

AIX 5L Version 5.3



Release Notes

AIX 5L Version 5.3



Release Notes

Note

Before using this information and the product it supports, read the information in Appendix B, "Notices," on page 43.

First Edition (August 2004)

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Chapter 1. Read This Before Installation

Note: This software may contain errors that could result in critical business impact. It is highly recommended that you install the latest available fixes prior to using this software. Fixes can be obtained from IBM® eServer™ pSeries® Support at the following Web site:

<http://www.ibm.com/servers/eserver/support/pseries/aixfixes.html>

APAR IY58143 delivers fixes for AIX 5L™ Version 5.3 that are required for optimal system stability and performance. APAR IY58143, when available, can be obtained from the following Web site:

<http://www.ibm.com/servers/eserver/support/pseries/aixfixes.html>

The AIX 5L Version 5.3 Release Notes include information that helps you install AIX 5L Version 5.3. To view the most current version of the Release Notes, go to the online Release Notes in the AIX Information Center. The information center is located at the following Web site:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

Required Hardware

Only Common Hardware Reference Platform (CHRP) machines are supported.

To see if you have a CHRP machine, log into the machine as the root user, and run the following command:

```
bootinfo -p
```

For more information about supported and unsupported items, see Appendix A, “AIX 5L Version 5.3 Unsupported Items,” on page 39.

IBM eServer POWER5™ Systems

Known Limitations for POWER5 Systems

One IDE adapter can be configured per partition.

IBM eServer POWER4™ pSeries Systems

Required Levels of Hardware Management Console (HMC) and Firmware

The following items are required for using AIX 5L Version 5.3:

- Platform firmware version 3 or later.

To determine your platform firmware level, type the following at the command prompt:

```
lscfg -vp | grep -p Platform
```

The last six digits of the ROM level represent the platform firmware date in the format *YYMMDD*.

Firmware with dates between 020413 and 021024, or that has firmware level *2xYYMMDD*, is considered Version 2.

Firmware with dates between 021025 and 040602, or that has firmware level *3xYYMMDD*, is considered Version 3.

- You must have upgraded to the latest Version 3 firmware service pack, and HMC Release 3 Version 2.0 or later.

For more information, see the following:

- HMC: See the *IBM Hardware Management Console for pSeries Installation and Operations Guide* in the AIX Information Center.
- Platform Firmware: Contact your customer service representative.

- AIX®: See the *AIX 5L Version 5.3 Installation Guide and Reference* in the AIX Information Center.

Known Limitations for POWER4 Systems

Adapters

In Full System Partition mode, only one graphics adapter and USB adapter with one keyboard and mouse are allowed per system. Only one graphics adapter and USB adapter with one keyboard and mouse are allowed per logical partition, and a maximum of eight logical partitions that have a graphics adapter and USB adapter are allowed.

CPU Gard

Disable the CPU Gard functions if AIX 5L Version 5.3 and platform firmware levels older than October 2002 are used together by typing the following command:

```
chdev -l sys0 -a cpuguard='disable'
```

If platform firmware levels are upgraded, CPU Gard functions can be re-enabled by typing the following command:

```
chdev -l sys0 -a cpuguard='enable'
```

In either case, no system reboot is required for the changes to take effect.

pSeries 690 Memory

The pSeries 690 model 681 (7040-681) supports a maximum system memory size of 1 TB (terabyte) with appropriate memory Feature Codes installed.

AIX 5.3 and Linux logical partitions can have nearly 512 GB logical partition memory sizes (about 503 GB after page table, POWER Hypervisor, and TCE table usage). AIX 5.3 and Linux logical partitions should have the **Small Real Mode Address Region** option selected on the HMC partition profile memory panel, and must be defined for logical partitions greater than 256 GB.

Some AIX Systems Might Not Boot From CD-ROM

Some AIX systems might not boot from CD-ROM because of firmware issues. To determine if your system will be affected by this problem, perform the following steps before you migrate or install a running AIX 4.3, AIX 5.1, or AIX 5.2 system:

1. At the command prompt, type the following:

```
lscfg -v1 cd*
```

2. Examine the data that is returned.

If *Part Number* is 04N2964 and *ROS Level and ID* is less than or equal to 1_04 (for example, 1_02, 1_01, or 1_00), contact your local service representative. Tell your service representative that your system requires the CD-ROM firmware upgrade that is described in RETAIN® TIP H1332.

If the data returned does not match the data described in the preceding paragraph, your system is not affected by this problem.

Firmware Upgrade Required for pSeries 7025/7026 Systems

The following pSeries models require an upgrade to their firmware in order to install and run AIX 5L Version 5.3:

- 7025-F80
- 7025-6F0
- 7025-6F1
- 7026-H80
- 7026-6H0
- 7026-6H1
- 7026-M80
- 7026-6M1

Note: You must upgrade the system firmware before installing AIX 5L Version 5.3 to the following levels:

System	System Level with Support of AIX 5.3
7025-F80/6F0/6F1	CL040712
7026-H80/6H0/6H1	CM040712
7026-M80/6M1	MM040712

The required version of the firmware can be obtained from the following Web site:

<http://techsupport.services.ibm.com/server/mdownload>

Refer to the history section for the firmware level for the statement of AIX 5L Version 5.3 support.

Firmware Upgrade Required to Support an Alternate Boot Device

The requirement of upgrading firmware when installing or booting AIX 5.3 in the scenarios described in this section applies only to the systems listed in the table included at the end of this section.

Installation

Some systems might encounter installation problems when you are installing AIX 5.3 on a system that is currently installed with a earlier version of AIX or when you are installing an earlier version of AIX on a system currently installed with AIX 5.3.

A firmware upgrade is required to support the following installation scenarios:

1. When an installation device is specified using the SMS menus, or when the Open Firmware command-line *and* the specified device is not the first available device in the AIX bootlist.

Note: SMS menus differ, depending on the system. On some systems, the installation device is specified under the Multiboot menus. On other systems, the installation device is specified under the Select Boot Options menus.

2. When the F5 key is selected during boot, which is the fastpath to install from the CD device, and when the CD device is not the first available device in the AIX bootlist.

No firmware upgrade is required if no installation device is specified in the SMS menus or the Open Firmware prompt *or* if the specified installation device is the first available device in the AIX bootlist.

Booting from an Alternate Boot Device

An alternate boot device can be specified using the Open Firmware prompt. A firmware upgrade is required to support an alternate boot device (specified using the Open Firmware prompt), which is not also the first available device in the AIX bootlist.

The table below specifies which firmware levels are required to support these scenarios:

System	Microcode Level with AIX 5.3 Fix
7013 or 7015 or 7017 -S70/S7A	20040716
7017-S80/S85	20040716
7025-F50	L04197
7025 or 7026-H50	L04197
7025 or 7026-H70	SST04195
7026-B80	NAN04194
7028-6C4/6E4	3R040323 or later
7028-6C1/6E1 and 9112-265	CLT04194
7029-6C3/6E3 & 9112-275	3F040326 or later

System	Microcode Level with AIX 5.3 Fix
7038-6M2	3K040323 or later
7039-651	3J040528 or later
7040-671/681	3H040326 or later *
7043-150/B50	TCP04195
7043-260	SPX04197
7043 or 7044-270	SPH04194
7044-170	SPH04194
9076-260	SPX04197
9076-270	SPH04194
9076-N80	NI04195
9076-N81	NI04195
9076-WCN	L04197

* The 7040-671/681 Version 2 microcode does not support AIX 5.3.

The required version of the firmware can be obtained from the following Web site:

<http://techsupport.services.ibm.com/server/mdownload>

AIX Information Center

The AIX Information Center provides navigation and search capabilities for system documentation. For instructions on how to use the information center, select **Information Center Help** from the navigation bar. For instructions on installing and configuring the information center on AIX, see the *AIX 5L Version 5.3 Installation Guide and Reference*.

To access the AIX Information Center, go to the following Web site:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

Documentation Library Services

Beginning with AIX 5L Version 5.3, a new application, the AIX Information Center, is available for installation. The AIX 5.3 books are only available through the AIX Information Center. The information center provides search and navigation capabilities for all installed AIX 5.3 books.

The Documentation Library Services application does not ship in AIX 5.3. However, in a migration installation of AIX 5.3, the Documentation Library Services application will not be removed, nor will the books that it serves. Both the Documentation Library Services and the AIX Information Center can exist on the same system. The AIX 5.3 documentation is available only in the AIX Information Center.

The information center, which is included on the *AIX Documentation CD*, can be installed and used on a local system or installed on a documentation server for use on an intranet. The information center is powered by Eclipse technology. The Documentation Library Services application and the AIX Information Center can coexist on the same system. Therefore, if the system is being used as a documentation server, it can continue to serve the books supporting releases earlier than AIX 5.3, as well as AIX 5.3 books. If you have created your own books and registered them with the Documentation Library Services application, they will not automatically be available to the AIX Information Center. To make these documents available to the AIX Information Center, they must be added to a plug-in that is suitable for use in the information center.

The information center is also available online at the following Web site, which has the most up-to-date AIX and pSeries information:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

Migration

Minimum Memory and Disk Requirements

The minimum memory required for AIX 5L Version 5.3 is 128 MB, and the minimum disk required is a 2.2 GB hard drive.

Maximum Size of Boot Image Increased

For AIX 5L Version 5.3, the maximum size of the boot image has changed from the previous value of 11,984 KB (12 MB minus 16 KB) to 31,984 KB (32 MB minus 16 KB).

System Migrated to AIX 5.3 Might Experience Double Boot

When booting AIX 5L Version 5.3 on a system that has previously been running an earlier release of AIX, you may notice that the system automatically reboots and restarts the boot process. This is how the firmware processes changed information in the boot image.

This reboot also occurs if the process is reversed. A system previously running AIX 5.3 that is booting a release of AIX prior to 5.3 goes through the same process. This "double boot" occurs only once; if the stored value does not change, then the second boot does not occur.

If you install AIX 5.3 and continue to use only AIX 5.3, this double boot occurs once, and it occurs only if your system was running a pre-AIX 5.3 release before you boot AIX 5.3. Systems that are preinstalled with AIX 5.3 and use only AIX 5.3 do not experience the "double boot."

Netscape Communicator Version 4 Removed

Netscape Communicator Version 4 is not supported on AIX 5.3 and is uninstalled during migration to AIX 5.3. The Communicator settings, such as bookmarks in the users' home directories, are not affected by this operation. The new Web browser for AIX is Mozilla. Mozilla is not installed during migration. For more information, see "AIX Web Browser Transition to Mozilla" on page 23.

Migration from AIX 4.2.1

A system running AIX 4.2.1 must be updated with the September 1999 or later Update CD before migrating to AIX 5.3. The CD label should have the number LCD4-0252-13 or higher. To check a running system, verify that the **bos.rte.install** file is at level 4.2.1.17 or higher.

No Login Prompt on Systems Using vterm with nimadm Command

A system that has only vterm should not use the **nimadm** command to perform a migration because there will be no login prompt.

xlc.rte Fileset

If you are migrating to AIX 5.3 from AIX 4.2.x or AIX 4.3.x, check the level of the **xlc.rte** fileset by typing the following command:

```
ls1pp -L xlc.rte
```

If the **xlc.rte** level is earlier than 5.0.2.x, you must apply APAR IY17981 before migrating to AIX 5.3. Without APAR IY17981 installed, the migrated system might fail to boot.

APAR IY17981 is available from the following Web site:

<http://www.ibm.com/servers/eserver/support/pseries/aixfixes.html>

bos.clvm.enh Fileset after Migration to AIX 5L Version 5.3

The **bos.clvm.enh** fileset is not installed when your system is migrating to AIX 5.3. After the migration is complete, users of the **bos.clvm.enh** fileset will need to re-install the fileset from the AIX 5.3 installation media.

KDE Desktop

If the CDE and KDE desktops are both installed on a system migrated from AIX 4.3 to AIX 5.3, the KDE desktop might not start from the CDE login. To fix this problem, remove the following CDE startup information from the **/etc/inittab** file:

Note: You must have root user authority to remove this CDE startup information.

```
dt:2:wait:/etc/rc.dt
```

Do not delete the following KDE entry from the **/etc/inittab** file:

```
kdm:2:once:/opt/freeware/kde/bin/kdm
```

Performance Monitoring API

The Performance Monitoring API is contained in the **bos.pmapi** fileset. A beta version of the same code was made available to selected customers, and also through alphaWorks[®], under the name *pmtoolkit*.

