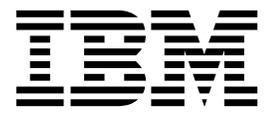


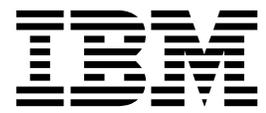
IBM AIX 7.2 with Technology Level 2

Release Notes



IBM AIX 7.2 with Technology Level 2

Release Notes



Note

Before using this information and the product it supports, read the information in "Notices" on page 25.

Second edition (March 2017)

This edition applies to IBM AIX 7.2 with Technology Level 2 and to all subsequent release and modifications until otherwise indicated in new editions.

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About this document

The Release Notes topics include late technical information that is not included in other topics, and they highlights new functions for the IBM® AIX® 7.2 with Technology Level 2 licensed program.

Highlighting

The following highlighting conventions are used in this document:

Bold	Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Bold highlighting also identifies graphical objects, such as buttons, labels, and icons that the you select.
<i>Italics</i>	Identifies parameters for actual names or values that you supply.
Monospace	Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or text that you must type.

Case sensitivity in AIX

Everything in the AIX operating system is case sensitive, which means that it distinguishes between uppercase and lowercase letters. For example, you can use the **ls** command to list files. If you type **LS**, the system responds that the command is not found. Likewise, **FILEA**, **FiLea**, and **filea** are three distinct file names, even if they reside in the same directory. To avoid causing undesirable actions to be performed, always ensure that you use the correct case.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

What's new

June 2018

Some POWER9™ processor-based servers have an erratum regarding the use of the Data Address Watchpoint Register (DAWR) that can crash the entire server. For more information, see the “Data Address Watchpoint Register (DAWR)” on page 19 section.

May 2018

AIX on IBM Hyperconverged Systems that are powered by Nutanix provides simplified management through a hyperconverged infrastructure. For more information, see the “IBM Hyperconverged Systems” on page 23 section.

March 2018

The AIX operating system supports POWER9 processor-based servers. For more information, see the “Version of the AIX operating system that support POWER9 processor-based servers” on page 3 section.

Read before installing AIX 7 with 7200-02

Before you use this software, you should go to the Fix Central website and install the latest available fixes that address security vulnerabilities and other critical issues.

Version of the AIX operating system that support POWER9 processor-based servers

The AIX 7 with 7200-02 and Service Pack 2, or later, operating system support the following POWER9 processor-based servers:

- IBM Power® System S914 (9009-41A)
- IBM Power System S924 (9009-42A)
- IBM Power System H922 (9223-22H)
- IBM Power System H924 (9223-42H)
- IBM Power System S922 (9009-22A)
- IBM Power System S922L (9008-22L)

For more information about POWER9 processor-based servers, see the POWER9 Knowledge Center website.

Installation tips

The latest installation hints and tips are available at the IBM Power server bulletins website.

AIX Live Update

The AIX operating system provides the AIX Live Update function that eliminates the workload downtime that is associated with AIX system restart that is required by previous AIX releases when fixes to the AIX kernel are deployed or updated.

AIX Live Update with AIX 7 with 7200-02 includes support for live update operations on an LPAR that is managed by IBM Power Virtualization Center (PowerVC). For partitions managed by PowerVC, the live update operation allocates and manages any additional storage that is required for the operation so it is not necessary to provide any existing disks.

If you are running Java applications or IBM WebSphere Application Server and AIX Live Update fails, you might need to apply APAR IV78743.

For more information about AIX Live Update, view the Live Update topic.

Software License Agreements

There are instances where the Software License Agreements (SLA) might not be displayed correctly. In this event, the License Agreements can be viewed for all languages at the Software license agreements website.

Software Maintenance Agreement

In AIX 7 with 7200-02, a separate Software Maintenance Agreement (SWMA) acceptance window displays during installation immediately after the license acceptance window. The response to the SWMA acceptance (accept or decline) is stored on the system, and either response allows the installation to proceed, unlike license acceptance, which requires an accept to proceed.

The SWMA acceptance window is displayed during a New Overwrite or Preservation installation from base CD media.

For base CD media New Overwrite or Preservation installations, if a non-prompted installation is wanted, the **ACCEPT_SWMA** field in the control_flow stanza of the **bosinst.data** file should be set to yes (to accept the SMWA terms) or no (to decline the SWMA terms). The **ACCEPT_SWMA** field is set to blank by default.

For NIM installations, if licenses have been accepted either from the choices that are made when initializing the installation, or by using the **ACCEPT_LICENSES** field in a customized **bosinst.data** file, then this will constitute SWMA acceptance.

Fixes and problem-solving databases

You can download AIX fixes and search technical databases (including "APARS" and "Tips for AIX administrators"), at the Fix Central website.

Security advisories

Security subscription services are available at My notifications website.

After you subscribe to the AIX security advisories, you will receive the advisories by email as soon as they are published.

System requirements

Review the following information to determine the minimum and recommended system requirements that are needed to run AIX 7 with 7200-02.

