

# Release Note for Workstation Additional Core Enhancements for HP-UX 10.20 (December 1999)

HP Product No. B6193EA

Supported Hardware: HP 9000 Workstations (S700 B, C & J Class)

Part Number/Date: B3782-90868 / December 1999

Copyright (C) Hewlett-Packard Company 1999

---

## Table of Contents:

### Chapter 1: Introduction

- Overview of this Release
  - The Workstation Quality Pack
  - Year 2000 (Y2K) Compliance
  - Current Workstation ACE (December 1999) Features
- Overview of Previous (June 1999 and earlier) ACE Releases
- Verifying Installation of ACE Software

### Chapter 2: ACE System Overview and Configuration Summary

- New ACE (December 1999) Workstation Systems That Are Supported
- Supported NFS Diskless Configurations
  - Servers and Clients
- ACE Software Delivery
- Installation of Large Replicated Sites

### Chapter 3: Current ACE (December 1999) Enhancements and Changes

- HP VISUALIZE-fxe Graphics Support
- USB Device Support (Three-button Mouse and Hub)
- Consolidated NFS Patches
- Support for new IDE CD-ROM Drives
- HP-UX Support Plus Media
- ACE Dec. 1999 Quality Pack
- Distributed Single Logical Screen (SLS/d)

### Chapter 4: Previous (June 1999 and earlier) Workstation ACE Changes

- June 1999 Enhancements:
  - Universal Serial Bus (USB) Support
    - PCI

- LVD SCSI
- IDE CD ROM
- PA-8500 Processor Support
- Audio
- USB Keyboard Support in Asian System Environment (ASE)
- Expert Recovery Tools Now on HP-UX Core Media
- Kernel Base Patch
- X Window System Enhancements
  - Low Bandwidth X Extension (LBX)
  - Proxy Manager (proxymngr)
  - Remote Execution (RX) Service
  - Security Extension
  - Application Group Extension (XC-APPGROUP)
  - SLS/d - Distributed SLS (HP VISUALIZE Center Support)
- New "euro" Symbol
- Tunable Kernel Parameters
- Turbo and Personal VRX Graphics Device Support
- June 1998 ACE Enhancements:
  - New Features for Graphics APIs : Starbase, PEX, PHIGS
  - X Windows Server
  - The 'slsclone' utility
  - OpenGL Support
  - Support for 1600 X 1200 Resolution
- April 1998 and earlier ACE Enhancements
  - HP VISUALIZE-fx Graphics Hardware
  - Stereo Graphics Output
  - X Window System
  - OpenGL Support
  - Starbase Graphics Library
  - Miscellaneous Graphics Support

### **Chapter 5: Previous I/O Changes (April 1998 and earlier)**

- Ultra Wide Single-Ended (UWSE) SCSI Support
- 10 Base-T and 100 Base-T Networking
- Manually Configuring Link Speed and Duplex Mode
- RJ-45 and AUI ports

### **Chapter 6: Other Previous Changes**

- Cold Install
- System Administration Manager (SAM)
- Diagnostics
- Languages, Tools and Compilers
- Linker and Object File Tools: ld, dld.sl, and chatr

### **Legal Notices**

---

# Chapter 1: Introduction

This Workstation Additional Core Enhancement release, herein referred to as ACE (December 1999), provides hardware, networking, graphics and other software enhancements for HP 9000 Workstations.

This Release Note is designed to:

- Inform current workstation users of new features and functionality that become available between major HP-UX OS releases.
- Document the changes to HP-UX 10.20 that relate to this software update.

This Release Note is cumulative. That is, it builds on the Release Notes provided in the previous (June 1999 and earlier) Workstation ACE releases. Each time you load an ACE release on your system the current Release Note (file name RelNotes10.20ACE.doc) overwrites the previous Release Note that was installed in /usr/share/doc on your system, with the following exception:

---

## NOTE

There was a separate April 1998 Release Note for the S700 Networking ACE bundle that added selected ONC+ functionality to HP-UX 10.20. Provided with this ACE December 1999 release is a new Networking Release Note (file name RelNotesSW.txt) which will overwrite the April 1998 document in your /usr/share/doc directory.

---

For those enhancements that apply only to this December 1999 release, see Chapter 3: Current ACE (December 1999) Enhancements and Changes.

This Workstation Additional Core Enhancements release includes two CD-ROMs. The Install/Update/Recovery CD-ROM is the latest version of the install media for HP-UX 10.20 which includes the original HP-UX 10.20 operating system plus the December 1999 version of the Additional Core Enhancements (ACE) software. The HP-UX Support Plus CD-ROM contains two depots -- one with on-line diagnostic software for Workstations, the other containing the latest version of the Workstation Quality Pack for HP-UX 10.20 (see below).

## The Workstation Quality Pack

In June 1998, Hewlett-Packard introduced the Workstation Quality Pack for HP-UX 10.20. The initial definition of the Workstation Quality Pack was the HP-UX 10.20 Critical Patch bundle. We then added three other sets of patches:

- core patches required to make your operating system Year 2000 compliant,
- a series of general release patches required to support key applications from HP and from independent software vendors, and
- patches that addressed common software problems as reported to the HP Response Center organization.

This Workstation ACE (December 1999) release includes the most recent version of this Quality Pack. HP will install this Pack on all Workstations ordered with pre-loaded HP-UX 10.20 software and will

continue to update the contents of the Pack twice a year.

HP strongly recommends that you install this current Workstation Quality Pack on all of your Workstations that are running the HP-UX 10.20 operating system. Our software installation tools will not enforce this action; however, HP believes that loading this Quality Pack is in your best interests. We have updated our software installation documentation to reflect this recommendation. If you have been loading the Critical patch bundle on your system(s), we recommend substituting the Quality Pack for that bundle.

HP Response Center engineers will also recommend loading the Workstation Quality Pack (as opposed to loading individual patches or other patch bundles) as the first step in resolving common HP-UX 10.20 software problems. Because the Workstation Quality Pack does not address all known HP-UX 10.20 defects, HP support personnel will continue to recommend individual patches for problems that occur less frequently, but will limit those recommendations to customers who have actually encountered those problems.

## **Y2K Compliance**

The Year 2000 patches included in the Workstation Quality Pack (above) are necessary to make your computer Year 2000 compliant, but they may not be sufficient for full compliance. They upgrade the HP-UX 10.20 core to properly deal with date handling in the year 2000 and beyond.

However, to make your systems fully Year 2000 compliant, you may also need to upgrade application software -- from HP and independent software vendors. For information about Year 2000 patches for HP layered software, please visit Hewlett-Packard's Y2K website:

<http://www.hp.com/go/year2000>

For information about Year 2000 compliance for other software packages, please contact the vendor of each product.

As HP discovers other Year 2000 requirements in our software products, we will create or update patches to address those issues. By loading the Workstation Quality Pack (above), you upgrade the HP-UX 10.20 core to be Year 2000 compliant. After this update, you need only update with the newest Year 2000 point patches if you want the most current Year 2000 solution from HP. For a current list of all Year 2000 patches, visit the HP Software Depot website:

<http://www.software.hp.com/>

This site lists all Year 2000 patches -- for core and layered products -- including those released since the last update of the Quality Pack.

## **Overview of the December 1999 Release**

ACE software bundles and the Workstation Quality Pack are an integral part of HP-UX 10.20 updates. HP thoroughly tests this full software solution -- base operating system, ACE bundles, Quality Pack, and selected application software -- before releasing the software. HP sets the same standards of software

quality for these bundles as for the base operating system.

## **Current Workstation ACE (December 1999) Features:**

New or improved functionality provided with this ACE (December 1999) release includes:

- HP VISUALIZE-fxe Graphics Card Support. VISUALIZE-fxe is HP's new entry-level, low cost, full-featured 3D graphics card which will replace the VISUALIZE-fx2 and VISUALIZE-EG (8 plane, 2D) products. It is a full 24-bit true color graphics device for both 2D and 3D applications and markets.
- Two newly supported USB devices. A new four-port USB Hub (D6804A) and a three-button USB Mouse. The USB Mouse is part of the A4983 USB Kit.
- Consolidated NFS Patches. HP has combined Networking product enablement patches to allow you update your system more quickly. The consolidation of these product patches also includes some NFS performance improvements.
- Support for IDE CD-ROM drives from additional manufacturers. Minor changes have been made to the HP-UX IDE driver to accommodate slight differences in the implementation of the IDE protocol in IDE CD-ROM drives from various manufacturers.
- HP-UX Support Plus. Support Plus is a new name for the existing HP program that delivers diagnostics and HP-UX system patches. It combines the former Diagnostic/Independent Product Release (IPR) CD-ROM and the former Extension Software Release CD-ROM. It also includes the current Workstation Quality Pack.
- ACE December 1999 Quality Pack. This Workstation ACE release includes the most recent version of this Quality Pack. HP installs this Pack on all Workstations ordered with pre-loaded HP-UX 10.20 software and continues to update the contents of the Pack twice a year. The Workstation Quality Pack depot is located on the HP Support Plus media.
- Distributed Single Logical Screen (SLS/d). This functionality was originally released in 10.20 ACE (June 1999) and cooperates with HP OpenGL to enable the sharing of 2D and 3D OpenGL windows across displays connected to multiple technical workstations. These extensions provide the underlying software for the HP VISUALIZE Center and HP VISUALIZE Workgroup.

## **Overview of Previous (June 1999 and earlier) ACE Releases:**

The June 1999 ACE release provided:

- Kernel support for the PA-8500 PA-RISC processor in the HP VISUALIZE Model C360 and B, C and J Class Workstations (B1000, C3000 and J5000).
- Universal Serial Bus (USB) support for certain user input devices including keyboards in many languages and the HP A4983-60101 scroll mouse.
- Kernel support for PCI devices in all PCI slots on HP VISUALIZE Series B, C and J Class Workstations.
- Enhanced SCSI support that works with Low Voltage Differential (LVD) SCSI devices.
- A new I/O controller chip that provides parallel, serial, IDE, USB and Floppy drivers. This controller supports a more robust IDE Floppy Drive and support for the CD-ROM drive.
- Support for expanded audio and headphone output configuration from the CD-ROM drive.
- New software included Asian Language Input Method enhancements to support USB keyboards for Japanese, Korean, Simplified and Traditional Chinese.
- For the June 1999 release, the File System Recovery Tools that were formerly found on the

- separate Recovery Media were included in the HP-UX Install/Update/Recovery Media.
- Changes to the core kernel patch delivery strategy: HP now uses a new Base/Incremental patch strategy for the largest non-networking kernel patch. The Base Patch is not superseded by subsequent related patches. Rather than continually re-issue this kernel Base Patch, HP produced targeted, incremental patches to fix specific kernel defects. From this release forward, you will need both the Base Patch and and specific incremental patches to correct defects.
  - Several new X Windows Server extensions:
    - Low Bandwidth X Extension
    - Proxy Manager
    - Remote Execution Service
    - Security Extension
    - Application Group Extension
    - Distributed Single Logical Screen (SLS/d) Extension
  - This release provided the proper hardware support for the European Economic and Monetary Union (EMU) "euro" symbol.
  - New "tunable" HP-UX kernel parameters were introduced that allow you to configure your kernel for optimum performance. For complete information, see the "HP-UX Kernel Tuning and Performance Guide" white paper at:

<http://www.hp.com/techpartners/tuning.html>

- Turbo VRX and Personal VRX graphics device support. These devices are no longer supported. See the information in Chapter 4.

The June 1998 ACE release enhanced HP-UX 10.20 with new graphics software capabilities. There was support for new graphics hardware -- entry-level HP VISUALIZE-EG/PCI, and the addition of optional hardware Texture Map memory for the HP VISUALIZE-fx family (-fx4 and -fx6 models only). Also implemented were new X Window System extensions: HP Color Recovery and Display Power Management Signaling.

