Digital UNIX

Release Notes and Installation Instructions for Version 4.0A

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This manual contains the release notes and installation instructions for Digital UNIX Version 4.0A

Digital Equipment Corporation
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About This Manual

This manual contains information specific to the Digital UNIX Version 4.0A operating system software. The information herein supplements that provided in both the Digital UNIX Version 4.0 *Release Notes* and the *Installation Guide*. It is important to read all of these manuals when you are installing the Digital UNIX operating system.

Audience

This manual should be read by anyone using the Digital UNIX Version 4.0A software kit.

Organization

This manual has four chapters and five appendixes:

Chapter 1	Summarizes the Version 4.0A software offering and explains how to use this document.
Chapter 2	Contains general release notes for Version 4.0A as well as descriptions of some of the enhancements provided by Version 4.0A.
Chapter 3	Contains release notes that are specific to the new system support for the Digital AlphaServer 1000A 5/300 systems, Digital AlphaServer 4000 class systems, Digital AlphaServer 8200/8400 class systems, Digital AlphaStation 500/400 systems, Digital DMCC EBM4x class SBCs, Alpha VME 4/224 and 4/288 SBCs, and AlphaPC 164 SBCs.
Chapter 4	Contains installation release notes and procedures that apply to Version 4.0A.
Appendix A	Contains an addendum to the Digital UNIX Version 4.0 *Release Notes*.
Appendix B	Contains information about installation enhancements in Version 4.0A.
Appendix C	Contains updated reference pages that apply to Version 4.0A.
Appendix D	Contains information on the software subsets for the Digital UNIX software kit.
Appendix E	Contains descriptions of worldwide language support subsets that are new in Version 4.0A

Related Documentation

In addition to this manual, you need to review the following documents:

- *Read This First* letter

  This letter provides general information pertaining to the Digital UNIX Version 4.0A software.

- Digital UNIX Version 4.0 *Release Notes*

  This document provides release notes and installation notes for the Version 4.0, most of which also apply to Version 4.0A.

- *Console Firmware Release Notes* for Version 4.0

  This document includes the console firmware revision numbers and release notes.

- Digital UNIX Version 4.0 *Installation Guide*

  This document describes in detail how to install Digital UNIX Version 4.0. Most of this information also applies to Version 4.0A.

- *Sharing Software on a Local Area Network*

  This document describes in detail how to set up and manage a Remote Installation Services (RIS) area for Digital UNIX systems. It also contains information on setting up Dataless Management Services (DMS).

- *System Administration*

  This document contains information on administering and maintaining your system.

- Hardware setup guides and firmware release notes.

Note that all the remaining documentation that ships with the Digital UNIX Version 4.0 kit also applies to Version 4.0A.

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If you have suggestions for improving particular sections or find any errors, please indicate the manual title, order number, and section numbers. Digital also welcomes general comments.

Conventions

The following conventions are used in this manual:

`%` `$`	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne and Korn shells.
`#`	A number sign represents the superuser prompt.

`>>>`
`CPU`*`nn`*`>>`
`R>`
	The console subsystem prompt is a combination of letters, numbers, and right angle brackets. Not all systems include all of these elements in their prompts.

`% cat`	Boldface type in interactive examples indicates typed user input.
`file`	Italic (slanted) type indicates variable values, placeholders, and function argument names.
`cat`(1)	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, `cat`(1) indicates that you can find information on the `cat` command in Section 1 of the reference pages.

Introduction 1

This introduction to the Digital UNIX Version 4.0A software kit attempts to help you understand and accomplish the following:

- Ascertain the contents of this software kit
- Determine the major differences between this and previously distributed software kits
- Locate the chapters and sections of this document and other documents that you should read

This information is provided in the form of brief questions and answers. This format quickly and effectively provides you with the information you need so that you can get the most out of this Digital UNIX software kit.

What does this software kit offer?

The Digital UNIX Version 4.0A software is a replacement for the Version 4.0 operating system software and provides new or additional support for the following:

- Maintenance for Digital UNIX Version 4.0
- Enhanced features
  - Automount `-p` option added
  - Compilers updated
    - System compiler
    - Alternate compiler suite (`cc.alt`)
  - Date command enhanced for Year 2000 support
  - Installation process enhanced
    - Support added for unattended installation cloning
    - Support added for invoking user-supplied files during an installation
  - Ladebug Debugger updated
  - Performance Manager updated to Version 2.1A

  - POLYCENTER NetWorker SingleServer updated to Version 3.2A
  - TCP/IP (`telnet`) printing added
  - Worldwide language support enhanced
    - Catalan
    - Czech
    - Hungarian
    - Japanese
    - Polish
- New hardware support
  - Digital AlphaServer 1000A 5/300 systems
  - Digital AlphaServer 4000 class systems
  - Digital AlphaServer 8200/8400 class systems
  - Digital AlphaStation 500/400 systems
  - Digital DMCC EBM4x class SBCs
  - Alpha VME 4/224 and 4/288 SBCs
  - AlphaPC 164 SBCs

When would you see Version 4.0A?

You would see the Version 4.0A identifier under the following conditions:

- If you have purchased a new system and it comes pre-installed with Version 4.0A via the factory installed software (FIS) option.
- If you update install the operating system software from Version 4.0 to Version 4.0A following the procedure outlined in Chapter 4
- If you perform a full installation of the operating system following the procedure outlined in Chapter 4.

If you already have Version 4.0, do you need Version 4.0A?

If your system is functioning properly with Version 4.0, then you do not necessarily need to update your operating system software. However, Version 4.0A provides some enhancements, including maintenance, new or improved features, and new hardware support, that have not previously been introduced into Digital UNIX. If you are interested in any of these enhancements, then you should update to Version 4.0A.

For more information about the enhancements that are included in Version 4.0A, see Chapter 2. For more information about the new hardware support, see Chapter 3.

Which parts of this document do you need to read?

If your system already has Digital UNIX Version 4.0A software installed, read the following chapters and sections of this manual:

- Chapter 2 and Appendix A for general operating system information
- Chapter 3 for hardware-specific information, if applicable

If you are using the CD–ROMs in this kit to reinstall or update install any of the operating system software, read the following chapters of this manual:

- Chapter 2 and Appendix A for general operating system information
- Chapter 3 for hardware-specific information, if applicable
- Chapter 4 for installation-specific information

What other documents pertain to this release?

In addition to the documentation listed in the About This Manual section, consider reviewing the following documents:

- Hardware documentation

  This documentation provides instructions about how to set up and use your new hardware system.

- Digital UNIX Version 4.0A Customer Log Desk (CLD) Fixes document and similar documents for previous releases

  This documentation provides descriptions of the fixes that went into Version 4.0A. These documents are available on line on the *Digital UNIX V4.0A Operating System, Volume 1* CD–ROM in the following directory:

  /mnt-point`/DOCUMENTATION/TEXT`

  Replace *`mnt-point`* with the name of the directory where your CD–ROM is mounted.

- *Writing VMEbus Device Drivers Supplement*

  This document is a supplement to the *Writing VMEbus Device Drivers* book, which provides information about writing device drivers for VME systems. The supplement is located on the *Digital UNIX V4.0A*

Operating System, Volume 1 CD–ROM in the following directories:

/mnt-point/DOCUMENTATION/POSTSCRIPT
/mnt-point/DOCUMENTATION/TEXT

Replace *mnt-point* with the name of the directory where your CD–ROM is mounted.

You may also want to refer to the *Digital UNIX V4.0 Documentation, Volume 1* CD–ROM, which provides HTML files for the full Digital UNIX documentation set from Version 4.0.

Release Notes 2

This chapter provides general operating system release notes as well as notes describing the enhancements in Version 4.0A and planned changes to the operating system for future releases.

2.1 General Release Notes

The following sections provide release notes for:

- EISA Configuration Utility revision requirements
- PCI RAID controller firmware requirements
- PCI/ISA Token Ring
- Generic Kernel recognizes up to 64 KZPSAs and 64 KZPBAs
- RZxx-VA and RZxx-VW drives
- Changes in the `mount` command for AdvFS
- DECC `-isoc94` option
- Problem with `setld` during installation of worldwide subsets
- Change to ATM (Asynchronous Transfer Mode)
- Bootable tape restriction
- Open3D support
- PBXGB-AA video card
- DEC Ada
- Change for `xntpd -x` option of the Network Time Protocol
- Copying files to `stdout` using the `dump` command
- Guide to Preparing Product Kits book updated
- Multimedia Services Run-Time Environment guide

2.1.1 EISA Configuration Utility Revision Requirements

For Digital UNIX Version 4.0A, the supported version of ECU is V1.9 or higher. If your system is configured with an EISA bus, you should update the ECU to this supported version.

2.1.2 PCI RAID Controller Firmware Requirements

For the Digital UNIX Version 4.0A software, the supported firmware and ARC for the PCI RAID controller is as follows:

- RAID Configuration Utility (RCU) requires revision 3.11 or higher.
- ARC revision must be at revision 3.5 or higher.

If your system is configured with a PCI RAID controller, you should update the RCU and ARC to their supported versions.

2.1.3 PCI/ISA Token Ring

The following notes and restrictions apply to the PCI Token Ring support:

- The PCI adapter will automatically determine what type of media is being used (whether it is UTP or STP). Do not plug in both types of cables at once because this could confuse the filter logic.
- The adapter starts up at 16M bps by default. If you need to change the speed to 4M bps, use the `ifconfig` command to change it. For example:

```
# ifconfig tra0 speed 4
```

2.1.4 Generic Kernel Recognizes Up to 64 KZPSAs and 64 KZPBAs

The `GENERIC` and `INSTALL` configuration files have been modified to recognize up to 64 instances of the KZPSA or KZPBA SCSI controllers. Previously, only 32 KZPSAs and 12 KZPBAs were recognized.

You no longer need to manually modify the configuration files to allow more instances of these controllers.

2.1.5 RZxx-VA and RZxx-VW drives

Mixing RZxx-VA and RZxx-VW drives in a wide storage enclosure may cause a problem. If you do have problems with this configuration, contact Digital technical support.

2.1.6 Changes in the mount Command for AdvFS

The `mount` command was changed in Digital UNIX Version 3.2D-1 and all versions thereafter. It now checks all of the sizes of the volumes in the file domain of the fileset it is mounting. It verifies that the volumes are at least the size stated in the file domain internal structures.

If all of the volumes pass the size check, a mount update is issued on the fileset. In this case, the fileset is left in a read-only state only if the user originally issued the `mount` command with the read-only option.

If one or more volumes fail the size check, each volume is flagged and the fileset is left as read-only. To correct this, make a complete backup copy of all volumes in the file domain. This will assure that you can recover your data in the event of a catastrophic failure during the volume label correction process.

Make sure there is adequate free space in the fileset. There must be enough free space to hold all the data with any one of the incorrectly labeled volumes removed. If there is not enough free space, you must add additional volumes to the fileset. Once this is done, perform the following steps on each of the failed volumes:

1. Remove the volume from the file domain (`rmvol`)
2. Correct the disk label of the volume
3. Add the corrected volume back to the file domain (`addvol`)
4. Balance the file domain (`balance`)

Note that the last step is very important. If the domain is not balanced after adding the corrected volume, other incorrectly labeled volumes may fill and cause an I/O error.

After completing the corrective procedures, recheck the volumes by issuing a `mount -u` command on the fileset. This will cause the `mount` command to recheck all of the volumes.

The following is an example of the error message that the `mount` command will issue if a volume in a file domain is incorrectly labeled.

```
# mount dmn#fs1 /fs1
Domain dmn, Volume /dev/rz9c has an incorrect size!
Domain dmn, Volume /dev/rz10c has an incorrect size!
Domain dmn, Volume /dev/rz11c has an incorrect size!
Domain dmn, Volume /dev/rz12c has an incorrect size!
Domain dmn, Volume /dev/rz13c has an incorrect size!
Domain dmn, Volume /dev/rz14c has an incorrect size!
The file system dmn#fs1 has been mounted READ ONLY!
Please check the disklabel of all volume(s) listed above!!
```

2.1.7 DECC -isoc94 Option

The `cc`(1) reference page fails to mention the DEC C compiler's `-isoc94` switch. This switch causes the macro `__STDC_VERSION__=199409L` to be passed to the preprocessor and it enables recognition of the digraph forms of various operators as specified in Amendment 1:1995 to ISO/IEC 9899:1990, titled ''C Integrity.''

2.1.8 Problem with setld During Installation of Worldwide Subsets

Information about the `setld` command in Section 2.1.4 of the Digital UNIX Version 4.0 *Release Notes* should read as follows:

> Sometimes the following error message will be displayed during the installation of worldwide subsets and the installation procedure will abort:
>
> ```
> /usr/sbin/setld: /usr/lbin/depord: arg list too long
> ```
>
> This problem occurs because too many subsets were chosen and the shell ran out of memory during installation. You can work around it by choosing fewer subsets to install at first, and then installing additional subsets at a later time.

2.1.9 Change to ATM (Asynchronous Transfer Mode)

The `atmsig` restriction for ATM described in Section 4.6.2.4 of the Digital UNIX Version 4.0 *Release Notes* is no longer applicable except when LANE is active.

2.1.10 Bootable Tape Restriction

Section 4.5.2 of the Digital UNIX Version 4.0 *Release Notes* contains information about bootable tape. The following additional restriction has been reported.

The `/usr/lib/sabt/sbin/custom_install.sh` shell script can be written only in the bourne shell. The bourne shell is the only shell provided on the mini-root file system.

2.1.11 Open3D Support

You are advised to consult the Open3D Software Product Description (SPD) before installing Open3D to ensure that this Digital layered product is supported on your system.

Installing Open3D on systems not supported by the Open3D layered product can leave your system in an unusable state.

2.1.12 PBXGB-AA Video Card

The following notes apply to the Digital PBXGB-AA video card:

- To use base operating system 2D graphics (not 3D) on the PBXGB-AA card installed on a Digital Semiconductor Reference System or clone, you must disable X Server DMA.

- On systems where the PBXGB-AA video card is to be installed behind the PPB, you must disable X Server DMA.

2.1.12.1 Procedure for Disabling X Server DMA

To disable X Server DMA for the PBXGB-AA video card, you must do the following:

1. Bring the system to single-user mode.

   If you are able to use the `shutdown` command, execute the following command as superuser:

   ```
   # /usr/sbin/shutdown +2 "Disabling graphics DMA"
   ```

   If you cannot use the `shutdown` command (for example, if the X Server on the PBXGB-AA card is hung), you must halt your system by pressing the hardware HALT button and then reboot your system to single-user mode by entering the following command:

   ```
   >>> boot -f1 s
   ```

2. Mount all local file systems.

   After your system is in single-user mode, mount all of your local file systems by entering the following command:

   ```
   # bcheckrc
   ```

3. Edit the `Xservers` files for XDM and CDE, then restart your system in multiuser mode.

   a. To disable X server DMA for the XDM session manager, change directory to `/var/X11/xdm` by entering the following command:

      ```
      # cd /var/X11/xdm
      ```

      You must then edit the `Xservers` file to append the text ‘‘-I -ffbDoDMA 0’’ to the end of the following line:

      ```
      :0 local /usr/bin/X11/X
      ```

      The following example illustrates backing up the `Xservers` file and then using the `sed` editor to make the appropriate change:

      ```
      # cp Xservers Xservers.old
      # sed '/^:0/s/$/ -I -ffbDoDMA 0/' Xservers.old > Xservers
      ```

   b. To disable X server DMA for the CDE session manager, change

directory to /usr/dt/config by entering the following command:

```
# cd /usr/dt/config
```

You must then edit the Xservers and Xservers.con files to append the text ‘‘-I -ffbDoDMA 0’’ to the end of the following line:

```
:0   Local local@console /usr/bin/X11/X :0
```

The following example illustrates backing up the Xservers and Xservers.con files and then using the sed editor to make the appropriate changes. This example assumes the files are the default distributed versions, in which the appropriate line for the change is the only line in each file that ends with the text ‘‘:0’’:

```
# cp Xservers Xservers.old
# cp Xservers.con Xservers.con.old
# sed '/:0/s/$/ -I -ffbDoDMA 0/' Xservers.old > Xservers
# sed '/:0/s/$/ -I -ffbDoDMA 0/' Xservers.con.old >
Xservers.con
```

c. Having made the appropriate edits, you can then bring the system to multiuser mode to use the PBXGB-AA video card as usual by pressing Ctrl/D at the prompt:

```
# Ctrl/D
```

The system will then request the run level, to which you should answer the following:

```
Enter run level (0-9, s or S): 3
```

2.1.13 DEC Ada

DEC Ada is not supported in Digital UNIX Version 4.0A.

2.1.14 Change for xntpd -x Option of the Network Time Protocol

Note that the default behavior for the xntpd -x option of the Network Time Protocol, Version 3, has been changed. The -x option is now used to prevent the system from setting the time backwards. The default is that the system’s time may be set backwards, either by settimeofday or adjtime, depending on the offset.

2.1.15 Copying Files to stdout Using the dump Command

Copying files to stdout using the dump command is not supported in this release.

2.1.16 Guide to Preparing Product Kits Book Updated

For Digital UNIX Version 4.0, the *Guide to Preparing Product Kits* was a supplementary book and not orderable in printed form. For this release, you can order it from Digital (Part Number AA-QYW7A-TE). It is also available on line on the *Digital UNIX V4.0A Operating System, Volume 1* CD-ROM in the following directory:

/mnt-point`/DOCUMENTATION/POSTSCRIPT`

Replace *`mnt-point`* with the name of the directory where your CD-ROM is mounted. Note that the latest version of this book contains additional information on testing the installation of foreign device kits. The version that is located on the *Digital UNIX V4.0 Documentation, Volume 1* CD-ROM does not contain this information.

2.1.17 Multimedia Services Run-Time Environment Guide

The Bookreader version of the *Run-Time Environment Guide* (`runtime-guide.decw_book`) for applications that use the Multimedia Services for DEC 3000 and AlphaStation workstations cannot be viewed. However, this book is available in PostScript format (`runtime-guide.ps`) on the *Digital UNIX V4.0A Associated Products, Volume 1* CD–ROM.

2.2 Enhancements Provided in Version 4.0A

The following sections discuss the maintenance and new or improved features that have been incorporated into Digital UNIX Version 4.0A.

2.2.1 Maintenance

Version 4.0A provides maintenance for the following system functional components:

- AdvFS
- ATM
- `bind` system call
- C / C++
- clist-based pseudo-ttys
- `date` command
- DECthreads
- `event_post` function
- `find` command

- `getcontext` function
- `getpeername` system call
- KornShell (`ksh`)
- `ld` command
- `lex` command
- `malloc` function
- `mountd` command
- NFS clients
- NIS slave server
- Object Broker 2.6-07
- `mmap` function
- `ping` command
- `printf` function
- `setsockopt` system call
- `showmount` command
- SNMP agent / eSNMP subagents
- `strxfrm` function
- SVR4 STREAMS interface
- `swscanf` routine
- `table` system call
- TCP protocol
- `wcsxfrm` function
- X server

Version 4.0A provides maintenance for the following system hardware support components:

- ATI Mach64 CX graphics card
- DE500-XA PCI Fast Ethernet card
- Loadable EISA bus driver support
- Symbios 810A/825A/860/875 chips

For specific descriptions of the maintenance included in Version 4.0A, see the *Digital UNIX Version 4.0A CLD Fixes* document and similar documents included in this kit. They are located on line on the *Digital UNIX V4.0A*

Operating System, Volume 1 CD–ROM in the following directory:

/mnt-point/DOCUMENTATION/TEXT

Replace *mnt-point* with the name of the directory where your CD–ROM is mounted.

2.2.2 Enhanced Features

The following sections contain notes pertaining to the new or improved features in Version 4.0A.

2.2.2.1 Automount -p Option Added

A new option, -p, has been added to the /usr/sbin/automount utility. This option limits local loopback mounts to primary Internet addresses.

When passed this option, the automount command will query each of the system's configured network interfaces for its primary Internet address. It will use local loopback mounts for all Internet addresses returned by this query. All Internet alias addresses for the system will be treated as remote addresses and will use NFS mounts.

For performance reasons, the default behavior of automount is to bypass NFS for all local internet addresses, including Internet alias addresses. The -p option will enable Internet alias addresses to use NFS for all file systems mounted with automount.

This option is necessary for servers in a DECsafe Available Server environment (ASE). Without it, ASE can have difficulty modifying or stopping services.

2.2.2.2 Alternate Compiler Suite (cc.alt) Updated

The compiler suite in the CMPALTCC subset has been updated for Version 4.0A. See the README file contained in the subset for an explanation of its use. Once the subset is installed, the README file can be found in the following directory:

/usr/lib/cmplrs/cc.alt/

2.2.2.3 Date Command Enhanced for Year 2000 Support

The date command has been enhanced to support setting the system date past the year 1999, thus providing customers with the ability to begin testing their software for potential century rollover problems.

The following formats, which include the existing XPG4-UNIX format, are valid for setting the system date using the date command:

Using the XPG4-UNIX format:

date *mmddHHMM*[*yy*]

Using one of three Digital formats, which provide the century field:

date *mmddHHMM*[[*cc*]*yy*][*.ss*]

date [[*cc*]*yy*]*mmddHHMM*[*.ss*]

date *mmddHHMM*[*.ss*[[*cc*]*yy*]]

The following definitions apply:

mm	is the month number
dd	is the number of the day in the month
HH	is the hour in the day
MM	is the number of minutes
ss	is the number of seconds
yy	is the last two digits of the year
cc	is the first two digits of the year

Note that the *LC_TIME* variable, if defined, controls the ordering of the day (*dd*) and month (*mm*) numbers in these formats. The default order is the month (*mm*) followed by the day (*dd*).

Each of the Digital formats allows you to specify the century (first two digits of the year). This century field (*cc*) is optional to ensure that input formats previously accepted by the `date` command are still supported.

Currently, the XPG4-UNIX format does not have a century field. This is consistent with current X/Open specifications regarding the `date` command. The century field will be added to this format in a future release of Digital UNIX once this new field is officially supported in future revisions of X/Open's UNIX specification.

2.2.2.3.1 Handling of Two-Digit Year Input – When the year is specified using two digits (as in the XPG4-UNIX format or when the [*cc*] field is omitted from the Digital formats), the century is determined in the following manner: if the specified two-digit year is between 69 and 99 inclusive, the 20th century is assumed (that is, 19*yy*); otherwise, the 21st century is assumed (that is, 20*yy*).

This algorithm for determining the century is consistent with current drafts of forthcoming X/Open UNIX specifications regarding two-digit year handling in various system interfaces and commands, including the `date` command.

This algorithm is based on the standard UNIX epoch (12:00:00 AM Jan 1, 1970 UTC), minus one year to account for different time zones. Internal UNIX time handling is based on the number of seconds in this epoch.

2.2.2.3.2 Handling of Ambiguous Input – If the input string is ambiguous, that is, if the format cannot be conclusively determined from the data, the `date` command will issue a warning to `stderr` and assume the *mmddHHMM*[[*cc*]*yy*][*.ss*] format. To avoid ambiguous input, use one of the three Digital formats and specify the [*cc*] field.

2.2.2.3.3 Examples – To set the date to 09:34:00 AM Jan 7, 2000:

Using the *mmddHHMM*[[*cc*]*yy*][*.ss*] Digital format:

```
# date 010709342000
# date 0107093400.00
# date 010709342000.00
```

Using the [[*cc*]*yy*]*mmddHHMM*[*.ss*] Digital format:

```
# date 0001070934
# date 200001070934
# date 200001070934.00
```

Using the *mmddHHMM*[*.ss*[[*cc*]*yy*]] Digital format:

```
# date 01070934.0000
# date 01070934.002000
```

Using the *mmddHHMM*[*yy*] XPG4-UNIX format:

```
# date 0107093400
```

An example of ambiguous input:

```
# date 0101010000
```

This input could be recognized as one of the following formats:

mmddHHMM[[*cc*]*yy*][*.ss*] meaning 01:00:00 AM Jan 1, 2000

[[*cc*]*yy*]*mmddHHMM*[*.ss*] meaning 12:00:00 AM Jan 1, 2001

In this case, the date command will display a warning and assume the *mmddHHMM*[[*cc*]*yy*][*.ss*] format, setting the date to 01:00:00 AM Jan 1, 2000.