The **bos.pmapi** fileset does not support the RS64-I (A35) processor. If you try to install the fileset on a machine with this processor, the installation fails and returns the following error:

```
setup_branchtable: Processor not yet supported.  
instal: Failed while executing the ./bos.pmapi.pmsvcs.post_i script.
```

When you are migrating from any level of AIX with any level of the beta fileset installed, you must uninstall the **pmtoolkit** fileset and reboot the machine before you install the **bos.pmapi** fileset. If you do not, the machine will fail to boot when you attempt to load the **pmtoolkit** fileset's kernel extension.

Verify that the **pmtoolkit** fileset is installed by typing the following at the command line:

```
lslpp -l pmtoolkit
```

- If you get the following output:

```
lslpp: 0504-132 Fileset pmtoolkit not installed
```

you can safely install the **bos.pmapi** fileset.

- If you get the following output:

Fileset	Level	State	Description

Path: /usr/lib/objrepos			
pmtoolkit	1.3.1.6	COMMITTED	Performance Monitor Toolkit 1.3.1

complete the following steps:

1. Run the following command:

```
installp -u pmtoolkit
```

2. Reboot the machine. After the machine reboots, you can safely install the **bos.pmapi** fileset.

SNMPv3

After you migrate to AIX 5.3, the non-encrypted version of SNMPv3 will run by default. If you have your own community, trap, or smux entries in your **/etc/snmpd.conf** file, those must be manually migrated to

the `/etc/snmpdv3.conf` file. For instructions on how to migrate this information, see "Network Management" in *AIX 5L Version 5.3 System Management Guide: Communications and Networks*.

Kerberos

All of the secure remote commands use the Kerberos Version 5 library and the GSSAPI library provided by IBM Network Authentication Service Version 1.4 that is located on the *AIX 5L Version 5.3 Expansion Pack* CD. However, you must install the `krb5.client.rte` fileset.

If you are migrating to AIX 5.3 and have Kerberos Version 5 installed, the installation scripts will prompt you to install the `krb5.client.rte` fileset. The secure remote commands support Kerberos clients and servers from both Native Kerberos 5 and DCE.

For more information, see "Understanding the Secure Rcmds" in the *AIX 5L Version 5.3 System User's Guide: Communications and Networks*.

AIX Toolbox for Linux Application Migration Information

If you previously installed the AIX Toolbox for Linux Applications and the level of the `rpm.rte` fileset is lower than 3.0.5.20, remove that software from the system before migrating to AIX 5.3. The Toolbox software installed with `rpm.rte` levels prior to 3.0.5.20 are incompatible with software from the AIX Toolbox installed on AIX 5L Version 5.3 because of shared library restructuring.

Remove the software if you are performing a preservation installation and you established an `/opt/freeware` file system for the Toolbox software. The files in that file system will not be automatically overwritten during a preservation installation. To remove your existing rpm filesets, use the `destroyRPMS` tool available in the `/contrib` directory on the *AIX Toolbox for Linux Applications* CD by typing the following:

```
mount -v cdrfs -oro /dev/cd0 /mnt
/mnt/contrib/destroyRPMS
```

If you are migrating your system from AIX 4.3.3 to AIX 5L and you installed the `rpm.rte` fileset without creating your own `/opt` or `/opt/freeware` file system, after running the `destroyRPMS` command it is recommended that you remove the `/opt/freeware` directory and the `/usr/opt/freeware` directory before migrating. On AIX 5L, the system provides a `/opt` file system into which the `rpm.rte` fileset is normally installed. However, if the RPM Package Manager (RPM) finds a pre-existing `/usr/opt/freeware` directory, it uses this location instead. You do not need to do this if you want your RPM freeware installed under the `/usr` file system, but the `/opt` file system is recommended.

If you have already migrated with the `/usr/opt/freeware` file system and want to change this afterwards, run the `destroyRPMS` command again, remove any existing `/usr/opt/freeware` and `/opt/freeware` directories, and install the `rpm.rte` fileset again.

Additional information is also available on the *AIX Toolbox for Linux Applications* CD in the `/README.TXT` file.

Multipath I/O (MPIO)

After you migrate to AIX 5.3, some disk devices will no longer be configured as *other FC disk*. These devices instead will be configured as *MPIO other FC disk*. The affected devices are EMC SYMMETRIX, HDS OPEN, and SSG SHARK disk subsystems. These devices are configured as MPIO devices if the device was previously configured as *other FC disk*.

The following describes some of the similarities and differences that are seen after the device has migrated to an *MPIO other FC disk*.

Terminology:

- A path is each physical connection between the host system and the device.
- A path control module (PCM) is a device specific module that manages a device's I/O across its paths.

A device configured as *other FC disk* has the following properties:

- Contains multiple device instances created for each path the device was detected on.
- Supports user-changeable device attributes.
- Can migrate to a vendor-specific device when vendor-supplied, device-specific ODM pre-definitions are installed.
- Is meant to be a transitory state during boot and install. The vendor-specific device ODM pre-definitions should be installed before using the device in a production environment.

A device configured as *MPIO other FC disk* has the following properties:

- Contains only one device instance created and multiple path instances created. Also contains one path instance for each physical connection between the host system and the device.
- Supports user-changeable device attributes. There may be additional attributes that are PCM specific.
- Can migrate to a vendor-specific device when vendor-supplied, device-specific ODM pre-definitions are installed.
- Presently is not supported by PowerPath, MDS, or SSD path management products. To support any of these products the vendor-specific no-MPIO ODM pre-definitions must be installed. Attempting to control a device configured as an MPIO device will produce undetermined results. Data integrity issues will exist if the device is operated in this configuration.
- Is supported in a production environment. Device-specific vendor ODM pre-definitions are not required to be installed before using in a production environment.
- Allows for installing and booting to an MPIO device.

Migration Issues

The following describes migration issues if the *MPIO other FC disk* support is removed after devices have been configured as *MPIO other FC disk*:

Migrating to an *other FC disk* can occur if the *MPIO other FC* support is removed. In this case, where the update is uninstalled with the force option, the AIX 5.3 release of MPIO handles the migration. If the system is rebooted, the device instance is in the define state. During migration, the device instance is left in the define state, and a new *other FC disk* instance is created.

If the system is not rebooted and the device instance is in the define state, the device instance is left in the define state, and a new *other FC disk* instance is created.

If the system is not rebooted and the device instance is in the available state, the device instance is unchanged.

There might also be *other FC device* instances created. If the *MPIO other FC device* is not open, an *other FC device* instance is created for each path the device is detected on. If the *MPIO other FC device* is in the open state, no *other FC device* instances are created. This is because the *MPIO other FC device* has already issued a **SCIOSTART** command to the FC adapter for each of the paths. The FC adapter does not allow two devices with the same worldwide name and worldwide nodename to exist in its internal data structures.

If *other FC device* instances were created, sending I/O to the device while it is configured as both *MPIO other FC* and *other FC device* can cause indeterminate device behavior or data damage. Reboot the system to correct this condition. After the system is rebooted, the *MPIO other FC device* instance will be in the defined state and can be removed using the **odmdelete** command. The **rmdev** command will not remove the device due to the missing pre-definitions.

For more information about additional features of MPIO devices, see “MPIO Features” in these release notes.

MPIO Features

Support for parallel SCSI SCSD disks was released in AIX 5L Version 5.2, and support for MPIO Fibre Channel disks is implemented in AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package. Some devices will configure differently than in previous releases. For more information, see “Multipath I/O (MPIO)” on page 7.

The following describes some of the features added to the MPIO device capabilities:

- Tracing the SCSI and Fibre Channel device drivers now includes traces within the MPIO FRAMEWORK. The MPIO FRAMEWORK is the interface layer between the AIX device driver and the path control module. The path control module (PCM) determines which path should be used to send I/O from the device driver to the target device.
- AIX PCM supports tracing within its interface routines. The trace hook for PCMs is 0x17B00000 HKWD_PCMKE. Vendor supplied PCMs can also use this trace hook.
- Dump support for MPIO FRAMEWORK and AIX PCM data structures are included in the component dump table (CDT). If a system stops, the MPIO FRAMEWORK and AIX PCM data structures are included in the dump and can be viewed using the **kdb** command.
- AIX PCM health-checking can test device connections (paths). This capability can re-enable failed paths. In the previous release of MPIO, you were required to run the **chpath** command to re-enable failed paths.

For more information about MPIO, see the following AIX publications:

AIX 5L Version 5.3 System Management Concepts: Operating System and Devices in the section titled *Multipath I/O*.

AIX 5L Version 5.3 System Management Guide: Operating System and Devices in the section titled *MPIO Devices*.

System V Printing Subsystem

The System V Printing Subsystem is an alternate printing subsystem in AIX. The installation of the **bos.svprint.*** filesets in a TCB environment requires that the **lp** user ID (UID:11) and **lp** group ID (GID:11) are present in the system. Otherwise, the installation of these filesets will fail.

To avoid this problem, create the **lp** user (UID:11) and **lp** group (GID:11) accounts on the AIX 4.3.3 system prior to the migration.

Installation

This section contains information about installing AIX 5.3 that supplements the information contained in the AIX 5.3 installation documentation.

The following publications describe AIX 5.3 installation:

- *AIX 5L Version 5.3 Operating System Installation: Getting Started* (SC23-4940-00)
- *AIX 5L Version 5.3 Installation Guide and Reference* (SC23-4887-00)
- *AIX 5L Version 5.3 AIX Installation in a Partitioned Environment* (SC23-4926-00)

The installation guides are available online in the AIX Information Center and in printed hardcopy.

To order these installation guides, contact your point of sale, or in the U.S., call IBM Customer Publication Support at 1-800-879-2755. Give the order number of the book you want to order.

To obtain AIX 5L Version 5.3 installation hints and tips, send e-mail with a subject line of **53_Install_Tips** to aixserv@austin.ibm.com, the AIX Service Mail Server.

Installing AIX 5L Version 5.3

The following methods can be used to install AIX 5L Version 5.3:

- Complete overwrite installation
- Preservation installation
- Migration installation

Note: After you install or migrate a system to AIX 5L Version 5.3, you can install a lower level of AIX by restoring a system backup or by performing a new and complete overwrite with base media. Preservation installations from AIX 5L Version 5.3 to a lower level of AIX are not supported.

To install AIX 5L Version 5.3, boot your system from the product media, and follow the instructions in the *AIX 5L Version 5.3 Installation Guide and Reference*.

Note: AIX 5L Version 5.3 cannot be installed on MCA (Micro Channel[®] Architecture) or PowerPC Reference Platform[®] (PReP) machines.

For more information about migration, see “Migration” on page 5.

Software License Agreements (SLA)

There are instances where the Software License Agreements might not be displayed correctly. In this event, the License Agreements can be viewed in all languages at the following Web site:

<http://www.ibm.com/software/sla/slabd.nsf>

Base Operating System Installation Options

The information in this section supplements the “Installation Options” chapter of the *AIX 5L Version 5.3 Installation Guide and Reference*.

In the Base Operating System installation menus, if there are more than 50 disks on the system, the disks are ordinarily grouped by adapter. However, for some types of disks, the grouping is slightly different:

SCSI disks

Disks may be grouped by adapter or SCSI bus

IBM TotalStorage[®] FASTT Storage Servers

Disks are grouped by disk array controller (DAC)

In each case, the user can select the adapter, SCSI bus, or DAC by name and see the associated disks. The physical location of the adapter, SCSI bus, or DAC is also displayed.

Graphics Software Bundle Requires Two CDs

Due to space constraints on the AIX base product media CDs, the graphics software bundle is now included on the *Volume 2* CD. For installations using CD media, you are prompted for the *Volume 2* CD if you install with the defaults for an overwrite or preservation installation (Graphics Software = yes).

If you create a Network Installation Management (NIM) `lpp_source`, you will not be prompted for the *Volume 2* CD to add the graphics software to the `lpp_source`. To add the graphics software after creating the `lpp_source`:

1. Type the **smitty nim_update_add** command. The **Add Software to an lpp_source** menu is displayed.
2. Select the **Graphics** bundle for **INSTALLP BUNDLE containing packages to add**.

Memory Requirements

AIX 5L Version 5.3 requires a minimum of 128 MB of physical memory.