Also included in the June 1998 ACE Media Kit was the Independent Product Release (IPR) CD-ROM which contained an extended Critical Patch Bundle. This bundle (see "The Workstation Quality Pack" above) added extra functionality to the ACE (June 1998) release.

The July 1997, February 1998 and April 1998 Workstation ACE releases enhanced HP-UX 10.20 to support new workstation models -- B132L+, B180L, C200, C240, J2240. These new workstation models included Ultra Wide Single-Ended SCSI I/O and 100 Base-T networking hardware.

In these releases, there was also low-level support in the kernel, compilers, and linker for the OpenGL 3-D graphics Application Programming Interface (API).

There were also new HP VISUALIZE-fx device drivers for the X Window System and 3-D graphics APIs (Starbase, HP PEXlib, HP-PHIGS), and improved rendering performance since the original HP-UX 10.20 release.

Previous releases also extended the System Administration Manager (SAM) tool with more graphics device configuration features. New since the first HP-UX 10.20 release was setmon, a monitor configuration tool for changing the screen resolution, refresh rate, etc. for HP VISUALIZE-EG and HP VISUALIZE-fx devices. Also new was a tool with a graphical user interface for changing the gamma

correction value used with HP VISUALIZE-fx cards.

## Verifying Installation of ACE Software

To verify that ACE (December 1999) software is loaded on your computer, execute the swlist command:

```
/usr/sbin/swlist | grep ACE
```

Scan the swlist output for the B6193EA software bundle with the description:

```
Workstation ACE for HP-UX 10.20 (December 1999)
```

This indicates that the December 1999 ACE software is installed. If you do not see this line, ACE software has not been installed.

---

## Chapter 2: ACE System Overview and Configuration Summary

### ACE (December 1999) Workstation Systems That Are Supported:

Model	CPU	Comments
HP VISUALIZE B180	PA-7300LC	Desktop
HP VISUALIZE B1000	PA-8500	Deskside
HP VISUALIZE C3000	PA-8500	Deskside
HP VISUALIZE J5000	PA-8500	Deskside

### Supported NFS Diskless Configurations

#### Servers and Clients:

Models 705, 710, 712, 715, 720, 725, 730, 735, 742, 743, 745, 747, 748, 750, 755, B-class, C-class and J-class.

---

#### NOTE

This Additional Core Enhancement release does not support NFS over TCP. NFS/TCP will be supported on a future HP-UX 11.X release.

---

## ACE Software Delivery

ACE software is available from three sources:

- On CD-ROM media (and DDS media for customers on older support contracts)
- On Instantly Ignited systems
- Via the World Wide Web

A special ACE software CD-ROM is part of the HP-UX 10.20 media kit that is received by customers.

ACE software media is for updating HP-UX 10.20 systems to support new hardware and software. ACE software media can also be used to "cold install" HP-UX 10.20 plus the enhancements.

Only hardware that requires ACE software is Instantly Ignited (pre-installed) with it.

Current and previous ACE release software is also available from HP's Software Depot Web Site:

<http://www.software.hp.com/ACE>

Applications that take advantage of new ACE functionality are delivered via HP's December 1999 Application Software Release.

### **Installation of Large Replicated Sites**

If you are installing or reinstalling a large replicated site (more than fifty systems), you may want to take advantage of the HP-UX Ignite-UX installation tool which is available from the HP Software Depot Web site - <http://www.software.hp.com>. Using Ignite-UX, you can set up an install server to save and replicate configurations for installations for your entire site. For detailed information on Ignite-UX, please see the manual "Installing HP-UX 11.0 and Updating HP-UX 10.x."

---

## **Chapter 3: Current ACE (December 1999) Enhancements and Changes**

### **HP VISUALIZE-fxe Graphics Support**

#### **Features:**

VISUALIZE-fxe is HP's new entry-level, low cost, full-featured 3D graphics card which replaces the VISUALIZE-fx2 and VISUALIZE-EG (8 plane, 2D) products. It is a full 24-bit true color 2D graphics device for all 2D applications and markets.

#### **Technical Specifications:**

Configurations:	8-bit Overlays 24-bit Image or 24/24-bit Image (8-bit TrueColor not supported)
Overlay visuals:	Depth 8 PseudoColor Depth 8 GrayScale (2D only)
Image visuals:	Depth 8 PseudoColor Depth 24 DirectColor (supported for Starbase, HP-PHIGS and PEX APIs only) & TrueColor
Resolutions:	1024x768 1280x1024 1600x1024 (Only supported with single buffer 8+24 configuration; 2D only) 1600x1200 (Only supported with single buffer 8+24 configuration; 2D only)

Previous API 8-bit TrueColor (cmap full 332) is not supported on the VISUALIZE-fxe. Similarly, there



is no support for any 12-bit visuals on the VISUALIZE-fxe product.

### **Texture Mapping Feature:**

The VISUALIZE-fxe product will support hardware accelerated texture mapping via the OpenGL API. Point, bilinear and trilinear filtering will be supported as well as up to ten level deep MIP-mapping and per-pixel perspective projection.

VISUALIZE-fxe texture mapping provides:

- 3.5 MB of texture memory.
- 1D and 2D textures supported by the hardware.
- No hardware support for 3D textures, specular separate lighting, or texel borders; these can be rendered via software with some performance penalty.
- RGB and RGBA textures at 8 bits per color component both require 32 bits per texel.
- Due to precision limitations in the hardware, the largest square RGB or RGBA texture that will fit into the texture memory will be 512 x 512 with or without MIP-mapping.
- Hardware accelerated support is provided for the OpenGL APIs only. Legacy APIs will be rendered via a software path with performance similar to an fx2.

### **Compatibility Issues:**

No source changes are required.

Binary compatibility for targeted applications built on 10.20 ACE (Dec. 1999) release.

### **Performance Issues:**

For compute intensive applications on processors with the same frequency, VISUALIZE-fxe 3D performance should be similar to a VISUALIZE-fx2 and overall application performance should scale with the SPU frequency.

For highly intensive graphics applications, however, some performance differences may be seen. Geometry accelerated devices, such as VISUALIZE-fx2, offload much of the graphics computational workload from the CPU to the graphics device. Since it is not a geometry accelerated device, VISUALIZE-fxe requires this work be done on the CPU before transferring the graphics primitives to the graphics hardware.

Highly interactive 3D graphics operations may require the VISUALIZE-fx4 product for full performance.

### **Texture Mapping Performance:**

VISUALIZE-fxe is a texture memory device as opposed to a texture cache device. A texture memory device is limited by its texture memory size (3.5 Mbytes for VISUALIZE-fxe). It must have the entire texture in the hardware before any textured primitives can be rendered. It doesn't require the complexity of texture interrupts or hardware texture directory. Small amounts of texture memory can limit the size of textures and cause thrashing due to the need to frequently swap textures.

A texture cache device (e.g., VISUALIZE-fx4 and -fx6) has hardware support for unlimited texture sizes. It can optionally download only a piece of a texture to the hardware rather than the entire texture. Unused pieces of texture may not have to be downloaded, which gives better utilization for a small amount of hardware texture memory

For more demanding applications, both the limited texture sizes (512x512) and the potential for thrashing with multiple textures on the VISUALIZE-fxe make the VISUALIZE-fx4 and -fx6 the preferred solutions.

### **Supported Systems:**

#### **Hardware:**

B180 (2D X libraries only; 3D supported only via VMX/VMD) B1000  
C3000  
J5000  
J7000

**Not Supported:** C360

#### **Software:**

Requires HP-UX 10.20 ACE December 1999 software.

### **System Requirements:**

VISUALIZE-fxe will provide 3D support for OpenGL, Starbase, PEX and HP-PHIGS 3D APIs with a full VISUALIZE-fx2-like feature set. It will also provide 2D features via the Xserver and Xlib identical to those of the VISUALIZE-fx2 and VISUALIZE-EG products except for fewer resolutions and programmable timings.

### **USB Device Support (USB Three-Button Mouse and USB Hub)**

#### **Features:**

The newly supported USB devices are:

- a four-port, powered USB hub (D6804A)
- a three-button only (with no scroll wheel) USB mouse (this is available as part of the A4983B USB local kit)

Also supported are the USB Keyboards as listed in the ACE4 Release Notes:

#### **USB Supported Keyboards:**

A4983-60401 English, U.S.  
A4983-60403 German, Germany

A4983-60404 Spanish, European  
A4983-60405 French, France  
A4983-60406 Japanese, Kanji  
A4983-60409 Norwegian  
A4983-60411 Swiss-German  
A4983-60412 Swedish  
A4983-60413 English, U.K.  
A4983-60414 Belgian/Flemish  
A4983-60416 Danish  
A4983-60417 Italian  
A4983-60421 Korean  
A4983-60423 Chinese, Traditional

**End-User Impact:**

No change in usage model (i.e. no configuration changes or procedural changes).

**Compatibility Issues:**

No compatibility issues.

**Performance Issues:**

No performance issues.

**Supported Systems:**

The D6408A USB mouse and USB hub are supported on all B, C and J Class Workstations.

**System Requirements:**

NA

**Consolidated NFS Patches**

**Background:**

Since its inception at ACE April 1998, the 10.20 ONC+/NFS product has lacked performance and required a complicated method of installing the product.

Prior to this ACE Dec. 1999 release, customers were expected to roll their patches back to the April 1998 level, install the current Networking ACE bundle and then reinstall all subsequent patches. As we created additional ACE releases, this process has become more and more complicated.

HP also delivered a "Smart Patch" with the original Networking bundle which could automatically detect whether the ONC+ Networking Enhancements had been installed, and would install the appropriate software updates. If the Networking Enhancements had not been installed, future patches would patch only the older ONC software. This "Smart Patch" depended on the system configuration

and whether or not certain products had been loaded on the system.

The "Smart Patch" and the rollback requirement also forced HP to maintain duplicate product sets - the older ONC/NFS products and the newer ONC+/NFS products - which contain many identical or closely related components.

### **New Consolidated NFS Patches**

This ACE December 1999 release features reconstructed patches - PHNE\_19426 (the NFS Kernel patches for the 700 and 800 platforms) and PHNE\_19073 (the NFS User Space Patch for the 700 and 800 platforms) - that deliver the ONC+/NFS Networking ACE products (NFS PV3, AutoFS, and CacheFS), as well as the ONC+/NFS versions of older products (such as the ONC Automounter) contained in the older ONC/NFS product set. Only the new ONC+/NFS product set, along with the ONC/NFS Automounter, will be delivered in this patch. All other products which were part of the older ONC/NFS will be replaced by their ONC+/NFS counterparts.

In addition, the new NFS patches deliver enhancements to certain commands and executable scripts. These scripts will automatically modify the currently existing NFS configuration file (/etc/rc.config.d/nfsconf) which will select the desired behavior of the patched system. The configuration file contents will be used to select whether to use AutoFS or Automounter, whether to treat NFS PV2 or NFS PV3 as the client's default protocol, and whether to support PV3 requests as a Server.

### **End-User Impact:**

1. Both the ONC/NFS Automounter and the ONC+/NFS AutoFS products will be delivered by this patch.
2. The /usr/sbin/automount command will no longer be an executable binary, but will be an executable script.
3. The NFS configuration file, /etc/rc.config.d/nfsconf, will be modified during boot time to contain the environment variables that allow selecting NFS behavior. The environment variables in the configuration file will be:

```
AUTOMOUNT=[0 | 1]
AUTOFS=[0 | 1]
MOUNT_VER=[2 | 3]
MOUNTD_VER=[2 | 3]
```

4. Systems that have NOT had the older ONC/NFS product loaded will be configured to run the ONC/NFS Automounter product. Mounts specified in the Automount maps will use the older NFS PV2 protocol. Hard mounts from the client will use PV2, and will automatically fall back to PV3 if necessary. The system will provide PV3 NFS access to exported file systems.
5. Systems that already contain the ACE Networking bundle will be configured to run the ONC+/NFS AutoFS product. All mounts will attempt to use the PV3 protocol and will automatically fall back to PV2, if necessary. The system will provide PV3 NFS access to exported file systems.