2.2.2.4 Installation Process Enhanced

The installation cloning feature introduced in Digital UNIX Version 4.0 has been enhanced to allow unattended installation cloning at client systems. Also, the installation process now supports the execution of user-supplied

scripts. For more information about these and other enhancements to the installation process, refer to Appendix B.

2.2.2.5 Ladebug Debugger Updated

An updated version of the Ladebug Debugger is supplied with Version 4.0A. The release notes for this version of Ladebug are located in the `OSFLDBDOC405` and `IOSLDBDOC405` subsets on the *Digital UNIX V4.0A Operating System, Volume 1* CD–ROM and can only be accessed when Ladebug is installed. After installation, the release notes can be found in the following location:

```
/usr/doc/ladebug/ladebug-relnotes.txt
```

2.2.2.6 Performance Manager Updated to Version 2.1A

A new version of Performance Manager, Version 2.1A, is being delivered with this release. This latest version contains the following enhancements:

- More features for the graphical user interface, including a toolbar
- Support for monitoring thesholds that have been exceeded for specified metrics
- Support for invoking commands and user-supplied scripts once a threshold has been crossed
- More system management and thresholding scripts
- Performance analysis, system management scripts, and cluster analysis
- Support for monitoring TruCluster 1.0 and TruCluster 1.4 systems
- Per-process and per-thread metrics
- Oracle7 database support

The release notes for Performance Manager are included on the *Digital UNIX V4.0A Associated Products, Volume 1* CD–ROM. The PostScript file is named `PMGR211_RELNOTES.ps` and the text file is named `PMGR211_RELNOTES.txt`.

2.2.2.7 POLYCENTER NetWorker SingleServer Updated to Version 3.2A

A new version of POLYCENTER NetWorker SingleServer, Version 3.2A, is being delivered with Digital UNIX Version 4.0A. NetWorker SingleServer is a graphical utility that backs up and recovers local files on a single machine to a local tape or loader.

Version 3.2A is a maintenance release that includes support for launching NetWorker from the Common Desktop Environment (CDE). The NetWorker icon will appear in the CDE Application Manager area of the desktop. To

start NetWorker from CDE, double-click on the NetWorker icon.

The release notes for NetWorker are included on the *Digital UNIX V4.0A Associated Products, Volume 1* CD–ROM. Once the subsets for this product have been installed, you can find the release notes in the following location:

```
/usr/opt/BRX321/usr/doc
```

NetWorker SingleServer can be easily upgraded to provide backup and archive services to a group of systems in a heterogeneous environment. See the POLYCENTER NetWorker Save and Restore for Digital UNIX Software Product Description (SPD 50.98) for a complete description of features.

2.2.2.8 TCP/IP (telnet) Printing Added

TCP/IP printing, also called `telnet` printing, is a new feature in the print daemon for Version 4.0A. It allows a user to submit print jobs to a remote printer that is directly connected to the network. Note that to use this feature, your printer must contain a TCP/IP interface card and must be registered with a TCP/IP node name and node address.

With TCP/IP printing, the local host manages print jobs in the same manner as it would manage print jobs for a local printer. The only difference is that with TCP/IP printing, the local print daemon (`lpd`) communicates with the remote printer over TCP/IP (similar to LAT printing). Each printer listens for connection requests on a socket number that is specified in the printer hardware or that is user-defined through the printer console.

Although multiple hosts can talk to a single printer connected to the network in this way, the hosts are handled on a first-come, first-served basis. Therefore, TCP/IP printing is not the same as remote printing, in which the remote printer manages a print queue on the remote site and listens for network connections on socket 515 (as specified in the entry for `printer` in `/etc/services`).

2.2.2.8.1 Setting up TCP/IP Printing – The following steps describe how to set up TCP/IP printing on a local host.

1. Set up the printer.

   Assign a TCP/IP address and node name to each printer with a network card. Also, determine the TCP/IP socket number on which the printer will listen for connection requests. You will need the socket number in Step 2b when you edit the `/etc/services` file.

   Table 2-1 lists the socket numbers for three printers made by Digital and one made by Hewlett Packard.

Table 2-1: TCP/IP Socket Numbers

Printer	Socket Number
DEClaser 3500 (LN14)	10001
DEClaser 5100 (LN09)	10001
HP Laserjet 4m+	9100
LN17	2501

To obtain the socket number for other printers, see your printer documentation. Some printers may allow you to specify this number yourself.

2. Configure the local host

   This step describes the utilities that you need to run and the files that you need to modify on the local host in order to configure TCP/IP printing. You must have superuser privileges to perform the following tasks:

   a. Configure the printer using `lprsetup`

      Execute the `/usr/bin/lprsetup` command and answer the questions to create an entry in the `/etc/printcap` file for your printer. When it prompts you to enter values for printcap control variables, assign the following values to the `ct` and `lp` variables:

      ```
      ct=tcp
      lp=@nodename/servicename
      ```

      Replace *nodename* with the name of the printer's node as registered for use on your network and replace *servicename* with the name you will choose to enter in the `/etc/services` database in the next step.

      If you want to modify an existing `/etc/printcap` printer entry to use TCP/IP printing, edit the `/etc/printcap` file using a text editor, such as `vi`, and modify the values for the `ct` and `lp` variables.

      You can also remove the values for the `xs`, `xc`, `fs`, and `fc` control variables which establish settings that are relevant to the serial port driver. These are ignored by the network socket driver.

   b. Configure the services database.

      You must register a service name and `tcp` port number (socket number) in the `/etc/services` database file. Enter the socket number that you determined when you configured the printer in step 1 and associate it with a service name of your choice.

For example, to configure the services database for a DEClaser 3500, you would add the following line to the `/etc/services` file:

```
declaser3500    10001/tcp
```

Note that the user-defined `declaser3500` string represents the service; it is the same string that you would have entered as the *servicename* in the `/etc/printcap` file in step 2a.

After saving the changes to the `/etc/services` file, restart the `inetd` daemon to reload the `/etc/services` file with the printer information you just added. To do this, type the following command:

```
# rcinet restart
```

This stops and restarts the Internet network services on your system.

c. Configure the remote hosts database

The *nodename* value that you specified as part of the `lp` variable value in the `/etc/printcap` file must be known by your local host's network management services; therefore, you must enter the *nodename* and its network address in the `/etc/hosts` database file. If you are running a BIND server for remote host names, you do not necessarily need to add the printer's node name to the `/etc/hosts` file, though if there is ever a problem with the BIND server, an entry in `/etc/hosts` would be a useful fallback.

2.2.2.8.2 Using TCP/IP Printing – Once configured, TCP/IP printing is used like local and remote printing. From the command line, execute the `lpr` command specifying the node name of the printer, command options, and file names.

2.2.2.8.3 Known Restrictions on the Use of TCP/IP Printing – TCP/IP printing works when printing within a local subnet; however, printing in complex networks across one or more routers may cause reliability problems.

In addition, printing non-PostScript files with some PostScript and non-PostScript filters may yield unexpected results. Table 2-2 lists the filters with which you could experience these problems.

Table 2-2: Non-PostScript and PostScript Filters

Filter Name	Filter Type
lpf	Non-PostScript
la75of	Non-PostScript
la324of	Non-PostScript

Table 2-2: (continued)

Filter Name	Filter Type
lqf	Non-PostScript
hplaserof	PostScript

To provide expected behavior with older printers, these non-PostScript filters maintain a dependence on the serial port driver to automatically supply carriage returns after line feeds when you specify the (octal) 020 bit to the `fs` control variable in the `/etc/printcap` file.

Because this control bit is not interpreted by the network socket driver, the formatting behavior that would be supplied by the serial port driver is absent. Therefore, non-PostScript files that are not preformatted for the printer may not print out as they would in serial-port-connected configurations. In particular, this may affect ASCII text files that do not contain embedded carriage-returns.

Most printers using the `lpf`, `la75of`, `la324of`, and `lqf` non-PostScript filters do not provide network interface card support. However, the printing problems may still be an issue for users who use serial-and-parallel-port to network-port converters, like the Digital RapidPrint network interface box, which allow these printers to act like TCP/IP printers with built-in network support.

The `hplaser4psof` PostScript filter works for PostScript files and for preformatted non-Postscript files (like PCL files), but it will likely produce unexpected results for files that have not been preformatted (such as ASCII text without embedded carriage-returns).

2.2.2.9 Worldwide Language Support Enhanced

Catalan Support was introduced in Digital UNIX Version 4.0, but for that release the system administrator was required to select Spanish from the Worldwide Language Support Installation selection menu before selecting the Catalan support subset. In Digital UNIX Version 4.0A, an entry for Catalan has been added to the selection menu. Now there are separate selection entries for Spanish Support and Catalan Support.

In addition, two subset descriptions (`IOSWWCDEDT405` and `IOSWWPRINT405`) have changed and several worldwide language support subsets have been added to support the following languages:

- Catalan
- Czech

- Hungarian
- Japanese
- Polish

For a full listing of the additional subsets and new descriptions, refer to Appendix E.

2.3 Planned Changes for Future Releases

The following notes provide information about plans to retire interfaces or add new features in future releases of Digital UNIX.

2.3.1 Change in Use of the release Field of the utsname.h File

In a future release, the contents of the `release` field in `struct utsname` (found in `/usr/include/sys/utsname.h`) will change. Currently, this field contains only the initial letter and numeric portion of the release name; therefore, for all variants of Digital Unix V4.0, this field contains simply `V4.0`. In the future, this field will expand to contain the letter suffix that uniquely identifies a particular release within a major release stream, as in `V4.0A`, and `V4.0B`. It is possible that there may be additional characters to further identify some releases. Note that `V4.0A` and `V4.0B` are only used as examples to illustrate the expanded field. The change will not be implemented in either of these releases.

This change will be visible upon the execution of the `uname -r` and `uname -a` commands, both of which display the contents of the `release` field.

2.3.2 Maximum Supported UID/GID and PID Numbers to Increase

In a future release of Digital UNIX, the maximum supported user ID (UID) and group ID (GID), `MAX_UID` as specified in `/usr/include/sys/limits.h`, will be increased to 4.3 billion (`UINT_MAX`). This will allow valid user ID numbers to rise above the current maximum of 65535 to a number as high as 4294967295. Developers of applications that use `UID_MAX` to size arrays or bitmap arrays will need to redesign their use of `UID_MAX`.

Applications that have hardcoded internal assumptions based on UID sizes less than or equal to 65535 will need to be modified to use `UID_MAX`. Also, any application that prints a UID number in a field of fixed length will need to be modified, as it will now require ten decimal digits to represent the largest user ID. Applications that currently use `UID_MAX` as the maximum allowable UID should be able to make use of the new UID numbers after their code is recompiled.

In addition, in a future release of Digital UNIX, the maximum supported process ID (PID) will be increased from 32K to 512K. While this has no direct effect on the number of processes that can be active on the system at a given time, it places an upper bound on this value and determines the largest PID value that can exist. This will be accomplished by changing `PID_MAX` in `/usr/include/sys/limits.h` to a value of 0x7ffff. Any developers of applications that have specific knowledge of or make any assumptions about the size of `PID_MAX` should examine their code to determine the effect of this change.

2.3.3 Retiring vchkdir and logread Commands

In Version 4.0, the developers of AdvFS introduced the `verify` command, which is more robust than its predecessor, the `vchkdir`. Both of these commands are currently available to users of Digital UNIX; however, the developers of AdvFS plan to retire the `vchkdir` command in a future release.

The `verify` command examines the integrity of the on-disk structures that make up an AdvFS domain, as opposed to the `vchkdir` command, which checks only one AdvFS fileset at a time. The `verify` command can also be executed on the `root` domain, unlike the `vchkdir` command. Finally, the `verify` command requires an examination of the domain to assure that all of its filesets have been unmounted. This eliminates the possibility of inconsistent and unreliable results due to file system activity.

The developers of AdvFS also plan to combine the features of the `logread` and `vlogpg` commands into one command, `vlogpg`. Hence, the `logread` command will be retired in a future release.

In addition to displaying data that the user previously obtained from the `logread` command, the new `vlogpg` command will provide a way to save the transaction log to a file for later examination.

New System Support Notes 3

This chapter contains notes that only apply to the following newly supported hardware systems:

- Digital AlphaServer 1000A 5/300 systems
- Digital AlphaServer 4000 class systems
- Digital AlphaServer 8200/8400 class systems
- Digital AlphaStation 500/400 systems
- Digital DMCC EBM4x class SBCs
- Alpha VME 4/224 and 4/288 SBCs
- AlphaPC 164 SBCs

In addition, this chapter provides a general discussion of upgrading your hardware system and updating the operating system software to Version 4.0A, where applicable.

3.1 Digital AlphaServer 1000A 5/300 Systems

The AlphaServer 1000A 5/300 is an enhanced version of the Digital AlphaServer 1000A 4/233 and Digital AlphaServer 1000A 4/266 systems. It replaces the Alpha 21064A-based CPU card with an Alpha 21164-based CPU card.

The following notes are specific to Digital AlphaServer 1000A 5/300 systems.

3.1.1 Verify CPU Version

The Digital AlphaServer 1000A 5/300 systems have a unique identifier; therefore, use the `sizer` utility to identify the CPU in your Digital AlphaServer 1000A class system. The `sizer -c` command displays the following output on these machines.

For the Digital AlphaServer 1000A 5/300 systems:

```
sysname> sizer -c
cpu             "DEC1000A_5"
```

For all other Digital AlphaServer 1000A class systems:

```
sysname> sizer -c
cpu             "DEC1000A"
```

If `sizer` returns `DEC1000A_5`, the remainder of Section 3.1 applies to your system. If it returns `DEC1000A`, you can skip the rest of this section.

3.1.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Digital AlphaServer 1000A 5/300 systems is V4.6 or higher. The minimum firmware version required for all other AlphaServer 1000A class sytems is V3.1 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following console firmware command at the prompt:

```
>>> show version
```

3.1.3 Restrictions and Known Problems

The following restrictions and known problems apply to Digital AlphaServer 1000A 5/300 systems.

3.1.3.1 Resolution

The default resolution for the Digital AlphaServer 1000A 5/300 systems containing built-in Cirrus video with 1MB of video ram is 1024x768. If the optional 512KB of video ram is not present, Digital UNIX will only support resolutions of 640x480 (by default) or 800x600.

To use 800x600 resolution for the XDM session manager, edit the `/usr/lib/X11/xdm/Xservers` file to change the following line:

```
:0 local /usr/bin/X11/X -nice2
```

to:

```
:0 local /usr/bin/X11/X -nice2 -screen0 800
```

To use 800x600 resolution for the CDE session manager, edit the `/usr/dt/config/Xservers` and `Xservers.con` files to change the following line:

```
:0   Local local@console /usr/bin/X11/X :0 -nice2
```

to:

```
:0   Local local@console /usr/bin/X11/X :0 -nice2 -screen0 800
```

Before editing these files for XDM or CDE, be sure that your system's monitor supports 800x600 resolution.

3.1.3.2 KZPSA Behind the PCI-to-PCI Bridge

Updating the firmware on the KZPSA SCSI adapter is not supported when the adapter is behind the PCI-to-PCI bridge. See your hardware installation guide for further information. A later version of the console firmware will support this feature.

3.2 Digital AlphaServer 4000 Class Systems

The AlphaServer 4000 class, which currently includes only the AlphaServer 4100, is Digital's newest mid-range server offering. The following notes are specific to Digital AlphaServer 4000 class systems.

3.2.1 Information About System Identification

The Digital AlphaServer 4000 class systems are identified by the Digital UNIX operating system as `DEC4100`.

3.2.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Digital AlphaServer 4000 class systems is V2.0 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following

console firmware command at the prompt:

```
>>> show version
```

3.2.3 Restrictions and Known Problems

PBXGA-xx and PBXGB-xx video cards are not supported on AlphaServer 4100 systems.

3.3 Digital AlphaServer 8200/8400 Class Systems

The AlphaServer 8200/8400 class is Digital's current high-end, enterprise server offering. The Digital UNIX Version 4.0A release provides operating system support enhancements (specifically, enhanced PCI bus support) for the AlphaServer 8200/8400 class systems.

The following notes are specific to Digital AlphaServer 8200/8400 class systems.

3.3.1 Information About System Identification

The Digital AlphaServer 8200/8400 class systems are identified by the Digital UNIX operating system as `DEC21000`.

3.3.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Digital AlphaServer 8200/8400 class systems is V4.0 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following console firmware command at the prompt:

```
>>> show version
```

3.4 Digital AlphaStation 500/400 Systems

The AlphaStation 500/400 system is Digital's latest mid-range workstation offering.

The following notes are specific to Digital AlphaStation 500/400 systems.

3.4.1 Information About System Identification

The Digital AlphaStation 500/400 systems are identified by the Digital UNIX operating system as `DEC_KN20AA`.

3.4.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Digital AlphaStation 500/400 systems is V6.0 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following console firmware command at the prompt:

```
>>> show version
```

3.5 DMCC EBM4x Class Single Board Computers

The Digital Modular Computing Components (DMCC) EBM4x-xx is Digital's latest PCI/ISA-based single board computer (SBC). The following notes are specific to Digital DMCC EBM4x class SBCs.

3.5.1 Information About System Identification

The Digital DMCC EBM4x class SBCs are identified by the Digital UNIX operating system as `DECEV45_PBP`.

3.5.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Digital DMCC EBM4x class SBCs is V4.6 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following console firmware command at the prompt:

```
>>> show version
```

3.5.3 Restrictions and Known Problems

The following restrictions and known problems apply to Digital DMCC EBM4x class SBCs.

3.5.3.1 Option Cards Restrictions

The ETMXB-AB (7 PCI) slot backplane uses PCI-to-PCI bridge (PPB) technology to provide three primary and four secondary (behind the PPB) slots. It does not contain an on-board SCSI controller. An option card such as KZPAA-AA is required for SCSI.

The option cards shown in Table 3-1 have been found to work behind the bridge. These cards can be plugged into any available slot.

Table 3-1: Supported Options Behind Bridge

Option Type	Part Number	Description
Graphics	PBXGA-AA	ZLXp-E1 8 PLANE ADAPTER
Disk	KZPAA-AA	PCI-SCSI HOST BUS ADAPTER, FNS
Network	DE435-AA	PCI Bus, 32 Bit,PC NIC
Network	DE450-CA	PCI NIC (TP, TW, AUI)

The option cards shown in Table 3-2 do not function behind the bridge. These must be plugged into the primary slots only.

Table 3-2: Nonsupported Options Behind Bridge

Option Type	Part Number	Description
Graphics	PB2GA-FA	ATI Mach64 2D GFX
Graphics	PB2GA-JA	S3 TRIO64 2MB DRAM PCI card

3.5.3.2 General Restrictions

The following server management features are not yet supported:

- Operator control panel
- Watchdog timer

3.6 Alpha VME 4/224 and 4/288 Single Board Computers

The Alpha VME 4/224 and 4/288 are Digital's latest VME-based single board computers (SBCs).

Support for the VME VIP/VIC64 VME adapter on the Digital Alpha VME 4/224 and 4/288 platforms is the same as the support for this adapter on the AXPvme Single Board Computers and Digital Alpha VME 2100 systems. VME performance improvements and bug fixes have been incorporated into this release of Digital UNIX Version 4.0A for VME support on Digital Alpha VME 4/224 and 4/288 systems.

The following notes are specific to Alpha VME 4/224 and 4/288 SBCs.

3.6.1 Information About System Identification

The Alpha VME 4/224 and 4/288 SBCs are identified by the Digital UNIX operating system as `DECALPHAVME_224`.

3.6.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the Alpha VME 4/224 and 4/288 SBCs is V1.0 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the firmware documentation that came with your system.

To determine the version of firmware on your system, enter the following console firmware command at the prompt:

```
>>> show version
```

3.6.3 Writing VMEbus Device Drivers

For information about writing VMEbus Device Drivers, refer to the *Writing VMEbus Device Drivers Supplement,* which is located on the *Digital UNIX V4.0A Operating System, Volume 1* CD–ROM in the following directories:

/mnt-point`/DOCUMENTATION/POSTSCRIPT`
/mnt-point`/DOCUMENTATION/TEXT`

Replace *`mnt-point`* with the name of the directory where your CD–ROM is mounted.

3.6.4 Restrictions and Known Problems

The following restrictions apply to Alpha VME 4/224 and 4/288 SBCs.

3.6.4.1 VME Autovectors

The Alpha VME 4/224 and 4/288 SBCs do not support VME autovectors.

3.6.4.2 Network Port Termination

An AlphaVME 4/224 or 4/288 SBC that has the network configured in an UP state must have its external network connection properly terminated. If the network connection is unplugged or not properly terminated, then the network software will periodically time out and perform a reset. This is normal for an unterminated Alpha VME system. However, it will cause high system latencies during the reset period, resulting in delays of about 10 milliseconds that can affect the real-time performance of the system.

Note that a loopback connector is not sufficient to terminate the network connection.

3.7 AlphaPC 164 Single Board Computers

The AlphaPC 164 is Digital Semiconductor's latest Single Board Computer (SBC).

The following notes are specific to the AlphaPC 164 SBCs.

3.7.1 Information About System Identification

The AlphaPC 164 SBCs are identified by the Digital UNIX operating system as EB164.

3.7.2 Firmware Requirements

Before installing the Digital UNIX software kit, make sure that your system has the correct firmware version. The minimum firmware version required for the AlphaPC64, EB64+, EB66+, and EB164 SBCs is V4.5 or higher. If you have an earlier firmware version, update your firmware before installing the Version 4.0A software. For information on how to update your firmware, refer to the *Alpha SRM Console for Alpha Microprocessor Evaluation Boards User's Guide.*

To determine the version of firmware on your system, enter the following

console firmware command at the prompt:

```
>>> show version
```

3.7.3 Restrictions and Known Problems

When an AlphaPC 164 system is booting up, it will display the following message:

```
Module 1095:646 not in pci option table, can't configure it
```

This message, which you will see for any version of Digital UNIX or firmware, can be safely ignored.

The message is generated by Digital UNIX as it probes the PCI bus for PCI option cards. It compares the information returned by these cards to a table of known, supported PCI options. Module 1095:646, a SMC PCI IDE controller, is not listed in this table because Digital UNIX does not support IDE controllers. When the operating system encounters this device, it reports that the option cannot be configured.

There is no workaround to prevent this message, and there are no plans to support this option in a future release of Digital UNIX.

3.8 Upgrading Your Hardware

You can follow the instructions in Chapter 2 of the Digital UNIX *Installation Guide* and those provided by your hardware and firmware documentation when you add new options or change your system hardware. However, if the new option is only supported in the newest version of Digital UNIX, you must perform the upgrade in the following sequence:

1. Update your operating system software to the version that supports the new hardware or option.
2. Upgrade your firmware.
3. Upgrade your hardware or install the new option.
4. Follow the instructions in Chapter 2 of the Digital UNIX *Installation Guide* for rebuilding your system kernel.

Installation Notes 4

This chapter provides installation release notes and summarizes installation procedures for Digital UNIX Version 4.0A. If your system has been shipped with Digital UNIX Version 4.0A factory installed software (FIS), you do not need to read the rest of this chapter.

Despite the enhancements that have been made to the Version 4.0A, it is very similar to Version 4.0, which means that you can follow the procedures that are described in the Digital UNIX Version 4.0 *Installation Guide* to install the Version 4.0A software. However, before you start your installation, be sure to do the following:

- Review the hardware documentation that came with your system.
- Refer to Chapter 3 of this manual for processor-specific release note information about the new hardware systems, if applicable.
- Review the installation release notes in the Digital UNIX Version 4.0 *Release Notes*.
- Review the installation release notes in this chapter.

4.1 Update Installations

To update your Digital UNIX operating system software to Version 4.0A, you must use the `installupdate` or full installation procedures as described in the Digital UNIX Version 4.0 *Installation Guide*. Note that Version 4.0A only supports update installations from Digital UNIX Version 4.0 and Version 3.2G.

Table 4-1 provides an overview of the proper installation process for each supplement with respect to the version of Digital UNIX currently running on your system. Note that ‘‘update install,’’ unless otherwise specified, refers to the Digital UNIX `installupdate` procedure.

