AIX 5L Version 5.2

Release Notes

SC23-5202-01

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SC23-5202-01

Note

Before using this information and the product it supports, read the information in Appendix B, “Notices,” on page 39.

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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`

The AIX 5L™ Version 5.2 Release Notes include information that helps you install AIX 5L Version 5.2. These Release Notes support AIX 5L Version 5.2 with the 5200-08 Recommended Maintenance package. To view the most current version of the Release Notes, go to the online Release Notes in the IBM eServer pSeries Information Center. The Information Center is located at the following Web site:

`http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/52relnotes.htm`

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:

```
lscfg | grep Architecture
```

To find out more about supported and unsupported items, see Appendix A, “AIX 5L Version 5.2 Unsupported Items,” on page 37.

IBM eServer POWER4 pSeries Machines

Required Levels of Hardware Management Console (HMC) and Firmware

You must have installed AIX 5L Version 5.2 with the 5200-03 Recommended Maintenance package or later, and 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 Information Center.
- Platform Firmware: http://techsupport.services.ibm.com/server/mdownload2
- AIX®: See the *AIX 5L Version 5.2 Installation Guide and Reference* in the 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 5.2 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.

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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 5.2 and Linux logical partitions can have nearly 512 GB logical partition memory sizes (about 503 GB after page table, hypervisor, and TCE table usage). AIX 5.2 and Linux logical partitions should have the **Small Real Mode Address Region** option selected on the HMC partition profile memory panel, and must been defined for greater than 256 GB logical partitions.

Memory Requirements

AIX 5L Version 5.2 minimum current memory requirements vary, based on the configuration.

Larger maximum memory configurations or additional devices will scale up the minimum current memory requirement. A general rule for a minimum current memory requirement for AIX 5L Version 5.2 is 256 MB - 512 MB. A smaller minimum current memory requirement of 128 MB may support a configuration with a very small number of devices and where the maximum memory setting is set to match the current memory of 128 MB.

AIX 5L Version 5.2 requires the minimum current memory requirement to increase as the maximum memory configuration or the number of devices scales upward, or both.

Paging Space Requirements

AIX 5L Version 5.2 creates a 512 MB paging space (**/dev/hd6**) for all new and complete overwrite installations.

Disk Space Requirements

AIX 5L Version 5.2 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 5.2 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 with the 5200-08 Recommended Maintenance package Allocated (Used)
/	4 MB (2.5 MB)	8 MB (5.6 MB)	16 MB (10 MB)
/usr	294 MB (279 MB)	385 MB (370 MB)	1040 MB (1034 MB)
/var	4 MB (1.3 MB)	4 MB (1.4 MB)	16 MB (7 MB)
/tmp	16 MB (0.6 MB)	20 MB (0.9 MB) see note	32 MB (1.1 MB)
/opt	N/A	4 MB (0.2 MB)	48 MB (26 MB)

Note: If the **/tmp** directory is less than 32 MB, it is increased to 32 MB during a migration installation so that the AIX 5L Version 5.2 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.

Some AIX Systems May Not Boot from CD-ROM

Some AIX systems may 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 -vl 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.

Where to Find AIX 5L Version 5.2 Documentation

Information Center

The IBM eServer pSeries Information Center is an information portal for AIX and pSeries customers. From this site, you can access the following:

- AIX 5L Version 5.1 for POWER, and AIX 5L Version 5.2 documentation
- Hardware documentation
- Message database for 7-digit error codes, LEDs, and error identifiers
- How-to's for users and system administrators
- FAQs
- Links to Redbooks™, white papers, and related products

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

`http://publib16.boulder.ibm.com/pseries/index.htm`

Migration

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 5.2. 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.

xlC.rte Fileset

If you are migrating to AIX 5.2 from AIX 4.2.x or AIX 4.3.x, check the level of the **xlC.rte** fileset by typing the following command:

```
lslpp -L xlC.rte
```

If the **xlc.rte** level is earlier than 5.0.2.x, you must apply APAR IY17981 before migrating to AIX 5.2. 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`

Trusted Computing Base (TCB)

Known Problems and Workarounds

The /dev/dlcqllc file: If you are on a migrated system with TCB enabled and you have the following error from the `tcbck -n tree`:

```
3001-020 The file /dev/dlcqllc was not found
```

Run the following command to re-create the **/dev/dlcqllc** device:

```
# mkdev -c dlc -s dlc -t x25_qllc
```

bos.clvm.enh Fileset after Migration to AIX 5L Version 5.2

The **bos.clvm.enh** fileset is not installed when your system is migrating to AIX 5.2. After the migration is complete, users of the **bos.clvm.enh** fileset will need to re-install the fileset from the AIX 5.2 installation media.

sysck Errors on X11.loc.nl_BE.Dt.rte

Users of the nl_BE language fileset might experience **sysck** error messages during migration to AIX 5.2. If this error is encountered, perform a force installation of the **X11.loc.nl_BE.Dt.rte** fileset.

xmodmap/Zh_CN Errors after Migration

After you migrate to AIX 5.2, an **lppchk -f** command might give the following warning message:

```
lppchk: 0504-206 File /usr/lpp/X11/defaults/xmodmap/Zh_CN/keyboard could not be located.
lppchk: 0504-206 File /usr/lpp/X11/defaults/xmodmap/Zh_CN could not be located.
```

If you have this condition, reinstall the **X11.loc.Zh_CN.base.rte** fileset after migration.

KDE Desktop

If the CDE and KDE desktops are both installed on a system migrated from AIX 4.3 to AIX 5.2 or on a system installed with AIX 5.2, 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 do this, 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 5.2, the non-encrypted version of SNMPv3 will run by default. If you had 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 5.2 System Management Guide: Communications and Networks*.

Kerberos

All the secure remote commands use the Kerberos Version 5 library and the GSSAPI library provided by IBM Network Authentication Service Version 1.3 or later that is located on the *AIX 5L Version 5.2 Expansion Pack* CD. However, you must install the **krb5.client.rte** fileset.