## Compatibility Issues:

Binary compatibility, when referring to header files, system APIs and other structural features will not be affected as a result of loading the Consolidated NFS Patches, as is the case today when moving from ONC/NFS to ONC+/NFS.

The NFS configuration file will be modified automatically, but only at boot time after installation of the patch. If the file has previously been modified, its current contents will not be altered.

Two compatibility aspects of this design should be noted:

1. The mount command option which specifies the PV2 protocol ("vers=2") is necessary for other vendor's clients who may be using PV2 as a requirement. However, most major NFS vendors (except HP) use the PV3 default.
2. Any application requiring synchronous IO behavior must currently open files with the O\_SYNC or D\_SYNC option, since not even PV2 is fully synchronous unless demanded by the characteristics of the open file. When files are opened in this manner, the behavior of PV2 and PV3 is identical.

## Performance Issues:

To address the ONC+/NFS performance problem, the NFS PV3 protocol will be enhanced to support up to 24 Kbyte read/write requests across NFS. Our current limitation is 8 Kbyte.

In addition, the default number of NFS Client and NFS Server daemons defined in the NFS configuration file (NUM\_NFSIOD and NUM\_NFSD, respectively) will now be set to a higher value than previously. The new default values of these environment variables (set during cold install and Instant Ignition) will be:

```
NUM_NFSD=16
NUM_NFSIOD=8
```

The values of these environment variables will not be modified during an update.

## ACE (Dec. 1999) Workstation Systems That Are Supported:

Model	CPU
HP VISUALIZE C180	PA-7300LC
HP VISUALIZE B1000	PA-8500
HP VISUALIZE C3000	PA-8500
HP VISUALIZE J5000	PA-8500
HP VISUALIZE J7000	PA-8500

## Supported NFS Diskless Configurations

### Servers and Clients:

Models 705, 710, 712, 715, 720, 725, 730, 735, 742, 743, 745, 747, 748, 750, 755, B-class, C-class and J-class.

**System Requirements:**

The additional space required for this product is slightly less than 100Kbytes.

**Support for IDE CD-ROM Drives****Features:**

This ACE (Dec. 1999) release will provide a patch to enable IDE CD-ROM drives from additional manufacturers.

Changes have been made in the HP-UX IDE driver to accommodate slight differences in the implementation of the IDE protocol as supplied from various CD-ROM manufacturers.

**End-User Impact:**

You must install the ACE Dec. 1999 CD-ROM patch (Patch Number PHKL\_19786) BEFORE activating one of these newly supported CD-ROM drives.

**Compatibility Issues:**

None. The new ACE Dec. 1999 IDE driver that is delivered in the CD-ROM patch works with the older IDE/ATAPI CD-ROM drives. You can use these new CD-ROM drives as you would other HP supported CD-ROM drives including booting HP-UX and software installation.

**Performance Issues:**

None.

**Supported Systems:**

All HP VISUALIZE B1000, C3000, J5000 and J7000 Workstations.

**System Requirements:**

None.

**HP-UX Support Plus****Features:**

HP-UX 10.20 Support Plus is a new name for the existing HP program that delivers diagnostics and HP-UX system patches. These patches:

1. fix known defects.
2. enable new hardware
3. may deliver new software functionality.

Support Plus combines the former Diagnostic/Independent Product Release (IPR) CD-ROM and the former Extension Software Release CD-ROM. It does not constitute a new release of HP-UX. This and all future Support Plus releases will be specific to a particular Operating System platform. HP will no longer combine 10.X and 11.X patches on the same Support Plus CD media.

The ACE Dec. 1999 release will support this new patch program.

**End-User Impact:**

The Support Plus media includes the following patch categories:

- Quality Pack software for workstations, including all recommended stable, Y2K, critical, and third party patches with full operating system (OS) release testing for selected core products.
- Diagnostics (including Support Tool Manager (STM) for online diagnostics, ODE (off-line diagnostics), EMS hardware monitors, Predictive Support (S800 only), and EMS Kernel Resource Monitor).
- General release patches, including Year 2000 (Y2K) changes and current patches for all core software.
- Hardware/critical patches, including hardware enablement, critical patches, and current core Y2K changes.

**Compatibility Issues:**

NA

**Performance Issues:**

NA

**Supported Systems:**

All HP-UX hardware platforms running the HP-UX 10.20 OS.

**System Requirements:**

NA

**ACE Dec. 1999 Quality Pack**

**Features:**

This Workstation ACE (Dec. 1999) release includes the most recent version of the Quality Pack. HP installs this Pack on all Workstations ordered with pre-loaded HP-UX 10.20 software and continues to update the contents of the Pack twice a year.

The original definition of the Workstation Quality Pack included the HP-UX 10.20 Critical Patch bundle plus the following patches:

- core patches required to make operating systems Year 2000 compliant,
- a series of general release patches required to support key applications from HP and from independent software vendors, and
- patches that addressed common software problems as reported to the HP Response Center organization.

**End-User Impact:**

HP continues to strongly recommend that the customer install this current Workstation Quality Pack on all Workstations that are running the HP-UX 10.20 operating system. HP software installation tools will not enforce this action; however, we believe that loading this Quality Pack is in the customer's best interest.

HP Response Center engineers also recommend loading the Workstation Quality Pack (as opposed to loading individual patches or other patch bundles) as the first step in resolving common HP-UX 10.20 software problems. Because the Workstation Quality Pack does not address all known HP-UX 10.20 defects, HP support personnel will continue to recommend individual patches for problems that occur less frequently, but will limit those recommendations to customers who have actually encountered those problems.

HP tests each Quality Pack update with the original HP-UX 10.20 Operating System release and also with all combinations of the Workstation and Networking ACE bundles. HP supports the Quality Pack in all these configurations.

**Compatibility Issues:**

NA

**Performance Issues:**

NA

**Supported Systems:**

All HP-UX hardware platforms running the HP-UX 10.20 OS.

**System Requirements:**

NA

**Future Plans:**

From this release forward, the Quality Pack will be part of the newly named HP Support Plus program.

**Distributed Single Logical Screen (SLS/d)****Features:**



This is the X-Server component of the HP immersive visualization solutions, including the HP VISUALIZE Center, HP VISUALIZE Workgroup, and HP VISUALIZE Desktop.

This functionality was originally released in 10.20 ACE June 1999 and cooperates with OpenGL to enable the sharing of 2D and 3D OpenGL windows across displays connected to multiple technical workstations.

For example, the user can set up a 1x3 SLS/d configuration by properly configuring three J5000 workstations, each with a single Fx6 card.

From the ACE June 1999 release, the significant changes are:

- Improved mouse performance when running display list OpenGL applications
- Ability to move the default visual to the image planes

**End-User Impact:**

Not significantly different from ACE June 1999.

**Compatibility Issues:**

If the user installs the ACE Dec. 1999 X server, OpenGL applications compiled with "older" versions of GLX will not take advantage of the improved mouse performance. The user must also load the OpenGL product software from the most recent HP Application Release to enable this feature.

**Performance Issues:**

Raw performance is not significantly different from ACE June 1999.

---

## **Chapter 4: Previous (June 1999 and earlier) Workstation ACE Changes**

The following features and changes, relative to the base HP-UX 10.20 release, were provided in previous Workstation ACE releases. These changes were carried forward unchanged for the Workstation December 1999 ACE release. All ACE (December 1999) changes (above) are IN ADDITION to these changes.

### **June 1999 Enhancements:**

#### **Universal Serial Bus (USB) Support**

##### **Features**

The ACE (June 1999) release provided kernel support for certain USB User Input Devices. Supported

peripherals included keyboards in many languages and the HP A4983-60101 scroll mouse. No other peripherals were supported at this time.

### **Supported Keyboards:**

A4983-60401 English, U.S.  
A4983-60403 German, Germany  
A4983-60404 Spanish, European  
A4983-60405 French, France  
A4983-60406 Japanese, Kanji  
A4983-60409 Norwegian  
A4983-60411 Swiss-German  
A4983-60412 Swedish  
A4983-60413 English, U.K.  
A4983-60414 Belgian/Flemish  
A4983-60416 Danish  
A4983-60417 Italian  
A4983-60421 Korean  
A4983-60423 Chinese, Traditional

## **PCI**

### **Features**

The June (1999) release added support for the I/O controller and PCI controller chips in the then new B1000, C3000 and J5000 workstations. The ACE (June 1999) kernel supported PCI Devices in all PCI slots present in the workstations.

## **LVD SCSI**

### **Features**

The June 1999 release added support for a new SCSI controller used in the new B1000, C3000 and J5000 workstations. This SCSI controller provided two SCSI busses -- one narrow single-ended bus (NSE) and one fast-wide low-voltage differential bus (LVD).

### **Compatibility**

The kernel SCSI driver continued to support all existing supported SCSI devices.

## **IDE CD ROM**

### **Features**

The June 1999 release added support for the internal IDE/ATAPI CD-ROM drive that is used in the new B1000, C3000 and J5000 workstations. Applications were able to mount and access the new IDE/ATAPI CD-ROM in the same way that they currently mount and access SCSI CD-ROM devices.

## **PA-8500 Processor Support**

### **Features**

ACE (June 1999) software supported the new PA-8500 PA-RISC processor in B, C and J Class Workstations. This included:

HP 9000 Model C360  
HP 9000 Model B1000  
HP 9000 Model C3000  
HP 9000 Model J5000

### **Compatibility**

The ACE (June 1999) kernel continued to support legacy processors.

## **Audio**

### **Features**

The ACE (June 1999) release added support for the audio interface hardware that is used in the new B1000, C3000 and J5000 workstations. This audio hardware is different from that used in previous workstations. The audio driver insulated users from most of the differences; however, there were a few differences that could impact compatibility with SCSI CD-ROM devices:

1. The new audio hardware had a separate input for CD audio. On previous models of HP-UX workstations the CD audio\_output from the CD-ROM drive (if the workstation had a CD-ROM drive) was wired in parallel with the line input, since the older audio hardware only had one line level input. Users who wanted to record CD audio from the CD-ROM drive had to choose the CD audio input instead of the line input.
2. The new audio hardware did not have a separate headphone output. The headphone amplifier circuit was wired in parallel with the line output (that is, there were still two separate jacks). To preserve compatibility, the audio driver converted/enabled the line output when requested to enable the headphone output. Any program that relied on the ability to separately control the line output and the headphone output would not behave as expected.
3. The new audio hardware supported two new native formats: linear 8-bit and little-endian linear 16-bit (a PCM format found most commonly in the Microsoft .wav file format). Higher level software has always supported these formats.
4. The audio driver supported the new CD input; however, most applications did not directly interface with the audio driver. Most HP-UX audio applications used the Audio Developer's Kit API, which allowed applications to make requests to an audio server (Aserver), which may actually reside on a different machine. The audio server is the CDE application that talks directly to the audio driver.
5. The Aserver did not support CD input on the HP 9000 B, C and J Class Workstations (Models B1000, C3000 and J5000) at the time of this release. However the Aserver would work on the new audio hardware without breaking binary compatibility. Audio applications that relied on Aserver could not utilize the new audio features on the B, C and J Class Workstations.