Table 4-1: Update Installation Paths to Version 4.0A

Current Version	Desired Version	Action
3.2, 3.2A, 3.2B	4.0A	Update install to 3.2C, use `setld` to update operating system to 3.2G, then update install to 4.0A
3.2C, 3.2D-1, 3.2D-2, 3.2E-1, 3.2E-2, 3.2F	4.0A	Use `setld` to update operating system to 3.2G, then update install to 4.0A
3.2G, 4.0	4.0A	Update install to 4.0A

Note that you can always choose to perform a full installation of Version 4.0A as described in the Digital UNIX Version 4.0 *Installation Guide*

Also note that if you do not already have the Version 3.2G software kit (QA-MT4AQ-H8) you can order it by calling 800-DIGITAL. The Version 3.2G kit will be orderable through December 1996.

4.1.1 Recovering Disk Space for Update Installations to Version 4.0A

You may need to free additional space in the `root`, `/usr`, or `/var` file systems to perform an update installation to Version 4.0A. There are several reasons for this, including the following:

- User file systems are near capacity
- Digital UNIX continues to grow in size as new features are added
- The update installation requires additional workspace to hold temporary versions of inventory and other working files used during the update procedure

If the update installation determines that there is inadequate space in a particular file system to continue the installation, it will display the file system name and the number of additional 1024-byte blocks needed before the update installation can proceed.

It is important to note that during a Version 3.2G to Version 4.0A update installation, the following subsets are deleted automatically (if currently

installed) due to major changes in their structure between the two releases:

```
CDEDOC350       CDE PostScript Documents
OSFEMACS350     GNU Emacs
OSFMANOP350     Ref Pages: Programming
OSFMANOS350     Ref Pages: Admin/User
OSFMANRT350     Ref Pages: Realtime
OSFMANWOP350    Ref Pages: Windows Programming
OSFMANWOS350    Ref Pages: Windows Admin/User
```

The space consumed by these subsets is automatically credited during the file system capacity calculation. Therefore, removing these subsets will not gain any additional file system capacity. Note that once the `350` versions of these subsets have been removed, the corresponding `405` subsets will be installed automatically.

If the update installation has saved ‘‘unprotected customized files,’’ you will be given the opportunity to save these files to another location so that you can recover the space being used by them. These files are typically Digital UNIX system files that have been customized by the user or by layered products. To save them from being overwritten once the update procedure begins to install new subsets, they are saved with a `.PreUPD` extension. They can be recovered after the update installation is complete.

If any `.PreUPD` files have been saved, the following menu will appear:

```
Digital UNIX Update Installation Main Menu
------------------------------------------
(c)  Continue the update installation
(q)  Quit the update installation
(u)  Update Administraion Utility
(v)  View error message again
```

Selecting option ‘‘u’’ will allow you to back up the `.PreUPD` files to another location, then delete them from the system to recover space for the update installation.

If the amount of space that the update installation can obtain from removal of `.PreUPD` files is not enough to allow the update installation to continue, you will not be given the option to continue after the removal of these files. You will then need to provide the additional space neccessary to continue by doing either of the following:

1. Remove any non-critical optional subsets using the `setld` command. Deleting or moving system files without using `setld` will not give you the additional space needed to continue. Section 2.4.3 of the Digital UNIX Version 4.0 *Release Notes* lists the procedure for identifying proper subset candidates for removal.
2. Delete any user-added files that are not part of the base or layered product inventory.

4.1.2 Netscape Will Be Saved During Update Installation

If a file or directory named `/usr/bin/X11/netscape` is found on a Version 3.2G system during the update installation procedure (`installupdate`), the installation procedure will rename it `/usr/bin/X11/netscape.customer` to prevent a file type conflict with the new Version 4.0A netscape executable file that will be installed. If your system will be affected by this, the following message will be displayed:

```
The /usr/bin/X11/netscape directory has been moved to
/usr/bin/X11/netscape.customer to avoid conflict with the
installation of the /usr/bin/X11/netscape executable file.
This change has been noted in /var/adm/smlogs/update.log
for future reference.
```

After the update is complete, your old `/usr/bin/X11/netscape` file or directory will exist under the name `/usr/bin/X11/netscape.customer` and the Version 4.0A Netscape executable file will exist under the name `/usr/bin/X11/netscape`. You may choose to restore your old version of Netscape, but doing so may interfere with the newly installed version.

If you encounter a space problem on the `/usr` file system, you can remove the file or directory `/usr/bin/X11/netscape.customer` to free up additional `/usr` disk space. Prior to removing this file or directory, you should create a backup to ensure recovery in case of a failure.

4.1.3 Worldwide Update Installations

Use the `wwinstallupdate` procedure to update Version 3.2G or 4.0 Worldwide Language Support software to Version 4.0A

4.2 Newly supported hardware systems

If your system is one of the following newly supported hardware systems, then follow the installation procedures in the corresponding section of the *Installation Guide*:

- For installation instructions for the Digital AlphaServer 1000A 5/300 systems, refer to the section on installing the Digital AlphaServer 1000A class systems.
- For installation instructions for the Digital AlphaServer 4000 class systems, refer to the section on installing the Digital AlphaServer 2100 class systems.
- For installation instructions for the Digital DMCC EBM4x class SBCs, refer to the section on installing the AXPpci 33 SBCs.

- For installation instructions for the Alpha VME 4/224 and 4/288 SBCs, refer to the section on installing the AXPvme 64/100/160/233 SBCs.
- For installation instructions for the AlphaPC 164 SBCs, refer to the section on installing the AlphaPC64, EB64+, EB66+, and EB164 SBCs.

4.3 Installation Enhancements

Enhancements have been made to the installation process for Version 4.0A. The installation cloning feature introduced in Version 4.0 has been enhanced to allow unattended installation cloning at client systems. For more information about this and other enhancements to the installation process, refer to Appendix B.

4.4 Verifying the Installation

To verify that you have installed all the correct elements from the Digital UNIX Version 4.0A supplement, check the Digital UNIX revision level that appears in the `/etc/motd` file. The correct version string is:

```
Digital UNIX V4.0A
Digital UNIX V4.0A Worksystem Software
```

Digital UNIX Version 4.0 Release Note Addendum A

This appendix contains an addendum to the Digital UNIX Version 4.0 *Release Notes*, the contents of which were submitted after the Version 4.0 *Release Notes* were printed. Originally, this information was distributed to Version 4.0 customers in the form of a cover letter. This appendix replaces that cover letter.

All of these notes also apply to Version 4.0A. Where applicable, they have been updated for Version 4.0A.

A.1 DEC 2000-300 System

The DEC 2000-300 system is not supported in a dataless environment and is not installable via Remote Installation Services (RIS).

A.2 Bootable Tape

The restriction on using bootable tape on 32MB file systems applies to UFS file systems in addition to AdvFS file systems.

A.3 Using netconfig

When using `netconfig` while CDE is running, avoid restarting network services after reconfiguring the primary network interface. This action can result in error dialog boxes and may even cause CDE to hang.

The problems may not be observed until you have set up BIND using `bindconfig`. In particular, do not use the following `netconfig` features while running a CDE session:

- Do not answer `yes` to restart the network services from the `netsetup` or `netconfig` menu interfaces.
- Do not answer `yes` to the prompt ‘‘restarting network services’’ after reconfiguring the primary network interface from the `netconfig` graphical interface.
- Do not use the Network pulldown menu in the `netconfig` graphical interface to start, stop, or restart network.

- Do not exit `netconfig` and use the `/usr/sbin/rcinet` stop, start, or restart options from the command line.

In order for the configuration changes to take effect, reboot your machine from the command line using `/sbin/reboot` or `/sbin/shutdown -r now`.

A.4 DtMail Configuration

The Digital UNIX Version 4.0 *Release Notes* describe how the `DtMail` application is supposed to disable ToolTalk locking by default

If you are running the `automount` daemon, the `DtMail` application may not be able to access your new mail inbox and you will see a dialog box showing the following message:

```
"Unable to access an object required to complete the operation"
```

If you see this message, copy the contents of your current mail inbox to a temporary file as a backup. and perform the following steps:

1. Check that the following line is in your `.mailrc` file:

   ```
   set cdenotooltalklock
   ```

2. If the line is not in your `.mailrc` file, edit the file to include it.

Alternatively, you can use the following method while in DtMail:

- From the Mailbox pull down menu, select Mail Options
- From the Mail Options dialog box, select the category Advanced.
- From the Advanced options, click on the option named: Use network aware mail file locking. This action should remove the check mark.
- Close all dialog boxes and restart the `DtMail` application. Check the contents of your current mailbox and the backup mailbox to ensure that no mail was lost during this process.

A.5 Installing to Fast/Wide SCSI on a 3000 Series Processor

If you install Digital UNIX Version 4.0 on a fast/wide SCSI device, you must use quotation marks around the boot device string when issuing the

command to boot the system. For example:

```
# set bootdef_dev "4/DKA400"
```

A.6 Error in mformat Reference Page

The `mformat` reference page does not describe how you must specify the storage device that is to be formatted. If you do not specify a device, or if a device is not found, the command may incorrectly format a SCSI device, which could be a system or data disk.

A.7 DECthreads

The following notes apply to DECthreads:

- Compiling programs with C++ that use localtime_r() and pthread_self()

  The `localtime_r()` and `pthread_self()` function declarations are missing from the system header files. No `extern` definitions are available. This affects applications that are compiled using C++.

- Problems with condition variables and `fork()` in multithreaded programs

  If a multithreaded process calls `fork()` after having called `pthread_cond_destroy(),` the child process will core dump with a segmentation violation. There is no work around for this problem.

- Problems with mutex destroy operations and `fork()` in multithreaded programs

  If a multithreaded process calls `fork()` with threads blocked on a mutex, the child process will be unable to destroy the mutex. The routine `pthread_mutex_destroy()` will return `EBUSY.` There is no work around for this problem.

A.8 Fortran Threaded Run-Time Library (RTL)

Digital Fortran Version 4.0 uses a threaded RTL on Digital UNIX Version 4.0. To run nonthreaded applications nonshared, the `libc_r.a` library must be linked in to resolve the thread routines used by the RTL. The Digital UNIX Version 4.0 f77 and f90 drivers determine if this is the case by recognizing the `-threads` command line option; if it is not present and `-non_shared` is, then `-qlc_r` is added to the line passed to `ld.`

Digital UNIX Version 4.0 added the `-pthread` switch to support POSIX 1003.1c-conformant DECthreads interfaces in `libpthread`. Drivers f77 and f90 do not recognize `-pthread` as requiring the same handling by them as `-threads` in Digital UNIX Version 4.0. To use `-pthread` (as in the

KAP product on Digital UNIX Version 4.0), you must compile using the `-c` switch to produce `.o` files and then explicitly invoke `ld` with the same switches that f77 or f90 would use, omitting `-qlc_r`.

A.9 System Clock Release Note Update

Section 2.4.5 of the Digital UNIX Version 4.0 *Release Notes* contains information about the system clock. This text has been revised as follows.

During an update installation, a short amount of time, possibly up to 3 minutes, will be lost when updating to Digital UNIX Version 4.0 or later. During the boot process the following message will be printed to the console:

```
WARNING: lost battery backup clock -- CHECK AND RESET THE DATE!
```

The time will be set to the previous shutdown time-stamp.

On some systems, similar behavior will occur every time the systems switch between Version 4.0 and a preceding version. For example, on a system that has a disk with Version 3.2C installed and another disk with Version 4.0 installed, the following behavior is observed:

- Time is set while either version is booted.
- When the system is shut down and the other version is booted, time will not be maintained by the time of year (TOY) clock and will be set to the previous shutdown time-stamp between boots of the different versions. There may be system-specific exceptions to this exact behavior.

This behavior will occur on DEC_3000, DEC_4000, DEC_7000, and DEC_8000 series systems and on the AXPVME64 system.

The exception to this behavior is Digital UNIX Version 3.2G, which implements TOY code identically and will be compatible.

Note that systems running `ntp` should not be affected, with the exception that a warning message may be printed to the console during boot.

A.10 Miscellaneous Release Notes Errors

Section 8.19 of the Digital UNIX Version 4.0 *Release Notes* has information about the retiring MSB driver. This information should be in a separate section.

In section 1.5.4, note that you cannot manually uncompress reference pages using the `gunzip` command as stated in this section. Manually uncompressing the reference pages invalidates the pointer files. In the same section, the cross-reference to `man`(5) should be `man`(1).

There is a section heading missing between sections 2.4.5 and 2.4.6. Information about Open 3D appears at the end of section 2.4.5.

A.11 LSM Sparse Plexes May Erroneously Mask an I/O Failure

Under certain hardware failure scenarios, an LSM volume configured with a sparse plex may erroneously return success to the file system or application when in fact the I/O failed. Digital recommends that you do not configure volumes with sparse plexes until this problem is fixed.

A.12 Restrictions with LSM root and swap Volumes

Root, primary swap, and secondary swap volumes configured under LSM have the following restrictions:

- Root and primary swap must be on the same physical disk and must be configured using the encapsulation tools.
- If a secondary swap volume is configured under LSM, the root and primary swap must also be configured.
- Root, primary swap, and any secondary swap volumes must be configured into the disk group named `rootdg`.

A.13 MLS+ and UFS File System

When using MLS+ with the UFS file system, there is a problem with setting properties. Setting a property on a FAST symbolic link, a block special file, or a character special file will cause `fsck` to erroneously detect contradictory block counts and produce inconsistent file system activity. There is no solution for this problem and it will be fixed in a future release.

A.14 Setting Break Points with dbx and ladebug

The `dbx` and `ladebug` debuggers are not able to stop at a breakpoint inside of the `_exit()` routine. If you attempt to set a breakpoint in this routine, the debugger will continue past it without stopping. Should you need to stop your application just before it exits, try setting a breakpoint in `exit()` instead of `_exit()`. Another workaround is to use the `dbx` debugger with the `-noproc` switch or the `ladebug` debugger with the `-ptrace` switch. For example:

```
% dbx -noproc myapp
```

or

```
% ladebug -ptrace myapp
```

A patch for this problem will be available soon, check with the customer service center for details.

A.15 Setting Break Points with atom

If you use the `atom` command's `-g` switch to debug an `atom` tool's analysis code, you may not be able to set debugger breakpoints in `ProgramAfter` or `ObjAfter` analysis routines. If you attempt to set such a breakpoint, the debugger will continue past it without stopping and may then report a false segmentation violation in your analysis code. To avoid this problem, use the `dbx` debugger with the `-noproc` switch or the `ladebug` debugger with the `-ptrace` switch. For example:

```
% dbx -noproc hw.atom
```

or

```
% ladebug -ptrace hw.atom
```

A patch for this problem will be available soon, check with the customer service center for details.

A.16 Firmware for DEC 3000 Series Processors

The Alpha AXP Systems Firmware Update Version 3.5 CD–ROM is shipped with Digital UNIX Version 4.0. The firmware CD–ROM contains Version 6.5 firmware for DEC 3000 series processors, but the supported PALcode version is at Version 1.35, which is out of date.

The correct firmware, supporting PALcode Version 1.45, is available either in DEC 3000 Series firmware Version 6.7 on the Alpha AXP Systems Firmware Update Version 3.6 CD–ROM. This CD–ROM will be available in early June, 1996. Version 6.6 is currently available by anonymous `ftp` over the Internet at the following location:

```
ftp://ftp.digital.com/pub/Digital/Alpha/firmware/interim/
```

A.17 AdvFS Configuration

The following AdvFS variables are not documented in the *Guide to File System Administration for the POLYCENTER Advanced File System and Utilities for Digital UNIX*.

- `AdvfsSyncMmapPages`

  This configurable parameter controls the behavior of both the `sync` system call and the update daemon. The `sync` system call

asynchronously writes dirty in-memory file data to disk. There are two ways a file can have dirty data in memory. One way is via the `write` system call, the other way is from a memory write reference after an `mmap` system call. The update daemon runs every 30 seconds and issues a `sync` call for every read/write file system mounted.

AdvFS provides the ability to select the behavior of the `sync` system call. When `AdvfsSyncMmapPages` has the default value of 1, the `sync` system call asynchronously commits dirty memory mapped file data to disk. If `AdvfsSyncMmapPages` is reconfigured to a value of 0 then only dirty data from the `write` system call will be asynchronously written to disk.

- `AdvfsMaxDevQLen`

  For each device, AdvFS maintains a number of queues that control when a given I/O request is handed off to a disk driver (or pseudo driver). I/O requests for file data are placed on the AdvFS consolidation queue, where small logically contiguous blocks requests are consolidated into larger consolidated I/O requests. The file data consolidation queue contains both read-ahead file data and asynchronously written file data.

  The `AdvfsMaxDevQLen` variable controls how many I/O requests to move off the consolidation queue and onto the device queue. All I/O requests that are put on the device queue are sent to the device driver. By default, .L AdvfsMaxDevQLen is set to 80. This means that the device queue must contain fewer than 80 I/O requests before AdvFS will take a request from the consolidation queue. .Sp Limiting the length of the device queue directly affects the amount of time a synchronous (blocking) I/O will take before it complete. AdvFS issues several types of blocking I/O requests, including AdvFS metadata and log data.

  The optimum value of `AdvfsMaxDevQLen` can vary from system to system. The default value of 80 should be appropriate for most configurations. It is possible there may be a need to change this value, particularly for very fast of very slow devices and controllers. A good rule of thumb is to set the `AdvfsMaxDevQLen` parameter no higher than the average number of I/O requests that be performed in 1/2 second. If no limit is desired, `AdvfsMaxDevQLen` can be set to zero.

- AdvfsFavorBlockingQueue

  This configurable parameter is used to control whether or not a defined number of I/O requests should be moved from the consolidation queue to the device queue when a flush of the blocking queue is requested. `AdvfsFavorBlockingQueue` should not be changed from its default value of 1.

A.18 AdvFS and fsync

The `fsync` system call is used to synchronously write dirty file data to disk. There are two ways a file can have dirty data in memory. One way is via the `write` system call. The other is from a memory write reference after an `mmap` system call. For AdvFS files, the `fsync()` system call will only write out dirty data from the `write` system call. If dirty data from an `mmap()` also needs to be written then the `msync` system call must also be used.

A.19 Correction to malloc(3) Reference Page

The default value of `__madvisor` has changed to 0.

Installation Enhancements B

This appendix describes enhancements to the Digital UNIX Version 4.0A full (default or custom) installation process and to the installation cloning process. Table B-1 summarizes the installation enhancements in this release.

Table B-1: Summary of Digital UNIX Version 4.0A Installation Enhancements

Enhancement	Applies To:
The installation process searches for and invokes user-supplied files to enable customizations on the system to be installed. The files can be on diskette, a RIS server, or on CD–ROM.	Full Installations and Installation Cloning
Administrators can modify the configuration description file (CDF) to achieve an unattended installation cloning process	Installation Cloning

The following information is included in this appendix:

- Overview of the installation cloning process and support of user-supplied files
- Role of the administrator
- Theory of operation for invoking user-supplied files and CDFs
- Description of the CDF
- Relationship between the user-supplied files and the CDF
- Acceptable differences between the CDF and the systems to be cloned
- Modifying the CDF to achieve unattended installation cloning of client systems
- Creating files for execution during a Digital UNIX full installation or installation cloning
- Moving the CDF and files to the appropriate distribution media (diskette, RIS server, or CD–ROM)

B.1 Installation Cloning Overview

Installation cloning allows an administrator to replicate the installation configuration from a model system that is already installed with Digital UNIX Version 4.0A onto one or more systems with the same or similar hardware configurations.

When a system is installed with Digital UNIX Version 4.0A, a configuration description file (CDF) is generated that contains the results of the questions answered during the installation. This file is located on the installed system in the `/var/adm/smlogs` directory under the file name `install.cdf`. The CDF contains all the configuration information required to perform an initial system installation on a client system.

B.1.1 Prerequisites for Installation Cloning

The only prerequisite for installation cloning is that the system to be installed by the installation cloning process has the same disk configuration as the system where the CDF was generated. This means that the disks used for the `/` (`root`), `usr`, and `var` file systems and `swap` areas on both systems must have the same disk type and the same device name.

It is possible, however, to support slight differences in configuration. Section B.7.1 describes these acceptable differences.

B.1.2 Benefits of Installation Cloning

The benefits to using installation cloning to mass-install systems are:

- Installation cloning produces identical installations.
- The administrator can set up the installation cloning process to run with very little user intervention.
- Installation cloning is ideal for environments in which there are many of the same or similar systems that need to be installed with Digital UNIX because it eliminates the need to perform duplicate installations on all systems.
- Once a suitable CDF has been located and optionally modified, the administrator has minimal involvement in the installation cloning process at the client systems.

B.1.3 Installation Cloning Features

The files necessary for the installation cloning process can be placed on a diskette, the `/var/adm/ris/clients/sets/`*`profile_set`* directory on a RIS server, or in the `/isl` directory on a CD–ROM or extracted RIS area. Under normal circumstances, a CD–ROM is a read-only device and

data cannot be written to it. However, if you have a special license agreement to copy and repackage the Digital UNIX Version 4.0A operating system, files can be written to the `/isl` directory on a CD–ROM. Refer to Section B.11.3 for more information about burning CD–ROMs.

In Digital UNIX Version 4.0, installation cloning could be only be done from a network connection to a remote installation services (RIS) server and required user intervention. In Digital UNIX Version 4.0A, however, installation cloning can be set up so that it automatically bypasses the following actions that previously required user intervention:

- Confirming use of the CDF to start an installation cloning
- Building a tailored kernel automatically

B.2 Overview of Support for User-Supplied Files

The Digital UNIX full installation and installation cloning processes have been enhanced to invoke user-supplied files that contain scripts, programs, or executables to perform user-defined customizations. This ability provides administrators with the opportunity to customize the installation procedure. The files can be provided on diskette, a RIS server, or in the `/isl` directory of the distribution media (either CD–ROM or an extracted RIS area). Refer to Section B.11.2.1 for things to consider when moving files to an extracted RIS area.

The first invocation of user-supplied files occurs before the actual installation process begins, that is, before any file systems are created and software is installed. At that point, for example, an administrator may want to write a new disk label onto a specific disk to customize disk partitions. This file must be named `preinstall`.

The second invocation is allowed after software is installed. At that point, for example, an administrator may want to install a customized software application after the installation of the Digital UNIX base software subsets. This file must be named `postload.`

Refer to Section B.9 and Section B.10 for more information about creating `preinstall` and `postload` files for execution during a full installation or installation cloning process.

B.3 Relationship Between CDFs and User-Supplied Files

CDFs are used only for an installation cloning process. User-supplied files are invoked and executed during both types of full installations (default and custom) and the installation cloning processes.

CDFs and user-supplied files can be used independently or in any combination. The CDFs and user-supplied files can be located on different

sources. For example, the `install.cdf` file may be on a diskette, the `preinstall` file might come from the RIS server, and the `postload` file might come from the `/isl` directory of the distribution media.

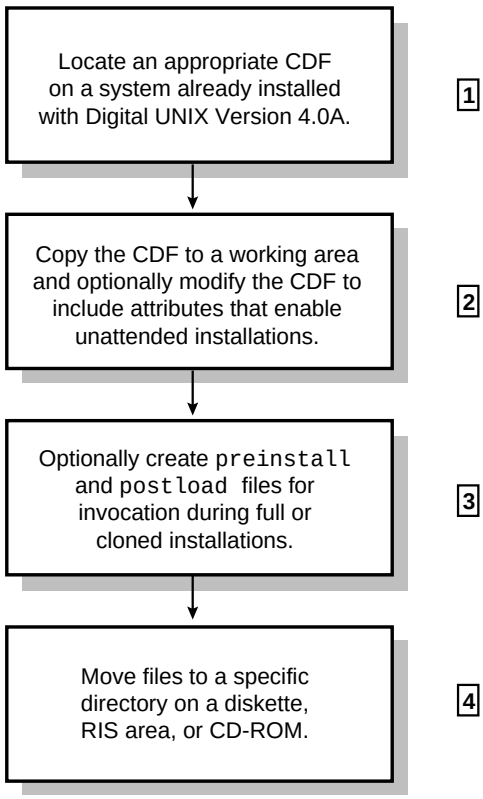
The installation process searches for the `install.cdf`, `preinstall`, and `postload` files in the following order of priority:

1. The `/` (`root`) directory of diskette drive `fd0` or `fd1`. If a diskette is used, it requires a standard UNIX File System (UFS).
2. The `/var/adm/ris/clients/sets/`*`profile_set`* directory on a RIS server where *`profile_set`* is a user-created directory name
3. In the `/isl` directory of the distribution media (for CD–ROM installations) or the `/isl` directory of an extracted RIS area (for RIS installations)

B.4 Role of the Administrator

To set up a system for installation cloning, an administrator performs the tasks described Figure B-1. To execute user-supplied files during a full installation, the administrator performs Tasks 3 and 4 only. The numbered list after the task summary describes the tasks in more detail and provides pointers to more information.