If you are migrating to AIX 5.2 and had Kerberos Version 5 or Kerberos Version 4 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 5.2 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 5.2. 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 5.2 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 -vcdrfs -oro /dev/cd0 /mnt
/mnt/contrib/destroyRPMS
```

If you are migrating your system from AIX 4.3.3 to AIX 5L and you installed **rpm.rte** without creating your own **/opt or /opt/freeware** file system, after running the **destroyRPMS** command it is recommended that you remove the **/opt/freeware** and **/usr/opt/freeware** directories prior to migrating. On AIX 5L, the system provides a **/opt** file system into which **rpm.rte** is normally installed. However, if rpm finds a preexisting **/usr/opt/freeware** directory, it will use this location instead. You don't 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 wish to change this afterwards, run the **destroyRPMS** command again, remove any existing **/usr/opt/freeware** and **/opt/freeware** directories, and install **rpm.rte** 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 upgrade to AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later, 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 an MPIO device if the device was previously configured as *other FC disk*.

The following describes some of the similarities and differences that will be 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 predefines 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 5.2 release of MPIO will handle the migration. If the system is rebooted, the device instance will be in the define state. During migration, the device instance will be left in the define state and a new *other FC disk* instance will be created.

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

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

There may also be *other FC device* instances created. If the *MPIO other FC device* is not open, there will be an *other FC device* instance created for each path the device is detected on. If the *MPIO other FC device* is in the open state, there will not be any *other FC device* instances created. This is because the *MPIO other FC device* will have already issued a **SCIOSTART** command to the FC adapter for each of the paths. The FC adapter will 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* may 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.

See “MPIO Features” for information about additional features of MPIO devices.

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. See “Multipath I/O (MPIO)” on page 6 for additional information.

The following describes the major 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 crashes 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.

Additional information about MPIO is available in the following AIX publications:

AIX 5L Version 5.2 System Management Concepts: Operating System and Devices in the section titled *Multipath I/O*.

AIX 5L Version 5.2 System Management Guide: Operating System and Devices in the section titled *MPIO Devices*.

System V Printing Subsystem Migration from AIX 4.3.3

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) be 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 5.2 that supplements the information contained in the AIX 5.2 installation documentation.

The following publications describe AIX 5.2 installation:

- *AIX 5L Version 5.2 Operating System Installation: Getting Started*
- *AIX 5L Version 5.2 Installation Guide and Reference*

Both installation guides are available online in the pSeries Information Center in the AIX 5L Version 5.2 documentation category 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 5.2 installation hints and tips, send e-mail with a subject line of **52_Install_Tips** to aixserv@austin.ibm.com, the AIX Service Mail Server.

Installing AIX 5L Version 5.2

The following methods can be used to install AIX 5L Version 5.2:

- Complete overwrite installation
- Preservation installation
- Migration installation

Note: After you install or migrate a system to AIX 5L Version 5.2, 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 5.2 to a lower level of AIX are not supported.

If your system has AIX 5.2 with 5200-00 through 5200-07 installed (you can verify the level by running the **oslevel -r** command), then you can use the base media or the Update CD to update to AIX 5L with 5200-08. In either case, use the **smitty update_all** command to perform the update.

Note: Because only the base install images are on the media, if you use the product media to update to AIX 5L with 5200-08, you cannot reject the software and return to the previous level.

To install AIX 5L Version 5.2, boot your system from the product media, and follow the instructions in the *AIX 5L Version 5.2 Installation Guide and Reference*.

Note: AIX 5L Version 5.2 cannot be installed on MCA (Micro Channel® Architecture) or PowerPC Reference Platform® (PReP) machines.

For more information about migration, see “Migration” on page 3.

Disk Format Requirement

You cannot install AIX on an improperly formatted SCSI disk. AIX requires the disk to be formatted to a sector size supported by the attached SCSI controller. All AIX SCSI controllers support 512-byte sector SCSI disks. The 522-byte sector SCSI disks are only supported when they are attached to SCSI RAID controllers. If the disk has been formatted for SCSI RAID, but is not attached to a SCSI RAID controller, the disk might not configure. If the disk does configure, it might be unreadable in the AIX environment. In some instances, the certify function and the format function in AIX diagnostics can be used to reformat the disk for the attached SCSI controller.

Creating a Bootable CD

It is recommended that you create a CD that can be used to boot and perform maintenance on your system that matches your current level of AIX.

To create a bootable CD, run the following commands (where *cdx* is an attached CD writer). The **bosinst.data** file must be set for a prompted install (`PROMPT = yes`).

```
cd /var/adm/ras
ls ./bosinst.data ./image.data | backup -ivqf/tmp/fakemksysb
mkcd -m /tmp/fakemksysb -d /dev/cdx
```

OR

```
 mkcd -m /tmp/fakemksysb -S
```

will create a CD image that can be transferred to a system with a CD writer.

Note: The final **mkcd** command in the previous example makes an image that can be transferred to another system (AIX or non-AIX) for burning.

Software License Agreements (SLA)

When you are using ASCII displays, there are some instances where the Software License Agreements may not be fully displayed. In this event, the License Agreements can be viewed in all languages at the following Web site:

`http://www.ibm.com/software/sla/sladb.nsf`

Base Operating System Installation Options

The information in this section supplements the ″Installation Options″ chapter of the *AIX 5L Version 5.2 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® DS4000 Family
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.

AIX Toolbox Media and NIM lpp_sources

When a Network Install Manager `lpp_source` is used for base system installs, do not copy the contents of the *AIX Toolbox for Linux Applications* CD into the `lpp_source`. This results in multiple copies of **cdrecord** and **mkisofs** software installing during base installation. Neither **cdrecord** or **mkisofs** installs if multiple copies are present.

Unmirroring the Root Volume Group

The following example describes the steps required to unmirror the root volume group (rootvg).

Note: Unmirroring the root volume group requires advanced system administration experience. If not done correctly, your system can become unbootable.

The rootvg is contained on hdisk01 and mirrored onto hdisk11. To remove the mirror on hdisk11 (regardless of the disk from which you previously booted), perform the following steps:

1. To unmirror the rootvg from hdisk11, enter the following command:

```
unmirrorvg rootvg hdisk11
```

This command turns quorum back on for rootvg.

2. To update the booted disk link, enter the following command:
   ```
   ln -f /dev/rhdisk01 /dev/ipldevice
   ```
3. To reduce the disk out of rootvg, type the following command:
   ```
   reducevg rootvg hdisk11
   ```
4. To initilize the boot record of the remaining disk again, enter the following command:
   ```
   bosboot -a -d /dev/hdisk01
   ```
5. To modify the boot list to remove the unmirrored disk, type the following command:
   ```
   bootlist -m normal hdisk01
   ```

When the rootvg unmirroring is complete, you must run the **bosboot**, **bootlist**, and **reboot** commands. You must run the **bosboot** command to initialize the boot record on the remaining disk again. The **bootlist** command needs to be run so that the system only boots to the disk remaining in rootvg. And since unmirroring turns quorum back on for rootvg, a reboot is required for this to take effect.

Note: The **reducevg** command in step 3 will fail if there are non-mirrored logical volumes such as raw logical volumes and system dump devices on the disk.

For more information about the **bosboot** and **bootlist** commands, see the *AIX 5L Version 5.3 Commands Reference, Volume 1*, available at the pSeries Information Center located at the following Web site:

`http://publib16.boulder.ibm.com/pseries/index.htm`

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**.

The contents of the graphics bundle has changed with AIX 5L with 5200-03. The bundle now includes the **bos.docsearch** and the **bos.docregister** software required by the **sysmgt.websm** fileset. This additional software is still on the *Volume 1* CD, and you are prompted for this additional software.

Graphics Software Support and Desktop Choices

The Desktop choices are CDE, KDE, GNOME, and NONE. If you select NONE, a minimal configuration is installed, including:

- X11
- Java™
- Web-based System Manager
- Document Search and Document Registry software

For new and complete overwrite installations, the graphics bundle installation always defaults to yes (`Graphics Software = yes`), which is to install graphics software support, whether or not the console is graphical. This allows for remote access to the applications from other graphical systems.

The Desktop installation option is not available if the console is non-graphical.

Other Installation Information

Installation Packaging Formats

AIX 5L Version 5.2 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 5.2 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 5.2, the ISMP packages are located in the following path, where *mount_point* is the mount point:

/mount_point/ismp/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 5.2 Installation Guide and Reference*.

Example

If you are using the **bffcreate** command or a user interface to copy images from CD to a directory on the disk, new subdirectories will be created in the target directory and the images will be placed in those directories.

In AIX 4.3, the default target directory for the **bffcreate** command was the **/usr/sys/inst.images** directory.

In AIX 5.2, if the following command is used on a PowerPC® machine:

```
bffcreate -d /dev/cd0 all
```

the default target directory is the **/usr/sys/inst.images/installp/ppc** directory.

Use the **gencopy** command as follows:

```
gencopy -d /dev/cd0 all
```

In addition to all of the **installp** images, you also get the **rpm** images that are contained on the product media, as follows:

```
cd /usr/sys/inst.images/RPMS/ppc
find . -print
./cdrecord.aix5.2.ppc.rpm
./mkisofs.aix4.3.ppc.rpm
```

Due to this change, you might need to update any custom scripts in which image locations are hardcoded.

BOS Installation Support for Fibre Channel Boot

BOS installation supports installation to Fibre Channel-attached disks. Either bootable AIX 5L Version 5.2 installation media or NIM resources prepared from such media are required. The Fibre Channel-attached disks must be attached to a Fibre Channel host adapter that supports boot capability. However, Fibre Channel drivers that have multiple, physical connections to the host or drivers that require supplemental device software should not be chosen as **rootvg** drives.

A Fibre Channel-attached disk can be identified by a World Wide Port Name and Logical Unit ID. To see the format of the World Wide Port Name and Logical Unit ID, type:

```
lsattr -E -O -l DiskName
```

- In a non prompted BOS installation, you can specify a Fibre Channel-attached disk in the target_disk_data stanza of the **bosinst.data** file using the following as an example:

  SAN_DISKID = (*World Wide Port Name*)//(*Logical Unit ID*)

  In the above example, *(World Wide Port Name)* and *(Logical Unit ID)* are each in the format returned by the **lsattr** command, that is, ″0x″ followed by one to 16 hexadecimal digits.
- In a prompted BOS installation, the BOS menus display the list of available disks and associated information. You can select the desired disks.

System Dump

The default system dump device is paging space. This default may not be adequate for system configurations that have large memory sizes or when system availability is a concern.

For large memory systems, AIX allocates a dedicated dump device, named **/dev/lg_dumplv**, if disk space is available. The following table shows the sizes of the dump devices based on the amount of real memory present in the system.

Dump Device Size (Based on System Real Memory)

Real Memory	Dump Device
4 GB < 12 GB	1 GB
12 GB < 24 GB	2 GB
24 GB < 48 GB	3 GB
>= 48 GB	4 GB

Note: If the root user starts a dump to a **/dev/sysdumpnull** dump device, the system will crash and no dump will occur.

The dump is now copied to tape in **pax** format instead of **tar**, because **pax** supports large (greater than 2 GB) files.

The **dumpcheck** facility runs by default each day at 3:00 p.m. local time. See the root **crontab** file to change the time that the **dumpcheck** facility runs. The **dumpcheck** facility ensures that there is enough space in the dump device and copy directory to receive the system dump. If dump compression will facilitate a system dump, it will be enabled unless you have manually disabled it. The results of the **dumpcheck** facility are in the system error log.

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 5.2 NIM product and includes the following topics:

- Restrictions on SPOT Creation for Releases Prior to 5.2 (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

When you use the **mksysb** command to create a backup tape, apply the following APARs to the system before creating the backup tape:

- AIX 5.1 APAR IY57522
- AIX 5.2 APAR IY56839

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

Recovering from Setting setenv real-base on Machine Types 7028, 7029, 7038 and 7040

When the **setenv real-base** command has been run on machine types 7028, 7029, 7038, or 7040, the system will start to boot, some messages or data will display, then the system will stop 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 have been 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 happen to restore devices to their customized configuration at the time of backup.

If devices were removed or replaced from the system after the backup was created, their information will be restored when you are installing a backup, and the system will show these devices in a defined state.

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

rsct.opt.storagerm Fileset

The **rsct.opt.storagerm** fileset is not automatically installed with the Reliable Scalable Cluster Technology (RSCT) updates. You can install this fileset after the RSCT updates are applied. If you install the **rsct.opt.storagerm** fileset, to reject the RSCT updates, you must uninstall the **rsct.opt.storagerm** fileset before you request PTF rejects.

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
```

Emergency Fix Management

Emergency Fix (efix) Management provides utilities that package, install, and manage efixes, which involves the following commands:

epkg The efix packager

emgr The efix manager

The **epkg** command creates efix packages that can be installed by the **emgr** command. After the efix is installed, the **emgr** command can be used to list, check, remove, and perform other operations with the installed efixes.