Required hardware

Only 64-bit Common Hardware Reference Platform (CHRP) machines that are running selected POWER7[®] and POWER8[®] processors that implement the Power Architecture[®] Platform Requirements (PAPR) are supported.

To see whether you have a supported machine, log in to the machine as the root user, and run the following command:

```
prtconf | grep 'Processor Type'
```

Firmware

I/O devices IPL limitation

Because of a firmware memory size limitation, only I/O devices in the first 144 I/O slots that are assigned to a logical partition or single system image partition can be used as an IPL (boot) source.

You can use the HMC to identify which devices are in the first 144 I/O slots by doing the following:

1. Select **Partition Properties > Hardware > I/O**.
2. Click the Bus column to sort the I/O devices in ascending order.

The first 144 I/O devices in the sorted list are in the bootable adapter slots.

If you are using a partition or single-system image partition with more than 144 assigned I/O slots, the following scenarios and their results and resolutions are possible.

Table 1. Scenarios for partitions with more than 144 assigned I/O slots

Scenario	Result	Resolution
Attempting to boot from a device beyond the first 144 I/O slots for installation or diagnostic purposes.	The device is not selectable as a boot source from the SMS menus.	Use a device in the first 144 I/O slots.
Booting from a device in the first 144 I/O slots, and then attempt to select a target installation device in a slot beyond the first 144 I/O slots.	The boot will succeed to the installation menus, but devices beyond the first 144 I/O slots will not be listed as bootable installation targets in the AIX menus.	Select a device that is available and marked as bootable.
Using an MPIO configuration where one adapter is in the first 144 I/O slots and another adapter is in a slot beyond the first 144 I/O slots. Both adapters are present at boot time.	The boot will succeed to the installation menus, and the device will be listed as bootable in AIX installation menus. The installation will proceed, but it will fail with the bootlist command failure "unable to set bootpath for all paths."	Use a device in the first 144 I/O slots for all paths.
Using DLPAR to add an adapter in a slot beyond the first 144 I/O slots, and then attempting to run the alt_disk_install command for the newly added device.	The device will not be listed as bootable.	Use a device in the first 144 I/O slots.

Table 1. Scenarios for partitions with more than 144 assigned I/O slots (continued)

Scenario	Result	Resolution
Using DLPAR to add an adapter in a slot beyond the first 144 I/O slots, and using the bootlist command to add the device as a bootable device (for example, by dynamically adding a redundant path to a current boot device or setting up for a network boot). Then removing the original adapter and rebooting.	The bootlist command succeeds, but the boot fails from the specified device, and AIX will not receive control.	Use a device in the first 144 I/O slots.
Using DLPAR to add an adapter whose probe order will make it displace a current bootable device, and then rebooting.	The boot fails, and AIX will not receive control.	Move the boot device to one of the first 144 I/O slots or remove the previously added device.
Selecting a device in a slot beyond the first 144 I/O slots as a dump device for a firmware-assisted dump.	The sysdumpdev command does not allow devices in slots beyond the first 144 I/O slots to be selected as firmware-assisted dump storage devices. An error occurs during the firmware-assisted dump configuration, and a traditional AIX dump automatically becomes available.	Use a device in the first 144 I/O slots for firmware-assisted dumps.
Using DLPAR to add an adapter whose probe order will make it displace a currently valid firmware-assisted dump target device, and then rebooting after the dump.	The firmware-assisted dump process fails during the boot process and displays an error message. The traditional AIX dump still runs to retrieve the dump image.	Avoid displacing the selected firmware-assisted dump target device or reconfiguring the sysdumpdev command for the firmware-assisted dump target device selection, and specify a device within the first 144 I/O slots.
Using DLPAR to add an adapter whose probe order will make it displace a currently valid firmware-assisted dump target device, and then rebooting.	The sysdumpdev command does not allow devices in slots beyond the first 144 I/O slots to be selected as firmware-assisted dump storage devices. An error occurs during the firmware-assisted dump configuration, and a traditional AIX dump automatically becomes available.	Use a device in the first 144 I/O slots for firmware-assisted dumps.

Memory requirements

AIX 7 with 7200-02 minimum current memory requirements vary, based on the configuration.

A minimum current memory requirement for AIX 7 with 7200-02 is 2 GB.

AIX 7 with 7200-02 requires the minimum current memory requirement to increase as the maximum memory configuration or the number of devices scales upward, or both. Larger maximum memory configurations or extra devices scale up the minimum current memory requirement. If the minimum memory requirement is not increased along with the maximum memory configuration, the partition hangs during the initial program load (IPL).

Host Ethernet Adapter memory requirements

Configurations containing a Host Ethernet Adapter (HEA) require more memory than the 2 GB minimum. Each logical HEA port that is configured requires an extra 102 MB of memory. The minimum memory requirement for configurations with one or more HEA ports that are configured, where n is the number of HEA ports, is 512MB + n*102MB.

Paging space requirements

AIX 7 with 7200-02 creates a 512 MB paging space (in the /dev/hd6 directory) for all new and complete overwrite installations.