Paging Space Requirements

AIX 5L Version 5.3 creates a 512 MB paging space (in the `/dev/hd6` directory) for all new and complete overwrite installations.

Disk Space Requirements

AIX 5L Version 5.3 requires a minimum of 2.2 GB of physical disk space for the same set of installed filesets due to increased library sizes and additional function.

Note: The following measurements provide information about disk usage when you install AIX 5L Version 5.3 as compared to previous versions.

Base AIX Installation (Graphical System with CDE-Default)

Location	AIX 4.3.3 Allocated (Used)	AIX 5L for POWER Version 5.1 Allocated (Used)	AIX 5L Version 5.2 Allocated (Used)	AIX 5L Version 5.3 Allocated (Used)
/	4 MB (2.5 MB)	8 MB (5.6 MB)	16 MB (9 MB)	16 MB (9 MB)
/usr	294 MB (279 MB)	385 MB (370 MB)	928 MB (919 MB)	928 MB (919 MB)
/var	4 MB (1.3 MB)	4 MB (1.4 MB)	16 MB (5 MB)	16 MB (5 MB)
/tmp	16 MB (0.6 MB)	20 MB (0.9 MB) (See note.)	24 MB (0.8 MB)	24 MB (0.8 MB)
/opt	N/A	4 MB (0.2 MB)	24 MB (9 MB)	24 MB (9 MB)

Note: If the `/tmp` directory has less than 32 MB, it is increased to 32 MB during a migration installation so that the AIX 5L Version 5.3 boot image is successfully created at the end of the migration.

During a migration installation, if `/opt` exists only as a directory and has less than 3 MB of data, then a new `/dev/hd10opt` logical volume and `/opt` file system are created, and the data that existed in the `/opt` directory is moved to the new `/opt` file system.

If there is more than 3 MB of data in the `/opt` directory, then the new logical volume and file system are not created.

If any existing file system has a mount point in the `/opt` directory, or a mount point of `/opt` itself, the new logical volume and file system are not created.

Fixes for Installing the RH021019 Level of the pSeries 670 or pSeries 690 Firmware

The following fixes or higher are recommended prior to installing the RH021019 level of the pSeries 670 or 690 (7040-671 or 7040-681) firmware:

- HMC version update: Update the HMC to the latest level listed at the following HMC Web site:
<http://techsupport.services.ibm.com/server/hmc>

Other Installation Information

Installation Packaging Formats

AIX 5L Version 5.3 supports the following installation-packaging formats:

- `installp`, AIX system installation command and packaging format

- RPM, a Linux installation command and packaging format
- ISMP, InstallShield Multi-Platform packaging format

With the **geninstall** command, you can list and install packages from media that contains installation images packaged in any of the listed formats. The **geninstall** and **gencopy** commands recognize the non-installp installation formats and either call the appropriate installers or copy the images, respectively.

The AIX 5L Version 5.3 product media contains installp packages and RPM packages that are installed during a BOS installation. The installp packages are located in the following path, where *mount_point* is the mount point:

```
/mount_point/installp/ppc
```

The RPM packages are located in the following path, where *mount_point* is the mount point:

```
/mount_point/RPMS/ppc
```

If you have media that contains ISMP packages for AIX 5.3, the ISMP packages are located in the following path, where *mount_point* is the mount point:

```
/mount_point/ismpp/ppc
```

The **installp**, **bffcreate**, **geninstall**, **gencopy** and **nim** commands recognize this media structure.

For more information about software packaging, see the Software Product Packaging Concepts section in the *AIX 5L Version 5.3 Installation Guide and Reference*.

mkcd and New IDE DVD-RAM Drive (Support for System Backup and Volume Group Backup)

A new slimline IDE DVD-RAM drive is now available (Feature Code 5751). This drive is not supported by the GNU/open source **cdrecord** and **readcd** commands. Therefore, to create system backups or volume group backups using the **mkcd** command, you must create the backups using the -U flag.

Universal Disk Format (UDF)-formatted media is not supported prior to AIX 5.2. In other words, you can boot and install a UDF-formatted system backup, but you cannot mount the UDF backup or extract files on a running system that is at a level lower than AIX 5.2. To pass files between AIX 5.3 and AIX 5.1, use either another device or other commands, such as **tar**, **cpio**, or **backup**.

For more information about creating CD-R and DVD-RAM backups, see the **/usr/lpp/bos.sysmgt/mkcd.README.txt** file.

To support booting from UDF backup media, older systems may require later firmware. For firmware updates, see the following Web site:

```
http://techsupport.services.ibm.com/server/mdownload
```

System Dump

Extended system failure status information is captured as part of the dump, detailing dump success or failure. Display the extended information by using the **sysdumpdev** command.

The **snap** command is enhanced to support the following:

- Independent service vendors (ISVs) can use custom scripts to collect their custom problem data as part of the snap process. For programming and process details, see "Copying a System Dump" in *AIX 5L Version 5.3 Kernel Extensions and Device Support Programming Concepts*.
- Large outputs can be split into smaller files for ease of transport.
- Output can be written to DVD-RAM media.

The system trace facility has been enhanced to support process and thread-based tracing. You can restrict the tracing to a process and capture the events in relation to the process for better debugging. For more information, see the **trace** command documentation.

The **trace** command supports settings of larger trace buffers for regular users. For more information, see the **trcctl** command documentation.

The system trace can be used to trace processor utilization register (PURR) to provide more accurate event timings in a shared processor partition environment.

Support for better core file management is implemented. The **chcore** command provides for management of location of core files. For more information, see the **chcore** command documentation.

System dump compression is turned on by default. For information about dump compression, see the **sysdumpdev** command documentation.

The system dump has been enhanced to support DVD-RAM as the dump media. A DVD-RAM can be used as the primary or secondary dump device.

AIX error logging now supports up to 2 KB of event data.

Network Installation Management

Network Installation Management (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 5L Version 5.3 NIM product and includes the following topics:

- Restrictions on SPOT Creation for Releases Prior to 5.3 (New LPP_SOURCE Directory structure)
- Web-based System Manager NIM May Have Problems Installing SW on Client Machines
- Restrictions on Customize Operation for RPM Packages
- Steps Necessary For Adding GNOME -or- KDE Desktop Support

The mksysb Tape

For more information about the **mkysb** tape, see the **/usr/lpp/bos.sysmgt/README** file.

Systems that can support firmware version 3x040319 or later, where x is the model (H, J, K, R, or F), will boot tapes with boot images larger than 12 MB. Use the real-base workaround on other models.

Real-base Workaround: If your system fails to boot from a **mkysb** tape, you might have encountered a problem that can be identified and resolved with the following instructions:

Note: This procedure does not work on machine types 7028, 7029, 7038, and 7040 and should not be used. For information about how to boot these machine types from a **mkysb** tape, see “Alternate mkysb Solution” on page 14. Affected systems include all CHRP architecture systems, beginning with the F50 model.

1. Access the firmware command line prompt, which usually appears as an option in the SMS menus.
2. At the firmware command line prompt, type the following commands:

```
setenv real-base 1000000
reset-all
```

The system will reboot.

3. Boot the system from the tape, assuming that you have an otherwise valid boot image on your tape media.

Alternate mksysb Solution: This solution works on all systems, but requires AIX product media at the same release (or higher) as the **mksysb** tape. This is the only solution for machine types 7028, 7029, 7038 and 7040.

1. Boot your system from the AIX product media (CD or network boot).
2. When the installation menus appear, select **3 Access Advanced Maintenance Functions**, and then select **4 Install from a System Backup**.
3. Select **tape drive** and proceed to install.

Recovering from Setting setenv real-base on Machine Types 7028, 7029, 7038 and 7040: When the **setenv real-base** command is run on machine types 7028, 7029, 7038, or 7040, the system starts to boot, some messages or data displays, and then the system stops on the open firmware prompt as shown below:

```
ok  
0 >
```

To restore the correct setting, type the following command:

```
0 > delenv real-base
```

This command will delete the real-base variable. After the above command is run, the system must be power-cycled, and AIX will boot normally from the hard disk. This solution will keep all other NVRAM data, such as partition information, intact.

The mksysb Command: The method used by the **mksysb** command to restore data through system backups has changed.

Enhancements were added to more fully restore customized data so that a system more closely resembles the system at the time the backup was performed. This occurs when restoring a backup on the system that the backup originated from. These enhancements were added to reduce the amount of additional work that sometimes needs to occur to restore devices to their customized configuration at the time of backup.

If devices were removed from or replaced on the system after the backup was created, that information is restored when you are installing a backup, and the system shows these devices in a defined state.

These enhancements do not affect installing the backup onto other systems, or *cloning*.

Reliable Scalable Cluster Technology (RSCT)

The RSCT Resource Monitoring and Control (RMC) application is part of RSCT. The RSCT includes a readme file that is installed with the **rsct.core.utils** fileset. The file is located in the **/usr/sbin/rsct/README/rsct.core.README** directory and contains additional information about the RMC application.

Restriction for Japanese Locales: When the responses specified with the predefined **notifyevent** script are used in Japanese locales, alphanumeric (English) characters should be used for the condition name. If the condition name has non-alphanumeric characters in the mail header, it will be damaged. To work around this problem, you can modify the **notifyevent** script to not use the **\$ERRM_COND_NAME** environment variable in the mail subject.

Service Resource Manager (ServiceRM): ServiceRM is an RSCT resource manager that creates serviceable events for problems found by AIX Diagnostics. ServiceRM sends these events to the Service Focal Point on the Hardware Management Console (HMC).

Firmware Limitation

The firmware in many of the PCI bus-based RS/6000® machines is limited in regard to the region of the hard disk from which it can read a boot image. This problem will not be encountered under most

circumstances. The symptom of the problem is a failure to boot from hard disk, resulting in a message from firmware similar to unrecognized Client Program format.

Affected machines can be identified most easily as the machines that provide access to the firmware System Management Services by pressing the F1 key on the system-attached keyboard or the 1 key on a TTY keyboard.

Firmware on the affected machines cannot read the boot image from the hard disk if any part of the boot image is located beyond the 4 GB boundary on the hard disk. This is not a problem for most customers because the AIX installation process creates the boot logical volume at the beginning of the disk. This is achieved by using the **-a** flag with the **mklv** command and specifying **e** (which corresponds to **edge**) as the parameter for the **-a** flag. Using the **mklv** command with this parameter results in the boot logical volume being created at the edge of the hard disk, and the resulting address that the firmware uses to read the boot image will be within a safe range. The AIX installation process has always created the boot logical volume near the edge of the hard disk because that region of the hard disk has the slowest access time, and this allows other regions of the hard disk to be used by file systems that can benefit from increased performance.

The only way that you can encounter this problem is by creating and initializing a new boot logical volume that extends past the 4 GB boundary of the hard disk.

In almost all cases, you do not need to create a new boot logical volume, but if you do, use the **lsvg** and **lslv** commands to verify that the newly created boot logical volume does not reside above the 4 GB address on the hard disk.

An example of this calculation follows:

1. Run **lsvg rootvg** to determine PP SIZE. On a 4.5 GB hard disk, the default PP SIZE is 8 MB. Make a note of that size.
2. Run **lslv -m bootlv00**, where *bootlv00* is the name of the newly created boot logical volume.

The numbers in the second, fourth, and sixth columns indicate the physical partitions that have been assigned to the boot logical volume. If the PP SIZE is 8 MB, the boot logical volume must not use any physical partition above 511 ($512 * 8 = 4096$, which is 4 GB). Similarly, if the PP SIZE is 16 MB, the boot image must not use any partition above 255, and if the PP SIZE is 4 MB, the boot image must not use any partition above 1023.

