HP OpenVMS Version 8.2 Upgrade and Installation Manual

OpenVMS Alpha Version 8.2, OpenVMS I64 Version 8.2

This is a new manual.

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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 Alpha Version 8.2 operating system or for installing the HP OpenVMS Industry Standard 64 Version 8.2 for Integrity Servers operating system, and for the startup, shutdown, and backup operations required on Alpha or 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 Alpha or Itanium -based (Integrity server) processor, refer to 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 Alpha and OpenVMS I64 operating systems.
- Chapter 4 describes the tasks you must perform after installing or upgrading the operating system.
- Chapter 5 describes how to prepare your system for an upgrade.
- Chapter 6 supplements Chapter 5 with additional tasks you must perform before upgrading an OpenVMS Cluster system.
- Chapter 7 describes how to upgrade the operating system.
- Appendix A contains instructions for halting an Alpha system, booting the OpenVMS Alpha operating system CD and the system disk, using console commands to set system parameters, using the Writeboot utility, and invoking system shutdown procedures. Except for the system shutdown procedure, which works for both OpenVMS Alpha and I64 systems, information in this appendix applies to Alpha systems only.
- Appendix B explains how to set up and boot HP Integrity servers.
- Appendix C explains how to back up and restore the system disk.
- Appendix D discusses the OpenVMS internationalization data kit (VMSI18N) and how to install it.
- Appendix E contains supplementary information about registering licenses.
- Appendix F explains how to remove the OpenVMS operating system from your disk.
- Appendix G explains alternate methods of initializing an OpenVMS Alpha or 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:

- All cover letters included with the kit.
- *HP OpenVMS Version 8.2 Release Notes*, which provides important supplementary information about the OpenVMS Alpha and OpenVMS I64 operating systems.
- *HP OpenVMS Version 8.2 New Features and Documentation Overview*, which describes enhancements and new features included in this release of the OpenVMS Alpha and OpenVMS I64 operating systems.
- *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 *HP 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 DECamds and the Availability Manager Concurrently*, which provides information about Availability Manager software and is available at the following Web site:

  `http://h71000.www7.hp.com/openvms/products/availman/docs.html`
- For documentation related to the Performance Data Collector (TDC), refer to the following Web site:

  `http://h71000.www7.hp.com/openvms/products/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 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 Alpha or Integrity server computer. 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 might need to 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 World Wide Web address:

`http://www.hp.com/go/openvms`

Reader's Comments

HP welcomes your comments on this manual.

Please send comments to either of the following addresses:

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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:

NOTE Throughout this book, if "OpenVMS" is indicated without the "Alpha" or "I64" modifier, assume the information is common to both OpenVMS Alpha and I64 operating systems. Where system output is similar for both Alpha and I64 systems, examples are taken from the OpenVMS Alpha operating system except where stated otherwise.

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: – Additional optional arguments in a statement have been omitted. – The preceding item or items can be repeated one or more times. – Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
( )	In command format descriptions, parentheses indicate that you must enclose choices in parentheses if you specify more than one. In installation or upgrade examples, parentheses indicate the possible answers to a prompt, such as: `Is this correct? (Y/N) [Y]`
[ ]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for 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: `Is this correct? (Y/N) [Y]`
|	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are optional; within braces, at least one choice is required. Do not type the vertical bars on the command line.
{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold type	Bold type represents the 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.
italic type	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error *number*), in command lines (/PRODUCER=*name*), and in command parameters in text (where *dd* represents the predefined code for the device type).
UPPERCASE TYPE	Uppercase type indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
`Example`	This typeface indicates code examples, command examples, and interactive screen displays. In text, this type also identifies 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.

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

1 Getting Started

This chapter defines key terms and describes preliminary procedures you must perform before installing or upgrading to an OpenVMS Alpha operating system, or installing an OpenVMS I64 system.

NOTE Throughout this book, examples are taken from OpenVMS Alpha installations or upgrades except where stated otherwise. OpenVMS DCL commands are in UPPERCASE, while HP Integrity servers (Itanium -based systems) console commands are in lowercase.

1.1 Key Terms

The following are a few key terms you need to know before you install or upgrade the system:

Table 1-1 Definitions of Terms

Term	Definition
Operating system media	Unless stated otherwise, this refers to the OpenVMS Alpha operating system CD or the OpenVMS I64 **Operating Environment** DVD included with your OpenVMS distribution kit, which contains the OpenVMS operating system and the installation and other procedures described in this manual.
HS*x* device	A self-contained, intelligent, mass storage subsystem that lets computers in an **OpenVMS Cluster** 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 HSC or HSD).
InfoServer	A general-purpose disk storage server. Systems connected to the same local area network (LAN) can install the OpenVMS operating system from the InfoServer instead of from a local CD or DVD. (Supported for OpenVMS Alpha installations only.)
Local drive	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.
Source drive	The drive that holds the operating system kit 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.
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.
Target drive	The drive that holds the target system disk during the upgrade or installation. Note: the target drive must be a hard drive.

1.2 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.

1.2.1 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 Alpha or Integrity server system.

  For initial installations on an Integrity server system, some information is also provided in this manual; see Appendix B. 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.
- 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.)

1.2.2 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 your HP support representative and request priority shipment of any missing items.
- Before installing the OpenVMS operating system software, review all cover letters and release notes.

1.2.3 OpenVMS Alpha Operating System CD

Included in your OpenVMS Alpha kit is the OpenVMS Alpha operating system CD, which you use to install or upgrade the operating system, or to perform operations such as backing up the system disk. The CD is labeled similar to the following:

CD Label:	HP OpenVMS Alpha Version 8.2 Operating System
Volume Label:	ALPHA082

NOTE The *volume label* is the machine-readable name that the OpenVMS Alpha operating system and InfoServer systems use to access the CD.

1.2.4 OpenVMS I64 Operating Environment DVD

Included in your OpenVMS I64 kit is the OpenVMS I64 Operating Environment 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 Industry Standard 64 Version 8.2 Operating Environment
Volume Label:	I64082

NOTE The *volume label* is the machine-readable name that the OpenVMS I64 operating system uses to access the DVD.

1.2.5 Firmware Revision Checking on Alpha Systems

OpenVMS Alpha Version 8.2 provides firmware checking for systems during each **boot** operation. When you boot the OpenVMS Alpha operating system CD, the system automatically checks the version of console firmware that is running on your computer. The system also provides information about how to update the firmware.

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

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

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

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

The latest firmware CD is included with your OpenVMS Alpha media kit. It includes system firmware for current and recent Alpha systems and some I/O adapters. Firmware for older hardware might not be included on the current CD but can be found on previous CDs or at the following Web site:

```
http://ftp.digital.com/pub/DEC/Alpha/firmware/
```

HP recommends updating to the latest released firmware for all systems and I/O adapters. Firmware is released more often than the OpenVMS Alpha operating system. The firmware version recommendations included in OpenVMS Alpha V8.2 might be superseded before the next version of the OpenVMS Alpha operating system is released.

NOTE After you install this version of the OpenVMS Alpha operating system, the firmware check will occur each time you reboot the system.

1.2.6 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 required for system, BMC, and MP firmware, refer to the *HP OpenVMS Version 8.2 Release Notes*. To update Integrity server firmware, follow the instructions provided in this section. For instructions on setting up a console on your Integrity server, see Appendix B and the hardware documentation that comes with the server.

NOTE The HP Integrity server firmware and utilities can differ significantly across models. They can even differ across versions of the same model. The information about hardware and firmware presented in this and other sections of this manual is often based on the HP Integrity rx2600 server. The information is not intended to replace the hardware documentation included with your Integrity server system. 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 online at the following Web sites:

`http://docs.hp.com`

`http://www.hp.com/support/itaniumservers`

Refer also to the *HP OpenVMS Version 8.2 Release Notes* for the latest information about firmware and software requirements and considerations for your Integrity server.

Note also that when entering commands for the Integrity server, if you press the Delete key on a VT*xxx* 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 from Ctrl/H to the DEL/RUBOUT, see Section B.1.2.

To update your system and BMC firmware, you must do the following:

1. Determine the current firmware version on your Integrity server (see Section 1.2.6.1).
2. Create a firmware update CD on any system equipped with a CD-recordable drive (see Section 1.2.6.2).
3. Update the firmware on your Integrity server (see Section 1.2.6.3).

To update your MP firmware, follow the steps provided in Section 1.2.6.4.

1.2.6.1 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. (To get to the EFI Shell prompt, select EFI Shell [Built in] from the main EFI Boot Manager menu. More information about the use of EFI is included in Section B.4.) For example:

```
Shell> info fw
```

An annotated sample display follows:

```
FIRMWARE INFORMATION

                Firmware Revision: 2.13 [4412]  <-- System firmware revision is 2.13.

                PAL_A Revision: 7.31/5.37
                PAL_B Revision: 5.65
                HI Revision: 1.02

                SAL Spec Revision: 3.01
                SAL_A Revision: 2.00
                SAL_B Revision: 2.13

                EFI Spec Revision: 1.10
                EFI Intel Drop Revision: 14.61
                EFI Build Revision: 2.10

                POSSE Revision: 0.10

                ACPI Revision: 7.00

                BMC Revision: 2.35  <-- BMC firmware revision is 2.35.
                IPMI Revision: 1.00
                SMBIOS Revision: 2.3.2a
                Management Processor Revision: E.02.29  <-- MP firmware
                                                            revision is E.02.29.
```

NOTE The `info fw` command at the EFI> shell prompt cannot be used while OpenVMS is running. You can use the **Management Processor (MP)** interface to check firmware on your system while OpenVMS is running. Use the `sysrev` command at the MP:CM> prompt. (The EFI `info fw` command displays more detail.) For more information about using MP, see Section B.3

For basic information about EFI, see Section B.1. For more information about using EFI, refer to the hardware documentation supplied with your server system.

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 displayed in uppercase.

1.2.6.2 Creating a Firmware Update CD

To create a firmware update CD for your Integrity server, you need a CD-recordable drive (CD-R, CD-W, or CD-RW) and software, plus a blank CD-R disk.

NOTE The instructions in this step 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. Click on the appropriate server in the list provided on this web page (a new web page appears at this and each of the next steps).
3. Click on the “Download drivers and software” link.
4. Click on the “Cross operating system (BIOS, Firmware, Diagnostics, etc)” link.
5. Locate the appropriate ISO-image firmware file, read the instructions for the file, 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 used for unzipping an .ISO image of the latest system and BMC firmware for an rx2600 system (the file name changes with each update of the firmware available at the Web site):

   ```
   $ UNZIP PF_CPEAKSYS0231.ZIP
   Archive: SYS$SYSROOT:[SYSMGR]PF_CPEAKSYS0231.ZIP
    inflating: PF_CPEAKSYS0231.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 help information, use 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 system kit. For more information about the software, visit the following Web site:

`http://www.hp.com/go/openvms/freeware/`

1.2.6.3 Updating Your Firmware from the Firmware Update CD

To update the firmware on your Integrity server from the firmware update CD, follow these steps:

1. Shut down the Integrity server to the EFI console level. If your OpenVMS I64 system is already running, you must shut down the operating system. Once you get the P00> prompt, press Return. In a few minutes, the main EFI Boot Manager screen appears. You can then select the EFI Shell option or wait a few seconds until the EFI Shell prompt appears automatically. For more information about EFI, refer to the appropriate hardware documentation or see Appendix B.
2. Remove the recorded CD from the CD-R drive, label it, and load it into the CD/DVD drive on your Integrity server.
3. Exit the EFI shell (enter the `exit` command at the EFI Shell prompt). From the EFI Boot Manager menu, select the Boot Option Maintenance Menu option, as shown in the following example. (To move to the option, use the up or down arrow keys (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 Return to toggle the selection.)

The shading indicates the default or selected option.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

4. The Boot Maintenance Manager menu appears, as in the following example. Use the Boot Maintenance Manager menu to select the Add a Boot Option.

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation

     Boot from a File
     Add a Boot Option
     Delete Boot Option(s)
     Change Boot Order

     Manage BootNext setting
     Set Auto Boot TimeOut

     Select Active Console Output Devices
     Select Active Console Input Devices
     Select Active Standard Error Devices

     Cold Reset
     Exit

Timeout-->[10] secSystemGuid-->[C198BA79-478A-11D7-9C22-6033AC66036B]
SerialNumber-->[US30464638    ]
```

5. A menu similar to the following appears. Select the "Removable Media Boot" line, as shown, and press Return.

```
 Add a Boot Option. Select a Volume

  NO VOLUME LABEL [Acpi(HWP0002,500)/Pci(2|0)/Ata(Primary,Master)/
  Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,M
  Load File [EFI Shell [Built-in]]
  Load File [Acpi(HWP0002,500)/Pci(3|0)/Mac(00306EF3A2B6)]
  Exit
```

6. When prompted, enter a new description for the Removable Media Boot option, enter N to select the No BootOption data type, and then answer YES to save your changes in NVRAM, as shown in the following example. In this example, the new description for the Removable Media Boot option is "DVD-ROM."

```
Device Path Acpi(HWP0002,500)/Pci(2|0)/Ata(Primary,Master)

    Enter New Description: DVD-ROM
    New BootOption Data. ASCII/Unicode strings only, with max of 240 characters
    Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption]: N



    Save changes to NVRAM [Y-Yes N-No]: Y
```

7. After the changes have been saved to NVRAM, select Exit. The Boot Maintenance Manager menu appears again. From that menu, select Exit to return to the EFI Boot Manager screen.
8. Boot the CD by selecting the new description line for theRemovable Media Boot option in the Boot Maintenance Manager menu.
9. When you boot the CD, the main screen of the EFI-based setup utility appears, similar to the following example, which is for an rx2600 Integrity server. (If you are familiar with Alpha systems, the EFI-based setup utility is functionally similar to the OpenVMS Alpha LFU utility.) This menu-based tool lets you

read the firmware release notes, choose which firmware to update, and exit with or without a reboot. It allows you to update the Integrity server firmware and I/O card firmware. The firmware includes firmware for the system, MP, BMC, and other system components.

```
  SFW 2.31 update for rx2600, zx6000, zx2000

    SFW 2.31 update for rx2600, zx6000, zx2000
    Type the key which corresponds to your selection below:


     a. Update an rx2600, zx2000 or zx6000



     v. View License and Warranty Agreement Notice
     x. exit and reboot          q. exit menu without reboot

< (c) Hewlett-Packard Company, 2003 >
```

10. To update the firmware for your Integrity server, enter the letter "a" at the prompt. A screen similar to the following appears.

```
SFW 2.31 update for rx2600, zx6000, zx2000

  Firmware Update Utility with HP Server rx2600, zx6000 and zx2000
  Firmware Version 2.31.
  Type the key which corresponds to your selection below:


  a. View rx2600, zx6000 and zx2000 release notes
  b. Update rx2600, zx6000 and zx2000 firmware to 2.31
  c. Update rx2600, zx6000 and zx2000 firmware to 1.94

  v. View License and Warranty Agreement Notice
  x. exit and reboot          q. exit menu without reboot


< (c) Hewlett-Packard Company, 2003 >
```

11. To view the release notes, enter the letter a. To update the firmware, enter the letter b.
12. After the firmware is updated, enter the letter x to exit, and then reboot. This option loads and runs the new firmware.
13. If you plan to use MP through a local area network (LAN) connection, set the MP network address (TCP/IP) (optional). For information about setting up MP through a LAN connection, see Section B.3.2.1.

1.2.6.4 Updating MP Firmware

The method for updating your MP firmware depends on the current version of the firmware. For updating MP firmware versions earlier than E.02.26, use method 1. You must update your firmware incrementally. For updating version E.02.26 to E.02.29, use method 2.

1.2.6.4.1 Method 1: Updating MP Firmware Versions Earlier Than E.02.26 If your MP firmware is earlier than E.02.26, you need the following information:

- The IP adddress of a system running an FTP server from which you will download the firmware.
- The path to the firmware files located on the FTP server.
- The user name and password for the FTP server if anonymous access is not allowed.

Make sure other users are not using the system while you perform the firmware update. In addition, configure your FTP server so that it maintains sessions without easily timing out. For example, for TCP/IP Services for OpenVMS, the server's inactivity timer is determined by the value of the logical TCPIP$FTPD_IDLETIMEOUT. The default is 15 minutes. Set it to a larger value, as in the following example, which increases the inactivity timer to one hour:

```
$ DEFINE/SYSTEM/EXEC TCPIP$FTPD_IDLETIMEOUT 01:00:00
```

Stop and restart the FTP server for the new setting to take effect. For more information about configuring and managing the FTP server provided with TCP/IP Services for OpenVMS, refer to the *HP TCP/IP Services for OpenVMS Management* guide.

To update your MP firmware, follow these steps.

NOTE Versions of firmware earlier than E.02.26 must be updated incrementally. Specifically, if the current version of MP firmware is earlier than E.02.10, you must first update your firmware to E.02.10 before updating it further. If the current version is earlier than E.02.26, you must update the firmware to E.02.26 before updating it to E.02.29.

---

1. Configure the MP network, as explained in Section B.3.2.1.
2. Shut the Integrity server down to the EFI console level. If your OpenVMS I64 system is already running, you must shut down the operating system. Once you get the P00> prompt, press Return. In a few minutes, the main EFI Boot Manager screen appears, similar to the one shown in the following example:

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

3. Once you see the EFI Boot Manager screen, press Ctrl/B to get to MP, which should prompt you to log in. If you are at the EFI Shell prompt, enter Exit to get to the EFI Boot Manager screen, then press Ctrl/B.

NOTE To get the login user name and password prompts, you might need to press Return one or more times on your console keyboard. If this does not work, then try pressing Ctrl/B.

If you only see the MP password prompt, press Return 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 again.)

If you see a message similar to the following, another user has the console. To gain control of the console from the other user, press and release Ctrl/E, then type the letters "cf." Alternatively, you can have the other user log off.

```
[Read only - use Ctrl-Ecf for console write access]
```

The system will be inoperative if it has MP firmware older than version E02.22.

To log in, use the Admin user name and Admin password (typed in the case shown). If this does not work, enter Return for the user name and also for the password. The following is an example of the login screen that you might see:

```
HP Management Processor
Firmware Revision E.02.29 Jul 1 2004,11:10:23
(c) Copyright Hewlett-Packard Company 1999-2004. All Rights Reserved.


MP login:Admin
MP Password:*****
```

4. At the MP main menu that appears next as in the following example, enter the `cm` command for command mode, as shown.

```
              Hewlett-Packard Management Processor

(c) Copyright Hewlett-Packard Company 1999-2003. All Rights Reserved.

                MP Host Name: myhost

                 Revision E.02.29

*****************************************************************
           MP ACCESS IS NOT SECURE

 Default MP users are currently configured and remote access is enabled.
 Modify default users passwords or delete default users (see UC command)
               OR
      Disable all types of remote access (see SA command)
*****************************************************************

  MP MAIN MENU:

     CO: Console
     VFP: Virtual Front Panel
     CM: Command Menu
     CL: Console Log
     SL: Show Event Logs
     CSP:Connect to Service Processor
```

```
          SE: Enter OS Session
          HE: Main Help Menu
          X: Exit Connection

    [uninitialized] MP> cm
```

5. At the MP> prompt, enter the xu command to activate upgrade mode. Messages similar to the following appear, warning you that you cannot upgrade the system firmware and MP firmware simultaneously, then prompting you to confirm that you want to activate upgrade mode:

```
MP> xu

XU

This command activates the upgrade mode. All connections will be closed,
the session will be aborted, and the modem connection will be dropped
immediately. Web and telnet connections will be dropped upon completion.

WARNING: Simultaneous upgrade of MP and System Firmware is not allowed
and will result in SFW corruption.

Please, confirm your intention to activate the upgrade mode (Y/[N]) : Y
```

6. The XU screen now prompts you to enter the source system IP address (the IP address of the system from which you will download the firmware) and the file path. The syntax for the file path depends on the operating system on which the FTP server resides. In the example that follows, the FTP server is on an OpenVMS system, so the file path is specified accordingly. You are also asked whether to use the default login, to which you should answer no and then enter the user name and password for FTP login to the source system.

```
Enter source system IP address (Q to quit): XX.XX.X.XX

Enter file path (Q to quit):DSA500:[MP_FW.222]


Do you wish to use the default login: anonymous / MP@hp.com (Y/[N]/Q) :N

Enter login: user-name

Enter password:
```

7. After you enter the login information successfully, the XU upgrade mode screen displays the parameters you entered and asks you to confirm. When you enter Y to confirm, messages indicate the MP firmware upgrade is in progress, as in the following example. The upgrade might take 10 to 20 minutes, depending on the speed of the connection you are using and how busy the system is from which you are downloading.

```
MP Firmware Upgrade Parameters:
   Source IP: XX.XX.X.XX( IP address of node for FTP login )
   File Path: dsa500:[mp_fw.222]
   Login:     firmwareupd

Confirm? (Y/[N]): Y
   -> MP firmware upgrade in progress....

      Retrieving upgrade file using FTP.
```

```
   Retrieved an upgrade file successfully.
   Programming ROM.  Percent Complete: 100.

   Retrieving upgrade file using FTP.

   Retrieved an upgrade file successfully.
   Programming ROM.  Percent Complete: 100.

   Retrieving upgrade file using FTP.

   Retrieved an upgrade file successfully.
   Programming ROM.  Percent Complete: 100.

-> MP firmware upgrade complete - Web and telnet connections will
   be dropped.  MP will now reset....
```

1.2.6.4.2 Method 2: Updating MP Firmware to Version E.02.29 If your current MP firmware version is E.02.26, you can update it to E.02.29 using a firmware update CD. To create a firmware update CD and boot the update CD, following the steps described in Section 1.2.6.2 and *except* the last two steps (steps 9 and 10) in Section 1.2.6.3. The EFI-based setup utility screen examples in steps 9 and 10 in Section 1.2.6.3 differ significantly from the screens you see while updating firmware from the MP firmware update CD. Refer to the instructions and screen examples in steps 9 and 10 that follow:

9. When you boot the CD, the main screen of the EFI-based setup utility menu appears, similar to the one in the following example. (If you are familiar with Alpha systems, the EFI-based setup utility is functionally similar to the OpenVMS Alpha LFU utility.)

```
Firmware update to MP Firmware Version E.02.29

  Firmware update to MP Firmware Version E.02.29
  Type the key which corresponds to your selection below:


   a. Update to MP Firmware Version E.02.29



   v. View License and Warranty Agreement Notice
   x. exit and reboot          q. exit menu without reboot

< (c) Hewlett-Packard Company, 2003 >
```

10. To update the MP firmware for your Integrity server, enter the letter "a" at the prompt. A screen similar to the following appears.

```
MP Firmware Version E.02.29

  Firmware Update Utility with MP Firmware Version E.02.29

  Type the key which corresponds to your selection below:


  a. View MP Firmware Version E.02.29 release notes
  b. Update to MP Firmware Version E.02.29

  v. View License and Warranty Agreements Notice

  x. exit and reboot          q. exit menu without reboot


< (c) Hewlett-Packard Company, 2003 >
```

1.2.7 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 CD/DVD drive, the device name is similar to the following:

  `DQA0`

- When the source drive is a CD drive connected to the InfoServer, the device name is *always* the following:

  `DAD1`

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

  `DKA0:`

  Note the following conventions:

  — *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.

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

  `DUA20.14.0.2.0`

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

1.3 Using the Operating System CD or DVD Menu

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

NOTE The OpenVMS Alpha CD and OpenVMS I64 DVD menu options are very similar. This section provides examples from the Alpha CD menu system. Because Version 8.2 of OpenVMS I64 is the first I64 release, the upgrade option is not applicable.

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, see 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 CD or DVD.
- Display a list of products that can be installed from the CD or DVD.
- Install or upgrade **layered products** from the CD or DVD.
- 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 Alpha CD main menu (similar to the OpenVMS I64 DVD main menu):

```
OpenVMS (TM) Alpha Operating System, Version 8.2

(c) Copyright 1976-2004 Hewlett-Packard Development Company, L.P.


Installing required known files...

Configuring devices...

************************************************************
You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha 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 Alpha Version 8.2
  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.

1.3.1 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, then you are given options to reinstall or reconfigure the OpenVMS system or reconfigure the OpenVMS platform.

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 Alpha.

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

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

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

1.3.1.1 INITIALIZE Option

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

- All software and data files that were previously 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 Alpha or Itanium-based 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 will have to reinstall the operating system using the INITIALIZE option.

NOTE With OpenVMS I64, during initialization of the 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 may take, see Appendix G.

With both OpenVMS Alpha and I64 systems, 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 G.

Note that by taking these steps, 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.

1.3.1.2 PRESERVE Option

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

IF ...	THEN ...
The OpenVMS operating system is *not* already installed on the target disk	• The operating system is *installed*. • All other contents of the target disk are retained.
The OpenVMS operating system *is* installed on the target disk	The operating system is *upgraded*, as follows: • Old operating system files and new files are merged or replaced. • All other contents of the target disk are retained.

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 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, see Section 4.11.

1.3.2 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 the versions of the required components and optional products that can be installed or upgraded along with the OpenVMS operating system when you select the install or upgrade option 1 from the main menu.
- The layered product kits that are available for installation when you select the layered products 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 product lists and other output often identify DECnet-Plus as “DECNET_OSI,” which represents “DECnet/OSI.” DECnet-Plus was formerly known as DECnet/OSI.

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 AXPVMS AVAIL_MAN_BASE V8.2
DEC AXPVMS VMS version V8.2
CPQ AXPVMS CDSA version V2.1
HP AXPVMS KERBEROS version V2.1
HP AXPVMS TDC_RT V2.1
DEC AXPVMS DWMOTIF version V1.5
DEC AXPVMS DECNET_OSI version V8.2
DEC AXPVMS DECNET_PHASE_IV version V8.2
DEC AXPVMS TCPIP version V5.5


  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
---------------------------------- ----------- ----------
```

```
CPQ AXPVMS CDSA V2.1                  Full LP     Sequential
DEC AXPVMS DECNET_OSI V8.2            Full LP     Sequential
DEC AXPVMS DECNET_PHASE_IV V8.2       Full LP     Sequential
DEC AXPVMS DWMOTIF V1.5               Full LP     Sequential
DEC AXPVMS TCPIP V5.5                 Full LP     Sequential
HP AXPVMS AVAIL_MAN_BASE V8.2         Full LP     Sequential
HP AXPVMS KERBEROS V2.1               Full LP     Sequential
HP AXPVMS TDC_RT V2.1                 Full LP     Sequential
---------------------------------- ----------- ----------

7 items found

Press Return to continue...
```

1.3.3 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 the install or upgrade option 1 from the main menu.

When you select the layered products 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 will be reinstalled. Note that any patches that were applied to the product will be 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 or upgrading DECwindows Motif and DECnet.)

NOTE The layered products listed include CDSA, Kerberos, TDC, and Availability Manager, which are required, and 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 product:

```
DEC AXPVMS 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.

   o If you are upgrading DECwindows Motif from version V1.1 and
     want to save the OSF/Motif Release 1.1.3 programming files,
     DO NOT upgrade now. Instead, see the DECwindows Motif
```

```
     installation manual and follow the instructions for running
     PCSI_INSTALLATION.COM.

  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 - CPQ AXPVMS CDSA V2.1                Layered Product
  2 - DEC AXPVMS DECNET_OSI V8.2          Layered Product
  3 - DEC AXPVMS DECNET_PHASE_IV V8.2     Layered Product
  4 - DEC AXPVMS DWMOTIF V1.5             Layered Product
  5 - DEC AXPVMS TCPIP V5.5               Layered Product
  6 - HP AXPVMS AVAIL_MAN_BASE V8.2       Layered Product
  7 - HP AXPVMS KERBEROS V2.1             Layered Product
  8 - HP AXPVMS TDC_RT V2.1               Layered Product

  9 - All products listed above

  10 - Exit

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

NOTE When you boot the OpenVMS operating system CD or 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 CD or 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).

1.3.4 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 coccur.

  (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
---------------------------------- ----------- ------------
CPQ AXPVMS CDSA V2.1               Full LP     Installed
DEC AXPVMS DECNET_OSI V8.2         Full LP     Installed
DEC AXPVMS DWMOTIF V1.5            Full LP     Installed
DEC AXPVMS OPENVMS V8.2            Platform    Installed
DEC AXPVMS TCPIP V5.5              Full LP     Installed
DEC AXPVMS VMS V8.2                Oper System Installed
HP AXPVMS AVAIL_MAN_BASE V8.2      Full LP     Installed
HP AXPVMS KERBEROS V2.1            Full LP     Installed
HP AXPVMS TDC_RT V2.1              Full LP     Installed
---------------------------------- ----------- ------------

9 items found
Do you wish to display product history? (Yes/No) [No] YES
---------------------------------- ----------- ----------- --------------------
PRODUCT                            KIT TYPE    OPERATION   DATE AND TIME
---------------------------------- ----------- ----------- --------------------
```

```
CPQ AXPVMS CDSA V2.1                 Full LP     Install     25-AUG-2004 18:04:23
DEC AXPVMS DECNET_OSI V8.2           Full LP     Install     25-AUG-2004 18:04:23
DEC AXPVMS DWMOTIF V1.5              Full LP     Install     25-AUG-2004 18:04:23
DEC AXPVMS OPENVMS V8.2              Platform    Install     25-AUG-2004 18:04:23
DEC AXPVMS TCPIP V5.5                Full LP     Install     25-AUG-2004 18:04:23
DEC AXPVMS VMS V8.2                  Oper System Install     25-AUG-2004 18:04:23
HP AXPVMS AVAIL_MAN_BASE V8.2        Full LP     Install     25-AUG-2004 18:04:23
HP AXPVMS KERBEROS V2.1              Full LP     Install     25-AUG-2004 18:04:23
HP AXPVMS TDC_RT V2.1                Full LP     Install     25-AUG-2004 18:04:23
CPQ AXPVMS CDSA V2.1                 Full LP     Remove      25-AUG-2004 18:04:23
DEC AXPVMS DECNET_PHASE_IV V8.2      Full LP     Remove      25-AUG-2004 18:04:23
DEC AXPVMS DWMOTIF V1.5              Full LP     Remove      25-AUG-2004 18:04:23
DEC AXPVMS OPENVMS V8.2              Platform    Remove      25-AUG-2004 18:04:23
DEC AXPVMS VMS V8.2                  Oper System Remove      25-AUG-2004 18:04:23
HP AXPVMS KERBEROS V2.1              Transition  Remove      25-AUG-2004 18:04:23
HP AXPVMS KERBEROS V2.1              Transition  Reg Product 25-AUG-2004 17:20:44
CPQ AXPVMS CDSA V1.0                 Full LP     Install     27-JAN-2004 21:07:15
DEC AXPVMS DECNET_PHASE_IV V7.3-1    Full LP     Install     27-JAN-2004 21:07:15
DEC AXPVMS DWMOTIF V1.3-1            Full LP     Install     27-JAN-2004 21:07:15
DEC AXPVMS OPENVMS V7.3-1            Platform    Install     27-JAN-2004 21:07:15
DEC AXPVMS TCPIP V5.3-18             Full LP     Install     27-JAN-2004 21:07:15
DEC AXPVMS VMS V7.3-1                Oper System Install     27-JAN-2004 21:07:15
---------------------------------- ----------- ----------- --------------------

20 items found

Press Return to continue...
```

NOTE The products listed in the product history will 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*.

