

AIX Version 4.2

Release Notes

Software Release AIX 4.2.1r1
Part Number **AX2RNA/IS2**

Second Edition (September 1997)

This edition of *Release Notes* applies to AIX 4.2.1r1 and to all subsequent releases of this product until otherwise indicated in new releases or technical newsletters.

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Introduction 1

About This Guide

Purpose

The *AIX 4.2.1 Software Release Notes* contains information on the functionality of Motorola's AIX 4.2.1 product.

Scope

Motorola's release of AIX 4.2.1 is based on IBM's AIX 4.2. These *Release Notes* contain information which is specific to Motorola's release of AIX followed by the full text of IBM's Release Notes on generic AIX.

Prerequisites

Some instructions in this guide assume that you are familiar with:

- AIX system administration commands
- System Management Interface Tool (SMIT)

More information about these concepts is available in IBM's *AIX Version 4.2 System Management Guide: Operating System and Devices*.

Use these *Release Notes* in conjunction with the *AIX 4.2 Installation Guide* and the *AIX 4.2 Quick Installation Guide*, both of which are available from Motorola.

Overview of Contents

The *Release Notes* are organized as shown in the table below.

This Chapter...	Discusses...
Chapter 2, "Features"	New and changed features of AIX for 4.2 and Motorola value-added features
Chapter 3, "Guidelines"	Notes and guidelines specific to Motorola products
Chapter 4, "Known Problems"	Known problems on Motorola systems and appropriate work arounds
Chapter 5, "Documentation Changes"	Errors and omissions in InfoExplorer documents and Motorola hardcopy documentation
Appendix A, "IBM Release Notes"	General issues concerning the AIX operating system.

Related Information

Optional Software Information

Licensed programs include AIX 4.2 and optionally purchased products. Each program can have one or more separately installable filesets. The Package Installation Database for Current Media is an InfoExplorer database that contains information about the contents of these separately installable filesets.

README Files

For information on how to view the README files for the base operating system (BOS) and optional software products, refer to the *AIX 4.2 Installation Guide*.

Some README files are shipped in separate directories that are not accessible if you follow the procedure described in the *AIX 4.2 Installation Guide*. To find the README files installed on your machine, use this command:

```
find /usr -name "*README" -print
```

Softcopy Documentation

The majority of the IBM AIX documentation library is shipped electronically with the InfoExplorer help system on the base operating system CDs. Refer to the *Installation Guide* for directions on installing InfoExplorer. Once installed, InfoExplorer can be invoked by typing **info** at the command line.

Supplemental softcopy documentation is available directly from IBM on their Hypertext Library CD. To see the contents of the Hypertext Library or to make an order, refer to http://www.rs6000.ibm.com/resource/aix_resource/Pubs/ on the Web.

Motorola Hardcopy Documentation

Custom hardcopy documentation for general AIX and for FX Series systems can be ordered by calling the Motorola Computer Group Literature Center at 888-432-1877 or at 602-804-7378.

AIX Version 4.2 Documentation for all Systems

The following hardcopy AIX documentation ships with your system (non FX):

- *AIX 4.2 Release Notes*
- *AIX 4.2 Installation Guide*
- *AIX System Diagnostics (ASD) Quick Reference*
- *Installing and Configuring NCDware*

The following documents may be especially useful to novice AIX users:

- *Guide to System Information*
- *Getting Started*
- *Quick Reference*
- *iFOR/LS System Management Guide*
- *iFOR/LS Tips and Techniques*
- *Problem Solving Guide*
- *Messages Guide and Reference*
- *Performance Tuning Guide*

Other MCG titles for generic AIX include:

- *Installation Checklist*
- *Quick Installation Guide*
- *Network Installation Management Guide and Reference*

-
- *Network Installation Management Tips and Techniques*
 - *VMEbus Device Driver Reference*
 - *SVR4 Porting Guide*
 - *Managing System Storage*
 - *Configuring and Maintaining the System*

IBM Documentation

Additional hardcopy titles pertaining to AIX 4.2 are directly available from IBM. A list of current IBM titles and ordering information is available at:

http://www.rs6000.ibm.com/resource/aix_resource/Pubs/
on the Web.

Getting Help for System Problems

If you encounter difficulties with AIX 4.2 on your system or on a supported board, contact your Value Added Reseller (VAR) or distributor first. If further assistance is needed, you can contact the Motorola Computer Group Sales office or Motorola Computer Group's customer support group at:

- U.S.A. 1-800-551-1016
- Canada 1-800-387-2416
- Maidenhead, U.K. 44-1628-39121
- Paris, France 33-1-467-43560
- Duesseldorf, Germany 49-211-65899-55

When you call, please be prepared to provide the following information:

- the type of system or motherboard you are using with AIX 4.2
- your system or board ID or serial number
- the name of your company, your name, and a telephone number
- a brief description of the problem, including the severity of its impact on your ongoing efforts

This information will be forwarded to the appropriate technical engineering contact, who will return your call promptly.

Features 2

Overview

This chapter describes new and changed features of the AIX 4.2 environment, as well as Motorola value-add features.

For more information about standard features in AIX 4.2, refer to the *AIX 4.2 Product Description*.

What's New in this Release

The following new features have been implemented in AIX 4.2.1:

Newly Supported Hardware

- support for the MPX 100
- support for the XR712-129 Alarm Transition Module

Changes to Storage Management

- NFS Version 3 introduced. Improvements include increase from 8KB to 32KB maximum read/write size; support for files larger than 2KB; and improved performance.
- Secondary dump device now used when dump fails on primary device.

Changes to Communication Features

- PPP Multilink Protocol (RFC 1990)
- PPP compression

Changes that affect programmers and users

- Shared memory up to 2.75GB enabled with EXTSHM=ON environment variable.
- Link option `-blazy` available for loading program dependent modules only when they are needed.

Motorola Value-Added Features

The AIX 4.2 product is based on IBM's AIX 4.2 operating system. Minimal changes have been made to this product to support Motorola-specific hardware platforms.

This section describes value-added features that are specific to systems running Motorola's version of the AIX 4.2 operating system.

AIX System Diagnostics (ASD)

ASD provides a set of on-line diagnostic tools and test suites to allow you to run diagnostics on individual system components, including:

- SCSI controllers and devices
- single or multiple floppy devices
- file systems
- internal or external asynchronous subsystems

ASD commands have been integrated with the standard SMIT interface. For additional information on ASD, see the *AIX System Diagnostics (ASD) Quick Reference* that came with your operating system.

Firmware

The following minimum firmware levels are necessary to run AIX 4.2.

Table 2-1. Firmware Requirements for Various Hardware

Platform	Firmware Levels
RISC PC	PPC1BUG 1.8 or Open Firmware 1.2
RISC PC Plus	PPC1BUG 1.9 or Open Firmware 1.2
Series E	PPC1BUG 1.8 or Open Firmware 1.2
Series EX	Open Firmware 1.2
Pro4000 and Net4000	Open Firmware 1.2
MPX Series	Open Firmware 1.2
MVME 160X (boards only)	PPC1BUG 1.8 or PPC1BUG 3.1
MVME260X, 360X, 460X (boards only)	PPC1BUG 3.1
XR Series systems	PPC1Bug 3.2
Atlas and Ultra boards	PPC1BUG 1.8
Ultra Plus boards	PPC1BUG 1.9

xdiff Utility Available

The `xdiff` utility is a graphical interface to the `diff` command that allows side-by-side viewing of differences between files and automated merging of selected differences to create a new version of a file.