Figure B-1: Summary of Administrator Tasks



1 An administrator locates a CDF that is suitable to use for installation cloning. On systems that are installed with Digital UNIX Version 4.0A, the CDF is located in the `/var/adm/smlogs` directory as the file named `install.cdf`. There is one CDF generated per system installation. Refer to Section B.6 for a description of the contents of the CDF. Refer to Section B.7 for information about what makes a CDF suitable for installation cloning and for information about acceptable differences between the CDF and the systems to be cloned.

2 The administrator copies and moves the CDF to a working area where it can be optionally modified for installation cloning. The administrator should make a copy of the `/var/adm/smlogs/install.cdf` file and move and modify the copy. The original CDF should be retained in the `/var/adm/smlogs` directory because it contains information about the initial system installation that could be valuable for future troubleshooting.

The administrator has the option to modify the CDF so that the installation bypasses all user responses usually required during a Digital UNIX installation cloning process. Refer to Section B.8 for information about the attributes in the CDF that can be modified to attain unattended installation cloning.

3. The administrator optionally creates scripts or programs to be executed at two predefined points in the full installation and installation cloning processes. The actions performed by these user-supplied files is determined by the administrator.

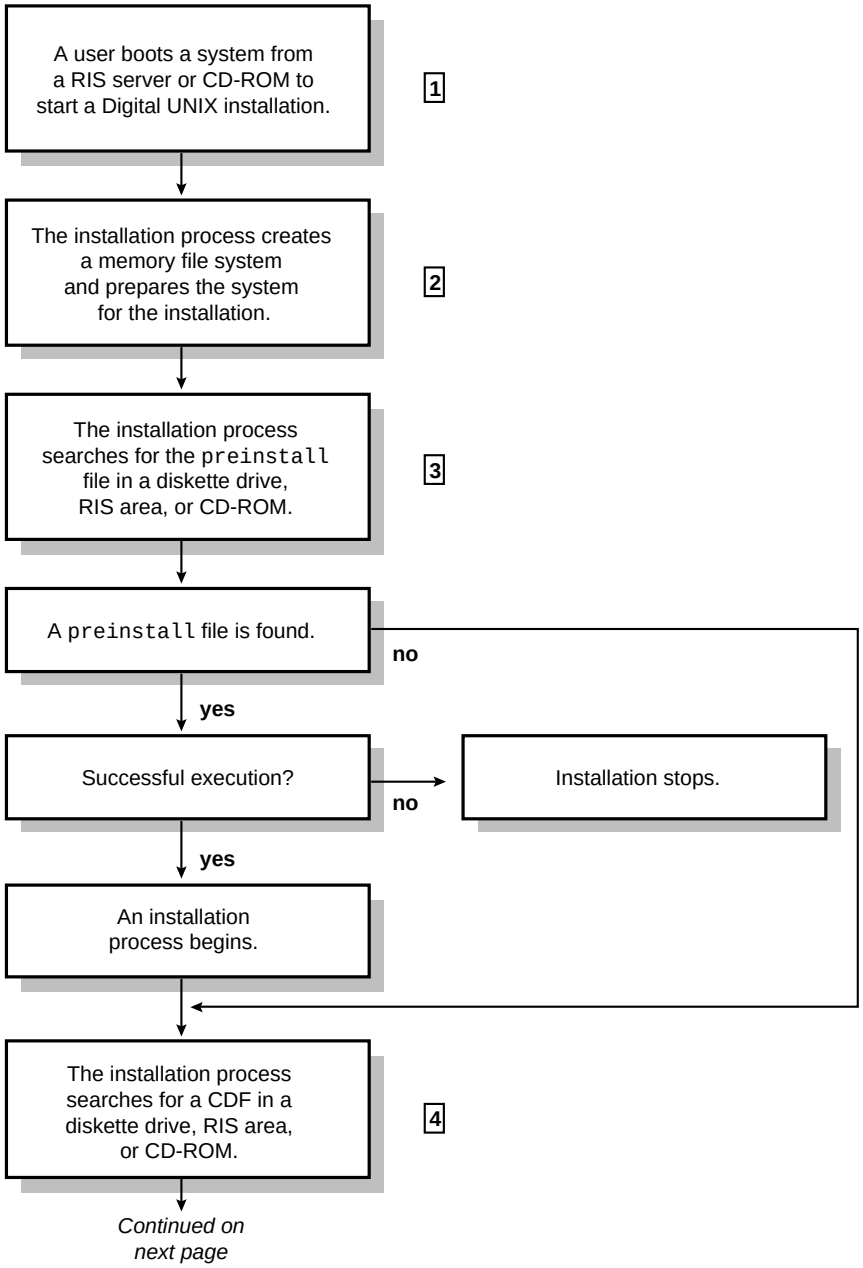
   Refer to Section B.9 and Section B.10 for more information about creating `preinstall` and `postload` files for execution during an installation.

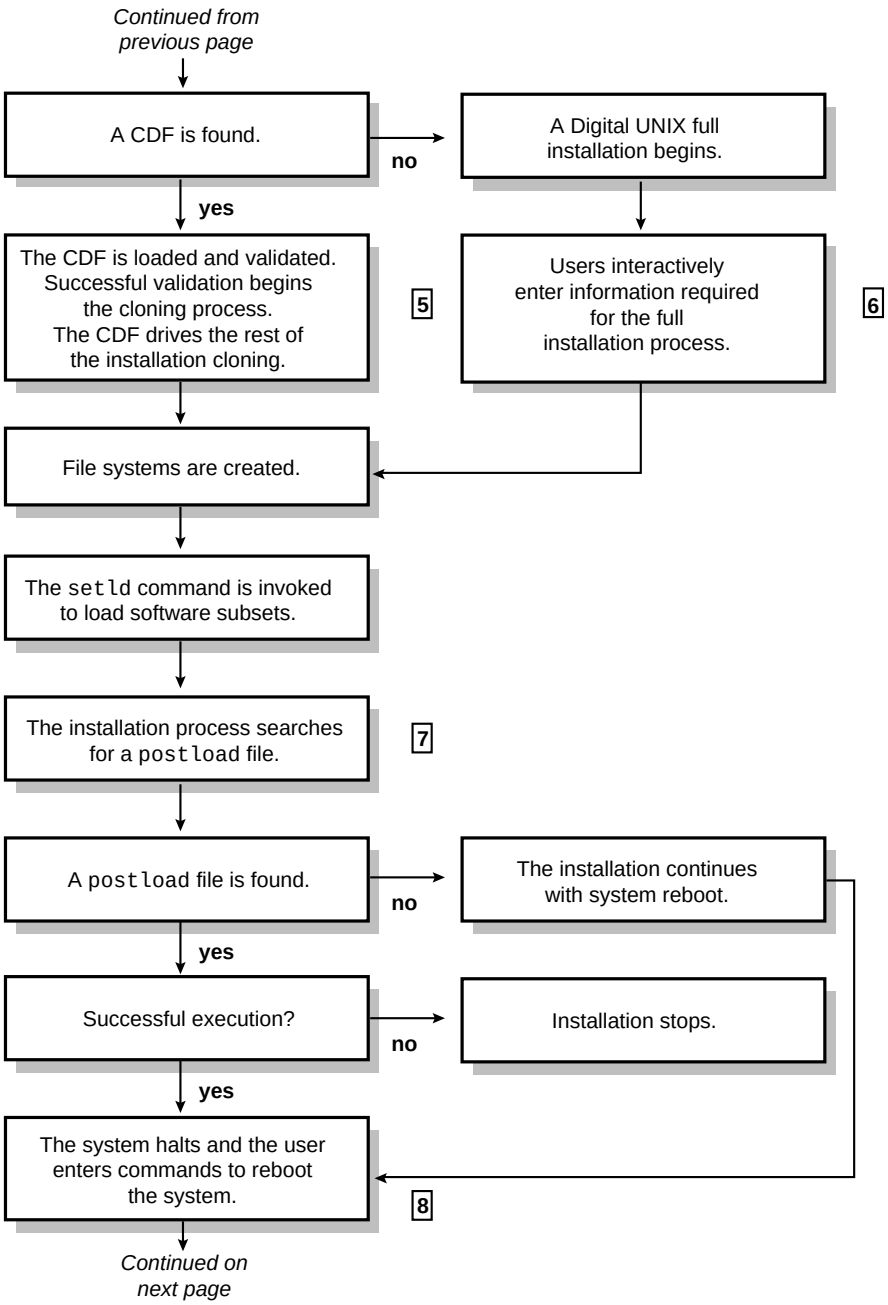
4. The administrator moves the modified CDF and any user-supplied files to the `/` (`root`) directory on a diskette, to the `/var/adm/ris/clients/sets/`*`profile_set`* directory on a RIS server, or to the `/isl` directory on a CD–ROM if the Digital UNIX distribution media is being repackaged. The files can also be copied to the `/isl` directory within an extracted RIS area. Refer to Section B.11 for information about copying the CDF to the appropriate place and the guidelines surrounding each type of distribution media.

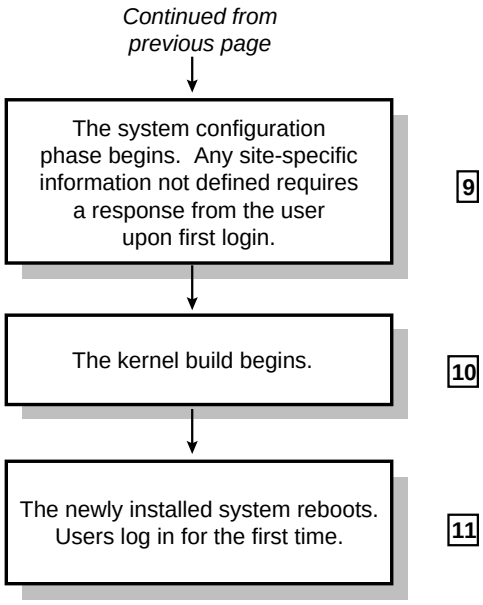
B.5 Theory of Operation

This section contains a synopsis of how the installation process uses the user-supplied files and CDFs during full and cloned installations. Detailed information is provided in subsequent sections. The work flow shown in Figure B-2 assumes that the administrator has completed the tasks shown in Section B.4.

Figure B-2: Theory of Operation




Continued from previous page
A CDF is found.
no
A Digital UNIX full installation begins.
yes
The CDF is loaded and validated. Successful validation begins the cloning process. The CDF drives the rest of the installation cloning.
5
Users interactively enter information required for the full installation process.
6
File systems are created.
The setld command is invoked to load software subsets.
The installation process searches for a postload file.
7
A postload file is found.
no
The installation continues with system reboot.
yes
Successful execution?
no
Installation stops.
yes
The system halts and the user enters commands to reboot the system.
8
Continued on next page



1 To start an installation process, users boot the system from the Digital UNIX Version 4.0A CD–ROM or over a network connection to a RIS server.

2 The Memory File System (MFS) creates writable space required by the installation process.

3 The installation process searches for a file named `preinstall`, which is a user-supplied script, program, or executable containing specific actions to be carried out before the installation process begins. If this file is found, it is executed. If execution is successful, the installation process begins. If execution is not successful, the installation process stops. If a `preinstall` file is not found, the installation process begins the search for a CDF. Refer to Section B.9 for more information about creating a `preinstall` file.

4 The installation process searches for a CDF that, if found, drives the rest of the installation and begins an installation cloning process. This file, named `install.cdf`, is searched for in the same order as the `preinstall` file. If an `install.cdf` file is not found, a Digital UNIX full installation process continues. Refer to the *Installation Guide* for more information about full installations. Section B.6 provides more information about the CDF.

5 The installation process validates the CDF before beginning an installation cloning process. Validation includes ensuring that the disk name and disk type specified in the CDF exists on the system to be cloned. A CDF validation failure causes the process to stop. For RIS

installations, validation includes comparing the versions of the software subsets included in the CDF with the software subset versions that are installed in the RIS environment. Diagnostic messages display the reason for validation failures. Upon successful CDF validation, an installation cloning process continues.

6 The user responses required during a full installation depend upon the type of full installation being performed (default or custom) and the user interface being used (text-based or graphical). The *Installation Guide* describes the responses required during a full installation process.

7 Upon completion of the software subset load phase, the installation process searches for a file named `postload`, which is a user-supplied script, program, or executable containing specific actions to be carried out after software subsets are loaded. If this file is found, it is executed. If execution fails, the installation process stops. Refer to Section B.10 for information about creating a `postload` file.

8 After software subsets are loaded, the installation process requires users to boot the system off the newly installed disks. The screen displays the boot commands that must be entered to reboot the system.

9 The configuration phase begins automatically after the system reboots. Configuration refers to the process of tailoring the software subsets; setting the host name, `root` password, date, time, geographic location, and time zone; system tuning; and building a kernel. For installation cloning processes, refer to Section B.8.4 about setting these site-specific attributes in the CDF. If values are not defined for these attributes or if the user did not enter a response during the full installation, the installation process becomes interactive to request it.

10 For installation cloning, the type of kernel build is defined in the CDF by the `kernel_options=` attribute. Refer to Section B.8.3 for the options that are available.

For full installations, the type of kernel build depends on whether a default or custom installation was performed. Default installations have noninteractive kernel builds that select mandatory kernel options. Custom installations have interactive kernel builds to give users the opportunity to choose the options to build into the kernel.

11 Refer to Table B-5 for information about setting site-specific information if it was not defined in the CDF nor entered during a full installation. If any of these attributes is null, the installation process becomes interactive to request a response from the user.

B.6 Description of the Configuration Description File

When Digital UNIX Version 4.0A is installed on a system, the installation process creates a configuration description file (CDF). As described previously, the information stored in the CDF can be used to mass-install machines with the same or similar hardware configurations.

The CDF contains the following information about an installation:

- File systems that were created: `/` (`root`), `/usr`, and `var`
- Swap space that was created
- Disk types and disk names where file systems reside
- File system layout (the specific partitions where file systems reside)
- File system types (UNIX File System or Advanced File System)
- System-specific information such as host name and `root` password and site-specific information such as geographic location, time zone, and date and time
- Type of distribution media (CD–ROM or RIS) from which the installation took place
- Software subsets that were installed

The CDF, `install.cdf`, is located on a newly installed system in the `/var/adm/smlogs` directory.

The CDF is in stanza file format, and is logically organized as groupings of **attribute-value** pairs. Each attribute-value pair is separated with an equal sign (`=`). Each logical grouping of attribute-value pairs is defined as an **item**. Refer to the `stanza`(4) reference page for more information about stanza file format.

Four items are defined in the installation CDF:

- `Inst_islinfo` contains initial system load information that conveys the state of the system before the start of the installation process
- `Inst_filesystem` contains file system information such as the number and type of file systems that were created on the installed system. There is one `Inst_filesystem` item for every file system and swap area that was created. At a minimum, there are four `Inst_filesystem` items in the CDF to describe the `/` (`root`), `/usr`, and `/var` file systems and the swap device.
- `Inst_subsets` contains a list of the installed Digital UNIX base software subsets
- `Inst_cinstall` conveys client system configuration information to the installation process. All of the attributes specified in the `Inst_cinstall` item are optional. If values are not provided for these

attributes, the installation process becomes interactive to request this information during the installation configuration phase.

B.6.1 Sample Configuration Description File

In the sample CDF shown in Example B-1, attributes marked with an asterisk (*) must be manually included into the CDF when it is retrieved from an installed system because the installation interfaces do not currently provide the ability to set these values. Section B.8 defines these attributes and shows you how to include them them in the CDF.

Section B.6.2 provides definitions of all attributes-value pairs in the CDF.

Example B-1: Sample Configuration Description File (CDF)

```
install:
      _item=Inst_islinfo
      prompt=no               *
      media_type=REMOTE
      server_timezone=Eastern
      timeset=1
      server_locality=US
      server=daria
      risdir=/
      _action=create
      srcloc=daria:
      client=kramer

install:
      _item=Inst_filesystem
      maj_min_num=8388608
      disk_number=0
      disk_name=rz0
      controller_type=SCSI
      name=root
      partition=a
      controller_number=0
      disk_type=RZ26L
      _action=create
      file_system_type=UFS

install:
      _item=Inst_filesystem
      maj_min_num=8388608
      disk_number=0
      disk_name=rz0
      controller_type=SCSI
      name=usr
      partition=g
      controller_number=0
      disk_type=RZ26L
      _action=create
      file_system_type=UFS

install:
      _item=Inst_filesystem
```

Example B-1: (continued)

```
      maj_min_num=8388608
      disk_number=0
      disk_name="in /usr"
      controller_type=SCSI
      name=var
      partition=g
      controller_number=0
      disk_type=RZ26L
      _action=create
      file_system_type=UFS

install:
      _item=Inst_filesystem
      maj_min_num=8388608
      disk_number=0
      disk_name=rz0
      controller_type=SCSI
      name=swap1
      partition=b
      controller_number=0
      disk_type=RZ26L
      _action=create
      file_system_type=swap

install:
      _item=Inst_subsets
      names=OSFBASE400,OSFBIN400,OSFBINCOM400,OSFCDEDT400,OSFCDEMAIL400,
OSF CDEMIN400,OSFCLINET400,OSFCMPLRS400,OSFDPSFONT400,OSFFONT15400,OSFHWB
ASE400,OSFHWBIN400,OSFHWBINCOM400,OSFKBDLK401400,OSFMITFONT400,OSFNETCON
F400,OSFNETSCAPE400,OSFNFS400,OSFNFSCONF400,OSFOLDX11400,OSFPRINT400,OSF
SER400,OSFSERTC400,OSFSYSMAN400,OSFTCLBASE400,OSFTKBASE400,OSFX11400,OSF
XADMIN400,OSFXPRINT400,OSFXSYSMAN400
      _action=create
      advflag=1

install:
      _item=Inst_cinstall
      kernel_option=all           *
      password=C36V.nMSW0j/o
      timeset=yes
      timezone=Eastern
      locality=US
      _action=create
      hostname=kramer
```

B.6.2 Attribute-Value Pair Definitions

This section provides definitions for all attribute-value pairs in the CDF.

The attribute-value pairs within individual items differ as a result of the distribution method (CD–ROM or RIS) that was used to perform the initial installation of the model system.

Caution

Digital recommends that only experienced system administrators modify the attributes-value pairs in the CDF. If you are an experienced administrator, Digital does not recommend editing the CDF other than for those attribute-value pairs in the `Inst_cinstall` item and those marked with an asterisk in the sample CDF shown in Example B-1. Typographical errors and inserting attribute-value pairs into the incorrect item may result in serious corruption on the cloned systems and may render the systems unusable.

In addition, attribute-value pairs cannot contain blank spaces. Blank spaces cause data validation errors. Be very careful to remove all blank spaces especially at the end of a line. When you want to give an attribute a null value, make sure there is nothing (null) after the equal sign (`=`).

Do not modify or remove attributes that are prefixed with an underscore (_). These attributes, for example `_action=create`, are internal variables required by the full installation and installation cloning processes.

B.6.2.1 Attributes in the Inst_islinfo Item

Table B-2 defines the attributes in the `Inst_islinfo` item in the CDF. The `Inst_islinfo` item is used to convey the system state before the start of the installation process.

Table B-2: Attribute Definitions in the Initial Subset Load (Inst_islinfo) Item

Attribute	Definition
`client=`	This attribute is only valid for RIS full installations (not installation cloning) and specifies the client name of the system that was cloned. The client name is automatically determined as a result of the `bootp` request to the server. Do not modify this attribute for installation cloning because the value in this attribute does not have to match the client systems to be cloned.

Table B-2: (continued)

Attribute	Definition
`clone=`	This attribute is automatically inserted into the CDF as a result of an installation cloning process and is only valid during the installation cloning process. This attribute-value pair should not be manually set.
`media_type=`	This attribute is used by the full installation and installation cloning processes to indicate the type of distribution media for the current installation. This is the only required entry in the `Inst_islinfo` item. Valid values are `REMOTE` and `CDROM`. Edit this attribute when the type of distribution media used for the initial installation is different than the installation cloning that is to take place.
`prompt=`	This attribute is used by the installation cloning process to indicate whether the start of an installation cloning process requires a confirmation response from the user. This attribute must be manually entered into the CDF for an installation cloning process because the installation interfaces do not provide the ability to insert this attribute into the CDF. A value of `yes` indicates that the process should prompt for confirmation to use the CDF. A value of `no` indicates that the installation cloning process should use this CDF and bypass the confirmation question. If this attribute is not included in the CDF, the default is `prompt=yes`. Setting the attribute to `no` should be used with caution because the installation cloning begins as soon as the installation process detects a CDF. If you wanted to boot the system from the distribution media and perform system management or disk maintenance tasks, for example, you would not want the installation cloning to begin immediately.
`risdir=`	This attribute is specific to RIS full installations and is automatically set to the base RIS directory of the product environment to which the client system is registered. Do not modify this attribute for installation cloning.

Table B-2: (continued)

Attribute	Definition
`server=`	This attribute is specific to RIS full and cloning installations and identifies the RIS server to which the client system is currently registered. Do not modify this attribute for installation cloning.
`server_locality=`	This attribute is specific to RIS full installations and specifies to the installation interfaces the current geographic location. Do not modify this attribute for installation cloning.
`server_timezone=`	This attribute is specific to RIS full installations and specifies to the installation interfaces the current geographic timezone. This value is automatically set during a RIS full installation. Do not modify this attribute for installation cloning.
`srcloc=`	This attribute is not used by either the full installation or installation cloning processes; it is used by the operating system for internal purposes. This attribute identifies the location of the software to load. For RIS installations, this value specifies the server name (appended with a colon). For CD–ROM installations, this value is the directory path `/ALPHA/BASE`. Do not modify this attribute unless the `media_type` attribute is changed because this value must be consistent with the value of `media_type`.
`timeset=`	This attribute applies to full installations and indicates to the installation interfaces whether the date and time on the client system have been successfully set and whether the date and time can be displayed during the installation. Valid values are: `0`- Date and time have not been set and will not be displayed during the installation process `1`- Date and time have been successfully set and will be displayed where appropriate during the installation process Do not modify this attribute for installation cloning.

B.6.2.2 Attributes in the Inst_filesystem Item

Table B-3 defines the attributes in the `Inst_filesystem` item in the CDF. The `Inst_filesystem` item is used to convey information about the number and type of file systems that are to be created on the cloned system. At a minimum, there must be at least four file system items to describe the `/` (`root`), `/usr`, and `/var` file systems and one `swap` area. Except where noted, you can optionally modify all attribute-value pairs in this item, although Digital does not recommend editing the CDF.

Table B-3: Attribute Definitions in the File System (Inst_filesystem) Item

Attribute	Definition
`name=`	This attribute is a required attribute that specifies the name of the file system to be made. Valid values are: `root`, `usr`, `var`, `swap1`, and `swap2`. There can only be one item each for `root`, `usr`, `var`, `swap1`, and `swap2`.
`file_system_type=`	This attribute is a required attribute that specifies the file system type to be created for the named file system. Valid values are: `ufs`, `advfs`, and `swap`. If the value of the `name=` attribute is `swap1` or `swap2`, the value of this attribute must be `swap`. **Caution** Be aware that changing this value from `ufs` to `advfs` may cause errors on the cloned system because the software subsets necessary to support an Advanced File System (AdvFS) may not be defined in the CDF and will not be installed on the cloned system. Therefore, the file system will be unreadable. Do not change this value to `advfs` unless other file systems have been set by the installation process to `advfs` or the required AdvFS software subsets are present in the `names=` attribute.