Large page (16 MB/16 GB) zeroing enhancements

The content of large page (16MB/16GB) in shared memory regions are zeroed when the region is deleted. You can use the `pgz_mode` tunable that is available with the `vmo` command to reduce the time that is needed to zero the pages by zeroing the pages in a nonuniform memory access (NUMA) aware parallel manner by using multiple kernel threads. You can specify the following values for the `pgz_mode` tunable:

Serial mode

The default option for previous release of the AIX operating system.

Synchronous parallel mode

Pages are deleted in parallel and in context of the thread that initiated the deletion.

Asynchronous parallel mode

The thread that initiated the deletion, offloads the work of zeroing the pages in parallel to a kernel process and continues with the deletion process.

Large page (16 MB) pool creation and resizing enhancements

A 16 MB page pool is created and resized dynamically. This 16 MB pool is created by using the `lpgg_size` tunable and the `lpgg_regions` tunable that are part of the `vmo` command. You can use the `pgz_lpgrow` tunable that is available with the `vmo` command to reduce the time that is needed to create or resize the 16 MB page pool by zeroing the large pages in parallel and by using multiple kernel threads. You can specify the following values for the `pgz_lpgrow` tunable:

Serial mode

The default option for previous release of the AIX operating system.

Synchronous parallel mode

Pages are zeroed in parallel and in context of the `vmo` command.

Asynchronous parallel mode

The `vmo` command offloads the work of zeroing the pages in parallel to a kernel process and continues to the next step in the pool creation or resizing process.

Disk requirements

AIX Version 7.2 requires a minimum of 20 GB of physical disk space for a default installation that includes all devices, the Graphics bundle, and the System Management Client bundle.

The following table provides information about disk usage when you install AIX 7 with 7200-02.

Location	Allocated (Used)
/	352 MB (174 MB)
/usr	2144 MB (1876 MB)
/var	192 MB (38 MB)
/tmp	96 MB (1 MB)
/admin	128 MB (1 MB)
/opt	96 MB (82 MB)
/var/adm/ras/livedump	256 MB (1 MB)

Note:

1. If the `/tmp` directory has less than 64 MB, it is increased to 64 MB during a migration installation so that the AIX 7 with 7200-02 boot image is successfully created at the end of the migration.
2. The boot logical volume must be of size 24 MB. The pre-migration script in the `usr/lpp/bos` directory on your media or in your NIM Shared Product Object Tree (SPOT) will check the storage space. During the migration operation, `hd5` (the boot logical volume) will be increased if necessary. The logical partitions must be contiguous and must be located within the first 4 GB of the disk.

You must format the SCSI disk properly before you install the AIX operating system on it. The AIX operating system 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 supported only 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.

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.

The AIX_FCPARRAY driver is not supported in AIX 7 with 7200-02. Before you migrate to AIX 7 with 7200-02, you must use the **manage_disk_drivers** command to convert any FCP array disks from the AIX_FCPARRAY driver to the AIX_AAPCM driver. The AIX_AAPCM driver supports Multiple Path I/O (MPIO) devices.

Disk capacity

SAS RAID controllers and Fibre Channel controllers support attached arrays and disks with capacities, which exceed 2 TB. The maximum supported capacity (beyond 2 TB) is limited by either the attached storage subsystem or the upper level logical storage management.

For additional information about SAS RAID controllers, see the SAS RAID controller for AIX topic.

For information about AIX capacity limitations for logical storage, see the Limitations for logical storage management topic.

Installing

This section contains information about installing AIX 7.2 that supplements the information that is contained in the Installation and Migration topic.

Installing AIX 7 with 7200-02

The following methods can be used to install AIX 7 with 7200-02:

- Complete overwrite installation
- Preservation installation
- Migration installation

Note: After you install or migrate a system to AIX 7 with 7200-02, 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 7 with 7200-02 to a lower level of AIX are not supported.

Note: Using the update media is recommended for updates. If you use the base media to update, some ODM settings (such as SRC subsystems settings) might be lost. If you use base media, or a software source create from base media, for an **update_all** operation, previous history of your software installation will be removed. Whenever a base image is installed, the history of the fileset installations are reset. The history is maintained when service updates are used for an **update_all** operation.

The minimum size of the boot logical volume is 24 MB. If your current boot logical volume is 16 MB or less, the installation process tries to increase it. However, partitions in a boot logical volume must be contiguous, and within the first 4 GB on the disk. If your system does not have free space that meets these requirements, a message indicates that there is not enough space to expand **hd5** (the boot logical volume).

To install AIX 7 with 7200-02, follow the instructions in the Installing the base operating system topic.