## Summary of Change

Changes required to the Audio Developer's Kit and other HP-UX audio applications:

1. the `_AInputSrcType` enumerated type in `/opt/audio/include/Alib.h` needed the addition of some new types for the CD input. Associated input source masks had to be added immediately after the definition of `_AInputSrcType`.
2. The `AInputSources()` entry point had to be modified to return the CD input as a possible input source, if that input source was supported on the current hardware.
3. The `ASetDefaultInput()` entry point had to be modified to support setting the CD input as the default input.
4. The audio server (`Aserver`) had to be modified to check to see if the audio hardware supported the separate CD input, and to use it if it existed (otherwise it returned an error to the client).
5. `audio_editor` and `AudioCP` were modified to support the new CD input.

Besides changes to support the new CD input, `Aserver` is modified to support the new native data formats. Although this change is not absolutely necessary, it would be more efficient. Since the older hardware didn't support these formats, `Aserver` had to convert the sample type to a different native format. This will now lead to double conversion. Because the new audio hardware does not support some of the older native formats, the driver has to convert the older native formats to a format that is native on the new hardware.

The previous audio hardware supported two inputs:

1. Microphone
2. Line Input

The new audio hardware supports five inputs:

1. Microphone
2. Line Input
3. CD Input
4. Stereo Mix Input (Stereo Mix of Microphone, Line & CD)
5. Mono Mix Input (Mono Mix of Microphone, Line & CD)

To choose an input, you would use the `AUDIO_SET_INPUT` ioctl. Previously, the only legal arguments for the `AUDIO_SET_INPUT` ioctl were (as defined in `<sys/audio.h>`):

```
AUDIO_IN_MIKE  
AUDIO_IN_LINE
```

Those continue to be the only supported values for older workstations. New workstations support the following arguments to the `AUDIO_SET_INPUT` ioctl (as defined in an updated `<sys/audio.h>`):

```
AUDIO_IN_MIKE  
AUDIO_IN_LINE  
AUDIO_IN_CD  
AUDIO_IN_STEREO_MIX
```

AUDIO\_IN\_MONO\_MIX

## **Compatibility**

Previous hardware and applications continue to function unchanged.

## **USB Keyboard Support in Asian System Environment (ASE)**

### **Features**

The Workstation ACE (June 1999) includes Asian language input method enhancements to support the USB keyboards. Support is provided for Japanese, Korean, Simplified-Chinese and Traditional-Chinese.

For more information, see the following files that are installed on your system when you load the Workstation ACE (June 1999) product:

Japanese System Environment(JSE)

*/usr/newconfig/RelNotes/[ASX-JPN/ASX-JPN-S/ASX-JPN-E]*

Korean System Environment(KSE)

*/usr/newconfig/RelNotes/ASX-KOR*

Simplified-Chinese System Environment(SSE)

*/usr/newconfig/RelNotes/ASX-SCH*

Traditional-Chinese System Environment(TSE)

*/usr/newconfig/RelNotes/ASX-TCH*

## **Expert Recovery Tools Now on HP-UX Core Media**

### **Features**

Kernel changes have been made that affect the File System Recovery Tools (hereafter known as Expert Recovery Tools) for both the workstation and server systems. The HP-UX core media is now the delivery mechanism for the these tools.

This new delivery mechanism for the Expert Recovery Tools matches that for the Expert Recovery Tools on HP-UX 11.00.

## **Kernel Base Patch**

### **Features**

To ensure timely delivery of higher quality patches, HP has implemented a new strategy for handling the largest non-networking core kernel patch in 10.20 (actually a pair of equivalent patches, one for each patch stream: PHKL\_16750 (s700) and PHKL\_16751 (s800)). This large patch is designated as a "Base Patch." This new strategy defines a Base Patch as a patch that is not superseded and is required for

proper operation of the system. Patches that would have superseded this "Base Patch," now called "Incremental Patches," specify the Base Patch as an SD-UX prerequisite.

The Base Patch must be installed if any incremental patch depending on it is required. However, once the base patch is installed, the prerequisite dependency is satisfied for all other Incremental Patches that depend on the Base Patch.

Conversely, once Incremental Patches have been installed, all Incremental Patches must be removed before the Base Patch can be removed. SD-UX refuses to allow the Base Patch to be removed if Incremental Patches are present. It also refuses to allow the Base Patch and Incremental Patches to be removed at the same time.

## **X Window System Enhancements**

### **Low Bandwidth X Extension (LBX)**

#### **Features**

The Low Bandwidth X extension (LBX) uses several compression and local caching techniques to improve performance on wide area networks and on slower speed connections. These reduce the amount of protocol data transported over the network and reduce the number of client-to-server round trips required for common application startup operations.

LBX is implemented in two pieces: an X server extension and a proxy application. The X server extension provides the new optimized protocol. The proxy application, `lbxproxy`, translates a normal client X protocol stream into an LBX stream. This permits any existing application to gain the benefit of the optimized protocol with no changes. The proxy is especially useful when multiple applications are running on the same local area network separated from the X server by a slower network. In this case, the full benefit of the local cache is shared by each application using the same proxy process.

#### **Summary of Change**

The `lbxproxy` binary is added to the `/usr/bin/X11` directory. It must be started by an end user either directly or through the Proxy Manager (`proxymngr`) and Find Proxy (`xfindproxy`).

#### **Performance**

When X clients are separated from the X server by a slow connection such as a modem, performance will be improved by going through `lbxproxy`. However, when the client and X server are separated by a fast connection such as a local area network, performance may be degraded by running through `lbxproxy`.

#### **Proxy Manager (`proxymngr`)**

The Proxy Management Protocol is an ICE based protocol that provides a way for application servers to easily locate proxy services such as the LBX proxy. LBX is currently the only supported proxy service.

Typically, a service called a "proxy manager" is responsible for resolving requests for proxy services, starting new proxies when appropriate and keeping track of the available proxy services. The proxy manager strives to reuse existing proxy processes whenever possible.

### **Summary of Change**

The proxymngr executable is added to the /usr/bin/X11 directory. It must be started directly by the user. This can also be used in conjunction with xFindproxy which is also in /usr/bin/X11.

### **Remote Execution (RX) Service**

The remote execution (RX) service specifies a MIME format for invoking applications remotely, for example via a World Wide Web browser. This RX format specifies a syntax for listing network services required by the application, for example an X display server. The requesting web browser must identify specific instances of the services in the request to invoke the application.

There are two methods to demonstrate this service: xrx, the helper program and libxrx.6.3, the Netscape plug-in.

### **Summary of Change**

The xrx helper program is added to the /usr/bin/X11 directory. End users must setup their web browsers to use this program for files with the rx extension. The Netscape plug-in, libxrx.6.3, is added to the /usr/lib/X11R6 directory. End users must copy this to their \$(HOME)/.netscape/plugin-ins (or equivalent) directory so that files with the rx extension are interpreted correctly. In order to use the plug-in, Netscape should not also be setup to use the helper program.

### **Security Extension**

The security extension adds X protocol needed to provide enhanced X server security. This extension adds the concepts of trusted and untrusted clients. The trust status of a client is determined by the authorization used at connection setup. All clients using host-based authorization are considered trusted. Clients using other authorization protocols may be either trusted or untrusted depending on the data included in the connection authorization phase.

When a connection identifying an untrusted client is accepted, the client is restricted from performing certain operations that would steal or modify data that is held by the server for trusted clients. An untrusted client performing a disallowed operation will receive protocol errors.

When a client is untrusted, the server will also limit the extensions that are available to the client. Each X protocol extension is responsible for defining what operations are permitted to untrusted clients; by default, the entire extension is hidden.

### **Application Group Extension (XC-APPGROUP)**

The application group extension provides new protocol to implement Application Groups (AppGroups). The AppGroup facility allows other clients to share the SubstructureRedirect mechanism with the window manager. This allows another client called the application group leader, such as a web browser,

to intercept a MapRequest made by a third application and re-parent its window into the web browser before the window manager takes control. The AppGroup leader may also limit the screens and visuals available to the applications in the group.

This extension, along with the Netscape remote execution plug-in, allows Netscape to run programs remotely over the Web with the output appearing in the Web browser display.

The only way for an application to become a member of an AppGroup is by using an authorization generated using the new security extension. Whenever an application connects to the server, the authorization that it used to connect is tested to see if it belongs to an AppGroup. This means that the Authorization data must be transmitted to the remote host where the application will be run. In the case of X, HTTP is used to send the Authorization. Sites who have concerns about sending un-encrypted authorization data such as MIT-MAGIC-COOKIE-1 via HTTP should configure their web servers and web browsers to use SHTTP or SSL.

## **SLS/d - Distributed SLS (HP VISUALIZE Center Support)**

### **Features**

SLS/d is an extension of the SLS (Single Logical Screen) functionality provided by the X server that allows the X desktop to span graphics displays that reside on distributed systems. By distributing the display across several systems, a larger "logical" array of graphics displays can be achieved than otherwise would be possible with a single system with multiple graphics cards. SLS/d provides the X Window system support for part of the 3-D VISUALIZE Center products.

### **Summary of Changes**

SLS/d involves a low-level change in the X server that unites several distributed graphics displays into a "logical" X Window System. The only user-visible changes are related to system configuration. The X Window system API remains unchanged in the SLS/d system, and thus is completely transparent to 2-D X window applications. The motivation behind this new functionality is to increase the size of the "logical" screen beyond what is possible using a single system with multiple graphics cards.

A new driver and a new X server extension have been added to the X server in order to implement this change. The functionality is enabled by modifying the server's X\* screens file. The full documentation for the SLS/d functionality can be found in the X server information file, `/usr/lib/X11/Xserver/info/screens/hp` and in the Graphics Administration Guide.

An SLS daemon and a configuration tool are delivered to aid system configuration. The daemon is controlled via start and stop scripts that reside in the `/sbin/init.d`, `/sbin/rc1.d`, and `/sbin/rc2.d` directories. The SLS daemon is started when the system enters runlevel 2 or greater and stopped when the system enters runlevel 1. See the X server documentation for more details.

### **Performance**

The performance of SLS/d depends on the performance of the underlying network to which the SPUs in the system are connected. On a dedicated network with a 100 Base-T backbone, the 2-D X windows performance approaches that of a single SPU SLS system.



## **Compatibility**

SLS/d is transparent to applications in the same manner as SLS. Once the system has been configured, it behaves identically to a single screen X window system, albeit with a much larger screen size. One requirement is that the underlying graphics cards in the system be homogeneous. Although not a strict requirement, it is also desirable that the systems participating in the SLS/d system be homogeneous as well.

## **New "euro" Symbol**

The European Economic and Monetary Union (EMU) has created a new character to represent the "euro" monetary unit. Consequently, this euro character must be integrated into information technology systems to allow users to store, retrieve, display and print it. The euro symbol is included on the keyboards that ship with the B1000, C3000, and J5000 workstation systems.

For more information about the euro symbol and how to implement it, refer to "HP and the euro" Web page at:

[http://www.hp.com/unixwork/euro/release\\_notes/index.html](http://www.hp.com/unixwork/euro/release_notes/index.html)

Or contact your local Response Center for copies of the euro Release Notes and a white-paper on "Setting Up euro Enablement For The First Time."

## **Tunable Kernel Parameters**

The Workstation ACE (June 1999) release delivers new kernel parameters that are tuned for technical workstation applications. These new parameters are the default when cold installing a system. If you are updating your system with this Workstation ACE (June 1999) software from a previous release, the kernel parameters are not modified by default. However, you have several options for updating your kernel parameters. Using a parameter set provided in HP's System Administration Manager (SAM) application or by manually forcing the install of the "Kernel Parameter Values Enhancement" patch, you can adjust your HP-UX 10.20 system for increased capacity and improved performance.

For more information about what has changed, why it was changed, how to apply the new parameters, and additional system tuning information, please see the White Paper placed on your system as part of the Workstation ACE (June 1999) installation at `/usr/share/doc/SystemTune.txt`.