1.3.5 Using the Reconfigure Installed Products Option (5)

Option 5 of the operating system main menu allows you 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 CD or DVD. For information about displaying products that are available for installation, see Section 1.3.2 (option 2 from the main menu).
- The product is installed. For information about displaying installed products, see Section 1.3.4 (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 - CPQ AXPVMS CDSA V2.1          Layered Product
  2 - DEC AXPVMS DECNET_OSI V8.2    Layered Product
  3 - DEC AXPVMS DWMOTIF V1.5       Layered Product
  4 - DEC AXPVMS TCPIP V5.5         Layered Product
  5 - HP AXPVMS AVAIL_MAN_BASE V8.2 Layered Product
  6 - HP AXPVMS KERBEROS V2.1       Layered Product
  7 - HP AXPVMS TDC_RT V2.1         Layered Product

  8 - All products listed above
  9 - Exit

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

1.3.6 Using the Remove Installed Products Option (6)

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

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 other method other than PCSI), some of the product's directories, files, or other objects will not be 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 - CPQ AXPVMS CDSA V2.1          Layered Product
  2 - DEC AXPVMS DECNET_OSI V8.2    Layered Product
  3 - DEC AXPVMS DWMOTIF V1.5       Layered Product
  4 - DEC AXPVMS OPENVMS V8.2       Platform (product suite)
  5 - DEC AXPVMS TCPIP V5.5         Layered Product
  6 - DEC AXPVMS VMS V8.2           Operating System
  7 - HP AXPVMS AVAIL_MAN_BASE V8.2 Layered Product
  8 - HP AXPVMS KERBEROS V2.1       Layered Product
  9 - HP AXPVMS TDC_RT V2.1         Layered Product

  10 - All products listed above
  11 - Exit

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

1.3.7 Using the Execute DCL Option (7)

When you select option 7 from the operating system main menu, 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 system 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.

1.3.8 Using the Shut Down This System 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 (>>>). The system displays a message similar to the following:

```
Shutting down the system

  SYSTEM SHUTDOWN COMPLETE
```

1.4 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 CD or DVD, 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.
You want to install the operating system in a nonclustered environment	Chapter 3.
You want to upgrade the operating system in an OpenVMS Cluster environment	Chapter 5, Chapter 6, and then Chapter 7.
You want to upgrade the operating system in a standalone environment	Chapter 5 and then Chapter 7.
You want only to back up or restore your system disk	Appendix C.

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 Checklist 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
❑	Before installing or upgrading the operating system in an OpenVMS Cluster environment, review relevant OpenVMS operating system and OpenVMS Cluster documentation.	Section 2.2
❑	Familiarize yourself with mixed-version and mixed-architecture support, and migration support in OpenVMS Cluster systems.	Section 2.3
❑	Have information ready to provide at the system prompt during an installation.	Section 2.4
❑	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:

- The cover letters and the software product descriptions included with your distribution kit
- *HP OpenVMS Version 8.2 New Features and Documentation Overview*
- *HP OpenVMS Version 8.2 Release Notes*
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*

Be sure to consult with 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. These two support types are warranted and migration.

Warranted support means that HP has fully qualified the two versions coexisting in an OpenVMS Cluster and will answer 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 VAX or OpenVMS Alpha systems. 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 release includes no configurations specific to migration support.

For the minimum version supported for an upgrade to OpenVMS Version 8.2, see Section 5.3.1.

Warranted support is provided for the following version groupings:

- Alpha Version 8.2 and Alpha Version 7.3-2
- Alpha Version 8.2 and I64 Version 8.2
- Alpha Version 8.2 and VAX Version 7.3
- Alpha Version 7.3-2 and VAX Version 7.3
- I64 Version 8.2 and Alpha Version 7.3-2
- I64 Version 8.2, Alpha Version 8.2, 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. 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.

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

`http://h71000.www7.hp.com/serv_support.html`

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

`http://h71000.www7.hp.com/openvms/openvms_supportchart.html`

In a mixed-version cluster, you might need to install remedial kits on earlier versions of OpenVMS. For a complete list of required remedial kits, refer to the *HP OpenVMS Version 8.2 Release Notes*. In a mixed-architecture cluster, you need to install an LMF patch on any OpenVMS Version 7.3-2 Alpha members.

For information about supporting the Performance Data Collector base software (TDC_RT) in OpenVMS Clusters, see Section 4.8.4.5.

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 will 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, see the network or system manager. If you install DECnet-Plus for OpenVMS (Phase V) software and do not plan to use DECnet Phase IV for OpenVMS addresses, then you do not need to provide this information.
Allocation class value	During the installation procedure, you are asked for the allocation class value (ALLOCLASS) of the computer on which you are installing the OpenVMS operating system. For example: `Enter a value for this_node ALLOCLASS parameter:` Refer to the *HP OpenVMS Cluster Systems* manual for the rules on specifying allocation class values. Note that in a mixed-interconnect OpenVMS Cluster environment, the allocation class value cannot be zero if the nodes serve DSSI or CI disks. It must be a value from 1 to 255. This is also true for any computer that is connected to a dual-pathed disk. After you enter the allocation class value, the installation procedure uses it to automatically set the value of the ALLOCLASS system parameter.
Whether you want a quorum disk	To help you determine whether you want a quorum disk in the cluster, refer to the *HP OpenVMS Cluster Systems* manual.
Location of the page and swap files	On a nonclustered system, the page and swap files are on one or more local disks but on a clustered system, the files are on one or more local or clustered disks. Refer to the *HP OpenVMS Cluster Systems* manual to help you determine where the page and swap files will be located for the system on which you are installing the OpenVMS operating system software.
Systems that will be **MOP servers**[1], **disk servers**, and tape servers	If you are going to set up either a local area or a mixed-interconnect cluster, you will need to make these determinations.

Required Information	Explanation
Cluster group number and cluster password[2]	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: • Cluster group number — A number in the range from 1 to 4095 or 61440 to 65535 • Cluster password — Must be from 1 to 31 alphanumeric characters in length and can include dollar signs ($) and underscores(_)

1. Servers that use the DECnet maintenance operation protocol.
2. Cluster group number and password are not required if all the cluster nodes are directly connected; that is, the entire cluster uses interconnects such as **CI** (**computer interconnect**), DSSI (Digital Storage Systems Interconnect), or MEMORY CHANNEL. 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 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 OpenVMS Alpha and I64 operating systems. 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 will be prompted to enter only that information necessary to customize your installation. Refer to the documentation provided with your system.

This chapter includes the procedures for booting the OpenVMS operating system kit. These procedures differ significantly between Alpha and Itanium-based systems. For additional information about booting Alpha systems, see Appendix A. Information about setting up and booting Itanium-based systems is located in Appendix B. If you are installing OpenVMS for the first time, refer to the appropriate appendix.

Once the system kit is booted, the procedures for installing OpenVMS Alpha and OpenVMS I64 are very similar.

NOTE Before you install the OpenVMS operating system, ensure that the correct version of firmware is running in your computer. For information about Alpha system firmware, see Section 1.2.5. For I64 system firmware, see Section 1.2.6.

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 Checklist

Use the checklist in Table 3-1 to ensure that you perform all necessary installation tasks. For most of the installation tasks, the information provided is common (with minor exceptions) to both the OpenVMS Alpha and I64 operating systems. Where the tasks are significantly unique for each operating system and, therefore, documented separately, this table identifies each subsection for the task specific to each operating system.

Table 3-1 Installation Checklist

	Task	Section
❑	Boot the appropriate OpenVMS operating system kit:	Section 3.2
❑	Boot the OpenVMS Alpha operating system CD.	Section 3.2.1
❑	Boot the OpenVMS I64 Operating Environment DVD.	Section 3.2.2
❑	Install the OpenVMS operating system onto a system disk.	Section 3.3
❑	Boot the new OpenVMS system disk:	Section 3.4
❑	Boot the OpenVMS Alpha system disk.	Section 3.4.1

Table 3-1 Installation Checklist (Continued)

	Task	Section
❑	Boot the OpenVMS I64 system disk.	Section 3.4.2
❑	Join the OpenVMS Cluster (optional).	Section 3.5
❑	Run AUTOGEN.	Section 3.6
❑	Reboot the operating system after AUTOGEN completes (this should occur automatically).	Section 3.7
❑	Log in to the system account.	Section 3.8

3.2 Booting the OpenVMS Operating System Kit

The OpenVMS Version 8.2 operating system includes procedures that allow you to easily install the operating system using the POLYCENTER Software Installation utility. First, you must boot the OpenVMS operating system kit. To boot an OpenVMS Alpha system kit, see Section 3.2.1. To boot an OpenVMS I64 system kit, see Section 3.2.2.

3.2.1 Booting the OpenVMS Alpha Operating System Kit

This section explains how to boot the OpenVMS Alpha operating system kit, either from your local CD drive or from a CD drive connected to the InfoServer, as described in Section 3.2.1.2 and Section 3.2.1.3. First, you need to identify the name of the CD drive, as explained in Section 3.2.1.1. For more information about booting operations, see Section A.1.

3.2.1.1 Determining the Boot Device

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

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

```
>>>SHOW DEVICE

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

   For additional information, refer to the *HP OpenVMS for Integrity Servers and HP OpenVMS Alpha Version 8.2 Operating Systems Software Product Description* (SPD 82.35.*xx*) and the hardware manuals that you received with your Alpha computer.

3.2.1.2 Booting from the Local Drive

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

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in Section 3.2.1.1. In this case, you would enter the following command and press Return:

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

3.2.1.3 Booting from the InfoServer

To boot the operating system CD using the InfoServer, follow these steps:

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

   ```
   >>> BOOT -FLAGS 0,0 -FILE APB_082 lan-device-name
   ```

   Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in Section 3.2.1.1.

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

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.8.
- On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (APB_082).

---

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

```
Network Initial System Load Function
Version 1.2


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

Enter a function ID value:
```

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

a. Enter 3 for the function ID.

b. Enter 2 for the option ID.

c. Enter the service name (ALPHA082).

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: ALPHA082
```

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

IF ...	THEN ...
You previously chose the INITIALIZE option	1. Reboot the OpenVMS Alpha operating system CD. 2. Choose the install option from the menu and perform the installation again, as described in this chapter.
You previously chose the PRESERVE option	1. Reboot the OpenVMS Alpha operating system CD. 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. (See Appendix C for complete information using MOUNT and BACKUP commands to restore a system disk.) 5. Log out from the DCL environment. 6. Choose the install option from the menu and perform the installation again, as described in this chapter.

3.2.2 Booting the OpenVMS I64 Operating System Kit

This section explains how to boot OpenVMS I64 from the Operating Environment DVD. (At present, you cannot boot OpenVMS I64 from an InfoServer or similar network device.) For information about required and optional tasks to be performed prior to booting the system, and tasks that can be performed after booting the system, see Appendix B.

3.2.2.1 Booting the OpenVMS I64 Operating Environment DVD

After powering on and setting up your system (see Appendix B), boot the OpenVMS I64 DVD by following these steps:

NOTE To boot the DVD, you must be using a serial device for the console. OpenVMS does not support VGA graphics (nor USB keyboards) as console devices for booting. Appendix B explains how to set up the console on your Integrity server.

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 displayed in uppercase.

1. Insert the OpenVMS software DVD into the DVD/CD drive on the front panel of the server.
2. To ensure that EFI can access the DVD, enter the following command at the EFI Shell prompt (initially, the EFI Shell prompt is Shell>; the prompt can change, as explained in Section B.4):

   ```
   Shell> map -r
   ```

3. To boot the DVD, type the following command at the EFI Shell prompt, where fs0: is the Integrity server DVD drive. For a new Integrity server, the DVD drive is normally fs0:.

   ```
   Shell> fs0:\efi\boot\bootia64.efi
   ```

   This assumes no other systems are present on any of your Integrity server's disks. If installations have been performed already on your server, then the DVD drive might be at another location. In the EFI list of mapped devices, look for the letters CDROM to determine where the DVD is, as in the following line:

   ```
   fs0   : Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)/HD(Part1,Sig0)
   ```

   If the suggested 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 Operating Environment DVD, as explained in Section B.6.1. EFI shell commands are not case sensitive. 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, see Section B.1.2.

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 **Baseboard Management Controller (BMC)** SEL is full. You can safely continue when the BMC SEL is full by following the prompts; OpenVMS will process the contents of the SEL. If you want to clear the SEL manually, enter the `clearlogs SEL` command at the EFI Shell prompt as in the following example:

```
Shell> clearlogs sel
```

This command deletes the contents of the SEL. The command is available with current system firmware versions.

If your Integrity server is configured with a Management Processor (MP) and you see a BMC event log warning while connected to the MP console, you can also clear the BMC event log by using MP. Press Ctrl/B to revert to the MP> prompt. At the MP> prompt, enter SL (from the main menu) and use the C option to clear the log.

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, see Section 1.2.6.

You can now install your OpenVMS I64 operating system onto the target disk, following the steps described in Section 3.3.

3.3 Installing the OpenVMS Operating System onto a System Disk

After booting the operating system kit, you can create an operating system disk by using option 1 of the menu provided by the operating system media (CD or DVD). This installation procedure is similar for both OpenVMS Alpha and OpenVMS I64 operating systems. Exceptions are summarized in Section 3.3.1 and noted in the installation instructions in Section 3.3.3. The output examples provided in these instructions are from an OpenVMS Alpha installation.

3.3.1 Differences between Alpha and I64 Installations

The main differences between installing an OpenVMS Alpha system and an OpenVMS I64 system onto a system disk include the following:

- Output from the installation procedure is nearly identical for both Alpha and I64 except, of course, the operating system names as well as names of products included with the installation; for example, the OpenVMS I64 windowing and networking product names are all displayed as HP I64VMS *product-name*, such as HP I64VMS KERBEROS, while OpenVMS Alpha product names are displayed in any of three different ways, depending on the product and version:
  - HP *product-name*, such as HP AXPVMS KERBEROS V2.1
  - DEC *product-name*, such as DEC AXPVMS DWMOTIF V1.5
  - CPQ *product-name*, such as CPQ AXPVMS CDSA V2.1
- The default target system disk and volume labels are unique per system.
- 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.
- The OpenVMS Alpha operating system includes several components that are not included with the OpenVMS I64, such as C Object Libraries and software support for translating images.
- 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 use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility to perform this operation. While 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 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 asking 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, type the "^" character as many times as needed. Note that entering "^" may take you back more than one question. To return to the main menu, enter Ctrl/Y.

HP recommends that you review the following summary before you begin the installation so that you have an understanding beforehand of the types of information you will need to provide.

During the installation, the system will prompt you for the following information:

- The names of the source drive, target drive, and local area network device (if you are booting from an InfoServer system).
- Whether you want to select the INITIALIZE or PRESERVE option (as described in Section 1.3.1).
- 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 will automatically calculate the SCSSYSTEMID value. If necessary, see 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 will need to 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 you 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, see Figure 3-1 on page 72.

3.3.3 Installing OpenVMS Using Option 1 of the Operating System Menu

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

1. **Selecting Option 1 from the Menu**: When you boot the OpenVMS operating system kit (as instructed in Section 3.2), the operating system main menu appears as 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.

```
 HP OpenVMS (TM) Alpha Operating System, Version 8.2
(c) Copyright 1976-2004 Hewlett-Packard Development Company, L.P.

Installing required known files...

Configuring devices...

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

You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha 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 Alpha Version 8.2
    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 Alpha operating system CD might contain patch kits. If it does, information similar to the following is displayed:

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

---------------------------------- ----------- ----------
PRODUCT                            KIT TYPE    KIT FORMAT
---------------------------------- ----------- ----------
DEC AXPVMS TCPIP_ECO V5.3-182      Patch       Sequential
---------------------------------- ----------- ----------

1 item found

Please consult the OpenVMS Alpha 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, check to 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. **Creating 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, as shown:

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

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

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

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

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

Respond to the INITIALIZE or PRESERVE prompt as follows:

IF ...	THEN ...
Your system disk is new	1. Enter INITIALIZE. 2. Press Return.
You want to remove all files from an existing system disk	1. Enter INITIALIZE. 2. Press Return.
You want to retain certain files on an existing disk	Press Return to accept the default (PRESERVE).

NOTE With OpenVMS I64, during initialization of the 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 may take, see Appendix G.

With both OpenVMS Alpha and I64 systems, 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 G.

Note that by taking these steps, 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.

3. **Specifying 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 Alpha will be installed.

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

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

   If you select a device that is not available or that cannot be used for some other reason, the 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. **Specifying 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 ASPVMS82.

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

Enter volume label for target system disk: [ALPHASYS]
```

   You can keep the label already assigned to the disk, accept the default label assigned by the system (for Alpha systems, ALPHASYS; 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, and optionally, 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 will not function as intended.

5. **Specifying On-Disk Structure Level**: After you enter the volume label for the target system disk, you are asked if 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 later can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file name characters are seen in uppercase on OpenVMS VAX systems.)

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

6. **Specifying Hard Links (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 will continue 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. **Confirming 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 without hard link. The volume label will be ALPHASYS.

```
        You have chosen to install OpenVMS Alpha 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 ALPHASYS.
        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. **Specifying 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 eight characters in length (but not exceeding 31 characters). Valid characters for the password include A through Z, 0 through 9, and optionally, 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 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:

    Reenter 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 gives you the opportunity to specify a valid password.

9. **Declaring 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 an **OpenVMS Galaxy instance** or 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 will ask a series of questions about the cluster. Your response to this question determines how the

VAXCLUSTER system parameter will be set. (The parameter name "VAXCLUSTER" has been retained on OpenVMS Alpha 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 will have to explicitly configure the node into the cluster after the installation is completed. For more information, see Section 3.5.

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

10. **Declaring System as OpenVMS Galaxy Instance (Alpha Only)**: The procedure next asks whether your system will be an instance in an OpenVMS Galaxy. (This question is asked in OpenVMS Alpha installations only. OpenVMS I64 does not support OpenVMS Galaxy.) The display is similar to the following:

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

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

11. **Setting SCSNODE System Parameter**: The system now asks you to specify a value for the first of two system parameters, the SCSNODE parameter (step 12 describes the output and prompts for the second system parameter, SCSSYSTEMID). SCSNODE is a name that can be from 1 to 6 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 node synonym.

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

Enter SCSNODE: ALPCSI
```

12. **Declaring Use of DECnet; Setting SCSSYSTEMID System Parameter**: The next prompt asks whether you plan to use DECnet. It also informs you that the SCSYSYSTEMID system parameter will be 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, you will see the information about the DECnet Phase IV addresses and a prompt for a DECnet Phase IV address. Enter a valid DECnet Phase IV address as in the following example. Note that

```
  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-Plus 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:

    (DECnet_area_number * 1024) + DECnet_node_number
```

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

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


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

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

Enter SCSYSTEMID [65535]: 12345
```

13. **Setting Local Time Zone**: Now the system will ask 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 considered as your default time zone. Usually, this is the time zone in which your system is running. In addition, your system will ask 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:

    - Selecting 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).

- Using 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 equal sign (“=”) at the menu prompt instead of a number. You can enter one or more words or partial words immediately after the equal string, or you can enter the equal 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*.

14. **Setting 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 savings 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*.

15. **Registering 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 4.3.

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

The OpenVMS Alpha operating system uses one or more of the types of licenses described in Table 3-2, depending on your hardware and software configuration. For the OpenVMS I64 operating system, 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). 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.

NOTE All OpenVMS Alpha Base and SMP licenses include the NO_SHARE attribute and remain with the initial host computer.

Table 3-2 Types of OpenVMS Alpha Licenses

Type of License	Description
Operating System Base License	Grants the right to noninteractive use of the remote batch, print, application, and computing services of the OpenVMS Alpha operating system on a single processor and authorizes one direct login (for system management purposes only). For dual-processor systems, the base license for these specific systems grants the right to noninteractive use of the remote batch, print, application, and computing services of the OpenVMS Alpha operating system on a dual processor. The base license is a prerequisite for OpenVMS Alpha User Licenses and the SMP Base Extension license.
Symmetric Multiprocessing (SMP) Base Extension License	Extends the rights of the Operating System Base License to the matching multiprocessing level of your Alpha SMP system. Because the Symmetric Multiprocessing (SMP) Extension grants all the rights that the existing Base provided at the uniprocessing level, you do not need to reinstall those licenses when you upgrade to a multiprocessing system. Each time you upgrade your system to a new multiprocessing level (for example, from a DEC 7000 Model 620 Alpha system to a DEC 7000 Model 630 Alpha system), you add an SMP Extension to your existing licenses.
Individual User License	Grants the right to interactive use of the OpenVMS Alpha operating system, provided the appropriate Operating System Base License has been previously installed on the OpenVMS Alpha operating system. The Individual User Licenses are available in any quantity desired or as an unlimited user license.
Distributed Interactive User License	Grants the right to interactive use of the OpenVMS Alpha operating system, provided the appropriate Operating System Base License has been previously installed on an OpenVMS Alpha operating system. Distributed Interactive User Licenses are concurrent-use licenses and are available in any quantity desired except unlimited. You can redesignate these licenses, and they may be installed and used on a single OpenVMS Alpha processor, or shared in a single OpenVMS Cluster environment.

Table 3-2 Types of OpenVMS Alpha Licenses (Continued)

Type of License	Description
OpenVMS Concurrent-Use Licenses	Grant the right to interactive use of the OpenVMS Alpha operating system, provided you have previously installed the appropriate OpenVMS Alpha Operating System Base License on an Alpha computer. These licenses are available in any quantity desired except unlimited. The licenses are mobile (can be redesignated), and they may be installed and used on a single OpenVMS Alpha processor, or shared in a single OpenVMS Cluster. You can add interactive users to the computer at any time by specifying the same node name on the additional Interactive User License PAK and by following the license combination procedure described in the *HP OpenVMS License Management Utility Manual*.

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.

16. **Installing Windowing and Networking Products**: Finally, 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 (but not both)
- TCP/IP Services for OpenVMS

The software that you choose to install (including the required software) will be 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*.

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 Alpha (required part of OpenVMS)
     o CDSA for OpenVMS Alpha (required part of OpenVMS)
     o KERBEROS for OpenVMS Alpha (required part of OpenVMS)
     o Performance Data Collector for OpenVMS Alpha (required part of OpenVMS)
     o DECwindows Motif for OpenVMS Alpha
     o DECnet-Plus for OpenVMS Alpha
     o DECnet Phase IV for OpenVMS Alpha
     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 Alpha 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 Alpha V8.2?
   (Yes/No) [YES]
```

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

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

17. **Choosing Descriptive Help Text**: 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.

18. **Selecting 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:
  DEC AXPVMS  OPENVMS V8.2          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.

DEC AXPVMS OPENVMS V8.2: OPENVMS and related products Platform

  COPYRIGHT 1976, 8-NOV-2004
  Hewlett-Packard Development Company, L.P.

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

When selecting options, note the following:

- If you want all the default values, press Return.

  If you want to select options individually, answer NO. The system will then prompt you for each option and suboption shown in the display in Figure 3-1.

- 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 will have an opportunity to 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 then prepare your OpenVMS system and your PC to run OpenVMS Management Station by following the procedures described in Appendix E.
- 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 1.3.1.2 and Section 4.11.
- 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 Operating Environment (OE) you have purchased. For example, OpenVMS Management Station is available with the Enterprise Operating Environment (EOE) and 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 of OpenVMS on Alpha 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://h71000.www7.hp.com/openvms/products/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 Alpha (required part of OpenVMS)

CDSA for OpenVMS Alpha (required part of OpenVMS)

KERBEROS for OpenVMS Alpha (required part of OpenVMS)

The Performance Data Collector for OpenVMS (required part of OpenVMS)

 DEC AXPVMS DWMOTIF V1.3-1: 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 (19).

```
DEC AXPVMS DECNET_PHASE_IV V8.2: 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 (19).

19. **Completing Installation onto System Disk - Review Options and Confirm**: 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 if 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 Object Libraries <-------------- Alpha only
    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)
Translated Image Support <-------------- Only Alpha supports translating images
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 operating system. Except as noted, these options apply to both Alpha and I64 systems. 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 prompt, you are allowed to selectively configure options and suboptions, even if you did not do so previously. When you finish, you will again be asked 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. A sample display follows.

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

```
%PMA0 CPU00: 27-AUG-2004 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 27-AUG-2004 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

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

NOTE Names of products installed with OpenVMS differ between OpenVMS Alpha and I64 installations. For example, the OpenVMS I64 windowing and networking product names are all displayed as HP I64VMS *product-name*, such as HP I64VMS KERBEROS, while OpenVMS Alpha product names are displayed in any of three different ways, depending on the product and version:

- HP *product-name*, such as HP AXPVMS KERBEROS V2.1
- DEC *product-name*, such as DEC AXPVMS DWMOTIF V1.5
- CPQ *product-name*, such as CPQ AXPVMS CDSA V2.1

```
   Execution phase starting ...

   The following products will be installed to destinations:
       CPQ AXPVMS CDSA V2.1                 DISK$ALPHASYS:[VMS$COMMON.]
       DEC AXPVMS DECNET_OSI V8.2           DISK$ALPHASYS:[VMS$COMMON.]
       DEC AXPVMS DWMOTIF V1.5              DISK$ALPHASYS:[VMS$COMMON.]
       DEC AXPVMS OPENVMS V8.2              DISK$ALPHASYS:[VMS$COMMON.]
       DEC XPVMS TCPIP V5.5                 DISK$ALPHASYS:[VMS$COMMON.]
       DEC AXPVMS VMS V8.2                  DISK$ALPHASYS:[VMS$COMMON.]
       HP AXPVMS AVAIL_MAN_BASE V8.2        DISK$ALPHASYS:[VMS$COMMON.]
       HP AXPVMS KERBEROS V2.1              DISK$ALPHASYS:[VMS$COMMON.]
       HP AXPVMS TDC_RT V2.1                DISK$ALPHASYS:[VMS$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. You might also 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.

20. **Final Installation Output:** The installation continues, displaying the products that have been installed and indicating the next steps to take, as in the following example:

```
The following products have been installed:
    CPQ AXPVMS CDSA V2.1                Layered Product
    DEC AXPVMS DECNET_OSI V8.2          Layered Product
    DEC AXPVMS DWMOTIF V1.5             Layered Product
    DEC AXPVMS OPENVMS V8.2             Platform (product suite)
    DEC AXPVMS TCPIP V5.5               Layered Product
    DEC AXPVMS VMS V8.2                 Operating System
    HP AXPVMS AVAIL_MAN_BASE V8.2       Layered Product
    HP AXPVMS KERBEROS V2.1             Layered Product
    HP AXPVMS TDC_RT V2.1               Layered Product

DEC AXPVMS OPENVMS V8.2: OPENVMS and related products Platform

    HP AXPVMS KERBEROS V2.1

   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 Kerberos 5 V2.1 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 AXPVMS 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_REAME.TXT

 Release notes are available in SYS$COMMON:[TDC]TDC_RELEASE_NOTES.TXT


DEC AXPVMS 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.

DEC AXPVMS TCPIP V5.5: HP TCP/IP Services for OpenVMS.

  Check the release notes for current status of the product.

The installation is now complete.

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

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


   You may shut down now or continue with other operations.


 Process AXPVMS_INSTALL logged out at 27-AUG-2004 14:45:49.54
```

```
Press Return to continue...

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

 You can install or upgrade the OpenVMS Alpha operating system
 or you can install or upgrade layered products that are included
 on the OpenVMS Alpha 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 Alpha Version 8.2
     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/?)
```

21. **Configuring Boot Options (OpenVMS I64 only)**: When you boot your new system disk, you can boot your system disk manually, as you did to boot your Operating Environment DVD, using the following command as explained in Section 3.4.2:

    ```
    Shell> fs0:\efi\vms\vms_loader.efi
    ```

    However, HP recommends instead that you configure your system to make booting your system disk much simpler. You can add your system disk as the first boot option in the EFI Boot Manager menu. In this way, when that menu appears, you need only press Return to boot the system disk, or if there is no response within 10 seconds, your system disk will boot automatically. To add a boot option for your system disk to the EFI Boot Manager menu, use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility. This is a menu-based utility that is simple to use, as explained in the following steps. For more information about this utility, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

NOTE To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility. (Use of the utility is optional for other devices but mandatory for Fibre Channel devices.) For more information about configuring and booting Fibre Channel devices, refer to the *Guidelines for OpenVMS Cluster Configurations*.

---

a. Select option 7 ("Execute DCL commands and procedures") from the OpenVMS main menu.

b. At the DCL prompt ($$$), enter the following command to invoke the OpenVMS I64 Boot Manager utility:

   ```
   $$$ @SYS$MANAGER:BOOT_OPTIONS.COM
   ```

c. When the utility is invoked, the main menu displays. 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 typing the "^" character as many times as needed. To abort and return to the DCL prompt, enter Ctrl/Y.

d. 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 DKA0::

```
Enter the device name (enter "?" for a list of devices): DKA0:
```

e. 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]: ?
```

f. 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 when the EFI Boot Manager menu times out, your system disk boots automatically, press Return or 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
```

g. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1), or press Return to set no flags:

```
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. For example:

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.

h. 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 for PLM's System

efi$bcfg: DKA0: (BOOT003) Option successfully added
```

i. When you have successfully added your boot option, exit the utility by entering E at the prompt, and then log out of DCL to return to the OpenVMS main menu.

```
Enter your choice: E
$$$> LOGOUT
```

22. **Shutting Down the System**: Unless you want to perform any 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 documented in Section 4.14.

```
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. If you are installing OpenVMS I64, make sure you remove the DVD from the drive.

3.4 Booting the New OpenVMS System Disk

After you have successfully installed the operating system onto the system disk, boot the new system disk. For booting the OpenVMS Alpha system disk, follow the instructions provided in Section 3.2.1. For instructions on booting the OpenVMS I64 system disk, see Section 3.4.2.

3.4.1 Booting the New OpenVMS Alpha System Disk

For booting the OpenVMS Alpha system disk, first follow the preparatory steps listed in the following section. Then, to boot the disk, follow the steps in Section 3.4.1.2.

3.4.1.1 Preparing to Boot the New System Disk

Before you boot the new system disk, you must do the following:

1. Halt the system by entering Ctrl/P or by pressing the Halt button. For more information about halting your Alpha computer, see Appendix A.
2. At the console prompt (>>>), enter the SET BOOTDEF_DEV command in the following format:

   SET BOOTDEF_DEV *target-drive*

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

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

   If the system disk is connected to a hierarchical storage device (HS*x*), the format for specifying that drive is different. For example, on a DEC 7000 series system connected to an HSC device, the command is similar to the following:

   ```
   >>> SET BOOTDEF_DEV DUA20.14.0.2.0
   ```

   For more information about setting and showing the default boot device, see Appendix A.