Service

Fixes and Problem-Solving Databases

You can download AIX fixes and search technical databases (including ″APARS″ and ″Tips for AIX administrators″), from the following IBM eServer Support Web site:

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

Chapter 2. AIX 5L Version 5.2

The following are some of the features that were introduced in AIX 5L Version 5.2:

- Dynamic Logical Partitioning (DLPAR)
- Capacity Upgrade on Demand (CUoD)
- Advanced RAS features
- Enhancements to Workload Manager
- Cluster Systems Management (CSM) for monitoring and administering multiple machines (both AIX and Linux) from a single point of control

To find out more about the new features introduced in AIX 5L Version 5.2, refer to the Information Center at the following Web site:

`http://publib16.boulder.ibm.com/pseries/index.htm`

Base Operating System (BOS)

64-bit System Identifier

AIX 5L Version 5.2 with the 5200-03 Recommended Maintenance package or later provides a 64-bit system identifier for compatibility with future systems. The white paper is available at the following web site:

`http://www-128.ibm.com/developerworks/eserver/library/es-aix-systemid.html`

64-bit Kernel

AIX 5L Version 5.2 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.

Note: The 32-bit kernel continues to be supported on AIX 5L Version 5.2. The maximum real memory supported by a 32-bit kernel system (or partition) is 96 GB.

System Support

For information about supported and unsupported items, see Appendix A, “AIX 5L Version 5.2 Unsupported Items,” on page 37.

Base Functionality

The AIX 5L Version 5.2 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 5.2 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.

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  - **Application Scalability.** AIX 5L Version 5.2 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 5.2. 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 5.2 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 5.2 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**, the path name of the uniprocessor is **/usr/lib/boot/unix_up**, and the path name of the multiprocessor versions of the 32-bit kernel is **/usr/lib/boot/unix_mp**.

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 which can result in multiple shell processes writing to the file. The shell does not detect or prevent such race conditions.

If the right-hand pattern of a regular expression contains the at (@) or vertical bar (|) characters used with their special meaning, the expression may not be properly evaluated. In this case, use the **/usr/bin/ksh93** command.

With the **/usr/bin/ksh93** command input redirection, using the ″here document″ may not be successful. To work around this problem, use the **/usr/bin/ksh** command.

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

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

JFS2 Log Attribute is Listed under JFS in the chfs Command

The *AIX 5L Version 5.2 Commands Reference, Volume 1* for the **chfs** command incorrectly lists the JFS2 log attribute under JFS. The correct information for JFS is:

-a log=LVName
Specifies the full path name of the file system-logging logical volume name of the existing log to be used. The log device for this file system must reside on the same volume group as the file system.

The correct information for JFS2 is:

-a log=LVName
For a file system using the outline log, you can use this option to change the outline log from one logical volume to another logical volume if the logical volume is properly formatted and if the type of the logical volume is `jfs2log`. If a file system is mounted at the time the **chfs** command is called to change the outline log, the **/etc/filesystems** file will indicate the change. However, the actual log will not be changed until the next mount for the file system, which follows a **umount** operation or a system crash and recovery.

For a file system using the inline log, this option does not support switching logs between the inline and the outline log. To switch from **inlinelog** to **outlinelog** (or vise versa), you must remove and re-create the file system.

New Flag for the mklv Command

-T O Uses a new device sub type of logical volume. An application (such as a database) may use this new device sub type as an indication that it may safely stop skipping the logical volume control block (lvcb) at the beginning of the logical volume (lv).

For more information about the **mklv** command, see the *AIX 5L Version 5.2 Commands Reference, Volume 3*.

The –V Flag for the sar Command not Supported

The **-V** flag for the **sar** command is not supported on AIX 5.1 and later.

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** 5.8.0 (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 5.2 introduces Perl 5.8.0. 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 5.8.0.

C99 Language Interfaces

AIX 5L Version 5.2 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_NOISOC99_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 5.2 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 5.2. 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 Web Browser Transition to Mozilla

AIX 5L Version 5.2 with the 5200-04 Recommended Maintenance package introduces support for the Mozilla 1.7.12 Web browser as the new default browser for AIX.

This AIX 5.2 maintenance package does not automatically change the default browser to Mozilla for existing AIX 5.2 installations. Instead, it adds Mozilla as an option to the system management tools to help facilitate this task.

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

Starting with AIX 5L Version 5.2 with the 5200-04 Recommended Maintenance package, 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 Base Operating System installation process:
  1. 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 the **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**.

- Configuring Mozilla using the following **smit** or **smitty** process:
  1. Run the **smit change_default_browser** or the **smitty change_default_browser** command.
  2. Specify **mozilla** or the **/usr/bin/mozilla** directory as the Default browser LAUNCH COMMAND.

License Use Management (LUM)

If your system has a 64-bit System ID (displayed by the **uname -f** command), the LUM Version 5.1 licensing software is installed. If your system has a nonzero 32-bit System ID (displayed by the **uname -u** command), the LUM Version 4 licensing software is installed. If both 32-bit and 64-bit System IDs are defined and the 32-bit ID is nonzero, both versions of LUM are installed.

LUM Version 4

The **i4blt**, **i4cfg**, **i4target**, and **i4tv** LUM Version 4 commands are in the **/usr/opt/ifor/ls/os/aix/bin** directory.

Note: To configure LUM Version 4, use the **i4cfg** command.

The default directory for the nodelock file is the **/var/ifor** directory.

For more information about LUM Version 4, see the *License Use Management User Guide* at **/usr/opt/ifor/ls/os/aix/doc/lumusg.htm**.

LUM Version 5

The **LUMblt**, **LUMcfg**, **LUMtarget**, and **LUMtv** LUM Version 5 commands are in the **/opt/LicenseUseManagement/bin** directory.

Note: To configure LUM Version 5, use the **LUMcfg** command.

The default nodelock directory is the **/var/LicenseUseManagement/nodelock** directory.

For more information about LUM Version 5, see the *License Use Management User Guide* at **/opt/LicenseUseManagement/doc/lumusg.htm**.