## **Turbo VRX and Personal VRX graphics devices are no longer supported**

The X server contained in the ACE (June 1999) release will not start on the Turbo and Personal VRX graphics devices. Instead, a message will appear that tells you these devices are no longer supported. You can then start the X server with unsupported device drivers by removing the file `/usr/lib/X11/Xserver/brokers/screens/VrxObsolete.1` and restarting the X server.

Turbo and Personal VRX systems should not be updated with any X server or 3D graphics patches created after February 1999, as such patches will not contain any libraries for these devices.

---

# June 1998 ACE Enhancements:

## New Features for Graphics APIs : Starbase, PEX, PHIGS

1. New code enhances PA2.0 performance.

New PA2.0-specific routines have been added to improve the performance of math intensive routines such as model clipping and capping, viewing transformations, triangle strip, facet normal computation and polymarkers. If you have a PA2.0 SPU, these performance enhancements will take effect automatically. They do not negatively affect performance on PA1.1 SPUs.

2. Four new Starbase gescapes provide specific performance improvements and new feature opportunities.

The application developer must make code changes to take advantage of the new gescapes.

### The `R_PERIMETER_TYPE` gescape

The `R_PERIMETER_TYPE` gescape works exactly like the `R_LINE_TYPE` except that it sets the perimeter pattern instead of the line pattern. This allows a dashed pattern to be specified for edged polygons. See the documentation for `R_LINE_TYPE`.

### The `HW_FB_DISTINGUISH (Hardware Front/Back)` gescape

This gescape allows hardware to determine front or back of polygons on `VISUALIZE-fx`. This feature provides a significant performance gain for 2-sided lighting and culling. It is supported on `VISUALIZE-fx` devices (fx2, fx4 and fx6). The functionality in this gescape can be accessed for Starbase as well as PHIGS and PEX by using the environment variable `HW_FB_DISTINGUISH`.

### Arguments

`arg1.i[0]` - Set to `TRUE` to turn it on and `FALSE` to turn it off.

### Example Implementation

```
char capabilities[SIZE_OF_CAPABILITIES];

inquire_capabilities (fildes, SIZE_OF_CAPABILITIES, capabilities);
if ((capabilities[PERF_HINTS_1_CAPABILITIES] & IC_HW_FB_DISTINGUISH)
== FALSE)
{
    gescape_arg arg1;
    arg1.i[0] = TRUE;
    gescape (fildes,
            HW_FB_DISTINGUISH, &arg1, NULL);
}
```

Calling the gescape when hardware front/back distinguish is not supported has no effect, so the `inquire_capabilities` call could be omitted.

## Description

When the user specifies culling or backflip lighting (which is also referred to as 2-sided lighting, PHIGS standard lighting and the REFLECTANCE\_NORMAL\_TOWARD\_VIEWER\_LIGHTING gescape), our libraries must tell the hardware whether a polygon faces the front or back. This is accomplished by computing the facet normal, transforming that normal by the current transformation, determining if the current polygon has a different orientation than the previous, and possibly telling the hardware that the polygon orientation has changed. If the user supplies a facet normal, the facet normal computation is avoided, but this is only a fraction of the total computation involved in front/back determination.

Culling is another option that requires front/back distinguish. In this case, the normal must be computed, transformed and then checked to see if it points towards or away from the viewer. If the polygon can be culled, we do not send it to the hardware.

The VISUALIZE-fx series has the ability to use the hardware for front/back determination. Based on the current vertex orientation (clockwise or counterclockwise), the hardware can compute the facet normal for each polygon and perform culling or 2-sided lighting. This gescape allows us to use this feature and take the fastest path through our libraries, which can result in significant performance gains.

The most significant difference between the software and hardware implementations is that the hardware is not supplied with the user's facet normal. If the user's normal is consistent with the polygon orientation or if the user does not supply a normal, this will not present a problem. If the normal is not consistent, the hardware will generate an incorrect image.

Polygons with more than 4 vertices can potentially present problems. These polygons must go through an expensive decomposition process before they can be sent to the hardware. Since this can result in multiple polygons, each individual polygon could get different front/back results if the polygon is not planar. If we cull these in software, we can potentially avoid the expensive decomposition process. As a result, turning hardware front/back distinguish on when culling is enabled may not result in a performance gain if large number of vertices are used to describe each polygon.

When edged polygons are culled, front/back distinguish will always be performed in software. The reason for this is that the edges are vectors which cannot be culled by the hardware. If culling is turned off and backflip lighting is turned on, hardware front/back distinguish can result in a performance gain.

## The OCCLUSION\_CULL\_CONTROL and OCCLUSION\_CULL\_CHECK gescapes

Two gescapes have also been added to enhance occlusion culling. To determine whether a device supports Occlusion Culling, you can call inquire\_capabilities() and check to see if the IC\_HW\_OCCLUSION\_CULL bit is set in the PERF\_HINTS\_1\_CAPABILITIES byte.

```
gescape: OCCLUSION_CULL_CONTROL
```

```
    arg1.i[0] = 0    will "reset" occlusion culling hardware
                   Note: This value *must* be set to 0.
```

```
gescape: OCCLUSION_CULL_CHECK
```

arg1 is ignored entirely.

arg2.i[0] will be set to 1 if all the graphics are culled (invisible) since the last OCCLUSION\_CULL\_CHECK (or since Occlusion Cull was first enabled, if this is the first call to OCCLUSION\_CULL\_CHECK)

arg2.i[0] will be set to 0 if any of the graphics are visible.

It is recommended that arg2.i[0] be set to 0 before the call is made, so that if run on a device that does not support occlusion culling, the "return" value will always be 0 (not culled), and the application should go ahead and render the part being tested.

### Example Code Usage Segment

```
void draw_bounded_polygons(int fildes)
{
    gescape_arg arg1, arg2;

    arg1.i[0] = 0x00;
    gescape(fildes, ZWRITE_ENABLE, &arg1, &arg2);

    write_enable(fildes, 0x00);
    fill_color(fildes, 0.0, 0.0, 1.0);
    polygon_with_data3d(fildes, bound_pgon,4,0,0,0);
    write_enable(fildes, 0xff);

    arg1.i[0] = 0xff;
    gescape(fildes, ZWRITE_ENABLE, &arg1, &arg2);
}

void update_display(int fildes)
{
    gescape_arg arg1, arg2;
    arg2.i[0] = 0;
    draw_cube(fildes);          /* Draw 'obscuring' graphics */
    arg1.i[0] = 0;
    gescape(fildes, OCCLUSION_CULL_CONTROL, &arg1, &arg2);
    /* Reset cull */
    draw_bound_pgons(fildes); /* Draw "bounding" box */
    arg2.i[0] = 0;
    gescape(fildes, OCCLUSION_CULL_CHECK, &arg1, &arg2);
    /* Check cull */
    if( arg2.i[0] == 0 ) {
        /* Didn't cull the bounding polygons; render torus */
        draw_torus(fildes);
    }
    else {
        /* printf("Culled the torus! \n"); */
    }
    dbuffer_switch(fildes, buffer=!buffer);
}
```

Performance is improved for edged polygons on VISUALIZE-fx devices. In many cases, performance increased by a factor of two.

## X Windows Server

Hewlett-Packard has implemented two new extensions for the X Window System:

### 1. HP Color Recovery Extension

Entry-level graphics devices for HP workstations include only eight planes of frame buffer memory, permitting the display of 256 colors using either indexed or direct color modes. The Integrated Color Graphics and VISUALIZE-EG devices support HP Color Recovery technology, which utilizes a special dither cell, along with sophisticated digital signal algorithms, to store and display the equivalent of over 8 million colors in an 8-plane frame buffer. This capability enables highly photo-realistic effects on low end graphics devices. The Starbase, HP PEXlib, and HP-PHIGS 3-D graphics APIs transparently use this capability when running on one of the entry level graphics devices that support HP Color Recovery technology.

For Xlib and Motif programmers, the HP Color Recovery (HPCR) extension provides a device independent way to display 24-bit image data on HP graphics devices with 8-plane frame buffers. The HPCR extension provides a simple API for allocating an appropriate visual and storing a 24-bit image using HP Color Recovery technology. For more information about the HPCR extension, check the on-line X Windows documentation file:

```
/usr/lib/X11/Xserver/info/screens/hp
```

This file describes the API entry points in general and describes how to use the HPCR calls in an application.

### 2. . The Open Group (X Consortium) Display Power Management Signaling Standard

The Video Electronic Standards Association (VESA) has defined a standard for reducing the amount of power used by computer monitors during periods of inactivity. This standard is known as the Display Power Management Signaling (DPMS) standard, and is supported by all current HP monitors for PA-RISC workstations. By default, HP systems do not enable power saving via DPMS.

The new X server supports a standard X Window System extension for activating the DPMS power-saving feature in a monitor. The June 1998 Workstation ACE release supports only the server-side of the DPMS extension, and only for the following graphics devices:

- internal graphics for Model 712/60, 712/80, 712/100,

715/64, 715/80, 715/100, 715/100 XC

- Internal Color Graphics cards
- Integrated Color Graphics cards
- HCRX family (-8, -8Z, -24, -24Z)
- VISUALIZE family (-8, -24, -48, -48XP)
- VISUALIZE-EG
- VISUALIZE-fx family (-fx2, -fx4, -fx6)

The DPMS extension API is supported as of the October 1998 patch.

End-users, however, can activate the DPMS power-saving via a new screen option in the "X\*screens" configuration file:

MinimumMonitorPowerSaveLevel <level>

You can set this screen option to any of the following four values from the VESA DPMS specification:

Level	Power-Saving Effect for Setting
0	No power savings. For CDE users, the screen saver settings are in effect.
1	Stand-by mode; minimal power savings, but short time to restore usable state.
2	Substantial savings, but longer time to restore visibility of data on screen.
3	Maximum power savings; system dependent behavior for restoring visibility.

If you set the "MinimumMonitorPowerSaveLevel" screen option, it will override the Screen Saver setting of your CDE Style Manager and put the monitor into a power-saving state after the specified time elapses with no input events. An input event -- such as moving the mouse or typing on the keyboard -- will cause the X server to signal the monitor to wake up.

## The 'slsclone' utility

This application provides an easy way to replicate screen definitions in an SLS environment.

The slsclone utility is delivered into /usr/contrib/bin/X11.

If you have an SLS configuration, you can replicate the content of any of the monitors across all monitors within the SLS configuration. For example, if you wanted the contents of monitor 0 (i.e. the leftmost monitor in a 1-by-N configuration) to appear on all monitors, you would execute:

```
slsclone -clone 0
```

In general, the command to replicate the contents of a monitor across all screens is:

```
slsclone -clone <n>
```

where <n> is 0 .. n and n+1 is the number of monitors in the SLS configuration.

To restore the SLS mode, execute:

```
slsclone -sls
```

## Support for 1600x1200 resolution

The VISUALIZE-fx4 (Rev. B) and fx6 graphics devices now support 1600 x 1200 resolution. If this resolution is supported on a given graphics device, setmon will display it as an option.

NOTE: All X Windows and all 3-D APIs support 1600 X 1200 resolution.

The current HP monitors that support these modes are:

A4332x  
A4575x  
A4576x

## OpenGL Support

NOTE: Many of these changes have been previously delivered in periodic patches, and some applications may be already taking advantage of some improvements.

NOTE: OpenGL version 1.05 runtime support is NOT on the ACE (June 1998) media. It is being released on the DART release coincident with Workstation ACE (June 1998).

### Performance enhancements:

- Improvements in Vertex Array performance (2X improvement)
- glxMakeCurrent performance tuning (up to 2X improvement)
- glPolygon Stipple performance tuning (+25% improvement)
- Optimizations to increase display list performance (up to 2X improvement)
- Texture Mapping performance tuning
- Improvement of the ReadPixel pipeline
- glDrawArraySetHP performance tuning (+17% improvement)
- Application buffer swap control for improved performance
- Cache management improvement for large models (up to +40% improvement)
- Stippled time Validation (+50% improvement)
- Display list memory optimizations
- 1600x1200 screen resolution support

### Compatibility Issues

This release is fully compatible with existing OpenGL based applications. Applications that are coded to use the new functionality, if coded correctly (as specified by the OpenGL Reference Manual regarding vendor extensions), will run on this and past OpenGL releases.