Installing AIX using a USB flash memory stick

AIX 7 with 7200-02 supports installation using a USB flash memory stick on POWER8 and later systems. A USB flash memory stick containing an AIX installation image can be created by first downloading the AIX installation image from the IBM Entitled System Support website. A single volume installation image of AIX 7 with 7200-02 is made available on the IBM Entitled System Support website for writing to USB flash memory. After downloading the AIX installationx the image can be written to a USB flash memory stick. IBM recommends using a recently manufactured USB flash memory stick. The minimum capacity requirements of the USB flash memory stick for AIX installation is 16 GB. On an AIX or a Linux based system, the image can be written to a USB flash memory stick using the `dd` command:

Additionally, it is possible to create an installable USB flash memory stick by copying the image directly from AIX DVD installation media by using the `dd` command:

```
$ dd if=/dev/cd0 of=/dev/usbms0 bs=4k
```

Comparable commands exist on Windows-based machines for writing the installation image to a USB flash memory stick.

After the USB flash memory stick AIX installation media has been created, the media can be used on POWER8 and later systems similar to the DVD install media.

Note: The AIX `bootlist` command can only recognize the USB flash memory stick (`usbmsX`) as a bootable device if the USB flash memory stick was present during IPL of the AIX partition. On POWER8 and later systems, the SMS menus can always be used to assign the USB flash memory stick as the boot source.

AIX and IBM Power Systems USB implementation is compliant with relevant USB standards. In the unlikely event a USB flash memory stick is not properly recognized by AIX, IBM recommends using a different brand of device.

NIM installations with updated LPP_SOURCE

NIM installations by using an `LPP_SOURCE` directory that contains base images from a prior release and that contains updates to the current release require that you use an `image_data` resource during operating system installations.

When you use an `LPP_SOURCE` directory that contains base images from a prior release and updates to the current release, create an `image_data` resource to use for any operating system installations. The SPOT must be updated with the updates added to the `LPP_SOURCE` directory, or a new SPOT must be created. In that SPOT, copy the `image.template` file that is found at `<SPOT_LOCATION>/lpp/bosinst/image.template` to a new location outside of the SPOT. Create a new NIM `image_data` resource that points to that location. Use that NIM `image_data` resource for all operating system installations.

Certain file systems have grown in size, and the default `image.data` file that is used during an operating system installation comes from the `bos` image in your `LPP_SOURCE` directory, which is the prior release `image.data` file.

Network Installation Management

Network Installation Management (NIM) includes a readme file that is installed with the NIM Master `bos.sysmgt.nim.master` file set. The path name of the file is `/usr/lpp/bos.sysmgt/nim/README`.

IBM SDK and JRE for AIX, Java Technology Edition, Version 7 64-bit

Java™ Technology Edition, Version 7 64-bit is available on the AIX base media.

IBM software development kit (SDK) and Java Runtime Environment (JRE) for AIX, Java Technology Edition is released in `JavaV.x` file sets, where *V* represents the version of Java, such as Java 7, and *x* is the individual file set, such as `Java7_64.sdk`.

To check whether a more recent service refresh is available for a version of Java, see the AIX Download and service information website.

Note: Java 5 is not available on the AIX 7 with 7200-02 base media or AIX Version 7.2 Expansion Pack media. Other versions of Java are available on the AIX 7 with 7200-02 Expansion Pack media.

Fileset changes

To provide you with more control over the software that is installed on your system, the `bos.net.tcp.client` and `bos.net.tcp.server` filesets are split into 33 new filesets.

The core code for each original fileset is in the `bos.net.tcp.client_core` and `bos.net.tcp.server_core` filesets. Requisites for software that is shipped with the AIX operating system (the `bos.net.tcp.client` and `bos.net.tcp.server` filesets) are changed to the `bos.net.tcp.client_core` and `bos.net.tcp.server_core` filesets. Additional requisites are added to the other new fileset as needed.

The original filesets still exist to satisfy any requisites from other software. The original filesets have requisites to all the new filesets to ensure that all the requirements are met.

To remove any of the new filesets, you must first remove either the `bos.net.tcp.client` fileset or the `bos.net.tcp.server` fileset. To remove the `bos.net.tcp.client` fileset, the `bos.net.tcp.server` fileset, or a new fileset, run the `lspp -d fileset_name` command. If no other software has requisites to the fileset that you want to remove, the removal is possible.

During an operating system migration, code changes occur, so that all the system configuration and user configurable files, which were owned by the `bos.net.tcp.client` and `bos.net.tcp.server` filesets, are merged by the new filesets that now own the files.

The list of new filesets follow:

- `bos.net.tcp.client_core`
- `bos.net.tcp.server_core`
- `bos.net.tcp.bind`
- `bos.net.tcp.bind_utils`
- `bos.net.tcp.bootp`
- `bos.net.tcp.dfpd`
- `bos.net.tcp.dhcp`
- `bos.net.tcp.dhcpd`
- `bos.net.tcp.ftp`
- `bos.net.tcp.ftpd`
- `bos.net.tcp.gated`
- `bos.net.tcp.imapd`
- `bos.net.tcp.mail_utils`
- `bos.net.tcp.ntp`
- `bos.net.tcp.ntpd`
- `bos.net.tcp.pop3d`
- `bos.net.tcp.pxed`
- `bos.net.tcp.rcmd`
- `bos.net.tcp.rcmd_server`
- `bos.net.tcp.sendmail`
- `bos.net.tcp.slip`
- `bos.net.tcp.slp`
- `bos.net.tcp.snmp`
- `bos.net.tcp.snmpd`
- `bos.net.tcp.syslogd`
- `bos.net.tcp.tcpdump`
- `bos.net.tcp.telnet`
- `bos.net.tcp.telnetd`
- `bos.net.tcp.tftp`
- `bos.net.tcp.tftpd`
- `bos.net.tcp.timed`
- `bos.net.tcp.traceroute`
- `bos.net.tcp.x500`

The encoded software in the `bos.net.uucp` fileset moved to the `bos.net.uucode` fileset.