3.4.1.2 How to Boot the New System Disk

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

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

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

```
OpenVMS (TM) Alpha Operating System, Version 8.2

Installing required known files...

Configuring devices...
(c) Copyright 1976-2004 Hewlett-Packard Development Company, L.P.
```

3.4.2 Booting the New OpenVMS I64 System Disk

The following steps explain how to boot your new OpenVMS I64 system disk.

NOTE Make sure the DVD has been removed from the DVD/CD drive.

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**, you will see your system disk as the first boot option in the EFI Boot Manager menu, as in the following example. You can either press Return to boot the system disk or wait 10 seconds, at which point the system disk boots automatically.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  DKA0: OpenVMS V8.2 for PLM's System PKA0.0
  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

- **If you have not configured your system with a boot option for your disk**, then follow these steps:

  1. Press Return or any other key (you might see text that instructs you to "hit any key to cold reboot"), and the machine displays several boot-related messages and then the EFI Boot Manager menu, as in the following example:

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

  2. Go to the EFI Shell prompt by selecting the EFI Shell [Built-in] option from the EFI Boot Manager menu (this is the default choice if you do not select one within 10 seconds). A display similar to the following appears. An explanation of the two types of devices shown (blk and fs) follows.

```
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 fs devices are file-structured logical partitions on physical disks included with your Integrity server system. Generally, fs0: corresponds to the target disk on which you installed OpenVMS I64 (unless the DVD was not removed, in which case fs1: would correspond 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, then the corresponding EFI device depends on what partitions are configured on the target disk.

blk The blk devices listed are block devices. These may include the DVD device as well as the diagnostic partitions on OpenVMS system disks. Diagnostic partitions are intended for use with the HP IPF Offline Diagnostics and Utilities CD provided with the purchase of your Integrity server. (For more information about this partition, see Appendix G.)

3. To boot the OpenVMS I64 system disk, type the following command at the EFI Shell prompt, where fs*n*: is the device associated with the system disk (it probably will be fs0:):

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

The OpenVMS I64 operating system will start 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
 (c) Copyright 1976-2004 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. 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 will process the contents of the SEL. If you want to clear the SEL manually, enter the `clearlogs SEL` command at the EFI Shell prompt as in the following example:

```
Shell> clearlogs SEL
```

This command deletes the contents of the SEL. The command is available only with current system firmware versions.

If your Integrity server is configured with a Management Processor (MP) and you see a BMC event log warning while connected to the MP console, you can also clear the BMC event log by using MP. Press Ctrl/B to revert to the MP> prompt. At the MP> prompt, enter SL (from the main menu) and use the C option to clear the log.

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, see Section 1.2.6.

3.4.3 Next Steps

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

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

After the system is rebooted with the new parameters, you can log into your system account, as explained in Section 3.8. You can also set up EFI to boot your system automatically from your target disk, as explained in Section B.7. Appendix B includes additional information regarding setting up and booting HP Integrity servers.

3.5 Joining an OpenVMS Cluster

If during the installation, you previously answered YES to the question about joining an OpenVMS Cluster, the system now asks a series of questions about your configuration (CI, DSSI, SCSI, local area, or mixed-interconnect). If you answered NO to this question, the system immediately runs AUTOGEN, as explained 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 SYS$MANAGER:CLUSTER_CONFIG.COM. You can do this by executing 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 3-3 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 particular cluster configuration, some prompts will not be displayed.

Table 3-3 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 may 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.
Will the Ethernet be used for cluster communications (Y/N)?	Enter N for a **CI-only OpenVMS Cluster** or DSSI-only OpenVMS Cluster. Otherwise, answer Y.[1]
Enter this cluster's group number[2]:	Enter a number in the range from 1 to 4095 or 61440 to 65535.
Enter this cluster's password[2]:	Enter the cluster password. The password must be from 1 to 31 alphanumeric characters in length and may 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 *HP OpenVMS Cluster Systems* manual for information about served cluster disks.
Will MYNODE serve RFxx disks (Y)?	Enter a response appropriate for your DSSI configuration, if such disks are available.

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

Question	How to Respond
Enter a value for MYNODE's ALLOCLASS parameter:	In a CI-only system (connected to a dual-ported disk), a DSSI-only system, or a local area or mixed-interconnect configuration where nodes serve DSSI or CI disks, enter the appropriate allocation class value (1 to 255). Otherwise, enter 0. For information about selecting the ALLOCLASS parameter, refer to the *HP OpenVMS Cluster Systems* manual.
Does this cluster contain a quorum disk (Y/N)?	For CI-only, SCSI, local area, and mixed-interconnect configurations, enter Y or N, depending on your configuration. For most DSSI systems, enter Y. However, if you are adding a two-system DSSI configuration to an existing cluster (in which case you might not need a quorum disk), you can answer N. If you enter Y, the system asks for the name of the quorum disk. Enter the device name of the quorum disk. Refer to the *HP OpenVMS Cluster Systems* manual for information about quorum disks.

1. The Ethernet may not be required for communication within a **local area OpenVMS Cluster system** configured with FDDI devices. Within certain DSSI or CI (computer interconnect) mixed-interconnect configurations, neither the Ethernet nor FDDI may be required for communication. If your configuration fits either scenario, you can answer NO (N) to this prompt.
2. Cluster group number and password are not required if all the cluster nodes are directly connected; that is, the entire cluster uses interconnects such as CI, DSSI (Digital Storage Systems Interconnect), or MEMORY CHANNEL. 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

The system 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 SYSGEN 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 DECnet
            Using SYS$MANAGER:CLUSTER_CONFIG.COM to create an OpenVMS Cluster
            Creating FIELD, SYSTEST, and SYSTEST_CLIG accounts if needed

%AUTOGEN-I-BEGIN, GETDATA phase is beginning.
%AUTOGEN-I-NEWFILE, 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, you will receive several messages at DECwindows startup. For information about these messages and how to avoid them, refer to the *HP DECwindows Motif for OpenVMS Release Notes*.

3.7 Rebooting after AUTOGEN

After AUTOGEN finishes, the system automatically shuts down, displaying 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 ALPCSI

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

After the shutdown of an OpenVMS I64 system, you must boot the system manually, as described in Section 3.4.2.

The OpenVMS Alpha system should automatically reboot after the shutdown; the installation will be complete. However, if the Alpha system does not reboot automatically, reboot the system manually. For example, if the system disk is on an RZ25 disk drive with a unit number of 1, enter the following command and press Return:

```
>>> BOOT DKA1
```

When the system starts booting, a message similar to the following is displayed:

```
     OpenVMS (TM) Alpha Operating System, Version 8.2

     Copyright (c) 1976-2004 Hewlett-Packard Development Company, L.P.


%STDRV-I-STARTUP, OpenVMS startup begun at 27-AUG-2004 14:50:18.35
.
.
.
```

When the system reboots, it displays informational messages and accounting information indicating that your OpenVMS Alpha 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  27-AUG-2004 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 (for an OpenVMS Alpha system):

```
        OpenVMS (TM) Alpha Operating System, Version 8.2

Username: SYSTEM
Password:
.
.
.
      OpenVMS (TM) Alpha Operating System, Version 8.2
```

If you forget your password, follow the instructions in Appendix A 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 displays on your screen:

1. Enter the user name SYSTEM followed by the password.
2. Click on the OK button.
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 4.

4 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 4.1 includes a checklist that you can use to make sure you perform all the postinstallation or postupgrade tasks necessary for your needs.

4.1 Postinstallation and Postupgrade Checklist

Use the checklist in Table 4-1 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 4-1 Postinstallation and Postupgrade Checklist

	Task	Section
❑	For a newly installed system disk, you can optionally back up the disk; you could just as well reinstall OpenVMS onto the disk. For a newly upgraded system disk, if it is *not* going to be a shadow set member, back up the system disk as a safeguard before proceeding with the next steps. If your newly upgraded system disk is going to be a shadow set member, re-formthe shadow set instead of backing up the disk.	Section 4.2
❑	Register any licenses that have not been registered during the installation; for an upgrade, register any new licenses.	Section 4.3
❑	Set system parameters to enable **volume shadowing** (new installations only, optional)	Section 4.4
❑	Tune BAP system parameters (Alpha upgrades only)	Section 4.5
❑	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 4.6
❑	*New installation (possibly upgrade):* Perform the following tasks that generally apply to new installations only but could also apply after an upgrade:	
	❑ Create proxy files if required.	Section 4.7.1
	❑ Set up the queue manager and start the default batch and print queues.	Section 4.7.2
	❑ Configure a multihead system, if applicable.	Section 4.7.3
	❑ Configure DECnet if it was installed. After an upgrade, perform only if DECnet was added during the upgrade.	Section 4.7.4

Table 4-1 Postinstallation and Postupgrade Checklist (Continued)

	Task	Section
	❑ 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 4.7.5
	❑ If you are using neither DECnet nor TCP/IP Services for OpenVMS, install and configure third-party networking software if necessary. You need networking software to download patches and as a requirement for certain layered products.	Section 4.7.6
	❑ Update SYSTARTUP_VMS.COM to have networking software start at boot. After an upgrade, do this only if networking software was added during the upgrade.	Section 4.7.7
❑	Initialize or configure the following optional products, as needed:	
	❑ Initialize CDSA.	Section 4.8.1
	❑ Configure Availability Manager.	Section 4.8.2
	❑ Configure Kerberos.	Section 4.8.3
	❑ Initialize and run the Performance Data Collector base software, TDC_RT.	Section 4.8.4
	❑ Prepare your OpenVMS system and your PC to run OpenVMS Management Station, and follow procedures in Appendix E.	Section 4.8.5
	❑ Install OpenVMS Debugger clients on a PC.	Section 4.8.6
❑	Create or edit a system-specific login welcome message SYS$MANAGER:WELCOME.TXT (optional).	Section 4.9
❑	*Upgrade only:* Examine command procedures for which the upgrade may have provided new template files.	Section 4.10
❑	Add and remove operating system files (optional).	Section 4.11
❑	Expand the system libraries using LIBDECOMP.COM (optional, Alpha only).	Section 4.12
❑	Download and apply any relevant OpenVMS or networking patches that are available (optional but recommended).	Section 4.13
❑	*New installation (possibly upgrade):* Install and configure layered products.	Section 4.14
❑	*New installation (possibly upgrade):* Create print queues.	Section 4.15
❑	Update SYSTARTUP_VMS.COM to have layered products, print queues, and other products or devices start at boot.	Section 4.16
❑	Create user accounts.	Section 4.17
❑	Run the **User Environment Test Package (UETP)** to test the system (optional).	Section 4.18
❑	Back up the system disk and start a systematic routine for backing up the application, data, and user disks.	Section 4.19

Table 4-1 Postinstallation and Postupgrade Checklist (Continued)

	Task	Section
❑	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 4.20
❑	*Upgrade only:* Reboot cluster members (if applicable).	Section 4.21
❑	Tune your operating system: after the system has run for at least 24 hours with users on the system, run AUTOGEN to collect feedback and, if necessary, modify the MODPARAMS.DAT file.	Section 4.22 Section 4.23

4.2 Backing Up Your System Disk

If your system disk will not be a shadow set member, or if it is 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 a multiple-member shadow set member, then a backup will not be necessary, as explained in Section 4.6. 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 Appendix A).
2. Boot the operating system CD or DVD (locally or from the InfoServer (Alpha only), as described in Section 3.2.
3. Use the OpenVMS operating system menu 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 typing its volume label. The /FOREIGN qualifier is required for the target disk when using 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:, you would 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.
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 CD or DVD and that allows you to back up a shadowed disk without disabling the shadow set, see Appendix C. For more information about the BACKUP utility, refer to the *HP OpenVMS System Management Utilities Reference Manual: A--L*.

4.3 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, the VOLSHAD license must be entered and loaded.

If you have upgraded your operating system, register any new OpenVMS or layered product licenses. Note that licensing schemes differ between Alpha and Integrity server systems. With the latter, 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 OpenVMS I64 systems, no update licenses are available.

For information about registering licenses, refer to the following:

- The *HP OpenVMS License Management Utility Manual*
- For OpenVMS I64 systems, refer to the *HP OpenVMS Version 8.2 Release Notes* and the *HP Operating Environments for OpenVMS Industry Standard 64 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 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.

4.4 Set System Parameters for Volume Shadowing (New Installations Only; Optional)

If you plan to form a shadow set, 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=4097    !Enable shadowing of the system disk and allow for mini-merge
SHADOW_SYS_UNIT=n       !Optional: default is 0, which creates DSA0
SHADOW_MAX_COPY=4       !Allow up to 4 shadow copies to be going on at the same time
SHADOW_MAX_UNIT=500     !Allow up to 500 shadow sets (includes dismounted and unused)
ALLOCLASS=x             !This number must be unique per node in the cluster;
                        !sets up $x$DSAn
```

In an OpenVMS Cluster, specify a unique ALLOCLASS value for each node. 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 explained in steps 6 through 10 in Section 4.5.

4.5 Tuning BAP System Parameters (Alpha Upgrade Only)

OpenVMS Alpha Version 7.1 and later contains system parameters that control the operation of bus-addressable pool (BAP).

The CIPCA, CIXCD, KFMSB, and Qlogic ISP 1020 (KZPSM-AA) adapters are some of the adapters that use bus-addressable pool to improve performance. BAP is a non-paged dynamic, physical-address-filtered memory pool used to overcome I/O bus and 32-bit adapter physical addressing limits.

The following table lists the BAP system parameters and their default values:

System Parameter	Default Value
NPAG_BAP_MIN	0
NPAG_BAP_MAX	0
NPAG_BAP_MIN_PA	0
NPAG_BAP_MAX_PA	-1

The default values of these parameters allow the system to boot with any configuration. When AUTOGEN is run on a configured system, it resets these parameters to values that should enhance performance for the current system configuration.

If this is an upgrade of OpenVMS, or if the system fails to boot after a hardware change and displays a message that refers to incorrect BAP parameters, HP recommends that you perform the following steps:

1. To begin the conversational boot, use the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of your system disk drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. At the SYSBOOT> prompt, type in the following:

   ```
   NPAG_BAP_MIN 0
   NPAG_BAP_MAX 0
   NPAG_BAP_MIN_PA 0
   NPAG_BAP_MAX_PA -1
   ```

3. This should allow the system to boot. Once completed, enter the following command:

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

4. The command entered in the preceding step creates a file that will contain the BAP values for the system in its current configuration. To see what they are, enter the following command (the BAP parameters in AGEN$FEEDBACK.DAT do not include the NPAG_ prefix):

   ```
   $ SEARCH SYS$SYSTEM:AGEN$FEEDBACK.DAT BAP
   ```

5. Check MODPARAMS.DAT for any hardcoded BAP values by entering the following command:

   ```
   $ SEARCH SYS$SYSTEM:MODPARAMS.DAT BAP
   ```

IMPORTANT If any BAP parameters are defined in MODPARAMS.DAT, HP strongly recommends removing them. Their presence in MODPARAMS.DAT could be the source of the current boot problem or might be a source of one in the future if a change is made to the adapter card configuration in the system.

6. Run AUTOGEN by entering the following command:

   ```
   $ @SYS$UPDATE:AUTOGEN GETDATA TESTFILES NOFEEDBACK
   ```

7. 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.
8. 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 6.
9. Once you are satisfied with the parameter settings, enter the following AUTOGEN command:

   ```
   $ @SYS$UPDATE:AUTOGEN GENPARAMS SETPARAMS NOFEEDBACK
   ```

   This command makes the parameter changes permanent so that they are used on subsequent reboots.
10. Reboot the system by entering the following command:

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

IMPORTANT If you make changes to adapters in the future and the system boots successfully, immediately run AUTOGEN, using the following command:

```
$ @SYS$UPDATE:AUTOGEN GETDATA SETPARAMS NOFEEDBACK
```

4.6 Forming the Shadow Set

If you have upgraded a disk in a volume shadowing environment, you must now re-formthe 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 4.4.

Forming the shadow set with the newly installed or upgraded disk as the master will cause 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.

Form the shadow set as follows:

1. Enter the SHOW DEVICE D command to display a list of disks available on your system. For example:

```
$ SHOW DEVICE D
Device                  Device     Error    Volume       Free  Trans Mnt
 Name                   Status     Count    Label       Blocks Count Cnt
$11$DKB100:   (NODE1)   Online         0
$11$DKB200:   (NODE1)   Mounted        0     ALPHA070    918150     1  31
```

2. Enter a command in the following format:

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

   Note the following conventions:

   - 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.
   - *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 shadowed system disk you just upgraded.

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:) ALPHA082

%MOUNT-F-SHDWCOPYREQ, shadow copy required
Virtual Unit - DSA54 Volume label ALPHA082
     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, dismount one of the shadowed 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, it would be 11DKB100:.

4.7 Customizing the System (New Installations, Possibly Upgrades)

You can customize the system to meet your site-specific needs. In addition, if your Alpha or Integrity server computer 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 may apply to upgrades. The tasks are as follows:

1. Create network proxy authorization files (Section 4.7.1)
2. Set up the queue manager and start the default batch and print queues (Section 4.7.2)

3. Configure your multihead system if applicable (Section 4.7.3)
4. Configure DECnet if it was installed or added during an upgrade (Section 4.7.4)
5. Configure TCP/IP Services for OpenVMS if it was installed or added during an upgrade (Section 4.7.5)
6. If neither DECnet nor TCP/IP Services for OpenVMS is being used, install and configure third-party networking software if necessary (Section 4.7.6)
7. Update SYSTARTUP_VMS.COM to have networking software start at boot (Section 4.7.7)

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

4.7.1 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$SYSTEM
$ 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 4.7.1).

If when you create the proxy files you see messages similar to the following, 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*.

4.7.2 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 4.14), some of these products will expect such queues to be present or will 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 You normally 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 will cause your system to overwrite your current queue database files.

As noted, the queue manager will automatically start when you next boot your OpenVMS system. To have the SYS$BATCH queue start automatically, remove the exclamation mark (!) from the following line in SYS$STARTUP:SYSTARTUP_VMS.COM. In that section, you can also define a default system print queue (SYS$PRINT).

```
$!$ START /QUEUE SYS$BATCH
```

For more information about starting and creating queues, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

4.7.3 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 automatically configured 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:

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 *HP DECwindows Motif for OpenVMS Installation Guide* and *Managing DECwindows Motif for OpenVMS Systems*.

4.7.4 Configuring DECnet

If you installed DECnet, or during an upgrade you added DECnet, you must configure DECnet now. Follow the instructions provided for the version of DECnet you installed.

If you installed DECnet-Plus for OpenVMS software, refer to the *HP 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 your local HP support representative for additional information.

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

- After you have registered the license for the DECnet Phase IV for OpenVMS software, execute the interactive command procedure SYS$MANAGER:NETCONFIG.COM to automatically configure your system for networking. For instructions on using NETCONFIG.COM, refer to *DECnet for OpenVMS Guide to Networking*. After all commands have been performed, the procedure asks whether you want the DECnet software started. If the license has been loaded, answer YES.
- Edit the commands in SYS$COMMON:[SYSMGR]SYSTARTUP_VMS.COM (as instructed in Section 4.7.7) 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.)

4.7.5 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 4.7.7) 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.

4.7.6 Install and Configure 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 may want to install and configure third-party networking software now. Refer to the appropriate vendor's product documentation.

4.7.7 Updating SYSTARTUP_VMS.COM

This step applies mainly to new installations or to upgrades in which networking software was added. HP recommends that you have your networking software start automatically at system boot. Make this happen by editing SYSTARTUP_VMS.COM. 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, simply delete the exclamation point (!) from the beginning of the line containing the product's startup command. (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.

4.8 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 4.8.1)
- Availability Manager (Section 4.8.2)
- Kerberos (Section 4.8.3)
- Performance Data Collector base software, TDC_RT (Section 4.8.4)
- OpenVMS Management Station (Section 4.8.5)
- OpenVMS Debugger clients (Section 4.8.6)

4.8.1 Initializing CDSA (Optional)

The Common Data Security Architecture (CDSA) software is automatically installed 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, you can skip to the next section.

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

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

An example of the output you might see follows:

```
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. Any attempt to remove it will 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 CPQ AXPVMS CDSA V2.1 is referenced
   by DEC AXPVMS OPENVMS V8.2
 -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]
```

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

4.8.2 Configuring the Availability Manager Base Software (Optional)

The Availability Manager base kit is automatically installed 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, you can skip to the next section.

The files in the Availability Manager base kit make up what is called the Data Collector. The Data Collector is used to collect data for the Availability Manager and DECamds products. To display the data, you need to install either an Availability Manager or a DECamds kit on a node in the local LAN. These kits are included in the OpenVMS upgrade media or can be obtained at the following Web site:

`http://h71000.www7.hp.com/openvms/products/availman/index.html`

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 is that these files are now installed as a required product rather than being bundled as part of the operating system kit. Procedures for configuring and using these files remains 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 DECamds and the Availability Manager Concurrently*). This and other Availability Manager documents, as well as DECamds documents, are available at the following Web site:

`http://h71000.www7.hp.com/openvms/products/availman/docs.html`

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. Any attempt to remove it will not work cleanly, and could create other undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP AXPVMS Availability Manager V8.2 is referenced
   by DEC AXPVMS OPENVMS V8.2
 -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]
```

4.8.3 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 upon Kerberos, you can 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 CD or DVD.

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. Any attempt to remove it will not work cleanly, and could create other undesirable side effects. An attempt to remove it results in a message similar to the following:

```
%PCSI-E-HRDREF, product HP AXPVMS Kerberos V2.1 is referenced
   by DEC AXPVMS OPENVMS V8.2
 -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]
```

4.8.4 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. To make use of TDC_RT, TDC_RT must be running on the system.

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, compatibility with prior releases, 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. Any attempt to remove TDC_RT will 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 is referenced
   by DEC AXPVMS OPENVMS V8.2
 -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]
```

4.8.4.1 User Privileges and Quotas

Users of TDC_RT will require various privileges, depending on the types of data to be collected. Online help is available when running the collector application, 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 the following:

4000 pagelets on Alpha systems
5000 pagelets on I64 systems

4.8.4.2 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 run TDC$STARTUP.COM, SYSNAM privilege is required.

4.8.4.3 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, individual users 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 may not be appropriate to add this command to SYS$MANAGER:SYLOGIN.COM.

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.

4.8.4.4 Compatibility with Prior Releases

For users of some third-party system-management applications, TDC Version 1.0 was distributed by web download. Applications that use TDC Version 1.0 will not work with TDC_RT Version 2.1. When TDC_RT Version 2.1 or any newer version of TDC is installed, files associated with TDC Version 1.0 are not removed. In any case, TDC_RT Version 2.1 and TDC Version 1.0 can safely coexist on a system. You can remove the older TDC files by uninstalling TDC (use the DCL command PRODUCT REMOVE).

TDC Version 2.0 was released for use on OpenVMS Alpha Version 7.3-2 systems. Prior to installing OpenVMS Alpha Version 8.2, you should have removed TDC Version 2.0 from your system. (When you install the latest version of TDC, the Version 2.0 files are removed automatically.) Software developers relying on the Software Developer's Kit (SDK) provided with TDC Version 2.0 should obtain the updated SDK that is included with the complete Performance Data Collector Version 2.1 kit. You can obtain that kit from the following Web site:

`http://h71000.www7.hp.com/openvms/products/tdc/`

With this release of OpenVMS, TDC and TDC_RT use the same naming scheme for image files. A build number is tagged to the image file names. For example, if the version of TDC_RT that ships with your operating system is Version 2.1-60 (where 60 is the build number), then the files that are installed will have names such as TDC$APISHR$A_V820-0060.EXE, where $A denotes Alpha ($I denotes I64), V820 denotes the version of OpenVMS (8.2), and 0060 is the build number. The SYS$STARTUP:TDC$STARTUP.COM startup file, which is also identical for both TDC and TDC_RT, uses this build number to determine which image files to use. When a subsequent installation is performed with software that has higher build numbers, the TDC$STARTUP.COM startup file uses the image files with the highest build number appropriate for the current platform.

4.8.4.5 Installation in OpenVMS Clusters

TDC_RT is installed in SYS$COMMON:[TDC] by default. Included are only those files required to run the data collector with the particular operating system version it was distributed with. Once the TDC_RT is installed and SYS$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://h71000.www7.hp.com/openvms/products/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.

4.8.5 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, see Appendix E.

4.8.6 Installing OpenVMS Debugger Clients on a PC (Optional)

The OpenVMS Debugger Version 8.2 runs on both OpenVMS Alpha and I64. On OpenVMS Alpha systems only, the OpenVMS Debugger includes a client/server interface. The debug server runs on OpenVMS; debug clients run on OpenVMS and on Microsoft Windows 95, Windows 98, Windows NT , Windows 2000, and Windows XP. There is no special installation procedure for the components that run on OpenVMS. This section describes the procedure for installing the debug client on a PC.

If you have Windows NT, you might need to install a COM update kit (Windows XP, Windows 2000, Windows 98, and Windows 95 do not require such a kit); choose one of the following options:

CPU	Operating System	Client Kit
Alpha	Windows NT	40COMAXP.EXE
Intel	Windows NT	40COMUPD.EXE

You must also install the debug client kit:

CPU	Operating System	Client Kit
Alpha	Windows NT	DEBUGALPHA011.EXE
Intel	Windows 95, 98, Me, NT, 2000, XP	DEBUGX86011.EXE

These client kits are self-extracting .EXE files. To make these clients available to PC users, copy these files from the operating system CD or DVD to a suitable **PATHWORKS for OpenVMS (Advanced Server)** or **Advanced Server for OpenVMS** share, FTP server, or other device available to the PC. (For the directory where these kits ship on the media, refer to the *Guide to HP OpenVMS Version 8.2 Media* provided with the operating system media kit.)

After the appropriate executable file has been transferred to the PC, the user can run the file to install the debug client on the PC. The InstallShield installation procedure guides the user through the installation.

By default, the debug client is installed in the \Programs\OpenVMS Debugger directory on the PC. Click Browse to select an alternate directory.

Choose one of the following options:

Install Option	Details
Typical	Debug client and *HP OpenVMS Debugger Manual* in HTML format
Compact	Debug client only
Custom	Choice of Debug client and/or *HP OpenVMS Debugger Manual* in HTML format

The installation procedure creates an OpenVMS Debugger program folder that contains the following items:

- Debug client
- Debug client help file
- *HP OpenVMS Debugger Manual* in HTML format
- Readme file

- Uninstall procedure

4.9 Creating a System-Specific Login Welcome Message (Optional)

You can use SYS$WELCOME to display a system-specific welcome message at login. The message could inform users of scheduled down time, recent updates to the system, who to contact if they are having system problems, and so forth. A template file is provided by the operating system. To create your own SYS$WELCOME file, do the following:

1. Copy the template file using the following command:

   ```
   $ COPY SYS$MANAGER:WELCOME.TXT SYS$SPECIFIC:[SYSMGR]WELCOME.TXT
   ```

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 starting and creating queues, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

4.10 Examining Your Command Procedures (Upgrades Only)

The upgrade procedure retains the site-specific versions of the following files located in the [VMS$COMMON] directory:

```
[SYSMGR]LAT$SYSTARTUP.COM
[SYSMGR]LOGIN.COM
[SYSMGR]SYCONFIG.COM
[SYSMGR]SYLOGICALS.COM
[SYSMGR]SYLOGIN.COM
[SYSMGR]SYPAGSWPFILES.COM
[SYSMGR]SYSECURITY.COM
[SYSMGR]SYSHUTDWN.COM
[SYSMGR]SYSTARTUP_VMS.COM
[SYSMGR]TFF$SYSTARTUP.COM
[SYSMGR]WELCOME.TXT
[SYS$STARTUP]ESS$LAST_STARTUP.DAT
```

The upgrade procedure might provide new templates for some of these files with the .TEMPLATE 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.

4.11 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 CD or DVD 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 CD or DVD.
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 Alpha Version 8.2
        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
    ********************************************************

.
.
.

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


.
.
```

```
.
    Version 8.2 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:
    DEC AXPVMS VMS V8.2                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.

DEC AXPVMS VMS V8.2: OpenVMS Operating System
```

```
     COPYRIGHT (c) 1-JUN-2004
     Hewlett-Packard Development Company, L.P.