`xdiff` is automatically installed with the Personal Productivity bundle. Alternatively, you can install it directly from the `X11.apps.motorola` fileset.

Environmental Monitor Commands

The following commands have been added to Motorola's AIX 4.2 operating system and are documented in the manual pages in section 1M. These commands are used with the environmental monitor and are supported on all systems except RISC PC and RISC PC Plus systems:

- `envctl`
- `envdiag`
- `rc.motpowerfail`

You must use the `man` command to access these manual pages; they are not available through InfoExplorer.

Environmental Monitor Special Files (Devices)

The following manual pages have been added to the manual pages section 7 on Motorola's AIX 4.2 operating system. These pages describe aspects of environmental monitor special files (devices) and are supported on all systems except RISC PC and RISC PC Plus systems:

- `envmon`
- `envmon_msg`
- `envmon_odm`

You must use the `man` command to access these manual pages; they are not available through InfoExplorer.

Guidelines 3

Overview

This section contains specific information about and guidelines for the AIX 4.2 operating system on Motorola systems. Additional information on generic AIX is available in the *IBM Release Notes*, which appear in Appendix A. It may be useful to skim the IBM notes before reading this chapter.

Installation

3

AIX Version 4.2 Shipped on Four CD-ROM Disks

AIX 4.2 is shipped on multiple media. If you are using CD-ROM when migrating from a previous release of AIX to Version 4.2, important instructions are provided in the *AIX 4.2 Installation Guide*.

Migrating to AIX Version 4.2 from a Version of AIX 4.1

Migrations to AIX 4.2 are available for systems which are currently running Version AOS 1.3 and later. For information on how to migrate your system from a version of the AIX 4.1 operating system, refer to the *Installation Guide*.

Note: It is possible, but unlikely, that problems which were fixed by PTF in AIX 4.1 will recur in 4.2. If so, contact your Value Added Reseller or distributor to see if an appropriate 4.2.0 PTF is available.

Required Firmware Upgrade for VME Systems

If you are migrating a VME system from a version of AIX earlier than AIX 4.1.5 to AIX 4.2, you must upgrade your firmware to PPC1BUG version. 3.3.

Network Boot Support

Network boot is only supported on integrated ethernet controllers and on DEC 2104x and 2114x-based PCI ethernet cards.

AIX 4.1 Customized InfoExplorer Files are Overwritten

When migrating to AIX 4.2 from AIX 4.1, the InfoExplorer files under `/usr/lpp/info/data` are overwritten with AIX 4.2 versions. If you have made customizations to the InfoExplorer configuration files, such as `/usr/lpp/info/data/ispaths`, you should backup the

customized files before starting the migration and merge your changes into the AIX Version 4.2 files after the migration is complete.

Some InfoExplorer filesets have been moved to volume 2 of the operating system CD.

Because of space limitations on volume 1 of the OS CD, some of the InfoExplorer filesets have been moved to volume 2. You should install the bos.info filesets from both CDs in order to install the complete InfoExplorer library.

Because the filesets have been moved, you may see installation errors concerning the following filesets, when installing the OS:

`bos.info.en_US.manage_gds`

`bos.info.en_US.probsolv_gds`

Missing Ultimedia Filesets

When installing the Personal Productivity bundle, you may get errors stating that the following filesets are missing.

`UMS.objects`

`UMS.speech`

`UMS.samples`

`UMS.demo`

`UMS.video_ext`

`UMS.info.en_US`

These filesets are part of the UltiMedia System (UMS) audio and video multimedia software. The files have been placed on the Bonus Pack CD.

Missing C Compiler and Debugger

When installing the Application Development bundle, you may get errors stating that the following filesets are missing.

x1C.C

xldb

Both of these filesets are on the Software Solutions for AIX Development CD which is available from IBM. The software will not function, however, until it has been licensed.

Node-locked Licenses Unavailable for Some Products

The *AIX 4.1 iFOR/LS System Management Guide* and the *AIX 4.1 iFOR/LS Tips and Techniques* manual include information about and references to node-locked licenses. However, node-locked licenses are not available for some products that are NetLS license-enabled. Only concurrent access licenses are generated for these products.

Motorola products that this affects are:

- C for AIX
- C Set ++
- XL FORTRAN
- XL Pascal
- Configuration Management Version Control (CMVC)
- IBM Cobol

You must use a concurrent access license with the above products.

Installing a PCI Expansion Chassis on a PowerStack II Series EX System

When installing a PCI expansion chassis on a PowerStack II Series EX system with the AIX operating system already installed, you must follow this procedure or your system will hang during boot:

1. Remove any cards from the PCI Expansion Chassis the first time it is rebooted.
2. Start `smit`.
3. Select `Devices`.
4. Select `Install/Configure Devices Added after IPL`.
5. Put the installation CD-ROM in the CD-ROM device.
6. In the `INPUT device/directory` field, enter the CD-ROM as the input device (usually `/dev/cd0`).
7. After completion, shutdown system, install chosen cards in the PCI Expansion Chassis and reboot.

Multiple Beep Volume Settings Not Supported

The hardware that generates the system's "beep" does not support multiple volume settings for the beep. Thus, the user's volume setting is ignored, except to check whether the setting is `Off`.

Base Operating System

3

Changing tty Port Attributes—chdev Command

The root user cannot use the `chdev` command to change the tty port attributes if the port is active and in use.

Ensuring Sufficient Disk Space in `/var/dt`

The Common Desktop Environment (CDE) writes log and error files to the `/var/dt` directory. If this directory is full, the desktop commands do not work correctly.

Verify that the `/var/dt` desktop is not full before starting the desktop. If this directory is full or close to full, you must delete some files from this directory before you start the desktop.

Common Desktop Environment (CDE) Manual Pages Directory Not in MANPATH

The Common Desktop Environment (CDE) manual pages are in the directory `/usr/dt/man`. This directory is not normally part of the defined path for manual pages (`MANPATH`). The `man` command is unable to find these CDE manual pages until you add this directory to your `MANPATH`.

Add these lines to your `$HOME/.profile` file to add the `/usr/dt/man` directory to the `MANPATH` variable:

```
MANPATH=$MANPATH:/usr/dt/man
export MANPATH
```

Adding Internal Loopback Functionality

If you wish to add internal loopback functionality to your system, apply PTFs U446595 and U446527. For information on obtaining the PTFs, contact your value added reseller or distributor.

National Language Support

Chinese (Simplified) Keyboard Translate Table

You can view the keyboard information for the Simplified Chinese Keyboard (Code Set IBM-eucUCS) in the file:

```
/usr/lpp/X11/defaults/xmodmap/zh_CN/keyboard
```

If you are running with the ZH_CN locale (UTF-8 codeset), this keyboard information is located in the file:

```
/usr/lpp/X11/defaults/xmodmap/ZH_CN/keyboard
```

Chinese (Simplified) Input Method Support

As of the AOS 1.3 release of AIX 4.1, support for the 5-stroke input method has been removed. Pressing Shift-F5 and Shift-F6 no longer invokes the 5-stroke input method under the simplified Chinese (zh_CN) locale.

