IBM AIX 7.1 with Technology Level 5

Release Notes

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 19 .

Third edition (May 2018)

This edition applies to IBM® AIX® 7.1 with Technology Level 5 and to all subsequent release and modifications until otherwise indicated in new editions.

Contents

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 7.1 with Technology Level 5 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.
Italics	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.

Read before installing AIX 7 with 7100-05

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 7100-05 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.

Versions of the AIX operating system that support POWER8 processor-base servers

There are minimum AIX operating system level requirements when you are supporting the following POWER8® systems:

- IBM Power System S814 (8286-41A)
- IBM Power System S824 (8286-42A)
- IBM Power System S822 (8284-22A)

When you support those systems, you must install the following versions of the AIX operating system, or a later version:

- AIX levels that support any I/O configuration:
  - AIX Version 7.1 with the 7100-03 Technology Level and Service Pack 3 and APAR IV56367
- AIX levels that support only virtualized I/O configurations:
  - AIX Version 7.1 with the 7100-03 Technology Level and Service Pack 1
  - AIX Version 7.1 with the 7100-02 Technology level and Service Pack 1
  - AIX Version 7.1 with the 7100-01 Technology Level and Service Pack 6

Installation tips

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

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 7100-05, 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 desired, 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 made when initializing the installation, or using the **ACCEPT_LICENSES** field in a customized **bosinst.data** file, then this will constitute SWMA acceptance.

Service

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 needed to run AIX 7 with 7100-05.

Required hardware

Only 64-bit Common Hardware Reference Platform (CHRP) machines running selected PowerPC® 970, POWER4, POWER5, POWER6®, POWER7®, POWER8, POWER9, and Power10 processors that implement the Power Architecture® Platform Requirements (PAPR) are supported.

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

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

Note: RS64, POWER3, and 604 processors, 32-bit kernel, 32-bit kernel extensions, and 32-bit device drivers are no longer supported.

Firmware

I/O devices IPL limitation

Because of a firmware memory size limitation, only I/O devices in the first 144 I/O slots 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.

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

Table 1. Scenarios for partitions with more than 144 assigned I/O slots (continued)		
Scenario	**Result**	**Resolution**
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 7100-05 minimum current memory requirements vary, based on the configuration.

A general rule for a minimum current memory requirement for AIX 7 with 7100-05 is 512 MB. A smaller minimum current memory might support a configuration with a small number of devices or a small maximum memory configuration. To install the AIX 7 with 7100-05 operating system with only 512 MB, you can overwrite only the existing operating system, and you cannot install any bundles or devices. If you update the AIX operating system with the **install_all_updates** command, your system must have more than 512 MB.

AIX 7 with 7100-05 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 additional 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 512 MB minimum. Each logical HEA port that is configured requires an additional 102 MB of memory. The minimum memory requirement for configurations with one or more HEA ports configured, where n is the number of HEA ports, is 512MB + n*102MB.

Paging space requirements

AIX 7 with 7100-05 creates a 512 MB paging space (in the /dev/hd6 directory) for all new and complete overwrite installations.

Disk requirements

AIX 7 with 7100-05-03 requires a minimum of 10 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 7100-05-03.

Location	Allocated (Used)
/	96 MB (33 MB)
/usr	2048 MB (1829 MB)
/var	192 MB (30 MB)
/tmp	96 MB (4 MB)
/admin	128 MB (1 MB)

Location	Allocated (Used)
/opt	96 MB (87 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 7100-05 boot image is successfully created at the end of the installation.

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.

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.

VPM throughput mode changes for Power10

When Power10 systems run in shared processor mode, the default value of the throughput mode for the virtual processor management (VPM) is 2. When you migrate the system to or from a Power10 system, and later, the AIX operating system automatically changes the default value of the throughput mode for the VPM. During boot operation, the AIX operating system selects the default value of the **vpm_throughput_mode** tunable parameter of the **schedo** command based on the type of server on which the LPAR is running. The value of the **vpm_throughput_mode** tunable parameter that is selected by the AIX operating system is preserved and used on the destination server. On Power10 systems, you can switch to the recommended value of 2 for the **vpm_throughput_mode** tunable parameter by using the following command:

```
schedo -d vpm_throughput_mode
```

Note: When you migrate to or from a Power10 system, and later, it is recommended to move the operating system level to 7300-00, 7200-05-03-2147, 7200-04-05-2148, 7100-05-09-2148 or later. Without this feature that enables you to change the **vpm_throughput_mode** tunable parameter by using the **schedo** command, updating the operating system levels to 7200-05-00-2037, 7200-04-03-2038, and 7100-05-07-2037 might override the value set for the **vpm_throughput_mode** tunable parameter.