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

Answer NO to this question, and select the options you want, as described in step 18 of the installation procedure described in Section 3.3.3 (a list of component options is provided in Figure 3-1 on page 72). After you respond to the prompts, the display continues and the installation procedure completes. The following is a continuation of the sample display:

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

Execution phase starting ...
The following product will be reconfigured:
    DEC AXPVMS VMS V8.2
Portion done: 0%...10%...20%...30%...40%...50%...60%...80%...90%...100%
The following product has been reconfigured:
    DEC AXPVMS VMS V8.2
.
.
.
```

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

4.12 Expanding the System Libraries (Optional, Alpha Only)

Libraries included with the OpenVMS Alpha operating system kit are in data-reduced (compressed) format. Unless disk space is limited, HP recommends expanding (decompressing) these libraries to give the system faster access to them.

The libraries included with the OpenVMS I64 operating system kit are in expanded (uncompressed) format. HP recommends keeping the libraries in expanded format. However, you can compress any of these libraries if necessary.

To expand libraries that are in data-reduced format or compress libraries that are in expanded format, use the OpenVMS Library Decompression utility (LIBDECOMP.COM). The utility runs on both OpenVMS Alpha and I64 systems. To run the utility, enter the following command:

```
$ @SYS$UPDATE:LIBDECOMP
```

For additional information about the utility, you can request help by entering the following command:

```
$ @SYS$UPDATE:LIBDECOMP HELP
```

You can list the sizes and format (reduced or expanded) of the libraries by using the following command:

```
$ @SYS$UPDATE:LIBDECOMP LIST
```

For complete details about expanding and reducing system library files and using LIBDECOMP.COM, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

Table 4-2 lists the libraries that ship on OpenVMS Version 8.2 and shows the approximate sizes of the libraries in both data-reduced (compressed) and expanded format. Note that library sizes differ for Alpha and I64 systems.

NOTE File sizes are subject to change. Some changes may have occurred after this manual went to print. In addition, layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in Table 4-1 do not reflect such entries. For the most accurate information, run the Library Decompression utility on your own system and review the output from the list function.

Table 4-2 Reduced and Expanded Library Sizes

Library Name/Description	OpenVMS Alpha		OpenVMS I64	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
[SYSHLP] directory; Help library files (.HLB)				
ACLEDT.HLB Access Control List Editor help	70	102	70	103
BKM$HELP.HLB Backup Manager help	156	248	156	251
DBG$HELP.HLB OpenVMS Debugger help	1234	2133	1234	2157
DBG$UIHELP.HLB OpenVMS Debugger help	269	438	269	462
EDTHELP.HLB EDT Editor help	154	229	154	233
EVE$HELP.HLB EVE Editor help	676	1197	676	1177
EVE$KEYHELP.HLB EVE Keypad help	99	145	99	148
EXCHNGHLP.HLB Exchange Utility help	83	118	83	118
HELPLIB.HLB[1] DCL help (see footnote at end of table)	9747	19097	10015	18543
LANCP$HELP.HLB LAN Control Program help	124	182	124	182
LATCP$HELP.HLB LAT Control Program help	157	243	157	243
MAILHELP.HLB Mail Utility help	211	316	211	316
NCPHELP.HLB Network Control Program help	261	412	261	412
SDA.HLB System Dump Analyzer help	357	537	357	543

Table 4-2 Reduced and Expanded Library Sizes (Continued)

Library Name/Description	OpenVMS Alpha		OpenVMS I64	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
SHWCLHELP.HLB Show Cluster Utility help	88	127	88	127
SYSGEN.HLB System Generation Utility help	363	572	363	572
SYSMANHELP.HLB System Management Utility help	554	895	554	889
TPUHELP.HLB Text Processing Utility help	575	1036	575	1015
UAFHELP.HLB Authorize Utility help	248	383	248	383
[SYSLIB] directory; Macro library files (.MLB)				
LANIDEF.MLB LAN internal driver macros	190	254	191	269
LIB.MLB Operating system macros	2890	4997	3100	5290
STARLET.MLB Operating system macros	2502	3743	2539	3500
[SYSLIB] directory; Object library files (.OLB)				
STARLET.OLB[1] System object library and run-time library (see footnote at end of table)	29553	448013	69523	116103
VAXCRTL.OLB HP C RTL routine name entry points; VAX G_floating double-precision, floating-point entry points	1268	1684	Not included	
VAXCRTLD.OLB Limited support of VAX D_floating double-precision, floating-point entry points	1728	2796	Not included	
VAXCRTLDX.OLB VAX D_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1658	2643	Not included	
VAXCRTLT.OLB IEEE T_floating double-precision, floating-point entry points	1574	2488	Not included	
VAXCRTLTX.OLB IEEE T_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1591	2488	Not included	

Table 4-2 Reduced and Expanded Library Sizes (Continued)

Library Name/Description	OpenVMS Alpha		OpenVMS I64	
	Reduced Size (as shipped)	Expanded Size	Reduced Size	Expanded Size (as shipped)
VAXCRTLX.OLB G_floating support; support for /L_DOUBLE_SIZE=128 compiler qualifier	1420	1998	Not included	
VMS$VOLATILE_PRIVATE_INTERFACES.OLB OpenVMS bugcheck processing codes	568	827	1189	1577
[SYSLIB] directory; Text library files (.TLB)				
BASIC$STARLET.TLB BASIC language variant of the STARLET library, containing version-independent declarations for system services	3833	7989	3798	8053
ERFLIB.TLB ANALYZE ERROR device descriptions	64	85	Not included	
LIB_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1881	3465	1881	3544
NTA.TLB Windows NT Affinity definition files	34	42	34	52
STARLETPAS.TLB PASCAL language variant of the STARLET library, containing version-independent declarations for system services	3750	8795	3733	8800
STARLET_RECENT_ADA_SUBSET.TLB Ada programmers toolkit of operating system definitions	1128	1995	1128	2022
STARLETSD.TLB Language-independent STARLET definitions used during layered product installations	4247	7758	4213	7774
SYS$LIB_C.TLB C language variant of the LIB library, containing internal and version-dependent declarations for system services	9971	21090	16482	34189
SYS$STARLET_C.TLB C language variant of the STARLET library, containing version-independent declarations for system services	6207	13447	6440	13872
TOTALS:	**91483**	**164007**	**129945**	**232929**

1. Layered products and user applications might add entries to the HELPLIB.HLB and STARLET.OLB libraries. The sizes listed in this table do not reflect such additional entries.

4.13 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 Release Notes*.

To download and install OpenVMS patches, do the following:

1. Create a directory on a non-system 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 e-mail address.
4. Once 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.

   ```
   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/alpha
   250 CWD command successful.
   ```

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

7. Move to the directory corresponding to the version of OpenVMS you want patches for (this is a partial list of the directories actually available; for the layered products directory, the choices are Alpha and VAX):

   - V8.2
   - V7.3-2
   - V7.3-1

   For example, to obtain patches for OpenVMS Alpha Version 7.3-2, enter the following command (enter in the exact case as indicated in the list; in other words, uppercase V, not lowercase):

   ```
   FTP> cd V7.3-2
   250 CWD command successful.
   ```

8. Search for the patch you are looking for 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 the VMS732_UPDATE-V0200 patch, enter the following `ls` command:

   ```
   FTP> ls *UPDATE*
   227 Entering Passive Mode (192,151,52,14,235,168)
   150 Opening ASCII mode data connection for file list.
   VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE
   VMS732_UPDATE-V0200.txt
   ```

```
226 Transfer complete.
62 bytes received in 00:00:00.00 seconds (60.55 Kbytes/s)
```

The patch to be downloaded has the extension .PCSI-DCX_AXPEXE.

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 you have found 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 VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE
227 Entering Passive Mode (192,6,165,75,248,228)
150 Opening BINARY mode data connection for VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE
(36218732 bytes).
##############################################################################
.
.
.
##############################################################################
#########
226 Transfer complete.
local: USER5:[PATCHES]VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE;1
remote: VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE
36218732 bytes received in 00:00:51.45 seconds (687.39 Kbytes/s)
```

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

```
$ RUN VMS732_UPDATE-V0200.PCSI-DCX_AXPEXE
```

12. To install a .PCSI patch, use the POLYCENTER Software Installation (PCSI) utility command PRODUCT INSTALL /SAVE_RECOVERY_DATA). Using the /SAVE_RECOVERY_DATA qualifier with the PRODUCT INSTALL command forces PCSI to save information that can be used to facilitate removing patches and mandatory update kits later. (To remove the patches, use the PRODUCT UNDO PATCH command. The /SAVE_RECOVERY_DATA qualifier and PRODUCT UNDO PATCH command were added in OpenVMS Alpha Version 7.3-2 and backported to OpenVMS for Alpha Version 7.2-2, 7.3, and 7.3-1.).

    To install an .A patch, use the following VMSINSTAL command:

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

13. After the patch is installed, delete the .PCSI or .A file, leaving the compressed file in case you need it again.

4.14 Installing and Configuring Layered Products (New Installations, Possibly Upgrades)

The OpenVMS operating system kits include kits for layered products. These include the **system-integrated product (SIP)** kits for the following products that are, or 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
- HP 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 CD or DVD. If these or any of the layered products included with the operating system CD or DVD 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 CD or DVD. Alternatively, you can install these products using the procedure described in Section 4.14.1.

In addition to the system integrated products (SIPs), the OpenVMS I64 Operating Environment DVD includes kits for various products that are part of the OpenVMS Operating Environments (OEs). HP does not support installing these OE product kits while booted from the Operating Environment DVD. To install these OE products, you must use the procedure described in Section 4.14.1.

NOTE To use menu option 3, the target system must have the exact same version of the OpenVMS operating system as does the CD or DVD. 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 CD or DVD, follow these steps:

1. Before you install all your layered products, be sure you back up the system disk.
2. If you are not already booted from the operating system CD or DVD (locally or, for Alpha systems, from the InfoServer), shut down the system and boot the operating system CD or DVD. Directions for shutting down the system are included in Appendix A (they apply to both OpenVMS Alpha and I64 systems).
3. If you want 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 4.14.1 or refer to the documentation you received with the layered product. Note that HP does not support VMSINSTAL, PRODUCT INSTALL, or other PRODUCT commands from the DCL option on the operating system CD or DVD.
4. To install layered products, choose option 3 from the menu. For more instructions, see Section 1.3.3.
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*.

4.14.1 Alternative Procedure

Use this alternative procedure to install:

- Layered products on a target system that has a different operating system version than that of the operating system CD or DVD.
- Layered products that require VMSINSTAL (indicated in the directories by save-set file names with file types of .A, .B, and so on)
- OpenVMS I64 Operating Environment products
- SIP kits (as an alternative to using menu option 3 of the operating system CD or DVD).
- Products on the Layered Products, Freeware, System Tools, and e-Business Infrastructure CDs

For a list of layered products that can be installed, refer to the *Guide to HP OpenVMS Version 8.2 Media*, which is provided with the operating system media 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:
   - The installation guides for these layered products
   - The *HP OpenVMS System Manager's Manual, Volume 1: Essentials*
   - Section 4.23 in this chapter
   - Section 4.16 in this chapter
2. After your target system disk has run AUTOGEN and booted, mount the OpenVMS operating system CD or DVD. For example, if the CD or 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 CD or DVD device is DKA400:, enter the following command:

   ```
   $ DIRECTORY /NOHEAD/NOTRAIL DKA400:[*.KIT]
   ```

   You can use the PRODUCT FIND command to locate kits that can be installed 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 CD or DVD device 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 CD or DVD device name and directory. Following is an example of the PRODUCT INSTALL command on an Alpha system:

```
$ PRODUCT INSTALL FORTRAN /SOURCE=DKB400:[ALPHA_FORT075.KIT]
```

4.15 Creating Print Queues (New Installations, Possibly 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 could 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 4.17). For more information about adding print queues, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

4.16 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 SYSTARTUP_VMS.COM 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*.

4.17 Creating Accounts (New Installations, Possibly Upgrades)

During the installation, DEFAULT and SYSTEM accounts are created for you 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*.

4.18 Testing the System with UETP (Optional)

The **User Environment Test Package (UETP)** is a software package designed to test 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 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*.

4.19 Backing Up the Customized System Disk and Initiating Systematic Backups

After you have customized the OpenVMS operating system to your satisfaction and performed the other steps recommended thus far in this chapter and relevant to your system, protect your work by making a standalone backup copy of the system disk, following the steps explained earlier in Section 4.2.

For complete information about backup operations, including a description of an alternative method that does not require booting from the operating system CD or DVD, see Appendix C.

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*.

4.20 Reforming the Shadow Set as Final Postupgrade Backup

If your system disk participates in a volume shadowing environment, re-formthe shadow set again to generate another shadow copy onto the other disks in the set. Follow the instructions in Section 4.2.

4.21 Rebooting Cluster Members (Upgrades Only)

If you are performing a **rolling upgrade** in an OpenVMS Cluster environment and have completed all the postupgrade tasks required thus far for your upgraded system disk, reboot each system that boots from that system disk.

For more information about booting your system, see Appendix A for OpenVMS Alpha systems and Appendix B for OpenVMS I64 systems.

4.22 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 on the system, run the AUTOGEN.COM procedure again to properly tune the system. 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 and press Return:

   ```
   $ TYPE SYS$SYSTEM:AGEN$PARAMS.REPORT
   ```

   You can also 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 workdays later and examine AGEN$PARAMS.REPORT, and then reboot the system. (For information about the importance of having a current AGEN$FEEDBACK.DAT file, see Section 5.7.)

3. HP recommends that you run AUTOGEN from the SAVPARAMS phase through the TESTFILES phase weekly thereafter until the system stabilizes (that is, 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 uptime 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 assumed the feedback was 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 will stop at the TESTFILES phase and issue 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 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*.

4.23 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 4.23.1. 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, see also Section 4.23.2.

4.23.1 General Notes About Modifying System Parameters

In modifying 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 will also adjust related parameters, unless they are hardcoded, in which case information will be 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.
- 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 the MODPARAMS.DAT file and about using AUTOGEN in general, refer torefer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

4.23.2 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.

4.23.2.1 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 chapter entitled “Managing System Parameters” 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
   ```

4.23.2.2 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 Alpha computer that boots from the system disk. You must review each of these MODPARAMS.DAT files.

The MODPARAMS.DAT file for the system on which you are running is located in SYS$SYSTEM:MODPARAMS.DAT. The MODPARAMS.DAT files for other roots on the same system disk can be found in SYS$SYSDEVICE:[SYS*x*.SYSEXE]MODPARAMS.DAT, where *x* represents the root number; for example, SYS0, SYS1, SYS2, and so forth. (Valid root numbers may 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 Alpha computers in the cluster and each has one VOTE, the value is 5.
- As you reboot each Alpha computer, AUTOGEN runs automatically. The cluster forms when you have booted enough computers to attain cluster quorum.

5 Before Upgrading the OpenVMS Alpha Operating System

This chapter describes which tasks you should perform prior to beginning an upgrade. Section 5.1 includes a checklist that you can use to make sure you perform all the tasks described in this chapter. Note that you cannot upgrade to Version 8.2 of the OpenVMS I64 operating system; you must do a new installation for OpenVMS I64. Upgrade information in this manual applies only to OpenVMS Alpha. Upgrading OpenVMS I64 will be supported in a future release, at which time upgrade information will be provided.

5.1 Preupgrade Checklist

Use the checklist in Table 5-1 to ensure that you perform all necessary tasks prior to upgrading your system:

Table 5-1 Preupgrade Checklist

	Task	Section
❑	Review relevant documentation.	Section 5.2
❑	Review notes, cautions, and restrictions about the following: • Upgrade paths available to Version 8.2 • Update license requirements • Components you choose not to install • Upgrade issues after the system disk directory structure has been changed • Licenses and possible reinstallation requirements for layered products	Section 5.3
❑	Check for appropriate versions of software and remove older versions as directed.	Section 5.4
❑	Perform required actions before upgrading in a volume shadowing environment.	Section 5.5
❑	Prepare the system disk.	Section 5.6
❑	Ensure that you have a recent FEEDBACK.DAT file.	Section 5.7
❑	Back up the current system disk.	Section 5.8
❑	Shut down the system.	Section 5.9

5.2 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:

- *HP OpenVMS Version 8.2 Release Notes*
- *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

5.3 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.

5.3.1 Upgrade Paths

The following subsections describe the various types of upgrades to OpenVMS Alpha Version 8.2.

Upgrades to OpenVMS I64 Version 8.2 are not supported; you must do a new installation to obtain OpenVMS I64 Version 8.2.

5.3.1.1 Direct Upgrade Paths

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

- Version 7.3-2
- Version 7.3-1

If you are currently running an OpenVMS Alpha system Version 6.2*x through 7.3* inclusive, you must first upgrade to Version 7.3-1 or 7.3-2, and then to Version 8.2. Note that standard support for OpenVMS Alpha Version 7.3-1 systems ends on March 31, 2005. After that, OpenVMS Alpha V7.3-1 systems will not be under Prior Version Support (PVS). For more information, refer to the OpenVMS Technical Software Support Service Web site at `ftp://ftp.compaq.com/pub/services/software/ovms.pdf`.

5.3.1.2 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 be running the upgraded version of the operating system.

5.3.1.3 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.

Only the following OpenVMS Alpha and OpenVMS VAX versions are supported in mixed-version clusters that include OpenVMS Alpha or I64 Version 8.2:

- Version 7.3-2 (Alpha)
- Version 7.3 (VAX) [not supported in a cluster with OpenVMS I64 Version 8.2]

For more information about mixed-version OpenVMS Clusters, see 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 7.3-2 and 7.3-1 of the OpenVMS Alpha operating system. If you have other versions in a cluster, you cannot do a rolling upgrade until those versions are upgraded to a supported version. For more information about upgrading clusters, see Chapter 6.

5.3.2 Update License Requirements

IMPORTANT To upgrade to OpenVMS Alpha Version 8.2, 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. If you have an OpenVMS Alpha license prior to Version 8.2 and are not covered by a Software Product Services agreement, which includes the right to use new versions (RTNV), you must purchase an Update License before upgrading to OpenVMS Alpha Version 8.2.

NOTE When you initially purchase the OpenVMS Alpha software and license, HP provides you 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 sales representative, who will assist you in purchasing the appropriate license(s) for your system.

If you are upgrading TCP/IP Services for OpenVMS, DECwindows Motif, DECnet, or any third-party products, you might need update licenses.

5.3.3 Components You Choose Not to Install

If you choose not to install optional OpenVMS Alpha 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 certain products for which you must manually remove older versions, see Section 5.4.

5.3.4 Files and Directories

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

The OpenVMS Alpha Version 8.2 upgrade procedure provides new files and directories in the directory [VMS$COMMON...]. If you had any special protections and access control lists (ACLs) before the upgrade, you need to reapply them to reestablish the security environment you previously set up. For more information about creating and maintaining a secure environment, refer to the *HP OpenVMS Guide to System Security* manual.

5.3.5 Licenses and Layered Products

The upgrade procedure is designed so that you should not have 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 Alpha license and layered product licenses intact. You do not need to reinstall these licenses after you upgrade.

5.4 Check for Appropriate Versions of Software on Your System

Before upgrading, check that the appropriate versions of software are running on your system. Look for older versions of software that should be removed, such as the following and respond as directed:

- The Performance Data Collector (TDC) versions 2.0 and earlier (Section 5.4.1)
- DECamds; older versions will be removed automatically but you must install the latest version (Section 5.4.2)
- DECram (Section 5.4.3)
- TCP/IP for OpenVMS Version 5.3 Early Adopter Kits (EAKs) (Section 5.4.4)
- PATHWORKS for OpenVMS (Advanced Server) and Advanced Server for OpenVMS (Section 5.4.5)

5.4.1 Remove Version 1.0 and 2.0 TDC Image Files

When you install OpenVMS Version 8.2, which includes TDC_RT (the run-time version of TDC), any previously-installed TDC Version 1.0 or 2.0 image files are retained.

If you previously installed TDC Version 1.0 as part of a system management solution but are no longer using the software, HP recommends removing the TDC Version 1.0 files. However, if TDC Version 1.0 is still part of your system management solution, you can retain these files — they can coexist safely with TDC_RT files.

If you previously downloaded and installed TDC Version 2.0, HP recommends removing the TDC Version 2.0 files. Note that if you download and install the latest version of TDC, the TDC Version 2.0 files are removed automatically.

Check for older files and remove them by following these steps:

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

   ```
   $ PRODUCT SHOW PRODUCT TDC
   ```

2. If the SHOW PRODUCT display shows an older version of TDC is installed, issue the following command to remove the product:

   ```
   $ PRODUCT REMOVE TDC
   ```

5.4.2 Install the Current Version of DECamds

Beginning with OpenVMS Version 7.3 and DECamds Version 7.3, certain parts of DECamds that were previously supplied with the layered product kit are now incorporated into OpenVMS. Because of this, earlier versions of DECamds must be removed.

The upgrade procedure checks that the appropriate version of DECamds is present. If the upgrade procedure detects a earlier version of DECamds, it displays the following message and automatically removes the earlier version of DECamds. Note that you must reinstall DECamds if you want to continue using it.

```
The target system contains a version of DECamds that is not
compatible with this version of the operating system.

If you continue DECamds will be removed.  A current version of
DECamds can be installed after the upgrade completes.
```

5.4.3 Remove Older Versions of DECram for OpenVMS (OpenVMS Alpha Only)

Beginning with OpenVMS Version 8.2, DECram for OpenVMS becomes an integral part of the OpenVMS operating system. Before upgrading to OpenVMS Alpha Version 8.2, you must manually remove earlier versions of DECram for OpenVMS. The upgrade procedure cannot remove DECram for OpenVMS automatically. If an old version of DECram for OpenVMS is installed, the upgrade procedure might abort; if the upgrade does complete, DECram for OpenVMS might cause errors or work improperly. This section explains how to remove an older version of DECram for OpenVMS from your operating system.

NOTE This requirement applies to OpenVMS Alpha systems only, and only to upgrades from any version of OpenVMS prior to Version 8.2. This requirement does not apply to OpenVMS I64 installations and will not apply to future upgrades from OpenVMS I64 Version 8.2.

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

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

   ```
   $ PRODUCT SHOW PRODUCT DECRAM
   ```

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

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

   ```
   $ PRODUCT REMOVE DECRAM
   ```

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

IMPORTANT Do *not* perform the next steps on OpenVMS Version 8.2. Perform these steps *only* on versions of OpenVMS prior to 8.2.

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

```
$ DIRECTORY SYS$COMMON:[SYSHLP]DECRAM$HELP.HLB;.*
$ DIRECTORY SYS$LOADABLE_IMAGES:SYS$MDDRIVER.EXE;*
$ DIRECTORY SYS$SYSTEM:MDMANAGER.EXE;*
$ DIRECTORY SYS$STARTUP:MDRECOVER.EXE;*
$ DIRECTORY SYS$HELP:DECRAM$HELP.HLB;*
$ DIRECTORY SYS$TEST:DECRAM$IVP.COM;*
```

   If files are found, use the commands in step 4 to remove these files. If no files are found, and your system is a standalone system, you are finished. If no files are found, and your system is a member of an OpenVMS Cluster, skip to step 5.

4. Remove the files found in the previous step by issuing the appropriate DELETE commands:

```
$ DELETE/NOCONFIRM/NOLOG SYS$COMMON:[SYSHLP]DECRAM$HELP.HLB;.*
$ DELETE/NOCONFIRM/NOLOG SYS$LOADABLE_IMAGES:SYS$MDDRIVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$SYSTEM:MDMANAGER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$STARTUP:MDRECOVER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$HELP:DECRAM$HELP.HLB;*
$ DELETE/NOCONFIRM/NOLOG SYS$TEST:DECRAM$IVP.COM;*
```

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

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

   If your system is a standalone system, you are finished. If your system is a cluster member, continue with the next step.

5. In an OpenVMS Cluster, check for node-specific instances of DECram for OpenVMS by issuing the following command:

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

6. Remove the files found in the previous step by issuing the appropriate DELETE commands:

```
$ DELETE/NOCONFIRM/NOLOG SYS$SYSDEVICE:[SYS*.SYS$LDR]SYS$MDDRIVER.EXE*
$ DELETE/NOCONFIRM/NOLOG SYS$SYSDEVICE:[SYS*.SYSEXE]MDMANAGER.EXE;*
$ DELETE/NOCONFIRM/NOLOG SYS$SYSDEVICE:[SYS*.SYSMGR]MDRECOVER.EXE;*
```

```
$ DELETE/NOCONFIRM/NOLOG SYS$SYSDEVICE:[SYS*.SYSHLP]DECRAM$HELP.HLB;*
$ DELETE/NOCONFIRM/NOLOG SYS$SYSDEVICE:[SYS*.SYSTEST]DECRAM$IVP.COM;*
```

5.4.4 TCP/IP Services Version 5.3 Early Adopter's Kits (EAKs)

If one or more of the following TCP/IP Services for OpenVMS Version 5.3 EAKs have been installed on your system, you must remove them prior to installing the latest version of TCP/IP Services for OpenVMS. Otherwise, the upgrade will fail while writing files to the system disk.

- SSH for OpenVMS EAK
- failSAFE IP EAK

Remove these by using PCSI (the PRODUCT REMOVE command at the DCL prompt). For other related information about removing older versions and upgrading TCP/IP Services for OpenVMS, refer to the *HP TCP/IP Services for OpenVMS Release Notes*.

5.4.5 PATHWORKS (Advanced Server) and Advanced Server for OpenVMS

PATHWORKS for OpenVMS (Advanced Server) is not supported on Version 8.2 of OpenVMS (Alpha and I64). [PATHWORKS V6.1 for OpenVMS (Advanced Server) is supported on earlier versions of OpenVMS Alpha and on OpenVMS VAX systems.]

Advanced Server V7.3A for OpenVMS is supported on OpenVMS Alpha Version 8.2 systems. The Advanced Server for OpenVMS is not supported on OpenVMS I64 systems (or on OpenVMS VAX systems). Make sure you have the latest release of Version 7.3A (ECO4, at the time this manual was printed). Advanced Server V7.3 for OpenVMS must be updated to 7.3A. Earlier versions and releases of the Advanced Server are not compatible and should be removed before upgrading the operating system.

5.5 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 multimember 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 physically access, 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.

5.5.1 Setting the Boot Device

Be sure your system is set to boot by default from the disk you intend to upgrade. Use the SHOW BOOTDEF_DEV and SET BOOTDEF_DEV console commands to accomplish this task. (For more information, see Appendix A.)

5.5.2 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 (see Appendix A) on the system disk you have chosen for your target disk. For example:

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

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

   ```
   SYSBOOT> SET SHADOW_SYS_DISK 0
   ```

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

   ```
   SYSBOOT> CONTINUE
   ```

5. After the boot completes, log in to the system.

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

5.6 Preparing the System Disk

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

5.6.1 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
```

5.6.2 Checking the SYSCOMMON Directories

For the upgrade to be successful, the SYSCOMMON directories in all system roots must be aliases (or hard links) for the VMS$COMMON directory. To check whether this is the case, execute the following commands if you are booted from the system disk that you will be 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 will be 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.

5.6.3 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.

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

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

5.6.4 Returning Authorization and AGEN$INCLUDE Files to the System Disk

If you have placed 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 will not be mounted during the upgrade. In addition, the logical names you have set up to point to these files will not be defined. The following sections explain how to make these files available to the upgrade procedure.

5.6.4.1 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 CD or DVD, 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 5-2, return the file to the default location and file name (see the extra requirements mentioned for the SYS$DUMP_PRIORITY.DAT file in the footnote to Table 5-2). 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 CD or DVD. After the upgrade and before booting the operating system, you can move these files back to their original locations off the system disk.

Table 5-2 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$SYSTEM:SYSALF.DAT
SYS$DUMP_PRIORITY	SYS$SPECIFIC:[SYSEXE]SYS$DUMP_PRIORITY.DAT[1]
VMSMAIL_PROFILE	SYS$SYSTEM:VMSMAIL_PROFILE.DATA
VMS$AUDIT_SERVER	SYS$MANAGER:VMS$AUDIT_SERVER.DAT
VMS$CLASS_SCHEDULE	SYS$SYSTEM:VMS$CLASS_SCHEDULE.DATA
VMS$OBJECTS	SYS$SYSTEM:VMS$OBJECTS.DAT
VMS$PASSWORD_DICTIONARY	SYS$LIBRARY:VMS$PASSWORD_DICTIONARY.DATA

Table 5-2 Logical Names for Relocated Authorization Files (Continued)

Logical Name	Location and File Name
VMS$PASSWORD_HISTORY	SYS$SYSTEM:VMS$PASSWORD_HISTORY.DATA
VMS$PASSWORD_POLICY	SYS$LIBRARY:VMS$PASSWORD_POLICY.EXE

1. Copies of this file might exist in multiple system-specific directories. If the file was moved off the system disk, then before upgrading, in addition to moving this file to its default location (and to its default name) on the system disk, you must manually merge and place copies of this file in the common directory.

5.6.4.2 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 CD or DVD for an upgrade, your normal startup procedure is not run, and so these logical names will not be 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.

5.6.5 Verifying System Parameters

Verify (and modify if necessary) system parameters, described as follows. (If necessary, 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 SYS$SYSTEM:MODPARAMS.DAT are lost during the upgrade. To retain these parameters, enter their names and the values that you have in use for them in SYS$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 will use this new value as a base, comparing it with collected data and increasing the value of GBLPAGES if necessary. Each time AUTOGEN is run, it will make the same comparison and adjust 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 will also adjust related parameters, unless they are hardcoded, in which case information will be 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.
- Enter numeric values as integers, without commas (for example, 10000). Enter alphabetic characters in lower 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, see Section 4.22.

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, MODPARAMS.DAT should exist in SYS$SYSROOT:[SYSEXE] for each root. You must edit MODPARAMS.DAT as necessary for each root.

5.7 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 [SYS*x*.SYSEXE], where *x* is the root; for example, SYS0 or SYS1). In OpenVMS Cluster systems, this file should exist in each node's SYS$SPECIFIC directory. When the system (or each system in a cluster) is rebooted after the upgrade, AUTOGEN is run. If a recent AGEN$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$FEEDBACK.DAT file, AUTOGEN might calculate system parameters that do not reflect your system's requirements. In that case, it can take multiple cycles of running AUTOGEN and rebooting before all layered products can be started. In some cases, successful startup can require additional entries in MODPARAMS.DAT. This should not be necessary if a current AGEN$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. When these conditions exist, 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 SYS$SYSTEM:SHUTDOWN.COM. 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 uptime 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 assumed the feedback was 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 will stop at the TESTFILES phase and issue 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 use them (by running the AUTOGEN SETPARAMS phase) or rerun AUTOGEN with valid feedback data.

5.8 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 will 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 Appendix A).
2. Boot the operating system CD or DVD (locally or, for OpenVMS Alpha systems, from the InfoServer), following the instructions in Section 3.2).
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 typing 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:, you would 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.
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 CD or DVD, see Appendix C. For more information about the BACKUP utility, refer to the *HP OpenVMS System Management Utilities Reference Manual: A--L*.

5.9 Finishing Preupgrade Tasks

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

IF ...	THEN ...
You are upgrading a **standalone system**	1. Log in to the SYSTEM account. 2. Enter the following command and then press Return: `$ @SYS$SYSTEM:SHUTDOWN` 3. When the procedure asks whether an automatic system reboot should be performed, enter N (NO) and press Return. 4. Go to the checklist at the beginning of this chapter to verify that you have performed the necessary tasks; then go to Chapter 7 to begin the upgrade procedure.
You are upgrading an **OpenVMS Cluster system**	1. Review the checklist at the beginning of this chapter. 2. Go to Chapter 6.

6 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 7.

6.1 Preupgrade Checklist for OpenVMS Cluster Environments

NOTE Be sure you have performed the preupgrade tasks described in Chapter 5 before you upgrade your OpenVMS Cluster system.

Use the checklist in Table 6-1 to ensure that you perform all necessary tasks prior to upgrading your system in an OpenVMS Cluster environment.

Table 6-1 Preupgrade Checklist for OpenVMS Cluster Environments

	Task	Section
❑	Before upgrading the operating system in an OpenVMS Cluster environment, review relevant OpenVMS Alpha operating system and OpenVMS Cluster documentation.	Section 6.2
❑	Familiarize yourself with mixed-version and mixed-architecture support, and migration support, in OpenVMS Cluster systems.	Section 6.3
❑	If you are adding a new OpenVMS Alpha computer system to an existing OpenVMS Cluster, choose one of two options for upgrading.	Section 6.4
❑	Perform the preliminary tasks required for the type of upgrade you want to perform: • Concurrent upgrade • Rolling upgrade	Section 6.5 • Section 6.5.1 • Section 6.5.2
❑	Begin the upgrade.	Chapter 7

6.2 Review Documentation

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

- The cover letters and the software product descriptions included with your distribution kit
- *HP OpenVMS Version 8.2 Release Notes*
- *HP OpenVMS Cluster Systems*
- *Guidelines for OpenVMS Cluster Configurations*
- *HP OpenVMS Version 8.2 New Features and Documentation Overview*

6.3 Mixed-Version Support in an OpenVMS Cluster Environment

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

Warranted support means that HP has fully qualified the two versions coexisting in an OpenVMS Cluster and will answer 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 release includes no configurations specific to migration support.

Warranted support is provided for the following version groupings:

- Alpha Version 8.2 and Alpha Version 7.3-2
- Alpha Version 8.2 and I64 Version 8.2
- Alpha Version 8.2 and VAX Version 7.3
- Alpha Version 7.3-2 and VAX Version 7.3
- I64 Version 8.2 and Alpha Version 7.3-2
- I64 Version 8.2, Alpha Version 8.2, 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. 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.