Error Logging with `errpt` Command

When you run the `errpt` command under a non-English language environment, in some cases the system may return a 4-digit hexadecimal value instead of the error message text. This indicates that the system cannot find a message number for that message in your language's codepoint catalog.

Change the language environment setting to English with the following command:

```
LANG=C
```

and then run the `errpt` command. The English text for the error message is displayed.

Additional Notes

3

Series EX and PowerStack II Pro 2000/3000 Systems Require Software Relicensing after Upgrade

If your current system is a Series EX or PowerStack II Pro 2000/3000 and you are running AIX 4.1.4r4 or an earlier release, you must obtain new software licenses after migrating to AIX 4.2, unless PTF #M000047 has been installed over the original operating system.

AIX 4.1.4 r4 generated the system serial number incorrectly on these systems. This problem was corrected in AIX 4.1.4r5. Because the correction causes the system serial numbers to change, your licensed software will no longer work after AIX4.2 is installed. Thus, you must obtain new license keys from the licensed software vendors.

PowerStack II Legacy ISA Slave DMA Limitations

PowerStack II systems can only perform legacy ISA slave DMA using compatibility timing. A device driver that requests a faster timing mode is forced to use compatibility timing as well. This can affect the performance and throughput of an ISA device that uses legacy ISA slave DMA. Scatter/gather ISA DMA is not affected by this limitation.

Known Problems 4

Overview

This chapter contains information on known problems in this release of AIX 4.2. Workarounds have been provided whenever they are available.

For additional troubleshooting information, refer to *AIX 4.2 Installation Troubleshooting* and *AIX 4.2 Problem Solving Guide and Reference*.

Highest Resolution Not Available on Systems with 1MB Display Memory for Cirrus Adapters

4

Tracking Number

TAR 1-39833

Problem

If your system contains only 1MB of display memory for Cirrus adapters (either on the motherboard or on a PCI card), the highest resolution you are able to use is 1024x768 mode. SMIT allows you to select a higher mode (1280x1024), but your system does not support it and defaults to 1024x768 resolution mode.

Workaround

If you must use a higher resolution than 1024x768 mode, you need to add display memory or add a card with more than 1MB of display memory to your system.

Floppy Drives Do Not Detect Disk Density

Tracking Number

TAR 1-44804

4

Problem

Floppy disk drives included in Motorola AIX systems support only 1.44Mb floppy media. The drives are not able to distinguish between low density (720Kb) and high density (1.44Mb) disks. If the **fdformat** command is run without the **-h** option, the system will try to format the high density disk as a low density floppy. This will put the floppy drive in a state where it cannot be accessed until the system is rebooted.

Workaround:

Always use the **fdformat** command in the following fashion.

```
fdformat /dev/fd0 -h
```

Extraneous Installation Error Messages

Tracking Number

TAR 1-12432:

4

Problem

When installing AIX4.2.1R1 the following error messages will appear near the end of the installation:

```
Method error (/usr/lib/methods/cfgasync_rspc -2 -l sa0):
```

```
    0514-040 Error initializing a device into the kernel.
```

```
Method error (/usr/lib/methods/cfgasync_rspc -2 -l sa1):
```

```
    0514-040 Error initializing a device into the kernel.
```

```
Method error (/usr/lib/methods/cfgfda_isa -2 -l fda0):
```

```
    0514-040 Error initializing a device into the kernel.
```

Workaround

No additional actions are necessary. The devices are installed and configured correctly and the errors do not affect their function.

Extraneous Error Messages on MVME4600 Systems

Tracking Number

TAR 1-12431

4

Problem

When installing AIX4.2.1R1 on MVME2600, MVME 3600, or MVME4600 systems with a PMC span card connected, and a version of PPC1BUG prior to version 3.2, the following error message appears:

```
Method error (/etc/methods/cfgbaud_isa -l paud0):  
0514-040 Error initializing a device into the kernel.
```

This error indicates that the audio driver is loaded, but no audio hardware exists.

This message also occurs if you start SMIT and follow the procedure to install or configure devices added after IPL, or if you run `cfgmgr`.

The error message does not affect other aspects of system function.

Workaround

Install PPC1BUG 3.3 RM04 or later to fix the error message.

Device Driver Messages Not Loaded with MVME376.

4

Tracking Number

TAR 1-12428

Problem

When the AIX 4.2.1 operating system detects an MVME376 module during installation, it will load the appropriate device driver, but it fails to load the corresponding device messages.

Workaround

1. Mount the OS CD-ROM using the **smit mountfs** fastpath.
2. Change to the `/usr/sys/inst.images` directory.
3. Load the messages manually from the command line:

```
#installp -qd devices.vme.msg.en_US.ent376 all
```

VMEbus Errors Can Cause Software Panics on VME2600, VME3600, and VME4600 Systems

Problem

There is a problem with MVME2600, MVME3600, and MVME4600 hardware which causes the VME bus to hang if a VME bus DMA operation performed by the VME controller terminates with a VME bus error. If this happens, the system will detect the problem and panic, since there is no way for software to recover from this problem.

4

Workaround

Drivers and other applications must prevent writes to VME bus addresses which will cause VME bus errors. Note that the system calls to busput, vmerw, and ioctlx (which read the VME bus) use the effected controller.

Configuration methods must ensure that board probes use only read accesses to potentially unavailable board addresses.

Ethernet Fails to Configure after a Migration Install on PowerStackII and MPX Systems

4

Tracking Number

TAR 1-12318

Problem

When migrating to AIX 4.2.1r1 from an earlier version of AIX, ethernet may fail to configure with the following message appearing:

Action Required:

The DT messaging system could not be started.

To correct the problem:

1. Choose [OK] to return to the login screen.
2. Select Failsafe Session from the login screen's option.
3. Check to see that the hostname is correct in /etc/hosts.

Other hostname problem can be corrected by using the command; SMIT MKTCPIP.

For additional information, see the DT User's Guide.

This problem occurs because of differences in the way AIX 4.2.1 and earlier versions of AIX manage the ethernet ODM attributes. These differences result in two ODM entries existing for the single physical ethernet devices, meaning that the latest version does not configure.

Workaround

- From the FailSafe session, remove the existing ethernet ODM attributes:

```
rmdev -ld ent0.
```

- Reboot the system.

4

Documentation Changes 5

Overview

This chapter documents changes and corrections to various books and InfoExplorer documents in the AIX 4.2 documentation set.

AIX Version 4 Installing and Configuring NCDware

5

The following corrections apply to the *AIX Version 4 Installing and Configuring NCDware* guide:

- In step 5 on page 8-4 and step 8 on page 8-6 of *AIX 4.1 Installing and Configuring NCDware*, the file path is listed incorrectly. The correct file path should be:

```
/etc/inetd.conf
```

- In step 2 on page 8-6 of *AIX Version 4 Installing and Configuring NCDware*, the directory is listed incorrectly. The correct command should be:

```
cd /usr/ncd/terminals/usr/lib/X11/ncd/configs
```

AIX Version 4 System Management Guide: Communications and Network

The procedure for configuring Serial Line Internet Protocol (SLIP) over a null modem cable is incorrectly documented in the soft copy (InfoExplorer) version of the *AIX Version 4 System Management Guide: Communications and Network*, available in InfoExplorer. The procedure is correctly documented in the hard copy version of this guide.

