# Procedures for AIX 6.1 and DS4000 Interoperability

The following procedures are required and apply to:

1. System p customers migrating from AIX 5.2/5.3 to AIX 6.1 using the DS4000 product family.
2. System p customers newly installing AIX 6.1 while using the DS4000 product family.

Note: Interoperability of AIX 6.1 with DS4000s is only supported on the DS4000 models noted in the following table and running with firmware v06.60.02.00. Other DS4000 firmware levels may be supported in the future.

**DS4300 (MT 1722) also known as FAStT 600**
**DS4500 (MT 1742) also known as FAStT 900**
**DS4700/DS4200 (MT 1814)**
**DS4800 (MT 1814)**

## I. Required AIX Levels

This section lists the minimum AIX release levels needed to support the DS4000 product family with MPIO. This section also includes the APAR/iFIX for each AIX release level. The APAR/iFIX must be installed before migrating from AIX 5.2/5.3 to AIX 6.1. The APAR/iFIX must be installed on AIX 6.1 in order for some models of the DS4000 to operate correctly.

There is an APAR available for each AIX release to ensure proper DS4000 operation.
The APARs are available from AIX fix central website
http://www-912.ibm.com/eserver/support/fixes/fixcentral/main/pseries/aix.

The following table shows the names of the APARs for each AIX release –

| AIX RELEASE | APAR NUMBER |
|---|---|
| 52TL10 | IZ13624 |
| 53TL6 | IZ13625 |
| 53TL7 | IZ13626 |
| 61TL0 | IZ13627 |

The APARs for some releases may not be published yet, but are available in iFIX format. The iFIXES are available from AIX ifix website
ftp://ftp.software.ibm.com/aix/efixes .

The following table shows the names of the iFIXES for each AIX release –

| AIX RELEASE | APAR NUMBER |
|---|---|
| 52TL10 | IZ13624.080201.epkg.Z |
| 53TL6 | IZ13625.080201.epkg.Z |
| 53TL7 | IZ13626.080201.epkg.Z |
| 61TL0 | IZ13627.080201.epkg.Z |

**Note : The following set of instructions will reference the APAR or iFIX listed above as MPIO_DS3_4K APAR/iFIX.**

## II. Instructions to migrate from AIX 5.2/5.3, to AIX 6.1.0

This section details the steps that must be taken before migrating from AIX 5.2/5.3 to AIX 6.1. These procedures are required to prevent operation issues with the DS4000 after migrating to AIX 6.1. See **APPENDIX A: AIX 6.1 Migration Problems** for information about these issues and recovery methods.

1) To ensure proper operation, a minimum level of AIX service packs should be installed. The following lists the AIX release and minimum service pack -
   - AIX 52TL10SP4
   - AIX 53TL6SP5
   - AIX 53TL7SP2
   - AIX 61TL0SP2

2) Install the **MPIO_DS3_4K APAR/iFIX** that is appropriate for the AIX release on the server ( see section I. ). This APAR/iFix is required to enable seamless migration of the FCPARRAY multipathing driver. Failure to perform this step may prevent subsequent system reboots and data access issues with applications. See Appendix A for additional information and instructions to recover if the **MPIO_DS3_4K APAR/iFIX** was not installed before migrating to AIX 6.1.0.
3) Perform a migration install of AIX 6.1.0 using the AIX CDs or a NIM

## II. Instructions to convert DS4000 disks from FCPARRAY to MPIO

The MPIO driver has been enhanced to support most DS4000 models. The supported models and firmware release is listed at the top of this document. The MPIO driver allows more than two paths to be configured to the device. This simplifies zoning and improves performance. The following steps must be performed for the DS4000 to operate correctly in an MPIO configuration.

1) The following steps may be performed on any of the AIX releases listed below. To ensure proper operation, a minimum level of AIX service packs should be installed. The following lists the AIX release and minimum service pack -
   - AIX 52TL10SP4
   - AIX 53TL6SP5
   - AIX 53TL7SP2
   - AIX 61TL0SP2

   Not all DS4000 models are supported by AIX MPIO. The following DS4000 models are supported by AIX MPIO. Starting with AIX 6.1, all future DS4000 models will be supported by AIX MPIO.

