, you can create cross-platform, security-enabled applications. CDSA is automatically installed with the operating system. For more information about CDSA, refer to the *HP Open Source Security for OpenVMS, Volume 1: Common Data Security Architecture* manual.

**complex** *See* *server complex*.

**CI-only cluster** A computer system consisting of several computers attached to a computer interconnect (CI) through which it communicates with other computers in the cluster. These computers share a single file system.

**computer interconnect (CI)** A type of I/O subsystem. It links computers to each other and to HSx devices (for example, an HSJ or HSG).

**concurrent upgrade** The entire OpenVMS Cluster is shut down and unusable while upgrading each system disk. When the cluster reboots, all cluster members start up the upgraded version of the OpenVMS operating system.

**core I/O** Provides the base set of I/O functions required by every nPartition on a cell-based Integrity server. Includes the partition console interface and the network interface. *See also cell, cell-based server, nPartition.*

**DECnet Phase IV** Networking software that allows OpenVMS systems to participate in network task-to-task communications to transfer and copy files, print files, and run applications. DECnet Phase IV networking capabilities are defined in the DIGITAL Network Architecture (DNA) Phase IV. A system integrated product (SIP), DECnet for OpenVMS I64 is a component of the Foundation Operating Environment (FOE) on Integrity servers license bundle. *See also DECnet-Plus, TCP/IP Services for OpenVMS.*

**DECnet-Plus** Formerly known as DECnet/OSI, DECnet-Plus is the networking software that offers the capabilities defined in the DIGITAL Network Architecture (DNA) Phase V protocols. DECnet-Plus provides the newest DECnet features such as extended addressing and downline-load performance enhancements. DECnet-Plus integrates DECnet and OSI protocols and provides a linkage to TCP/IP. DECnet-Plus for OpenVMS I64 is a component of the Foundation Operating Environment (FOE) on Integrity servers license bundle. *See also DECnet Phase IV, TCP/IP Services for OpenVMS.*

**DECwindows Motif for OpenVMS** A layered product that provides support for both OSF/Motif, a standards-based graphical user interface, and the X user interface (XUI) in a single, run-time and development environment. DECwindows Motif displays the OSF/Motif user interface, but applications written on either toolkit will run regardless of the environment selected by the user.

**device name** The name used to identify a device on the system. A device name indicates the device code, controller designation, and unit number, such as DKA0, where DK is the device code, A is the boot device controller designation, and 0 is the unit number on the boot device.

**diagnostic partition** When present on an OpenVMS I64 system disk, this partition corresponds to the contents of `SY$MAINTENANCE:SY$DIAGNOSTICS.SYS` on

the disk. The diagnostic partition and its contents are intended and reserved for use by HP Services. Customer access and use is not supported.

**disk server** A computer within a local area cluster that provides an access path to CI, DSSI, and locally connected disks for other computers that do not have a direct connection.

**Extensible Firmware Interface (EFI)** The interface between HP Integrity server operating system and system firmware enabling you to perform such tasks as configuring the firmware and controlling the booting environment. EFI is the Intel specification of an interface between firmware and hardware. *See also Baseboard Management Controller (BMC), Management Processor (MP), Pre-OS System Environment (POSSE).*

**HSx device** A self-contained, intelligent, mass storage subsystem (for example, an HSJ or HSG) that lets computers in a cluster environment share disks.

**HSx drive** Any disk or tape drive connected to an HSx device (for example, an HSJ or HSG). A system disk on an HSx drive can be shared by several computers in an OpenVMS Cluster environment.

**InfoServer** A general-purpose disk storage server. OpenVMS systems connected to the same local area network (LAN) can boot from a virtual drive available from the InfoServer instead of from a local CD or DVD.

**instance** *See OpenVMS instance.*

**Integrated Lights-Out (iLO)** *See Management Processor (MP).*

**Kerberos** A network authentication protocol that provides authentication for applications using secret-key cryptography. Kerberos is automatically installed with the OpenVMS operating system.

**layered products** Products (including system-integrated products) provided by HP and third parties that can be installed on an OpenVMS system. *See also system-integrated product (SIP).*

**local area OpenVMS Cluster system A** configuration consisting of one or more computers that act as a MOP server and disk server, and a

number of low-end computers that act as satellite nodes. The local area network (LAN) connects all of the computers. These computers share a single file system.