In addition the procedure for deactivating a Serial Line Internet Protocol (SLIP) connection is incorrectly documented. The paragraph beginning, “If `slattach` is accidentally killed with a -9 flag...” should read:

“If `slattach` is accidentally killed with a -9 flag, a `slip` lock may remain in `/etc/locks`. Delete this lock file to clean up after `slattach`.”

The sample program on this page is also incorrect. Disregard this example.

You can also deactivate the SLIP connection, using SMIT instead of the `kill` command. Follow this procedure:

1. Enter:

```
smit chinnet
```

2. Select the SLIP interface (for example, `s10`).
3. Select the `Current STATE` field and view your choices.
4. Select either `down` or `detach`.
5. Confirm your selection to deactivate the SLIP connection.

Configuring NIS Documentation Error

The *System Management Guide: Communications and Networks* incorrectly documents how to configuring NIS. The guide tells you to add the pattern '+:0:0:::' as the last line of the local `/etc/passwd` file. This is incorrect. Instead, you must add this pattern:

```
+::0:0:::
```

to the local `/etc/passwd` file in order for the NIS `/var/yp/passwd` to be checked for user entries.

If you do not do this no one is able to log in if they are not in the local `/etc/passwd` file.

IBM Release Notes **A**

Overview

Motorola's AIX 4.2.1 release is based on the corresponding release by IBM. This section contains the text of IBM's Release Notes for AIX 4.2.1, which may be useful as a baseline on the general features of the operating system.

A



AIX 4.2 Release Notes

Memorandum to: Licensees of AIX Version 4.2'

Subject: AIX Version 4.2

Date: March 31, 1997

Release Notes Version: 1.0

Enclosed is information about the AIX Version 4.2 release. **Read this information before installing AIX Version 4.2.**

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AIX Version 4.2 Release Notes

Introduction

AIX 4.2 Release Notes contains information on new, changed, or removed functionality that was not available at the time of publication of the AIX documentation, and contains additional information not documented in other publications.

Some of the installation instructions in this document assume knowledge of:

- AIX system administration commands
- System Management Interface Tool (SMIT)
- Software installation operations, such as *apply* and *commit*

These notes should be used in conjunction with the *AIX Version 4.2 Installation Guide*, SC23-1924, the *AIX Version 4.2 Quick Install Guide*, SC23-1925, and the *AIX Version 4.2 Network Installation Management Guide and Reference*, SC23-1926.

Other Sources of Information

Optional Software Information

Licensed programs include AIX 4.2 and optionally purchased products. Each program can have one or more separately installable filesets. The *Package Installation Database for Current Media* is an InfoExplorer database which contains information about the contents of these separately installable filesets. See "Viewing Information about Optional Software" on page 24 for instructions on viewing this online database.

README Files

For information on how to view the README files for base operating system (BOS) software and optional software products, refer to the *AIX Version 4.2 Installation Guide*, SC23-1924.

Some README files are shipped in separate directories that are not accessible if you follow the procedure described in the *AIX Version 4.2 Installation Guide*. To find the README files installed on your machine, use the following command:

```
find /usr -name "*README*" -print
```

Installation Hints and Tips

The latest AIX 4.2 installation hints and tips can be obtained from:

- **The IBM FAX Information Server**

Call 800-IBM-4FAX in the U.S. from any touch-tone telephone, or 415-855-4329 worldwide from your FAX machine, and request document number 3685.

- **The AIX Service Mail Server**

Send electronic mail with a subject of **42_Install_Tips** to aixserv@austin.ibm.com.

AIX Version 4.2 Installation Documentation

This section lists the available AIX Version 4.2 installation documentation. Documentation may be available in the form of a book, online database, or both. When ordering a document, please mention the order number.

To order documentation, contact your point of sale, or, in the U.S., call IBM Customer Publication Support at 1-800-879-2755.

Order Number	Title
SC23-1924	<i>AIX Version 4.2 Installation Guide</i>
SC23-1926	<i>AIX Version 4.2 Network Installation Management Guide and Reference</i>
SC23-1925	<i>AIX Version 4.2 Quick Install Guide</i>

For further information on AIX Version 4.2 documentation available, see the *AIX and Related Products Documentation Overview*, SC23-2456. This document is available:

- On the World Web web. Using your web browser, go to the IBM Home Page by opening the following URL:
<http://www.ibm.com/>
On the IBM Home Page, search on "AIX and Related Products Documentation Overview" to access the publication.
- In the Hypertext Information Base Library Version 1 for AIX. This online documentation is designed for use with the InfoExplorer hypertext retrieval system.
- As a hardcopy publication; use order number SC23-2456.

How to Get Help and Report Problems

To report code-related problems, contact the Program Services representative for your area.

Installation

This chapter contains information about installing AIX Version 4.2 that supplements the information contained in the AIX Version 4.2 Installation documentation. Refer to the publications listed in “AIX Version 4.2 Installation Documentation” on page 6 for complete installation instructions.

Migration issues

Information in this section relates to migration and upgrade issues:

- Installing AIX Version 4.2.1 on an existing AIX system
- Migrating to the Common Desktop Environment (CDE) Version 1.0
- UMS and UIM/X requirements (when upgrading from AIX 4.1.2 or earlier)
- Graphics Licensed Programs requirements (when upgrading to AIX Version 4.2)
- 7135 RAIDiant Array for AIX requirements (when upgrading to AIX Version 4.2)
- DCE/DFS migration to AIX 4.2.1
- C Set++ recommendation for AIX Version 4.2

Check “Troubleshooting” on page 13 for problem-solving information related to migration and upgrade.

Installing AIX Version 4.2.1 on an Existing AIX System

Updating from AIX 3.2 or AIX 4.1.1 or later (but not from AIX 4.2.0)

We recommend that you do a migration install. Boot from the product media and follow instructions in the *AIX Version 4.2 Installation Guide*, SC23-1924.

Note: If you update your current 4.1.X system to 4.2 using preservation install, some configuration information will not be saved. See the *AIX Version 4.2 Installation Guide*, SC23-1924, for more information about preservation install.

Updating from AIX 4.2.0 to AIX 4.2.1

Use **smit update_all** with your product media to update to AIX 4.2.1. If installing from CD-ROM, be sure to do **smit update_all** with all the other volumes that you were shipped, and reboot when the update is complete. Complete instructions are in the *AIX Version 4.2 Installation Guide*, SC23-1924.

Migrating to the AIX Common Desktop Environment 1.0

This section provides information on moving to the AIX Common Desktop Environment (CDE) 1.0 from any version of AIX 3.2 or AIX 4.

Notes:

1. AIX Common Desktop Environment (AIX CDE) is the default desktop shipped with AIX 4.1.3 or higher.
2. AIXwindows Desktop is the default desktop shipped with AIX 3.2.x, 4.1.0, 4.1.1, and 4.1.2.

An online help volume is provided to assist you in migrating to AIX CDE 1.0 from the AIXwindows Desktop. This help will be displayed automatically the first time you log onto AIX CDE 1.0 if you have previously logged onto the AIXwindows desktop on AIX 4.1.0, 4.1.1, or 4.1.2. You can also view this online help by selecting “Welcome to AIX CDE 1.0” from the Help Manager subpanel.

Note: A minimum of 64 MB of paging space is required to run AIX CDE.