New PRIVSEG_LOADS Option for LDR_CNTRL Tunable Parameter

Specifying the **PRIVSEG_LOADS** option directs the system loader to put dynamically loaded private modules into the process private segment. This might improve the availability of memory in large memory model applications that perform private dynamic loads and tend to run out of memory in the process heap. If the process private segment lacks sufficient space, the **PRIVSEG_LOADS** option has no effect. The **PRIVSEG_LOADS** option is only valid for 32-bit applications with a non-zero **MAXDATA** value.

Communications, Networking, and I/O

7135 RAIDiant Array for AIX Requirements after Installing AIX 5L Version 5.2

Customers installing AIX 5L Version 5.2 on systems with attached 7135-110 or 7135-210 RAIDiant Array subsystems must also obtain and install the latest version of controller and drive microcode. This microcode update can be obtained using hardware service channels (800-IBM-SERV in the U.S.) and by requesting ECA 010. You can also order the publication for the 7135, which is *7135 RAIDiant Array for AIX: Installation Guide and Reference*, that contains information about microcode and device driver installation.

Enable Link Polling and Time Interval for Link Polling Configuration Attributes

The IBM 10/100 Mbps Ethernet PCI Adapter (Feature Code 23100020) does not have an interrupt-driven mechanism to tell the device driver of any changes in its link state.

To avoid this drawback, the device driver now provides an ODM attribute to determine the status of the link. This **Enable Link Polling** attribute is disabled by default. If this attribute is enabled, the device driver will poll the adapter every time period, equal to the time in milliseconds, specified in the **Time interval for Link Polling** attribute, for a change in the adapter's link state.

If the adapter's link is disabled for any reason, the device driver will disable its **NDD_RUNNING** flag. When the device driver finds that the link is restored, it will enable this **NDD_RUNNING** flag.

To work successfully, protocol layer implementations, such as EtherChannel, need notification if the link is disabled. Enable the **Enable Link Polling** flag for this adapter to send notification.

Note: The performance of this adapter will decrease if this flag is enabled, because of the additional PIO calls that the device driver makes to the adapter every few milliseconds while it determines the link status.

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 the following:

- AIX kernel support. Systems with AIX 5L for POWER Version 5.1 with the 5100-04 Recommended Maintenance package (APAR IY44478) and AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package (APAR IY44479) or later systems have the latest EEH services.
- 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 5.2:

- Storage Adapters:
  - PCI-X Dual Channel Ultra320 SCSI Adapter (5712, 5710, 1974)
  - PCI-X Dual Channel Ultra320 SCSI RAID Adapter (5703, 5711, 1975)
  - Dual Channel SCSI RAID Enablement Card (5709, 5726, 1976)
  - PCI-X Quad Channel U320 SCSI RAID Adapter (2780)
  - PCI-XDDR Dual Channel Ultra320 SCSI Adapter (5736, 1912)
  - PCI-XDDR Dual Channel U320 SCSI RAID Adapter (5737, 1913)
  - Dual Channel SCSI RAID Enablement Card (5727, 5728, 1907)
  - Dual Channel SCSI RAID Enablement Card (1908)
- 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)
- 10 Gigabit Ethernet-SR PCI-X Adapter (FC 5718)
- 10 Gigabit Ethernet-LR PCI-X Adapter (FC 5719)
- S/390® ESCON® CHANNEL PCI ADAPTER (FC 2751)
- IBM ARTIC960HX 4-PORT PCI ADAPTER (FC 2947)
- IBM ARTIC960RXD QUAD DIGITAL TRUNK ADAPTER (FC 6310)
- 4-Port 10/100/1000 Base-TX PCI-X Adapter (FC 5740)
- IBM 10 Gigabit Ethernet-SR PCI-X 2.0 DDR Adapter (FC 5721)
- IBM 10 Gigabit Ethernet-LR PCI-X 2.0 DDR Adapter (FC 5722)

- Encryption Adapters:
  - IBM PCI Cryptographic Coprocessor (FC 4958 and 4963) *
  - IBM eBusiness Cryptographic Accelerator (FC 4960) *
- Graphics and Miscellaneous
  - GXT135P Graphics Adapter (FC 2848) *
  - USB Open Host Controller (FC 2737) *
  - 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 intrusion prevention system supports stateful filtering with a rich set of IF, ELSE, and ENDIF rules. It also guards against port scan-based attacks with a robust set of shun filters. Intrusion prevention is further strengthened with the ability to match and prevent patterns within the network data packets.

Using Certificate Management System (CMS) with Java 1.4

To use CMS, the following changes need to be made to **java.security** file, located in the **/usr/java14/jre/lib/security/** directory, when Java 1.4 is installed. CMS is part of the **AIX Certificate and SSL Base Runtime (GSKIT)** fileset that is included on the AIX 5L Version 5.3 Expansion Pack.

Locate the following stanza in the **java.security** file:

```
security.provider.1=com.ibm.jsse.IBMJSSEProvider
security.provider.2=com.ibm.crypto.provider.IBMJCE
security.provider.3=com.ibm.security.jgss.IBMJGSSProvider
security.provider.4=com.ibm.security.cert.IBMCertPath
```

Add the following two lines to the beginning of this stanza:

```
security.provider.1=sun.security.provider.Sun
security.provider.2=com.ibm.spi.IBMCMSProvider
```

The resulting stanza should show:

```
security.provider.1=sun.security.provider.Sun
security.provider.2=com.ibm.spi.IBMCMSProvider
security.provider.3=com.ibm.jsse.IBMJSSEProvider
security.provider.4=com.ibm.crypto.provider.IBMJCE
security.provider.5=com.ibm.security.jgss.IBMJGSSProvider
security.provider.6=com.ibm.security.cert.IBMCertPath
```

Write quit to save and close the file.

Then move the **gskikm.jar** file from the **/usr/java14/jre/lib/ext** directory to the **/tmp** directory.

EtherChannel

The EtherChannel backup function and the existing network interface backup (**netif_backup**) function are supported on all Ethernet adapters.