Installation, migration, upgrade, and configuration information

Installation

This section contains information about installing AIX 7.1 that supplements the information contained in the Installation and Migration topic.

Installing AIX 7 with 7100-05

The following methods can be used to install AIX 7 with 7100-05:

- Complete overwrite installation
- Preservation installation
- Migration installation

Note: After you install or migrate a system to AIX 7 with 7100-05, 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 7100-05 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.

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 will indicate that there is not enough space to expand **hd5** (the boot logical volume).

To install AIX 7 with 7100-05, follow the instructions in the Installing the base operating system topic.

Installing AIX using a USB flash drive

AIX 7 with 7100-05 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 7100-05 is made available on the IBM Entitled System Support website for writing to USB flash memory. After downloading the AIX installation image, 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:

```
$ dd if=/tmp/AIX_V7.2_Base_Install_7100-05-00_flash_102017.iso  of=/dev/usbms0 bs=4k
```

Additionally, you can create an installable USB flash memory stick by copying the image directly from AIX DVD installation media 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 drive.

After the USB flash drive 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 drive 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 drive as the boot source.

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

NIM installations with updated LPP_SOURCE

NIM installations 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 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 used during an operating system installation comes from the **bos** image in your LPP_SOURCE directory, which is the prior release image.data file.

⟩❘Update Access Keys on Power10

IBM Power10, or later processor-based servers include an AIX update access key (UAK) that is checked when you update the AIX operating system. UAKs include an expiration date. Informational messages are generated when the release date for this AIX operating system has passed the expiration date of the UAK. Informational messages are also generated when the server boots or during the live partition mobility (LPM) operation and the current AIX operating system level has passed the expiration date of the UAK. Additionally, the server periodically checks and informs the administrator about UAKs that are about to expire, UAKs that have expired, or UAKs that are missing.

Support for Update Access Keys on Power10 processor-based servers is included in IBM AIX 7.2 with Technology Level 5 and Service Pack 7200-05-03-2136, or later, and AIX Version 7.1 with the 7100-05 Technology Level and Service Pack 7100-05-09-2136, or later.

❘⟨

IBM Systems Director Software

The IBM® Systems Director has gone end of service (EOS) and is no longer supported on the AIX operating system. The following software, and `tivoli.tivguid`, are no longer installed by default.

The following filesets are no longer supported:

- `DirectorCommonAgent` (All required files of Director Common Agent, including JRE, LWI)
- `DirectorPlatformAgent` (Director Platform Agent for IBM Systems Director on AIX)
- `sysmgt.cim.providers.metrics` (Metrics Providers for the AIX operating system)
- `sysmgt.cim.providers.osbase` (Base Providers for the AIX operating system)
- `sysmgt.cim.providers.scc` (Security Control Compliance Providers for the AIX operating system)
- `sysmgt.cim.providers.smash` (Smash Providers for the AIX operating system)
- `sysmgt.cim.smisproviders.hba_hdr` (SMI-S HBA&HDR Providers for the AIX operating system)
- `sysmgt.cim.smisproviders.hhr` (SMI-S HHR Providers for the AIX operating system)
- `sysmgt.cim.smisproviders.vblksrv` (SMI-S Storage Virtualizer Providers for the AIX operating system)

- `sysmgt.cimserver.pegasus.rte` (Pegasus CIM Server Runtime Environment)
- `cas.agent` (Common Agent Services Agent)
- `lwi.runtime` (Lightweight Infrastructure Runtime)

If you remove the software in the above list, the following dependent software will also be removed:

- `sysmgt.pconsole.apps.pda`
- `sysmgt.pconsole.apps.wdcem`
- `sysmgt.pconsole.apps.wrbac`
- `sysmgt.pconsole.apps.wsmit`
- `sysmgt.pconsole.rte`
- `artex.base.agent`

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`.