For customers moving to AIX CDE 1.0 from any version of AIX 3.2

The following list provides options for customers moving to AIX CDE 1.0 from any version of AIX 3.2:

- If you have not customized the AIXwindows desktop, you do not need to take any action.
- If you have customized the AIXwindows desktop, you can use the **xdt2cde** migration tool to move X.desktop objects from the AIXwindows version 3.2 desktop to the new graphical Common Desktop Environment desktop syntax. This migration tool is also used for converting XPM2 pixmaps to XPM3 pixmaps.

To start the **xdt2cde** migration tool:

1. Select the **Application Manager** control from the Front Panel.
2. Select the **Desktop_Tools** icon.
3. Select the **Migration Tool** icon.

Online help is provided for the **xdt2cde** migration tool. In addition, you can order *AIXwindows to CDE Migration Guide* (SC23-2531).

For customers moving to AIX CDE 1.0 from any level of AIX 4.1

Some changes have been made to action, data type, and front panel definitions between any level of AIX 4.1 and this release of AIX. Therefore, the following list provides options for customers moving to AIX CDE 1.0 from any level of AIX 4.1.

- If you have not made any customizations to your desktop, if you do not have your home directory out in a networked environment, and if you do not mount a file system containing action, data type, and front panel definition files, you do not need to make any changes.

The **X11.Dt.compat** fileset should be installed to aid in the transition from AIXwindows Desktop on AIX 4.1 to the AIX CDE 1.0 desktop. This fileset contains executables, icons, action and data type definitions, and symbolic links to maintain compatibility with previous versions of the CDE desktop. This fileset also contains the Migrate Actions icon and its associated action definition. The "Welcome to AIX CDE 1.0" help volume contains additional information about the contents of this fileset. This fileset can be deinstalled later when you no longer have a need for the files contained within it.

- If you have made customizations to your desktop action and data type definition files (*.dt) or to your front panel definition files (*.fp) or installed icons on the front panel, you need to migrate these changes to the new desktop using Migrate Actions (**dtmigrate**).

To start **dtmigrate**:

1. Select the **Application Manager** control from the Front Panel.
2. Select the **Desktop_Tools** icon.
3. Select the **Migrate Actions** icon.

- If you have customized your desktop actions, data types or front panel, or are planning on running the desktop with file systems that contain action, data type or front panel definitions and the Calendar

resource file (**.desksetdefaults**) shared between an AIXwindows Desktop on AIX 4.1.1 or 4.1.2 and an AIX Common Desktop Environment on AIX 4.1.3 or higher,

you must take special action. See the “Welcome to AIX CDE 1.0” help for details.

For customers moving to AIX CDE 1.0 from a snapshot version of CDE

Customers migrating to AIX Version 4.1.3 or higher who have installed a “snapshot version” of the Common Desktop Environment and who will be installing AIX CDE 1.0 should remove the **/etc/dt** and **/var/dt** directories before installing AIX Version 4.1.3 or higher. While some customizations made in **\$HOME/dt** will still work unmodified, it is also recommended that the **.dt** directory be renamed to **.dt.old** prior to logging in to CDE 1.0.

Note: A “snapshot version” of CDE was distributed to select customers in April, 1994 and runs with AIX 3.2.5 only.

When performing an install of the desktop on any machine that does not have a graphics adapter installed, particularly a machine that will be used as a server for X stations or diskless and dataless workstations, the following packages must also be installed:

```
X11.fnt.isol
X11.fnt.defaultFonts
```

UMS and UIM/X requirements (when upgrading from AIX 4.1.2 or earlier)

Ultimedia Services and UIM/X users upgrading from AIX Version 4.1.2 or earlier to AIX Version 4.2 also need to upgrade to the following levels of UMS and/or UIM/X:

- Ultimedia Services Version 2.1.4 or later
- UIM/X Version 2.8.1 or later

Ultimedia Services is available as part of both the AIX Version 4.2 Bonus Pack for Entry Clients and the AIX Version 4.2 Bonus Pack for Workgroups, Connections, Entry Server and Advanced Servers. UIM/X is available as a separate licensed program under program number 5765-400.

Graphics Licensed Programs requirements (when upgrading to AIX 4.2)

Users of these graphics licensed programs will need to upgrade to the following levels when migrating to AIX Version 4.2:

- IBM PEX and PHIGS Programming Interfaces Version 4.2 for AIX (5765-660)
- OpenGL 1.0 and GL 3.2 for AIX Version 4.2 (5765-659)

7135 RAIDiant Array for AIX requirements (when upgrading to AIX 4.2)

Customers upgrading systems with attached 7135-110 Raidiant Array subsystems to AIX 4.2 must also obtain and install the latest version of controller and drive microcode. This microcode update can be obtained using hardware service channels (800-IBM-SERV in the U.S.) by requesting ECA 005. A new publication for the 7135, containing information on microcode and device driver installation, should also be ordered. This publication is titled *7135 Raidiant Array for AIX: Installation Guide and Reference*, SC23-1742.

DCE/DFS Migration to AIX Version 4.2.1

For customers using the DCE Distributed File System (DFS) for AIX, migrating an existing AIX system to AIX 4.2.1 will automatically upgrade the following filesets if they exist on the system:

DCE Client Services	dce.client.core.rte	02.01.0000.0016
DCE Security Services	dce.security.rte	02.01.0000.0014
DCE DFS Client Services	dce.client.dfs.rte	02.01.0000.0014
DCE DFS Base Server	dce.dfs_server.rte	02.01.0000.0012
DCE Enhanced DFS	dce.edfs.rte	02.01.0000.0010
DCE NFS to DFS Authenticating Gateway	dce.dfsnfs.rte	02.01.0000.0007

These upgrades are necessary for the DCE Distributed File System to continue supporting the export of JFS file systems to DFS. Without these changes, customers who export a JFS file system on an AIX 4.2.1 system will experience the following problems:

- Attempts to access DFS exported JFS files will result in ENOSYS errors.
- If an attempt is made to access a JFS file via the local pathname after it has been exported by DFS, the system will crash.

Also, beginning with AIX Version 4.2.1, the DCE Distributed File System (DFS) for AIX no longer supports the use of the DFS fileset backup and restore utilities with JFS filesystems exported to DFS.

The DFS backup and restore utilities are:

- the **fts** commands (**fts dump**, **fts restore**)
- the DFS Backup System (the **bak dump**, **bak restoredisk**, **bak restoreft**, and **bak restoreftfamily** commands)

If you export JFS data to DFS from an AIX 4.2.1 or later system, the DFS commands to dump and restore this data will display the following message:

```
Error in <dump|restore>: The system call does not exist on this system
```

This will happen even if you are running the DFS commands on earlier versions of AIX. What matters is the level of the AIX system on the DFS File Server where the data is being exported to DFS.

Use standard AIX backup and restore utilities to back up JFS data that is exported to DFS.

C Set++ recommendation for AIX Version 4.2

C Set++ Version 3.1.4 is an updated version of C Set++ that takes advantage of new features in AIX Version 4.2. Customers should upgrade to C Set++ Version 3.1.4 when moving to AIX Version 4.2. C Set++ Version 3.1.4 supports both AIX Version 4.1 and 4.2.