Support for Ethernet adapters is provided in the form of fixes in the current release. The APAR numbers for these fixes are as follows:

10/100 Mbps Ethernet PCI Adapter II (1410FF01)

- APAR IY34820

10/100/1000 Base-TX PCI-X Adapter (14106902) and Gigabit Ethernet-SX PCI-X Adapter (14106802)

- APAR IY34821

10/100/1000 Base-T Ethernet PCI Adapter (14100401) and Gigabit Ethernet-SX PCI Adapter (14100401)

- APAR IY34822

Gigabit Ethernet-SX PCI Adapter and IBM 10/100/1000 Base-T Ethernet PCI Adapter

The Gigabit Ethernet-SX PCI Adapter and the IBM 10/100/1000 Base-T Ethernet PCI Adapter share the same device driver. Therefore, the device driver and diagnostic package can be obtained by installing the **devices.pci.14100401** fileset. The device driver conditionally switches code that is unique for either adapter.

Note: The **lslpp** output for the **devices.pci.14100401** fileset (shown below) refers to the Gigabit Ethernet-SX PCI Adapter, although the fileset is shared by both adapters:

```
# lslpp -L | grep devices.pci.14100401
  devices.pci.14100401.diag   5.2.0.0   C   Gigabit Ethernet-SX PCI Adapter
  devices.pci.14100401.rte    5.2.0.0   C   Gigabit Ethernet-SX PCI Adapter
```

Gigabit Ethernet Fast Port Failover

The Gigabit Ethernet Fast Port Failover function enables the IBM 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter or the IBM 2-Port Gigabit Ethernet-SX PCI-X Adapter to be deployed in a primary/backup mode, where one port of the adapter is configured as the primary port, and the other port is configured as the backup port. In the event of a link failure, the primary port fails over automatically to the backup port.

The failover time is significantly less than EtherChannel failover (typically less than 1 second). Because some packet loss might occur at the time of the failover, a reliable protocol, such as TCP, should be used in conjunction with this function.

IPX/SPX Protocol Support

IPX/SPX protocol support is provided in the **ipx.base** package. The **ipx.base** package is supported on the 32-bit kernel only.

Removal of Support for Devices

The following devices are not supported on AIX 5L Version 5.2 with the 5200-08 Recommended Maintenance package:

- **PCI FDDI I/O** (FC 2741, FC 2742, and FC 2743) is not supported on AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later.
- **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 5.2. After a migration to AIX 5L Version 5.2, or when AIX 5L Version 5.2 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 5.2.

The devices.artic960 Fileset

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

- S/390 ESCON Channel PCI Adapter (FC 2751)
- 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 2751, 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.

When you are upgrading to the current release of AIX 5L on an existing AIX 5.2 system and a new PCI IBM ARTIC960 adapter is installed, support is provided on an Additional Device Software Support (*MES*) CD that is included with the PCI IBM ARTIC960 adapter. The **devices.artic960 fileset** should then be upgraded to the most current level of **devices.artic960** that ships with the current release of AIX 5L.

Included with the **devices.artic960** 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 the IBM ARTIC960 device driver and making it again using the **rmdev** and **mkdev** commands. This process loads the necessary adapter software onto the adapter.

If the error log shows a permanent EEH error, you must use the hot plug manager to remove the adapter and make it 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** fileset, Enhanced Error Handling (EEH) support is provided. Either 32-bit or 64-bit kernel mode is supported. Applications that are 32-bit are supported.

RAID 1 TB Limitation

There are limits to the amount of hard drive capacity allowed in a single RAID set. The adapters affected by the RAID 1 TB limitation are:

- PCI-X Dual Channel Ultra320 SCSI RAID Adapter (5703, 5711, 1975)
- Dual Channel SCSI RAID Enablement Card (5709, 5726, 1976)
- PCI-X Quad Channel U320 SCSI RAID Adapter (2780)
- PCI-XDDR Dual Channel U320 SCSI RAID Adapter (5737, 1913)
- Dual Channel SCSI RAID Enablement Card (5727, 5728, 1907)
- Dual Channel SCSI RAID Enablement Card (1908)

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 -dl` *`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 Directory (LDAP)

To access the latest IBM Directory, Version 4.1.0.0 product information, go to the following Web site:

`http://www.ibm.com/software/network/directory/`

Installation and Configuration

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

`http://www.ibm.com/software/network/directory/library`

From the **IBM Directory Server** category on this Web site, click **Product Manuals and Technical Documentation** > **Version: 4.1**. Read the following documents:

- *Installation and Configuration Guide for Multiplatforms*
- *Server Readme*

- *Client Readme*
- *Readme Addendum*

Before you run **ldapxcfg**, the following symbolic links must exist:

```
/usr/ldap/db2 -> /usr/opt/db2_07_01
/usr/ldap/lib/libdb2.a -> /usr/opt/db2_07_01/lib/libdb2.a
```

You can verify that these links exist by typing the following commands:

```
ls -l /usr/ldap/lib
ls -l /usr/ldap/db2
```

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

```
ln -s -f /usr/opt/db2_07_01/lib/libdb2.a /usr/ldap/lib/libdb2.a
ln -s -f /usr/opt/db2_07_01 /usr/ldap/db2
```

Installing DB2 UDB7.2: If you are reinstalling, force installing, or installing an update to the DB2® UDB 7.2 **db2_07_01.msg.ja_JP** fileset, you should first remove the **db2_07_01.msg.Ja_JP** and **db2_07_01.msg.ja_JP** filesets.

Directory Management Tool (DMT): It is strongly recommended that you run DMT when you are logged in as a user without root authority.

Administration

After installation of the **ldap.client** package, create the following link:

```
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.

Support for these two features can be obtained by installing APAR IY37183. This APAR will install the **/usr/lpp/bos/README.FIBRE-CHANNEL** file. More information concerning these features is in this readme file.

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 5.2 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 5.2 System Management Guide: Communications and Networks*.

Note: IP over Fibre Channel is supported only within one subnet. Routing through a gateway is not supported. IP packets cannot be sent to a different subnet over Fibre Channel.

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
   ```

   APAR IY49409 is required for these **ifconfig** command options.

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.
4. For TCP/IP over Fibre Channel, set the **tcp_sendspace** network option to a value which is at least equal to a device's Maximum Transfer Unit (MTU). Values higher than the MTU are preferred, but not mandatory.