Table B-3: (continued)

Attribute	Definition
`disk_name=`	This attribute is a required attribute that specifies the disk name for the named file system as it is known to the operating system (for example, `rz0`). The value in this attribute must be consistent with (or match) the value in the `disk_type=` attribute. If you change this attribute, you must validate the change with respect to the `disk_type=` attribute. For example, if you change this value to `disk_name=rz1`, you must determine the type of disk at `rz1`. If it is an `RZ58` type of disk, make sure the value of the `disk_type=` attribute is `RZ58`.
`disk_type=`	This attribute is a required attribute that indicates the type of disk for the specified `disk_name` (for example `RZ26`). The value in this attribute must be consistent with the `disk_name=` attribute. Refer to the `disk_name=` attribute for more information.
`partition=`	This attribute is a required attribute that specifies the disk partition on which the named file system will be created. Valid values are the letters `a` through `h` inclusive. The `root` file system must always be located on partition `a`. If you change the value in this attribute for any file system other than `root`, make sure the partition you choose does not overlap another partition.
`controller_type=`	This attribute identifies the controller type to which the specified disk for the named file system is connected. During a full installation, this value is automatically provided for informational purposes. During an installation cloning process this attribute is not used, and can be omitted from the CDF.
`controller_number=`	This attribute identifies the controller number to which the specified disk for the named file system is connected. During a full installation, this value is automatically provided for informational purposes. During an installation cloning process this attribute is not used, and can be omitted from the CDF.

Table B-3: (continued)

Attribute	Definition
`maj_min_num=`	This value is automatically calculated for full and cloned installations so there is no need to modify it. This attribute is required for the `root` file system item and specifies the major and minor number of the specified disk for the named file system. The major and minor number is used to map the software device name (as known to the operating system) to the firmware device name (as known to the SRM console) so that the proper boot commands are displayed on the screen during the manual boot phase of the installation.

B.6.2.3 Attributes in the Inst_subsets Item

Table B-4 defines the attributes in the `Inst_subsets` item in the CDF. The `Inst_subsets` item is used to convey information to the installation cloning process about the Digital UNIX base software subsets that are to be installed on the system to be cloned.

Table B-4: Attribute Definitions in the Software Subsets Load (Inst_subsets) Item

Attribute	Definition
`advflag=`	Digital recommends that you do not modify this attribute. This attribute is a required attribute that specifies the type of installation (custom or default) that is to occur. Valid values are: `0`- Default installation `1`- Custom installation **Caution** Be aware that changing the value of this attribute may cause the `setld` command to fail during software subset loading because the software subsets defined in the CDF may not be compatible with the type of installation defined by this attribute. The *Installation Guide* contains more information about installation types. Setting this attribute to `0` nullifies the `kernel_option=` attribute in the `Inst_cinstall` item because default installations provide noninteractive kernel builds with mandatory kernel options.
`names=`	This attribute is a required attribute that specifies the list of Digital UNIX base software subsets to be installed. Each software subset name is separated by a comma (,) and must be on one continuous line (let the line wrap). If you add software subset names to this attribute, you must consider available disk space and dependencies upon other software subsets. Refer to the *Installation Guide* for software subset dependency information and disk space requirements.

B.6.2.4 Attributes in the Inst_cinstall Item

Table B-5 defines the attributes in the `Inst_cinstall` item in the CDF. The `Inst_cinstall` item is used to convey client system configuration information to the installation cloning process. All of the attributes specified in the installation configuration item are optional. If values are not provided for these attributes, the installation process becomes interactive to request this

information during the installation configuration phase.

To use a single CDF to clone many systems, consider leaving the system-specific attributes such as host name and password null, but provide attributes for site-specific attributes such as kernel option, time zone, geographic location, and date and time.

Table B-5: Attribute Definitions in the Installation Configuration (Inst_cinstall) Item

Attribute	Definition
`hostname=`	This attribute specifies the client system's host name to the installation process. Host names for client systems that exist on the same network must be unique. Refer to the Installation Guide for guidelines on choosing a proper host name. During a RIS installation cloning process, this value is automatically set to the host name of the client system. For CD–ROM installations, make sure this value is set correctly or is null. A null value means that the installation process becomes interactive during the installation configuration phase to request a host name.

`kernel_option=`	This attribute specifies to the installation process whether the tailored kernel build should be interactive or noninteractive.
	
	This attribute must be manually entered in the CDF for an installation cloning process because the installation interfaces do not provide the ability to insert this attribute in the CDF.
	
	In an interactive kernel build session, a kernel options menu is presented allowing selection of any or all optional kernel options. To specify an interactive tailored kernel build, use the following value:
	
	`kernel_option=interactive`
	
	For noninteractive kernel builds, two options are provided:
	
	`kernel_option=mandatory`
	`kernel_option=all`

Table B-5: (continued)

Attribute	Definition
	The `mandatory` value builds a tailored kernel with only mandatory kernel options. The `all` value builds a tailored kernel with all mandatory and optional kernel options. The default behavior of a full, custom installation is the `interactive` type of kernel build. Full, default installations have `mandatory` type kernel builds. If the value of the `advflag` attribute in the `Inst_subsets` item is zero (`0`), the value given to the `kernel_option` attribute value is ignored.
`locality=`	This attribute specifies the geographic location of the client system. Valid values for this attribute are located on an installed system in the `/etc/zoneinfo` directory, which contains an entry (a file or a directory) for each geographic location. During a RIS installation cloning process, this value is automatically set to the geographic location of the RIS server. A null value means that the installation process becomes interactive during the installation configuration phase to request a geographic location.
`password=`	This attribute specifies to the installation process the encrypted `root` password for the client system. The presence of a value here means that all cloned systems share the same `root` password. A null value means that the installation process becomes interactive during the installation configuration phase to request a password. Because the value of `password=` must be encrypted, you cannot manually enter a new value for this attribute.

Table B-5: (continued)

Attribute	Definition
`timeset=`	This attribute specifies to the installation process that the system date and time have already been set on the client system. In the case of a RIS full installation or RIS installation cloning, this value is always set to `yes`. Valid values are: `no`- System date and time have not been set. The installation process becomes interactive to request the date and time. `yes`- System date and time have been set. For CD–ROM installations, users should verify the accuracy of the date and time after logging in for the first time because the installation process may not have set it correctly.
`timezone=`	This attribute specifies the time zone within a specific geographic location (if applicable). Valid values for this attribute are located in the subdirectories of the `/etc/zoneinfo` directory. During a RIS installation cloning process, this value is automatically set to the time zone of the RIS server. The value of `timezone` must be a valid time zone for the geographic location defined in the `locality=` attribute. For example, if `locality=US`, only time zones in the United States are valid. If the geographic location does not have a time zone, leave this value null. The installation process recognizes geographic locations that do not have time zones, and will not request a time zone during the configuration phase. If the geographic location has valid time zones, a null value means that the installation process becomes interactive during the installation configuration phase to request a time zone.

B.7 Generating or Selecting an Appropriate CDF

When generating a CDF through the installation of a system or selecting which CDF to use to clone other similar systems, you must consider the disk configuration, graphics adapter, font sizes and keyboard types of the systems to be cloned. Ideally, however, you should clone systems with identical

hardware configurations.

To reduce the disk space required when Digital UNIX is installed, the software required to support the different graphics adapters, font sizes, and keyboard types has been packaged so that only the software subsets required to support options present on the system are mandatory and installed automatically. All other software subsets are considered optional and are not installed unless you specifically select them. Determining the mandatory software subsets for a system is done automatically by the installation process and guarantees that only appropriate software subsets are installed.

However, when a system is installed using installation cloning, the software subsets installed onto the system are defined in the CDF. Therefore, if the system to be cloned has a different graphics adapter, font size, or keyboard type than the system on which the CDF was created, the appropriate software subsets will not be installed and the cloned system may not be usable.

To generate a CDF that is versatile enough for use across differing systems, you may want to consider installing a system to use as a model. That is, perform a custom installation on a model system so that the CDF generated from that installation is usable by systems with different graphics adapters, font sizes, and keyboards. You do this by installing the software subsets to support all graphics adapters, font sizes, and keyboard types required by the systems to be cloned even though they are not required by the model system.

Acceptable differences in disk configuration, graphics adapter, font sizes, and keyboard type are explained in the following sections.

B.7.1 Acceptable Differences in Disk Configurations

The system to be installed by the installation cloning process should have the same hardware configuration as the system where the CDF was generated. However, it is possible to support slight differences in configuration.

The system to be cloned must have the same disk configuration for the disks on which `root`, `usr`, `swap1`, `var` (if it is not a directory under `/usr`) and `swap2` (if allocated) are to be installed as the system on which the CDF was generated. The same disk configuration means that the disk type (for example `RZ26`) and the device name (for example `rz0`) must match. If the partition tables for these disks are not identical on both systems, the software defined in the CDF may not fit on to the system to be cloned or would overlap the disk partitions.

Note

You may want to consider writing a `preinstall` script to install a common disk label on all systems to be cloned. Example B-2 contains a sample script that installs a common disk label.

It does not matter if disks other than those used for the file systems and swap areas created during an installation are different on the system to be cloned.

Table B-6 illustrates acceptable differences in disk configuration between a CDF generated from a model system and a system to be cloned.

Table B-6: Acceptable Differences in Disk Configuration Between a Model System and a System to be Cloned

System	Disk Type	Device Name
model system	RZ26	rz0[a]
	RZ25	rz1
system to be cloned	RZ26	rz0
	RZ26	rz1

Table Note:

a. The / (root), and /usr file systems and swap1 space are located on the rz0 device on the model system.

Assuming there are no other differences in disk configuration, the system to be cloned can use the CDF generated from the model system. The difference in disk type at device name rz1 is acceptable because the file systems and swap space were not placed on it. If the disk device at rz0 were different, however, an installation cloning could not be performed.

B.7.2 Considering Differences in Graphics Adapters

When you install a model system from which you will use the CDF to clone other systems, you must consider the graphics options of the systems that will be cloned. If any of the systems to be cloned have different graphics options, the software subsets required to support the graphics options needed by those systems must be installed on the model system.

When selecting software subsets, look in the `Windowing Environment` category for software subsets starting with the words `X Servers for` *<name>*. Replace *<name>* with the name that describes the graphics options supported by the software subset. In Digital UNIX Version 4.0A, the

following graphics software subsets are available:

- `X Servers Base` - Device independent X Server support (always installed)
- `X Servers for Open3D` - Supports the ZLXp-L graphics adapter
- `X Servers for PCbus` - Supports EISA bus and PCI bus graphics adapters
- `X Servers for TurboChannel` - Supports TurboChannel bus graphics adapters

Note

`X Servers for PCbus` adapters supported by Digital UNIX are specified in the *Software Product Description* (SPD).

Table B-7 displays the graphics adapters on a model system and a system to be cloned. The hardware configuration of the model system and the system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

Table B-7: Differences in Graphics Adapters Between a Model System and a System to be Cloned

System	Graphics Adapter
model system	`Open3D`
system to be cloned	`QVision (PCbus)`

During the installation of the model system, the `X Servers for Open3D` software subset is considered mandatory for the model system and is automatically installed. The `X Servers for PCbus` software subset is considered optional for the model system. Installing this optional software subset on the model system ensures that the appropriate software is available for the system to be cloned. If you do not install the `X Servers for PCbus` onto the model system, the graphics capabilities of the system to be cloned are likely to be disabled.

Caution

Do not use the CDF from a system that does not have graphics capabilities to clone systems that have the hardware to support graphics. There are several software subsets, most notably those associated with the common desktop environment (CDE), that will not be loaded on systems without graphics capabilities that are mandatory for systems with graphics capabilities. If you use a CDF from a system without graphics capabilities to clone a system with graphics capabilities, the desktop environment on the cloned system will be corrupted.

If you are unsure of which graphics options are available on the systems you want to clone, install all of the graphics software subsets that are available. However, installing all of the software subsets requires more disk space than loading only selected graphics software subsets.

B.7.3 Considering Differences in Font Size

To reduce the disk space required when Digital UNIX is installed, the software required to support the `75dpi` (dots per inch) and `100dpi` font sizes are contained in separate software subsets.

During an installation cloning, the font software subsets to be installed are defined in the CDF. If the system to be cloned requires a different size font than those defined by the software subsets in the CDF, the system to be cloned will not have the appropriate fonts loaded.

When generating the CDF through the full installation of a model system, you must consider the font sizes required by the systems to be cloned from the CDF. If the systems to be cloned require different size fonts, load the appropriate font software subset when installing the model system.

The need for `DECwindows 75dpi Fonts` or `DECwindows 100dpi Fonts` depends on the resolution of the graphics adapter being used. On a system already installed with Digital UNIX, this value can be determined by entering the following command:

```
# sizer -gr
```

When the resolution is 1024x768 or less, the `DECwindows 75dpi Fonts` are required. When the resolution is greater, the `DECwindows 100dpi Fonts` are required. If you are unsure of the resolution available on the systems to be cloned, select both font software subsets to ensure that the correct font is available.

Systems with multiple graphics adapters may require both the `DECwindows 75dpi Fonts` and `DECwindows 100dpi Fonts` if the adapters include those with 1024x768 or less resolution and those with greater resolution.

While there are other software subsets that contain fonts, only the DECwindows fonts are packaged separately by size.

Table B-8 displays the different font sizes required on a model system and a system to be cloned. The hardware configuration of the model system and the system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

Table B-8: Differences in Font Sizes Between a Model System and a System to be Cloned

System	Graphics Resolution	Required Font Size
model system	1024x680	DECwindows 75dpi Fonts
system to be cloned	1280x1024	DECwindows 100dpi Fonts

During the installation of the model system, the `DECwindows 75dpi Fonts` software subset is mandatory and is installed automatically; the `DECwindows 100dpi Fonts` software subset is optional. You should install the optional software subset to provide the necessary fonts for the installation cloning of the client system.

If you are unsure of the fonts available on the systems you want to clone, you can ensure that you provide the appropriate fonts by installing all of the font software subsets onto the model system. Installing all of the font software subsets will require more space than loading selected fonts.

B.7.4 Considering Differences in Keyboard Type

To reduce the disk space required when Digital UNIX is installed, the software subsets required to support the different Digital keyboard types is contained in separate software subsets.

During an installation cloning, the keyboard support software subset to be installed is defined in the CDF. If the system to be cloned has a different keyboard type than the model system, the cloned system will not have the appropriate keyboard software installed.

When generating the CDF through the installation of a model system, you must consider the keyboard type of the systems that will be cloned using the CDF. If the systems that will be cloned have different keyboard types, load the appropriate keyboard support software subset when installing the model system. The keyboard type can be determined from information available when the system is in console mode or by looking at the model number on the underside of the keyboard.

Table B-9 displays the keyboard types on a model system and a system to be cloned. The hardware configuration of the model system and the system to be cloned are determined to be similar enough to allow the CDF from the model system to be used for the installation cloning.

Table B-9: Differences in Keyboard Types Between a Model System and a System to be Cloned

System	Keyboard Type
model system	PXCAL
system to be cloned	LK444

During the installation of the model system, the software subset `PCXAL Keyboard Support` is mandatory and is installed automatically. The software subset for `LK444 Keyboard Support` is optional. Selecting this optional software subset results in some unnecessary software being loaded on the model system but allows the CDF to be appropriate to clone the client system.

If you are unsure of the keyboard types available on the systems you want to clone, you can ensure that you provide the appropriate keyboard type by installing all of the keyboard software subsets. However, loading all keyboard software subsets will require more disk space than loading selected keyboard software subsets.

B.8 Modifying Attributes in the CDF to Achieve Unattended Installations

Digital recommends that only experienced system administrators modify the attributes-value pairs in the CDF. Before modifying the CDF, make sure you read the information in the Caution in Section B.6.2.

Do not modify the original CDF located in the `/var/adm/smlogs` directory of an installed system. Instead, make a copy of `install.cdf` and modify the copy. The original `install.cdf` file contains information related to the system installation that could be valuable for future use. You should retain the `install.cdf` file in the `/var/adm/smlogs` directory.

Some attribute-value pairs must be manually added to the CDF for an installation cloning process because the installation interfaces do not currently provide the ability to set these values. The following sections describe the attribute-values pairs that can be manually added to the CDF to attain unattended installations.

B.8.1 Errors in the CDF

While modifying a CDF, a common error is to include a trailing blank space after an attribute-value pair. If the validation process detects a trailing blank space in the CDF, a message similar to the following will be displayed:

```
----------------------------------------
Some errors occurred:
SetItmAttr: invalid attribute value kernel_option=all
----------------------------------------
```

This error causes the installation process to stop. In the previous example, the validation process found a trailing blank space after the word `all` in the `kernel_option=all` attribute-value pair. The corrective action is to edit the CDF and remove the blank space. Then, restart the installation process at the client system.

B.8.2 Modifying the CDF Confirmation Attribute

Previous versions of the installation cloning process required the user to confirm that the CDF was to be used to start an installation cloning rather than a full installation. The purpose of this confirmation was to protect a system from an inadvertent installation cloning if the system was mistakenly still registered to a RIS environment and CDF.

The CDF confirmation question is now configurable through the `prompt=` attribute-value pair in the `Inst_islinfo` item in the CDF. The value of the `prompt=` attribute determines whether confirmation is required before the CDF is used to start an installation cloning process. Valid values are:

- `prompt=yes`- means that the user will be asked to confirm that the CDF should drive the installation cloning process.
- `prompt=no`- means that the installation cloning process will bypass the CDF use confirmation question and begin an installation cloning process automatically.

If this attribute-value pair is not defined or is null, the installation cloning process defaults to `prompt=yes`.

A portion of a CDF in the following example shows you where to include the `prompt=` attribute-value pair in the `Inst_islinfo` item:

```
install:

_item=Inst_islinfo
prompt=no
media_type=CDROM
server=cosmo
_action=create
srcloc=/ALPHA/BASE
```

B.8.3 Modifying the Tailored Kernel Build Attribute

A Digital UNIX default installation provides a noninteractive kernel build with mandatory kernel options enabled. A custom installation provides an interactive kernel build and allows you to tailor the kernel by allowing you to select mandatory and optional kernel options.

The `kernel_option` attribute in the `Inst_cinstall` item allows a noninteractive tailored kernel build with all kernel options (mandatory and optional) or mandatory kernel options only. In addition, the `interactive` value can be specified to allow you to tailor the kernel. The values for the `kernel_option` attribute are defined as follows:

- `kernel_option=interactive`- Provides an interactive kernel build. This is the default setting for this attribute.
- `kernel_option=mandatory`- Provides a noninteractive kernel build that selects mandatory kernel options only.
- `kernel_option=all`- Provides a noninteractive kernel build that selects all (mandatory and optional) kernel options.

A portion of a CDF in the following example shows you where to include the attribute-value pair into the `Inst_cinstall` item:

```
install:

_item=Inst_cinstall
kernel_option=all
password=SdDt78fuPrMkE
timeset=yes
timezone=Eastern
locality=US
_action=create
hostname=kramer
```

Kernel build failures that occur during a noninteractive kernel build cause the kernel build process to become interactive and provides the user with options for proceeding.

B.8.4 Modifying Site- and System-Specific Attributes

You must read this section if you plan perform installation cloning from CD–ROM.

Setting site- and system-specific information such as host name, geographic location, time zone, date, and time are trivial in the case of a RIS installation because these values are obtained from the RIS server automatically during the installation. This statement is true for full installations from RIS or from a RIS installation cloning process.

In the case of a standalone system installed by a CD–ROM installation cloning process, however, setting these values must be determined from the CDF that drives the installation cloning. If the CDF does not define these attributes, the values must be entered interactively during the configuration phase of the installation cloning process that occurs after software has been loaded.

The system-specific attributes to be considered are:

- Host Name

  A system's host name is contained in the `hostname=` attribute-value pair in the `Inst_cinstall` item. Refer to the *Installation Guide* if you need guidelines for choosing a proper host name. Host names for client systems that exist on the same network must be unique. If the `hostname=` attribute does not exist in the CDF, or if the value associated with this attribute is null, the installation process becomes interactive during the configuration phase of the installation cloning process to request this information.

- Password

  Be aware that an encrypted value in the `password=` attribute means that all cloned systems share the same `root` password. You may want to consider leaving this value null so that the installation process becomes interactive to request a `root` password. For security reasons, sharing passwords among systems is not recommended. If you choose to retain the encrypted password in the CDF, remember that the password came from the model system and you should change the password on that model system to protect it from unauthorized users.

  Because the value of the `password=` attribute must be encrypted, this value cannot be manually set.

  If you need to change the password on the model system, the *Installation Guide* contains guidelines for choosing appropriate passwords.

The site-specific attributes to be considered are:

- Geographic Location and Time Zone

  A system's geographic location and time zone are contained in the `locality=` and `timezone=` attribute-value pairs in the `Inst_cinstall` item. On a system already installed with Digital UNIX Version 4.0A, valid values for these attributes are located in the `/etc/zoneinfo` directory. The *Installation Guide* defines the acronyms shown in the `/etc/zoneinfo` directory. Geographic locations that are divided into time zones are shown as directories in `/etc/zoneinfo`. The contents of the `/etc/zoneinfo` directory is similar to the following. Geographic locations directories are identified

by a slash (/):

```
Australia/  GMT      GMT+7    GMT-6    GMT4       Japan     Singapore
Belfast     GMT+0    GMT+8    GMT-7    GMT5       Libya     SystemV/
Brazil/     GMT+1    GMT+9    GMT-8    GMT6       London    Turkey
CET         GMT+10   GMT-0    GMT-9    GMT7       MET       UCT
Canada/     GMT+11   GMT-1    GMT0     GMT8       Mexico/   US/
Chile/      GMT+12   GMT-10   GMT1     GMT9       NZ        UTC
Cuba        GMT+13   GMT-11   GMT10    Greenwich  NZ-CHAT   Universal
Dublin      GMT+2    GMT-12   GMT11    Hongkong   Navajo    W-SU
EET         GMT+3    GMT-2    GMT12    Iceland    PRC       WET
Egypt       GMT+4    GMT-3    GMT13    Iran       Poland    Zulu
Factory     GMT+5    GMT-4    GMT2     Israel     ROC       localtime@
GB-Eire     GMT+6    GMT-5    GMT3     Jamaica    ROK       sources/
```

The geographic location directories contain the time zones within that specific geographic location. When you specify a value for `locality=`, you must choose a valid time zone for that geographic location.

When the geographic location (and when relevant, time zone) are specified in the CDF, these values are used to configure the system accordingly.

If the `locality=` and `timezone=` attributes do not exist in the CDF, or if the value associated with these attributes is null, the installation process becomes interactive during the configuration phase to request this information. A `locality=` attribute can be present without a `timezone=` attribute because not all geographic locations are divided into time zones. For example, the geographic location `Japan` does not have time zones. In that situation, the installation process recognizes the fact that Japan does not have time zones and bypasses the request for a time zone.

- Date and Time

  It is not possible to specify dynamic values such as date and time in a CDF and still retain accuracy at the cloned system. The ability does exist, however, for the CDF to indicate that the date and time have been previously set either by invocation of one of the installation interfaces, or through a RIS installation cloning invocation. The method used is the `timeset=` attribute-value pair in the `Inst_cinstall` item:

  – `timeset=no`- Means that the system date and time have not been previously set. The installation cloning process becomes interactive to acquire this information.

  – `timeset=yes`- Means that the system date and time have been previously set. It is possible through the use of the `timeset=` attribute set to `yes` to continue the installation in an unattended fashion, even if the system time had not been actually set. The value of date and time is undetermined until the first user logs in and sets

the date and time to the proper value using the `date` command.

B.9 Creating preinstall Files

The installation process tests for the existence of customer supplied files at predefined invocation points. The first invocation point is between the creation of the memory file systems (MFS) and the search for a CDF. At this point, the installation process searches for a file named `preinstall`, which is a user-supplied script, program, or executable containing specific actions to be carried out before the file system creation and software subset load phases of the installation process.

Actions to be carried out before file system are created and software subsets are loaded might include writing a customized disk label to one or more disks.

You would not want the `preinstall` file to execute any function that requires the installed file systems and software to be available because these phases of the installation have not yet been completed.

The user-supplied file must be named `preinstall`, and the `preinstall` file and any files that it calls require execute permission.

It is not necessary that this file be contained on the same media on which the CDF and `postload` files are found.

If execution of the `preinstall` file fails, the `preinstall` file is responsible for supplying its own status or error messages. Digital does not guarantee the results of executing the script or program but does guarantee that upon successful completion, the installation process proceeds.