This release of OpenGL requires the installation of the 3D Graphics patches that are part of the Workstation ACE bundle for June 1998.

**WARNING:** If OpenGL version 1.0, 1.01, or 1.02 is currently installed and the system is upgraded to ACE (June 1998) then the currently installed OpenGL will NOT OPERATE CORRECTLY. A new version of OpenGL (1.03 or newer) must be installed; DART 9806 is the preferred version to install.

Application changes for software developers:

- glDrawArraySet added New Ext (+45% improvement)
- Rescale Normals added New Ext (+30% improvement)

In general, the OpenGL glDrawArraySetHP and GL\_RESCALE\_NORMAL improvements are

observable only if the software developer takes advantage of these features.

The other OpenGL performance improvements take effect independent of application changes.

---

## **April 1998 and earlier ACE Enhancements:**

The following features and changes, relative the base HP-UX 10.20 release, were provided in previous Workstation ACE releases. These changes were carried forward unchanged for the current release. All ACE (June 1999) changes are IN ADDITION to these changes

### **HP VISUALIZE-fx Graphics Hardware**

VISUALIZE-fx is the name of HP's family of graphics accelerators. There are three HP VISUALIZE-fx frame buffer configurations:

- HP VISUALIZE-fx2
- HP VISUALIZE-fx4
- HP VISUALIZE-fx6

All these configurations include eight (8) overlay planes and multiple color maps. HP VISUALIZE-fx2 includes 24 image planes, making it equivalent (in terms of pixel depth and double-buffering) to the existing VISUALIZE-fx or HCRX-24Z graphics devices.

HP VISUALIZE-fx4 and -fx6 include 48 image planes grouped into two banks of 24 planes each.

There is also an optional Video Out board available to attach to VISUALIZE-fx base boards.

### **Stereo Graphics Output**

Both VISUALIZE-fx 48-plane configurations support quad buffer stereo graphics output using HP's implementation of the OpenGL(tm) API (see below). This quad buffer mode permits stereo output using the full resolution (1280x1024 pixels) of the display and is also known as "stereo in a window".

Note that other 3-D APIs (Starbase, HP PEXlib, HP-PHIGS) support stereo by assigning lines in the top half of the frame buffer to the left image and lines in the bottom half are used for the right image. This "halving" of the horizontal screen resolution necessitates scaling images in the Y-axis. Starbase, HP PEXlib, and HP-PHIGS do not support the quad buffer mode for stereo output.

### **Hardware Configuration**

All HP VISUALIZE-fx graphics devices interface with the PCI bus included in some, but not all, B-class, C-class, and J-class workstations. (Note that not all workstation models include a PCI bus.) Furthermore, there are restrictions on what I/O slots support HP VISUALIZE-fx graphics devices, depending on overall card height, bus bandwidth, power requirements, etc.

### **X Window System**



## Device support and visuals:

The updated DDX device driver supports HP VISUALIZE-fx graphics devices. Visuals supported for HP VISUALIZE-fx2 are similar to those supported on HP VISUALIZE-24/HCRX-24Z, and the visuals supported for HP VISUALIZE-fx4 and HP VISUALIZE-fx6 are similar to those supported on HP VISUALIZE-48. They are exactly the same when used with the Starbase, HP PEXlib or HP-PHIGS API's.

## X Server Logging Capability

The X Server creates a log to record information -- "X\*screens" contents, dynamically loaded libraries -- that defines a specific instance of the server. The log names use the same display identifier as the corresponding X startup file ("X\*screens").

For example, the name of the logfile is:

```
/var/X11/Xserver/logs/X*.log
```

where \* corresponds to screen number.

This log feature has been present in X Server patches for HP-UX 9.07, 10.10, and 10.20 Releases.

## OpenGL Support

OpenGL is a hardware-independent Application Programming Interface (API) that provides an interface to graphics operations. HP's implementation of OpenGL converts API calls to graphical images via hardware and/or software functionality. The interface consists of a library of functions that allow applications to define and manipulate three-dimensional objects. The functions fall into the following categories:

- Geometric primitive definitions
- Viewing operations
- Lighting specifications
- Primitive attributes
- Pipeline control
- Rasterization control

OpenGL has been implemented on a large number of platforms where the graphics hardware supports a wide range of capabilities (for example, frame-buffer-only devices, accelerated devices, devices without frame buffer, etc.).

If the OpenGL API is installed, the DDX driver will support several new visuals. These new visuals are needed for GLX (the OpenGL Extension to the X Window System) and are called "replicated GLX visuals." They are versions of existing visuals with additional attributes which are not part of the X Window System standard. The new attributes include Z-buffering, accumulation buffers, quad buffer stereo support, etc. and are only visible through the visual query mechanisms supported in GLX.

For applications that do NOT use OpenGL, these replicated visuals behave in identical fashion to the corresponding non-OpenGL visual. Their presence in the list of available visuals (and even selecting them for use) should have no effect on the behavior of most existing X- based applications.

On HP VISUALIZE-fx4 or -fx6 graphics devices, a number of depth 12 visuals can be enabled through screen options. A depth 12 PseudoColor visual can be added to the visual list by adding the Enable12BitPseudoColorVisual screen option to the X0screens file. This should be enabled for OpenGL applications that need the depth 12 PseudoColor visual. The Enable12BitDirectColorVisual and Enable12BitTrueColorVisual screen options can be used to enable new depth 12 DirectColor and TrueColor visuals. Note that all depth 12 visuals on VISUALIZE-fx4 and -fx6 are NOT visible/accessible by default.

On HP VISUALIZE-fx2 graphics devices, depth 12 DirectColor and TrueColor visuals ARE present by default. These visuals are used by applications to achieve good double-buffering performance. The depth 12 PseudoColor visual is NOT present by default but it can be enabled through the Enable12BitPseudoColorVisual screen option.

If the X Server is in the "OpenGL stereo mode" on VISUALIZE-fx4 and -fx6 graphics devices, then the quad buffer stereo mode is available and the new depth 12 TrueColor and DirectColor visuals mentioned above will be present. These can be used for quad buffer stereo (stereo in a window) support. Quad buffer stereo is not supported on VISUALIZE-fx2.

The X Server will support GLX. GLX is used by the OpenGL API to help manage interaction between the OpenGL client and the X Server. GLX includes calls for selecting a "best visual", managing double-buffering state, managing rendering contexts, etc.

For more information about a specific HP OpenGL product, consult the documentation for that product:

OpenGL Programming Guide	Part No. B2355-90144
OpenGL Programming for the X Window System	Part No. B2355-90145
OpenGL Reference Manual	Part No. B2355-90146
HP's Implementation of OpenGL	Part No. B6196-90001

There is also a Web-browsable version of the documentation located on your system at:

`file:///opt/graphics/OpenGL/doc/Web/`

## **Starbase Graphics Library**

The device driver to support the HP VISUALIZE-fx graphics devices is available in both archive library and shared library formats. The shared library driver operates with Starbase applications that follow the "plug and go" guidelines.

Starbase does NOT support the depth-12 PseudoColor visual.

### **gescape Calls**

There are two gescape operations that support word-per-pixel block reads and block writes of the frame buffer:

R\_READ\_FB  
R\_WRITE\_FB

Starbase supports these operations on ALL devices.

## **HP PEXlib Graphics Library**

There is a new device driver to support the HP VISUALIZE-fx graphics devices.

HP PEXlib does NOT support the depth-12 PseudoColor visual. PEXlib will refuse to open a window of this type.

## **HP-PHIGS Graphics Library**

There is a new device driver to support the HP VISUALIZE-fx graphics devices.

HP-PHIGS does NOT support the depth-12 PseudoColor visual. An attempt to open a window using this type of visual will result in an error.

## **Miscellaneous Graphics Support**

- GLX--Window System Interface Toolkit

The X Server supports GLX, an extension to the X Window System used as an interface by the OpenGL API. GLX includes calls for selecting a "best visual", double-buffering support, managing rendering contexts, etc.

- Dynamic Loading of the PEX Extension

In past releases of HP PEXlib, the PEX daemon was started at X Server startup time. The PEX daemon is now dynamically loaded on systems where the X Server supports dynamically loaded extensions (DLE). If the PEX extension is loaded on a system with an X server that does not support DLE, the behavior--static startup at X server startup time--will remain the same.

- Defect Fixes

The updated X Server (including extensions and DDX drivers) will include all defect fixes from HP-UX 10.20 X Server patches released prior to July 1997. These are cumulative patches.

## **Device Locking Mechanism**

The Workstation ACE software update includes support for graphics hardware that uses a locking mechanism called "Virtual Device Access." Previous locking mechanisms required each graphics application to acquire a lock before accessing the graphics device, in order to properly share the device. The new mechanism uses the HP-UX kernel virtual memory subsystem to arbitrate access to the graphics device. Each application accesses the device as if it owned it. If another application is currently accessing the device, access permission will be revoked from that process and given to the new process. The HP-UX virtual memory subsystem ensures that only one process has access to the device.

## SIGGFAULT Signal

Before the new process can access the device it must save the graphics "state" of the previous process and restore its own graphics state. HP-UX sends a signal (SIGGFAULT) to trigger the state "save" and "restore" operations. A signal handler that has been installed by HP-UX graphics library code handles everything.

The SIGGFAULT signal was designed to be as unobtrusive as possible. Application code should not need to be changed to take this signal into account. The only code that needs to know about and use the SIGGFAULT signal is the graphics library code that is provided by HP in binary form to graphics application developers.

However, since the SIGGFAULT signal is not completely invisible, there is some possibility that application code may need to change to take it into account. The following information is provided for programmers to make that evaluation:

1. Since a new signal has been added, the value of NSIG (the number of visible signals) has increased. This increase will only be seen by Unix95 compliant processes (that is, processes that work with or support signal numbers greater than 32). For compatibility reasons, NSIG will always be 31 for processes that are not Unix95 compliant.
2. To prevent application code from installing a signal handler for SIGGFAULT (and therefore overriding the signal handler that was installed by the graphics library), the signal handler can only be installed if a special flag is used when calling `sigaction()`. Otherwise `EINVAL` will be returned.
3. SIGGFAULT cannot be masked.
4. The SIGGFAULT signal is not visible to debuggers, that is, it will not be trapped by the normal `ptrace()` signal trapping mechanism.

Unless an application has code like:

```
for (i = 1; i < NSIG; i++) {  
    /* Do something for every possible signal */  
    ...  
}
```

it should not require modification. If the application includes code like the example above, it should already have exception cases for signals like `SIGKILL` and `SIGSTOP`, since they cannot be masked and signal handlers cannot be installed for them. In this case `SIGGFAULT` should be treated likewise, assuming that the program is Unix95 compliant.

### NOTE

`SIGGFAULT` is a signal that has been added at the end of the existing range. Existing binaries, (even if they had code like the above example in them), will still work, since `NSIG` is a compile time constant.

In summary, application code should not attempt to do anything with the `SIGGFAULT` signal. It is intended only for use by the graphics libraries provided by HP. The only code that might need to change is code that tries to do something with every defined signal and is Unix95 compliant. In this case, `SIGGFAULT` should be added to the list of signals that the application should not process, similar to

## Chapter 5: Previous I/O Changes

### Ultra Wide Single-Ended (UWSE) SCSI Support

This updated software adds support for Ultra Wide Single-Ended SCSI (or Fast 20) devices to the existing kernel SCSI device driver. UWSE SCSI provides high speed SCSI connections--16-bit parallel, maximum transfer rate of 40 Mbytes per second--with devices that support the standard. The internal hard disk drives used in the new PA-RISC workstations are UWSE SCSI devices.