Migrating

You can do an operating system migration to AIX 7 with 7200-02 from any level of the AIX operating system, on a system that supports AIX 7.2 boot. Installing any new level of AIX requires more disk space than previous levels. Verify that you have enough free space in the file systems, or that you have free partitions in the rootvg. Migrating requires slightly more free space than a basic installation.

If you are using a NIM **lpp_source** created with a prior level base media and later levels of updates added, you should initially create the **lpp_source** with the base media at the same release date or later than the level of AIX 5.3, AIX 6.1, or AIX 7.1 that you are migrating from. The last 4 digits of the output of the **oslevel -s** command represent the year and week of the service pack currently installed (YYWW).

The default value of the **j2_inodeCacheSize** tunable parameter was changed from 400 to 200. The **j2_inodeCacheSize** tunable parameter allows approximately 50,000 open files per gigabyte (GB) of main memory, and improves system performance. However, the **j2_inodeCacheSize** tunable parameter value of 200 can cause issues in systems that have a small amount of main memory (4 GB or less) and many concurrent users or many concurrent open files. To fix these issues, you can change the values for the **j2_inodeCacheSize** and the **j2_metadataCacheSize** tunable parameters from 200 to the previous value of 400 by running the following command:

Note: When you run the following command, the current value and boot value of both the tunable parameters are reset.

```
iio -p -o j2_inodeCacheSize=400 -o j2_metadataCacheSize=400
```

If the issues are not fixed after you change the values for the **j2_inodeCacheSize** and the **j2_metadataCacheSize** tunable parameters, you can contact IBM Support.

IBM License Metric Tool

The IBM License Metric Tool (ILMT) version 7.2 is no longer supported. To learn more about the replacement version of ILMT Version 9.x, go to [IBM License Metric Tool 9.2](#).

Note: If you already have BigFix Lifecycle installed, you can leverage the same BigFix Enterprise Server (BES) for ILMT 9.x.

Java Version 5 removed

By default, Java Version 5 software is removed when you migrate to AIX 7 with 7200-02. However, you can keep Java 5 by changing the selection in the base operating system installation menus, or in the NIM **bosinst_data** resource. After the migration is complete and Java 5 is removed, you must change the PATH variable to `java7_64` in the `/etc/environment` file.

Note: Java 5 is not available on the AIX Version 7.2 base media or Expansion Pack media. Other versions of Java are available on the AIX Expansion Pack media.

IBM PowerSC Trusted Surveyor

IBM PowerSC™ Trusted Surveyor is not supported in AIX 7 with 7200-02. If you are migrating to AIX 7 with 7200-02, you must remove the `powersc.ts` fileset before you start the migration process. If you have WPARs that you are migrating, you must verify that the `powersc.ts` fileset is not installed on the WPARs.

Reliable Scalable Cluster Technology (RSCT)

When you upgrade to AIX 7 with 7200-02, RSCT Version 3.2.3.0 is installed and replaces the previous version of RSCT. For more information about RSCT, see the RSCT 3.2.3 Knowledge Center website.

When you migrate to AIX 7 with 7200-02 the `rsct.core.utils 3.2.3.0` fileset is applied. RSCT Version 3.2.3.0 is not compatible with the `rsct.vsd` fileset and the `rsct.lapi.rte` fileset that might already be installed on your system. You must deinstall the `rsct.vsd` fileset and the `rsct.lapi.rte` before you migrate to AIX 7 with 7200-02. After you remove the filesets, you must rename the `/opt/rsct` directory by running the `mv /opt/rsct /opt/rsct.old` command. If you do not remove the filesets and rename the directory, the `rsct.core.utils 3.2.3.0` fileset and other prerequisite RSCT filesets are not installed.

The following error occurs during the installation `rsct.core.utils 3.2.3.0` fileset if you do not remove the `rsct.vsd` fileset, the `rsct.lapi.rte` fileset, and rename the `/opt/rsct` directory:

```
rmdir(/opt/rsct): Do not specify an existing file.  
sysck: 3001-017 Errors were detected validating the files  
for package rsct.core.utils.
```

```
0503-464 installp: The installation has FAILED for the "usr" part
```

To recover from a failed migration after you remove the filesets and rename the directory, run the `smitty update_all` command to install the missing RSCT filesets.

DSM

The `dsm.core` ships a `/etc/ibm/sysmgmt/dsm/overrides/dsm.properties` file, which allows the user to override SSH configuration. If this file was modified, the file needs to be backed up manually before an update or a migration, as it is overwritten.