Machine Limitations with Universal Disk Format (UDF)

When booting a 7043-150 or 7046-B50 system from the Universal Disk Format (UDF) media, use the **O/F** command instead of SMS. The following is an example of how to use the **O/F** command:

```
boot /pci@fef00000/scsi@c/sd@4,0:1,\ppc\bootinfo.txt
```

Service

Fixes and Problem-Solving Databases

You can download AIX fixes from the following IBM eServer Support Web site:

<http://www.ibm.com/servers/eserver/support/pseries/aixfixes.html>

You can also search technical databases, including:

- APARS
- Tips for AIX administrators

Chapter 2. AIX 5L Version 5.3

The following are some of the features that are introduced in AIX 5L Version 5.3:

- Advanced Accounting
- NFS Version 4
- Simultaneous Multithreading
- JFS2

To find out more about the new features introduced in AIX 5L Version 5.3, see the AIX Information Center at the following Web site:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

Base Operating System (BOS)

64-bit System Identifier

AIX 5.3 provides a 64-bit system identifier for compatibility with future systems. This identifier is available in the following forms:

id_to_system

The **id_to_system** identifier is unique for a system, but it is common to all partitions on the system. This identifier should be used by applications to license to a system. The value can be obtained using one of the following commands:

```
uname -F
lsattr -El sys0 -a id_to_system
```

id_to_partition

The **id_to_partition** identifier is similar to the **id_to_system** identifier, but it also includes the partition number and therefore is unique for each partition. This identifier should be used by applications to license to a partition. The value can be obtained using one of the following commands:

```
uname -f
lsattr -El sys0 -a id_to_partition
```

In addition, a new field in the **xutsname** structure returned by the **unamex** system call is defined. This new field, **longnid**, contains the 16 hexadecimal characters of the **id_to_partition** value.

64-bit Kernel

AIX 5L Version 5.3 provides a scalable 64-bit kernel that is capable of supporting large application workloads running on 64-bit hardware. The 64-bit kernel scalability is primarily provided through a larger kernel address space. This space supports larger system software applications without requiring practical bounds and kernel extension interfaces.

32-bit Kernel

The AIX 5L operating system previously contained both a uniprocessor 32-bit kernel and a 32-bit multiprocessor kernel. Effective with AIX 5L Version 5.3, the operating system supports only the multiprocessor kernel.

The AIX 5L Version 5.3 32-bit multiprocessor kernel supports the following systems: RS/6000, eServer pSeries, or OEM hardware based on the Common Hardware Reference Platform (CHRP) architecture, regardless of the number of processors. The maximum real memory supported by a 32-bit kernel system (or partition) is 96 GB.

AIX 5L Version 5.2 is the last release of AIX that supports the uniprocessor 32-bit kernel.

Long User Names, Group Names, and Path Names

User names, group names, and path names longer than eight characters are supported. Long name-enabled systems have interactive limitations with non-enabled systems.

The System Resource Controller (SRC Master) does not support the long user name, group name, and path name format in the following cases:

Client Application	SRC Master	Subsystem or Daemon
53	pre53	53
53	pre53	pre53
pre53	pre53	53

Notes:

1. The 53 notation is respective source code compiled with the AIX 5.3 OS environment.
2. The pre53 notation is respective source code compiled with the pre-AIX 5.3 OS environment.

Any application calling **addssys()**, **chssys()**, **defssys()**, **getsubsvr()**, or **getssys()** should be recompiled with AIX 5.3 if it is to run on AIX 5.3.

System Support

For information about supported and unsupported items, see Appendix A, “AIX 5L Version 5.3 Unsupported Items,” on page 39.

Base Functionality

The AIX 5L Version 5.3 kernels provide the same functionality, regardless of which kernel is being used. The 32-bit and 64-bit kernel systems have common base libraries, commands, utilities, and header files.

Differences between 32-bit and 64-bit kernel systems are limited to the following:

- **System and I/O Support.** The 64-bit kernel limits support to 64-bit POWER-based systems, while the 32-bit kernel supports both 32-bit and 64-bit POWER-based systems. In addition, the 64-bit kernel does not support all I/O that is supported by the 32-bit kernel.
- **Application Support.** The 64-bit kernel supports both 32-bit and 64-bit applications. Application source and binaries are portable between AIX 5L Version 5.3 64-bit and 32-bit kernel systems, in the absence of any application dependencies on internal kernel details or on kernel extensions that are not supported under the 64-bit kernel but are supported under the 32-bit kernel.
 - **Binary Compatibility.** Binary compatibility is provided for 32-bit applications running on earlier versions of AIX on POWER-based systems, except for applications linked statically or applications dependent on undocumented or unsupported interfaces. In addition, some system file formats have changed, and 32-bit applications processing these files might need to be recompiled.
 - **Application Scalability.** AIX 5L Version 5.3 provides a more scalable application binary interface (ABI) for 64-bit applications. To take advantage of the scalability improvements to 64-bit programs, all 64-bit applications and libraries must be recompiled on AIX 5L Version 5.3. In addition, existing 32-bit kernel extensions and device drivers used by 64-bit applications might have to be modified in order to support the new 64-bit ABI.
- **Kernel Extensions.** Kernel extensions for the 64-bit kernel run in 64-bit mode and have the scalability of the larger kernel address space. Some kernel services available in the 32-bit kernel are no longer provided by the 64-bit kernel, so existing 32-bit kernel extensions may have to be ported in order to be used with the 64-bit kernel.

Existing 32-bit kernel extensions continue to be supported by the 32-bit kernel, but these kernel extensions are not usable by the 64-bit kernel. Not all of the kernel extensions supported for the 32-bit kernel are supported for the 64-bit kernel, particularly the device drivers for the I/O.

- **Dual-mode Kernel Extensions.** AIX 5L Version 5.3 supports dual-mode kernel extensions, which can be loaded by a common configuration method, regardless of which kernel is being used. A dual-mode kernel extension is an archive file that contains both the 64-bit and 32-bit versions of the kernel extension as members.
- **Installation and Enablement.** The 32-bit and 64-bit kernels are provided as part of the AIX 5L Version 5.3 base media and are installed on all supported hardware systems. By default, the 32-bit kernel is enabled during base system installation. However, you can override this at installation time to enable the 64-bit kernel through the system installation panels.

You can switch between the 32-bit and 64-bit kernels without reinstalling the operating system.

1. Modify the `/usr/lib/boot/unix` directory and the `/unix` directory to be a symbolic link to the binary for the desired kernel.
2. Run the `bosboot` command to write a new system boot image.
3. Reboot the system.

The path name of the 64-bit kernel is `/usr/lib/boot/unix_64`, and the path name of the multiprocessor versions of the 32-bit kernel is `/usr/lib/boot/unix_mp`.

Data Management Application Programming Interface (DMAPI)

AIX 5.3 provides a Data Management Application Programming Interface (DMAPI), an implementation of the X/Open standard, *System Management: Data Storage Management (XDSM) API* published by The Open Group. The DMAPI allows software vendors to develop data management applications using a set of functions and semantics not found in POSIX-compliant systems. It does not provide direct functionality to the end user. Complete documentation of the DMAPI can be found in the Publications section of The Open Group's Web site, available at <http://opengroup.org>.

The DMAPI is implemented in an abstract layer within AIX, allowing any underlying file system to define its individual level of support and implementation options. The JFS file system does not provide any support for the DMAPI. The JFS2 behaviors for implementation options, limits, and other specifics described by the X/Open standard are outlined in the following paragraphs.

The `dm_init_service` subroutine returns 0 when the AIX DMAPI is properly initialized. It returns -1 if the initialization fails. Use of any other DMAPI subroutine after initialization fails will also fail.

The `dm_get_config` subroutine returns the following values for the JFS2 implementation options and limits:

<code>DM_CONFIG_BULKALL</code>	supported
<code>DM_CONFIG_LEGACY</code>	supported
<code>DM_CONFIG_PERS_ATTRIBUTES</code>	supported
<code>DM_CONFIG_PERS_EVENTS</code>	supported
<code>DM_CONFIG_PERS_INHERIT_ATTRIBS</code>	supported
<code>DM_CONFIG_PERS_MANAGED_REGIONS</code>	supported
<code>DM_CONFIG_PUNCH_HOLE</code>	supported
<code>DM_CONFIG_WILL_RETRY</code>	supported
<code>DM_CONFIG_CREATE_BY_HANDLE</code>	not supported
<code>DM_CONFIG_LOCK_UPGRADE</code>	not supported
<code>DM_CONFIG_OBJ_REF</code>	not supported
<code>DM_CONFIG_PENDING</code>	not supported
<code>DM_CONFIG_DTIME_OVERLOAD</code>	TRUE
<code>DM_CONFIG_MAX_ATTR_ON_DESTROY</code>	128
<code>DM_CONFIG_MAX_ATTRIBUTE_SIZE</code>	4072

DM_CONFIG_MAX_HANDLE_SIZE	32
DM_CONFIG_MAX_MANAGED_REGIONS	167
DM_CONFIG_MAX_MESSAGE_DATA	65536
DM_CONFIG_TOTAL_ATTRIBUTE_SPACE	4072

For AIX, the **DM_SESSION_INFO_LEN** limit is 256, and the **DM_ATTR_NAME_SIZE** limit is 8.

All DM attribute values share the same allocation. Consequently, the size of any one attribute's value cannot exceed the value of **DM_CONFIG_MAX_ATTRIBUTE_SIZE**, and is further restricted by the sum of the value sizes of all DM attributes associated with an object, which is also limited to the value of **DM_CONFIG_MAX_ATTRIBUTE_SIZE**.

AIX DMAPI does not provide support for the **dm_downgrade_right**, the **dm_upgrade_right**, the **dm_obj_ref_*** family, or the **dm_pending** optional DMAPI subroutines. The JFS2 implementation does not support the optional cancel and debut DMAPI events or the optional **dm_getall_dmattr**, **dm_create_by_handle**, and **dm_symlink_by_handle** subroutines.

When a data management (DM) application specifies that it wants to block until a right becomes available, the DM application is blocked and can not be interrupted.

AIX allows multiple, non-overlapping persistent managed regions. For JFS2, only regular files are allowed to have managed regions. Due to the current implementation of the JFS2 extended attribute support, the **dm_set_region** subroutine causes the file's *ctime* to be modified. JFS2 does not attempt to reorder nor coalesce managed regions.

When no session has registered to receive a particular event for which an object is enabled, and activity occurs which would otherwise trigger the event, AIX does not generate the event, and allows the process to proceed as if there is no event enabled.

Calling the **dm_set_eventlist** subroutine causes a persistent event list to be stored with the object. If an event list was previously set for the entire file system, and a subsequent event list for an object in that file system includes an event that was set for the file system, events will continue to be generated based on the event list for the file system until that event is disabled, in which case the event list for the object will be used.

When a process generating an event is blocked while waiting for a response from a DM application, the sleep mode can be interrupted.

AIX has a reliable model of asynchronous message delivery. The number of asynchronous messages that are not delivered is limited by the amount of available memory, real or virtual, configured on the system. If the number of messages exceeds the amount of available memory, asynchronous messages that are not delivered will be lost. JFS2 generates asynchronous namespace event messages for all corresponding operations whether they succeed or fail.

JFS2 provides interfaces that allow preallocation and direct control of metadata within a file system. Use of these interfaces with either the **MM_ALLOC** or **MM_RECORD** modes generates a DMAPI write event for the specified offset and length.

If a value is not specified for the mask to the **dm_get_bulkall**, **dm_get_bulkattr**, **dm_get_dirattrs**, and **dm_get_fileattr** subroutines (for example, it is set to zero), JFS2 will return all fields in the **dm_stat** structure.

JFS2 does not use the *respbufp* parameter of the **dm_respond_event** subroutine. If specified, the content of the buffer is undefined when the functions return.

Because JFS2 overloads the `dm_ctime` and `dm_dtime` parameters (the `DM_CONFIG_DTIME_OVERLOAD` option is set to true), the `setdtime` parameter of the `dm_set_dmattr` subroutine is ignored.

At the time a file is memory-mapped (for example, when the `mmap(2)` call runs), any nonresident portions of a file must be made resident by the DM application. To notify the application of the mapping, JFS2 will generate a read event or a write event corresponding to the mode and region being mapped.

New Memory Allocation Algorithm `MALLOCTYPE=watson`

AIX 5.3 introduces a new memory allocation algorithm, `MALLOCTYPE=watson`. The Watson `malloc()` setting can provide improvement over the default `malloc` in areas of memory fragmentation and performance in massively multithreaded applications, particularly with respect to small requests. New features have been added to the `malloc` debugging facility to aid in the diagnosis of memory allocation problems, and `malloc` debugging capabilities have been integrated into the `dbx` symbolic debugger.

For more information about the `malloc` debugging facility, see "System Memory Allocation Using the `malloc` Subsystem" in *AIX 5L Version 5.3 General Programming Concepts: Writing and Debugging Programs*.

Known Problems with the `ksh` and `ksh93` Commands

With the `ksh` command, when multiple shells have the `noclobber` option set and they redirect output to the same file, there could be a race condition that can result in multiple shell processes writing to the file. The shell does not detect or prevent such race conditions.