**local drive** A drive, such as a CD, DVD, or disk drive, that is connected directly to a computer. If you have a standalone computer, it is likely that all drives connected to the system are local drives.

**Maintenance Operations Protocol (MOP)** A protocol used for operations such as downline loading and upline dumping. *See also MOP server.*

**Management Processor (MP)** A utility on HP Integrity servers that provides both local and remote access for controlling the system console, reset/power management, and transfer of control (TOC) capabilities. It also allows you interact with the Extensible Firmware Interface (EFI) and to monitor tasks and display detailed information about various internal subsystems. MP is available even when the server main power switch is in the off position. On entry-class Integrity servers, MP is known as the Integrated Lights-Out (iLO) Management Processor. *See also Baseboard Management Controller (BMC), Extensible Firmware Interface (EFI).*

**media** Any packaging agents capable of storing computer software (for example, compact discs, magnetic tapes, floppy disks, disk packs, and tape cartridges).

**migration support** In OpenVMS Clusters, migration support means that HP has qualified the versions for use together in configurations that are migrating in a staged fashion to a newer version of OpenVMS VAX, OpenVMS Alpha, or OpenVMS I64. Problem reports submitted against these configurations are answered by HP. However, in exceptional cases HP might request moving to a warranted configuration as part of the solution. Migration support helps customers move to warranted OpenVMS Cluster pairs. *See also warranted support.*

**MOP server** A computer system using either the LAN Auxiliary Control Process (LANACP) or DECnet software to downline-load systems using the

Maintenance Operations Protocol (MOP). Systems loaded include OpenVMS systems, print servers, and LAT servers. *See also Maintenance Operations Protocol (MOP).*

**nPartition (node partition)** A hard partition within a cell-based server that provides both hardware and software isolation among different instances of the operating system running on a single server. Cell-based servers can be configured either as a single, large, symmetric multiprocessor or as several independent systems. An nPartition has exclusive use of the memory, processor, and I/O resources belonging to the cells that are assigned to that partition, and can execute its own operating system image. *See also cell, partition, server complex, virtual partition).*

**OE** *See Operating Environments (OEs) for OpenVMS for Integrity Servers.*

**OpenVMS Cluster system** A computer system consisting of two or more Alpha, VAX, or Integrity server computers running HP OpenVMS Cluster software. Many types of cluster interconnect devices can be used to create a cluster environment; for example, CI, DSSI, and LAN devices in a local area network, and Shared Memory CI (SMCI) for OpenVMS Galaxy instances. An OpenVMS Cluster can consist of a single interconnect or a mixed-interconnect cluster with any combination of cluster interconnects.

**OpenVMS instance** The OpenVMS operating system running in either a soft or hard partition of a hardware platform. To share memory in a hard partition, the GALAXY system parameter must be set.

**OpenVMS Management Station** A powerful Microsoft Windows based management tool for system managers and others who perform system management tasks on OpenVMS systems. Allows system managers to manage user accounts, printers, and storage across multiple systems, using an intuitive interface that eliminates the need to remember complex OpenVMS DCL syntax, command procedures, and device names. A server component is installed on OpenVMS (automatically if you select all the default values during the installation); a client component is installed on a PC.

**Operating Environments (OEs) for OpenVMS for Integrity Servers** The model for delivering the OpenVMS I64 operating system, layered products, and documentation. Each operating environment bundles a group of products offered together at a single price based on the number of processors in the target system. Three operating environments are available: Foundation (FOE), Enterprise (EOE), and Mission Critical (MCOE).

**Operating Environment (OE) DVD** The DVD containing the OpenVMS for Integrity Servers Operating Environment and operating system, and the installation and other procedures described in this manual.

**operating system CD** The CD containing the OpenVMS Alpha operating system and the installation and other procedures described in this manual. *See also operating system media, Operating Environment DVD.*

**operating system media** The operating system CD or the OE DVD included with your OpenVMS distribution kit. *See also operating system CD, Operating Environment DVD.*

**partition** A subset of the server hardware that includes processor, memory, and I/O resources on which an operating system can run. This type of partitioning allows a single server to run independently an operating system in each partition with isolation from other partitions. *See also cell, nPartition, server complex, virtual partition.*

**PATHWORKS for OpenVMS (Advanced Server)** Supported on OpenVMS Alpha and VAX systems only, an OpenVMS-based network operating system compatible with Microsoft networking technology. Allows OpenVMS systems to be file and print servers for Windows desktop users. Such users can use Microsoft products and utilities such as Windows Explorer to access file and print resources. Also provides a flexible system for network administration and security. *See also Advanced Server for OpenVMS.*

**Performance Data Collector (TDC)** The Performance Data Collector for HP OpenVMS (TDC) collects and manages configuration and performance data for analysis by other applications. TDC\_RT Version 2.1 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. By default, data is collected in a file. Subsequently, user applications can retrieve the data from the file.