Thin Servers

If you migrate any previous version of the AIX Common Operating System Image (COSI) and associated AIX Thin Servers to the AIX 7 with 7200-02, it is recommended that you delete any dump device that is associated with the migrated Thin Servers and re-create the Thin Servers.

Additionally, you must install the `devices.tmiscsw.rte` fileset on the NIM master for the AIX 7 with 7200-02 Thin Server to create a dump device. The `devices.tmiscsw.rte` fileset is available in the AIX Expansion Pack.

IBM Subsystem Device Driver

AIX Version 7.2 does not support the IBM Subsystem Device Driver (SDD) for IBM TotalStorage Enterprise Storage Server[®], the IBM TotalStorage DS family, and the IBM System Storage[®] SAN Volume Controller. If you are using SDD, you must transition to Subsystem Device Driver Path Control Module (SDDPCM) or AIX Path Control Module (PCM) for the multipath support on AIX for IBM SAN storage. SDD to SDDPCM migration scripts are available to help you with the transition.

Contact IBM storage technical support to request access to the migration scripts.

For more information about the available multipath I/O solutions and supported AIX versions for IBM SAN storage products, see the IBM System Storage Interoperation Center (SSIC) website.

DB2 migration

IBM DB2® Version 10.5 with FP7 is available on the AIX base media. You can upgrade your DB2 environment from DB2 Version 10.1, 9.8, or 9.7 to DB2 Version 10.5. For more information about upgrading to DB2 Version 10.5, see the Upgrade to DB2 Version 10.5 topic.

Configuring

This section contains information about configuring the AIX operating system.

Dynamic queue depth for MPIO devices

A dynamic change occurs when you change a device attribute while the device is in the opened state. In the AIX operating system, you can change certain device attributes while the device is in the opened state by running the **chdev** command with the **-U** flag. In AIX 7 with 7200-02, you can dynamically change the `queue_depth` attribute for MPIO devices.

For each device that the AIX `scsidisk` device driver manages, a separate command queue is created. This queue is used as a buffer for the SCSI commands that are sent to the device. The `queue_depth` attribute represents the maximum number of SCSI commands that are allowed in the queue. The initial setting for the `queue_depth` attribute is configured in the ODM when the device is installed. In previous releases of the AIX operating system, the `queue_depth` attribute was static when a device was in the opened state. In AIX 7 with 7200-02, you can change the `queue_depth` attribute while the disk is in an opened state by running the **chdev -U -l hdiskX -a queue_depth=NEW_VALUE** command, where `NEW_VALUE` is the new queue depth.

libusb library

The `libusb` library is an open source C library that is supported on AIX 7 with 7200-02. The `libusb` library provides generic access to USB devices. You can run `libusb` applications on AIX 7 with 7200-02 by recompiling the applications with this new `libusb` package. You can download the `libusb` RPM Package Manager (RPM) from the <https://public.dhe.ibm.com/aix/freeSoftware/aixtoolbox/RPMS/ppc/libusb/> website. For more information about using the `libusb` library, see the following topics:

- `usbllibdev` Special File
- `USBLIBDD` Passthru Driver

Thin provisioning

AIX 7 with 7200-02 includes space reclamation support for thin provisioned disks that were added by using the Logical Volume Manager (LVM). When a sufficiently large amount of disk space from a physical volume is available, LVM releases this disk space back to the storage device. This function is enabled by default and can be turned off by using the **ioo** command. The space reclamation function is supported on only disks that are exposed to the AIX operating system with `N_Port` ID virtualization (NPIV) or direct attached FC adapters. Thin provisioning is available on the following storage products that support SCSI thin provisioning (Logical Block Provisioning) commands:

- IBM DS8000
- IBM XIV
- EMC Symmetric family

For information about displaying space reclamation information, see the **lvmstat** command.

Diagnostics tasks

AIX 7 with 7200-02 supports scheduling periodic diagnostics multiple times a day instead of only once per day. To schedule periodic diagnostics multiple times a day, run the **diag** command and select **Task Selection > Periodic Diagnostics** and specify a time interval between each test.

AIX 7 with 7200-02 supports formatting and certifying up to 10 disks in parallel instead of a single disk at a time. To format or certify multiple disks, run the **diag** command and from the **Task Selection** menu, select **Certify Media in Parallel** or **Format Media in Parallel**. All eligible resources are displayed in a list. You can select up to 10 disks from the list. The status of the operation is updated every 5 seconds. The time the operation takes to complete for each disk is based on various factors such as disk type, size, and speed.

Limitations and restrictions

This section lists restrictions and limitations that apply to AIX 7 with 7200-02.

Data Address Watchpoint Register (DAWR)

The Data Address Watchpoint Register (DAWR) is a hardware register that is used by debuggers to detect read or write access to a memory location specified by its effective address. DAWR is used by debuggers, such as the **dbx** command, to implement watchpoints.