During login shell startup, the following files are processed in the order specified:

1. `/etc/environment`
2. `/etc/profile`
3. `.profile`
4. `.env`

New `-I` Flag for `cp` and `mv` Commands

A new `-I` flag is available for the `cp` and `mv` commands. The `-I` flag suppresses the warning message during ACL conversion. When ACL conversion succeeds with the `cp -p` or `mv` commands, a warning message is printed out to `stderr`. You can use the `-I` flag to suppress this warning message.

`cp` Command Syntax

The `cp` command syntax is as follows:

- To copy a file to another file, type the following:

```
cp [ -E{force|ignore|warn} ] [ -f ] [ -h ] [ -i ] [ -p ] [ -I ] [ -U ] [ - ] SourceFile TargetFile
```

- To copy a file to a directory, type the following:

```
cp [ -E{force|ignore|warn} ] [ -f ] [ -h ] [ -i ] [ -p ] [[ -r | -R ]  
[ -H | -L | -P ]] [ -I ] [ -U ] [ - ] SourceFile ... TargetDirectory
```

- To copy a directory to a directory, type the following:

```
cp [ -E{force|ignore|warn} ] [ -f ] [ -h ] [ -i ] [ -p ] { -r | -R }  
[ -H | -L | -P ] [ -I ] [ -U ] [ - ] SourceDirectory ... TargetDirectory
```

`mv` Command Syntax

The `mv` command syntax is as follows:

- To move files to a directory, maintaining the original file names, type the following:

```
mv [ -E{force|ignore|warn} ] [ -i | -f ] [ -I ] SourceFile TargetFile
```

- To move and rename a file or directory, type the following:

```
mv -E{force|ignore|warn} [ -i | -f ] [ -I ] SourceFile ... TargetDirectory
```

Perl

Note: IBM continues to ship Perl, but does not support it.

The following Perl filesets are included with AIX pursuant to the terms of the artistic license:

- **perl.rte** 5.8.2 (version 5.8)
- **perl.man.en_US**

For more information, run the **perl -v** command. To view the artistic license, see the following Web site:

<http://www.opensource.org/licenses/artistic-license.html>

The **perl.rte** fileset is automatically installed.

For more information about Perl, see the following Web site:

<http://www.perl.org>

The new Perl man pages are now located in the **/usr/opt/perl5/man** directory and the **/usr/opt/perl5/man64** directory.

AIX 5L Version 5.3 introduces Perl 5.8.2. If you have a Perl external subroutine compiled on earlier versions of Perl, the external subroutine may need to be recompiled with threading enabled on Perl 5.8.2.

C99 Language Interfaces

AIX 5L Version 5.3 system libraries and headers include interfaces required by the ISO/IEC 9899:1999(E) (C99) language standard and the Single UNIX Specification, Version 3. Some of the interfaces may have the same names as symbols in existing programs. The interfaces may be hidden by specifying the **-D_NOISO99_SOURCE** when you are compiling.

Most of the new C99 language interfaces are unavailable when compiling to use the 128-bit long double floating point format rather than the default 64-bit long double format.

Domain errors generally do not occur for math routine error conditions.

IBM 32-bit SDK for AIX, Java 2 Technology Edition, Version 1.4

IBM 32-bit SDK for AIX, Java 2 Technology Edition, Version 1.4 is released in **Java14.*** filesets. For more information, see the **/usr/java14/docs/sdkguide.aix32.htm** file.

IBM 32-bit SDK for AIX, Java 2 Technology Edition, Version 1.4 is included with the AIX base operating system. The 64-bit version is available on both the AIX 5L Version 5.3 Expansion Pack and the AIX Java Web site at <http://www.ibm.com/developerworks/java/jdk/aix>.

You can dynamically reconfigure a logical partition (LPAR) running a Java 1.4 application.

Note: Decreasing the number of CPUs or real memory allocated to an LPAR will likely degrade the performance of a Java application, but the application should continue to run.

IBM AIX Developer Kit, Java 2 Technology Edition, Version 1.3.1, 32-bit version for POWER and IBM AIX Developer Kit, Java 2 Technology Edition, Version 1.3.1, 64-bit version for POWER are both supported on AIX 5L Version 5.3. You can download these products from the AIX Java Web site. Install all of the Java service refreshes. To see if a more recent refresh is available:

1. Go to the developerWorks Web site at <http://www.ibm.com/developerworks/java/jdk/aix>.
2. Select the **Download and service information** link.
3. Select the **Fix Info** link from the **Java 1.3.1 32-bit** column or the **Java 1.3.1 64-bit** column.

As with Java 1.4, you can dynamically reconfigure an LPAR running Java 1.3.1.

AIX 5.3 supports long user names and long group names (up to 256 characters, including the terminating NULL). The IBM SDK Version 1.4 supports user names of up to eight characters only. If you try to run the JVM or the **appletviewer** command with a user name that is longer than eight characters, it will fail. Before running the **java** or **appletviewer** commands, ensure that you are logged in with a user name that is no longer than eight characters.

The IBM SDK Version 1.3.1 supports user names of up to eight characters only. Before running the **java** or **appletviewer** commands, ensure that you are logged in with a user name that is no longer than eight characters.

AIX Web Browser Transition to Mozilla

AIX 5L Version 5.3 introduces support for the Mozilla 1.4.2 Web browser as the default browser for AIX. Netscape Communicator Version 4 is not supported on AIX 5.3.

The Mozilla Web browser for AIX is available on a CD that can be ordered with AIX, or it can be downloaded from the following Web site:

<http://www.ibm.com/servers/aix/browsers>

Mozilla for AIX requires GNOME libraries, which are available on the *AIX Toolbox for Linux Applications* CD or from the following Web site:

<http://www.ibm.com/servers/aix/products/aixos/linux>

Installing Mozilla for AIX

Mozilla for AIX can be installed as an option during the AIX Base Operating System installation process, or it can be installed later. All listed installation methods use the Mozilla installation bundle, which includes Mozilla and the required GNOME libraries.

The Mozilla installation process fails if the required GNOME libraries are not found. The required rpm filesets are listed.

Use one of the following installation methods:

- Install Mozilla using the following AIX BOS installation process:
 1. You can select Mozilla for installation during the AIX Base Operating System installation process by selecting these options in the following order:
 - a. 2 = Change/Show Installation Settings and Install
 - b. 3 = More Options
 - c. 6 = Install More Software
 - d. 1 = Mozilla (Mozilla CD)

The default setting is to not install Mozilla.

2. When prompted to do so, insert the *Mozilla* CD and the *AIX Toolbox for Linux Applications* CD.
- Install Mozilla as a bundle using the following Configuration Assistant process:
 1. Start **configassist**.
 2. Select **Manage software**, and click **Next**.
 3. Select **Install additional software**, and click **Next**.
 4. Select **Install by bundle**, and click **Next**.
 5. Specify the device or directory that contains the installation images, and click **Next**. If the location is a directory, such as **/usr/sys/inst.images**, verify the following:
 - The **Mozilla.base** installp package is in the **/usr/sys/inst.images/installp/ppc** directory
 - The toolbox rpm filesets are in the **/usr/sys/inst.images/RPMS/ppc** directory

6. Select the Mozilla bundle, and click **Next**.
 7. Accept the license agreement, and click **Next** to start the installation process.
- Install Mozilla as a bundle using the following **smit** or **smitty** process:
 1. Run the **smitty install_bundle** or **smit install_bundle** command.
 2. Specify the **INPUT device/directory** for software. If the location is a directory, such as **/usr/sys/inst.images**, verify the following:
 - The **Mozilla.base** installp package is located in the **/usr/sys/inst.images/installp/ppc** directory
 - The toolbox rpm filesets are located in the **/usr/sys/inst.images/RPMS/ppc** directory
 3. Select the **Fileset Bundle = Mozilla**.
 4. In the Install Software Bundle screen, accept the license agreement, and press Enter to start the installation process.

Configuring Mozilla as the Browser for AIX Documentation Services

Mozilla can be configured as the default browser that is used to view the AIX Documentation using Configuration Assistant or **smit**.

- Configure Mozilla using the following Configuration Assistant process:
 1. Start **configassist**.
 2. Select the Configure documentation server task.
 3. If Mozilla is detected as already installed, select **Yes, use Mozilla as the default browser**, and click **Next**.
- Configure Mozilla using the following **smit** or **smitty** process:
 1. Run the **smit change_documentation_services** command or the **smitty change_documentation_services** command.
 2. Verify that the **/usr/bin/mozilla** directory is the DEFAULT_BROWSER.

Migrating an Existing Netscape Communicator Version 4 Profile

If a Netscape Communicator Version 4 profile exists in your home directory and Mozilla is run for the first time, Mozilla prompts whether or not it should convert the Communicator profile, including the bookmarks to be used within Mozilla.

For more information about Mozilla for AIX, see the **file:///usr/mozilla/base/README.HTML** file after Mozilla is installed.

License Use Management (LUM) Commands

Location Change for the LUM Commands

The location of the **i4blt**, **i4cfg**, **i4target**, and **i4tv** License Use Management commands has changed from the **/var/ifor** directory to the **/usr/opt/ifor/ls/os/aix/bin** directory.

Note: To configure LUM, use the **i4cfg -script** command.

The **/usr/lib/netls/conf** directory does not exist on AIX 5L Version 5.3. The only valid directory for the nodelock file is the **/var/ifor** directory.

Change for the LUM Graphical User Interface (GUI)

AIX 5L Version 5.3 includes a new Java-based GUI. If you are migrating from AIX Version 4 to AIX 5L Version 5.3, you must install the **ifor_ls.java.gui** fileset to use the new LUM GUI.

Communications, Networking, and I/O

Multiple IDE Controllers Not Supported on Same Partition

Multiple IDE Controllers are not currently supported on the same partition.

Enhanced Error Handling (EEH)

EEH is an I/O error detection, reporting, and recovery mechanism to increase system availability from such errors. In the current implementation, the EEH mechanism can recover I/O errors on the PCI bus for most devices. Information about the faulty component and nature of the error (recoverable versus permanent) is logged in the AIX error log.

For EEH to work, your system must have:

- AIX kernel support.
- AIX device driver support (dds). Most dds has full EEH recovery (with a few exceptions).
- EEH-capable hardware.
- Appropriate system firmware levels.

Certain hardware and firmware requirements must be met for EEH to work on a given system. Refer to your system guides to determine if EEH will work on your system.

Supported Devices

Device Driver support for EEH is limited to the following devices that are supported by AIX 5L Version 5.3:

- Storage Adapters:
 - Fibre Channel (6227)
 - Fibre Channel (6228)
 - Fibre Channel (6239)
 - PCI SCSI RAID Devices
 - PCI Ultra SCSI Devices
 - PCI Dual Channel Ultra3 SCSI Adapter (FC 6203)
 - PCI Dual Channel Ultra2 SCSI Adapter (FC 6205)
 - PCI-X Dual Channel Ultra320 SCSI RAID Adapter (5703, 5711)
 - PCI-X Dual Channel Ultra320 SCSI Adapter (5712, 5710)
- Communications and connectivity (PCI bus type):
 - Token-Ring PCI 4/16 Adapter (FC 2920 and 4959)
 - IBM Ethernet 10/100 Mbps (FC 2968)
 - 10/100 Mbps Ethernet PCI Adapter II (FC 4962)
 - IBM 4-Port 10/100 Base-TX Ethernet PCI Adapter (FC 4961)
 - 10/100/1000 Base-T Ethernet PCI Adapter (FC 2975)
 - Gigabit Ethernet (FC 2969)
 - TURBOWAYS 622 Mbps PCI MMF ATM Adapter (FC 2946)
 - 2-Port Multiprotocol PCI Adapter (FC 2962)
 - 8-Port and 128-Port 232/422 Async PCI Adapters (FC 2943 and 2944)
 - IBM 64-bit/66 MHz PCI ATM 155 adapter (FC 4953 and 4957)
 - IBM Gigabit Ethernet-SX PCI-X Adapter (FC 5700)
 - IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5701)
 - IBM 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5706)
 - IBM 2-Port Gigabit Ethernet-SX PCI-X Adapter (FC 5707)

- IBM ARTIC960HX 4-PORT PCI ADAPTER (FC 2947)
- IBM ARTIC960RXD QUAD DIGITAL TRUNK ADAPTER (FC 6310)
- Encryption Adapters:
 - IBM PCI Cryptographic Coprocessor (FC 4958 and 4963) *
 - IBM eBusiness Cryptographic Accelerator (FC 4960) *
- Graphics and Miscellaneous
 - GXT135P Graphics Adapter (FC 2848 and 2849) *
 - USB Open Host Controller (FC 2737 and 2738) *
 - GXT4500P (FC 2842)*
 - GXT6500P (FC 2843)*

Note: The devices above that are denoted with an asterisk (*) require the user to intervene and manually recover the device after a bus error is encountered (for example, through device reconfiguration). Also, you may need to reboot Graphics and USB devices because those devices may not completely recover. If the device encounters an error during the configuration process, the device will be left in the defined state until there is a subsequent configuration attempt.