**platform** A POLYCENTER Software Installation utility concept in which the OpenVMS operating system is kitted with options for selected other products (for example, DECwindows Motif and networking products) so that the user can opt to install all at once. Generically, a platform is the combination of physical hardware and operating system on which a piece of management or application software runs.

**Pre-OS System Environment (POSSE)** The HP implementation of EFI that extends the EFI Shell and EFI Boot Manager to include additional features for managing hardware and system boot options.

*See also Extensible Firmware Interface (EFI).*

**rolling upgrade** Each system disk in an OpenVMS Cluster is upgraded individually, allowing old and new versions of the operating system to run together. Certain members of the cluster are available for use while others are being upgraded.

*See also concurrent upgrade.*

**satellite node** A computer that is part of a local area cluster. A satellite node is downline loaded from a MOP server and then boots remotely from the system disk served by a disk server in the local area cluster. *See also disk server, MOP server.*

**scratch disk** A blank disk or a disk with files you no longer need.

**server complex** The hardware of a cell-based server that includes all cells, I/O expansion cabinets, cables, cabinet hardware, fans, and power and utilities components. The complex can support multiple instances of an operating system by means of nPartitions. *See also cell, nPartition (node partition), server complex.*

**SIP** *See system-integrated product (SIP).*

**source drive** The drive that holds the operating system distribution media during an upgrade or installation. This may be a local drive or an InfoServer. The drive contains either the operating system CD or DVD, or a copy of it.

**standalone system** A computer system consisting of a single computer that is not part of a network or OpenVMS Cluster.

**system disk** The disk from which OpenVMS is booted. During an installation or upgrade, this is the source drive. After installation, the target drive is booted and becomes the system disk.

**system-integrated product (SIP)** A product provided by HP that can be installed or upgraded as part of the OpenVMS installation or upgrade. SIPs include required products, such as CDSA, Kerberos, and the base kit for Availability Manager, and optional products such as DECwindows Motif, DECnet-Plus, DECnet Phase IV, and TCP/IP Services for OpenVMS. *See also layered products.*

**target drive** The drive that holds the system disk during an upgrade or installation, or the drive you designate when backing up the system disk.

**TCP/IP Services for OpenVMS** HP standard implementation of the TCP/IP and NFS networking protocols, integrated with the OpenVMS operating system installation. Provides interoperability and resource sharing among systems running OpenVMS, UNIX, Windows, and other operating systems that support TCP/IP. TCP/IP provides a comprehensive suite of functions and applications that support industry-standard protocols for heterogeneous network communications and resource sharing.

*See also DECnet Phase IV, DECnet-Plus.*

**TDC** *See Performance Data Collector.*

**UETP (User Environment Test Package)** A software package that tests all the standard peripheral devices on your system, various commands and operating system functions, the system's multiple-user capability, DECnet software, and the cluster environment.

**virtual partition** A soft partition within a cell-based server that can provide software isolation among different instances of the operating system running on a single server or nPartition. Cell-based servers can be configured either as a single large symmetric multiprocessor or as several independent systems. A virtual partition uses a subset of the system processor, memory, and I/O resources, and includes operating system and application-related

software. The HP-UX operating system is the only operating system that can run in a virtual partition. *See also cell, partition, nPartition (node partition), server complex.*

**volume shadowing** The software that performs disk mirroring operations using a redundant array of independent disks (RAID) 1 storage strategy. Provides high data availability for disk devices by ensuring against data loss that results from media deterioration or controller or device failure. This prevents storage subsystem component failures from interrupting system or application tasks. Volume Shadowing for OpenVMS is available as both a separately licensed product on Integrity server systems and a component of the Enterprise Operating Environment (EOE) on Integrity servers.

**warranted support** In OpenVMS Clusters, warranted support means that HP has fully qualified the specified versions of OpenVMS coexisting in the cluster and addresses all problems identified by customers using the cluster configuration. *See also migration support.*





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