The following POWER9 processor-based servers have an erratum when you are using DAWR that can cause a server to crash. Therefore, DAWR is disabled on the following POWER9 processor-based servers:

- IBM Power System S914 (9009-41A)
- IBM Power System S924 (9009-42A)
- IBM Power System H922 (9223-22H)
- IBM Power System H924 (9223-42H)
- IBM Power System S922 (9009-22A)
- IBM Power System S922L (9008-22L)

DAWR is a privileged register that requires a call to the **ptrace** subroutine. When you use the **ptrace** subroutine with the **PT_WATCH** or **PTT_WATCH** parameters to set and remove watchpoints, the subroutine call returns success but the watchpoint is not set. In this scenario, the KDB kernel debugger and the **dbx** watchpoint subcommands do not display an error message. However, when you exit the KDB kernel debugger an error message is displayed.

Note: APAR IJ04848 adds kernel changes that make watchpoint requests fail explicitly. These changes might prevent any confusion when you are using watchpoints on a POWER9 processor-based server.

For more information about watchpoints, see the following topics:

- **ptrace** Subroutine
- **dbx** Command
- **kdb** subcommands
- KDB kernel debugger

Upgrading IBM Security Directory Server

IBM Security Directory Server Version 6.4 is available on the AIX base media. To upgrade to Security Directory Server Version 6.4, you must upgrade from Security Directory Server Version 6.3. For instructions about upgrading to Security Directory Server Version 6.4, see the Upgrade an instance of IBM Security Directory Server topic.

You might have to manually accept the license terms when you install IBM Security Directory Server version 6.3.0.17, or later, with the AIX operating system. The installation process stops until the license terms are accepted, which prevents an unattended installation when the license is not already installed. For more information, see the License acceptance required for Security Directory Server 6.3.0.17 (or later) topic.

AIX 7.2 Enterprise Edition 1.1, or later

Previous versions of AIX Enterprise Edition included IBM® Tivoli® Monitoring Version 6.2.3 and Version 6.3.0. However, AIX 7.2 Enterprise Edition 1.1, or later, includes only Tivoli Monitoring Version 6.3.0. To use AIX 7.2 Enterprise Edition 1.1, or later, you must upgrade to Tivoli Monitoring Version 6.3.0.

OpenSSL version 1.0.2

OpenSSL 0.9.8 shared objects (libcrypto.so.0.9.8 and libssl.so.0.9.8) are also included in the OpenSSL 1.0.2.1100 fileset libraries for compatibility with earlier versions of OpenSSL.

OpenSSL versions 0.9.8 and 1.0.1 are no longer supported by IBM. The OpenSSL 0.9.8 shared objects are retained in the libraries as is. You should update your applications to use the newer version of the OpenSSL libraries.

Applications must use OpenSSL version 1.0.2 shared objects (libcrypto.so or libcrypto.so.1.0.0, and libssl.so or libssl.so.1.0.0) that are included in libraries of OpenSSL 1.0.2.1100 fileset to continue using the supported version of OpenSSL.

POWER8 hardware cryptography capability and OpenSSL version 1.0.2.1100

The OpenSSL version 1.0.2.1100 fileset and AIX 7 with 7200-02 can use the in-core cryptographic function that is available with POWER8 systems. To use this function, the following conditions must be met:

- Any existing applications that use an older version of the OpenSSL fileset must be recompiled with the latest headers and relinked to the newer 1.0.2 libraries that are included with the OpenSSL 1.0.2.1100 fileset.
- Applications that use the **dlopen** function to load the 0.9.8 version of the OpenSSL shared objects must be reconfigured to load the 1.0.2 version of the OpenSSL shared object.
- A future OpenSSL release that is incompatible must be recompiled with the latest headers and relinked with the newer binaries.

The following algorithms are implemented in OpenSSL version 1.0.2 that can use the POWER8 in-core cryptographic capabilities:

- AES-128-CBC
- AES-192-CBC
- AES-256-CBC
- AES-128-ECB
- AES-192-ECB
- AES-256-ECB
- AES-128-GCM
- AES-192-GCM
- AES-256-GCM
- AES-128-XTS
- AES-192-XTS
- AES-256-XTS
- SHA1
- SHA224
- SHA256
- SHA384
- SHA512

Note: Applications that use earlier versions of the OpenSSL fileset continue to function and use the OpenSSL default software cryptographic modules on the POWER8 system.

To download the latest version of the OpenSSL fileset, go to the AIX Web Download Pack Programs website.

OpenSSH Version 7.1p1

The OpenSSH file set has been updated to open source community 7.1p1 release with AIX VRMF 7.1.102.1100.

- The OpenSSH file set includes the patch for GSSAPI Key Exchange feature.
- The OpenSSH file set has been compiled with openssl 1.0.2k version.

Note: This file set can be installed on either versions of openssl because of the compatibility between openssl 1.0.1 and 1.0.2.

- All of the vulnerabilities reported in the higher version of openSSH (including 7.5p1 release) have been back ported to this file set.

OpenSSH 6.0p1 with VRMF 6.0.0.6204, or earlier, are no longer supported. To download the latest version of the OpenSSH fileset, go to the AIX Web Download Pack Programs website.