IP Security

AIX IP Security works on IP addresses that have run through Network Address Translation (NAT) devices. The software changes adhere to the following IETF drafts:

- **draft-ietf-ipsec-nat-t-ike-07.txt**
- **draft-ietf-ipsec-udp-encaps-08.txt**

Path MTU (PMTU) Discovery

Path Maximum Transmission Unit (PMTU)-related information is now stored separately from the routing table, in a table called the PMTU table. Routes are no longer cloned for IPv4, and the **netstat -rn** command no longer displays PMTU values. A new **pmtu** command is provided to view the PMTU table. This command is used to display IPv4 and IPv6 entries and can also be used to delete a PMTU entry. A PMTU entry is added when the **route add** command runs with the **mtu** value specified. When a route is deleted, all PMTU entries using that route are also deleted. A **pmtu_expire** network option is provided to expire unused PMTU entries. The default value is 10 minutes.

User Datagram Protocol (UDP) applications using PMTU discovery must always specify the **IP_DONTFRAG** socket option, along with the **IP_FINDPMTU** socket option.

AF_INET6 Sockets

Beginning with AIX 5.3, the behavior of **AF_INET6** sockets for protocol **IPPROTO_RAW** has changed to comply with RFC3542.

When an application performs a `receive` on this type of socket, it will receive *only* payload data from the packet. In earlier versions of AIX, when an application performed a `receive` on an **AF_INET6 IPPROTO_RAW** socket, it received the IPv6 header, followed by the payload data.

To preserve the former behavior (to continue receiving the IPv6 header followed by payload data), applications must now have their code modified to set the new **IPV6_AIXRAW_SOCKET** socket option on any **AF_INET6 IPPROTO_RAW** sockets and recompile.

Removal of Support for Devices

The following devices are not supported on AIX 5.3:

- **PCI FDDI I/O** (FC 2741, FC 2742, and FC 2743) is not supported on AIX 5.3.

- **devices.pci.b7105090**. The Ethernet adapter that is supported by the **devices.pci.b7105090** fileset in AIX versions *prior* to AIX 5L Version 5.1 is *not* supported in AIX 5L Version 5.3. After a migration to AIX 5L Version 5.3, or when AIX 5L Version 5.3 is installed and this Ethernet adapter is in the machine, the following messages may display on the console or be written to log files:

```
Method error (/usr/lib/methods/cfgv3boom -l ent1 ):
    0514-068 Cause not known.
```

```
cfgmgr: 0514-621 WARNING: The following device packages are required for
device support but are not currently installed.
```

```
devices.pci.b7105090 Not found on the installation media.
```

Remove the unsupported Ethernet adapter from the machine. This adapter will not be configured by AIX 5L Version 5.3.

The **devices.artic960.5.3** fileset

The **devices.artic960.5.3** fileset provides support for the following IBM ARTIC960 adapters:

- IBM ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947)
- IBM ARTIC960RxD Quad Digital Trunk Adapter (FC 6310)

This includes EEH support and 64-bit support for FC 2947 and FC 6310 adapters. If an additional fileset is installed to access a particular IBM ARTIC960 adapter, full EEH and 64-bit support depends on the ability of the additional fileset to support EEH and 64-bit.

Included with the **devices.artic960.5.3** fileset are the following filesets:

- **devices.artic960.rte**, IBM ARTIC960 Runtime Support
- **devices.artic960.ucode**, IBM ARTIC960 Adapter Software
- **devices.artic960.diag**, IBM ARTIC960 Adapter Diagnostics

When a PCI I/O error occurs on an IBM PCI ARTIC960 adapter, the adapter slot becomes frozen and the IBM ARTIC960 adapter can be reset. Following an EEH error, the adapter software needs to be downloaded to the adapter again.

To determine if an EEH error occurred on an IBM ARTIC960 adapter, inspection of the error log is necessary. A temporary EEH error on an IBM ARTIC960 adapter is logged as a temporary EEH error followed by I/O errors specific to the IBM ARTIC960 adapter. Recovery from a temporary EEH error is accomplished by removing and making the IBM ARTIC960 device driver using the **rmdev** and **mkdev** command. This process will load the necessary adapter software onto the adapter.

If the error log shows a permanent EEH error, it is necessary to use the hot plug manager to remove and make the adapter again.

The **devices.pci.14108c00** Fileset

The **devices.pci.14108c00** fileset provides support for SDLC and bi-synchronous protocols on the IBM ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947). When combined with the installation of the **devices.artic960.5.3** fileset, Enhanced Error Handling (EEH) support is provided. Either 32-bit or 64-bit kernel mode is supported. 32-bit applications are supported.

Missing Resource Processing

In a partitioned environment, missing resource processing (through the **diag -a** command) is not performed for processors, memory, L2 Cache, integrated devices, or pluggable adapters that have been moved to another partition. This is done to aid configuration for resources that are moved from one partition to another partition, then moved back to the original partition.

To remove a device from the configuration, log in as the root user, and type `rmdev -d1 device` at a command prompt, where *device* is the name of the device you want to remove.

For more information, view the service hints section within diagnostics when you are logged in as the root user or using the CE login. You can view the service information by doing the following:

1. At the command line, type `diag`.
2. When **Diagnostic Operating Instructions** is displayed, press Enter.
3. At the Function selection menu, select **Task Selection**.
4. At the Task Selection menu, select **Display Service Hints** and press Enter.

IBM Tivoli Directory Server, Version 5.2 (LDAP)

To access the latest IBM Tivoli Directory Server, Version 5.2.0.0 product information, go to the following Web site:

<http://www.ibm.com/software/network/help-directory/>

Installation and Configuration

For information specific to IBM Tivoli Directory Server installation and configuration, go to the following Web site:

<http://www.ibm.com/software/tivoli/products/directory-server/>

From the **IBM Tivoli Directory Server** category on this Web site, click **Technical Documentation > Version: 5.2**. Read the following documents:

- *Installation and Configuration*
- *Server Readme*
- *Client Readme*
- *Readme Addendum*

Before you run the **ldapxcfg** command, verify that the following links exist by typing the following commands:

```
/usr/ldap/db2 -> /usr/opt/db2_08_01  
/usr/ldap/lib/libdb2.a -> /usr/opt/db2_08_01/lib/libdb2.a
```

If these links are not present, create these links by typing the following commands:

```
ln -s -f /usr/opt/db2_08_01/lib/libdb2.a /usr/ldap/lib/libdb2.a  
ln -s -f /usr/opt/db2_08_01 /usr/ldap/db2
```

The Web Administration Tool is supported on AIX 4.3.3, 5.1, and 5.2. You can install the Web Administration Tool on a system with or without the client or server.

If you are using DB2 8.1, you must enable asynchronous I/O before you begin the configuration. To enable asynchronous I/O, type the following command at the command prompt:

```
smitty aio
```

There is a size underestimation with **ldap.server.com**. This can cause the installation to fail if not enough disk space is allocated.

Administration

After you install the **ldap.client** package, create the following link by typing the following:

```
ln -s -f /usr/ldap/lib/aix5/libldapiconv64.a /usr/lib/libldapiconv64.a
```

IBM Directory with Ja_JP Locale

In the Japanese environment, it is strongly recommended that you use IBM Directory in the Ja_JP locale. In other Japanese locales, the Server Administration GUI does not work properly.

Dynamic Tracking and Fast I/O Failure of Fibre Channel Devices

AIX supports Dynamic Tracking and Fast I/O Failure of Fibre Channel Devices.

Dynamic Tracking allows the user to perform certain prescribed storage area network (SAN) changes that result in N_Port ID changes (such as cable movement at the switch ports or the creating of inter-switch links) without taking devices offline.

Fast Fail causes I/Os down a particular link to fail faster due to lost links between the switch and the storage device. This may be useful in a multipath environment where you want I/Os to fail over to another path relatively quickly.

Independent Software Vendors (ISVs) developing kernel extensions and/or applications that communicate with the AIX Fibre Channel Driver stack should refer to the "Fibre Channel Protocol for SCSI and iSCSI Subsystem" article in *AIX 5L Version 5.3 Kernel Extensions and Device Support Programming Concepts* for changes necessary to support Dynamic Tracking.

Note: Pay special attention to the *Required FCP and iSCSI Adapter Device Driver ioctl Commands* and *Understanding the scsi_buf Structure* sections.

Internet Protocol (IP) over Fibre Channel

This information supplements the "Internet Protocol (IP) over Fibre Channel" section in the *AIX 5L Version 5.3 System Management Guide: Communications and Networks*.

To set up the Fibre Channel networking capability between AIX and Thomson Grass Valley™ Media Servers (such as Profile PVS 1000), note that feature 6228 (IBM 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus) is currently the only Fibre Channel adapter supported for this configuration. In addition, the following steps are recommended to establish the communication between the two host systems:

1. Disable FARP (Fibre Channel Address Resolution Protocol) on AIX. For example, if the IP over Fibre Channel protocol driver instance is `fcnet0`, type the following command:

```
chdev -l fcnet0 -a enable_farp=no
```
2. If the Profile Media Server is set up to disable "checksum and re-transmit on error" (this is the default option), type the following command on the AIX command line, assuming `fc0` is the interface for this purpose:

```
ifconfig fc0 tcp_disable_cksum
```

You can also use the AIX `ifconfig fc0` command to verify whether TCP checksum is disabled. To re-enable the TCP checksum on the IP over Fibre Channel interface, type the following command:

```
ifconfig fc0 -tcp_disable_cksum
```

3. It is recommended that initial communication always be established from AIX with the **ping** command. Initiating the exchange (pinging) from the Profile Media Server, prior to any exchange over Fibre Channel from the AIX side, might result in a prolonged delay in the establishment of communication between the two systems.

IBM is working to resolve these limitations.

AIX iSCSI Software Initiator

Beginning with AIX 5L with 5200-03, the iSCSI protocol driver is included as part of AIX Base Operating System. The iSCSI protocol allows the access of storage devices over gigabit Ethernet TCP/IP networks. The iSCSI support is in the filesets **devices.iscsi_sw.rte**, **devices.iscsi.disk.rte**, and **devices.common.IBM.iscsi.rte**. These filesets supersede the **iscsi_sw.rte** fileset that was previously included in the AIX Bonus Pack.

To use the iSCSI protocol driver, add the names of the iSCSI targets being accessed to the **/etc/iscsi/targets** file. For more information about configuring iSCSI, see the "iSCSI Software Initiator" section in the *AIX 5L Version 5.3 System Management Guide: Communications and Networks*. For more information about the **/etc/iscsi/targets** file, see the *AIX 5L Version 5.3 Files Reference*.

The AIX iSCSI protocol driver supports the 1-port and 2-port gigabit Ethernet adapters with optical or copper connections (FC 5700, FC 5701, FC 5706, and FC 5707). The iSCSI protocol driver is verified to work with the Cisco MDS 9000 IPS module as the iSCSI target, attaching to the IBM TotalStorage ESS F20 and IBM TotalStorage ESS 800 storage devices.

The current iSCSI protocol driver implements the draft-20 version of the IETF iSCSI standard, with the following limitations:

- During installation, the iSCSI driver creates a default initiator name. However, this generated iSCSI name might not comply with the format specified by the iSCSI String Profile document. You can use the iSCSI SMIT panels (under **smit iscsi**) to change the initiator name to comply with the standard or to match local iSCSI name conventions.
- The iSCSI protocol driver can connect to a maximum of 16 unique targets at one time. If fewer targets are in use, you can change the **Maximum Targets Allowed** field in the SMIT panel to reduce memory usage by the iSCSI driver.
- This implementation of iSCSI supports only one TCP/IP connection per iSCSI session.
- This implementation of iSCSI does not support redirection of iSCSI logins. Any received login response with a status class code of 01 is equivalent to a login failure.