   **1722-600 = DS4300 = FAStT 600**
   **1742-900 = DS4500 = FAStT 900**
   **1814 = DS4700/DS4200**
   **1815 = DS4800**

2) If this step was previously performed, this step can be skipped. If DS4000 firmware is updated this step must be performed again since it gets reset. Change the NVSRAM settings on DS4000 storage used in the SAN (or direct attach) by executing the following steps. This must be done in order for the device to follow SCSI standards set by the T10 standards committee.

   a. From the main Enterprise Management screen *highlight the subsystem you want to change.
   b. From the 'Tools' menu, select 'Execute Script'. This will open a Script Editor window.
   c. Enter the following:
      set controller [a] HostNVSRAMBYTE [0x06,0x27] = 0;
      set controller [b] HostNVSRAMBYTE [0x06,0x27] = 0;
   d. From the 'Tools' menu in Script Editor, select 'Verify & Execute'
   e. Wait for the script to complete (do not hit the cancel button). Upon completion you can exit the Storage Manager.

3) Install the **MPIO_DS3_4K APAR/iFIX** that is appropriate for the AIX release on the AIX server and reboot the AIX server.

4) Next you will need to determine what DS4000 model(s) you are using on your AIX host. To do this run the following:

   **lsdev –Cc disk | grep DS4K**
   **lscfg –vl hdiskX** (Where "X" is the hdisk number for the "DS4000 Array Disk" type)

   Example A:

   # **lsdev -Cc disk**
   hdisk2 Available 0C-08-02 DS4K Disk Array Device

   # **lscfg -vl hdisk2**
   hdisk2 U787A.001.DPM0WY4-P1-C5-T1-W200800A0B81326B7 L3000000000000
   1742-900 (900) Disk Array Device

   Manufacturer.....IBM
   **Machine Type and Model.....1742-900**
   ROS Level and ID.....30393134
   Serial Number.....
   Device Specific.(Z0).....0000053245004032
   Device Specific.(Z1).....

   Machine Type and Model is 1742-900, which translates to DS4500.
   See step **5** to determine what machine type model you are connected to.

5) Using the output from step **4** compare it to the rules below and determine what machine type and model you are connected to:

   **1722-600 = DS4300 = FAStT 600**

**1742-900 = DS4500 = FAStT 900**
**1814 = DS4700/DS4200**
**1815 = DS4800**

6) Check the AIX systems driver support and state by running the following command:

# **'manage_disk_drivers'**
This will display the DS4000 devices that are supported by MPIO as well as RDAC and if they are currently configured for MPIO or RDAC enablement.

Example B:
# **manage_disk_drivers**
1: DS4300: currently RDAC/fcparray; supported: RDAC/fcparray, MPIO
2: DS4500: currently RDAC/fcparray; supported: RDAC/fcparray, MPIO
3: DS4700/DS4200: currently RDAC/fcparray; supported: RDAC/fcparray, MPIO
4: DS4800: currently RDAC/fcparray; supported: RDAC/fcparray, MPIO

7) From "example a**"**, we know that hdisk2 is a DS4500 and from "example b" we know that the DS4500 is currently enabled for RDAC/fcparray. To change which driver is managing the DS4000, do the following commands in order-
# **manage_disk_drivers – c 3**
The "3" represents the DS4700 as indicated in the 'manage_disk_drivers' command output. If you had a DS4800 attached you would use a "4" in place of the "3" and so on.

**Answer 'Y' when prompted, to verify the change.**
**# bosboot –a**
**# shutdown –Fr**

8) If the AIX system has more than one type of DS4XXX models attached,
The 'manage_disk_drivers' command will need to be run for **each model type.**

Example C:
**manage_disk_drivers –c 1 (for DS4300s)**
**manage_disk_drivers –c 2 (for DS4500s)**

**bosboot –a**
**shutdown –Fr.**

9) Once the server has rebooted, all the hdisk devices that were converted will now be configured under the MPIO driver. All hdisks connected to DS4000 should show up as "MPIO Other DS4K Array Device" as indicated by the '**lsdev –Cc disk'**output.

10) run '**mpio_get_config –A'** command to verify that hdisks are mapped to the appropriate LUNs on DS4000. This utility is similar to '**fget_config'** for RDAC driver. The **mpio_get_config** command is for informational purposes only, you cannot change the LUN ownership using this utility.