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

`http://h71000.www7.hp.com/serv_support.html`

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

`http://h71000.www7.hp.com/openvms/openvms_supportchart.html`

In a mixed-version cluster, you might need to install remedial kits on earlier versions of OpenVMS. For a complete list of required remedial kits, refer to the *HP OpenVMS Version 8.2 Release Notes*. In a mixed-architecture cluster, you need to install an LMF patch on any OpenVMS Version 7.3-2 Alpha members.

For information about supporting the Performance Data Collector base software (TDC_RT) in OpenVMS Clusters, see Section 4.8.4.5.

6.4 Adding a New System to an OpenVMS Alpha Cluster

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

Alternatively, any Alpha node that needs to be upgraded can be temporarily removed from the cluster and added back after it has been upgraded to Version 7.3-2 or 8.2. This allows you to form the Version 7.3-2/8.2 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 will support a maximum of two architectures. Therefore, an OpenVMS Cluster that contains both Alpha and VAX nodes cannot have an I64 node added to it.

6.5 Types of Upgrades

There are two types of cluster upgrades: **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.

6.5.1 Concurrent Upgrade

This section describes the following:

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

6.5.1.1 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 be running 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.

6.5.1.2 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 will be upgrading. Then go to Chapter 7 and perform an upgrade on each system disk. You do not have to reboot the operating system CD or DVD 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) and press Return.
4. Choose the CLUSTER_SHUTDOWN option.
5. When the shutdown procedure is finished on all nodes, halt each system by entering Ctrl/P or by pressing the Halt button. For more information about halting your Alpha computer, see Appendix A.
6. If you have only one system disk for your cluster, go to Chapter 7 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.

6.5.2 Rolling Upgrade

This section describes the following:

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

6.5.2.1 How a Rolling Upgrade Works

During a rolling upgrade, you upgrade each system disk individually, allowing old and new versions of the operating system to run together in the same cluster, creating a **mixed-version** cluster. Because rolling upgrades allow mixed-version clusters, the systems that you are not upgrading remain available. During a rolling upgrade, you keep some of the computers in the cluster running while you upgrade others (you must have more than one system disk).

6.5.2.2 Notes and Restrictions

The following restrictions apply to rolling upgrades. Refer to the HP OpenVMS Version 8.2 Release Notes for additional compatibility issues and restrictions.

- Rolling upgrades are supported from Version 7.3-1 and 7.3-2 of the OpenVMS Alpha operating system. Rolling upgrades in mixed-architecture OpenVMS Cluster environments are supported with VAX computers running Versions 7.3 of the OpenVMS VAX operating system (see Section 6.3).
- 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 CD or DVD does not MSCP serve local disks.) Whenever possible, HP recommends that 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.

NOTE Any attempt to access the target disk from the remaining OpenVMS Cluster members will corrupt the target disk in most cases. Even if the target disk is only mounted by a remaining cluster member, and no file access is done, 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 (and preferably the latest) version of the OpenVMS Alpha operating system.
- You cannot perform a rolling upgrade if all systems boot from a single system disk. Perform a concurrent upgrade instead.
- The upgrade procedure affects the queuing system as follows:
  - The queuing system is not active on the system you are upgrading; do not attempt to execute a START/QUEUE/ MANAGER command.
  - You cannot create a queue database on the operating system CD or 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.

6.5.2.3 Preparing Your System for a Rolling Upgrade

To prepare for a rolling upgrade:

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 5.)
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:

```
$ 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) and press Return.

   b. Choose the REMOVE_NODE option.

If a proper quorum is not maintained at any time during the upgrade procedure, the shutdown procedure will hang the cluster. If the cluster hangs during a shutdown, enter the following commands on the system console of a system that is still a cluster member. These commands are only for OpenVMS Alpha (or VAX) systems; they cannot be performed at the console of an OpenVMS I64 system.

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

After the shutdown procedure is finished on all nodes, go to Chapter 7 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 might be wise to disable them during the upgrade.

---

7 Upgrading the OpenVMS Alpha Operating System

This chapter explains how to upgrade the OpenVMS Alpha operating system and includes information about reinstalling or reconfiguring your system.

NOTE Because no supported upgrade path exists for OpenVMS I64 Version 8.2, this chapter includes information specific to OpenVMS Alpha only. Upgrade information for OpenVMS I64 systems will be provided in future releases.

If for any reason you need to reinstall an OpenVMS I64 system disk, the procedure is nearly identical to what is described in this chapter. Differences are noted in Section 3.3.

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

7.1 Upgrade Checklist

Use the checklist in Table 7-1 to ensure that you perform all necessary upgrade tasks.

Table 7-1 Upgrade Checklist

	Task	Section
❑	Boot the OpenVMS operating system CD.	Section 7.2
❑	Use option 1 of the operating system CD menu to upgrade your OpenVMS operating system, respond to the prompts, and then shut down the system when the upgrade completes.	Section 7.3, Section 7.4
❑	Reboot your system, and reboot your system after AUTOGEN runs (these steps vary according to the type of upgrade you are performing).	Section 7.5

7.2 Booting the Operating System Kit

The OpenVMS Alpha Version 8.2 operating system includes procedures that allow you to easily upgrade the operating system using the POLYCENTER Software Installation utility. To get started, boot the OpenVMS Alpha operating system CD either from your local CD drive or from a CD drive connected to the InfoServer, as described in Section 7.2.2 and Section 7.2.3. First, you need to identify the name of the CD drive, as explained in Section 7.2.1. For more information about booting operations, see Section A.1.

7.2.1 Determining the Boot Device

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

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

```
>>>SHOW DEVICE

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

   For additional information, refer to the *HP OpenVMS for Integrity Servers and HP OpenVMS Alpha Version 8.2 Operating Systems Software Product Description* (SPD 82.35.*xx*) and the hardware manuals that you received with your Alpha computer.

7.2.2 Booting from the Local Drive

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

```
BOOT -FLAGS 0,0 source-drive
```

Substitute the device name of the CD drive for *source-drive*, such as DKA400, as listed in the SHOW DEVICE display example in Section 7.2.1. In this case, you would enter the following command and press Return:

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

7.2.3 Booting from the InfoServer

To boot the operating system CD using the InfoServer, follow these steps:

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

```
>>> BOOT -FLAGS 0,0 -FILE APB_082 lan-device-name
```

   Substitute the name of the local area network device for *lan-device-name*, such as EWA0, as listed in the SHOW DEVICE display example in Section 7.2.1.

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

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer using an alternate TURBOchannel device, such as a PMAD (Ethernet) or DEFTA (FDDI), by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.8 in Appendix A.
- On DEC 4000 series systems, you *must* specify the ISL file name in uppercase (APB_082).

---

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

```
Network Initial System Load Function
Version 1.2


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

Enter a function ID value:
```

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

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA082).

   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: ALPHA082
```

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

1. Reboot the OpenVMS Alpha operating system CD.
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. (See Appendix C 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.

7.3 Performing the Upgrade

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

7.3.1 Upgrading the System Using Option 1 of the Operating System CD Menu

After you boot the operating system CD, choose the upgrade option (1) from the menu displayed on the screen. The display is similar to the following:

```
 OpenVMS (TM) Alpha Operating System, Version 8.2

Installing required known files...

Configuring devices...
(c) Copyright 1976-2004 Hewlett-Packard Development Company, L.P.


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

You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha 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 Alpha Version 8.2
    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 Alpha operating system CD might contain patch kits. If it does, information similar to the following is displayed:

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

    ---------------------------------- ----------- ----------
    PRODUCT                            KIT TYPE    KIT FORMAT
    ---------------------------------- ----------- ----------
    DEC VAXVMS TCPIP_ECO V5.3-182      Patch       Sequential
    ---------------------------------- ----------- ----------

    1 item found

    Please consult the OpenVMS 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.
```

7.3.2 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 Alpha.

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

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

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

For an upgrade, press Return to accept the default (PRESERVE).

7.3.3 Specifying the Target Disk

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

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

Enter device name for target disk: [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
```

7.3.4 Checking for Recovery Data

If you specify the /SAVE_RECOVERY_DATA qualifier with the PRODUCT INSTALL command, the POLYCENTER Software Installation (PCSI) utility will save 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 added in OpenVMS Alpha Version 7.3-2 and backported to OpenVMS for 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 has to be removed before the upgrade can continue, because this data would become 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 prior 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-NOV-2004 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.
```

7.3.5 Specifying the Volume Label

After specifying the target disk, and if applicable, checking for recovery data, the system then 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 ASPVMS732.

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

Enter volume label for target system disk: [ALPHASYS]
```

You can accept the default label assigned by the system or specify a different volume label (with a limit of 12 characters can include A to Z, 0 to 9, and optionally, 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.

7.3.6 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 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 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 later can mount ODS-5 volumes, but cannot create or access files having extended names. (Lowercase file name characters are seen in uppercase on OpenVMS VAX systems.)

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

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

    OpenVMS Alpha will be upgraded on DKB400:.
```

If you choose to change to ODS-5, you will be 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 will then continue.

```
  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 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 Alpha will be upgraded on DKB400:.
```

7.3.7 Setting OpenVMS Cluster Membership Information

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) NO
```

You should answer YES if the system will be an OpenVMS Galaxy instance or a member of an OpenVMS cluster. Unlike an installation, answering YES to this question will *not* cause SYS$MANAGER:CLUSTER_CONFIG.COM to be run. However, correct cluster membership information is required by the upgrade procedure. Your response to this question determines how the VAXCLUSTER system parameter will be set. (The parameter name "VAXCLUSTER" has been retained on OpenVMS Alpha systems.) Note that you can run SYS$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 the *Guidelines for OpenVMS Cluster Configurations*.

7.3.8 Setting OpenVMS Galaxy Information

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

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

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

7.3.9 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 correctly configured to use a valid OpenVMS time differential factor (TDF).

If the installation procedure determines that time zone information is incomplete, it will prompt you to set the correct default time zone and TDF for your system. For details about setting the time zone information, see step 13 in 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*.

7.3.10 Selecting Reinstallation and Reconfiguration Options

If you are using the OpenVMS Alpha Version 8.2 CD and have selected a target disk that already has Version 8.2 installed, you are presented with several configuration options. A sample display follows. See also the example in Section 4.11.

```
Version 8.2 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 displays:

```
  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 then 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, see Chapter 4.

7.3.11 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

The software that you choose to install (including the required software) is included with the OpenVMS Alpha operating system. You can change the default values for these products later in the installation/upgrade procedure.

If you are upgrading DECnet, the procedure removes the existing version of DECnet during the upgrade.

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 Alpha (required part of OpenVMS)
    o CDSA for OpenVMS Alpha (required part of OpenVMS)
    o KERBEROS for OpenVMS Alpha (required part of OpenVMS)
    o Performance Data Collector (base) for OpenVMS Alpha (required part of
      OpenVMS)
    o DECwindows Motif for OpenVMS Alpha
    o DECnet-Plus for OpenVMS Alpha
    o DECnet Phase IV for OpenVMS Alpha
    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 Alpha (required part of OpenVMS) is
required.
It will be installed.

CDSA for OpenVMS Alpha (required part of OpenVMS)
is already installed on your system. An upgrade is not required.


KERBEROS for OpenVMS Alpha (required part of OpenVMS)
is already installed on your system. An upgrade is not required.

Performance Data Collector (base) for OpenVMS Alpha (required part of OpenVMS) is
required.
It will be installed.

DECwindows Motif for OpenVMS Alpha
is installed on your system. It will be upgraded.


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

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

HP TCP/IP Services for OpenVMS
is installed on your system. It will be upgraded.
```

Some of the windowing and networking products might have the required versions already installed on the system. You will see a message indicating that the software is already installed and that an upgrade is not required, as for CDSA and Kerberos in the previous example. Some of the windowing and networking products might have versions installed that are earlier than the current versions, but which still work on OpenVMS Version 8.2. 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 choose to keep the currently installed version, or to upgrade to the newer version supplied with OpenVMS Version 8.2. If you choose to keep the currently installed version, you should verify what level of support is available from HP for this version.

Some windowing and networking products might have versions installed that do not work on OpenVMS Version 8.2. In this case, you are not given a choice to upgrade. The software will be upgraded automatically. In the preceding example, an earlier version of TCP/IP Services for OpenVMS is currently installed on the system. The message indicates it will be upgraded.

7.4 Completing the Upgrade

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

7.4.1 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.

7.4.2 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 7.4.3.) Step through the options and deselect the option to delete files archived by remedial kits. This will save all such files.
2. Before beginning the upgrade, rename any _OLD files that you want to save. Files that you do not rename will be deleted.

Note that the upgrade will not delete all files with an extension ending in _OLD. Only those _OLD files that were archived by OpenVMS remedial kits will be deleted.

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 the _OLD extension appended to their names; however, some patch kits have added the files without this extension. If the upgrade procedure detects files without the appended _OLD extension, 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$LDR]SHELL9K.EXE_STB
[000000]DEC-AXPVMS-VMS-V0703-1-2.PCSI$DESCRIPTION
```

7.4.3 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:
     DEC AXPVMS OPENVMS V8.2        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.

DEC AXPVMS OPENVMS V8.2: OPENVMS and related products Platform

    COPYRIGHT 1976, 8-NOV-2004
    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 Alpha operating system on your system. Therefore, before you respond to the prompt, note the following:

- If you answer YES (by pressing Return) to accept the default values, you will 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 Alpha operating system.
- If you want to include or exclude any components differently from 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, you can 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 if you are satisfied with the values. However, 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 selecting component options, note the following as well:

- Whether you choose all the default values or select individual files, the system will allow you to view your selections and make changes (if necessary).
- If you are not sure whether you want certain component options, 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 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 then prepare your OpenVMS Alpha system and your PC to run OpenVMS Management Station by following the procedures described in Appendix E.
- If you decide after the upgrade to change which OpenVMS Alpha operating system components you want installed on your system, you must reconfigure the installation as described in Section 4.11.
- 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 of OpenVMS on Alpha 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://h71000.www7.hp.com/openvms/products/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 Alpha (required part of OpenVMS)

CDSA for OpenVMS Alpha (required part of OpenVMS)

KERBEROS for OpenVMS Alpha (required part of OpenVMS)

Performance Data Collector (base) for OpenVMS Alpha (required part of OpenVMS)

  DEC AXPVMS DWMOTIF V1.5: DECwindows Motif
   If a Local Language Variant is installed, refer to the Installation
   Guide.

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

For a list of component options included with the OpenVMS Alpha Version 8.2 operating system, see Figure 3-1 on page 72.

7.4.4 Final Upgrade Procedure 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 if necessary) and then displays messages about the following:

- Notification that DECwindows Motif for OpenVMS, DECnet-Plus for OpenVMS, DECnet Phase IV for OpenVMS, or TCP/IP Services for OpenVMS has been upgraded (or installed) on your system.
- Notification that the upgrade has been completed.
- Information about running AUTOGEN.
- The menu.

The following is a sample display.

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

```
%PMA0 CPU00: 30-AUG-2004 14:58:40 Remote System Conflicts with
Known System - REMOTE NODE
%PMA0 CPU00: 30-AUG-2004 14:58:45 Remote System Conflicts with
Known System - REMOTE NODE
```

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

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

Execution phase starting ...

The following products will be installed to destinations:
    CPQ AXPVMS CDSA V2.1                    DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DECNET_OSI V8.2              DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DWMOTIF V1.5                 DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS OPENVMS V8.2                 DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS TCPIP V5.5                   DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS VMS V8.2                     DISK$ALPHASYS:[VMS$COMMON.]
    HP AXPVMS AVAIL_MAN_BASE V8.2           DISK$ALPHASYS:[VMS$COMMON.]
    HP AXPVMS TDC_RT V2.1                   DISK$ALPHASYS:[VMS$COMMON.]

The following products will be removed from destinations:
    CPQ AXPVMS CDSA V2.0                    DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DECNET_OSI V7.3-2            DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS DWMOTIF V1.3-1               DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS OPENVMS V7.3-2               DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS TCPIP V5.4                   DISK$ALPHASYS:[VMS$COMMON.]
    DEC AXPVMS VMS V7.3-2                   DISK$ALPHASYS:[VMS$COMMON.]

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

```
**** DECwindows Motif application and run-time support files DETECTED
****  **** DECwindows device support files DETECTED ****
...100%


The following products have been installed:
    CPQ AXPVMS CDSA V2.1                    Layered Product
    DEC AXPVMS DECNET_OSI V8.2              Layered Product
    DEC AXPVMS DWMOTIF V1.5                 Layered Product
    DEC AXPVMS OPENVMS V8.2                 Platform (product suite)
    DEC AXPVMS VMS V8.2                     Operating System
    DEC AXPVMS TCPIP V5.5                   Layered Product
    HP AXPVMS AVAIL_MAN_BASE V8.2           Layered Product
    HP AXPVMS TDC_RT V2.1                   Layered Product

The following products have been removed:
    CPQ AXPVMS CDSA V2.0                    Layered Product
    DEC AXPVMS DECNET_PHASE_IV V7.3-2       Layered Product
    DEC AXPVMS DWMOTIF V1.3-1               Layered Product
    DEC AXPVMS OPENVMS V7.3-2               Platform (product suite)
    DEC AXPVMS TCPIP V5.4                   Layered Product
    DEC AXPVMS VMS V7.3-2                   Operating System

   DEC AXPVMS OPENVMS V8.2: OPENVMS and related products Platform

    HP AXPVMS TDC_RT V2.1: The Performance Data Collector 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_REAME.TXT

     Release notes are available in SYS$COMMON:[TDC]TDC_RELEASE_NOTES.TXT

    DEC AXPVMS 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.

    DEC AXPVMS TCPIP V5.5: HP TCP/IP Services for OpenVMS

      Check the release notes for the current status of the product.

    The upgrade is now complete.

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

```
        o  Run AUTOGEN to set system parameters.
        o  Reboot the system with the newly set parameters.

    You may shut down now or continue with other operations.


  Process AXPVMS_INSTALL logged out at 12-AUG-2004 15:34:22.47

Press Return to continue...

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

    You can install or upgrade the OpenVMS Alpha operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS Alpha operating system distribution media.

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

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS Alpha Version 8.2
        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
```

7.4.5 Shut 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, as in the following example:

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


SYSTEM SHUTDOWN COMPLETE
```

7.5 What to Do After the Shutdown

After the system shuts down, boot the newly upgraded system disk. AUTOGEN will run automatically, after which the system will then shut down again and automatically reboot. 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 4 to check for any postupgrade tasks that need to be performed. You might need to perform certain postupgrade tasks before the system and cluster can be used. Once you have completed all required postupgrade steps, you can reboot other cluster members. The system and cluster will then be ready for use.

A Halt, Boot, and Shutdown Procedures for OpenVMS Alpha Systems

This appendix applies to Alpha systems only and explains how to halt, boot, and shut down the operating system. It also includes related information, such as setting the system for automatic booting and using the Writeboot utility. This appendix also includes brief troubleshooting procedures. Shutdown, halt, and boot information specific to Integrity servers running OpenVMS I64 is included in Appendix B.

This appendix contains the following information:

- Booting operations, including the following:
  - Booting the operating system CD locally and from an InfoServer system
  - 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 directory
  - Booting with a PMAZB or PMAZC TURBOchannel adapter
  - Booting over the network with an alternate TURBOchannel adapter
  - Booting in an emergency
- Set, Show, and Writeboot operations, including the following:
  - Setting the system for automatic booting
  - Setting and showing boot devices
  - Setting boot parameters
  - Writing a new boot block
- Halt and shutdown operations
- Troubleshooting procedures

A.1 Booting Operations

The following sections describe different methods of booting your system.

A.1.1 Booting the OpenVMS Alpha Operating System CD

If you need to boot the OpenVMS Alpha operating system CD, either to perform an installation or upgrade or to perform related operations such as mounting or backing up the system disk, follow the steps in the following sections, depending on whether you are booting locally or from the InfoServer.

A.1.1.1 Booting from the Local Drive

Boot from the local drive as follows:

1. Insert the operating system CD into the local CD drive.
2. At the console prompt (>>>), enter the SHOW DEVICE command so you can identify the name of the CD drive (for example, DKA400:)
3. Enter the boot command in the following format:

   `BOOT –FLAGS 0,0` *`source-drive`*

   Substitute the device name of the CD drive (as listed in the SHOW DEVICE display) for *source-drive*.

   For example, if the SHOW DEVICE display lists the device name of your CD drive as DKA400, enter the following command and press Return:

   ```
   >>> BOOT –FLAGS 0,0 DKA400
   ```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

- Install or upgrade the operating system using the POLYCENTER Software Installation utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

A.1.1.2 Booting from the InfoServer

To boot the operating system CD using the InfoServer, do the following:

1. At the console prompt (>>>), enter the SHOW DEVICE command and scan the devices listed in the output to determine the name of the CD drive. Look for a device listed with its hardware address, as in the last line of the following example; compare this information with that provided by the table in step 2.

   ```
   >>>SHOW DEVICE

   dva0.0.0.1000.0     DVA0                    RX23
   dka200.2.0.5.0      DKA200                  RZ28M  1004
   dka300.3.0.5.0      DKA300                  RZ29B  0016
   dka400.4.0.5.0      DKA400                  RZ26L  442E
   ewa0.0.0.3.0        EWA0          00-00-F8-1F-70-3D
   ```

   For additional information, refer to the *HP OpenVMS for Integrity Servers and HP OpenVMS Alpha Version 8.2 Operating Systems Software Product Description (SPD 82.35.xx)* and the hardware manuals that you received with your Alpha computer.

2. At the console prompt, enter the following command, where *`lan-device-name`* is the local area network (LAN) device (for example, EWA0) identified with your computer:

   ```
   >>> B –FLAGS 0,0 –FILE APB_082 lan-device-name
   ```

   For information about the LAN devices your system supports, see Table A-1. Ethernet device EWA0 refers to the first EW device. Subsequent devices are named EWB0, EWC0, and so on. For most systems, you can use the SHOW CONFIGURATION console command to list LAN devices available for boot. For additional information, refer to the hardware manuals that you received with your Alpha computer and the OpenVMS software product description (SPD). The APB file name in the previous command is the

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

Table A-1 Supported LAN Devices

Alpha Computer	Ethernet Device	FDDI Device
ALPHAbook 1	EOA0	-
AlphaServer 400 series	EWA0	FWA0
AlphaServer 1000 series	ERA0, EWA0	FRA0
AlphaServer 1000A series	EWA0	FWA0
AlphaServer 1200 series	EWA0	FWA0
AlphaServer 2000 series	ERA0, EWA0	FRA0
AlphaServer 2100, 2100A series	ERA0, EWA0	FRA0
AlphaServer 4100 series	EWA0	FWA0
AlphaServer 8200 series	EXA0, EWA0	FXA0
AlphaServer 8400 series	EXA0, EWA0	FXA0
AlphaStation 200 series	EWA0	FWA0
AlphaStation 400 series	EWA0	FWA0
AlphaStation 500 series	EWA0	FWA0
AlphaStation 600 series	ERA0, EWA0	FWA0
DEC 2000 series	ERA0	—
DEC 3000 series	ESA0	"n/ESA0"
DEC 4000 series	EZA0	—
DEC 7000 series	EXA0	FXA0
DEC 10000 series	EXA0	FXA0
Digital Personal Workstation (DPWS) series	EWA0	FWA0
AlphaServer DS15	EWA0, EIA0	FWA0
AlphaServer DS20	EWA0, EIA0	FWA0
AlphaServer DS20e	EWA0, EIA0	FWA0
AlphaServer DS25	EWA0, EIA0	FWA0
AlphaServer ES40	EWA0, EIA0	FWA0
AlphaServer ES45	EWA0, EIA0	FWA0

Table A-1 Supported LAN Devices (Continued)

Alpha Computer	Ethernet Device	FDDI Device
AlphaServer ES47	EWA0, EIA0	FWA0
AlphaServer ES80	EWA0, EIA0	FWA0
AlphaServer GS60	EWA0	FWA0
AlphaServer GS80	EWA0, EIA0	FWA0
AlphaServer GS140	EWA0	FWA0
AlphaServer GS160	EWA0, EIA0	FWA0
AlphaServer GS320	EWA0, EIA0	FWA0
AlphaServer GS1280	EWA0, EIA0	FWA0

NOTE If you are using a DEC 3000 or 4000 series system, note the following:

- On DEC 3000 series systems, you can boot through the InfoServer with an Ethernet PMAD device or FDDI DEFTA device by specifying the device name as "*n*/ESA0". The value for *n* is the TURBOchannel slot number, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. For more information, see Section A.1.2.
- On DEC 4000 series, you *must* specify the ISL file name in uppercase (for example, APB_082).

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

```
Network Initial System Load Function
Version 1.2


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

Enter a function ID value:
```

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

   a. Enter 3 for the function ID.

   b. Enter 2 for the option ID.

   c. Enter the service name (ALPHA082).

   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: ALPHA082
```

After you boot, the system displays a menu from which you can choose options to perform the following tasks:

- Install or upgrade the operating system using the POLYCENTER Software Installation utility.
- Enter a DCL environment from which you can perform preinstallation or maintenance tasks such as mounting or showing devices and backing up or restoring files on the system disk.
- Shut down the system.

A.1.2 Booting with a PMAZB or PMAZC TURBOchannel Adapter

PMAZB and PMAZC TURBOchannel adapters are adapters that are software-compatible with the integrated SCSI ports on DEC 3000 Alpha series systems. If your system is not a DEC 3000 Alpha series system, skip to the next section.

The DEC 3000 Alpha series system consoles implement the SHOW CONFIGURATION console command, which displays information about the TURBOchannel options and the built-in adapters in the system. When a PMAZB or PMAZC adapter is installed in the TURBOchannel, the SHOW CONFIGURATION command displays the “PMAZB-AA” or “PMAZC-AA” string, the TURBOchannel slot number, and the device status.

The DEC 3000 Alpha series consoles also implement the SHOW DEVICE command, which displays information about the devices in the system. Because the integrated SCSI adapter is built into every DEC 3000 Alpha series system, the SHOW DEVICE console command can display the SCSI devices connected to the integrated SCSI ports. However, the SHOW DEVICE console command cannot display the SCSI devices connected to the PMAZB or PMAZC SCSI ports.

To make the console display the devices connected to the PMAZB or PMAZC SCSI ports, enter the following command at the console prompt, where *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed:

```
>>> TEST TCx CNFG
```

This command displays the devices that are connected to each SCSI port of the PMAZB or PMAZC adapter. The device controller letters are either A or B, based upon the PMAZB or PMAZC ports to which the devices are connected. Do not confuse these devices with any DKA*xxx* or DKB*xxx* devices displayed by the SHOW DEVICE command, which shows SCSI devices on the integrated SCSI ports only.

To boot from a device connected to a PMAZB or PMAZC adapter, enter the boot command as follows:

```
>>> BOOT "x/dkyzzz"
```

The following conventions are used:

- *x* is the TURBOchannel slot number in which the PMAZB or PMAZC adapter is installed.
- *dk* is the device code of the boot device.
- *y* is either A or B, depending on the SCSI port of the PMAZB or PMAZC adapter that contains the boot device.
- *zzz* is the SCSI unit number of the boot device.

The OpenVMS Alpha operating system does not distinguish between the PMAZB or PMAZC adapter and the integrated SCSI adapter. The operating system views them as identical adapters. Because the operating system searches for I/O adapters in backplane slot number order, device controller letters are assigned that correspond to the backplane order of the TURBOchannel options, followed by the integrated adapters. This is different from console SCSI device naming, which always designates SCSI devices on the integrated SCSI ports as either "A" or "B" port devices.

On a DEC 3000 Model 500 Alpha system with no TURBOchannel options installed, the OpenVMS Alpha operating system names the integrated SCSI ports PKA0 and PKB0, and the devices connected to the ports inherit the controller letter from the port controller letter (A or B). However, if a PMAZB or PMAZC adapter is installed in the TURBOchannel, the operating system names the PMAZB or PMAZC SCSI ports PKA0 and PKB0 and names the integrated SCSI ports PKC0 and PKD0. The devices connected to the ports inherit the controller letter from the port controller letter (A, B, C, or D).

A.1.3 Booting Manually from the System Disk

Boot the system disk manually as follows:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1.
The OpenVMS Alpha operating system is *not* running	Step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press Return:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. (See Section A.3.1for more information about how to halt your Alpha computer.)
5. Enter the BOOT command in the following format:

   BOOT *device-name*

   Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT DKA400
   ```

   To boot from the network, enter the following command and press Return:

   ```
   >>> BOOT ESA0
   ```

A.1.4 Performing a Conversational (Interactive) Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file (ALPHAVMSSYS.PAR) if you modified system parameters to values that render the system unbootable
- Specify a minimum startup

There are several ways to perform a conversational boot. The following procedure is the most direct:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1.
The OpenVMS Alpha operating system is *not* running	Step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press Return:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. (Section A.3.1 for more information about how to halt your Alpha computer.)
5. To begin the conversational boot, enter the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   for *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

   If you do not specify a device name, the system boots from the boot device assigned when you entered the SET BOOTDEF_DEV command.
6. At the SYSBOOT> prompt, you can enter any of the SYSGEN commands listed in Table A-2. 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-2 SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.

Table A-2 SYSGEN Commands Used in the SYSBOOT Procedure (Continued)

Command	Description
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET *parameter-name*	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [*parameter*]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)
USE [*file-spec*]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.

For examples of using conversational booting, see Section A.1.5 and Section A.1.9.

A.1.5 Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.