Configurable IP Multipath Routing

The Configurable IP Multipath Routing Feature provides functionality and flexibility when you are using the IP Multipath Routing (MPR). With MPR, you can configure multiple routes to a single destination (network or host routes), as long as the gateways are different. MPR provides a degree of fault tolerance and helps in load balancing across multiple paths.

Currently, you can configure multiple default routes through different gateways. When multiple routes are configured to the same destination network or host, these routes are used in a round-robin fashion.

MPR incorporates new policies into the route selection process in addition to the default round-robin policy (a special case of Weighted Round-Robin when the weights are 1 or not configured). With this feature, you can select and configure any of the following policies to be used with MPR:

- Weighted Round-Robin
- Random
- Weighted Random
- Lowest Utilization
- Hash-Based

Each of these policies works as follows:

Weighted Round-Robin (WRR)

You can configure the multiple routes to a destination network to have different weights. These weights will determine the manner in which these routes are used. For example, if you configure three routes of a multipath routing set (it is implied that all three routes have the same destination network or host but go through different gateways) to have weights of 3, 5, and 2 respectively, and then configure the policy to be WRR, then the first route will be used three times (three different connections) before moving on to using the second route, which will be used five times, and then the third route, which will be used twice. Then it uses the first route in the same manner as before. Therefore, the round-robin now uses the weights to perform Weighted Round-Robin selection. If the weights are not configured (default is 1), then regular round-robin is used.

Random (RND)

As the name suggests, a route is chosen at random from the multipath routing set.

Weighted Random (WRND)

With this policy, the configured weights of all routes are added, and a random number between 0 and the total weight is chosen. This random number is scaled down to a number between 0 and the number of routes in the MPR set, and chooses the route that corresponds to this scaled-down value.

Lowest Utilization (LUT)

With this policy, a route with the lowest reference count in the MPR set is chosen. The reference count is an indicator of the number of active connections using this route and therefore is used as an indicator of the use of these routes.

Hash-Based (HSH)

With this policy, a hash calculation is performed, based on the destination IP address, and a route is selected. You should not use this policy in the following cases:

- If the routes in an MPR set are all host routes.
- If most connections from the host that is being configured are to a specific destination IP address.

In both cases above, because this policy is based on the destination IP address, the hash-algorithm always chooses the same route.

These new policies can be configured globally on a per-system basis, or on a per-MPR set basis (each MPR set comprises a set of routes to a single destination network or host). The local setting takes precedence over the global setting when it is configured.

The global configuration is provided through a new network option that can be viewed through the **no** command. The new option is called **mpr_policy**, which can be set to any value from 1 to 5, with each value corresponding to the numbers above for the policies. For more information about this option, see the **no** command documentation.

To configure the policies on a per-MPR set basis (each MPR set comprises a set of routes to a single destination network or host) the policy can either be set during route creation or by using the **route set** command after the route has been created. For more information about this command, see the **route** command documentation and the examples below.

The configuration information, such as the weight and policies currently used, can be viewed using the **netstat -Cn** command.

Examples

Example 1: Adding Multiple Routes with Different Weights: To add multiple routes with different weights, which are displayed as follows:

```
==> netstat -rn

Destination      Gateway          Flags  Refs    Use  If  PMTU Exp Groups
Route tree for Protocol Family 2 (Internet):
default          9.3.149.65      UGc    0        0  en0  -  -  =>
default          10.10.10.3      UGc    0        0  en1  -  -
```

Here are two default routes through two different gateways: 9.3.149.65 and 10.10.10.3. To configure weights and policies for these routes, as follows:

```

==> netstat -Cn
Routing tables
Destination      Gateway          Flags      Wt  Policy  If    Cost  Config_Cost

Route tree for Protocol Family 2 (Internet):
default         9.3.149.65      UGc       2   LUT    en0    0      0 =>
default         10.10.10.3      UGc       4   "-"    en1    0      0

```

Route 1 through 9.3.149.65 is configured with a weight of 2 and a policy corresponding to Lowest Utilization (4). Route 2 has a weight of 4. The policy information is per multipath routing set, not individual routes.

To add route 1 and route 2, type the following commands:

```

route add default 9.3.149.65 -weight 2 -policy 4
route add default 10.10.10.3 -weight 4

```

Example 2: Changing Weight and Policy Information for Routes: To change weight and policy information for routes already created, use the following command:

```
route set
```

To change the weight and policy information of the default routes added in Example 1, type the following commands:

```

route set default 9.3.149.65 -weight 3 -policy 2
route set default 10.10.10.3 -weight 6

```

The output is as follows:

```

==> netstat -Cn
Routing tables
Destination      Gateway          Flags      Wt  Policy  If    Cost  Config_Cost

Route tree for Protocol Family 2 (Internet):
default         9.3.149.65      UGc       3   RND    en0    0      0 =>
default         10.10.10.3      UGc       6   "-"    en1    0      0

```

System Management

Cluster Systems Management (CSM)

You can access the CSM documentation from the following Web site:

<http://www.ibm.com/servers/eserver/clusters/library>

Click the **AIX cluster software documentation** link, and then click the **Cluster Systems Management** link.

Note: Before you install CSM, you must read the *Software Planning and Installation Guide* for specific procedural steps to use when you are installing CSM. Installation of this product is not possible if you do not use the documented procedures in this book.

CSM Server requires four open-source rpm filesets that must be installed prior to installing the CSM Server software and its dependent packages, the CSM Distributed Command Execution Manager (DCEM) GUI and the CSM DCEM Web-based System Manager application. The required rpm filesets are:

- tcl
- tk
- expect

- `conserver`

As the root user, do the following to install the rpm filesets and the CSM Server:

1. Install the above rpm filesets using SMIT Install Software (type **smitty install_latest** at the AIX command line).
 - a. Press F4, and select **/dev/cd0** (CD Drive) as the **INPUT device / directory for software**.
 - b. Press F4, and select (by pressing F7 for each package) **tcl-8.3.3**, **tk-8.3.3**, **expect-5.32**, and **conserver-7.2.4** as the **SOFTWARE to install** values, or press F4 and select all the software packages you want.
 - c. To accept the software license agreements, press the Tab key to change no to yes as the **ACCEPT new license agreements** value, and then press Enter.
 - d. Press Enter again to confirm that you want to continue the installation process.
 - e. Review the installation results, and press F3 to return to the installation panel, or press F10 to return to the AIX command line.
2. Install the CSM Server and its dependent software using SMIT Install Software (type **smitty install_latest** at the AIX command line).
 - a. Press F4, and select (by pressing F7 for each package) **csm.server**, **csm.gui.dcem**, and **csm.gui.websm** as the **SOFTWARE to install** values, or press F4 and select all the software packages you want.
 - b. To accept the software license agreements, press the Tab key to change no to yes as the **ACCEPT new license agreements** value, and then press Enter.
 - c. Press Enter again to confirm that you want to continue the installation process.
 - d. Review the installation results, and press F3 to return to the installation panel, or press F10 to return to the AIX command line.

Software Requirements

The following software is required for CSM:

- CSM for AIX 5L, Version 1.4 (5765-F67)

The following APARs are required for CSM on AIX 5L Version 5.3:

- IY58080
- IY58078 (RSCT for AIX 5.3)

The following APAR is required for CSM on AIX 5L Version 5.2 nodes:

- IY58079 (RSCT for AIX 5.2)

The cluster management server must be a pSeries machine running AIX 5L Version 5.3 or AIX 5L Version 5.2 with the 5200-04 Recommended Maintenance package. Other machines within the cluster are referred to as *managed nodes* and can run AIX 5L Version 5.3, AIX 5L Version 5.2 with the 5200-04 Recommended Maintenance package and APARs as previously mentioned, or AIX 5L for POWER Version 5.1 with the 5100-07 Recommended Maintenance package. They can also be xSeries machines running CSM for Linux on e325 and xSeries Version 1.4.

Using the `mkprtdap` Command with IBM Tivoli Directory Server 5.2

For IBM Directory 5.1 and IBM Tivoli Directory Server 5.2 or later, the IBM Directory (LDAP) server must be installed and configured on the system before the `mkprtdap` command can be run to configure System V print-specific information. The `mkprtdap` command supports configuring an IBM Directory 4.1 server on the system if one has not been configured before. The initial IBM Directory configuration that is supported by the `mkprtdap` command in IBM Directory 4.1 is configuring the Administrator's DN password and the DB2 database when they have not been configured before. This functionality is not supported by the `mkprtdap` command for IBM Directory 5.1 or IBM Tivoli Directory Server 5.2 or later.

The **mkprtdap** command is supported only for IBM Directory 5.1 and IBM Tivoli Directory Server 5.2 or later on AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later, including AIX 5L Version 5.3.

Parallel Printer Cable Selection

The parallel printer cable must be changed to a cable that is IEEE1284-compliant if all of the following statements are true:

- Your system was manufactured after 1998.
- The printer is "parallel attached."
- The attached printer is not a dot-matrix printer.
- The output of the **lsdev -C -l ppa0** command contains the word IEEE1284.

If the output of the **lsdev** command contains the word Standard, or if the printer is a dot-matrix printer, an IEEE1284-compliant cable is not required.

Cables that are not IEEE1284-compliant may not correctly transmit data to high-speed printers. Loss of printer data may occur because the cables may not be capable of transmitting data at rates that are possible with newer ECP parallel ports.

Web-based System Manager

Remote Client Management

An HTTP Server must be installed and configured using one of the following configuration methods:

- Installing the IBM HTTP Server 2.0.47.1 on an AIX machine
- Installing any other HTTP Server on an AIX machine

This is necessary to support remote client management using Web-based System Manager. Proper configuration of an HTTP Server allows an AIX machine to serve the remote client download pages, Java Web Start, applet pages, and online extended helps.

When installing the IBM HTTP Server 2.0.47.1 on an AIX machine:

- Use the **wsm_remote** Software Bundle (**smitty install_bundle**) to install the IBM HTTP Server.
- Upon successful installation of the software, the bundle's post-installation processing script consolidates the steps needed to configure and initiate remote access and file serving capabilities for Web-based System Manager.
- This software installation bundle prompts you to insert the AIX Expansion Pack media to install the IBM HTTP Server.
- If you obtained the IBM HTTP Server, Version 2.0.47.1 from the following IBM HTTP Server product Web site:

<http://www.ibm.com/software/webservers/httpservers/>

then the **wsm_remote** Software Bundle allows you to install IHS from the hard disk by specifying the directory path name that contains your copy of the software installation images. To install IHS on AIX using the **wsm_remote** Software Bundle, manually complete the setup as follows:

1. The installation directory path name must be in the format `./ismp/ppc/package_name`. For example, downloaded installation images can be copied to the `/usr/sys/inst.images/ismp/ppc/IHS2` directory. In this example, the installation source name is `/usr/sys/inst.images`, and the package name is **IHS2**.
2. The response file named **silent.res** must be linked to the name **IHS2.response** for AIX to detect automatic responses during a silent installation, such as specifying the **-P ihs.installLocation=/usr/HTTPServer** preferred AIX installation location and a language other than the default en (English) language.

When installing any other HTTP Server on an AIX machine, complete the following:

1. Install the Web server.
2. Upon successful installation of the software, configure the Web server using the **smitty web_based_system_manager** SMIT fast path command.
3. Provide the required information in the panels. A configuration script runs and consolidates the steps needed to configure and initiate remote access and file-serving capabilities for Web-based System Manager.

Distributed Command Execution Manager (DCEM)

The installation of the CSM DCEM GUI (**csm.dcem.gui**) and the CSM DCEM Web-based System Manager application (**csm.dcem.websm**) packages is dependent upon the installation of the CSM Server. See “Cluster Systems Management (CSM)” on page 32 for installation instructions.

Inventory Scout, Version 2.2.0.0

Inventory Scout, Version 2.2.0.0 provides support for the new POWER5 server family. The Vital Product Data (VPD) collection and formatting has changed significantly for this family of IBM servers, using the industry standard XML to encapsulate the VPD inventory data. These changes, for the most part, should be transparent to users of the system. The IBM tools and servers that receive VPD data have been enhanced to use this new format. The new XML-formatted VPD does not support the concatenation of VPD files that the previous format permitted.