Switch Network Interface (SNI)

Switch Network Interface (SNI) provides AIX support for the eServer pSeries High Performance Switch (HPS). The HPS communication subsystem is a network data technology based on the architecture of SP™ Switch and SP Switch2. HPS is supported on IBM eServer pSeries 690 and 655 clustered servers.

For more information, see *Switch Network Interface for @server pSeries High Performance Switch Guide and Reference*.

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 5.2 System Management Guide: Communications and Networks*. For more information about the **/etc/iscsi/targets** file, see the *AIX 5L Version 5.2 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 supports login redirection to numeric IP addresses only. Any received login redirection that specifies a host name instead of a numeric IP address is considered a login failure.

Storage Adapter Microcode

It is always important to update the adapter microcode to the latest fix level available. This is especially important for the following SCSI adapters:

- PCI-X Dual Channel Ultra320 SCSI Adapter (5712, 5710, 570B, 570A, 1974)
- PCI-X Dual Channel Ultra320 SCSI RAID Adapter (5703, 5711, 1975)
- Dual Channel SCSI RAID Enablement Card (5709, 5726, 1976)
- PCI-X Quad Channel U320 SCSI RAID Adapter (2780)
- PCI-XDDR Dual Channel Ultra320 SCSI Adapter (5736, 1912)
- PCI-XDDR Dual Channel U320 SCSI RAID Adapter (5737, 1913)
- Dual Channel SCSI RAID Enablement Card (5727, 5728, 1907)
- Dual Channel SCSI RAID Enablement Card (1908)

All these adapters support concurrent microcode download. Check for the latest adapter microcode updates at the following Web site:

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

System Management

Cluster Systems Management (CSM), Version 1.5

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.

CSM Server

Before you install the CSM Server, 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 CSM management server can be any supported pSeries, iSeries, or xSeries machine. If the CSM management server is running AIX, it must use a minimum of AIX 5L Version 5.3 or AIX 5L Version 5.2 with the 5200-04 Recommended Maintenance package. Other machines within the CSM cluster are referred to as managed nodes. Managed nodes can also be any supported pSeries, iSeries or xSeries machine. If the managed node is running AIX, it must use a minimum of 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 5100-08 Recommended Maintenance package. Please refer to the CSM documentation for more information on which machines and which versions of Linux are supported in a CSM environment.

Reliable Scalable Cluster Technology (RSCT), Version 2.3.7.1

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 at **/usr/sbin/rsct/README/rsct.core.README**, 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)

Service Resource Manager (ServiceRM) is a Reliable, Scalable, Cluster Technology (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).

CD and DVD Automount Facility

AIX 5L Version 5.2 provides a CD and DVD automount facility (**cdromd**) with the **bos.cdmount** fileset. To have the **cdromd** daemon enabled on each system startup, add the following line to the **/etc/inittab** file:

```
cdromd:23456789:wait:/usr/bin/startsrc -s cdromd
```

The **cdromd** daemon can interfere with scripts, applications, or instructions that attempt to mount the CD or DVD device without first checking to see if the device is already enabled. A resource or device busy error occurs in this condition. Use the **cdumount** or **cdeject** commands to unmount the device so that you can mount the device as specified in the program or instructions. Alternatively, use the **cdcheck -m** or **mount** commands to determine the current mount point of the device.

For more information, see the **cdromd** command documentation in *AIX 5L Version 5.2 Commands Reference, Volume 2*, available at the pSeries Information Center located at the following Web site:

```
http://publib16.boulder.ibm.com/pseries/index.htm
```

Notes:

1. To suspend the management of a device by the **automounter** daemon without causing the device to eject the media, type the following command, where *device* is the name of the device:

   ```
   cdutil -s -k device
   ```

   By default, when the **bos.cdmount** fileset is installed, the **cdromd** entry in the **/etc/inittab** file is not enabled.
2. The AIX 5L Version 5.2 system management documentation incorrectly states that CDs and DVDs are mounted by default.
3. When the **cdromd** command is enabled and an installation is performed that requires an additional volume, the CD is ejected, and you are prompted to enter the next volume. If this behavior is undesired, disable the **cdromd** command during installation. Normal behavior during multivolume installation is to unmount the CD and prompt for the next volume without ejecting the CD.

Known Problem Writing to DVD Drive

When creating system or volume group backups to Slimline or Virtual DVD-RAM drives you might see the following error:

```
/usr/bin/readcd: Invalid argument. Cannot send SCSI cmd via ioctl
 burn_cd: Command error.
```

You can verify the level of cdrecord by running the `lslpp -L cdrecord` command. It needs to be at least at level 1.9-6, which is available on this current AIX release or you can get it from:

```
ftp://ftp.software.ibm.com/aix/freeSoftware/aixtoolbox/RPMS/ppc/cdrecord/cdrecord-1.9-6.aix5.2.ppc.rpm
```

SVR4 Printing

For information about configuring and setting up SVR4 printing, see the *Printing for Fun and Profit under AIX 5L* (IBM Redbook number SG24-6018-00) at the following Web site:

```
http://www.redbooks.ibm.com/
```

Using the mkprtldap Command with IBM Directory 5.1

For IBM Directory 5.1 and later, the IBM Directory (LDAP) server must be installed and configured on the system before the **mkprtldap** command can be run to configure System V print-specific information. The **mkprtldap** command supports configuring an IBM Directory 4.1 server on the system if one has not been

configured before. The initial Directory configuration that is supported by the **mkprtldap** 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 **mkprtldap** command for IBM Directory 5.1 and later.

The **mkprtldap** command is supported only for IBM Directory 5.1 on AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later.

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 and required Documentation Library services software.
- Upon successful installation of the software, the bundle's post-installation processing script consolidates the steps needed to configure and initiate remote access and document serving capabilities for Web-based System Manager and the Documentation Library remote services.
- This multimedia installation bundle prompts you to have the AIX Expansion Pack media available to install the IBM HTTP Server and the AIX base media to install the Documentation Library filesets.
- 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 change_doc_search_server** SMIT fast path command.
3. Select **Local - this computer** as the value for ″Documentation search server LOCATION,″ and provide the required information in the subsequent 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.

After updating the **sysmgt.websm** filesets, **wsmserver** in the **/etc/services** file is updated.

Configuration Assistant

The Configuration Assistant displays after an AIX base installation completes. Some preliminary configuration is performed during the base installation that was intended to simplify subsequent configuration of the Web server.