NOTE Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. Enter the following command and press Return:

   ```
   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.1.6 Booting with the XDelta Utility (XDELTA)

The XDelta utility (XDELTA) is a debugging tool that system programmers use. The procedure for booting all Alpha computers with XDELTA is the same.

The following table describes the valid values you can specify when booting with XDELTA:

Value	System Response
0	Normal, nonstop boot (default).
1	Begins a conversational boot and then displays the SYSBOOT prompt.
2	Includes XDELTA but does not take the initial breakpoint.
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from the console prompt:

```
>>> BOOT -FLAGS 0,7
```

For more information about using XDELTA, refer to the *HP OpenVMS Delta/XDelta Debugger Manual*.

A.1.7 Booting from a Different Root Directory

By default, the OpenVMS Alpha operating system is installed in the system root directory [SYS0]. However, if you have created a cluster system disk, you can use the SYS$MANAGER:CLUSTER_CONFIG.COM procedure to add a copy of the operating system to a different root directory. (Refer to the *HP OpenVMS System Manager's Manual* for more information about using the SYS$MANAGER:CLUSTER_CONFIG.COM procedure.)

To boot from a different directory (for example, [SYS3]), enter the BOOT command as follows:

```
>>> BOOT -FLAGS 3,0  DKA200
```

A.1.8 Booting over the Network with an Alternate TURBOchannel Adapter

You can use an alternate TURBOchannel adapter to boot a DEC 3000 series Alpha computer (with the TURBOchannel option) over the network in an InfoServer or OpenVMS Cluster environment. Examples of alternate TURBOchannel adapters are the PMAD (which connects to the Ethernet) and the DEFTA (which connects to the FDDI).

To boot from a TURBOchannel device connected to one of these alternate adapters, enter the boot command as follows:

```
>>> BOOT "n/ESA0"
```

The value for *n* is the TURBOchannel slot number for the device, which you can obtain by entering the SHOW CONFIGURATION command at the console prompt (>>>) and examining the display. In the following example, the TURBOchannel slot number (listed under the "TCINFO" column) is 0:

```
>>> SHOW CONFIG
DEC 3000 - M300
Digital Equipment Corporation
     VPP PAL X5.56-80800101/OSF PAL X1.34-80800201 - Built on 18-DEC-1996 11:376

                TCINFO     DEVNAM     DEVSTAT
                ------     --------   --------
                  CPU      OK KN16-AA -V3.2-S6CD-I151-sV2.0-DECchip 21064 P3.0-150
                 ASIC      OK
                  MEM      OK
                  MEM      OK
6
                  CXT      OK
5
                  NVR      OK
                  SCC      OK
                   NI      OK
                 ISDN      OK
4
                 SCSI      OK
0-PMAD-AA        TC0
```

A.1.9 Booting in an Emergency

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table A-3 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table A-3 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.1.9.1 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 BOOT command in the following format:

```
BOOT -FLAGS 0,1 [device-name]
```

For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

```
>>> BOOT -FLAGS 0,1 DKA400
```

2. At the SYSBOOT> prompt, enter the following command:

```
SYSBOOT> USE DEFAULT
```

The USE DEFAULT command specifies that default values should be used for all parameters.

3. To avoid starting all layered products on a system that is not tuned for them, possibly causing the system to hang, set the STARTUP_P1 system parameter as follows:

```
SYSBOOT>  SET STARTUP_P1 "MIN"
```

4. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 3:

```
SYSBOOT> SET WRITESYSPARAMS 0
```

5. Enter the following command to continue booting:

```
SYSBOOT> CONTINUE
```

6. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7. 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.1.9.2 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 modifying the startup or login procedure, it is possible to accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

2. Enter the following command at the SYSBOOT> prompt:

   ```
   SYSBOOT> SET/STARTUP OPA0:
   ```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

   ```
   SYSBOOT> SET WRITESYSPARAMS 0
   ```

4. Enter the following command to continue booting:

   ```
   SYSBOOT> CONTINUE
   ```

5. When the system is booted, the operator console displays the DCL command prompt ($). You are logged in.

6. Enter the following DCL command:

   ```
   $ SET NOON
   ```

   This command directs the operating system to ignore any errors that might occur. If you do not enter this command and you invoke an error, the system logs you out.

7. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedure, or to the SYSUAF.DAT file.)

   Invoke a text editor to correct the startup or login file. Note that some system consoles might not supply a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME and DELETE commands.

8. Perform a normal startup by entering the following command:

   ```
   $ @SYS$SYSTEM:STARTUP
   ```

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ @SYS$SYSTEM:STARTUP
```

A.1.9.3 Booting Without the User Authorization File

Ordinarily, the startup and login procedures provided by HP always work; however, certain conditions can cause them to fail. A simple way to lock yourself out of the system is to set passwords to login accounts and forget them. Another way to be locked out is if one or more core system Product Authorization Key (PAK) software licenses are unavailable or expired. In such emergencies, perform a conversational emergency boot by following the steps given in this section.

How to Perform This Task

1. Halt the system by entering Ctrl/P or whatever method is used for your computer. (See Section A.3 for more information about how to halt Alpha computer systems.)
2. Begin the conversational boot by entering the BOOT command in the following format:

   ```
   BOOT -FLAGS 0,1 [device-name]
   ```

   For *device-name*, substitute the device name of the drive from which you want to boot. For example, if the system disk has a device name of DKA400, enter the following command and press Return:

   ```
   >>> BOOT -FLAGS 0,1 DKA400
   ```

   If your system has a hardware password (various systems support a password that prevents unauthorized access to the console), you need this password for logging in to the console. If you do not have this password, contact 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 that:

   - OpenVMS read the system startup commands directly from the system console
   - The Windows system (if any) not start
   - OpenVMS not record the parameter changes for subsequent system reboots

   The last command causes the booting to continue.
4. At the DCL prompt, the system now accepts startup commands directly from the console. Enter the following two commands as shown. These commands allow a normal system startup while you are left logged in on the console. Without the SPAWN command, you would be logged out when the startup completes.

   ```
   $ SPAWN
   $ @SYS$SYSTEM:STARTUP
   ```
5. Once you log out of this session, the system completes the startup and can be used normally. Optionally, you can choose to reboot the system.

NOTE Instead of using the SET/STARTUP OPA0: command, an alternative method of booting under these emergency conditions is to set the UAFALTERNATE system parameter to use the alternate authorization file rather than the standard user authorization file. Setting the system parameter UAFALTERNATE defines the logical name SYSUAF to refer to the file SYS$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

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.

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SPAWN
$ @SYS$SYSTEM:STARTUP
$
```

A.2 Configuring Boot Behavior for Alpha Systems

The following sections describe how to set up automatic booting, set and show the default boot device, modify boot parameters, and create a bootable OpenVMS Alpha system disk using the Writeboot utility.

A.2.1 Setting the System for Automatic Booting

Alpha computers can boot automatically from a designated boot device. When you installed the OpenVMS Alpha operating system, you designated the system disk as the default boot device. Section A.2.2 describes how to change the default boot device.

Alpha computers can boot automatically from the default boot device under the following conditions:

- When you first turn on system power
- When system power comes on after a power failure
- After you shut down the system (if you enter Y when the shutdown procedure asks whether an automatic reboot should be performed)
- After a bugcheck or system crash
- If the system halts under program control

Set the system to boot automatically by performing one of the following steps:

IF ...	THEN GO TO...
The OpenVMS Alpha operating system is running	Step 1.
The OpenVMS Alpha operating system is *not* running	Step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press Return:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system by entering Ctrl/P or by pressing the Halt button. (See Section A.3.1 for more information about how to halt your Alpha computer.)
5. If you have an SMP system with multiple CPUs, enter the following command at the console prompt (>>>) to stop the other CPUs:

   ```
   >>> INITIALIZE
   ```

6. Enter the following command to show whether the system has been set to boot automatically:

   ```
   >>> SHOW AUTO_ACTION
   ```

   The system displays one of the following:

   - Restart
   - Boot
   - Halt

7. Enter the SET AUTO_ACTION command if you want to change the automatic booting behavior. HP recommends that AUTO_ACTION be set to RESTART. This will force the system to attempt to write a crash dump to the dump file, and after the dump write completes, the system will try to reboot itself automatically. For example, the following command sets the system to reboot automatically:

   ```
   >>> SET AUTO_ACTION RESTART
   ```

8. After you set this variable, HP recommends that you set the boot device and operating system flags as well, using the SET BOOTDEF_DEV and SET BOOT_OSFLAGS commands described in the following sections.

A.2.2 Setting and Showing Boot Devices

Use the SET BOOTDEF_DEV command to tell the system which drive you want to boot from (that drive becomes the default boot device). Use the SHOW BOOTDEF_DEV command to display the current default boot device.

Note that when you set this variable, HP recommends that you set the operating system boot parameters as well, using the SET BOOT_OSFLAGS command.

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

```
SET BOOTDEF_DEV device-name
```

Substitute the device name of the system disk for *device-name*. For example, to boot from a drive with a device name of DKA400 on a DEC 3000 Alpha series computer, enter the following command and press Return:

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

The next time you boot the system, you can enter the BOOT command without specifying a device name (because DKA400 is now the default boot device). For example:

```
>>> BOOT
```

NOTE If you have not used the SET BOOTDEF_DEV command to set the drive to boot from and you enter the BOOT command without specifying a device name, the system displays an error message.

Use the SHOW BOOTDEF_DEV command to find out what drive was specified in the last SET BOOT command. For example:

```
>>> SHOW BOOTDEF_DEV
```

To cancel the drive specified in a previous SET BOOTDEF_DEV command, enter the following command and press Return:

```
>>> SET BOOTDEF_DEV
```

NOTE This command is not valid on DEC 3000 Alpha series systems.

A.2.3 Setting Boot Parameters

By default, when you boot the operating system, the flags parameter is set to 0. If you want to define parameters to enable specific functions during the booting process, use the SET BOOT_OSFLAGS console command.

The following is a list of values you can specify with the SET BOOT_OSFLAGS command.

NOTE HP recommends that you keep the BOOT_OSFLAGS parameter at the default value 0 unless you have a specific need to change it (for example, to troubleshoot a system boot problem).

Hexadecimal Value	System Response
1	Allows a conversational boot (the system displays the SYSBOOT> prompt).
2	Maps XDELTA to a running system.
4	Stops the boot procedure at the initial system breakpoint.
8	Performs a diagnostic **bootstrap**.
10	Stops the boot procedure at the bootstrap breakpoints.
20	Omits header from secondary bootstrap image.
80	Prompts for the name of the secondary bootstrap file.
100	Halts the system before the secondary bootstrap.
2000	Marks corrected read data error pages as bad.
10000	Displays extensive, detailed debug messages during the boot process.
20000	Displays selected user-oriented messages during the boot process.

The following examples show how to use the SET BOOT_OSFLAGS command:

- The following command specifies the root directory as 0 and the parameter as 1, which sets the system to perform a conversational boot from the [SYS0] directory when you enter the BOOT command:

  ```
  >>> SET BOOT_OSFLAGS 0,1
  ```

- The following command specifies the root directory as 1 and the parameter as 0, which sets the system (for example, the second host in a two-system DSSI OpenVMS Cluster configuration) to boot from the [SYS1] directory (instead of [SYS0]) when you enter the BOOT command:

  ```
  >>> SET BOOT_OSFLAGS 1,0
  ```

- The following example specifies the root directory as 0 and the parameters as 1, 2, 4, and 20000 (for a total hexadecimal value of 20007). As a result, when you enter the BOOT command, the system will perform a conversational boot from the [SYS0] directory with XDELTA, stop at the initial system breakpoint, and display relevant user messages.

  ```
  >>> SET BOOT_OSFLAGS 0,20007
  ```

To display the parameters you have just set, use the SHOW BOOT_OSFLAGS command. For example:

```
>>> SHOW BOOT_OSFLAGS
BOOT_OSFLAGS = 0,20007
```

Now that the boot parameters have been set, to boot the system using the parameters you have specified, simply type BOOT or B at the prompt (>>>).

A.2.4 Writing a New Boot Block

The boot block is block 0 of the system disk. It contains the size and location of the primary bootstrap image (APB.EXE) used to boot the system. If you suspect that the boot block on your system disk is invalid, you can use the Writeboot utility (WRITEBOOT.EXE) to write a new boot block.

The Writeboot utility is copied to your system disk during the installation procedure. It allows you to create a bootable OpenVMS Alpha system disk from one that was originally created by one of the following methods:

- A nonimage backup of an Alpha system disk (possibly corrupting the boot block)
- A nonimage restore of an Alpha system disk from an image save set

The Writeboot utility also allows you to rewrite the boot block of an OpenVMS Alpha system disk to point to a new version of the OpenVMS Alpha primary bootstrap file (APB.EXE) that you have previously copied to the disk. (Note that the file must be contiguous.)

To invoke the Writeboot utility, enter the following command:

```
$ RUN SYS$SYSTEM:WRITEBOOT
```

The utility prompts you as follows:

```
Update VAX portion of boot block (default is Y):
Update Alpha portion of boot block (default is Y):
```

Answer N (NO) to the VAX prompt. If you answer Y (YES) to update the Alpha boot block, the utility prompts you for the Alpha boot file:

```
Enter Alpha boot file:
```

Specify *device-name*:[VMS$COMMON.SYSEXE]APB.EXE in response to this prompt, where *device-name* indicates the device on which the system disk is mounted. The utility writes the specified information to the boot block on the system disk. For more information, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.3 Halt and Shutdown Operations

The following sections describe halt and shutdown operations for Alpha computers.

A.3.1 Halting the System

During installation, upgrade, and related system operations, you might need to halt your system. The methods for halting Alpha computers differ slightly with certain models, as described in the next section.

The following table summarizes the ways you can halt specific Alpha computers:

Alpha Computer	How to Halt
AlphaServer 300, 800, 1000, 1200, 2000, 2100 series	Do one of the following: • Press the Halt button. • Press Ctrl/P.
AlphaServer 8200, 8400 series	Press Ctrl/P.
AlphaStation 200, 400, 500, 600 series	Do one of the following: • Press the Halt button (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 2000, 3000 series	Do one of the following: • Press the Halt button (if the graphics monitor is serving as the console). • Press Ctrl/P (if you are using the alternate console and port).
DEC 4000 series	Do one of the following: • Press the Halt button. • Press the Break key on the console (the default setting). • Press Ctrl/P, but only after using the console command SET TTA0_HALTS*n* to enable this key combination, where *n* can be 6 (enables the Break key and Ctrl/P) or 2 (enables Ctrl/P but disables the Break key).
DEC 7000, 10000 series	Press Ctrl/P.

A.3.2 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.

You can perform the following three types of shutdown operations:

- An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM (see Section A.3.2.1)
- An emergency shutdown with OPCCRASH.EXE (see Section A.3.2.2)
- An emergency shutdown with crash commands (see Section A.3.2.3)

If you want the system to reboot automatically after the shutdown, see Section A.2.1.

A.3.2.1 Orderly Shutdown

The SHUTDOWN.COM procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN.COM command procedure, log in to the SYSTEM account, enter the following command, and press Return:

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

For more information about the SHUTDOWN.COM command procedure, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

A.3.2.2 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, enter the following command, and press Return:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

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

A.3.2.3 Emergency Shutdown with Crash Commands

Use crash commands only if the system is "hung" (stops responding to any commands) and you cannot log in to the SYSTEM account to use the SHUTDOWN.COM procedure or the OPCCRASH.EXE program.

NOTE The method described here works on all Alpha computers. However, on certain systems, you can force your processor to fail (crash) by entering a specific console command. Refer to the hardware manuals that came with your computer for that information.

To force your processor to fail, do the following:

1. Halt the system by entering Ctrl/P or by pressing the Halt button. (See Section A.3.1 for more information about how to halt your Alpha computer.)
2. To examine processor registers, enter the following commands and press Return:

   ```
   >>> E -N F R0
   >>> E PS
   ```

   The system displays the contents of the registers. Write down these values if you want to save information about the state of the system.
3. Enter the following commands and press Return:

   ```
   >>> D PC FFFFFFFF00000000
   >>> D PS 1F00
   ```

   By depositing these values, you cause the system to write a memory dump to the system dump file on the disk.
4. Enter the following command and press Return:

   ```
   >>> CONTINUE
   ```

   This causes the system to perform a bugcheck.
5. After the system reboots, log in to the SYSTEM account.

6. To examine the dump file, enter the following commands and press Return after each one:

```
$ ANALYZE/CRASH SYS$SYSTEM:SYSDUMP.DMP
SDA> SHOW CRASH
```

   For more information about the System Dump Analyzer (SDA) utility, refer to the *HP OpenVMS Alpha System Analysis Tools Manual*.

A.4 Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

A.4.1 If the System Does Not Boot

If the system does not boot because a hardware problem occurs, a question mark(?) usually precedes the error message displayed on the console terminal. An example of a hardware problem is a read error on a disk.

A.4.1.1 For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Alpha computer.
2. Contact an HP support representative.

A.4.1.2 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-AUG-2004 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.1.9.
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.4.2 Detecting and Responding to System Problems

If your system exhibits unexpected behavior, note the following:

- If the system displays a bugcheck message on the console terminal and shuts itself down, it means the system encountered a problem that made further operation impossible or dangerous. If the system does not reboot automatically, set up your system to boot automatically as explained in Section A.2.1, or reboot the system manually as explained in Section A.1.3.
- If the system stops responding to your commands (that is, the system "hangs"), there is a possible failure in a system software or hardware component or a possible power failure.

- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine whether the failure is a system problem:

- Be sure that you did not press the F1 key (the Hold Screen key). The Hold Screen light goes on when you press either F1 or enter 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 have set the terminal to NOBROADCAST mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)
- Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem:

1. Force an exit from a stalled or "hung" program by entering Ctrl/Y. Note that when you enter Ctrl/Y, any work performed by the program and not saved on disk is lost.
2. If the system is still unresponsive, halt it by entering Ctrl/P or by pressing the Halt button. (See Section A.3.1 for more information about how to halt your Alpha computer.)
3. Note in detail the sequence of events that caused the problem and notify an HP support representative.

B Setting Up, Booting, and Shutting Down HP Integrity Server Systems

This appendix describes the configuration and management tools available on HP Integrity servers (Itanium-based systems), and explains how to set up the Integrity server, configure boot options, boot 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 and powering on the Integrity server system
- Using the Management Processor (MP)
- Using the Extensible Firmware Interface (EFI)
- Accessing the Baseboard Management Controller (BMC) interface
- Booting operations, including the following:
  - — Booting the Operating Environment DVD manually
  - — 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
- Halt and shutdown operations
- Troubleshooting procedures

NOTE Information about configuring the hardware and using the hardware utilities is provided for your convenience and is not intended to replace the hardware documentation included with your Integrity server system. Most of the information pertaining to the hardware in this manual is based on the Integrity rx2600 server model. HP Integrity servers come in many different configurations. Hardware, utilities, and certain hardware configuration procedures may 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

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to guide you. The latest version of documentation for your server can be found online at the following Web sites:

`http://docs.hp.com`

`http://www.hp.com/support/itaniumservers`

B.1 Configuration/Management Tools on HP Integrity Server Systems

This section provides an overview of the configuration and management tools available for your Integrity server system. For more information, refer to the appropriate hardware documentation.

B.1.1 Overview and Comparison of the Tools and Console Options

Three interfaces are available to configure and manage your HP Integrity server environment on HP Itanium-based systems: the Extensible Firmware Interface (EFI), the Baseboard Management Controller (BMC), and the Management Processor (MP).

EFI is the main boot and preboot interface; it is the core interface to the system firmware and console commands. BMC is available on all HP Integrity servers (although on a few systems the interface itself is hidden). BMC provides basic management capabilities and access to EFI. MP is available on most systems. On some systems it is available only if the necessary console hardware has been installed and configured. MP provides advanced management functionality beyond that which is available through BMC and the BMC access into EFI, including remote management, network console and web-based access, and enhanced diagnostic capabilities.

You can interact with EFI and the EFI Shell and menus through either BMC or, when present, the MP interface. In hierarchical terms, MP is connected to BMC, and BMC itself connects to EFI. EFI is the base console environment, and you can interact with the capabilities of the console interface you are using or with EFI itself, as required.

To set up your Integrity server system and boot the system for the first time, you use EFI as explained later in this appendix. If your system includes MP, you can set it up to provide your console interface, as explained in Section B.3.1.

The following briefly describes 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 Boot Manager provides support for operating system loaders and allows you to configure the firmware and control the booting environment. A FAT partition on the boot disk stores the system loader. The Boot Option Maintenance menu allows you to add or delete a boot option, change the boot order, select the active console, and more. When you select the Shell command-line interface option, you can enter commands at the EFI Shell prompt. For more information about EFI options and commands, see Section B.4 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 and takes into account the special hardware features that HP offers.

- Management Processor (MP)

  MP 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. The following is a brief summary of MP's main features:

  — Console connectivity

  As a console interface, it allows you to interact with EFI and to boot the OpenVMS operating system; ultimately, it can function as the OPA0: terminal port in OpenVMS.

  — Virtual front panel

  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 of commands and command-line interface, including such commands as HE (help), PC (power control), RS (system reset), PR (power restore policy), LC (LAN and web connection configuration), and DF (display FRU information).

  — Availability/standby power

  MP is available whenever the system is connected to a power source, even if the system's main power switch is in the off position.

  — Accessibility

  MP is accessible in several ways: by direct monitor connection using a terminal, PC, laptop or any desktop computer connected to the MP serial port; by modem through an EIA-232 port; or by Telnet or web browser on the LAN.

  — Console log

  MP records recent output from the system console. The CL command enables you to view the recorded information.

  — Event logs

  MP includes event logs. In most cases, OpenVMS automatically clears event logs. If you see a message indicating the event log is full, HP recommends that you clear the event log frequently. You can clear the system event log by selecting SL from the MP main menu and then selecting the C option. For more information about clearing event logs, refer to the hardware documentation. You can also clear the system event log at the EFI Shell prompt, as explained in Section B.6.

  On some systems, such as the rx1600, MP is optional. On systems such as the rx4640, MP functionality is built into the system board. For more information about MP options and commands, refer to the appropriate hardware documentation.

NOTE MP provides much more functionality than BMC and may be more appropriate for your use. On some systems, MP is an optional component and on others it is built into the system. Some systems do not include MP.

- Baseboard Management Controller (BMC)

  BMC is much 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 and boot the OpenVMS operating system; it can function as the OPA0: terminal port in 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.

  On some systems such as the rx4640, the BMC user interface is hidden; however, BMC is still present and functional. For more information about BMC commands, refer to the appropriate hardware documentation.

The following table compares the EFI, MP, and BMC tools.

Table B-1 Comparison of Hardware Management Interfaces

Feature/Function	EFI Interface	MP Interface	BMC Interface
Main Function	Interface between operating systems and the Integrity server firmware	Control of system console and power management	Simple hardware and firmware configuration and management
Availability	All systems; primary interface to firmware	Depending on the system, either embedded, a standard plug-in card, or optional	Most systems; on some systems such as the rx4640 it is hidden and unavailable to the user
Interface when system is turned on first time, before customization?	Yes, depending on the system and type of connection	Yes, depending ont he system and type of connection	No
Main prompt	Shell>	MP>	cli>
Configure and manage boot environment	Yes, extensive functionality	Yes (after initial boot only)	Limited (after initial boot only)
Status displays	System date/time System Devices and drivers Memory	LAN Modem Power management System power Locator LED Processor	Power management System power Locator LED
Ways it can alter server state	Reset system	Reset modem Control remote power Reset BMC System reset Transfer of control	Control system power Locator LED System reset Transfer of control

Table B-1 Comparison of Hardware Management Interfaces (Continued)

Feature/Function	EFI Interface	MP Interface	BMC Interface
Configuration capabilities	Boot environment System date/time Security passwords Processors Devices and drivers SCSI parameters Memory	Power restore policy Default configuration Diagnostics Upgrade firmware Security options Inactivity timeout User configuration Serial, LAN, and remote/modem access Make or change connections	Power restore policy Security options BMC password
Remote manageability	Yes, depending on MP or BMC connectivity	Yes	Yes, through modem or remote serial connection
Access	Depends on MP or BMC connectivity (EFI behavior is independent of the connection type)	Local EIA-232 serial with terminal emulation software, remote (modem) EIA-232 serial, LAN/Telnet (also allows access through web browser)	Local EIA-232 serial only, with terminal emulation software
Default access settings	Not applicable	Serial: Baud rate: 9600 Bits: 8 Parity: None Stop Bits: 1 (one) Flow Control: None Modem: Baud rate: Input and output rates same Flow Ctrl: Hardware: RTS/CTS Software: XON/XOFF Terminal type: HPterm For other settings, refer to the hardware documentation	Serial: Baud rate: 9600 Bits: 8 Parity: None Stop Bits: 1 (one) Flow Ctrl: XON/XOFF
Interface	Command line and menu mode	Command line and menu mode	Command line mode
User support	Single user	Multiple users: one entering commands, others viewing[1]	Single user
Security/password	User and administrator passwords	Security options and access control	User password

Table B-1 Comparison of Hardware Management Interfaces (Continued)

Feature/Function	EFI Interface	MP Interface	BMC Interface
Functionality (diversity of functions)	Medium	High	Low
Power dependency	Dependent on server power status	Standby, independent of server power status	Standby, independent of server power status

1. Command mode and console mode are mirrored. Thus, only one user can have write access to the shared console at a time.

B.1.2 The Delete or Backspace Key

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 much different than the way OpenVMS Alpha systems or Microsoft Windows computers 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 entering commands for the Integrity server, if you press the Delete key on a VT*xxx* 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, to have the key work properly on OpenVMS, you must still issue the SET TERMINAL command described above.

B.2 Setting Up and Powering On the Integrity Server System

For a console terminal, you need a laptop, PC, or similar device that has terminal emulation software. OpenVMS does not support using a VGA graphics display as a console device. To connect your console terminal to your Integrity server, you will need a standard PC-to-PC file transfer cable (also known as a 9-pin null modem serial cable, it has 9-pin female connectors at each end). The serial port on the server system is set to 9600 baud, 8-bit, no parity, and one stop bit. Set up your terminal emulation software accordingly, specifying VT100 mode. The settings can vary for other ports and access methods.

To set up the console terminal and power up the system, follow these steps:

1. Unpack your server system and set it up, as instructed by the hardware documentation provided.
2. Connect the power cord from the server to a power source, following the directions provided in the hardware documentation.
3. Connect one end of the PC-to-PC file transfer cable to the COM1 connector on your console terminal device. If your server includes MP, connect the other end to the MP console connector on the rear panel; otherwise, connect to the console serial port (on rx4640 systems, you connect to the local serial port, since MP is built into those systems).

   Some systems, such as the rx1600 and rx2600, provide a three-connector cable (also referred to as an M-cable) to use for this connection. In this case, connect your PC-to-PC file transfer cable to the port marked "Console" on the three-connector cable, and connect the three-connector cable to the MP 25-pin serial port on the rear panel, if available; otherwise, connect it to the appropriate serial port on the rear panel. If MP is available, HP recommends using MP instead of BMC (the latter is used by default if MP is not present or used).

NOTE For MP connections that require the three-connector cable, make sure you connect your PC-to-PC cable to the connection port marked “Console” on the three-connector cable. All three connection ports on that cable are DB9 9-pin connectors, but only the port marked “Console” will work. The other two connection ports are for remote (modem) and UPS connections only.

4. Power up the server system by pressing the power button on the front panel. Press ONCE only: the green LED indicating the system is powered does not light immediately. If after 30 seconds the LED is still not on, then press the power button again. If the system has a separate MP card, the system LED blinks; otherwise, the power LED turns on and the system LED blinks on and off (both LEDs are adjacent to the power button). Your screen might remain blank for up to a minute before you see activity.

If MP is included with your system, and you want to take advantage of this utility, continue to the next section. If MP is not included, or you do not want to take advantage of this utility, skip to Section B.4.

B.3 Using the Management Processor (MP) Interface

This section explains how to set up and access MP as the console interface and how to use MP to power the Integrity server on or off. If your Integrity server does not include MP, skip to the next section. This section assumes you have connected your console terminal device to the appropriate connector for MP, on the rear panel of your system, as instructed in Section B.2.

B.3.1 Setting MP as the Console Interface (Optional)

MP provides additional features and functionality to what is provided by the EFI and BMC tools. For a brief description and comparison of these tools, see Section B.1. For more information, refer to the hardware documentation.

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 setting up your server for the first time. You can use the LAN connectivity immediately, even before the operating system is installed.

This section assumes you have just powered up your system. You will be prompted to log in to MP when you power up your system. To set up MP as your console device, follow these steps:

1. Log in to the MP console interface. By default, both user name and password are set to “Admin.” The user name and password are case sensitive. Be sure you specify both as “Admin”. For security purposes, HP recommends that you change the password immediately. If you forget the password, you can manually reset the password to the default. (On some machines, an MP reset button is available that you can press when you power on your system; refer to your hardware documentation.)

NOTE To get the login user name and password prompts, you might need to press Return one or more times on your console keyboard. If this does not work, then try pressing Ctrl/B.

If you only see the MP password prompt, press Return 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 again.)

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). 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.

```
[Read only - use Ctrl-Ecf for console write access]
```

The system will be inoperative if it has MP firmware older than version E02.22. For information about updating the MP firmware, see Section 1.2.6.4.

```
HP Management Processor
Firmware Revision E.02.29 Jul 1 2004,11:10:23
(c) Copyright Hewlett-Packard Company 1999-2004. All Rights Reserved.


MP login:Admin
MP Password:*****
```

The following is a sample display including the MP main menu:

```
                Hewlett-Packard Management Processor

(c) Copyright Hewlett-Packard Company 1999-2003. All Rights Reserved.

                  MP Host Name: myhost

                    Revision E.02.29

*****************************************************************
              MP ACCESS IS NOT SECURE

   Default MP users are currently configured and remote access is enabled.
   Modify default users passwords or delete default users (see UC command)
                    OR
         Disable all types of remote access (see SA command)
```

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

  MP MAIN MENU:

     CO: Console
     VFP: Virtual Front Panel
     CM: Command Menu
     CL: Console Log
     SL: Show Event Logs
     CSP:Connect to Service Processor
     SE: Enter OS Session
     HE: Main Help Menu
     X: Exit Connection

[uninitialized] MP>
```

NOTE The "[uninitialized]" text appears before the MP prompt until you assign a name to the MP host, after which you will see the host name appear in the brackets.

You can use the MP Main menu later, entering MP Main menu selections (CO, VFP, CM, CL, CSP, SE, SL, HE, and X) at the MP> prompt.

You can use command mode (CM) to access commands not displayed in the MP Main menu. (Enter command mode by entering the `cm` command at the MP> prompt.) To display the commands available, use the MP help function. Enter HE at the MP:CM> prompt, and then enter LI at the MP help prompt (MP:HE>). You can return to the MP Main menu by typing Ctrl/B.

2. When the MP> prompt first appears, the system waits 10 seconds for a response. At the MP> prompt, type CO for console mode, as shown. The `co` command brings you to the EFI Boot Manager screen; if you do not enter a command within 10 seconds, the EFI Shell> prompt appears. (When the operating system is running, the `co` command brings you to the console port of the operating system.)

   ```
   [uninitialized] MP> co
   ```

   Several messages should indicate the EFI Boot Manager is being loaded. If 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. (HP recommends using MP to power on your system, as documented in Section B.3.2.3.) Wait until you see the EFI Boot Manager screen similar to the one shown in the following example. By default, you have 10 seconds to select an option from the menu on this screen. The shading indicates the default or selected menu selection.

   ```
   EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

   Please select a boot option

     EFI Shell [Built-in]
     Boot Option Maintenance Menu
     System Configuration Menu

     Use ^ and v to change option(s). Use Enter to select an option.
   ```

If the CO command results with a screen that is unexpected or difficult to interpret, pressing Return might help. If you end up at the EFI Shell prompt, enter `exit` at the prompt to get to the EFI Boot Manager screen.

3. From the EFI Boot Manager screen, select the Boot Option Maintenance Menu option as shown in the following example. To move to the option, use the up or down arrow keys (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 Return to toggle the selection. If you do not select an option within the default 10-second limit, the EFI Shell prompt appears. If so, the note that follows explains how to return to the Boot Manager screen.
:

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

NOTE The system pauses for 10 seconds to give you time to select a Boot Manager option. (You can change the default timeout period by using the EFI Boot Option Maintenance menu.) If you do not select an option within that time, the system takes you to the EFI Shell prompt. To exit the EFI shell and return to the Boot Manager menu, enter the `exit` command at the EFI Shell prompt.