Other Installation Information

Information in this section concerns installation issues not specifically related to migration or upgrade.

bos.content_list Fileset and the which_fileset Command

AIX 4.2 includes a new, optionally installable fileset, **bos.content_list**, that lists all installable files and the filesets/packages that contain them. The fileset includes one file, **/usr/lpp/bos/AIX_file_list**

The **bos.rte.install** fileset now also ships the **/usr/sbin/which_fileset** command, which allows you to search the **/usr/lpp/bos/AIX_file_list** file after **bos.content_list** is installed.

AIX Network Install Manager (NIM) README

The AIX Network Install Manager (NIM) includes a **README** file that is installed with the NIM Master **bos.sysmgt.nim.master** fileset. The path name of the file is **/usr/lpp/bos.sysmgt/nim/README**. The **README** file contains additional information about the AIX Version 4.2 NIM product.

SystemView License Use Management Runtime

Some of the products included in this release have been modified to use license management software. These products require a license password in order for you to use them. SystemView License Use Management Runtime for AIX is the new license management product. It is an enhancement to iFOR/LS included in AIX Version 4.1 and contains new license management functions, but still uses the same technics and is completely compatible with iFOR/LS. For further information on SystemView License Use Management Runtime see *Using SystemView License Use Management Runtime for AIX* (SC23-1883).

Installing NetWare

When installing NetWare for AIX on your system using a language other than English, do the following:

1. Type 'locale' at the system prompt.
2. Note the value of the **LC_ALL** variable.
3. Set the **LC_ALL** variable to **en_US** using the command:

```
export LC_ALL=en_US
```
4. Install NetWare.
5. After installing NetWare, reset the **LC_ALL** variable to the original value noted in step 2.

Troubleshooting

This section lists known problems related to installation, migration, and upgrade. If available, a workaround is also provided.

Installation Warning Message

You may see the following warning message during installation of the **X11.msg.xx_XX.vsm.rte** fileset:

```
Conflicting Versions of Filesets ...
```

This warning occurs because of a refresh of Installation Assistant translations and can be ignored; the newest version of the fileset will be installed automatically.

Default Paging Space Problem

The default amount of paging space on your system may not be large enough for you to configure your network, install additional software (beyond the base operating system filesets), or run applications. You can use Installation Assistant (the **install_assist** command) to increase your paging space.

Note: If you completed a migration or preservation install and had previously increased your paging space, you may not need to increase your paging space now.

Trusted Computing Base (TCB) and Reject Problem

The 4.2.1 Maintenance release of AIX contains some changes to file permissions for security reasons. For example, the **/etc/passwd** file has changed permissions from 664 to 644. Because of a problem with reject and Trusted Computing Base (TCB), we recommend that you commit the 4.2.1 updates if you have the TCB enabled on your system.

To determine whether TCB is enabled on your system, run the **tcbck** command as root. If TCB is enabled, running **tcbck** results in display of the appropriate message.

AFS Network-related Problems

AFS users on AIX 4.2.1 may have problems with AFS during intermittent network problems. The AFS problems may be sporadic and may be resolved by rebooting the client machine that is experiencing the problem.

NIM Install Limitation

Network Install Manager (NIM) will fail to install AIX Version 4.2.1 in a number of situations where machines are configured with 16 MB of memory. This is a known limitation specific to AIX Version 4.2.1. The suggested workaround is to configure the target machine with greater than 16 MB of RAM.

AIX Version 3.2 to 4.2 Migration Problems

On some AIX Version 3.2 systems, the default install method is set as preservation (instead of migration). Check the default settings and select your desired method of installation from the **Change/Show Installation Settings and Install** panel. See "To Verify the Default Installation and System Settings" in the *AIX Version 4.2 Installation Guide*, SC23-1924-00, for additional information.

AIX Common Desktop Environment (CDE) Migration Problems

If, after migrating to AIX CDE 1.0 from AIXwindows desktop on AIX 4.1.1 or 4.1.2, you have problems with the desktop (for example, icons on the front panel do not execute properly, icons are missing, or actions can not be found), check that the following has been done:

1. The **X11.Dt.compat** fileset has been installed.
2. Action, data type, and front panel definitions in personal directories have been migrated to a valid format for AIX CDE 1.0.

The “Welcome to AIX CDE 1.0” help volume contains information about these steps and other useful information to aid in the transition to AIX CDE 1.0.

X.25 Licensed Program Migration Problems (from AIX 3.2.5 to 4.2)

Migration installs of AIX 4.2 from AIX 3.2.5 will not preserve your X.25 licensed program port configurations.

Workaround: Before performing a migration install follow these steps:

1. Manually run **/usr/lpp/sx25/bin/backupx25**.
2. Save the files that it produces.
3. After the X.25 licensed program has been migrated, reconfigure your ports on the 4.2 system with **/usr/bin/restorex25**.

Creating or Modifying a 7135 RAIDiant Array for AIX LUN

When creating or modifying a Logical UNit (LUN), we do not recommend setting the **Reserve Lock** field to **NO** in a multiple host environment. Setting the **Reserve Lock** field to **NO** in a multiple host environment can expose the system to file corruption unless an application exists to coordinate access to the shared disk.

AIX Version 3.2 or 4.1 Customized InfoExplorer Files

When migrating to AIX Version 4.2 from AIX Version 4.1 or 3.2, the InfoExplorer files under **/usr/lpp/info/data** are overwritten with AIX 4.2 versions. If you have made customizations to InfoExplorer configuration files, such as **/usr/lpp/info/data/ispaths**, you should back up the customized files before starting the migration and merge your changes into the AIX Version 4.2 files after the migration is complete.

Using sendmail Version 5.64 on AIX Version 4.2

Sendmail Version 5.64 (supported on AIX Version 3.2 and 4.1) and sendmail Version 8.7 (supported on AIX Version 4.2 or later) are not compatible. UCB sendmail Version 8.7 will not work with the Version 5.64 **/etc/sendmail.cf** file. There is no script available to assist in migration of the Version 5.64 **/etc/sendmail.cf** file to the Version 8.7 **/etc/sendmail.cf** file.

During migration installation of AIX Version 4.2, the Version 5.64 sendmail files are saved in the following locations:

```
/usr/lpp/save.config/usr/sbin/sendmail
/usr/lpp/save.config/etc/sendmail.cf
/lpp/save.config/etc/sendmail.nl
```

The **/etc/aliases** file was not modified during the installation.

Although sendmail Version 5.64 is not supported on AIX Version 4.2, if you have made complex changes to your previous sendmail configuration, and cannot immediately merge those changes into the sendmail Version 8.7 files, you can use the following procedure to copy the saved sendmail Version 5.64 files for temporary use on AIX Version 4.2. You must replace all the above files. The sendmail Version 8.7 and 5.64 files will not interoperate.

Use these instructions to revert to sendmail Version 5.64:

1. Login as root.

2. Stop sendmail using the command:

```
stopsrc -s sendmail
```

3. Save the existing **sendmail** files:

```
cp -p /usr/sbin/sendmail /usr/sbin/sendmail.orig
cp -p /etc/sendmail.cf /etc/sendmail.cf.orig
cp -p /etc/sendmail.nl /etc/sendmail.nl.orig
```

4. Restore the sendmail Version 5.64 files using the commands:

```
cp /usr/lpp/save.config/usr/sbin/sendmail /usr/sbin/sendmail
cp /usr/lpp/save.config/etc/sendmail.cf /etc/sendmail.cf
cp /lpp/save.config/etc/sendmail.nl /etc/sendmail.nl
```

5. Restart **sendmail** using the command:

```
startsrc -s sendmail -a "-bd -q30m"
```

Using the sendmail Version 8.7 .forward File

Sendmail has been updated on AIX Version 4.2 to UCB Version 8.7. Please note that the use of the \ (backslash) in the **\$HOME/.forward** files has changed from the previous UCB version.