Inventory Scout has a new microcode management graphical user interface (GUI). This feature is available on your AIX system by installing the **invscout.websm** fileset, or if a Hardware Management Console (HMC) is attached, by using the microcode update function. The GUI is a Web-based System Manager plug-in that surveys the microcode levels of the system, and, on POWER4 and POWER5 systems, downloads and installs microcode. Inventory Scout continues to work with the applet, to perform surveys only, at the following Web site:

<https://techsupport.services.ibm.com/server/aix.invscoutMDS>

This release of Inventory Scout significantly changes the method used to determine the microcode levels of systems, adapters, and devices to compare it to the latest available levels. Previously, data was collected and sent to IBM to determine the state of the system.

The new microcode management feature does the following:

- Downloads a catalog of available levels to the system being examined
- Conducts a microcode survey on the system and compares it to the latest available microcode
- Allows you to download and flash to the latest microcode available for POWER4 and POWER5 systems

The new microcode survey procedure might cause some problems with customer techniques used for surveying systems and might require changes to those procedures.

The microcode management feature relies on system features that were not present in previous generations of the systems. Support for microcode on these systems is limited to survey only. For more information about microcode updates, see the following Web site:

<http://techsupport.services.ibm.com/server/mdownload>

To enable the new Inventory Scout functionality, the following filesets must be installed at the following levels or higher:

invscout.com	2.2.0.0
invscout.ldb	2.2.0.0
invscout.rte	2.2.0.0
invscout.websm	2.2.0.0

To obtain the required filesets, order APAR IY58377 from the following Web site:

<http://www.ibm.com/servers/eserver/support/pseries/aixfixes.html>

If you are using the microcode management feature tool through the HMC, your HMC should be at Release 3, Version 3.0.

The HMC code can be obtained from the following Web site:

<http://techsupport.services.ibm.com/server/hmc/>

Customers who need to survey microcode levels on systems isolated from the Internet should go to the following Web site:

<https://techsupport.services.ibm.com/server/aix.invsoutMDS>

Pay special attention to the section "Two ways to use this service." The second bullet under that section addresses this issue.

Known Problems

The following devices have limitations in the ability to update microcode with the microcode management feature:

- PCI 4-Channel Ultra3 SCSI RAID Adapter.
- CD-ROM and DVD-ROM Drives.
- RAID Devices.
- SSA devices and adapters.
- Inventory Scout does not properly handle some OEM adapters and devices. For more information, see "Obtaining the Firmware CD."

For more information about these devices, see the readme files at the following Web site:

<http://techsupport.services.ibm.com/server/mdownload>

Some adapters and devices do not support concurrent operation with microcode flashing. Such devices must be taken offline to update the microcode. This situation creates a problem when you are updating microcode for communications adapters used to communicate with the Internet to get the microcode updates or to communicate with an HMC. In this case, if the adapters are online and the update is attempted, the final step of flashing the device is not completed. You can complete the update procedure by taking the device offline and going into diagnostic service aids to download microcode to that device.

Due to the changes in how the survey works, you can no longer concatenate survey results prior to sending them to IBM.

There is a known system firmware upgrade problem with the IBM eServer pSeries 690 or the IBM eServer pSeries 670 machines that have six 7040-61D I/O drawers and three Integrated Battery Features (IBFs), or seven or more 7040-61D I/O drawers, regardless of the number of IBFs. Systems with this configuration should not use the new GUI for microcode management to update the system firmware. For additional information, refer to the 7040-681 and 7040-671 readme files which can be found at the following Web site:

<http://techsupport.services.ibm.com/server/mdownload>

Obtaining the Firmware CD: Inventory Scout firmware management has problems with proxy servers and fire walls. If you are unable to successfully conduct a firmware survey, you may have problems accessing the Internet. The alternative to access the Internet for firmware fixes is to download the *Firmware CD* from the following Web site:

<http://techsupport.services.ibm.com/server/mdownload/cdimage.html>

Tivoli Management Agent (TMA), Version 3.7.1.0

The foundation for the Tivoli Enterprise Software product suite and third-party management products is the Tivoli Management Framework. This framework provides the graphical desktop, object-oriented databases, and base services used by other management products. TMA is a less substantial version of the Tivoli Management Framework for installation on client systems.

For more information about Tivoli Systems products and services, including how to become a Tivoli Systems customer, do one of the following:

- Call 1-800-2TIVOLI to be connected to your local sales office
- Visit the Tivoli software page at the following Web site:

<http://www.ibm.com/software/tivoli/>

Other Software

This section contains information about other software. Additional information about AIX-supported products is available from the following Web site:

<http://www.ibm.com/servers/aix/products/ibmsw/list/>

Compilers

The following programs are fully supported versions:

- VisualAge C++ Professional for AIX, Version 6.0
Install Version 6.0 by using your existing Version 6.0 CD, then apply APARs IY57427, IY57430, IY57431, IY57433, and IY57434.
- C for AIX, Version 6.0
Install Version 6.0 by using your existing Version 6.0 CD, then apply APARs IY57427, IY57430, IY57431, and IY57434.
- XL Fortran for AIX, Version 8.1.1
 - Install Version 8.1.1 by using your existing Version 8.1.1 CD, then apply APARs IY57427, IY57430, IY57435, IY57436, and IY57434.
 - XL Fortran Run-Time Environment for AIX, Version 8.1.1 is a fully supported version of this product. Install Version 8.1.1 by using your existing Version 8.1.1 CD, then apply APAR IY57436.

AIXlink/X.25

AIXlink/X.25, Version 2.1

AIXlink/X.25 Version 2.1 is supported on AIX 5.3.

For more information about supported adapters and about configuration and installation, see the *AIXlink/X.25 Version 2.1 for AIX: Guide and Reference* at the following Web site:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

AIXlink/X.25, Version 1.1.5

AIXlink/X.25 Version 1.1.5 is not supported on AIX 5L Version 5.3.

AIX Fast Connect, Version 3.2

AIX Fast Connect documentation is available at the following Web site:

<http://publib.boulder.ibm.com/infocenter/pseries/index.jsp>

The latest updates of this product are described in the `/etc/cifs/README` file, which is installed with AIX Fast Connect.

Quick Start

To install AIX Fast Connect:

1. Install AIX Fast Connect from the distribution CD using the **smitty install_all** fast path.
2. Use the **smitty smb** fast path to access AIX Fast Connect SMIT menus.
3. Configure AIX Fast Connect for encrypted passwords, and add a user.
4. Access the AIX Fast Connect server from a PC client by mapping a network drive. The server name is the same as the AIX host name, and HOME share is available by default.

Communications Server

If you are using Communications Server for Systems Network Architecture (CS/AIX or SNA) support, use the following level:

- Communications Server for AIX, Version 6.1 (6.1.0.5 or later)

Communications Server for AIX, Version 6.1 (the **sna** package) requires PTF level 6.1.0.5 to install on AIX 5.3. See the Communications Server Support Web site to find the PTF 6.1.0.5 readme file for installing CS/AIX:

<http://www.ibm.com/software/network/commsserver/aix/support/>

You can download the PTF level 6.1.0.5 installable image from the Communications Server Service Update Web site using the Service Key provided with the product.

Note: The AnyNet functions of CS/AIX are not supported on the 64-bit kernel.

DCE for AIX

DFS/DCE is not currently supported on AIX 5.3.

Enterprise Identity Mapping (EIM)

AIX 5.3 supports Enterprise Identity Mapping (EIM), which may be used to manage user identities across multiple systems. In some cases, EIM requires installation of Kerberos modules from the AIX 5.3 Expansion Pack. It is recommended that Kerberos be installed from the AIX 5L Version 5.3 Expansion Pack before using EIM.

Appendix A. AIX 5L Version 5.3 Unsupported Items

AIX 5L Version 5.3 Unsupported Devices and Machines

The following devices and machines are not supported:

- RS/6000 or OEM hardware based on the MCA bus
- Scalable Parallel (SP™) nodes based on the MCA bus
- RS/6000, Power Personal Systems, or OEM hardware based on the PReP architecture
- POWER1, POWER2™, POWER Single Chip (RSC), POWER2 Single Chip (P2RSC), and 601 and 603 processors
- PCMCIA device support
- PCI adapters:
 - 2408 F/W SCSI SE, PCI/SHORT/32BIT/5V
 - 2409 F/W SCSI DIFF, EXT ONLY, PCI/SHORT/32BIT/5V
 - 2638 VIDEO CAPTURE(NTSC/PAL/SECAM), PCI/LONG/32BIT/5V
 - 2648 (GXT150P) PCI/SHORT/32BIT/5V, GRAPHICS ADAPTER
 - 2657 S15 GRAPHICS ADAPTER, PCI/SHORT/32BIT/5V, WEITEK P9100
 - 2708 Eicon ISDN DIVA PRO 2.0 PCI S/T Adapter
 - 2837 MVP MULTI-MONITOR ADAPTER, PCI/LONG/32BIT/3.3 OR 5V
 - 2854 3D (GXT500P), PCI/LONG/32BIT/3.3 OR 5V, GRAPHICS ADAPTER
 - 2855 3DX (GXT550P), PCI/LONG/32BIT/3.3 OR 5V, GRAPHICS ADAPTER
 - 2856 PCI/SHORT/32BIT/3.3 OR 5V, 7250 ATTACH ADAPTER
 - 8242 10/100BASET ETHERNET PCI/SHORT/32BIT/5V
- ISA adapters:
 - 2647 VIDEO CAPTURE ENHANCEMENT, ISA/SHORT
 - 2701 4 PORT SDLC, ISA/LONG, EIA 232/V.35/X.21
 - 2931 8-PORT, ISA/LONG, EIA232 ADAPTER/FAN-OUT BOX
 - 2932 8-PORT, ISA/LONG, EIA232/422 ADAPTER/FAN-OUT BOX
 - 2933 128-PORT, ISA/LONG, EIA232 ASYNCH CONTROLLER
 - 2961 1 PORT X.25, SDLC, PPP, ISA/LONG, ADAPTER (C1X)
 - 2971 TOKEN RING ADAPTER, ISA
 - 2981 ETHERNET ADAPTER, ISA, RJ45/BNC
 - 8240 A/M 3COM ETHERNET ISA/SHORT TP ONLY
 - 8241 A/M 3COM ETHERNET ISA/SHORT BNC/AUI
- Non-CHRP Graphics Adapters:
 - Gt3/Gt3i
 - Gt4/Gt4e/Gt4i/Gt4x/Gt4xi
 - GXT110P
 - GXT150L/GXT150M/GXT150P
 - GXT155L
 - GXT500
 - GXT500D
 - GXT500P
 - GXT550P (FC 2855 only)
 - GXT800M

- GXT1000™
- MVP MULTIPCI Adapter
- S15
- VIDEO OUTPUT OPTION (#3200) (FC 7254)
- 7250 ATTACH Adapter (FC 2856)

AIX 5L Version 5.3 Unsupported Functions and Filesets

The following functions and filesets are not supported:

- 7318 Model P10/S20 Serial Communications Network Server
- AIX Xstation Manager®
- AIX Version 3.2 Network Installation Tools
- Remote Customer Support and Services
- SOMobjects® Base Toolkit
- Information Presentation Facility Runtime
- X11.vsm.helps
- X11.vsm.icons
- X11.vsm.rte
- GL 3.2
- power management
- IBM-850 locales
- libipfx.a
- devices.pci.b7105090
- The 7318 Serial Communications Network Server
- Network Terminal Accelerator
- The 9333 Serial Link DASD Subsystem
- devices.pci.331101e0
- OpenGL.html.xx_XX
- PEX_PHIGS.html.xx_XX
- X11.html.xx_XX
- bos.html.xx_XX.adapt
- bos.html.xx_XX.cmds
- bos.html.xx_XX.files
- bos.html.xx_XX.lowlevprg
- bos.html.xx_XX.manage_gds
- bos.html.xx_XX.prog_gds
- bos.html.xx_XX.techref
- bos.html.xx_XX.topnav
- bos.html.xx_XX.user_gds
- bos.man.xx_XX
- infocenter.html.xx_XX.tasks_topics
- perfagent.html.xx_XX
- sx25.html.xx_XX
- IMNSearch.bld
- IMNSearch.msg.xx_XX.rte.com
- IMNSearch.rte

- IMNSearch.rte.httpdlite
- devices.pci.14107800.rte

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Part Number: 16R1778

Printed in U.S.A.

GI10-0756-00



(1P) P/N: 16R1778