If lines from the preceding screen linger to obscure the EFI Shell prompt, press Return to bring the EFI Shell prompt into view.

4. The Boot Maintenance Manager menu appears, similar to the one in the following example. Use the Boot Maintenence Manager menu to select the serial console as the sole input, output, and error device from the system, as explained in steps 5 through 9:

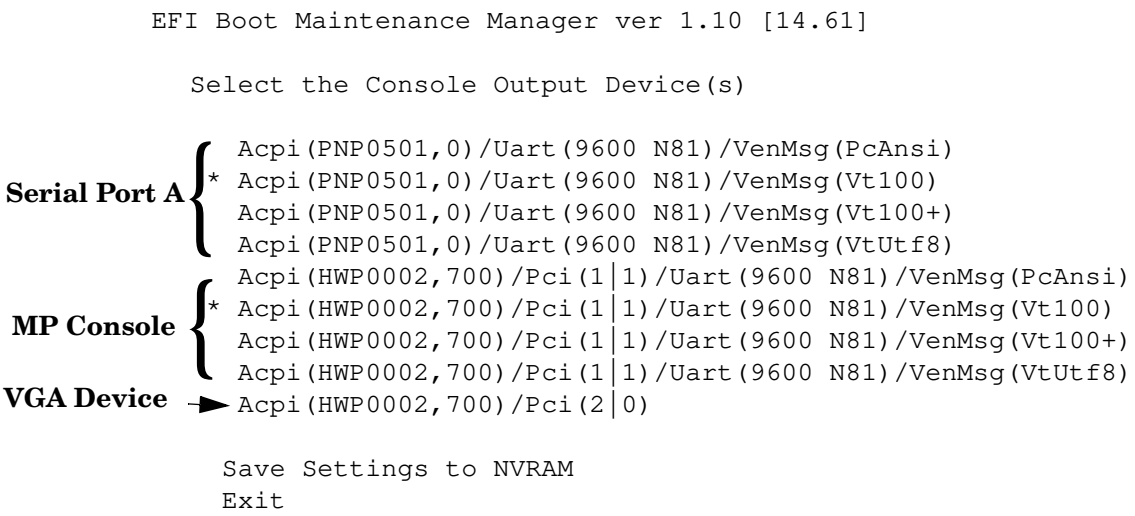
```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation

     Boot from a File
     Add a Boot Option
     Delete Boot Option(s)
     Change Boot Order

     Manage BootNext setting
     Set Auto Boot TimeOut

     Select Active Console Output Devices
     Select Active Console Input Devices
     Select Active Standard Error Devices

     Cold Reset
     Exit

Timeout-->[10] secSystemGuid-->[C198BA79-478A-11D7-9C22-6033AC66036B]
SerialNumber-->[US30464638    ]
```

NOTE The console devices must point to a serial line console, and they must all be the same serial device. OpenVMS does not support booting using a USB keyboard or a VGA graphics display device. The system might boot with these devices but you would not receive 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 would normally expect to see when booting.

---

5. Select Active Console Output Devices and press Return. You will see a display similar to the following (this example shows the devices for an Integrity rx2600 server). A description of the devices shown follows. The asterisk next to a line indicates the default device defined for the console. OpenVMS will not operate if more than one line has an asterisk. To deselect a line, use the arrow keys to move to the line

(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). Once the line is highlighted, press Return. The asterisk will disappear.



Serial Port A	These first four lines (the "PNP" lines) indicate any of the valid devices that you can define for the console connected to the serial port.
MP Console	The next four lines (the "HWP" lines) appear only if your system includes the MP port (provided with an MP card, which is available on some systems such as the rx2600). They define devices for the MP console interface.
Graphics Device	This is the graphic console device, which is unsupported. Do not select this. OpenVMS does not support VGA graphics as a console output device for booting.

6. After deselecting any lines that denote devices you are not going to use, select the VT100+ line corresponding to your port connection (the PNP line if connected to the serial port; the HWP line if connected to the MP port), and press Return to toggle your selection. This line defines a VT100+ mode device, where VT100+ is any VT100 family terminal. For example, the MP VT100+ mode device is defined by this line:

   ```
   Acpi (HWP0002, 700) / Pci(1|1)/Uart(9600 N81)/VenMsg(VT100+)
   ```

   Once selected, an asterisk should appear to the left of the line.
7. Select Save Settings to NVRAM from the Boot Option Maintenance menu, and press Return.
8. Select Active Console Input Devices from the Boot Option Maintenance menu and press Return. Then repeat steps 6 and 7 to configure console as the input device for the system.
9. Select Active Standard Error Devices from the Boot Option Maintenance menu and press Return. Repeat steps 6 and 7 to configure console as the error device for the system.
10. Finally, initiate a cold reset by selecting Cold Reset from the Boot Option Maintenance menu and pressing Return. You will be prompted to confirm.
11. The main EFI Boot Manager screen reappears. You can return to MP by pressing Ctrl/B. Or, you can select an EFI Boot Option Maintenance Menu option. If you do not make a selection within the default 10-second limit, the EFI Shell> prompt appears. In this case, enter the EXIT command at the prompt to

bring you back to the EFI Boot Manager menu, and then select the Boot Option Maintenance Menu option. (This time you have unlimited time to make your selection. The ten-second limit is only valid after the first boot from powering on the system.)

MP is now set up as your console interface. Later, you can set up a LAN or remote console interface, or use any of the other features provided by MP. However, at this point, your next step is to boot the OpenVMS I64 DVD to install the operating system onto a system disk. Follow the instructions given in Chapter 3. Specific instructions for booting the Operating Environment DVD are also included in Section B.6.1.

B.3.2 Using MP Features (Optional)

This section describes how to use various features provided by MP. This section assumes the following:

- You have already booted the OpenVMS I64 DVD to install the OpenVMS I64 operating system onto a system disk
- Your system has MP
- You have connected your console terminal device appropriately to the Integrity server
- You are logged into MP (if the preceding conditions are met, you should be prompted to log in to MP when the Integrity server is powered on)

For more information, refer to your Integrity server hardware documentation.

NOTE If you are at the EFI console, switch to MP by pressing Ctrl/B. To enter EFI console mode from MP, enter CO at the MP prompt.

B.3.2.1 Configuring a Network Console Interface on MP

You can use MP to establish remote console access, such as through the Telnet utility provided with HP TCP/IP Services for OpenVMS.

NOTE To ensure system security, HP recommends that a private network be used for console connections. In addition, you should change the default MP password (Admin) to a private password. To change passwords, use the MP `so` command or the `dc` command (and for the latter, select the "Reset Security Configuration" option).

1. Connect a network cable to the appropriate LAN connector on the rear panel.
2. At the MP> prompt, type `cm` to get to the command mode prompt (MP:CM>):

```
MP> cm
MP:CM>
```

3. At the command mode prompt, type `lc` to configure the local area network (LAN). The LAN Configuration screen appears, displaying your current LAN settings. The screen is similar to the one shown in the following example:

```
MP:CM> lc

LC

At each prompt you may type DEFAULT to set default configuration or Q to Quit

Current LAN configuration:
```

```
-  -  MAC Address              :  0x00306e1ee0dd
I  -  IP address               :  127.0.0.0
H  - MP Host Name              :  hostname
S  - Subnet Mask               :  255.255.255.0
G  - Gateway Address           :
L  - Link State                :  Auto Negotiate
W  - Web Console Port Number   :  2023

Enter parameters(s) to change, A to modify All, or [Q] to Quit:
```

4. At the prompt, type A to modify all parameters. Follow the prompts to enter your IP address, host name, and gateway. HP recommends that you assign a unique IP address and host name to the MP console, separate from any address or name used by OpenVMS. Your system administrator should provide you with the subnet mask, gateway address, and any other information required. For more information about each parameter, consult your hardware documentation.
5. When all parameters are set, type `xd` at the prompt to reset MP.
6. Type `r` at the prompt to restart MP.
7. You can now disconnect your console terminal device and begin accessing the console interface over TCP/IP using the TELNET command; that is, close your current terminal emulation program and use a Telnet connection instead. When you log in to MP, you are connected to the Integrity server system console using Telnet.

B.3.2.2 Accessing the MP Console Interface Over the Web

Alternatively to accessing the MP console interface through a TELNET connection, you can access the MP console interface through the Internet using an Internet browser:

1. Open an Internet browser.
2. Click on File and select Open... from the File menu.
3. At the Open popup prompt, type in the IP address (you can display the current setting for this and other parameters by using the LS command at the MP prompt).
4. The MP login screen appears in your browser. You can now log in to get to the MP main menu.

B.3.2.3 Powering the Integrity Server On or Off from the MP Console Interface

To power the Integrity server system on or off using the MP console interface, follow these steps:

1. Type cm at the MP> prompt to switch to command mode, as in the following example (which omits the initial MP display and Main menu).

```
                    .
                    .
                    .
MP> cm

        (Use CTRL-B to return to MP main menu.)

MP:CM>
```

2. To power on the Integrity server, enter the `pc -on -nc` command at the MP:CM> prompt, as shown in the following example. The `-nc` argument tells the system not to prompt you to confirm your request.

```
MP:CM> pc -on -nc
PC -on -nc
System will be powered on

    -> System is being powered on

-> Command successful.

MP:CM>
```

At the MP:CM> prompt, enter Ctrl/B to get to the MP> prompt, and then enter CO to get to the console. Wait for the diagnostics to complete and the EFI Boot Manager menu screen to appear.

3. To power off the system, use the `pc -off -nc` command at the MP:CM> prompt, as in the following example. Make sure you have shut down the operating system prior to issuing this command.

```
MP:CM> PC -off -nc
PC -off -nc
System will be powered off

   You must shut down the OS manually before this command is executed.
   Failure to do this can cause problems when the OS is restarted.

    -> System is being powered off

-> Command successful.

MP:CM>
```

NOTE You can view the status of the front panel of your Integrity server by using MP's Virtual Front Panel (enter the `vfp` command at the MP prompt). This is especially advantageous when powering the system on or off from a remote location and you want to verify that the process has completed. For large systems with multiple partitions, which take longer to power on, the Virtual Front Panel displays the current status of the boot process. Under certain circumstances, the boot might be blocked, and if you are at a remote location the Virtual Front Panel would help you determine this (in which case, you would need to reset the system).

Integrity server systems are sometimes mounted in a cabinet with other systems. To determine which physical system you are interacting with, enter the following command at the MP:CM> prompt. This command turns on a blinking blude LEFD on the front and rear of the panel.

```
MP:CM> loc -on -nc
```

B.4 Using the Extensible Firmware Interface (EFI)

EFI is the basic interface between the operating system and firmware on all Integrity server systems, similar to SRM (P00>) on Alpha systems. EFI provides a boot option menu and the ability to configure boot options.When you first power on a new Integrity server system, you first see a series of diagnostic messages followed by the EFI Boot Manager screen unless MP is available. The following is an example of an initial EFI Boot Manager screen. (On some systems that include MP, you might first see the MP login screen described in

Section B.3. As noted at the beginning of this appendix, the behavior of Integrity server systems can vary significantly from model to model as well as from version to version.)

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

The system pauses 10 seconds to allow you to select an option. If you do not select an option in that time, EFI takes you to the first option on the list, the EFI Shell (you see the EFI Shell prompt). 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.

To select an option from the EFI Boot Manager menu, use the up or down arrow key to highlight an item, and then press Return to activate the selection. You can use EFI to configure numerous options for your Integrity server and OpenVMS operating system; however, HP recommends that you use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility after you have installed and started running the OpenVMS I64 operating system, as described in Section B.7.

In any case, for the first boot of a system on which OpenVMS is not preinstalled, you will probably need to use EFI to get started. When you select the EFI Shell, the interface displays a list of file systems (fs drives and partitions) and block devices (blk), followed by the EFI Shell> prompt, as in the following example. If you do not see the EFI Shell> prompt, press Return (note also that the EFI Shell prompt may have changed, as explained in Section B.4.1). The drives and devices are described in more detail in Section 3.4.2.

```
Loading.: EFI Shell [Built-in]
 EFI Shell version 1.10 [14.61]
 Device mapping table
   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)
   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>
```

If you are booting from the OpenVMS I64 Operating Environment DVD and no other systems are present on any of your Integrity server's disks, the DVD is usually associated with fs0:. You can boot the DVD to start installing OpenVMS onto a system disk by following the directions provided in Section 3.2.2.

After installing the system, you can use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility to set up EFI to boot the new system disk automatically whenever the Integrity server is powered on or the system is rebooted. This utility is easier to use than EFI and allows you to configure the most pertinent options for your system, 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. For instructions on how to use the utility, see Section B.7. For more information about configuring Fibre Channel devices with this utility, refer to the *Guidelines for OpenVMS Cluster Configurations*. Information about using the OpenVMS I64 Boot Manager utility to display boot options is provided in Section B.7.2. For information about setting the pause length, see Section B.7.3. 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*.

B.4.1 General Tips and Notes on Using EFI

Note the following:

- For an example using the EFI Boot Maintenance Manager, see Section B.6.1. Another example is provided in Section B.3.1.
- To switch to a different file system, enter the file system name, as in the following example showing how to switch to fs3: from the current location (top level of the EFI Shell):

  ```
  Shell> fs3:
  fs3:\>
  ```

  Once you move from the Shell> prompt to a specified file system location, the EFI Shell prompt will be the name of the file system as in the example shown. The Shell> prompt displays again if you reset the system.
- 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 as follows:

  ```
  fs0:\> cd efi
  fs0:\efi>
  ```

  To display the contents of the efi directory, use the `dir` command.
- 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 system is running, use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM), as described in Section B.7. The EFI Utilities for OpenVMS are described in detail 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 that of the OpenVMS I64 Operating Environment 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`.

- 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 in the following example:

  ```
  fs0:\> alias dir "ls"
  ```

  To define an alias for the command that boots OpenVMS from fs0:, you would type the following command:

  ```
  fs0:\> alias bvms "fs0:\efi\vms\vms_loader.efi"
  ```

NOTE Setting an alias to point to a specific device as in this example could lead to unexpected results. For example, if you insert a DVD in the DVD/CD drive, fs0: will now point to the DVD/CD drive. HP recommends using the OpenVMS I64 Boot Manager to set your system disk as a boot device, as explained in Section B.7.

To list the aliases currently defined, enter the `alias` command, as shown:

```
fs0:\> alias
   dir    : ls
   bvms   : fs0:\efi\vms\vms_loader.efi
```

- If your system has a large number of file systems, when EFI lists the file systems and block devices at startup, you might only see the last portion of the list (probably the block devices). To see the entire list, enter the `exit` command at the EFI Shell prompt. You are then brought to the EFI Boot Manager screen. From there, reenter the EFI Shell to see all the devices.

- The boot devices listed in the EFI Boot Manager menu are linked to a specific serial number (listed in the device mapping table) not to the fs number (fs0 or fs1, for example). Thus, if you use a copy of a boot disk, the boot entry (corresponding to the original boot disk) in the EFI Boot Manger menu will not work. You would have to remove that boot option entry and reset the system (enter the `reset` command at the EFI Shell prompt).
- To move from MP interface to EFI, type CO (Console) at the MP> prompt.
- To move from the BMC interface to EFI, press the Esc key followed by entering the BMC Q command.
- To move from the EFI to MP, press Ctrl/B (this assumes MP is present and configured).
- To move from the EFI to BMC, press the Esc key followed by the left parenthesis character [(] (Shift/9).
- For more information about using EFI, refer to the documentation provided with your Integrity server.

B.5 Accessing the Baseboard Management Controller (BMC)

BMC is available on most Integrity servers. If you want to use BMC, follow these directions:

1. Make sure the serial cable is connected to the serial connector marked “SERIAL A” on the rear panel of the system.
2. Configure your terminal emulator accordingly (settings are listed in Table B-1 on page 190) and connect to the system.
3. To move to BMC from EFI, press the Esc key followed by the left parenthesis character [(] (Shift/9), and then press Return. If AC power is connected to the system, this command activates the BMC command line interface even if the system power is off.
4. If prompted, enter the user or admin password at the login prompt. If no password has been defined, you are not prompted for the password.

   ```
   login>
   ```

5. Use BMC commands at the cli> prompt, as described in your hardware documentation. For help information about BMC commands, enter `h` at the cli> prompt.
6. When you are finished using BMC, you can log out of BMC in one of two ways:
   - Log out of BMC and return to the system console (EFI) by pressing the Esc key followed by the BMC `Q` command:

```
cli> [ESC] Q

 EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

 Please select a boot option

   EFI Shell [Built-in]
   Boot Option Maintenance Menu
   System Configuration Menu

   Use ^ and v to change option(s). Use Enter to select an option.
```

- Log out of BMC without returning to the system console (EFI) by using the BMC `Q` command. This assumes you have a system password set. When you enter the `Q` command, the login prompt appears, as shown in the following example:

```
cli> Q

login>
```

B.6 Booting Operations

This section explain various methods for booting your OpenVMS I64 operating system.

NOTE 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. 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 will process the contents of the SEL. If you want to clear the SEL manually, enter the `clearlogs SEL` command at the EFI Shell prompt as in the following example:

```
Shell> clearlogs sel
```

This command deletes the contents of the SEL. The command is available with current system firmware versions.

If your Integrity server is configured with a Management Processor (MP) and you see a BMC event log warning while connected to the MP console, you can also clear the BMC event log by using MP. Press Ctrl/B to revert to the MP> prompt. At the MP> prompt, enter SL (from the main menu) and use the C option to clear the log.

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, see Section 1.2.6.

B.6.1 Booting the OpenVMS I64 Operating Environment DVD

After powering on your system and performing any other tasks to set up the system, you can boot the OpenVMS I64 Operating Environment DVD.

1. Insert the OpenVMS software DVD into the DVD/CD drive on the front panel of the server.
2. To ensure that EFI can access the DVD, enter the following command at the EFI Shell prompt:

   ```
   Shell> map -r
   ```

3. To boot the Operating Environment DVD, type the following command at the EFI Shell prompt, where fs0: is the Integrity server DVD drive. For a new Integrity server, the DVD drive is normally fs0:. If installations have been performed already on your server, then the DVD drive might be at another location.

   ```
   Shell>fs0:\efi\boot\bootia64.efi
   ```

   If this command does not work or you have doubts about which device maps to the DVD drive, you can use the EFI Boot Manager menu system to boot the Operating Environment DVD, as explained in steps a through f:

   a. To use the EFI Boot Manager menu system to boot the Operating Environment DVD, go to the EFI Boot Maintenance Manager menu. If you have just powered up your system and are at the EFI prompt, do the following to get to the EFI Boot Maintenance Manager screen:

      1. Enter the Exit command at the EFI Shell prompt. This takes you to the main EFI Boot Manager screen.
      2. From the Boot Manager menu, select the Boot Option Maintenance Menu option.

   b. From the EFI Boot Maintenance Manager menu, select the Boot from a File option, as shown in the following example. To navigate up or down, use either the letter v or the caret (^) on your keyboard, or the up or downarrow keys, and press Return to toggle your selection.

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation

    Boot from a File
    Add a Boot Option
    Delete Boot Option(s)
    Change Boot Order

    Manage BootNext setting
    Set Auto Boot TimeOut

    Select Active Console Output Devices
    Select Active Console Input Devices
    Select Active Standard Error Devices

    Cold Reset
    Exit

Timeout-->[10] sec SystemGuid-->[C198BA79-478A-11D7-9C22-6033AC66036B]
SerialNumber-->[US30464638     ]
```

c. A menu similar to the following appears. Select the "CDROM (Entry0)" line, as in the following example, and press Return.

```
Boot From a File. Select a Volume

 V8.2 [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)
 Removable Media Boot [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Maste
 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, as in the following example.

EFI Boot Maintenance Manager ver 1.10[14.61]

Select file or change to new directory:

```
5/04/04   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 (contains the boot file) as in the following example:

EFI Boot Maintenance Manager ver 1.10[14.61]

Select file or change to new directory:

```
5/04/04 06:21a<DIR>     2,048 .
5/04/04 06:21a<DIR>       0
5/04/04 06:21a<DIR>     2,048 boot
5/04/04 06:21a<DIR>     2,048 vms
Exit
```

f. The following screen displays the files within the boot directory. Select the file named bootia64.efi, as in the following example:

EFI Boot Maintenance Manager ver 1.10[14.61]

Select file or change to new directory:

```
5/04/04 06:21a<DIR>     2,048 .
5/04/04 06:21a<DIR>     2,048 ..
5/04/04 06:21a          334,848 bootia64.efi
Exit
```

You can now install your OpenVMS I64 operating system onto the target disk; see Section 3.3.

B.6.2 Booting Manually from the System Disk

Boot the OpenVMS I64 operating system disk manually as follows:

IF ...	THEN GO TO...
The OpenVMS I64 operating system is running	Step 1.
The OpenVMS I64 operating system is *not* running	Step 4.

NOTE On Integrity server systems, HP recommends setting up your system with a boot option for your system disk (preferrably, so that it boots automatically on powering on or reboot). Add your system disk as a boot option in the EFI Boot Manager menu by using the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility, as explained in Section B.7.1. Another method for setting up your system disk to boot automatically is described in Section B.7.1.2.

1. Log in to the SYSTEM account.
2. Enter the following command and press Return:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system. (See Section B.8 for more information about how to halt your Integrity server).
5. Boot the system disk manually by entering the following command at the EFI Shell prompt, where fs*n*: (such as fs1:) is the device associated with the system disk:

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

B.6.3 Performing a Conversational (Interactive) Boot

A conversational boot is most commonly used in research and development environments and during software upgrades. Perform a conversational boot to stop the boot process before it completes. The boot process stops after it loads SYS$SYSTEM:SYSBOOT.EXE and displays the SYSBOOT> prompt. At the SYSBOOT> prompt, you can enter specific OpenVMS System Generation utility (SYSGEN) commands to do the following:

- Examine system parameter values
- Change system parameter values
- Specify another parameter file
- Specify another system startup command procedure
- Select the default system parameter file (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 *not* running,	Step 4.

1. Log in to the SYSTEM account.
2. Enter the following command and press Return:

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

3. Answer the questions displayed by the system. When the procedure asks whether an automatic reboot should be performed, press Return for NO. When the procedure is finished, it displays the following message:

   ```
   SYSTEM SHUTDOWN COMPLETE
   ```

4. Halt the system. (See Section B.8 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 fs*n*: 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 B-2. 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 B-2 SYSGEN Commands Used in the SYSBOOT Procedure

Command	Description
CONTINUE	Resumes the boot procedure.
DISABLE CHECKS	Inhibits checking of parameter values specified with the SET command.
ENABLE CHECKS	Permits checking of parameter values specified with the SET command.
HELP	Displays a summary of the SYSBOOT commands on the terminal screen.
SET *parameter-name*	Establishes the value of a system parameter.
SET/STARTUP	Sets the name of the system startup command procedure.
SHOW [*parameter*]	Displays active, current, default, maximum, and minimum values for specific parameters. (Use qualifiers to display characteristics of parameters grouped by categories.)

Table B-2 SYSGEN Commands Used in the SYSBOOT Procedure (Continued)

Command	Description
USE [*file-spec*]	Specifies a parameter file to be used as a source of values. You must enter the entire file specification, including device and directory; you cannot specify a logical name.
USE DEFAULT	Specifies that default values be used for all parameters.

For examples of using conversational booting, see Section B.6.4 and Section B.6.7.

B.6.4 Booting with Minimum Startup

In certain cases, you might want to boot your system without performing the full sequence of startup events. For example, if a startup event prevents you from logging in, you might want to boot the system without executing the startup so that you can log in and fix the problem. You can use the conversational boot to specify a minimum startup.

NOTE Because this procedure bypasses specific startup operations, it does not autoconfigure the system's peripheral devices.

Boot the system with minimum startup as follows:

1. Begin the conversational boot by entering the following command at the EFI Shell prompt, where fs*n*: is the device (such as fs1:) associated with the system disk:

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

2. Enter the following command and press Return:

   ```
   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
   ```

B.6.5 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.

Value	System Response
3	Displays the SYSBOOT prompt and includes XDELTA but does not take the initial breakpoint.
6	Includes XDELTA and takes the initial breakpoint.
7	Includes XDELTA, displays the SYSBOOT prompt, and takes the initial breakpoint at system initialization.

The following is an example of booting with XDELTA from fs1: at the EFI> prompt:

```
EFI> fs1:\efi\vms\vms_loader.efi -flags 0,7
```

For more information about using XDELTA, refer to the *HP OpenVMS Delta/XDelta Debugger Manual*.

B.6.6 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 fs*n*: (such as fs1:) is the device associated with the system disk:

```
Shell>fsn:\efi\vms\vms_loader.efi -flags 3,0
```

B.6.7 Booting in an Emergency

If a system problem prevents your system from booting, you might need to perform an emergency boot operation. Table B-3 summarizes these emergency boot operations, and the sections that follow describe each boot operation in more detail.

Table B-3 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

B.6.7.1 Booting with Default System Parameters

If the current values stored in the parameter file have been incorrectly modified, these incorrect values might cause the system to become unbootable. With a conversational boot operation, you can reset the active values for all system parameters to the default value. (In most cases, 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 fs*n*: (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
   ```

6. When the system finishes booting, determine which changed parameter caused the problem and reset the parameter value. If you specified the value for the parameter in the AUTOGEN parameter file MODPARAMS.DAT, fix the value in that file and run AUTOGEN. For more information, refer to the *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

7. 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
```

B.6.7.2 Booting without Startup and Login Procedures

If the system does not complete the startup procedures or does not allow you to log in, you might need to bypass the startup and login procedures. The startup and login procedures provided by HP should always work. However, if you introduce an error when modifying the startup or login procedure, it is possible to accidentally lock yourself out of the system.

How to Perform This Task

1. Begin the conversational boot by entering entering the following command at the EFI Shell prompt, where fs*n*: (such as fs1:) is the device associated with the system disk:

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

2. Enter the following command at the SYSBOOT> prompt:

   ```
   SYSBOOT> SET/STARTUP OPA0:
   ```

3. Enter the following command to ensure that the operating system does not record for subsequent system reboots the STARTUP_P1 parameter change you made in step 2:

   ```
   SYSBOOT> SET WRITESYSPARAMS 0
   ```

4. Enter the following command to continue booting:

   ```
   SYSBOOT> CONTINUE
   ```

5. When the system is booted, the operator console displays the DCL command prompt ($). You are logged in.

6. Enter the following DCL command:

   ```
   $ SET NOON
   ```

   This command directs the operating system to ignore any errors that might occur. If you do not enter this command and you invoke an error, the system logs you out.

7. Correct the error condition that caused the login failure. (That is, make the necessary repairs to the startup or login procedure, or to the SYSUAF.DAT file.)

   Invoke a text editor to correct the startup or login file. Note that some system consoles might not supply a screen-mode editor. You can also copy a corrected file and delete the incorrect version by using the RENAME and DELETE commands.

8. Perform a normal startup by entering the following command:

   ```
   $ @SYS$SYSTEM:STARTUP
   ```

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SET NOON
$ SET DEFAULT SYS$SYSROOT:[SYSEXE]
$ @SYS$SYSTEM:STARTUP
```

B.6.7.3 Booting without a User Authorization File

Ordinarily, the startup and login procedures provided by HP always work; however, certain conditions can cause them to fail. A simple way to lock yourself out of the system is to set passwords to login accounts and forget them. Another way to be locked out is if one or more core system Product Authorization Key (PAK) software licenses are unavailable or expired. In such emergencies, perform a conversational emergency boot by following the steps given in this section.

How to Perform This Task

1. Halt the system. (See Section B.8 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 fs*n*: (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 that:

   - OpenVMS read the system startup commands directly from the system console.
   - The Windows system (if any) not start.
   - OpenVMS not record the parameter changes for subsequent system reboots.

   The last command causes the booting to continue.
4. At the DCL prompt, the system now accepts startup commands directly from the console. Enter the following two commands as shown. These commands allow a normal system startup while you are left logged in on the console. Without the SPAWN command, you would be logged out when the startup completes.

   ```
   $ SPAWN
   $ @SYS$SYSTEM:STARTUP
   ```
5. Once you log out of this session, the system completes the startup and can be used normally. Optionally, you can choose to reboot the system.

NOTE Instead of using the SET/STARTUP OPA0: command, an alternative method of booting under these emergency conditions is to set the UAFALTERNATE system parameter to use the alternate authorization file rather than the standard user authorization file. Setting the system parameter UAFALTERNATE defines the logical name SYSUAF to refer to the file SYS$SYSTEM:SYSUAFALT.DAT. If this file is found during a normal login, the system uses it to validate the account and prompts you for the user name and password.

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.

Example

```
SYSBOOT> SET/STARTUP OPA0:
SYSBOOT> SET WINDOW_SYSTEM 0
SYSBOOT> SET WRITESYSPARAMS 0
SYSBOOT> CONTINUE
$ SPAWN
$ @SYS$SYSTEM:STARTUP
$
```

B.7 Configuring and Managing Booting of Your Integrity server

This section explains how to configure and manage the booting behavior of your Integrity server, including how to use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility to configure boot options including automatic booting of your system disk (recommended) and, alternatively, to use EFI to manually set these options.

IMPORTANT For configuring 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 the *Guidelines for OpenVMS Cluster Configurations* manual.)

If you have just completed the initial setup of your Integrity server, perform the following two steps before continuing:

1. Power up your server system using the MP `pc -on` command, as explained in Section B.3.2.3. If MP is not available, use the power button on the front panel, pressing it only once.

NOTE If you see a warning that the BMC System Event Log (SEL) is full, you can safely continue when the BMC SEL is full by following the prompts; OpenVMS will process the contents of the SEL. If you want to clear the SEL manually, see the instructions in the first note of Section B.6.

HP recommends that you load and use the most current system firmware. For more information about updating the system firmware, see Section 1.2.6.

2. 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.

B.7.1 Setting Automatic Booting and Boot Flags for Your System Disk

The OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) is an easy-to-use, menu-based utility that allows you to configure EFI boot options for your Integrity server. With this OpenVMS utility, you can do such actions as the following:

- Set your system disk 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 timeout and set the timer

This section explains how to perform the first two operations. For more information about this utility, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

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 occurs (after 10 seconds, by default), your system disk boots automatically. You can do this manually and set boot flags manually, as explained in Section B.7.1.2 and Section B.7.1.1; however, it is much simpler to use the OpenVMS I64 Boot Manager utility, which allows you to do both operations and much more. Follow these steps:

NOTE To configure booting on Fibre Channel devices, you must use the OpenVMS I64 Boot Manager utility. (Use of the utility is optional for other devices but mandatory for Fibre Channel devices.) 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 the *Guidelines for OpenVMS Cluster Configurations*.

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 displays. 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 typing the "^" character as many times as needed. To abort and return to the DCL prompt, enter Ctrl/Y.