If you are defining local users in a file defined by class L in the **/etc/sendmail.cf** file, then you no longer need to specify a \ (backslash) in front of the user name in your **\$HOME/.forward** file. The backslash is now interpreted as part of the username. This only applies if you have defined local users in a file specified in class L in the **/etc/sendmail.cf** file.

Base Operating System (BOS)

This chapter contains information about the base operating system (BOS).

Changes and Additions

This section provides information on changes and additions to the BOS procedures.

New Network Install Manager (NIM) Visual Systems Management (VSM) Interface

A new Visual Systems Management (VSM) interface for the Network Install Manager (NIM) has been shipped in AIX Version 4.2.1. Install the **bos.sysmgt.nim.master_gui** fileset to receive the new **xnim** functionality.

More details about the NIM VSM interface can be found in the Network Install Manager README file that is installed with the NIM Master **bos.sysmgt.nim.master** fileset. The path name of the file is **/usr/lpp/bos.sysmgt/nim/README**.

Additional Parameter for the lgamma Subroutine

The following parameter should be added to the documentation for the **lgamma**, **lgammal_r**, **lgammal**, **lgammal_r**, **gamma**, or **gamma_r** subroutine, described in *AIX Version 4 Technical Reference:Base Operating System (BOS) and Extensions*.

signgam Pointer to a thread-specific integer variable where the sign of lgamma of **x** is stored. The global variable **signgam** should not be used here; instead, each thread should have its own integer variable to pass into the **lgamma_r**, **lgammal_r**, and/or **gamma_r** routines.

Communications and Networks

This chapter contains information about communications and networks.

Changes and Additions

This section provides information on changes and additions to the communications and network procedures.

Network File System (NFS) Update in AIX 4.2.1

The Network File System (NFS)** has been updated in AIX 4.2.1 to include support for the latest NFS protocol update—NFS Version 3. AIX NFS continues to provide distributed file system access for AIX as in the past. The AIX 4.2.1 implementation continues to provide an NFS Version 2 client and server and is therefore backward compatible with the existing install base of NFS clients and servers.

AIX Version 4.2.1 NFS Version 3 enhancements

The new NFS Version 3 protocol brings many improvements for both NFS client and server. These are the most notable improvements:

- NFS Version 3 allows the NFS client to request an asynchronous write and commit sequence for writing file data, allowing for faster file writes to the NFS server. (In NFS Version 2, the NFS server had to write file data to disk before responding to the NFS client.)
- NFS Version 3 relaxes the transfer size for READs and WRITEs. The AIX implementation (like most in the industry) offers a 32KB READ and WRITE size for both client and server. (NFS Version 2 limited the size of READ and WRITE requests to 8KB.)

In NFS Version 2, reading a 128KB file required the NFS client to send 16 individual remote procedure calls to the NFS server. With NFS Version 3, the same file can be read with 4 remote procedure calls.

- NFS Version 3 was developed with the ability to access files greater than 2 gigabytes in size. The AIX NFS client and server have been implemented to take advantage of this ability to provide access to files greater than 2GB.

Additional AIX 4.2.1 NFS enhancements

Along with NFS Version 3 support, AIX 4.2.1 introduces these functional changes in the NFS client and server:

- **NFS over TCP.** The NFS client and server are able to utilize the TCP network transport for communication. Before AIX 4.2.1, NFS was limited to the UDP transport for remote procedure calls. In AIX 4.2.1, the default transport for NFS continues to be UDP, but for environments that could benefit from using TCP transport, selection of the TCP transport can be made when the file system is mounted on the NFS client.

These are examples of environments that may benefit from using NFS over TCP:

** NFS is a trademark of Sun Microsystems Inc.

- networks with several intermediate gateways or routers
- wide area networks
- environments with heavily loaded NFS servers

In all cases, NFS over TCP should provide a well balanced network load.

- **Multithreaded NFS server.** The NFS client and server daemons have been implemented in AIX 4.2.1 to use AIX's multithreading support. The NFS server daemon, **nfsd**, has been a multiprocess implementation in the past. With the new multithreaded NFS server, load balancing the server becomes much easier. NFS server threads are created and destroyed on demand as the incoming NFS client requests increase and decrease. The NFS client also takes advantage of the multithreaded approach to provide a well balanced resource approach to reading and writing files.
- **NFS file locking implementation improved.** In previous AIX releases, the NFS daemon that services network file locking requests was a separate, user level process. In AIX 4.2.1, the NFS file locking requests are serviced in a similar fashion to the classic NFS requests. The **rpc.lockd** daemon is a multithreaded kernel level implementation. This allows for better throughput and response time.

AIX 4.2.1 NFS performance impact

In certain circumstances, the new AIX 4.2.1 NFS implementation will provide better NFS performance than previous releases. Improvement may be seen in environments where throughput is not limited because of CPU, network bandwidth, or disk bandwidth:

- The NFS Version 3 implementation can provide better throughput for READ because of the larger transfer sizes. Up to 20% more throughput can be obtained using a 32KB READ size over NFS Version 3 compared to the 8KB READ size over NFS Version 2.
- The use of the asynchronous write capability of NFS Version 3, along with the larger WRITE transfer sizes, can result in an increase of 2 to 3 times the current sequential write throughput measured with NFS Version 2.
- The new NFS Version 2 server implementation can provide up to 10% improvement for overall throughput or NFS operations per second, as compared with previous implementations of Version 2.

WebNFS

The new NFS implementation in AIX 4.2.1 also introduces NFS server capability for WebNFS. WebNFS was defined by Sun Microsystems and is a simple extension of the NFS protocol. This extension is meant to provide easier access to the NFS server through Internet firewalls. The enhancements are also meant to provide easy access to WebNFS enabled clients. A WebNFS enhanced Web browser would be able to use a NFS URL to access data directly at the NFS server. An example of the NFS URL would be:

```
nfs://www.yourcompany.com/
```

WebNFS is meant to provide easy access to existing NFS server data and to take advantage of the scalability of NFS servers. It will work in tandem with existing Web-based protocols to provide data to Web clients.

Power Management

These adapters do not support power management:

- 8 Port Asynchronous Adapter - EIA-232, ISA bus
- 8 Port Asynchronous Adapter - EIA-232/EIA-422 ISA bus
- 128 Port Asynchronous Controller, ISA bus

Troubleshooting

This section lists known problems related to communications and networks. If available, a workaround is also provided.

PPP Subsystem Management

Warning: If you must make changes to your PPP configuration or stop the PPP subsystem for any reason, we recommend that you reboot your system. A system crash may result if you attempt to reload PPP after shutting it down without an intervening reboot.

Error in SNA Documentation

The *SNA Server for AIX Version 3.1 Planning and Performance*, SC31-8220, incorrectly recommends that you change your maxmbuf value to 2048 when using your system with SNA. However, the maxmbuf value should remain at the default value of 0.

Kernel Services

This chapter contains information about kernel services.

Changes and Additions

This section provides information on changes and additions to the kernel services procedures.