The Configuration Assistant task titled ″Configure a web server to run Web-based System Manager in a browser″ seems to detect the IBM HTTP Server in the path **/usr/HTTPServer/htdocs**.

However, Web server software is not installed as part of the AIX base processing. You must first install a Web server and then return to this task to properly complete the configuration.

After successful installation of any HTTP server, you may bring up the Configuration Assistant using the **configassist** command from within a desktop window:

- Complete the task titled ″Configure a web server to run Web-based System Manager in a browser″ using the required information from the Web server software that was installed.

The alternate configuration methods are listed in the previous section, “Remote Client Management” on page 31. Either of those methods will also result in a correct Web server configuration that supports the Web-based System Manager remote environment.

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), Version 1.5” on page 28 for installation instructions.

Pattern Matching

Several changes have been made to the pattern matching capability of the **Find** and **Filter** actions. The AIX 5.1 behavior of pattern matching was to locate a substring of the pattern. The AIX 5.2 behavior allows the use of one or more asterisk (*****) characters to represent complex pattern matches similar to the Korn shell.

Because of this change, patterns used in AIX 5.1 will not work the same in AIX 5.2. In AIX 5.1, a pattern of *abc* would match property values that contained the substring *abc*. In AIX 5.2, a pattern of *abc* will only match property values that are exactly *abc*. In order to get the AIX 5.1 behavior, specify the pattern as **abc**.

In addition to the change in the pattern matching rules, the name of the pattern matching operator in the **Filter** dialog has changed from **contains** to **matches**.

Viewing Remote Queue Status

In Web-based System Manager, the **All Print Queues** view for AIX remote printers can inaccurately indicate a problem with a remote queue. Check the actual status of the queue from the command line by typing the following command:

```
enq -q -P queue
```

If the command returns status indicating that the queue is ready, printing will function normally.

Inventory Scout, Version 2.2.0.7

Inventory Scout, Version 2.2.0.7 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 are enhanced to use this new format. The new XML-formatted VPD does not support the concatenation of VPD files that the legacy 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, downloads, and installs the microcode levels of the system.

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	2.2.0.2
invscout.rte	2.2.0.7
invscout.websm	2.2.0.4

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

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

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 will 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`

When you are updating system firmware from an HMC, the connection between the HMC and the system might not be synchronized. You can fix this problem by going to the server management panel on the HMC and selecting **Rebuild Managed System**.

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

If you are unable to successfully conduct a firmware survey using the Inventory Scout firmware management tool, the tool may be having problems accessing the Internet. The alternative to accessing 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`

ITDS Server Hang

ITDS Server Version 5.2 and above could hang on systems running AIX Version 5.2. The hang occurs if two conditions are met:

1. The system is also configured as a LDAP client to itself by **mksecldap**, and
2. After a restart of the **ibmslapd** server process (including a system reboot).

Once this occurs, the system might have the following symptoms:

- AIX commands will appear to hang on LDAP users/groups (such as `lsuser -R LDAP foo`).
- LDAP users cannot login to the system.
- The client **secldapclntd** daemon also appears to hang.
- The server stops responding to LDAP request and appears to hang.

Restarting the **secldapclntd** daemon (**restart-secldapclntd**) fixes the problem.

Other Software

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

- IBM Global Services Supported Products List (http://www.ibm.com/servers/aix/products/ibmsw/list)
- IBM Software Support Lifecycle (http://www-306.ibm.com/software/info/supportlifecycle/)

Compilers

The following programs are fully supported versions:

- **C/C++**:

  VisualAge C++ Professional for AIX, Version 6.0
  C for AIX, Version 6.0
  XL C/C++ Enterprise Edition, Version 7.0 for AIX
  XL C Enterprise Edition, Version 7.0 for AIX

  Information for current required APARs is available from the following web site:

  `http://www.ibm.com/support/docview.wss?uid=swg21207318`

- **Fortran**:

  XL Fortran for AIX, Version 8.1.1
  XL Fortran Run-Time Environment for AIX, Version 8.1.1
  XL Fortran Enterprise Edition, Version 9.1 for AIX

  Information for current required APARs is available from the following web site:

  `http://www.ibm.com/support/docview.wss?uid=swg21207319`

AIXlink/X.25

AIXlink/X.25, Version 2.1

AIXlink/X.25 Version 2.1 is supported on AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later, which is included on the AIX Update CD, beginning with May 2003.

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 http://publib.boulder.ibm.com/infocenter/pseries/index.jsp. Select **AIX documentation** → **Networking and communication** → **AIXlink/X.25 Version 2.1 for AIX: Guide and Reference**.

AIXlink/X.25, Version 2.0.2

AIXlink/X.25 Version 2.0.2 is supported on AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance package or later, which is included on the AIX Update CD, beginning with May 2003.

For more information about supported adapters and about configuration and installation, see the *AIXlink/X.25 Version 2.0 for AIX: Guide and Reference* at the following Web site:

`http://publibn.boulder.ibm.com/doc_link/en_US/a_doc_lib/aixlnk25/x25usrgd/x25usrgdtfrm.htm`

AIXlink/X.25, Version 1.1.5

AIXlink/X.25 Version 1.1.5 is not supported on AIX 5L Version 5.2.

AIX Fast Connect, Version 3.1.2

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

`http://publib16.boulder.ibm.com/pseries/en_US/aixbman/fastcon/fastcontfrm.htm`

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 for AIX, Version 6.1

See the Communications Server Support web site for more information about this product:

`http://www.ibm.com/software/network/commserver/aix/support`

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

Distributed Computing Environment (DCE)

IBM DCE for AIX, Version 3.2, support for AIX Version 5.2 requires PTF 4.

IBM DFS for AIX, Version 3.1, support for AIX Version 5.2 requires PTF 7.

See http://www-306.ibm.com/software/network/dce/support/version/info.html for more details.

High Availability Management Server, Version 1.4.1.11

It is recommended that you install the following APARs for HAMS, Version 1.4.1.11, for AIX 5L Version 5.2 with the 5200-08 Maintenance package:

- IY74862
- IY75313

Appendix A. AIX 5L Version 5.2 Unsupported Items

AIX 5L Version 5.2 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

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

AIX 5L Version 5.2 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
- CPU Gard
- devices.pci.331101e0

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