3. The utility prompts you for the device name. Enter the system disk device you are using for this installation, as in the following example, where the device 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. 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
```

5. The utility prompts you for OpenVMS boot flags. By default, no flags are set. Enter the OpenVMS flags (for example, 0,1) followed by pressing Return, or press Return 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:

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.

6. 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 for PLM's System

efi$bcfg: DKA0: (BOOT003) Option successfully added
```

7. When you have successfully added your boot option, exit the utility by entering E at the prompt.

```
Enter your choice: E
$
```

B.7.1.1 Manually Setting OpenVMS I64 Boot Flags (Optional, for Manual Boots Only)

To set the OpenVMS boot flags, HP recommends using the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility as you add a boot entry to the EFI Boot Manager menu (see the first note in Section B.7). You can also type the `set vms_flag` command at the EFI shell prompt, as shown. If you set up the OpenVMS boot flags manually as described, you must boot your system manually each time. If you want to have your OpenVMS system booted automatically, do not set up the OpenVMS boot flags manually.

```
Shell> set vms_flags 0,0
```

Optionally, you can use any of the standard OpenVMS boot flags such as the following:

`set vms_flags 0,1`	Enable SYSBOOT to change system parameters; enable conversational booting for debugging purposes.
`set vms_flags 0,2`	Load XDELTA.
`set vms_flags 0,4`	Take the initial EXEC_INIT breakpoint.
`set vms_flags 0,20000`	Print debug messages on boot.
`set vms_flags 0,30000`	Print more debug messages on boot.

If you want to reset the boot flags (for example, if you used the SET VMS_FLAGS 0,1 command to enable SYSBOOT and now you no longer want SYSBOOT enabled), enter the SET VMS_FLAGS 0,0 command.

B.7.1.2 Manually Setting Automatic Booting of Your System Disk

This section explains how to manually set up your Integrity server firmware to automatically boot your OpenVMS I64 system from disk.

To have your system boot automatically (instead of requiring you to enter a boot command at the EFI Shell prompt), add a new entry on the EFI Boot Manager menu that specifies the OpenVMS target disk and boot loader. To do so, HP recommends that you use the OpenVMS I64 Boot Manager (BOOT_OPTIONS.COM) utility, as explained in Section B.7.1. The utility simplifies the task for you. However, if you want to perform the task manually without taking advantage of this utility, you can access the EFI shell and type the following line at the prompt, where fs*n*: (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") is what appears at position 1 in the menu, as in the following example. You can enter any text that helps you identify the operating system. During system power up, the position 1 item is automatically executed after the default pause of 10 seconds. To set flags, use the SET VMS_FLAGS command at the EFI Shell prompt, as explained in Section B.7.1.1. To change the amount of time that EFI pauses before automatically booting the boot option, see Section B.7.3.

To get to the EFI Boot Manager menu, enter EXIT at the EFI Shell prompt. The following EFI Boot Manager screen example shows the OpenVMS boot option added at position 1 in the menu:

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.31 [4334]

Please select a boot option

  HP OpenVMS I64
  EFI Shell [Built-in]
  Boot Option Maintenance Menu
  System Configuration Menu

  Use ^ and v to change option(s). Use Enter to select an option.
```

Alternatively, you can add an EFI boot menu option by using the EFI menu interface:

1. Select the Boot Options Maintenance Menu option.
2. Select the 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 EFI 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, as in the following example, where DKA0: is the OpenVMS system disk being added as the first boot option:

```
Shell> \efi\vms\vms_bcfg boot add 1 dka0: -fl 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*.

B.7.2 Displaying EFI Boot Entries and Mapped OpenVMS Devices

The Integrity server EFI Boot Manger 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 B.7.1). 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*.

B.7.3 Setting EFI Boot Option 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 timeout value and also to disable the timeout (so that there is no wait) and enable it.

Start the utility at the DCL prompt (@SYS$MANAGER:BOOT_OPTIONS.COM) and select option 6 from the main menu (the main menu is shown in Section B.7.1). 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
```

B.7.4 Writing a New Boot Block

The boot block is block 0 of the system disk. It contains the size and location of the primary bootstrap image (IPB.EXE) used to boot the system. If you suspect that the boot block on your system disk is invalid, you can use the DCL command SET BOOTBLOCK to write a new boot block (this command functions similarly to the Writeboot utility, WRITEBOOT.EXE, used on OpenVMS Alpha systems; however, do not use the Writeboot utility on OpenVMS I64 systems).

The SET BOOTBLOCK command allows you to create a bootable OpenVMS I64 system disk from one that was originally created by one of the following methods:

- A version of BACKUP that does not support the OpenVMS I64 system disk structure
- A nonimage backup of an OpenVMS I64 system disk (possibly corrupting the boot block and various directory backlinks that must be manually reset)
- A nonimage restore of an OpenVMS I64 system disk from an image save set

The SET BOOTBLOCK command also allows you to rewrite the boot block of an OpenVMS I64 system disk to point to a new version of the OpenVMS I64 primary bootstrap file (SYS$EFI.SYS) that you have previously copied to the disk.

To write a boot block onto a disk, enter the following command:

```
$ SET BOOTBLOCK [bootfile-name]
```

You can specify a boot file with the command. By default, the command creates the bootfile SYS$SYSDEVICE:[VMS$COMMON.SYS$LDR]SYS$EFI.SYS. The boot file must be contiguous. If it is not contiguous, use the DCL command COPY/CONTIGUOUS or similar to recreate a contiguous version of the boot file. In addition, the boot file must also be marked NOMOVE (use the DCL command SET FILE/NOMOVE) to avoid bootstrap failures that could otherwise arise 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 (as does the OpenVMS Alpha Writeboot utility).

B.7.5 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 (P00>) 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 some of the commands listed might not be available on certain hardware systems.

Table B-4 Alpha and Integrity Server EFI Command Equivalents

To perform the following:	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), or @SYS$MANAGER:BOOT_OPTIONS.COM[1]
Display all system information:	SHOW FRU	`info all`, or `pci`, or `info io`
Display memory information	SHOW MEMORY	`info mem`
Display volume information of the file system	SHOW DEV DKA0	`vol fs0`
Display hardware information about the CPU	SHOW CONFIGURATION	`info cpu`
Display power status	SHOW POWER	`info all`[2]
Set system dump disk	SET DUMP_DEV *disk1*, *disk2*...	`vms_set dump_dev` *disk1*, *disk2*, ... (from \efi\vms) or @SYS$MANAGER:BOOT_OPTIONS.COM
To set boot flags:	SET BOOT_OSFLAGS 0,0	`set vms_flags "0,0"` or @SYS$MANAGER:BOOT_OPTIONS.COM

Table B-4 Alpha and Integrity Server EFI Command Equivalents (Continued)

To perform the following:	Alpha SRM command at P00> prompt:	Integrity Server EFI command at Shell prompt:
To set boot behavior to automatic boot:	SET AUTO_ACTION BOOT	`bcfg boot add 1 fsx:\efi\vms\vms_loader.efi "I64"` or @SYS$MANAGER:BOOT_OPTIONS.COM
To change the current boot option:	SET AUTO_ACTION HALT	`bcfg boot mv 1 2` or @SYS$MANAGER:BOOT_OPTIONS.COM

1. 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.

B.8 Halt and Shutdown Procedures

The following sections describe halt and shutdown procedures for Integrity servers and OpenVMS I64.

B.8.1 Halting the System to Recover from Hangs and Crashes

If your system hangs and you want to force a crash, go to the MP command mode prompt (MP:CM>) if MP is available on your system, enter the `tc` command, and confirm, as shown in the following example:

```
MP> cm
MP:CM> tc

Execution of this command irrecoverably halts all system processing and
I/O activity and restarts the system.
Type Y to confirm your intention to restart the system (Y/[N]) Y
```

The `tc` command forces a crash dump. You can reset the machine (without forcing a crash) by entering the RS command at the MP:CM> prompt.

Alternatively, when the operating system controls the console, enter Ctrl/P. The next step taken by the system depends on whether XDELTA was loaded.

- If XDELTA was loaded, the system enters XDELTA after you enter a 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 was not loaded, entering Ctrl/P causes the system to respond with the "Crash? (Y/N)" prompt. Type "Y" to cause the system to crash and bring you eventually to EFI. If you type any other character, the system continues.

B.8.2 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.

You can perform the following three types of shutdown operations:

- An orderly shutdown with SYS$SYSTEM:SHUTDOWN.COM (see Section B.8.2.1)
- An emergency shutdown with OPCCRASH.EXE (see Section B.8.2.2)

If you want the system to reboot automatically after the shutdown, see Section B.7.

B.8.2.1 Orderly Shutdown

The SHUTDOWN.COM procedure shuts down the system while performing maintenance functions such as disabling future logins, stopping the batch and printer queues, dismounting volumes, and stopping user processes. To use the SHUTDOWN.COM command procedure, log in to the SYSTEM account, enter the following command, and press Return:

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

For more information about the SHUTDOWN.COM command procedure, refer to the *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

B.8.2.2 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, enter the following command, and press Return:

```
$ RUN SYS$SYSTEM:OPCCRASH
```

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

B.9 Troubleshooting Procedures

The following sections describe procedures that you can follow if you encounter problems with your system.

B.9.1 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. One way to get to the EFI Boot Manager to attempt to reboot is to go to the MP command mode prompt (MP:CM>) if MP is available on your system, enter the `rs` command, and confirm, as shown in the following example:

```
MP> cm
MP:CM> rs -nc
```

B.9.1.1 For Hardware Problems

If you suspect a hardware problem, do the following:

1. Consult the hardware manual for your Integrity server.
2. Contact an HP support representative.

B.9.1.2 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-AUG-2004 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 B.6.7.
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*.

B.9.2 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 B.7, or reboot the system manually as explained in Section B.6.2.
- If the system stops responding to your commands (that is, the system "hangs"), there is a possible failure in a system software or hardware component or a possible power failure.
- If the system exhibits erratic behavior (it does not respond according to specifications), it indicates a possible failure in a system software or hardware component.

To determine whether the failure is a system problem:

- Be sure that you did not press the F1 key (the Hold Screen key). The Hold Screen light goes on when you press either F1 or enter 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 have set the terminal to NOBROADCAST mode by entering the command SET TERMINAL/NOBROADCAST, this procedure does not work.)
- Make sure the cable connecting the terminal or monitor to the system is secure.

If you determine that you have a system problem:

1. Force an exit from a stalled or "hung" program by entering Ctrl/Y. Note that when you enter Ctrl/Y, any work performed by the program and not saved on disk is lost.
2. If the system is still unresponsive, halt it (see Section B.8.1 for more information.)
3. Note in detail the sequence of events that caused the problem and notify an HP support representative.

C 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 Alpha operating system CD or OpenVMS I64 Operating Environment DVD, or through an alternative method that does not require the CD or 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*.

C.1 Reasons for Backing Up the System Disk

The primary reason why you should have a backup copy of the system disk is so you can fully restore your system in response to any hardware or software problem that affects the integrity of your original system disk or your ability to access it. For example, you would need to 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 backed up the system disk *before* you attempted any of those procedures, you could restore the system disk and attempt the procedure again.
- When a system file that is accidentally deleted renders the system disk inoperable. If you backed up the system disk *after* you installed or upgraded the OpenVMS operating system and any other software products, you could 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.

C.2 Suggested Procedures

HP recommends the following:

- The preferred method for performing system disk backup and restore operations is to boot the operating system CD, choose the DCL option from menu, and then enter the appropriate backup commands. The detailed procedures are described in Section C.4 and Section C.5.

However, if you do not have access to the compact disc 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 C.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 label on each system disk and backup copies of system disks are unique. Use the SET VOLUME/LABEL command to change a volume label, if necessary.

C.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.

C.4 Backing Up the System Disk

The following sections describe how to back up the system disk.

C.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 CD locally or, for OpenVMS Alpha systems only, from the InfoServer (as described in Appendix A).
4. Choose the DCL option (7) from the menu. For example:

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

You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha 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 Alpha Version 8.2
        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 so you can determine which device is the source drive (the system disk you want to back up) and which device is your target drive (the supported disk or tape device that will hold the backed up files).

C.4.2 Mounting Devices

When you have determined which devices will be 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
```

Note the following conventions:

- *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

C.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
```

C.4.4 Changing the CLUSTER_SIZE Parameter

The BACKUP command creates a system disk that includes a set of volume parameters provided by HP, including a CLUSTER_SIZE (disk access scheme) that is appropriate for your system. (The CLUSTER_SIZE refers to the way files are stored on the disk, *not* to cluster environments.) You can change most volume parameters later with the SET VOLUME command.

Note that to change the CLUSTER_SIZE, you must back up the system disk to a disk that has been previously initialized with the CLUSTER_SIZE that you want. 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*.

C.4.5 Logout, Shutdown, and Reboot

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.

C.5 Restoring the System Disk

The following sections describe how to restore the system disk.

C.5.1 Getting Started

Before you can restore the system disk:

1. Shut down the system.
2. Boot the operating system CD locally or, for OpenVMS Alpha systems, from the InfoServer (as described in Appendix A).
3. Choose the DCL option (7) from the menu. For example:

```
You can install or upgrade the OpenVMS Alpha operating system
or you can install or upgrade layered products that are included
on the OpenVMS Alpha 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 Alpha Version 8.2
     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 so you can determine which device is the source drive (the drive holding the backed up files you want to restore) and which device is your target drive (the disk on which you want the files restored).

C.5.2 Mounting Devices

When you have determined which devices will be 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
```

Note the following conventions:

- *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

C.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:
```

C.5.4 Logout, Shutdown, and Reboot

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.

C.6 Alternative Backup and Restore Procedure (Minimum OpenVMS Environment)

This section describes an alternative method of performing backup and restore operations. It 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 $$$ system prompt. Use this method under the following conditions:

- If you do not have access to the operating system CD or DVD and its menu system
- If you want to back up a shadowed system disk without disabling the shadow set

NOTE It is also possible to back up your running system disk by using the qualifier /IGNORE=INTERLOCK 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 method to back up or restore the system disk, you use the method described in this section.

C.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 will be your target disk during that installation. To install the operating system with no options on your target disk, you will need the following amount of free disk space:
   - OpenVMS Alpha: approximately 75,000 blocks
   - OpenVMS I64: approximately 1,05,000 blocks

   Existing data will remain 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 /SYSTEM, /CLUSTER, /GROUP, or /SHARE, dismount that disk and mount it without using those qualifiers or the /FOREIGN qualifier. For example:

   ```
   $ MOUNT/OVERRIDE=IDENTIFICATION DKA200
   ```
4. For OpenVMS Alpha, enter the following command to install the operating system, with no options, on the target disk:

   ```
   $ @SYS$SYSTEM:AXPVMS$PCSI_INSTALL_MIN.COM [target-disk]
   ```

   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 (on Alpha systems):

```
DEC AXPVMS OPENVMS V8.2: OpenVMS and related products platform

    COPYRIGHT (c) 8-NOV-2004
    Hewlett-Packard Development Company, L.P.

Execution phase starting ...

The following product will be installed:
    DEC AXPVMS VMS V8.2

Portion Done: 0%..10%..20%..30%..40%..50%..60%..70%..80%..90%..100%

The following product has been installed:
    DEC AXPVMS VMS V8.2
    .
    .
    .
    The installation of minimum OpenVMS Alpha is now complete.

    Use the following command to boot minimum OpenVMS:

        BOOT -FLAGS E,O device-name

    (Your system may require additional parameters 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.

C.6.2 Using the Alternate System Disk

Use the alternate system disk (on which you installed the operating system with no options) to perform backup and restore operations as follows:

1. Shut down your system.
2. Boot the alternate system disk from the SYSE root. For example, from an OpenVMS Alpha system:

   >>> **BOOT -FLAGS E,0 DKA200**

   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 explained in step 20 of Section 3.3.3 (Step 20 is found several pages after the start of the section). 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 fs*n*: (such as fs1:) is the device associated with the system disk:

   Shell>**fs*n*:\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 license on this data disk. You will then be able to 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 will be able to use the system only from the console.

4. Mount the system disk and any output devices you plan to use during the backup or restore operations. See Section C.5.2 for more information.
5. Perform the necessary backup or restore operations by entering the appropriate BACKUP commands. For examples using the BACKUP command to back up the system disk, see Section C.4.3; for examples using the BACKUP command to restore the system disk, see Section C.5.3.
6. Shut down the system.
7. Boot from your original system disk.

D 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 HP 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 Guide to OpenVMS Version 8.2 Media.

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, as in the following example, where *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=dev:[dir]

The following product has been selected:
    DEC AXPVMS VMSI18N V8.2                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.

DEC AXPVMS VMSI18N V8.2
```

```
Do you want the defaults for all options? [YES] NO
    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:
    DEC AXPVMS VMSI18N V8.2                DISK$ALPHASYS:[VMS$COMMON.]

Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%

The following product has been installed:
    DEC AXPVMS VMSI18N V8.2                Layered Product

$
```

E 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.

During the OpenVMS installation or upgrade procedure, the OpenVMS Management Station server software is automatically installed on your OpenVMS system disk.

If you accepted the default options, the PC client files will be located in SYS$COMMON:[TNT.CLIENT]. If these files are deleted from your system, you can download them 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 new kit from this Web site.

After you have ensured that OpenVMS Management Station software is installed on your system, follow the procedures described in this appendix.

E.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.

E.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

   If the files will be located on 1DJA15, define logical names as follows:

   ```
   $ DEFINE/SYSTEM/EXEC TNT$ACS -
   _$ $1$DJA15:[VMS$COMMON.SYSEXE]TNT$ACS.DAT
   ```

   TNT$EMERGENCY_MOUNT.COM will be created in SYS$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:
   1. Copy the SYS$EXAMPLES:CLU_MOUNT_DISK.COM file to the [VMS$COMMON.SYSMGR] directory, and edit it for your configuration.
   2. 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 1DJA16, include the following command:

```
$  @SYS$SYSDEVICE:[VMS$COMMON.SYSMGR]CLU_MOUNT_DISK.COM -
_$ $1$DJA16: volume-label
```

E.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 a reboot, 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
```

E.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, there will be multiple server error logs.

E.1.4 Updating the Printer and Storage Database

When you installed OpenVMS Management Station, the installation started the OpenVMS Management Station server on the installation node. If this installation was an upgrade, the server converts the existing OpenVMS Management Station database to the latest V3.* format. If this was 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.

E.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 prior to the ENABLE AUTOSTART/QUEUES.

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 does not mount any volumes.

Add the following command line to the system shutdown file, SYS$MANAGER:SYSHUTDWN.COM:

```
$ @SYS$STARTUP:TNT$SHUTDOWN.COM
```

E.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 will recognize that you started a queue or mounted a volume with your command procedures and will assume 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. And, in the event of an unforeseen system problem or a corrupt server database (SYS$SYSTEM:TNT$ACS.DAT), you could 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.

E.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.

E.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.

E.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 TNT$UTILITY.COM.

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 will not be synchronized. In this case, the OpenVMS Management Station client will advise you to run TNT$UTILITY.COM 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 used DCL to delete a queue, you need to delete that queue from the database. TNT$UTILITY.COM assumes that your system is set up and running the way that you want it to, so you should fix any problems before you run TNT$UTILITY.COM.

E.1.7.3 Are There Any Requirements for Running TNT$UTILITY.COM?

You need the SYSNAM privilege to run TNT$UTILITY.COM.

TNT$UTILITY.COM connects to the OpenVMS Management Station server on the current OpenVMS system to determine device and queue information. Therefore, the OpenVMS Management Station server must be running on the node where you run TNT$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.

E.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.

E.1.9 Enabling Disk Quotas

Before installing OpenVMS Management Station, you might have disabled disk quotas on the SYSTEM disk. If so, you should 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
```

E.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 to wait (in seconds) 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 behave 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 minimum to maximum range.

E.1.11 Running Third-Party TCP/IP Stacks

HP 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, also make sure that TCPware's UCX$IPC_SHR.EXE is an installed image.
- Also for TCPware, make sure you are running a version of TCPware that correctly implements a DECC-compatible socket interface.

E.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 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 printed in the preface to send us your comments.

E.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.

E.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 have prepared your OpenVMS system to run the server software, you must next prepare your PC to run the client software.

E.2.1 Required Memory and Disk Space

Your PC requires 20 MB of free disk space to install the OpenVMS Management Station client software.

E.2.2 Distribution Files

The OpenVMS Management Station client kit, TNT032.EXE for Intel systems (Windows NT, 95, 98, 2000, and Me), is located in the SYS$COMMON:[TNT.CLIENT] directory.

E.2.3 Required Software

Microsoft Windows NT Version 4.0 (Service Pack 3 or higher) or Windows 95, 98, 2000, Me, or higher (Intel only) 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.

E.2.4 Time Required for Installation

The time required to install the OpenVMS Management Station client software is approximately 5 minutes.

E.2.5 Copying the Client File to the PC

The client file TNT032.EXE is located in the SYS$COMMON:[TNT.CLIENT] directory. 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.

E.2.6 Installation Directory

The installation procedure allows you to select the installation directory, and suggests \Program Files\OpenVMS Mgmt Station\ as the default.

E.2.7 Installation Procedure

Run TNT032.EXE from a temporary directory. It is a self-extracting executable file that automates the OpenVMS Management Station installation.

E.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

E.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 The OpenVMS Management Station client supports only TCP/IP connections for primary servers. 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.

E.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.

E.5 Uninstalling Version 2.1 of the OpenVMS Management Station Client

Version 3.2 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 client, you can uninstall the Version 2.1 client software.

E.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 Microsoft Management Console (MMC) support files.

E.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*.

F 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 (CD or DVD) 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 CD or DVD, log in to a privileged account.
   - If OpenVMS is running from the distribution CD or DVD, choose the option to execute DCL commands.
3. Enter the following DCL commands:

   ```
   $ DEFINE/NOLOG PCSI$SYSDEVICE target-disk
   $ DEFINE/NOLOG PCSI$SPECIFIC target-disk:[SYSx.]
   $ DEFINE/NOLOG PCSI$DESTINATION target-disk:[VMS$COMMON]
   ```

   where:

   - *target-disk* is the device name of the disk from which OpenVMS is being removed
   - SYS*x* is the root number that you did *not* remove in step 1
4. If the disk also contains layered products that were installed using the 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 0 or the hexadecimal number of any additional OpenVMS Cluster roots on the target disk:
     - ALPHAVMSSYS.PAR (OpenVMS Alpha systems)

       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:

   - ALPHAVMSSYS.PAR (OpenVMS Alpha systems)

     IA64VMSSYS.PAR (OpenVMS I64 systems)
   - MODPARAMS.DAT
   - LMF$LICENSE.LDB
   - RIGHTSLIST.DAT
   - SYSUAF.DAT

   Also, if you previously removed layered products, there might be additional files created by the layered products that you might want to delete, move, or archive.

7. Review the target disk for the directory structures [VMS$COMMON...] and [SYS*x*...] that remain after you remove the OpenVMS operating system. You might want to delete these directories.

   Note that the directories [SYSx]SYSCOMMON.DIR (in all [SYS*x*]) are aliases for the file [000000]VMS$COMMON.DIR. DO NOT DELETE THESE SYSCOMMON.DIR files. Instead, use SET FILE /REMOVE as follows:

   ```
   $ SET FILE /REMOVE [SYS*]SYSCOMMON.DIR
   ```

   After you have executed this command and deleted, moved or archived all the files in [VMS$COMMON...] you can delete [000000]VMS$COMMON.DIR. You can then proceed to delete, move, or archive the files in each [SYS*x*] directory.

G Alternative Ways to Initialize the System Disk

The normal 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:

- On both OpenVMS Alpha and OpenVMS I64 systems, 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 G.1.

- On OpenVMS I64 systems only, a diagnostic partition is created

  The diagnostic partition is visible only from the console; it corresponds to the file [VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS on the system disk. The partition is intended for use 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 G.1. Alternatively, if you have already created the system disk and the partition, you can remove it by following the steps described in Section G.2. You can recreate the partition anytime afterward; see Section G.3.

G.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 will be reinitialized using the defaults.

1. After booting the operating system CD or DVD, 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:

```
$ INITIALIZE /SYSTEM /HEADERS=150000 /STRUCTURE=ods-level target-disk target-label
```

where:

ods-level is 2 (for ODS-2) or 5 (for ODS-5[1])

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 alternate 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. If you are installing OpenVMS I64 and you want the diagnostics partition created (as recommended by HP), perform the following steps; otherwise, skip to step 4.

   a. Check if the required directory is present by entering the following command:

   ```
   $ DIRECTORY target-disk:[VMS$COMMON]SYSMAINT.DIR
   ```

   If the directory file is not found, create it with the following command:

   ```
   $ CREATE/DIRECTORY target-disk:[VMS$COMMON.SYSMAINT]
   ```

   b. Check if the diagnostic partition file is present in the directory:

   ```
   $ DIRECTORY target-disk:[VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS
   ```

   If the file is not found, create it with the following commands.

   ```
   $ DEFINE/NOLOG/USER DIAG$FILE -
   _$ target-disk:[VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS
   $ RUN SYS$SYSTEM:EFI$CP
   EFI$CP> /INIT /CREATE /SIZE=600000 /CONTIGUOUS /DEVICE_ALIAS=alias: DIAG$FILE
   EFI$CP> EXIT
   ```

   c. Set the file to disable movefile operations:

   ```
   $ SET FILE/NOMOVE target-disk:[VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS
   ```

   d. Now proceed to step 4.

4. Exit DCL (log off), and then select option 1 (“Upgrade, install or reconfigure OpenVMS”) from the main menu.
5. When you are asked whether to initialize or preserve the target disk, choose PRESERVE (the default).
6. Continue with the installation.

1. If this disk will be mounted on an OpenVMS Alpha system prior to Version 7.2, do not specify ODS-5. ODS-5 was introduced with Version 7.2.

G.2 Removing the Diagnostic Partition File (OpenVMS I64 Only)

To remove the diagnostic partition on an OpenVMS I64 system disk, delete the file SYS$MAINTENANCE:SYS$DIAGNOSTICS.SYS and then reset the boot block. 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
```

NOTE The /PRESERVE=SIGNATURE qualifier causes the existing Globally Unique Identification (GUID) to be preserved. If you want to reset the GUID, do not use this qualifier.

If the diagnostic partition becomes necessary later, you can recreate it and reset the boot block, as explained in Section G.3.

G.3 Creating the Diagnostic Partition (OpenVMS I64 Only)

If you have an OpenVMS I64 system disk that does not have the HP-recommended diagnostic partition, you can create one as follows:

1. Check if the required directory is present by entering the following command:

   ```
   $ DIRECTORY target-disk:[VMS$COMMON]SYSMAINT.DIR
   ```

   If the directory file is not found, create it with the following command:

   ```
   $ CREATE/DIRECTORY target-disk:[VMS$COMMON.SYSMAINT]
   ```

2. Create the diagnostic partition file with the following commands.

   ```
   $ DEFINE/NOLOG/USER DIAG$FILE -
   _$ target-disk:[VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS
   $  RUN SYS$SYSTEM:EFI$CP
   EFI$CP> /INIT /CREATE /SIZE=600000 /CONTIGUOUS /DEVICE_ALIAS=alias: DIAG$FILE
   EFI$CP> EXIT
   ```

3. Set the file to disable movefile operations:

   ```
   $ SET FILE/NOMOVE target-disk:[VMS$COMMON.SYSMAINT]SYS$DIAGNOSTICS.SYS
   ```

4. 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
   ```

NOTE The /PRESERVE=SIGNATURE qualifier causes the existing Globally Unique Identification (GUID) to be preserved. If you want to reset the GUID, do not use this qualifier.

G.3.1 Partitions on OpenVMS I64 System Disks

NOTE This section applies to OpenVMS I64 only; OpenVMS Alpha system disk do not use partitions.

Typically, an OpenVMS I64 disk with no SYS$DIAGNOSTICS.SYS file has three partitions and, therefore, three block devices (blk) visible from the EFI menu, as well as one file system (fs). A disk with the SYS$DIAGNOSTICS.SYS file has five block devices and two file systems.

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 DECamds.

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 boot the OpenVMS operating system. *See also Extensible Firmware Interface (EFI), Management Processor (MP).*

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 An Alpha computer that is part of a local area OpenVMS Cluster system. The boot server is a combination of a MOP server and a disk server for the satellite system disk. *See also satellite node.*

Common Data Security Architecture (CDSA) A multi-platform, 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. Security services, such as cryptography and other public key operations, are available through a dynamically extensible interface to a set of add-in modules. These modules can be supplemented or changed as business needs and technologies evolve. 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.

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 HS*x* 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 will start up the upgraded version of the OpenVMS operating system. *See also rolling upgrade.*

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 Alpha is licensed separately from the OpenVMS operating system. DECnet for OpenVMS I64 is a component of the Enterprise Operating Environment (EOE) 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 Alpha is licensed separately from the OpenVMS operating system.

DECnet-Plus for OpenVMS I64 is a component of the Enterprise Operating Environment (EOE) 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.

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).*

HS*x* device A self-contained, intelligent, mass storage subsystem (for example, an HSJ or HSG) that lets computers in a cluster environment share disks.

HS*x* drive Any disk or tape drive connected to an HS*x* device (for example, an HSJ or HSG). A system disk on an HS*x* drive can be shared by several computers in an OpenVMS Cluster environment.

InfoServer A general-purpose disk storage server. Systems connected to the same local area network (LAN) can install the OpenVMS operating system from the InfoServer instead of from a local CD or DVD.

Kerberos A network authentication protocol that provides authentication for applications using secret-key crytpography. Kerberos is automatically installed with the OpenVMS operating system.

layered products EProducts (including system-integrated products) provided by HP and third parties that can installed on an OpenVMS system. *See also system-integrated products (SIPs).*

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.

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 boot the OpenVMS operating system, as well as to monitor tasks and display detailed information about various internal subsystems. *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).

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.

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 for OpenVMS Industry Standard 64 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 DVD The DVD containing the OpenVMS I64 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.

operating system media The operating system CD or the operating environment DVD included with your OpenVMS distribution kit. *See also operating system CD, Operating Environment DVD.*

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 automatically installed 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 whereby the OpenVMS operating system is kitted with options for selected other products (for example, DECwindows Motif and networking products) so that the user can optionally elect to install all at once. In addition, 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 takes into account the special hardware features offered by HP systems.

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 boot server, disk server, mop server.*

scratch disk A blank disk or a disk with files you no longer need.

SIPs *See system-integrated products (SIPs).*

source drive The drive that holds the operating system distribution kit 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 products (SIPs) Products provided by HP that can be installed or upgraded as part of the OpenVMS installation or upgrade. SIPs include required products, such 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's 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. A layered product: for OpenVMS Alpha, a separate license is required. For OpenVMS I64, the product is licensed as part of the Foundation Operating Environment (FOE). *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 multiuser capability, DECnet software, and the cluster environment.

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 either Alpha or Integrity server systems, as well as a component of the Enterprise Operating Environment (EOE) on Integrity servers.

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