System Dump Changes

The secondary dump device is no longer a shared device. This will not affect most systems, because the default value for the secondary dump device is **/dev/sysdumpnull** (undefined).

The secondary is now used to back up the primary dump device. If an error occurs during a system dump to the primary dump device, the system attempts to dump to the secondary device. This is useful if your system is unable to successfully perform a system dump to the primary dump device; however, it means that the secondary dump device can no longer be a shared device. When the system is booted, both the primary and secondary dump devices are opened for use and kept open by the dump subsystem.

If you force a system dump to the secondary dump device, you are no longer prompted to make the device ready.

These 3-digit completion codes have been changed to reflect this enhancement:

- 0c1** This code indicates that an I/O error occurred. Note however that 0c1 is not shown if the dump was started to the primary and successfully failed over to the secondary.
- 0c4** This code now means simply “out of space.”
- 0c6** This was formerly the prompt for making the secondary device ready. This code has been eliminated.
- 0cc** This code displays if the dump has failed over to the secondary, but only while the dump is in progress. The dump completion code subsequently displays as normal when the dump completes.

See the documentation in InfoExplorer for details.

New AIX Kernel Memory Overlay Detection System (MODS)

Some of the most difficult types of problems to debug are what are generally called “memory overlays.” Memory overlays include the following:

- Writing to memory that is owned by another program or routine
- Writing past the end (or before the beginning) of declared variables or arrays
- Writing past the end (or before the beginning) of dynamically-allocated memory
- Writing to or reading from freed memory
- Freeing memory twice
- Calling memory allocation routines with incorrect parameters or under incorrect conditions.

In the kernel environment (including the AIX kernel, kernel extensions, and device drivers), memory overlay problems have been especially difficult to debug because tools for finding them have not been available. Starting with AIX Version 4.2.1, however, the Memory Overlay Detection System (MODS) is being shipped to help detect memory overlay problems in the AIX kernel, kernel extensions, and device drivers.

Note: This feature does not detect problems in application code; it only watches kernel and kernel extension code.

bosdebug command

A new command, **bosdebug**, turns the MODS facility on and off. Only the root user can run the **bosdebug** command.

To turn on the base MODS support, type:

```
bosdebug -M
```

For a description of all the available options, type:

```
bosdebug -?
```

Once you have run **bosdebug** with the options you want, run the **bosboot -a** command, then shutdown and reboot your system (using the **shutdown -r** command). If you need to make any changes to your **bosdebug** settings, you must run **bosboot -a** and **shutdown -r** again.

When to use the MODS feature

This feature is useful in the following circumstances:

- You are developing your own kernel extensions or device drivers and want to test them thoroughly.
- You are experiencing problems with kernel extensions provided by third-party developers and want to further isolate the problems.
- You have been asked to turn this feature on by IBM AIX service to help in further diagnosing a problem that you are experiencing.

How MODS works

The primary goal of the MODS feature is to produce a dump file that accurately identifies the problem.

MODS works by turning on additional checking to help detect the conditions listed above. When any of these conditions is detected, your system crashes immediately and produces a dump file that points directly at the offending code. (Previously, a system dump might point to unrelated code that happened to be running later when the invalid situation was finally detected.)

If your system crashes while the MODS is turned on, then MODS has most likely done its job.

To make it easier to detect that this situation has occurred, the **crash** command has been extensively modified. The **stat** subcommand of **crash** now displays both:

- Whether the MODS (also called "xmalloc debug") has been turned on
- Whether this crash was the result of the MODS detecting an incorrect situation.

A new **xmalloc** subcommand provides details on exactly what memory address (if any) was involved in the situation, and displays mini-tracebacks for the allocation and/or free of this memory.

Similarly, a new **netm** command displays allocation and free records for memory allocated using the **net_malloc** kernel service (for example, **mbufs**, **mclusters**, etc.).

You can use these commands, as well as standard crash techniques, to determine exactly what went wrong.

MODS limitations

There are limitations to the Memory Overlay Detection System. Although it significantly improves your chances, MODS cannot detect all memory overlays. Also, turning MODS on has a small negative impact on overall system performance and causes somewhat more memory to be used in the kernel and the network memory heaps. If your system is running at full CPU utilization, or if you are already near the maximums for kernel memory usage, turning on the MODS may cause performance degradation and/or system hangs.

Our practical experience with the MODS, however, is that the great majority of customers will be able to use it with minimal impact to their systems.

MODS benefits

You'll see these benefits from using the MODS:

- You can more easily test and debug your own kernel extensions and device drivers.
- Difficult problems that once required multiple attempts to recreate and debug them will generally require many fewer such attempts.

Optional Software

This chapter contains information about optional software.

Changes and Additions

This section provides information on changes and additions to the optional software procedures.

Viewing Information about Optional Software

Licensed programs include AIX 4.2 and optionally purchased products. Each program can have one or more separately installable filesets. The Package Installation Database is an InfoExplorer database which contains information about the contents of these separately installable filesets.

If you would like to use the Package Installation Database for reference when installing other filesets, install the following fileset using instructions in *Installation Guide*.

pkg_gd Package Installation Database for Current Media

If you have a graphics console, and want to use the graphical InfoExplorer user interface, you should also install this fileset:

X11.info AIXwindows InfoExplorer Runtime Environment

View the Package Installation Database using the command:

```
info -l lp_info
```

Appendix A. Electronic Fix Distribution for AIX

Fixes on the Internet

IBM provides a number of mirrored sites on the Internet where you may freely download AIX-related fixes. While not every AIX-related fix is available, we are constantly adding more and more product fixes. These sites are anonymous FTP servers. Though we do not guarantee all fixes will be made available immediately, we usually update the servers within 24 hours after the fix is made available from our tape sites.

AIX fixes are mirrored at a number of sites around the globe to provide you faster downloads and redundancy in case you cannot reach your usual site. The servers are:

Canada	rwww.aix.can.ibm.com	204.138.188.126
Germany	www.ibm.de	192.109.81.2
Japan	fixdist.yamato.ibm.co.jp	203.141.89.41 (previously 202.32.4.20)
United Kingdom	ftp.europe.ibm.com	193.129.186.2
United States	service.software.ibm.com	198.17.57.66

Accessing the Fixes — World Wide Web, FixDist, and FTP

You can obtain fixes through any of three available interfaces. The primary interface is the World Wide Web. We have also developed a highly functional application called FixDist as a web alternative. It provides more discrete downloads and transparently delivers all required images with just one click. For those customers with only basic FTP access, you can use the anonymous login account to obtain these fixes.

Read more about these services at the following URL:

<http://service.software.ibm.com/aix.us/fixes>

Putting Fixes on Tape — TapeGen

If you need to get the downloaded fixes from your networked systems to a standalone system, you can use a utility called TapeGen. TapeGen is a service tool from IBM that enables you to create a stacked tape containing SMIT installable fixes. You create a stack file that lists all the images you want stacked onto a tape and TapeGen does the rest.

Read more about TapeGen at the following URL:

<http://service.software.ibm.com/aix.us/tools>

Appendix B. Problem Solving Databases for AIX

Besides electronic fix distribution, IBM also provides searchable technical databases through the World Wide Web. Much of the technical information is available to customers with support contracts but we also provide a large assortment of technical information to any web user.

You can freely search AIX related bug reports and technical tips at the following URL:

<http://service.software.ibm.com/aix.us/psearch>

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