## IV. Instructions to convert DS4000 disk driver from MPIO to FCPARRAY

A fresh install of AIX 6.1 will use MPIO as the default multipathing driver for supported DS4000 devices listed at the top of this document. To continue using the DS4000 with the MPIO driver, follow the first three steps listed below. This ensures proper operation of the DS4000 in a MPIO configuration. To convert the DS4000 driver from MPIO to FCPARRAY perform all the steps listed below.

1) To ensure proper operation, a minimum level of AIX service packs should be installed. The following lists the AIX release and minimum service pack -
   - AIX 52TL10SP4
   - AIX 53TL6SP5
   - AIX 53TL7SP2
   - AIX 61TL0SP2

2) Install the **MPIO_DS3_4K APAR/iFIX** that is appropriate for the AIX release on the server.

3) If the NVSRAM setting was previously performed, this step can be skipped. If DS4000 firmware is updated this step must be performed again since it gets reset. Change the NVSRAM settings on DS4000 storage used in the SAN (or direct attach) by executing the following steps. This must be done in order for the device to follow SCSI standards set by the T10 standards committee.

   a. From the main Enterprise Management screen *highlight the subsystem you want to change.
   b. From the 'Tools' menu, select 'Execute Script'. This will open a Script Editor window.
   c. Enter the following:
      set controller [a] HostNVSRAMBYTE [0x06,0x27] = 0;
      set controller [b] HostNVSRAMBYTE [0x06,0x27] = 0;
   d. From the 'Tools' menu in Script Editor, select 'Verify & Execute'

4) Wait for the script to complete (do not hit the cancel button). Upon completion you can exit the Storage ManagerThe NVSRAM setting does not need to be changed when converting back to the FCPARRAY driver. The N

5) In order to migrate from MPIO (multiple HBA ports connected to the switch/fabric and switch/fabric connected to the storage – DS4000 under same zone) to RDAC, you must ensure that there are no more than two connections between the server and the storage ( one per controller). To ensure this, verify that there is a separate zone for each HBA and controller pair. Please refer to the RDAC documentation for valid configuration details.

6) Once the efix installation has completed successfully a system reboot is required.

7) Next you will need to determine what DS4000 model(s) you are using on your AIX host. To do this run the following:

   **lsdev –Cc disk | grep DS4K**

**lscfg –vl hdiskX** (Where "X" is the hdisk number for the "MPIO Other DS4K Array Disk" type)

Example A:

# **lsdev -Cc disk**
hdisk2 Available 0C-08-02 MPIO Other DS4K Array Device

# **lscfg -vl hdisk2**
hdisk2 U787A.001.DPM0WY4-P1-C5-T1-W200800A0B81326B7
L3000000000000 1742-900 (900) Disk Array Device

Manufacturer.....IBM
**Machine Type and Model.....1742-900**
ROS Level and ID.....30393134
Serial Number.....
Device Specific.(Z0).....0000053245004032
Device Specific.(Z1).....

Machine Type and Model is 1742-900, which translates to DS4500.
See step **5** to determine what machine type model you are connected to.

8) Using the output from step **4** compare it to the rules below and determine what machine type and model you are connected to:

**1722-600 = DS4300 = FAStT 600**
**1742-900 = DS4500 = FAStT 900**
**1814 = DS4700/DS4200**
**1815 = DS4800**

9) Check the AIX systems driver support and state by running the following command:

# **'manage_disk_drivers'**
This will display the DS4000 devices that are supported by MPIO as well as RDAC and if they are currently configured for MPIO or RDAC enablement.

Example B:
# **manage_disk_drivers**
1: DS4300: currently MPIO; supported: RDAC/fcparray, MPIO
2: DS4500: currently MPIO; supported: RDAC/fcparray, MPIO
3: DS4700/DS4200: currently MPIO; supported: RDAC/fcparray, MPIO
4: DS4800: currently MPIO; supported: RDAC/fcparray, MPIO

10) From "example a**"**, we know that hdisk2 is a DS4500 and from "example b" we know that the DS4500 is currently enabled for MPIO. To change which driver is managing the DS4000, do the following commands in order-

# **manage_disk_drivers – c 2**
The “2” represents the DS4500 as indicated in the ‘manage_disk_drivers’ command output. If you had a DS4800 attached you would use a “4” in place of the “2” and so on.