The installation process queries the return status from the execution of the `preinstall` file and terminates the installation process if a non-zero return status is received.

The installation process searches for the `preinstall` file in the following order of priority:

1. The `/(root)` directory of diskette drive `fd0` or `fd1`. If a diskette is used, it requires a standard UNIX File System (UFS).
2. The `/var/adm/ris/clients/sets/`*`profile_set`* directory on the RIS server. Profile set directories are created by the RIS or system administrator. Refer to Section B.11.2 for more information about profile set directories on RIS servers.
3. In the `/isl` directory of the distribution media or to the `/isl` directory of an extracted RIS area

The sample `preinstall` script shown in the following example applies a customized disk label to an `RZ26` disk.

Example B-2: Sample preinstall Script

```
#!/sbin/sh

#
# Write a custom disk label to the
# system disk before staring the installation.
#

# NOTE:  THIS FILE ASSUMES A HARDCODED VALUE OF rz0 AND RZ26 TO ACT UPON

#
# Make the device special file for rz0
#
(cd /dev; ./MAKEDEV rz0)

      #
      # First, zero the label
      #
      2>/dev/null disklabel -z rz0

      #
      # Next, restore the label
      #
      disklabel -Rr rz0 ./DLSAVE RZ26 ||                    1
      {
            echo "\nError restoring disklabel on rz0\n"
            exit !
      }

      echo "\nThe disklabel that has been applied is:\n"
      disklabel -r rz0 | tail -10
        exit 0
```

1 The DLSAVE file called by the `preinstall` script must reside in the same directory as the `preinstall` script.

The sample DLSAVE file required by the `preinstall` script is shown in Example B-3. The DLSAVE file contains a disk label that was created by reading the disk label of the disk at `rz0` and redirecting the output into a file. To create this file, you would enter commands similar to the following:

```
# disklabel -r rz0 > DLSAVE
```

Example B-3: DLSAVE File Required By the Sample preinstall Script

```
# /dev/rrz8a:
type: SCSI
disk: rz26
label:
flags:
bytes/sector: 512
sectors/track: 57
tracks/cylinder: 14
sectors/cylinder: 798
cylinders: 2570
```

Example B-3: (continued)

```
sectors/unit: 2050860
rpm: 3600
interleave: 1
trackskew: 0
cylinderskew: 0
headswitch: 0          # milliseconds
track-to-track seek: 0 # milliseconds
drivedata: 0

8 partitions:
#      size  offset  fstype [fsize bsize  cpg]
 a:  131072       0  4.2BSD   1024  8192   16  # (Cyl.    0 - 164*)
 b:  262144  131072  unused   1024  8192       # (Cyl.  164*- 492*)
 c: 2050860       0  unused   1024  8192       # (Cyl.    0 - 2569)
 d:  552548  393216  unused   1024  8192       # (Cyl.  492*- 1185*)
 e:  552548  945764  unused   1024  8192       # (Cyl. 1185*- 1877*)
 f:  552548 1498312  unused   1024  8192       # (Cyl. 1877*- 2569*)
 g: 1210000  393216  4.2BSD   1024  8192   16  # (Cyl.  492*- 2009*)
 h:  447644 1603216  4.2BSD   1024  8192   16  # (Cyl. 2009*- 2569*)
```

B.10 Creating postload Files

Upon completion of the file system creation and software subset load phases and the preparation of the configuration environment for the pending configuration phase, the installation process searches for a file named `postload`, which contains specific actions to be carried out.

Actions to be carried out after software subsets are loaded might include creating additional file systems or installing additional software that was not installed as part of the Digital UNIX base operating system.

The `postload` file and any files that `postload` calls require execute permission. The installation process searches for this file in the same order of priority as the `preinstall` script shown in the previous section.

It is not necessary that this file be contained on the same media on which the CDF and `preinstall` file are found.

The installation process queries the results of the execution of the `postload` file and terminates the installation process upon a non-zero return status.

It is important to know that at this invocation point, the newly created `root`, `/usr`, and `/var` file systems on the magnetic media are mount-relative with respect to the directory `/mnt` until the system is rebooted from the default boot device. That is, the root file system is `/mnt`, the `usr` file system is `/mnt/usr`, and so on.

The sample `postload` script shown in Example B-4 is creating a new file system called `users` and is then adding the entry into the `/etc/fstab` file to mount the new file system upon every reboot.

Example B-4: Sample postload Script

```
#!/sbin/sh
#
# postload - script which is invoked after the subset load of a full
#     installation.  The script creates a new file system and
#     adds an entry in the fstab file.  Doing this will make the
#     file system available as soon as the installation completes.

#
# Create a new file system on rz2c which is to be mounted at /usr/users
#

echo "postload:  creating new file system on rz2c\n"

# First, make sure that all device special files exist

(cd /dev; ./MAKEDEV rz2)

# Next, create the UFS file system on rz2c, an RZ26L disk.

/usr/sbin/newfs -F /dev/rrz2c RZ26L ||
{
      echo "postload:  failed to create a new file system on rz2c\n"

      # We consider this a nonfatal error and allow the install to
      # continue.  This is done by returning 0.  Otherwise, exit with a
      # non-zero value.

      exit 0
}

# Next, add an entry to fstab so that this new file system is
# automatically mounted when the system boots.

# NOTE:  the actual installed file systems are mounted at /mnt.
# Therefore, we want to add the entry to /mnt/etc/fstab and
# not /etc/fstab.

echo "/dev/rz2c  /usr/users  ufs rw 1 2" >> /mnt/etc/fstab

# Finally, make sure the mount point is created.  Once again, create it
# relative to /mnt.

/bin/mkdir /mnt/usr/users

# Process complete!

exit 0
```

B.11 Moving the CDF and Files to the Appropriate Destination

It is the administrator's responsibility to place the `install.cdf` file, the `preinstall` and `postload` files and all files required by `preinstall` and `postload` into the appropriate directories so the installation process

can find them. Depending upon how you want to deliver the CDF and all related files, you can copy them to the following destinations:

- The / (root) directory of diskette drive fd0 or fd1. Refer to Section B.11.1 for more information about formatting the diskette and copying the CDF and files there.
- The /var/adm/ris/clients/sets/*profile_set* directory on the RIS server to which the client system is registered. Refer to Section B.11.2 for more information about moving the CDF and files to a profile set on the RIS server.
- The /isl directory of a CD–ROM image. Refer to Section B.11.3 for information about burning data onto a CD–ROM. You can also move the the files to the /isl directory of an extracted RIS area.

During an installation cloning, the cloning process searches for the CDF and user-supplied files in the following order of priority:

1. Diskette drive fd0 or fd1
2. The /var/adm/ris/clients/sets/*profile_set* subdirectory on the RIS server
3. The /isl directory on the distribution media (local CD–ROM or extracted RIS area). Refer to Section B.11.2.1 for things to consider when moving files to an extracted RIS area.

B.11.1 Moving the CDF and Files to a Diskette

Before you can copy the CDF and user-supplied files to the diskette, you must first format the diskette, write a new disk label, and then create a new file system using the following command syntax:

fddisk -fmt *raw_diskette_device*

disklabel -wr *diskette_drive disk_type*

newfs *raw_diskette_device_partition*

Use commands similar to the following to format the diskette in diskette drive fd0, write a new disk label specifying the rx23 type of diskette, and creating a new file system on the entire diskette (partition c):

1. Enter commands similar to the following to format a diskette drive fd0:

   ```
   # fddisk -fmt /dev/rfd0
   ```

2. Enter commands similar to the following to to write a new disk label to

an rx23 type of diskette. The diskette type is printed on the diskette.

```
# disklabel -wr fd0 rx23
```

3. Use commands similar to the following to create a new file system on the entire diskette, the c partition:

```
# newfs /dev/rfd0c
```

If either the preinstall or postload files are located on the diskette, all files called by the preinstall or postload files must be located on the diskette.

Use commands similar to the following to mount the diskette drive and copy the CDF and all related files to the diskette:

1. Mount the diskette drive on the /mnt mount point:

```
# mount /dev/fd0c /mnt
```

2. Enter the chmod command to ensure all files have execute permissions:

```
# chmod 777 *
```

The asterisk (*) is a wildcard character that represents all files in the directory.

3. Assuming that you are in the directory in which the files are located, enter the following copy commands to copy the files to the diskette:

```
# cp ./install.cdf /mnt/install.cdf
# cp ./preinstall /mnt/preinstall
# cp ./postload /mnt/postload
# cp ./file_name /mnt/file_name
```

4. Unmount the diskette drive:

```
# umount /mnt
```

B.11.2 Moving the CDF and Files to a RIS Server

The Remote Installation Services utility (RIS) has been modified to support client registration to both RIS environments and profile set directories. RIS maintains the CDFs and user-supplied files in logically organized subdirectories that are created by the RIS administrator. These subdirectories, known as **profile sets** must be located within the /var/adm/ris/clients/sets directory. The administrator uses the mkdir command to make profile set directories.

A profile set is a directory that contains the files used during an installation process. The sets directory can contain many profile sets. Each of the profile set directories may contain a CDF (install.cdf), a preinstallation (preinstall) file, a postinstallation file (postload), and all files called

by the preinstall and postload files. All files are optional; they can be used independently or in any combination. It is the RIS administrator's responsibility to place the appropriate files into the correct profile set directory.

The profile_set directories you create depend upon your working environment and how you want to logically organize the functions of the CDFs and files. If, for example, your site or facility requires engineering workstations to be installed and configured different than the workstations in the accounting department, you might want to create two profile set directories; one named engineering and one named accounting. Those profile sets would contain the CDFs and files that were created to suit the configuration needs of both departments.

Another hypothetical situation for defining profile sets is one in which separate CDFs and files are maintained for server type systems and workstation type systems. Profile set directories named server and workstation might be set up under that scenario.

Use procedures similar to the following to copy the CDF, preinstall and postload files, and related files to a profile set directory:

1. Change to the /var/adm/ris/clients/sets directory, and using the naming scheme of your choice, create a profile set directory with an appropriate name:

   ```
   # cd /var/adm/ris/clients/sets
   # mkdir engineering
   ```

2. To ensure files are copied to the correct directory, change to the new profile set directory:

   ```
   # cd engineering
   ```

3. Using the copy tool you usually use (for example, ftp, dcp, or ,rcp) copy the modified CDF and optionally the preinstall, postload, and all other related files from your working area to the new engineering profile set directory.
4. Enter the chmod command to ensure all files have execute permissions:

   ```
   # chmod 777 *
   ```

   The asterisk (*) is a wildcard character that represents all files in the directory.

After you copy the appropriate CDF and other files to the profile sets directory, you can register RIS clients for installation cloning or for user-defined file invocation during a full RIS installation. You do this by registering new clients to a RIS environment as well as to a profile set. If a RIS client is registered to a profile set and boots across the network to start an installation, the order of priority in which a search for a CDF and other

optional files is done is shown in Section B.11. If a CDF is found, it is retrieved and used by the installation process to provide the answers to all installation configuration questions.

B.11.2.1 Moving Files to an Extracted RIS Area

If an `install.cdf`, `preinstall`, or `postload` file is moved to the `/isl` area of an extracted RIS area, the files will be used by all client systems installing from that RIS area.

If this action is not appropriate, the administrator should create profile set directories to supply these files on a client-by-client basis.

B.11.2.2 Changes to the RIS Interface

The following changes have been made to the Digital UNIX Version 4.0A RIS interface to accommodate the addition of profile set directories:

- When RIS is invoked for the first time on a system that has been updated to Digital UNIX Version 4.0A that previously supported Digital UNIX Version 4.0 installation cloning, the existing RIS area is converted. In previous versions of Digital UNIX, CDFs were located in the `/var/adm/ris/clients/cdf` directory and could have any file name.

  The conversion process converts all existing CDFs into profile set directories. The new profile set directory has the same name as the original CDF and the original CDF is renamed to `install.cdf`. If the original CDF name could not be used to name the new profile set directory, a unique profile set name is created by appending a digit (starting with the number one) to the original CDF name.

  The first time RIS is invoked after Digital UNIX Version 4.0A has been installed, messages similar to the following are displayed:

  ```
  Converting old cdf directory to new sets directory format...
  CDF File acctng moved to set acctng and renamed install.cdf
  CDF File acctng.cdf moved to set acctng1 and renamed install.cdf
  CDF File acctng1.cdf moved to set acctng11 and renamed install.cdf
  CDF File acctng.cdf2 moved to set acctng12 and renamed install.cdf
  done
  ```

  After the conversion is done, these messages will not be displayed again.

- A question similar to the following is displayed during RIS client registration if at least one profile set directory exists. If no profile set

directories exist, the question will not be displayed.

```
Do you want to specify an Installation Profile Set
for Installation Cloning on this client? [y/n]
```

If you enter `y`, a list of available profile sets is displayed for selection.

```
This RIS server has the following Installation Profile Sets available:

acctng acctng1 acctng11 acctng12

Enter a set name or press <Return> to exit set selection: acctng

You have selected the acctng installation profile set.
This set contains the following files:
install.cdf preinstall postload DLSAVE
```

Once a profile set is selected, RIS validates the CDF to ensure that the software subsets specified in the CDF match the software subset names and software subset version numbers present in the RIS environment to which the client system is registered. No validation of the user supplied files is performed.

B.11.2.3 Registering a RIS Client to a Profile Set

Follow the general procedures in *Sharing Software on a Local Area Network* to register a client system to a RIS environment and a profile set. The *Sharing Software on a Local Area Network* guide was not updated to reflect the new prompts shown in Section B.11.2.2.

B.11.2.4 Determining Registration for RIS Clients

To determine if a RIS client is registered to a profile set, examine the RIS database file, `/var/adm/ris/clients/risdb`, on the RIS server. The name of the profile set is specified in the fourth field; fields are separated by a colon. In the following sample entry in the `risdb` file, the client system `kramer` is registered to the `engineering` profile set:

```
kramer:08-00-2b-58-89-1c:ris2.alpha,product_1:engineering
```

B.11.2.5 Removing a RIS Client from Profile Set Registration

You can remove a client from profile set registration by using the `Modify` option from the RIS Utility Main Menu. When you are prompted to specify a profile set for the client, enter `n` or press Return to register the client without specifying a profile set.

B.11.2.6 Deleting Profile Sets from the RIS Server

If a profile set is no longer needed, you can delete it by removing the appropriate *profile_set* directory from the directory /var/adm/ris/clients/sets.

Examine the RIS database file on the RIS server, /var/adm/ris/clients/risdb, before deleting a profile set to ensure that no clients are registered to it. The name of the profile set is specified in the fourth field; fields are separated by a colon (:). In the following sample entry in the risdb file, the client newman is registered to the accounting profile set:

```
newman:08-00-2b-58-89-1c:ris2.alpha,product_1:accounting
```

B.11.3 Burning the CDF and Files onto a CD–ROM

You can repackage the Digital UNIX Version 4.0A operating system CD–ROM to include CDFs and user-supplied files in the /isl directory.

Note

Copying software may only be done for the purposes of licensed use of Digital UNIX. A valid license agreement must be present for all instances of use of the copied Digital UNIX operating system.

Use the method you normally use to burn a CD–ROM if you plan to provide the install.cdf, preinstall, and postload files on a CD–ROM. The method you use depends upon the type of CD–ROM burner you have.

The basic steps to create an image and burn a CD–ROM are:

1. Mount the Digital UNIX Version 4.0A CD–ROM to determine how much disk space is required on the magnetic disk to which you will be copying the contents of the CD–ROM.

   For example, to mount the CD–ROM in drive /dev/rz4c on the directory /mnt, enter commands similar to the following:

   ```
   # mkdir /mnt
   # mount -r /dev/rz4c /mnt
   # cd /mnt
   ```

2. Enter the following command to determine disk space in kilobytes:

   ```
   # df -k
   ```

   Remember this figure and make sure you have a disk large enough to meet the space requirement.

3. Unmount the CD–ROM using commands similar to the following:

   ```
   # umount /mnt
   ```

4. Create an image of the operating system by copying the contents of a Digital UNIX Version 4.0A CD–ROM onto a disk that is at least as large as the figure obtained in Step 2.

   Use commands similar to the following to copy the contents of the CD–ROM to disk. In the example, the input file is the CD–ROM device, (`/dev/rz4c`), the output file is the magnetic disk (`/dev/rz2c`), and the input and output block size is 32 kilobytes (`32k`).

   ```
   # dd if=/dev/rz4c of=/dev/rz2c bs=32k
   ```

   Caution

   The output file (`of=`) must specify a disk partition that starts at block zero (usually `a` or `c`). Specifying a partition that does not start at zero (`0`) results in an operating system image that is not bootable.

5. Mount the disk to which you just copied the contents of the Digital UNIX Version 4.0A CD–ROM, and use the `cp` command to copy the `install.cdf`, `preinstall`, `postload` files and any files called by the files into the `/isl` directory of the image:

   ```
   # mount /dev/rz2c /mnt
   # cp ./preinstall /mnt/isl/preinstall
   # cp ./install.cdf /mnt/isl/install.cdf
   # cp ./postload /mnt/isl/postload
   # cp ./file_name /mnt/isl/file_name
   ```

6. Depending upon the type of CD–ROM burner you have, use the recommended method to burn a CD–ROM from the modified image on the disk.

   Note

   To ensure that you have a valid, bootable Digital UNIX Version 4.0A image, Digital recommends that you verify the ability to boot from the image before burning the CD–ROM.

Reference Page Update C

The doconfig(8) reference page has been updated for Version 4.0A.

NAME

doconfig – Builds the kernel described by system configuration files

SYNOPSIS

/usr/sbin/doconfig [-s | -b] [-a | -m] [-c *config_file*] [-d -n] [-e *ed_script*]

FLAGS

-a

Specifies a noninteractive kernel build that enables all (mandatory and optional) kernel options automatically. The -a flag creates a new system configuration file in /sys/conf/*SYSTEM_NAME* unless you also specify the -c flag, in which case the configuration file uses the existing /sys/conf/*SYSTEM_NAME*. If you specify the -c flag with a specific configuration file name along with the -a flag, the kernel is built with the kernel options already included in the configuration file; you will not be prompted to edit the configuration file.

You cannot use this flag with the –m flag, which provides a noninteractive kernel build that enables mandatory kernel options only.

-b

Specifies that you want to build a bootstrap linked kernel. A bootstrap linked kernel is built directly into memory, without writing an executable file to disk. To create the kernel, the bootstrap program reads a text file that describes the hardware and software support needed in the kernel.

You cannot use this flag with the –s flag, which builds an executable image file called /vmunix. The –b flag has no effect if specified with

the .–dflag

–c *config_file*
Specifies that you want to build a kernel using the existing configuration file, *config_file*. The configuration file resides in the /usr/sys/conf directory and is usually named using the system name, in uppercase letters. You must supply the name of the existing configuration file without specifying the pathname.

The /usr/sbin/doconfig program also uses any existing *config_file*.list file. If there is no *config_file*.list file, and a .product.list file exists, /usr/sbin/doconfig copies the .product.list file to the *config_file*.list file. These files must exist in the /sys/conf directory.

–d
Specifies that only device special files are created.

–e *ed-script*
Specifies that you want to run the specified ed editor script on the configuration file before a new kernel is built.

-m
Specifies a noninteractive kernel build that enables mandatory kernel options automatically. The -m flag creates a new system configuration file in /sys/conf/*SYSTEM_NAME* unless you also specify the -c flag, in which case the configuration file uses the existing /sys/conf/*SYSTEM_NAME*. If you include the -c flag with a specific configuration file name along with the -m flag, the kernel is built with the kernel options already included in the configuration file; you will not be prompted to edit the configuration file.

You cannot use this flag with the –a flag, which provides a noninteractive kernel build that enables all (mandatory and optional) kernel options.

–n
Builds a network-bootable kernel for Dataless Management Services (DMS) clients. The -n flag invokes the pmerge utility, which builds a stripped network-bootable kernel called .vmunix. This flag is used by the dataless management utility, dmu, during its configuration phase. For more information, refer to dmu(8) and pmerge(8).

–s
Specifies that you want to build a statically linked kernel. A statically linked kernel is a traditional kernel, built and stored in an executable image file called /vmunix. This flag is the default if you omit the –b and –s flags.

You cannot use this flag with the –b flag, which builds a bootstrap

linked kernel, or the `-d` flag. This flag has no effect when specified with the `-n` flag.

DESCRIPTION

The `/usr/sbin/doconfig` program builds a new kernel, optionally allowing you to edit the configuration file before the new kernel is built. You might need to build a new kernel when you:

- Add or remove hardware from your system
- Add or remove kernel subsystems from the kernel
- Tune the performance of your operating system

Depending on how you modify the system, you might be able to make the modification without rebuilding the kernel. In this case, you use dynamic configuration commands, such as the `sysconfig` command, to modify the system. For information that helps you decide whether to use dynamic configuration commands or rebuild the kernel by using the `/usr/sbin/doconfig` program, refer to the *System Administration* guide. For more information about the `sysconfig` command, refer to the `sysconfig`(8) reference page.

If you need to rebuild the kernel using the `/usr/sbin/doconfig` program, you usually use a text editor to modify the system configuration file, `/usr/sys/conf/`*`config_file`*, the `/usr/sys/conf/param.c` file or the layered products configuration file, `/usr/sys/conf/`*`config_file`*`.list`. For information about the contents of these files, refer to the *System Administration* guide and the *System Tuning and Performance Management* guide.

After you modify the necessary files, run the `/usr/sbin/doconfig` program and use the `-c` flag.

For example, suppose you need to build a new kernel for a system named `mysys`. You edit the target configuration file, the `param.c` file, or the layered products configuration file and make some changes.

Follow these steps to rebuild your kernel:

1. Log in as `root` or become the superuser and set your default directory to the `/usr/sys/conf` directory.
2. Save a copy of the running kernel. If possible, save the file in the root

(/) directory, as follows:

```
# cp /vmunix /vmunix.save
```

If there are disk space constraints, save the kernel file in a file system other than root. For example:

```
# cp /vmunix /usr/vmunix.save
```

Note

Be aware that you cannot boot your system from a kernel in any directory other than the root directory. If you do not have a bootable kernel such as genvmunix in the root directory, and the new vmunix kernel is not bootable, you will have to boot the system from the distribution media to get your system to the UNIX shell. Then follow the procedures in the *Installation Guide* to mount the appropriate file systems and copy the saved vmunix to the root directory.

3. Run the /usr/sbin/doconfig program as follows:

   ```
   # /usr/sbin/doconfig -c MYSYS
   ```

   Messages similar to the following are displayed:

   ```
   *** KERNEL CONFIGURATION AND BUILD PROCEDURE ***
   Saving /usr/sys/conf/MYSYS as /usr/sys/conf/MYSYS.bck
   ```

4. Answer the following prompt to indicate whether or not you want to edit the configuration file:

   ```
   Do you want to edit the configuration file? (y/n) [n]:
   ```

   If you modified the configuration file before you started this procedure, enter n.

   If you enter y to edit the configuration file, the /usr/sbin/doconfig program invokes the editor specified by the EDITOR environment variable.

   After you finish editing the configuration file, the /usr/sbin/doconfig program builds a new kernel.

   When the /usr/sbin/doconfig program finishes, it displays a message showing the full pathname of the new vmunix kernel.

5. If you built a statically linked kernel by using the -s flag, which is the default, move the new vmunix kernel (from the location in the message

in step 3) to /vmunix as follows:

```
# mv /usr/sys/MYSYS/vmunix /vmunix
```

If you used the -n option, you must move .vmunix as well.

If you built a bootstrap linked kernel using the –b flag, follow the instructions displayed by the doconfig program to copy the built modules and new /etc/sysconfigtab file into place.

6. Reboot the system as follows:

```
# /usr/sbin/shutdown -r now
```

If the new vmunix kernel fails to boot, you can recover by booting the vmunix.save file that you created at the beginning of this procedure:

Note

If you copied and saved the vmunix kernel to a directory other than the root directory, and your system does not have a bootable kernel such as genvmunix in the root directory, you will have to boot the system from the distribution media to get your system to the UNIX shell. Then follow the procedures in the *Installation Guide* to mount the appropriate file systems and copy the saved vmunix to the root directory.