GSKit version requirement for NIST compliance

GSKit version 8.0.50.59 is provided on the AIX 7 with 7200-02 Expansion Pack media.

You must use GSKit version 8.0.50.10, or later, when you use IP Security with Rivest-Shamir-Adleman (RSA) key lengths that are greater than 2048 bits. The minimum RSA key length of 2048 bits is a requirement for complying with the National Institute of Standards and Technology (NIST) standard as defined in Special Publication 800-131A.

nmon command changes

The behavior of the nmon recordings for the PCPU and SCPU sections are not recorded by default in AIX Version 7.2. To enable the recording of the PCPU and SCPU sections, run the nmon recording with the **-y PCPU=on,SCPU=on** options. When the PCPU and SCPU sections are enabled, the recorded format is the same as the format in previous versions of the AIX operating system. For more information about the **nmon** command, see the nmon command topic.

Perl

The previous version of Perl was upgraded to Perl Version 5.20.1 in AIX Version 7.2. Perl is a separate 3rd-party open source package that is not owned by IBM. The Perl package might not preserve full compatibility across all versions. If you are moving Perl scripts to version 5.20.1, you must complete an evaluation of the scripts to verify that they continue to work as expected. For more information about Perl, see the Perl Programming Documentation website.

Code removed from AIX Version 7.2

The following code and functions were removed from AIX Version 7.2, or later:

- Fcpararrayhead driver
- graPHIGS programming interface
- Network Data Administration Facility (NDAF)
- Network Information Services + (NIS+)

Note: NIS is still available.

- IBM Systems Director Console for AIX
- IP over Fibre Channel (FC) driver

Licensed programs not supported in AIX Version 7.2

The following licensed programs are not supported in AIX Version 7.2:

- AIX Fast Connect
- Performance Toolbox for AIX
- IBM PowerSC Trusted Surveyor
- AIX Profile Manager

CIFS Client fileset

The `bos.cifs_fs` software package has moved to the AIX Version 7.2 Expansion Pack media. The CIFS Client is provided as-is (without support).

Shared processor partition virtual CPU limit

The shared processor partitions in the AIX operating system are limited to a maximum of 128 virtual processors. Each virtual processor contains up to eight hardware threads and allows up to 1024 logical processors for POWER8 Systems that run in SMT8 mode. If your configuration requires more AIX LPAR processors, you must use dedicated processors.

Additional information

IBM AIX Version 7.2 Knowledge Center

To view the most current version of the AIX Version 7.2 information, see the AIX Knowledge Center website.

To order AIX Version 7.2 Knowledge Center on physical media, you can place an order for feature 2321 on product ID 5692-A6P on the Entitled Software Service website or in the eConfig tool.

You can also download the AIX Version 7.2 Knowledge Center as a **.zip** file from the Entitled Software Service website. After you download the **.zip** file, you must extract the **.zip** file and run the **setup.exe** file to install the AIX Version 7.2 Knowledge Center.

IBM Hyperconverged Systems

AIX on IBM Hyperconverged Systems that are powered by Nutanix provides simplified management through a hyperconverged infrastructure. You can run AIX Version 7.2.2 with Service Pack 2, or later, with APAR IJ05283 and APAR IJ06373 on IBM Hyperconverged Systems with POWER8 based CS821 and CS822 nodes.

AIX Version 7.2.2 with Service Pack 2, or later, runs fully virtualized on the Nutanix Acropolis Hypervisor and the corresponding virtual machine (VM) lifecycle is managed by the Nutanix PRISM graphical user interface (GUI). IBM Hyperconverged Systems support is integrated into the same version of the AIX 7.2.2 operating system that runs on IBM PowerVM platforms. IBM Hyperconverged Systems are binary compatible with the AIX operating system running on PowerVM per the AIX binary compatibility guarantee.

For more information on IBM Hyperconverged Systems, see the IBM Hyperconverged Systems topic.

AIX Dynamic System Optimizer

The IBM AIX Dynamic System Optimizer (DSO) extends the features that are provided by the Active System Optimizer (ASO) to automatically adjust some system settings to maximize the efficiency of your system. This automates the difficult job of manually tuning those system settings to optimize eligible workloads. The additional features that are provided by DSO are large page optimization and data stream prefetch optimization.

DSO is no longer a stand-alone feature and is included in AIX Version 7.2, or later, as part of ASO. For more information about DSO and ASO, see the AIX Dynamic System Optimizer topic.

Linux SHA-256 and SHA-512 password cryptographic algorithm

A Loadable Password Algorithm (LPA) model is available that supports the Linux SHA-256 and SHA-512 password cryptographic algorithm. The Linux SHA-256 and SHA-512 password cryptographic algorithm is supported by other operating systems and was published in the public domain by Ulrich Drepper (<https://www.akkadia.org/drepper/SHA-crypt.txt>).

The LPA model is included in the pwmod Licensed Program Product (LPP) package. You can get the pwmod package from the AIX Web Download Pack website.

Server-side support for new Unicode locales

For information about server-side support for new Unicode locales, see the Supported languages and locales topic.

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