**Answer ‘Y’ when prompted, to verify the change.**
**# bosboot –a**
**# shutdown –Fr**

11) If the AIX system has more than one type of DS4XXX models attached, The ‘manage_disk_drivers’ command will need to be run for **each model type.**

Example C:

**manage_disk_drivers –c 1 (for DS4300s)**
**manage_disk_drivers –c 3 (for DS4700s)**

**bosboot –a**
**shutdown –Fr.**

12) Once the server has rebooted, all the hdisk devices that were converted will now be configured under the RDAC driver.

# APPENDIX A:

## IBM Blade Center Issues

The blade center sometimes doesn’t recognize all of it’s adapters. This can cause the storage devices to not be configured. It is recommended to change the Fibre Channel adapter’s init_link setting from “arbitrated loop” to
“point to point”.
The following is the sequence of commands to implement this change.
chdev -l fcsX -ainit_link=pt2pt –P
bosboot -aD
cfgmgr

## AIX 6.1 Migration Problems

The following DS4000 related problems can occur when migrating from AIX 5.2/5.3 to AIX6.1 and the proper **MPIO_DS3_4K APAR/iFIX** was not installed prior to the migration.

AIX 6.1 uses the MPIO driver to manage a number of the DS4000 models. There are two issues which can occur after migrating from AIX 5.2/5.3. The first issue is that most DS4000 devices will convert from the FCPARRAY driver to the MPIO driver. The user may not want this conversion to occur. The second issue is some device support for certain DS4000 models is missing in AIX 6.1. This can cause boot issues. The **MPIO_DS3_4K APAR/iFIX** resolves both of these issues if applied to an AIX 5.2/5.3 system before migrating to AIX 6.1.
The following outlines how to resolve the two issues if the **MPIO_DS3_4K APAR/iFIX** was not applied before migrating.

1) The DS4000 disks will change from being managed by the FCPARRAY driver to the MPIO dr
   This issue can be corrected by following the steps outlined in section **IV Instructions to conv**
   **DS4000 disk driver from MPIO to FCPARRAY**.
2) The FastT200, FastT500 and FastT700 devices will not be recognized properly by the AIX ser
   If the rootvg contains one of these devices, the server will hang on reboot. To recover from thi
   problem either call AIX service or follow the steps listed below in **FastT200/500/700 recover**

## FastT200/500/700 Recovery

A 5.2 or 5.3 system whose boot disk is located on a FAStT 200, 500, or 700 storage subsystems and
has been migrated to AIX 6.1.0 SP2 will become unbootable. It will hang with the system LED show
554. This is due to a lack of boot support for RDAC devices (the driver for those FAStT models) on
current AIX 6.1.0 boot media.

1) Boot the system using AIX 6.1.0 SP2 boot media, exactly as if the system was being installed
   migrated.
2) At the boot menu, select option 3 “Start Maintenance Mode for System Recovery”.
3) At the Maintenance menu, select option 1 “Access a Root Volume Group”.
4) At the “Access a Root Volume Group” menu, select the volume group which has migrated to
   6.1.0 SP2 and is located on a FAStT 200, 500, or 700 storage subsystems.
5) At the “Volume Group Information” screen, select option 1 “Access this Volume Group and s
   shell”.
6) At the resulting shell, perform the following commands in order:

```
cd /usr/lib/boot/protoext
cat >disk.proto.ext.fcp.disk.array.rte
fcparray        ---- 777 0 0 /usr/lib/drivers/fcparray
fcparraypin     ---- 777 0 0 /usr/lib/drivers/fcparraypin
cfgfcparray     ---- 777 0 0 /usr/lib/methods/cfgfcparray
cfgfdac         ---- 777 0 0 /usr/lib/methods/cfgfdac
cfgfdar         ---- 777 0 0 /usr/lib/methods/cfgfdar
fdarcfgrule     ---- 777 0 0 /usr/lib/methods/fdarcfgrule
^D  (note: ^D means to enter control-D)
bosboot –ad /dev/ipldevice
shutdown –Fr
```

7) The system will reboot, and should boot correctly from the FAStT boot disk. Once the system
   rebooted, install the **MPIO_DS3_4K APAR/iFIX**, which includes full support for the change
   during this recovery procedure**.**