1. Check all local file systems using the fsck command with the -p option as follows:

```
# fsck -p
```

2. Write-enable the root file system using the mount command with the -u option as follows:

```
# mount -u
```

3. If necessary, mount the file system where the /vmunix.save file is stored. For example, if you copied the /vmunix file to the /usr file system, issue the following command:

```
# mount /usr
```

4. Restore the saved copy. For example, if you saved your running kernel in the /vmunix.save file, issue the following command:

```
# cp /vmunix.save /vmunix
```

If you saved your runnning kernel to the /usr/vmunix.save file,

issue the following command:

```
# cp /usr/vmunix.save /vmunix
```

5. Shut down and reboot the system as follows:

```
# shutdown -r now
```

After your system boots, you can reedit the configuration file and try to rebuild the new kernel by using the `/usr/sbin/doconfig` command.

For other examples of how to use the `/usr/sbin/doconfig` command to build a new kernel, refer to the *System Administration* guide.

FILES

`/sys/conf/`*`config_file`*
: Specifies the system configuration file, where *`config_file`* is usually the name of the system converted to uppercase letters. For example, for a system named `mysys`, the configuration file is named `MYSYS`.

`/sys/conf/`*`config_file`*`.list`
: Specifies the optional configuration file that is used by kernel layered products to extend the system configuration file. You can modify this file to remove kernel layered product entries by deleting or putting a comment character (#) in front of specific entries.

`/sys/conf/.product.list`
: Specifies the optional configuration file that is used by kernel layered products to register their configuration file requirements. This file is used as the basis for the *`config_file`*`.list` file and should not be modified.

`/sys/`*`system_name`*`/sysconfigtab`
: Specifies the name of the newly built text file describing the kernel.

`/sys/`*`system_name/system_name`*`.mod`
`/sys/`*`system_name`*`/EXTRAS.mod`
: Specifies the name of modules for a bootstrap linked kernel.

`/sys/`*`system_name`*`/vmunix`
: Specifies the name of the newly built static kernel.

`/sys/`*`system_name`*`/.vmunix`
: Specifies the name of the network-bootable kernel for DMS clients.

RELATED INFORMATION

Commands: `config`(8), `pmerge`(8), `dmu`(8)
Installation Guide
System Administration
Sharing Software on a Local Area Network

Software Subset Information D

This appendix provides the sizes of all Digital UNIX software subsets for full, update, and RIS installations.

D.1 Disk Space Required for Software Subsets

Table D-1 shows disk space as the number of 512-byte blocks required in the `root`, `/usr`, and `/var` file systems to install each Digital UNIX software subset. The figures for each group of files within a subset have been rounded up to the next higher 512-byte increment; this means that the total space requirements listed are slightly greater than the space actually required.

To determine the subset size in megabytes (MB), divide the size in blocks by 2048.

For information on the contents of each subset, refer to the *Installation Guide*. If you want to add optional subsets after you install Digital UNIX Version 4.0A, use the `df` command to determine free disk space in blocks.

Table D-1: Digital UNIX Software Subset Sizes

Digital UNIX V4.0A Operating System Subset	root	/usr	/var	Total
OSFACCT405	9.67	1077.52	91.03	1178.22
OSFADVFS405	4151.00	5846.36	—	9997.36
OSFADVFSBIN405	2260.07	3.06	—	2263.13
OSFADVFSBINOBJECT405	—	3701.19	—	3701.19
OSFAFM405	—	2160.73	—	2160.73
OSFATMBASE405	208.06	575.00	—	783.06
OSFATMBIN405	3657.35	12.22	—	3669.57
OSFATMBINCOM405	—	381.95	—	381.95
OSFATMBINOBJECT405	—	10289.30	—	10289.30
OSFBASE405	22330.90	71569.50	796.31	94696.71
OSFBIN405	13010.60	1359.71	—	14370.31
OSFBINCOM405	48.50	25211.40	—	25259.90
OSFBINOBJECT405	—	19836.60	—	19836.60
OSFC2SEC405	860.55	1346.47	84.00	2291.02
OSFCDAPGMR405	—	3309.47	—	3309.47
OSFCDEAPPS405	—	11300.80	—	11300.80

Table D-1: (continued)

Digital UNIX V4.0A Operating System Subset	root	/usr	/var	Total
OSFCDEDEV405	—	25955.30	—	25955.30
OSFCDEDT405	—	53149.20	—	53149.20
OSFCDEMAIL405	—	3354.43	—	3354.43
OSFCDEMANOP405	—	2132.41	—	2132.41
OSFCDEMANOS405	—	1588.62	—	1588.62
OSFCDEMIN405	—	14119.90	76.00	14195.90
OSFCLINET405	753.26	13321.50	41.00	14115.76
OSFCMPLRS405	—	27811.90	—	27811.90
OSFCTABLOC405	34.25	359.30	—	393.55
OSFDCMT405	—	1091.81	—	1091.81
OSFDCMTEXT405	—	4368.44	—	4368.44
OSFDECW405	—	1781.11	47.20	1828.31
OSFDMS405	—	87.09	73.00	160.09
OSFDOSTOOLS405	—	1005.00	—	1005.00
OSFDPSFONT405	—	5161.47	—	5161.47
OSFEMACS405	—	39719.50	—	39719.50
OSFEURLOC405	—	1664.22	—	1664.22
OSFEXAMPLES405	—	1393.29	—	1393.29
OSFEXER405	—	3387.00	—	3387.00
OSFFONT15405	—	3160.99	—	3160.99
OSFFONT405	—	2432.85	—	2432.85
OSFHWBASE405	18919.80	2936.55	34.40	21890.75
OSFHWBIN405	17465.80	1911.39	—	19377.19
OSFHWBINCOM405	—	2270.47	—	2270.47
OSFHWBINOBJECT405	—	16934.30	—	16934.30
OSFINCLUDE405	—	5142.15	—	5142.15
OSFINET405	527.84	6629.52	482.18	7639.53
OSFKBDLK201405	—	361.70	—	361.70
OSFKBDLK401405	—	248.44	—	248.44
OSFKBDLK411405	—	134.33	—	134.33
OSFKBDLK421405	—	16.42	—	16.42
OSFKBDLK444405	—	126.52	—	126.52
OSFKBDPCXAL405	—	273.12	—	273.12
OSFKTOOLS405	—	933.72	7941.71	8875.43
OSFLAT405	534.83	923.71	7.82	1466.36
OSFLDBBASE405	—	16272.00	—	16272.00
OSFLDBDOC405	—	35.89	—	35.89
OSFLDBGUI405	—	9610.11	—	9610.11
OSFLDBSRV405	—	163.72	—	163.72
OSFLEARN405	—	3097.86	—	3097.86
OSFLIBA405	—	7311.22	—	7311.22
OSFLSMBASE405	5152.67	3053.97	48.21	8254.85
OSFLSMBIN405	556.79	3.05	—	559.84
OSFLSMBINCOM405	—	461.96	—	461.96

Table D-1: (continued)

Digital UNIX V4.0A Operating System Subset	root	/usr	/var	Total
OSFLSMBINOBJECT405	—	608.27	—	608.27
OSFLSMX11405	—	2246.59	47.90	2294.49
OSFLVM405	—	2933.42	—	2933.42
OSFMANOP405	—	17006.30	—	17006.30
OSFMANOS405	—	12764.40	—	12764.40
OSFMANRT405	—	288.44	—	288.44
OSFMANWOP405	—	10772.00	—	10772.00
OSFMANWOS405	—	1637.77	—	1637.77
OSFMH405	—	4368.18	—	4368.18
OSFMITFONT405	—	18937.20	104.01	19041.21
OSFMOTIF11405	—	12847.10	—	12847.10
OSFNETCONF405	—	2303.64	—	2303.64
OSFNETSCAPE405	—	5720.06	—	5720.06
OSFNFS405	50.21	1164.45	—	1214.66
OSFNFSCONF405	—	337.90	—	337.90
OSFOBSOLETE405	—	1943.00	—	1943.00
OSFOLDDECW405	—	14977.30	—	14977.30
OSFOLDX11405	—	1394.37	—	1394.37
OSFPGMR405	—	9292.54	—	9292.54
OSFPRINT405	83.68	8011.23	19.00	8113.91
OSFRCS405	—	1853.84	—	1853.84
OSFRIS405	—	147.64	143.00	290.64
OSFRTDEV405	—	267.81	—	267.81
OSFSCCS405	—	8664.66	—	8664.66
OSFSDE405	—	15435.30	—	15435.30
OSFSDECDE405	—	284.69	—	284.69
OSFSER3D405	—	12130.00	—	12130.00
OSFSER405	—	14479.40	66.32	14545.72
OSFSERPC405	—	3493.00	—	3493.00
OSFSERTC405	—	694.00	—	694.00
OSFSVID2405	31.59	703.69	—	735.28
OSFSYSMAN405	8.56	4833.51	—	4842.07
OSFTCLBASE405	—	2808.22	—	2808.22
OSFTERM405	—	3669.57	—	3669.57
OSFTKBASE405	—	3705.68	—	3705.68
OSFUUCP405	101.73	10328.00	266.00	10695.73
OSFX11405	22.70	45837.50	692.48	46552.68
OSFXADMIN405	—	7190.08	73.19	7263.27
OSFXC2SEC405	—	1272.02	—	1272.02
OSFXCDADEV405	—	524.98	—	524.98
OSFXDEMOS405	—	2221.22	—	2221.22
OSFXDEV405	—	3369.41	—	3369.41
OSFXEXAMPLES405	—	9132.35	—	9132.35
OSFXIEDOC405	—	1478.88	—	1478.88

Table D-1: (continued)

Digital UNIX V4.0A Operating System

Subset	root	/usr	/var	Total
OSFXINCLUDE405	—	8301.93	—	8301.93
OSFXLIBA405	—	17048.00	—	17048.00
OSFXMAIL405	—	1186.56	—	1186.56
OSFXMIT405	—	9312.66	—	9312.66
OSFXNEST405	—	374.00	10.11	384.11
OSFXOEM405	—	0.00	965.87	965.87
OSFXPRINT405	—	336.43	—	336.43
OSFXSYSMAN405	—	10367.90	128.97	10496.87
OSFXVFB405	—	230.00	10.11	240.11
Total	90780.41	775115.82	12249.81	878146.03

Grand Totals	root	/usr	/var	Total
	90780.41	775115.82	12249.81	878146.03

Digital UNIX V4.0 CDE Instructional Video

Subset	root	/usr	/var	Total
CDEVIDEO100	—	156364.00	—	156364.00
CDEVIDPLR100	—	149.65	—	149.65
Total	—	156513.65	—	156513.65

Alternative Development Environment Tools for Digital UNIX V4.0A

Subset	root	/usr	/var	Total
CMPDEVALT405	—	10106.90	—	10106.90
CMPDEVENH405	—	886.18	—	886.18
Total	—	10993.08	—	10993.08

DEC Ada runtime library

Subset	root	/usr	/var	Total
ADALIB331	—	8961.64	—	8961.64
Total	—	8961.64	—	8961.64

DEC C++ Class Libraries Version 4.0 for Digital UNIX

Subset	root	/usr	/var	Total
CXLLIBA405	—	417.90	—	417.90
CXLSHRDA405	—	300.12	—	300.12
Total	—	718.01	—	718.01

DEC COBOL RTL V2.3-83 for Digital UNIX Systems

Subset	root	/usr	/var	Total
DCARTL230	—	4108.50	—	4108.50
O2ABASE230	—	2901.28	—	2901.28
Total	—	7009.78	—	7009.78

DECevent

Subset	root	/usr	/var	Total
DIABASE220	9.13	39328.60	213.56	39551.29
Total	9.13	39328.60	213.56	39551.29

DEC Fortran RTL

Subset	root	/usr	/var	Total
DFARTL369	—	4959.12	—	4959.12
Total	—	4959.12	—	4959.12

DEC Pascal RTL V5.4-18 for Digital UNIX Systems

Subset	root	/usr	/var	Total
DPORTL541	—	1890.15	—	1890.15
Total	—	1890.15	—	1890.15

Sort Runtime Library

Subset	root	/usr	/var	Total
SORLIB300	—	717.85	—	717.85
Total	—	717.85	—	717.85

DECtalk Runtime Kit V4.2A

Subset	root	/usr	/var	Total
DTKDFCRT420	—	18793.50	—	18793.50
DTKEMSRT420	—	1641.53	—	1641.53
DTKRT420	—	5845.04	—	5845.04
DTKRTCDE420	—	252.06	—	252.06
DTKRTDOC420	—	4661.71	—	4661.71
DTKRTRELNOT420	—	220.75	—	220.75
Total	—	31414.59	—	31414.59

Free Software Foundation GNU Source for Digital UNIX V4.0

Subset	root	/usr	/var	Total
FSFEMACSSRC405	—	55742.80	—	55742.80
FSFGAWKSRC405	—	1220.38	—	1220.38
FSFGZIPSRC405	—	1894.38	—	1894.38
FSFINDENTSRC405	—	1244.45	—	1244.45
FSFRCSSRC405	—	1907.18	—	1907.18
Total	—	62009.19	—	62009.19

Multimedia Services V2.2 for Digital UNIX

Subset	root	/usr	/var	Total
MMEDOC220	—	4701.01	—	4701.01
MMEDOCHW220	—	3685.72	—	3685.72
MMEDRVAV201220	76.07	875.85	—	951.92
MMEDRVAV300220	84.90	2214.22	—	2299.12
MMEDRVAV3X1220	70.95	1520.77	—	1591.72
MMEDRVBBA220	—	303.84	—	303.84
MMEDRVMSB220	72.98	844.34	—	917.32
MMEMANRT220	—	316.79	—	316.79
MMERELNOTES220	—	1006.84	—	1006.84
MMERT220	32.74	16084.40	—	16117.14
MMERTCDE220	—	467.70	—	467.70
MMERTSMPLDAT220	—	12385.80	—	12385.80
Total	337.65	44407.28	—	44744.92

POLYCENTER NetWorker Save, Restore, and Archive for Digital UNIX

Subset	root	/usr	/var	Total
BRXCKIT321	—	101780.00	—	101780.00
BRXRNOTES321	—	15294.40	—	15294.40
BRXSMAN321	—	1212.92	—	1212.92
BRXSOAKIT321	5.57	97764.60	—	97770.17

POLYCENTER NetWorker Save, Restore, and Archive for Digital UNIX

Subset	root	/usr	/var	Total
Total	5.57	216051.92	—	216057.49

Digital UNIX 4.0 X Window System PanoramiX Extension ADK

Subset	root	/usr	/var	Total
PRXADK100	—	2985.98	—	2985.98
Total	—	2985.98	—	2985.98

Performance Manager for Digital UNIX

Subset	root	/usr	/var	Total
PMGRAPP211	—	421.89	—	421.89
PMGRBASE211	107.62	4495.57	—	4603.19
PMGRCLUSTERS211	490.44	884.46	—	1374.89
PMGRGUI211	—	32503.50	—	32503.50
PMGRMAN211	—	75.22	—	75.22
PMGRUTIL211	1527.21	19.09	—	1546.30
Total	2125.27	38399.72	—	40524.99

Digital Porting Assistant V2.0-0 for Digital UNIX

Subset	root	/usr	/var	Total
PRTBASE200	—	50977.10	—	50977.10
PRTMAN200	—	13.72	—	13.72
Total	—	50990.82	—	50990.82

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSAACMENU405	—	0.00	—	—
IOSCACDEAPPS405	—	222.45	—	222.45
IOSCACDEDEV405	—	172.05	—	172.05
IOSCACDEDT405	—	1049.97	—	1049.97
IOSCACDEMAIL405	—	84.04	—	84.04
IOSCACDEMIN405	—	3968.55	—	3968.55
IOSCADECW405	—	150.65	—	150.65
IOSCAOLDDECW405	—	27.00	—	27.00
IOSCAX11405	—	337.33	—	337.33
IOSCAXDEV405	—	92.79	—	92.79
IOSCSCDEAPPS405	—	215.37	—	215.37

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSCSCDEDEV405	—	152.68	—	152.68
IOSCSCDEDT405	—	1207.61	—	1207.61
IOSCSCDEMAIL405	—	78.31	—	78.31
IOSCSCDEMIN405	—	474.07	—	474.07
IOSCSDECW405	—	704.62	—	704.62
IOSCSOLDDECW405	—	3976.19	—	3976.19
IOSCSOLDX11405	—	863.35	—	863.35
IOSCSUCSBASE405	—	124.20	—	124.20
IOSCSX11405	—	6619.21	—	6619.21
IOSCSXDEV405	—	92.66	—	92.66
IOSCSXMAIL405	—	334.78	—	334.78
IOSDECDEAPPS405	—	221.40	—	221.40
IOSDECDEDEV405	—	161.81	—	161.81
IOSDECDEDT405	—	1049.98	—	1049.98
IOSDECDEHLP405	—	18237.30	—	18237.30
IOSDECDEMAIL405	—	86.75	—	86.75
IOSDECDEMIN405	—	486.33	—	486.33
IOSDEDECW405	—	705.84	—	705.84
IOSDENETSCAPE405	—	506.08	—	506.08
IOSDEOLDDECW405	—	4004.22	—	4004.22
IOSDEOLDX11405	—	877.02	—	877.02
IOSDEX11405	—	6302.62	—	6302.62
IOSDEXDEV405	—	92.77	—	92.77
IOSDEXMAIL405	—	391.34	—	391.34
IOSELFONT100M405	—	1076.80	—	1076.80
IOSELFONT100P405	—	1080.35	—	1080.35
IOSELFONT75M405	—	918.43	—	918.43
IOSELFONT75P405	—	926.76	—	926.76
IOSELOLDDECW405	—	552.52	—	552.52
IOSELOLFONT405	—	1976.36	—	1976.36
IOSELUCSBASE405	—	102.09	—	102.09
IOSELX11405	—	355.61	—	355.61
IOSELXMAIL405	—	68.59	—	68.59
IOSESCDEAPPS405	—	217.63	—	217.63
IOSESCDEDEV405	—	160.00	—	160.00
IOSESCDEDT405	—	1061.50	—	1061.50
IOSESCDEHLP405	—	22239.00	—	22239.00
IOSESCDEMAIL405	—	85.09	—	85.09
IOSESCDEMIN405	—	498.11	—	498.11
IOSESDECW405	—	687.50	—	687.50
IOSESOLDDECW405	—	4031.10	—	4031.10
IOSESOLDX11405	—	886.37	—	886.37
IOSESX11405	—	6272.58	—	6272.58
IOSESXDEV405	—	92.82	—	92.82
IOSESXMAIL405	—	348.40	—	348.40
IOSFRCDEAPPS405	—	226.64	—	226.64

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSFRCDEDEV405	—	153.72	—	153.72
IOSFRCDEDT405	—	1044.86	—	1044.86
IOSFRCDEHLP405	—	18698.60	—	18698.60
IOSFRCDEMAIL405	—	88.34	—	88.34
IOSFRCDEMIN405	—	499.11	—	499.11
IOSFRDECW405	—	679.20	—	679.20
IOSFRNETSCAPE405	—	497.32	—	497.32
IOSFROLDDECW405	—	3990.56	—	3990.56
IOSFROLDX11405	—	870.65	—	870.65
IOSFRX11405	—	6298.06	—	6298.06
IOSFRXDEV405	—	92.91	—	92.91
IOSFRXMAIL405	—	365.20	—	365.20
IOSHUCDEAPPS405	—	217.01	—	217.01
IOSHUCDEDEV405	—	169.14	—	169.14
IOSHUCDEDT405	—	1196.93	—	1196.93
IOSHUCDEMAIL405	—	80.75	—	80.75
IOSHUCDEMIN405	—	3989.26	—	3989.26
IOSHUDECW405	—	676.65	—	676.65
IOSHUOLDDECW405	—	3981.59	—	3981.59
IOSHUOLDX11405	—	855.98	—	855.98
IOSHUUCSBASE405	—	108.20	—	108.20
IOSHUX11405	—	6472.63	—	6472.63
IOSHUXDEV405	—	92.76	—	92.76
IOSHUXMAIL405	—	342.43	—	342.43
IOSITCDEAPPS405	—	213.17	—	213.17
IOSITCDEDEV405	—	159.80	—	159.80
IOSITCDEDT405	—	1048.04	—	1048.04
IOSITCDEHLP405	—	14603.40	—	14603.40
IOSITCDEMAIL405	—	88.63	—	88.63
IOSITCDEMIN405	—	504.20	—	504.20
IOSITDECW405	—	682.54	—	682.54
IOSITOLDDECW405	—	4033.67	—	4033.67
IOSITOLDX11405	—	891.73	—	891.73
IOSITX11405	—	6357.72	—	6357.72
IOSITXDEV405	—	92.84	—	92.84
IOSITXMAIL405	—	365.25	—	365.25
IOSIWBASE405	—	119.63	—	119.63
IOSIWCDEDT405	—	264.77	—	264.77
IOSIWCDEMIN405	—	106.00	—	106.00
IOSIWDECW405	—	65.12	—	65.12
IOSIWFONT100M405	—	594.96	—	594.96
IOSIWFONT100P405	—	2157.05	—	2157.05
IOSIWFONT75M405	—	371.72	—	371.72
IOSIWFONT75P405	—	1901.38	—	1901.38
IOSIWOLDX11405	—	11.77	—	11.77
IOSIWOLFONT405	—	3003.34	—	3003.34

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSIWUCSBASE405	—	92.20	—	92.20
IOSIWX11405	—	1698.04	—	1698.04
IOSIWXDEV405	—	875.86	—	875.86
IOSJPABASE405	—	3546.82	—	3546.82
IOSJPAMANOS405	—	35.76	—	35.76
IOSJPBASE405	608.95	13317.20	6.10	13932.25
IOSJPCDEAPPS405	—	475.68	—	475.68
IOSJPCDEDEV405	—	1212.54	—	1212.54
IOSJPCDEDT405	—	4207.16	—	4207.16
IOSJPCDEHLP405	—	32843.40	—	32843.40
IOSJPCDEHLPSJIS405	—	32839.40	—	32839.40
IOSJPCDEMAIL405	—	307.84	—	307.84
IOSJPCDEMIN405	—	1836.59	—	1836.59
IOSJPDECW405	—	789.45	—	789.45
IOSJPFONT100M405	—	11994.10	—	11994.10
IOSJPFONT100P405	—	11912.50	—	11912.50
IOSJPFONT75M405	—	8380.05	—	8380.05
IOSJPFONT75P405	—	8310.46	—	8310.46
IOSJPFONTM405	—	13552.70	—	13552.70
IOSJPLDBBASE405	—	929.53	—	929.53
IOSJPLDBGUI405	—	5681.31	—	5681.31
IOSJPMANOS405	—	6674.98	—	6674.98
IOSJPMANWOS405	—	223.13	—	223.13
IOSJPMSG405	—	1593.90	—	1593.90
IOSJPMSGSJIS405	—	531.26	—	531.26
IOSJPNEMACS405	76.00	23369.70	—	23445.70
IOSJPNEMACSSRC405	—	10261.80	—	10261.80
IOSJPNETSCAPE405	—	967.95	—	967.95
IOSJPOLDDECW405	—	6138.83	—	6138.83
IOSJPOLDX11405	12.39	956.94	—	969.33
IOSJPPGMR405	—	2065.42	—	2065.42
IOSJPUCSBASE405	—	7753.77	—	7753.77
IOSJPWNN405	104.97	20149.00	—	20253.97
IOSJPWNNPGMR405	—	1225.36	—	1225.36
IOSJPWNNSRC405	—	10791.00	—	10791.00
IOSJPX11405	—	6822.54	—	6822.54
IOSJPXDEV405	—	130.50	—	130.50
IOSJPXMAIL405	—	753.29	—	753.29
IOSKOBASE405	—	1796.00	—	1796.00
IOSKOCDEAPPS405	—	185.78	—	185.78
IOSKOCDEDEV405	—	158.27	—	158.27
IOSKOCDEDT405	—	1427.97	—	1427.97
IOSKOCDEHLP405	—	21954.20	—	21954.20
IOSKOCDEMAIL405	—	130.05	—	130.05
IOSKOCDEMIN405	—	758.07	—	758.07
IOSKODECW405	—	146.13	—	146.13