Java Technology Edition

The following versions of Java™ Technology Edition are available on the AIX 7.1.5 base media:

Table 2. Java versions			
Java Version	**Base media DVD1**	**Base media DVD2**	**Expansion pack**
Java Version 5 (32 bit)	None	None	All
Java Version 5 (64 bit)	None	None	All
Java Version 6 (32 bit)	None	None	All
Java Version 6 (64 bit)	None	None	All
Java Version 7 (32 bit)	None	All	None
Java Version 7 (64 bit)	`Java7_64.jre`, `Java7_64.sdk`, and Japanese messages	Remaining `Java7_64` software	None
Java Version 7.1 (32 bit)	None	None	All
Java Version 7.1 (64 bit)	None	None	All
Java Version 8 (32 bit)	`Java8.sdk`, `Java8.jre`, and Japanese messages	Remaining Java8 (32 bit) software	None
Java Version 8 (64 bit)	All except non-Japanese message filesets	Remaining message filesets	None

Only Java Version 8 will be installed for new overwrite or preservation operating system installation. For these installations, the *PATH* variable in the `/etc/environment` file will point to `java8_64`. If you upgrade to AIX 7 with 7100-05 or perform an operating system migration, all previous levels of Java remain on the system, and the `/etc/environment` *PATH* variable is not changed. Later, if you remove the previous levels of Java (Java Version 5, Java Version 6, and Java Version 7), then you must change the `/etc/environment` *PATH* variable to point to `java8_64`.

Note: It is recommended to use `java8_64`. There is no support for security vulnerabilities in Java Version 5 and Java Version 6.

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

Other installation information

Migration

You can do an operating system migration to AIX 7.1 from any level of the AIX operating system, on a system that supports AIX 7.1 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 will require slightly more free space than a basic installation.