#### NOTE

The recommended cabling for UWSE SCSI differs from the cables used with wide-differential SCSI. If you upgrade a new C- or J-class Workstation with board upgrade and wide-differential disk interface, the total cable must be limited to 12.5 meters. If this cable length is exceeded, the boot may fail with a message that the peripheral device cannot be found.

This is not a limitation with the B-class.

Consult the Owner's Manual for your PA-RISC workstation for additional information about interfacing UWSE SCSI devices to your computer, including restrictions on cable length and connectors.

### 10 Base-T and 100 Base-T Networking

#### Features

This update adds a kernel LAN device driver to support the 100 Base-T networking standard. The 100 Base-T standard provides a network transport rate of 100 Mbits per second over Ethernet LAN media. It supports TCP/IP, SNA, LMX, NetWare and network services (NFS, FTP, telnet, etc.).

The new PA-RISC workstations include LAN interfaces for both 10 Base-T and 100 Base-T standards. The built-in RJ-45 networking port on the rear panel supports both 10 Base-T and 100 Base-T connections (see section below on RJ-45 and AUI ports). The onboard networking hardware automatically senses the LAN speed and adjusts its operation to the appropriate standard. The enhanced LAN circuitry can handle both full and half duplex operation with auto-negotiation. See the section on "Compatibility" below.

You can connect the new platforms into a current 10 Base-T network, or upgrade and connect into a 100 Base-T network.

#### Summary of Change

- Built-in LAN driver (btlan3) available in Workstation ACE software bundles. Additional changes or features include:
  - 10/100 Mbps speed support
  - half and full duplex support

- auto-speed sense and auto-negotiation
- Filesets that are added to HP-UX to support 100 Base-T:
  - CORE100-KRN for kernel files
  - CORE100-RUN for command files
  - CORE100-FMT for the nettl formatter
  - CORE100-INIT for system initialization and configuration
- Configuration specifics.
  - System keyword is btlan3
  - nettl subsys\_id is 173
  - Dynamic major number
- Support for transports and services
  - Support for the current transport stacks (TCP/IP, SNA, LMX, NetWare)
  - Support for the current services (NFS, Internet Services)
- Patches
  - A patch to support 100 CORE functionality (existing patch **PHNE\_9840**)
  - A patch in SAM to support btlan3 and full duplex options. (existing patch PHCO\_9895 or superseding version)
  - A patch in lanc for schednetisr process launch for high speed links (existing patch PHNE\_9277 or superseding version)

## Impact

Detection and installation will be done by the product scripts.

You will be able to connect the new platforms into a current 10 Base-T network, or upgrade and connect into a 100 Base-T network.

## Compatibility

The LAN driver will continue to support the current set of transports (TCP/IP, SNA, LMX, NetWare) and services (NFS, Internet Services). The new driver does not support IP Multicast or Promiscuous Mode. Support for these features will be provided by a patch delivered after the release of this update.

## Manually Configuring Link Speed and Duplex Mode

The networking hardware in the new Workstations is capable of setting its speed and duplex modes via "auto-negotiation" -- that is, the link will automatically determine the highest-performance setting (100 Mbps FullDuplex, 100 Mbps HalfDuplex, 10 Mbps FullDuplex, 10 Mbps HalfDuplex) of the hub or switch to which it is connected.

Some switches do not implement auto-negotiation or you may wish to manually set the speed and/or duplex mode of the 10/100 Base-T interface and override the auto-negotiation process with a particular switch. Also, manually configuring the speed or duplex setting at the switch may disable the switch from doing auto-negotiation, in which case the speed and/or duplex mode of the 10/100Base-T interface may need to be set manually to match. This may be done in two ways:

1. At boot time

With this method you may set both the speed and duplex mode of the interface, and have this setting be in effect across subsequent system reboots.

To access the LAN Configuration commands: From the boot console, select the "Configuration Menu" and from there select "LAN Configuration."

From this menu you can configure and display the current mode of the 10/100 Base-T interface using these commands:

```
LanConfig          Display current configuration settings.
LanConfig 10/Half_dx Operate in 10 Mbit/s, half duplex mode.
LanConfig 100/Half_dx Operate in 100 Mbit/s, half duplex mode.
LanConfig 10/Full_dx Operate in 10 Mbit/s, full duplex mode.
LanConfig 100/Full_dx Operate in 100 Mbit/s, full duplex mode.
LanConfig AUTO_detect (default) Enable auto-negotiation
LanConfig AUI       Use the AUI port (10 Mbit/s, half duplex).
```

## 2. Via the lanadmin -S command

With this method you may set the duplex mode of the interface only, and allow the system itself to automatically sense only the speed of the link. This setting does not persist across system reboots.

To set the duplex mode of the interface, use the -S option of the lanadmin command as follows:

```
lanadmin -S mode nmid
```

where:

a mode of 1 = full-duplex mode

a mode of 0 = half-duplex mode

nmid is the Network Management ID of the card, which you can get from the output of the lanscan command

For example, if the nmid of the 100 Base-T interface is 5, the command to set the interface to full-duplex mode would be:

```
lanadmin -S 1 5
```

After setting the duplex mode as specified, the lanadmin command will echo the current speed setting of the interface as follows; this output may be ignored (output shown for 100Mbps operation):

```
Old Speed= 100000000
New Speed= 100000000
```

After issuing the lanadmin -S command you must wait at least 8 seconds before attempting to use the specified network interface.

If you want the Duplex Mode setting to be effective in all subsequent reboots, you must create an SD script and include the appropriate command in the /sbin/init.d directory so it gets executed on each reboot.

## **RJ-45 and AUI ports**

The 10/100 Base-T link works with both an RJ-45 and an AUI port. The RJ-45 port can be used for either 100 Base-T or 10 Base-T networking; the AUI port is used only for 10 Base-T. Only one of these ports should be connected to a network at any given time. The link will normally attempt to automatically sense which port is connected and configure that port, unless this is overridden via the Boot Time LAN configuration described above.

If no network is connected to the system, the system will configure itself to use the AUI port.

## **Performance**

The 100 Base-T product is initially set with a conservative value for the Transmit Threshold (that is, the number of bytes that must be in the transmit FIFO buffer before transmission can begin). The Transmit Threshold is set to a "store and forward" value. This means that the entire Ethernet frame must be in the transmit FIFO before transmission of data onto the wire will begin.

The initial Transmit Threshold value is set to eliminate Transmit Underruns (that is, when the transmitter encounters an empty transmit FIFO during the transmission). However, it can also reduce transmit performance by not being able to pre-fetch the next packet until the current frame is completely transferred. This causes a slight delay between frames and subsequently causes an overall drop in transmit performance.

Fortunately, the Transmit Threshold value is adjustable. Adjusting the Threshold to either 1024 or 512 bytes can increase performance. If the Transmit Threshold is 1024 or 512, the CORE 100 Base-T interface will start transmitting data onto the wire after 1024 or 512 bytes are in the transmit FIFO. This allows the CORE 100 Base-T hardware to start pre-fetching the next frame into the transmit FIFO before the current frame is completely transmitted. This results in less time between subsequent frames and therefore increases the transmit performance.

## **Setting the Transmit Threshold**

The CORE 100 Base-T product supports three levels of Transmit Threshold. These three levels are modified via another usage of the -S option of the lanadmin command:

```
lanadmin -S TransmitThreshold nmid
```

where

```
TransmitThreshold of 512 is most aggressive  
TransmitThreshold of 1024 is somewhat aggressive  
TransmitThreshold of 1500 is conservative
```

In all of the cases above, after setting the Transmit Threshold mode as specified, the lanadmin command will echo the current speed of the interface:

```
old speed= 100000000  
new speed= 100000000
```



this output may be ignored (output shown is for 100 Mbits/s operation).

After issuing the `lanadmin -S` you must wait at least 8 seconds before attempting to use the specified network interface.

If you want the Transmit Threshold setting to be effective in all subsequent reboots, you must create an SD script and include the command in the `/sbin/init.d` directory so it gets executed on each reboot.

#### **NOTE**

Adjusting the Transmit Threshold should be done with caution. While lowering the Threshold may increase performance, it also makes the CORE 100 Base-T interface more susceptible to Transmit Underrun errors.

A large number of Transmit Underrun errors (more than 1 out of every 1000 packets) may cause a noticeable drop in networking performance. The performance drop will depend on the application being used. Applications that send data in a continuous stream (FTP, for example) may have a more noticeable drop in performance (when more than 1 out of every 1000 packets have errors) than applications which are request-response in nature (NFS, for example).

Transmit Underrun errors may occur on some HP systems when there is sufficient bus contention from competing I/O devices on the system I/O bus. These errors can be monitored in two ways:

1. Examine the output from the `netstat -I` interface command. If the number of output errors is high (more than 1 out of every 1000 packets) then the system is most likely suffering from Transmit Underruns on the specified network interface and corrective action must be taken to resolve the problem.
2. Turn on `nettl` errors and warnings for the network interface being monitored. The following command will turn on disasters, errors and warnings for the network interface with Instance number 1. NOTE: It is highly recommended to always keep disaster and error `nettl` logging enabled.

```
nettl -log 0xe -e gsc100bt -C 1
```

The `nettl` log file `/var/adm/nettl.LOG00` should then be monitored for the following message:

*HP CORE 10/100BASE-T driver encountered a Transmit Underflow*

If a significant number of these messages occur and the timestamps for each of the messages are within 30 seconds of each other, then the specified networking interface will suffer a noticeable performance drop. Corrective action must be taken to resolve this problem.

---

## **Chapter 6: Other Previous Changes**

### **Cold Install**

#### **Features**

Cold Install provides single-step system installation capability of the additional core enhancements, leaving the system with HP-UX 10.20 bits and one or more ACE bundles. Your system will still look as though HP-UX 10.20 has been installed.

The Install kernel and file system are changed to support the new hardware. The Install Media Configure Table documents the June 1998 enhancements as part of the runtime partition. A software bundle is "added" to install media (for ACE cold install media only).

The actual Cold Install process steps do not change. The ACE cold install media will be compatible with all workstation hardware supported on HP-UX 10.20.

## **System Administration Manager (SAM)**

### **Features**

HP's System Administration Manager (SAM) will now support the new HP-UX 10.20 drivers:

- the HP VISUALIZE-fx X Window System driver (delivered in a previous ACE release)
- the 100 Base-T driver
- HP VISUALIZE-fx Graphics Configuration Capabilities with SAM (delivered in a previous ACE release)

This update adds capabilities for graphics device configuration to the SAM tool. There is a new folder titled "Display" in the SAM main menu which holds the "X Server Configuration" tool, plus two additional monitor configuration tools.

The first tool, found in `/opt/graphics/common/bin/setmon`, lets you modify the graphics device configuration--frame buffer resolution, refresh rate, timing standard, hardware double-buffering and quad buffer stereo operation--without requiring a re-boot.

The 1600 x 1200 resolution has been added for ACE (June 1998) for selected graphics devices.

The second tool, found in `/opt/graphics/common/bin/gamma`, lets you modify the "Gamma Correction" value for a specified display device, using a graphical user interface. You can save or remove the gamma value in the X Server configuration file. It is also possible to specify a gamma change as global or applied to a single, user-specified window.

- SAM will also support several screen options that control the visibility of the X visuals intended for OpenGL and GLX support. See X Window System for more information.
- SAM will also provide access to a program (setmon) for modifying graphics configuration values in the boot ROM (also known as ISL).