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSKOFONTM405	—	3762.47	—	3762.47
IOSKOFONTP405	—	9568.90	—	9568.90
IOSKONETSCAPE405	—	502.70	—	502.70
IOSKOOLDDECW405	—	2146.14	—	2146.14
IOSKOOLDX11405	—	433.60	—	433.60
IOSKOOLFONT405	—	6159.31	—	6159.31
IOSKOPGMR405	—	168.50	—	168.50
IOSKOUCSBASE405	—	2122.66	—	2122.66
IOSKOX11405	—	4753.58	—	4753.58
IOSKOXDEV405	—	101.00	—	101.00
IOSKOXMAIL405	—	76.40	—	76.40
IOSLDBBASE405	—	20265.40	—	20265.40
IOSLDBDOC405	—	38.99	—	38.99
IOSLDBGUI405	—	9631.88	—	9631.88
IOSLDBSRV405	—	166.79	—	166.79
IOSLTX11405	—	37.93	—	37.93
IOSPLCDEAPPS405	—	199.49	—	199.49
IOSPLCDEDEV405	—	167.97	—	167.97
IOSPLCDEDT405	—	1194.06	—	1194.06
IOSPLCDEMAIL405	—	117.98	—	117.98
IOSPLCDEMIN405	—	3998.58	—	3998.58
IOSPLDECW405	—	694.93	—	694.93
IOSPLOLDDECW405	—	3972.02	—	3972.02
IOSPLOLDX11405	—	870.47	—	870.47
IOSPLUCSBASE405	—	124.20	—	124.20
IOSPLX11405	—	6709.61	—	6709.61
IOSPLXDEV405	—	92.79	—	92.79
IOSPLXMAIL405	—	353.84	—	353.84
IOSRUDECW405	—	687.34	—	687.34
IOSRUOLDDECW405	—	4150.13	—	4150.13
IOSRUOLDX11405	—	876.66	—	876.66
IOSRUUCSBASE405	—	108.20	—	108.20
IOSRUX11405	—	6645.37	—	6645.37
IOSRUXDEV405	—	92.91	—	92.91
IOSRUXMAIL405	—	336.74	—	336.74
IOSSKCDEAPPS405	—	207.22	—	207.22
IOSSKCDEDEV405	—	276.39	—	276.39
IOSSKCDEDT405	—	1222.71	—	1222.71
IOSSKCDEMAIL405	—	80.67	—	80.67
IOSSKCDEMIN405	—	3994.71	—	3994.71
IOSSKDECW405	—	664.03	—	664.03
IOSSKOLDDECW405	—	3934.27	—	3934.27
IOSSKOLDX11405	—	846.86	—	846.86
IOSSKUCSBASE405	—	124.20	—	124.20
IOSSKX11405	—	6094.18	—	6094.18
IOSSKXDEV405	—	92.63	—	92.63

Digital UNIX Worldwide Language Support V4.0A

Subset	root	/usr	/var	Total
IOSSKXMAIL405	—	326.06	—	326.06
IOSSLX11405	—	49.23	—	49.23
IOSSVCDEAPPS405	—	215.22	—	215.22
IOSSVCDEDEV405	—	155.36	—	155.36
IOSSVCDEDT405	—	1020.82	—	1020.82
IOSSVCDEHLP405	—	12779.50	—	12779.50
IOSSVCDEMAIL405	—	73.28	—	73.28
IOSSVCDEMIN405	—	443.43	—	443.43
IOSSVDECW405	—	663.32	—	663.32
IOSSVOLDDECW405	—	3759.16	—	3759.16
IOSSVOLDX11405	—	835.55	—	835.55
IOSSVX11405	—	5938.46	—	5938.46
IOSSVXDEV405	—	92.63	—	92.63
IOSSVXMAIL405	—	326.23	—	326.23
IOSTHBASE405	—	783.48	—	783.48
IOSTHBIN405	451.41	12.20	6.10	469.71
IOSTHCDEAPPS405	—	138.79	—	138.79
IOSTHCDEDEV405	—	256.52	—	256.52
IOSTHCDEDT405	—	1180.90	—	1180.90
IOSTHCDEMAIL405	—	67.13	—	67.13
IOSTHCDEMIN405	—	485.98	—	485.98
IOSTHDECW405	—	145.56	—	145.56
IOSTHFONTM405	—	105.02	—	105.02
IOSTHOLDDECW405	—	1991.29	—	1991.29
IOSTHOLDX11405	—	434.15	—	434.15
IOSTHOLFONT405	—	7347.15	—	7347.15
IOSTHPGMR405	—	124.49	—	124.49
IOSTHPRINT405	—	172.89	—	172.89
IOSTHX11405	—	2782.18	—	2782.18
IOSTHXDEV405	—	109.73	—	109.73
IOSTHXMAIL405	—	74.33	—	74.33
IOSTRFONT100M405	—	1080.75	—	1080.75
IOSTRFONT100P405	—	4113.84	—	4113.84
IOSTRFONT75M405	—	929.03	—	929.03
IOSTRFONT75P405	—	3468.61	—	3468.61
IOSTROLDDECW405	—	130.10	—	130.10
IOSTROLFONT405	—	5420.68	—	5420.68
IOSTRUCSBASE405	—	102.09	—	102.09
IOSTRX11405	—	420.52	—	420.52
IOSTRXMAIL405	—	68.58	—	68.58
IOSULUCSBASE405	—	3608.36	—	3608.36
IOSWWBASE405	185.46	1269.57	—	1455.03
IOSWWBIN405	986.55	91.38	12.20	1090.13
IOSWWBINCOM405	38.11	417.44	—	455.56
IOSWWCDEDT405	—	893.13	—	893.13
IOSWWFONTM405	—	933.64	—	933.64

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Subset	root	/usr	/var	Total
IOSWWLAT2FONT100M405	—	1161.37	—	1161.37
IOSWWLAT2FONT100P405	—	4363.31	—	4363.31
IOSWWLAT2FONT75M405	—	989.44	—	989.44
IOSWWLAT2FONT75P405	—	3677.32	—	3677.32
IOSWWLAT2OLFONT405	—	5538.47	—	5538.47
IOSWWLAT4FONT100M405	—	1148.55	—	1148.55
IOSWWLAT4FONT100P405	—	4386.89	—	4386.89
IOSWWLAT4FONT75M405	—	981.27	—	981.27
IOSWWLAT4FONT75P405	—	3699.16	—	3699.16
IOSWWLATCFONT100M405	—	1144.07	—	1144.07
IOSWWLATCFONT100P405	—	2424.95	—	2424.95
IOSWWLATCFONT75M405	—	970.88	—	970.88
IOSWWLATCFONT75P405	—	2030.64	—	2030.64
IOSWWLATCOLFONT405	—	3644.37	—	3644.37
IOSWWMOTIF11405	—	9837.15	—	9837.15
IOSWWMULE405	—	94519.80	—	94519.80
IOSWWMULESRC405	—	26961.80	—	26961.80
IOSWWOLDBKR405	—	5632.69	—	5632.69
IOSWWOLDDECW405	—	401.85	—	401.85
IOSWWPGMR405	—	263.72	—	263.72
IOSWWPHRASE405	413.47	1610.22	6.10	2029.79
IOSWWPRINT405	63.33	962.22	—	1025.55
IOSWWSVEDEV405	—	286.31	—	286.31
IOSWWSYSMAN405	—	350.63	4.78	355.41
IOSWWUCSBASE405	—	1938.27	—	1938.27
IOSWWUDCOS405	427.59	2293.19	6.10	2726.88
IOSWWUDCWOS405	—	122.60	—	122.60
IOSWWX11405	—	4092.13	—	4092.13
IOSWWXDEV405	—	2250.93	—	2250.93
IOSWWXFR405	—	1186.21	3.49	1189.70
IOSZHBASE405	—	255.21	—	255.21
IOSZHBIG5405	189.08	1517.37	3.05	1709.50
IOSZHCNBASE405	—	414.43	—	414.43
IOSZHCNCDEAPPS405	—	123.36	—	123.36
IOSZHCNCDEDEV405	—	154.42	—	154.42
IOSZHCNCDEDT405	—	1170.30	—	1170.30
IOSZHCNCDEHLP405	—	14529.00	—	14529.00
IOSZHCNCDEMAIL405	—	72.92	—	72.92
IOSZHCNCDEMIN405	—	447.16	—	447.16
IOSZHCNLOC405	—	1122.28	—	1122.28
IOSZHCNUCSBASE405	—	3342.51	—	3342.51
IOSZHCONV405	87.12	259.66	3.05	349.83
IOSZHEUCTW405	—	814.20	—	814.20
IOSZHHANYU405	—	878.05	—	878.05
IOSZHHANZI405	—	750.41	—	750.41
IOSZHHKBASE405	—	3627.33	—	3627.33

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Subset	root	/usr	/var	Total
IOSZHHKUCSBASE405	—	2802.26	—	2802.26
IOSZHPGMR405	—	2451.46	—	2451.46
IOSZHSDECW405	—	146.38	—	146.38
IOSZHSFONTM405	—	3322.40	—	3322.40
IOSZHSFONTP405	—	27595.30	—	27595.30
IOSZHSNETSCAPE405	—	502.70	—	502.70
IOSZHSOLDDECW405	—	2050.17	—	2050.17
IOSZHSOLDX11405	—	425.72	—	425.72
IOSZHSOLFONT405	—	15014.50	—	15014.50
IOSZHSX11405	—	3138.28	—	3138.28
IOSZHSXDEV405	—	204.77	—	204.77
IOSZHSXMAIL405	—	75.07	—	75.07
IOSZHTDECW405	—	439.60	—	439.60
IOSZHTELEX405	154.39	2170.68	3.05	2328.12
IOSZHTFONTM405	—	8960.66	—	8960.66
IOSZHTFONTP405	—	25532.30	—	25532.30
IOSZHTNETSCAPE405	—	502.75	—	502.75
IOSZHTOLDDECW405	—	6043.84	—	6043.84
IOSZHTOLDX11405	—	1284.83	—	1284.83
IOSZHTOLFONT405	—	28075.70	—	28075.70
IOSZHTWBASE405	—	3334.67	—	3334.67
IOSZHTWCDEAPPS405	—	367.62	—	367.62
IOSZHTWCDEDEV405	—	458.43	—	458.43
IOSZHTWCDEDT405	—	3672.87	—	3672.87
IOSZHTWCDEHLP405	—	18677.40	—	18677.40
IOSZHTWCDEMAIL405	—	196.19	—	196.19
IOSZHTWCDEMIN405	—	1325.51	—	1325.51
IOSZHTWLOC405	—	9750.79	—	9750.79
IOSZHTWUCSBASE405	—	8374.88	—	8374.88
IOSZHTX11405	—	7822.78	—	7822.78
IOSZHTXDEV405	—	965.39	—	965.39
IOSZHTXMAIL405	—	233.12	—	233.12
IOSZHUCSBASE405	—	7363.66	—	7363.66
IOSZHX11405	—	6464.00	—	6464.00
Total	3798.82	1061639.48	54.01	1065492.31

Grand Totals	root	/usr	/var	Total
	6276.44	1738990.86	267.57	1745534.86

POLYCENTER Advanced File System Advanced Utilities AFAADVANCED401

Subset	root	/usr	/var	Total
AFA401	—	0.00	—	—
’POLYCENTER	—	0.00	—	—
AFAADVANCED401	—	591.46	—	591.46
AFAADVDAEMON401	67.71	1752.97	—	1820.68
AFAADVGUI401	66.43	13771.60	—	13838.03
AFAADVMAN401	—	75.60	—	75.60
Total	134.14	16191.63	—	16325.77

System V Environment SVEADM400

Subset	root	/usr	/var	Total
SVE400	—	0.00	—	—
’System	—	0.00	—	—
SVEADM400	442.78	62279.80	—	62722.58
SVEBCP400	84.64	20191.60	—	20276.24
SVEDEV400	54.49	29406.10	—	29460.59
SVEENV400	40.13	19.16	—	59.30
SVEMAN400	—	8273.21	—	8273.21
SVEPRINT400	259.06	42349.30	—	42608.36
Total	881.10	162519.17	—	163400.27

TruCluster Available Server Software V1.4

Subset	root	/usr	/var	Total
TCR140	—	0.00	—	—
TCRASE140	2034.00	18590.00	—	20624.00
TCRCMS140	156.88	11967.80	—	12124.68
TCRCOMMON140	70.79	1545.81	—	1616.60
TCRCONF140	—	50.31	—	50.31
TCRDSVC140	2451.69	9810.55	—	12262.24
TCRMAN140	—	1305.51	—	1305.51
TCRMCA140	—	3978.53	—	3978.53
Total	4713.36	47248.51	—	51961.87

Grand Totals	root	/usr	/var	Total
	5728.60	225959.31	—	231687.91

D.2 Disk Space Required for Update Installations

For update installations, the `installupdate` script automatically computes and reports the difference between the amount of disk space used and the amount of disk space required. The update installation of your system from Digital UNIX Version 3.2G or Version 4.0 to Digital UNIX Version 4.0A will require the following minimum amounts of additional disk space in megabytes (MB).

The values in the following tables were determined before the use of the Update Administration Utility and account for the additional processing space that the update installation requires. They will vary depending on your specific hardware configuration, file system type, disk partitions, and the software currently installed on your system.

Table D-2: Disk Space for Mandatory Subsets (3.2G to 4.0A)

File System	File System Type	Version 3.2G Subsets	Version 4.0A Subsets	Additional Space Needed
/	ufs	31	42	13
/usr	ufs	128	201	75
/	AdvFS	35	46	17
/usr	AdvFS	136	209	92

Table D-3: Disk Space for All Subsets (3.2G to 4.0A)

File System	File System Type	Version 3.2G Subsets	Version 4.0A Subsets	Additional Space Needed
/	ufs	44	52	19
/usr	ufs	277	318	42
/var	ufs	6	7	1
/	AdvFS	35	45	22
/usr	AdvFS	277	318	59
/var	AdvFS	7	8	1

Table D-4: Disk Space for Mandatory Subsets (4.0 to 4.0A)

File System	File System Type	Version 4.0 Subsets	Version 4.0A Subsets	Additional Space Needed
/	ufs	40	41	4
/usr	ufs	165	165	3
/	AdvFS	45	45	5
/usr	AdvFS	167	168	17

Table D-5: Disk Space for All Subsets (4.0 to 4.0A)

File System	File System Type	Version 4.0 Subsets	Version 4.0A Subsets	Additional Space Needed
/	ufs	53	50	8
/usr	ufs	327	326	3
/var	ufs	6	6	1
/	AdvFS	50	51	9
/usr	AdvFS	327	326	17
/var	AdvFS	7	7	1

D.3 Disk Space Required for RIS Areas

The RIS area for Digital UNIX Version 4.0A requires approximately 964.7 MB of disk space. The space requirements are broken down as follows:

Product Area	512-Byte Blocks
./ALPHA/BASE	943858
./ALPHA/CDE_Video	137522
./ALPHA/COMPILERS	6648
./ALPHA/DEC_Ada_RTL	3130
./ALPHA/DEC_C++_RTL	328
./ALPHA/DEC_Cobol_RTL	2850
./ALPHA/DEC_EVENT	10912
./ALPHA/DEC_Fortran_RTL	2408
./ALPHA/DEC_Pascal_RTL	806
./ALPHA/DEC_Sort_RTL	364
./ALPHA/DECtalk_Runtime	9272
./ALPHA/GNUSRC	23566
./ALPHA/Multimedia_Services	39894
./ALPHA/NetWorker_SingleServer	125058
./ALPHA/PanoramiX_ADK	354
./ALPHA/Performance_Manager	14550
./ALPHA/Porting_Assistant	10596
./ALPHA/WORLDWIDE	643636
Total	1975754

D.4 Disk Space Required for Documentation

The files for the Digital UNIX documentation set and the Worldwide support documentation are contained on the CD–ROM labeled *Digital UNIX V4.0 Documentation, Volume 1*. These files require the following amounts of disk space if moved from the CD–ROM onto a local disk:

- Digital UNIX operating system documentation – 100 MB
- Worldwide support documentation – 20 MB

Additional Worldwide Subsets for Version 4.0A E

The tables in this appendix contain descriptions of worldwide language support subsets that have been added for this release.

Table E-1 lists an additional subset for Japanese support.

Table E-1: Additional Worldwide Japanese Support Subsets

Subset	Description
IOSJPCDEHLPSJIS405	Japanese (SJIS) CDE Online Help (Windowing Environment) Contains Japanese online help files for the Common Desktop Environment in Shift JIS. This software subset is optional and requires the IOSJPCDEDT405 software subset.

Table E-2 lists additional subsets for Catalan support.

Table E-2: Additional Worldwide Catalan Support Subsets

Subset	Description
IOSCACDEAPPS405	Catalan CDE Additional Applications (Windowing Applications) Contains Catalan resource files and message catalogs for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS405 and IOSCACDEDT405 software subsets, and it is mandatory if the OSFCDEAPPS405 software subset is installed.
IOSCACDEDEV405	Catalan CDE Software Development (Software Development) Contains the Catalan Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV405 and IOSCACDEDT405 software subsets, and it is mandatory if the OSFCDEDEV405 software subset is installed.

Table E-2: (continued)

Subset	Description
IOSCACDEDT405	Catalan CDE Desktop Environment (Windowing Environment)
	Contains Catalan resource files and message catalogues for the Common Desktop Environment. This software subset requires the OSFCDEDT405 and IOSCACDEMIN405 software subsets, and it is mandatory if the OSFCDEDT405 software subset is installed.
IOSCACDEMAIL405	Catalan CDE Mail Interface (Mail Applications)
	Contains Catalan resource files and message catalogues for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL405 and IOSCACDEDT405 software subsets, and it is mandatory if the OSFCDEMAIL405 software subset is installed.
IOSCACDEMIN405	Catalan CDE Minimum Run-time Environment (Windowing Environment)
	Contains Catalan resource files and message catalogues for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN405 and IOSCAX11405 software subsets, and it is mandatory if the OSFCDEMIN405 software subset is installed.
IOSCADECW405	Catalan Additional DECwindows Applications (Windowing Applications)
	Contains Catalan resource files and UID files for the X11/DECwindows client application dxprint. This software subset requires the OSFDECW405 and IOSCAX11405 software subsets, and it is mandatory if the OSFDECW405 software subset is installed.
IOSCAOLDDECW405	Catalan Old Additional DECwindows Applications (Windows Applications)
	Contains Catalan resource files and UID files for the X11/DECwindows client application dxdiff, which will be retired in a future release of Digital UNIX. This software subset requires the OSFOLDDECW405 and IOSCAX11405 software subsets, and it is mandatory if the OSFOLDDECW405 software subset is installed.

Table E-2: (continued)

Subset	Description
IOSCAXDEV405	Catalan X Window Software Development (Windowing Environment) Contains libraries and data files needed to produce Catalan X/Motif window system client applications. This software subset is optional and requires the IOSWWXDEV405 and IOSCAX11405 software subsets.

Table E-3 lists additional subsets for Czech support.

Table E-3: Additional Worldwide Czech Support Subsets

Subset	Description
IOSCSCDEAPPS405	Czech CDE Additional Applications (Windowing Applications) Contains Czech resource files and message catalogues for the Common Desktop Environment additional applications. This software subset requires OSFCDEAPPS405 and IOSCSCDEDT405 software subsets, and it is mandatory if the OSFCDEAPPS405 software subset is installed.
IOSCSCDEDEV405	Czech CDE Software Development (Software Development) Contains the Czech Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV405 and IOSCSCDEDT405 software subsets, and it is mandatory if the OSFCDEDEV405 software subset is installed.
IOSCSCDEDT405	Czech CDE Desktop Environment (Windowing Environment) Contains Czech resource files and message catalogues for the Common Desktop Environment. This software subset requires the OSFCDEDT405 and IOSCSCDEMIN405 software subsets, and it is mandatory if the OSFCDEDT405 software subset is installed.
IOSCSCDEMAIL405	Czech CDE Mail Interface (Mail Applications) Contains Czech resource files and message catalogues for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL405 and IOSCSCDEDT405 software subsets, and it is mandatory if the OSFCDEMAIL405 software subset is installed.

Table E-3: (continued)

Subset	Description
IOSCSCDEMIN405	Czech CDE Minimum Run-time Environment (Windowing Environment) Contains Czech resource files and message catalogues for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN405 and OSCSX11405 software subsets, and it is mandatory if the OSFCDEMIN405 software subset is installed.

Table E-4 lists additional subsets for Hungarian support.

Table E-4: Additional Worldwide Hungarian Support Subsets

Subset	Description
IOSHUCDEAPPS405	Hungarian CDE Additional Applications (Windowing Applications) Contains Hungarian resource files and message catalogues for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS405 and IOSHUCDEDT405 software subsets, and it is mandatory if the OSFCDEAPPS405 software subset is installed.
IOSHUCDEDEV405	Hungarian CDE Software Development (Software Development) Contains the Hungarian Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV405 and IOSHUCDEDT405 software subsets, and it is mandatory if the OSFCDEDEV405 software subset is installed.
IOSHUCDEDT405	Hungarian CDE Desktop Environment (Windowing Environment) Contains Hungarian resource files and message catalogues for the Common Desktop Environment. This software subset requires the OSFCDEDT405 and IOSHUCDEMIN405 software subsets, and it is mandatory if the OSFCDEDT405 software subset is installed.

Table E-4: (continued)

Subset	Description
IOSHUCDEMAIL405	Hungarian CDE Mail Interface (Mail Applications) Contains Hungarian resource files and message catalogues for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL405 and IOSHUCDEDT405 software subsets, and it is mandatory if the OSFCDEMAIL405 software subset is installed.
IOSHUCDEMIN405	Hungarian CDE Minimum Run-time Environment (Windowing Environment) Contains Hungarian resource files and message catalogues for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN405 and IOSHUX11405 software subsets, and it is mandatory if the OSFCDEMIN405 software subset is installed.

Table E-5 lists additional subsets for Polish support.

Table E-5: Additional Worldwide Polish Support Subsets

Subset	Description
IOSPLCDEAPPS405	Polish CDE Additional Applications (Windowing Applications) Contains Polish resource files and message catalogues for the Common Desktop Environment additional applications. This software subset requires the OSFCDEAPPS405 and IOSPLCDEDT405 software subsets, and it is mandatory if the OSFCDEAPPS405 software subset is installed.
IOSPLCDEDEV405	Polish CDE Software Development (Software Development) Contains the Polish Common Desktop Environment software development examples. This software subset requires the OSFCDEDEV405 and IOSPLCDEDT405 software subsets, and it is mandatory if the OSFCDEDEV405 software subset is installed.

Table E-5: (continued)

Subset	Description
IOSPLCDEDT405	Polish CDE Desktop Environment (Windowing Environment) Contains Polish resource files and message catalogues for the Common Desktop Environment. This software subset requires the OSFCDEDT405 and IOSPLCDEMIN405 software subsets, and it is mandatory if the OSFCDEDT405 software subset is installed.
IOSPLCDEMAIL405	Polish CDE Mail Interface (Mail Applications) Contains Polish resource files and message catalogues for the Common Desktop Environment mail system. This software subset requires the OSFCDEMAIL405 and IOSPLCDEDT405 software subsets, and it is mandatory if the OSFCDEMAIL405 software subset is installed.
IOSPLCDEMIN405	Polish CDE Minimum Run-time Environment (Windowing Environment) Contains Polish resource files and message catalogues for the Common Desktop Environment minimum run-time environment. This software subset requires the OSFCDEMIN405 and IOSPLX11405 software subsets, and it is mandatory if the OSFCDEMIN405 software subset is installed.

In addition, the description for the IOSWWCDEDT405 and IOSWWPRINT405 subsets have changed. Table E-6 contains the new definitions.

Table E-6: New Descriptions for Subsets

Subset	Description
IOSWWCDEDT405	Worldwide CDE Desktop Environment (Windowing Environment) Contains font alias files for Greek, Russian, Lithuanian, Slovene, and Turkish languages in the CDE environment. This software subset requires the OSFCDEDT405 software subset and it is a mandatory subset if the OSFCDEDT405 software subset is installed.

Table E-6: (continued)

Subset	Description
IOSWWPRINT405	Contains the lp* commands for Chinese, Greek, Japanese, Korean, Thai and Turkish languages. It also contains the common print filters for all Asian language variants. This software subset requires the OSFPRINT405 and IOSWWBASE405 software subsets and it is a mandatory subset if the OSFPRINT405 software subset is installed.

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