When you migrate from AIX 5.3 or 6.1 to AIX 7.1, you can avoid the risk of down-leveling fixes previously installed on your AIX 5.3 or AIX 6.1 system by migrating to the latest available Technology Level of AIX 7.1. 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 or AIX 6.1 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.

```
ioo -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.

Reliable Scalable Cluster Technology (RSCT)

When you upgrade to AIX 7 with 7100-05, RSCT Version 3.2.3 is installed and replaces the previous version of RSCT. For more information about RSCT, see the RSCT 3.2.3 Knowledge Center.

When you migrate to AIX 7 with 7100-05 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 uninstall the `rsct.vsd` fileset and the `rsct.lapi.rte` before you migrate to AIX 7 with 7100-05. 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 of `rsct.core.utils 3.2.3.0` fileset if you do not remove the `rsct.vsd` fileset, and 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/sysmgt/dsm/overrides/dsm.properties` file which allows the user to override SSH configuration. If this file was modified, the file will need to be backed up manually before an update or a migration, as it will be overwritten.

xlC runtime software

When you migrate from an AIX 5L operating system to an AIX 7.1 operating system, the **xlC.aix50.rte** file set is replaced by the **xlC.aix61.rte** file set. If you upgraded the **xlC.aix50.rte** file set after you installed your system, the migration may replace your upgraded version with a downlevel version. Before you migrate to an AIX 7.1 operating system, save the level of your **xlC.aix50.rte** file set. After the migration is complete, compare your saved level of the **xlC.aix50.rte** file set with the **xlC.aix61.rte** file set. If the changes that you made to your level of the **xlC.aix50.rte** file set are not in the **xlC.aix61.rte** file set, upgrade the **xlC.aix61.rte** file set.

Thin Servers

If you migrate any previous version of the AIX Common Operating System Image (COSI) and associated AIX Thin Servers to the AIX Version 7.1, it is recommended that you delete any dump device 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 Version 7.1 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 7.1 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 additional information related to the available multipath I/O solutions and supported AIX versions for IBM SAN storage products, see the IBM System Storage Interoperation Center (SSIC) website.

libusb library

The libusb library is an open source C library that is supported on AIX 7 with 7100-05. The libusb library provides generic access to USB devices. You can run libusb applications on AIX 7 with 7100-05 by recompiling the applications with this new libusb package. You can download the libusb 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:

- usblibdev Special File
- USBLIBDD Passthru Driver

Limitations and restrictions

This section lists restrictions and limitations applying to AIX 7 with 7100-05.

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 License acceptance required for Security Directory Server 6.3.0.17 (or later).

AIX 7.1 Enterprise Edition 1.1

Previous versions of AIX Enterprise Edition included IBM® Tivoli®® Monitoring Version 6.2.3 and Version 6.3.0. However, AIX 7.1 Enterprise Edition 1.1 includes only Tivoli Monitoring Version 6.3.0. To use AIX 7.1 Enterprise Edition 1.1, 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 must 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 7100-05 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 POWER8 systems.

To download the latest version of the OpenSSL fileset, go to the AIX Web Download Pack Programs website. You must log in to the web page by using your IBMid and password to access and download the packages.

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 file set, go to the AIX Web Download Pack Programs website. You must log in to the web page by using your IBMid and password to access and download the packages.

GSKit version requirement for NIST compliance

GSKit version 8.0.50.44 is provided on the AIX Version 7.1.5 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 7 with 7100-05. 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 it was 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 5.28.1 in AIX 7.1 Technology Level 5 Service Pack 5. 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 5.28.1, 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.

Additional information

IBM AIX Version 7.1 Documentation

To view the most current version of the AIX Version 7.1 information, see the IBM Documentation for AIX website.

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. You must log in to the web page by using your IBMid and password to access and download the packages.

Cluster Aware AIX

The Cluster Aware function is part of the AIX operating system. Using Cluster Aware AIX (CAA) you can create a cluster of AIX nodes and build a highly available solution for a data center.

Migration support

Migration is not supported for AIX 6 with 6100-07 or for AIX 7 with 7100-01. To upgrade from AIX 6.1 with 6100-06 of Cluster Aware AIX (CAA) or from AIX 7 with 7100-00 of CAA to AIX 6 with 6100-07 or to AIX 7 with 7100-01, first remove the cluster, and then install AIX 6 with 6100-07 or install AIX 7 with 7100-01 on all nodes that will be included in the new cluster.

Removal of solidDB

CAA no longer uses an embedded IBM solidDB database. The `bos.cluster.solid` fileset still exists, but it is now obsolete. The solid and solidhac daemons are no longer used by CAA.

clusterconf command

CAA commands no longer support forced cleanup options.

The following is a list of options, by command, that are not supported in AIX 6 with 6100-07 or in AIX 7 with 7100-01.

```
chcluster      -f

clusterconf    -f, -s, -u

rmcluster      -f
```

The **clctrl** command can be used for tuning the cluster subsystem. Only tune the cluster subsystem at the direction of IBM customer support.

Vendor disk support

The CAA infrastructure now provides limited support for some disks that are managed by vender disk drivers. No disk events are available for these disks, but they can be configured into a cluster as a

repository or as shared disks. See the documentation for the clustering product that you are using, such as IBM PowerHA® SystemMirror® for AIX, for a complete list of vendor disk devices that are supported for your environment.

DB2 migration

IBM DB2® Version 10.5 with FP5 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.

Lightweight Infrastructure

For information about licensing LWI v7.1, see the Program-unique Terms section of the AIX license information documentation.

Server-side support for new Unicode locales

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

Notices

This information was developed for products and services offered in the US.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as follows:

© (your company name) (year).

Portions of this code are derived from IBM Corp. Sample Programs.

© Copyright IBM Corp. _enter the year or years_.

Privacy policy considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as the customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at http://www.ibm.com/privacy and IBM's Online Privacy Statement at http://www.ibm.com/privacy/details the section entitled "Cookies, Web Beacons and Other Technologies" and the "IBM Software Products and Software-as-a-Service Privacy Statement" at http://www.ibm.com/software/info/product-privacy.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at Copyright and trademark information at www.ibm.com/legal/copytrade.shtml.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.