## **Diagnostics**

### **Features**

With this update, the on-line diagnostic system (sysdiag) is replaced with an on-line diagnostic system

called Support Tool Manager (STM). The STM diagnostic system began shipping with the HP-UX 10.10 release and has been evolving through the HP-UX 10.20 release with the final version being completed for the next HP-UX release.

The on-line diagnostic system provides hardware information, tools, verifiers and exercisers that are now available to customers. Diagnostics and expert tools will still require passwords.

The STM diagnostic system can be accessed through any of the interfaces noted below. Access to the system can be made by entering the mnemonic for the appropriate interface (xstm, \ mxtm or cstm) that will be used.

#### STM Interfaces:

- Graphical (xstm) - highly intuitive graphical interface.
- Menu (mstm) - highly intuitive menu based interface.
- Command line (cstm) - low level interface suitable for being driven by scripts.

The software is distributed on the HP-UX Support Media and is also Instantly Ignited on all systems requesting this option.

The STM diagnostic system consists of a group of modules instead of a single diagnostic with many functions. The user interface allows you to run a module on several devices at the same time. You start tests running on more than one system from within the STM user interface.

The set of tools that are provided with the STM diagnostic system include the following:

#### **INFORMATION MODULE:**

These modules provide detailed information about hardware. This includes product id, path, firmware revision, and onboard log information, if available.

#### **DIAGNOSTICS:**

These modules perform a complete test of the hardware. They will isolate failures to an FRU or a component, if possible.

#### **EXERCISERS:**

These modules are intended to help reproduce intermittent problems by stressing the hardware in such a way as to equal or exceed the maximum stress expected in a user environment.

#### **VERIFIERS:**

These modules quickly verify that the hardware is functional.

#### **EXPERT TOOLS:**

Sophisticated troubleshooting tools for expert users. These are interactive tools with the same look and feel as the STM user interface. These tools are now located on the HP-UX Core OS media.

#### **FIRMWARE UPDATE TOOLS:**

These tools provide the capability to update firmware on hardware devices.

To start the STM diagnostic system, type `xstm`, `mstm`, or `cstm` at the HP-UX prompt. To obtain more information on this system there is one manpage for the interfaces. That can be viewed by reading the `stm` manpage. The diagnostic system will create a map of the system when it has been started. Operations can be performed on an individual device or class of device. The Help facility in the diagnostic system will provide more information on the system and individual tools.

## **Impact of Changes**

If you have developed scripts to perform any diagnostic related functions you will have to modify them to use the `cstm` interface.

With the obsolescence of the `sysdiag` diagnostic system, the system log files (`lognnnn`) will be converted automatically so they can be interpreted by the `logtool` utility.

Performance is improved in that users of the new diagnostic system can obtain information on previous tests run on each system. They can also test multiple systems from one host.

# **Languages, Tools and Compilers**

## **HP C**

The ACE HP C toolset is intended to provide compatibility with HP-UX 10.20 and support PA-8200 and PA-7300LC hardware.

### **Features**

This update for HP C is similar to the HP-UX 10.20 HP C release. It improves performance for PA-8200 and PA-7300LC hardware and includes defect repairs to the C compiler. Refer to the Release Notes document for HP C.

### **Compatibility**

HP C object files from the HP-UX 10.20 and ACE compilers are inter-operable. Exceptions are due to moving object files that reference OpenGL to HP-UX 10.20.

1. Source code that compiles with the HP-UX 10.20 compiler will compile with the updated compiler.
2. Object files produced by the updated compiler that DO NOT contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software), and can be linked with other object files produced by the original or updated compiler.
3. Object files produced by the updated compiler that DO contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software) that contains an updated ACE linker or dynamic loader (respectively), and can be linked with other object files produced by the original or updated compiler.

### **Performance**

The compile time of the updated compiler will be the same as, or better than, the original HP-UX 10.20 compiler.

The updated compiler provides an application performance boost of up to 10% for selected applications.

The updated compiler supports the PA-8200 and PA-7300LC architectures.

The memory requirements of the new compiler will be the same as, or better than, the HP-UX 10.20 compiler.

## **Fortran**

### **Features**

The updated FORTRAN 77 compiler is similar to the HP-UX 10.20 FORTRAN 77 release. The differences are in additional performance for PA-8200 and PA-7300LC hardware and compiler defect repairs.

### **Compatibility**

FORTRAN 77 object files from the original HP-UX 10.20 compiler and the updated compiler are inter-operable.

1. Source code that compiles with the HP-UX 10.20 compiler will compile with the updated compiler.
2. Fortran 77 object files that do not contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software), and can be linked with other object files produced for HP-UX 10.20 (with or without ACE software).

### **Performance**

The compile time of the updated compiler will be the same as, or better than, the HP-UX 10.20 compiler.

The updated compiler supports the PA-8200 and PA-7300LC architectures.

The memory requirements of the updated compiler will be the same as, or better than, the HP-UX 10.20 compiler.

## **HP aC++**

HP ANSI C++ is an ANSI-conforming implementation of the C++ programming language, often abbreviated as aC++

The updated HP aC++ toolset is compatible with HP-UX 10.20 and supports PA-8200 and PA-7300LC hardware. HP aC++ will have additional performance improvements described in the aC++ Release Notes document.

## **NOTE**

There is a situation that may occur that would prevent you from installing aC++ on a system with HP-UX 10.20 and the Workstation ACE software.

When the ACE enhancements are installed, several patches are automatically installed on the system. For instance, the patches PHSS\_10053 and PHSS\_10113 are automatically installed with the Workstation ACE bundle. These patches supersede the patches that would normally be installed by aC++ (i.e. PHSS\_8324 and PHSS\_9201). Thus, the aC++ patches do not get installed. The problem is that aC++ has a prerequisite upon those patches resulting in aC++ not getting installed.

This problem has been corrected on current Application Software Releases.

## **Compatibility**

1. Source code that compiles with the HP-UX 10.10 or 10.20 compiler will compile with the updated compiler.
2. Object files produced by the updated compiler that DO NOT contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software), and can be linked with other object files produced by the original or updated compiler.
3. Object files produced by the updated compiler that DO contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software) that contains an updated linker or dynamic loader (respectively), and can be linked with other object files produced by the original or updated compiler.

## **Performance - Compile time**

The compile time of the updated compiler will be the same as, or better than, the HP-UX 10.20 compiler.

The new compiler provides an application performance boost of up to 10% for selected applications.

The new compiler supports the PA-8200 and PA-7300LC architectures.

The memory requirements of the updated compiler will be the same as, or better than, the HP-UX 10.20 compiler.

## **HP C++**

### **Features**

Updated HP C++ is similar to the 10.20 HP C++ release. The differences are in additional performance for PA-8200 and PA-7300LC hardware and compiler defect repairs.

### **Compatibility**

HP C++ object files from the original HP-UX 10.20 compiler, as well as the updated compiler, are inter-operable.

1. Source code that compiles with the HP-UX 10.20 compiler will compile with the updated compiler.
2. HP C++ object files produced by the updated compiler that DO NOT contain any new features will link and run on an HP-UX 10.20 system (with or without ACE software), and can be linked with other object files produced by the original or updated compiler.
3. The compile time of the ACE compiler will be the same as, or better than, the HP-UX 10.20 compiler.
4. The updated compiler supports the PA-8200 and PA-7300LC architectures.
5. The memory requirements of the updated compiler will be the same as, or better than, the HP-UX 10.20 compiler.

## **Linker and Object File Tools: ld, dld.sl, and chatr**

### **Features**

The new version of these tools provides additional options to support tuning. These options are described in the appropriate man pages.

Linker (ld) options to support tuning:

- +O select for tuning application performance
- +k option for avoiding creation of executable when errors occur

chatr changes to support tuning:

- +pd/+pi set page sizes
- +k enable/disable option for kernel assisted branch prediction

### **Compatibility**

The toolset is compatible with that of HP-UX 10.20.

1. The new linker toolset runs on HP-UX 10.20 (with or without ACE software).
2. Object code compiled for HP-UX 10.20 will link with the updated linker.
3. Object code produced by the updated compiler that DOES NOT contain any new features (see C and C++) will link and run on an HP-UX 10.20 system (with or without ACE software), and can be linked with other object files produced by the original or updated compiler.
4. Object files produced by the updated compilers that contain any new features will produce a runtime error if linked with an HP-UX 10.20 linker.

### **Performance**

The link time of the updated version of ld will be the same as, or better than, the HP-UX 10.20 linker.

---

## **Legal Notices**

---

Use of this manual and compact disc(s), flexible disc(s) or tape cartridge(s) supplied for this pack is restricted to this product only. Additional copies of the programs can be made for security and back-up purposes only. Resale of the programs in their present form or with alterations, is expressly prohibited.

This document contains information which is protected by copyright. All rights are reserved. Reproduction, adaptation, or translation without prior written permission is prohibited, except as allowed under the copyright laws.

Corporate Offices:

Hewlett-Packard Co.  
3000 Hanover St.  
Palo Alto, CA 94304

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or direct, indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Warranty: A copy of the specific warranty terms applicable to your Hewlett-Packard product and replacement parts can be obtained from your local Sales and Service Office.

### **HP Year 2000 Warranty**

This HP Year 2000 Warranty is in addition to the HP Standard Commercial Warranties contained in Exhibit E16, HP Terms and Conditions of Sale and Service. HP warrants that each HP hardware, software, and firmware Product delivered under this HP Year 2000 Warranty will be able to accurately process date data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000, including leap year calculations, when used in accordance with the Product documentation provided by HP (including any instructions for installing patches or upgrades), provided that all other products (e.g. hardware, software, firmware) used in combination with such HP Product(s) properly exchange date data with it.

If the Specifications require that specific HP Products must perform as a system in accordance with the foregoing warranty, then that warranty will apply to those HP Products as a system, and Customer retains sole responsibility to ensure the Year 2000 readiness of its information technology and business environment. The duration of this warranty extends through January 31, 2001. The remedies available under this warranty will be defined in, and subject to, the terms and limitations of the warranties contained in HP's standard commercial warranties. To the extent permitted by local law, this warranty applies only to branded HP Products and not to products manufactured by others that may be sold or distributed by HP. This HP Year 2000 Warranty applies only to HP Products shipped after the effective date, July 01, 1998, of this warranty. Nothing in this warranty will be construed to limit any rights or remedies provided elsewhere in the HP Terms and Conditions of Sale and Service with respect to matters other than Year 2000 compliance.



**Trademark Acknowledgment:**

UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

Copyright (C) The Regents of the University of California 1979, 1980, 1983, 1985

This software and documentation is based in part on the Fourth Berkeley Software Distribution under license from the Regents of the University of California.

Copyright (C) The Regents of the University of Colorado, a body corporate 1979. This document has been reproduced and modified with the permission of the Regents of the University of Colorado, a body corporate.

Copyright (C) Microsoft Corporation. All rights reserved.

Microsoft and MS-DOS are registered trademarks, and Windows, Windows95, Windows NT and MS-DOS are trademarks of Microsoft Corporation in the United States and other countries

OpenGL(TM) is a registered trademark of Silicon Graphics, Inc. in the United States and other countries.

Copyright (C) 1986, 1987, 1988 Sun Microsystems, Inc.

Copyright (C) 1980, 1984, 1986 UNIX System Laboratories, Inc.

Copyright (C) 1985, 1986, 1988 Massachusetts Institute of Technology

Copyright (C) 1986 Digital Equipment Corp.

Restricted Rights Legend: Use, duplication or disclosure by the U.S. Government Department of Defense is subject to restrictions as set forth in paragraph (b)(3)(ii) of the Rights in Technical Data and Software clause in FAR 52.227-7013.

Rights for non-DOD U.S. Government Departments and Agencies are as set forth in FAR 52.227-19(c)(1,2).

This guide's printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The part number changes when extensive technical changes are incorporated. New editions of this manual will incorporate all material updated since the previous edition.