



# **AIX and PowerVM/VIOS**

## **SAN hosts and cloud clients**

NetApp

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# AIX and PowerVM/VIOS

## Use IBM AIX 7.2 and/or PowerVM (VIOS 3.1) with ONTAP

You can use the ONTAP SAN host configuration settings to configure IBM AIX 7.2 and/or PowerVM (VIOS 3.1) with ONTAP as the target.

### Install the AIX/VIOS host utilities

You must install the AIX Host Utilities Kit while using AIX MPIO with NetApp ONTAP storage.

You can download the compressed file containing the Host Utilities software packages from the [NetApp Support Site](#). After you have the file, you must decompress it to get the two software packages you need to install the host utilities.

NetApp AIX Host Utilities 6.1 is the latest release. This release addresses the memory leak issue that was reported in the previous releases. Refer to release notes section for additional information.

#### Steps

1. Login to your host.
  - On an AIX host, log in as **root**.
  - On a PowerVM host, log in as **padmin**, and then enter the `oem_setup_env` command to become root.
2. Download a copy of the compressed file containing the Host Utilities from NetApp Support Site to a directory on your host.
3. Go to the directory containing the download.
4. Uncompress the file and extract the SAN Toolkit software package.

```
tar -xvf ntap_aix_host_utilities_6.1.tar.gz
```

The following directory is created when you decompress the file: `ntap_aix_host_utilities_6.1`. This directory will have one of the following subdirectories: `MPIO`, `NON_MPIO`, or `SAN_Tool_Kit`.

5. Install the AIX MPIO:

```
installp -aXYd /var/tmp/ntap_aix_host_utilities_6.1/MPIO  
NetApp.MPIO_Host_Utility_Kit
```

6. Install the SAN Toolkit:

```
installp -aXYd /var/tmp/ntap_aix_host_utilities_6.1/SAN_Tool_Kit  
NetApp.SAN_toolkit
```

7. Reboot the host.

### SAN toolkit

The tool kit is installed automatically when you install the NetApp Host Utilities package. This kit provides the `sanlun` utility, which helps you manage LUNs and HBAs. The `sanlun` command returns information about the LUNs mapped to your host, multipathing, and information necessary to create initiator groups.

## Example

In the following example, the `sanlun lun show` command returns LUN information.

```
#sanlun lun show

controller(7mode) /          device      host      lun
vserver(Cmode)   lun-pathname filename  adapter  protocol  size
mode
-----
-----
data_vserver      /vol/vol1/lun1   hdisk0    fcs0      FCP       60g
C
data_vserver      /vol/vol2/lun2   hdisk0    fcs0      FCP       20g
C
data_vserver      /vol/vol3/lun3   hdisk11   fcs0      FCP       20g
C
data_vserver      /vol/vol4/lun4   hdisk14   fcs0      FCP       20g
C
```

## SAN booting

### What you'll need

If you decide to use SAN booting, it must be supported by your configuration. You can use the [NetApp Interoperability Matrix Tool](#) to verify that your OS, HBA, HBA firmware and the HBA boot BIOS, and ONTAP version are supported.

SAN booting is the process of setting up a SAN-attached disk (a LUN) as a boot device for an AIX/PowerVM host. You can set up a SAN boot LUN to work in an AIX MPIO environment that is running the AIX Host Utilities with either the FC or FCoE protocol. The method you use for creating a SAN boot LUN and installing a new OS image on it in an AIX MPIO environment can vary, depending on which protocol you are using.

## Multipathing

Multipathing allows you to configure multiple network paths between the host and storage system. If one path fails, traffic continues on the remaining paths. The AIX and PowerVM environments of the Host Utilities use AIX's native multipathing solution (MPIO).

For AIX, Path Control Module (PCM) is responsible for controlling multiple paths. PCM is a storage vendor supplied code that handles path management. This gets installed and enabled as part of the Host Utilities installation.

### Non-ASA configurations

For non-ASA configurations, there should be two groups of paths with different priorities. The paths with the higher priorities are Active/Optimized, meaning they are serviced by the controller where the aggregate is located. The paths with the lower priorities are active but are non-optimized because they are served from a different controller. The non-optimized paths are only used when no optimized paths are available.

## Example

The following example displays the correct output for an ONTAP LUN with two Active/Optimized paths and two Active/Non-Optimized paths:

```
# sanlun lun show -p |grep -p hdisk78
      ONTAP Path:
vs_aix_clus:/vol/chataix_205p2_vol_en_1_7/jfs_205p2_lun_en
      LUN: 37
      LUN Size: 15g
      Host Device: hdisk78
      Mode: C
      Multipath Provider: AIX Native
      Multipathing Algorithm: round_robin
```

host	vserver	AIX	host	vserver	AIX MPIO
path	path	MPIO	path	path	path
state	type	path	adapter	LIF	priority
up	secondary	path0	fcs0	fc_aix_1	1
up	primary	path1	fcs0	fc_aix_2	1
up	primary	path2	fcs1	fc_aix_3	1
up	secondary	path3	fcs1	fc_aix_4	1

All SAN Array configurations

In All SAN Array (ASA) configurations, all paths to a given LUN are active and optimized. This improves performance by serving I/O operations through all paths at the same time.

Example

The following example displays the correct output for an ONTAP LUN:



All SAN Arrays (ASA) configurations are supported beginning in ONTAP 9.8 for AIX Hosts.

```
# sanlun lun show -p |grep -p hdisk78
      ONTAP Path:
vs_aix_clus:/vol/chataix_205p2_vol_en_1_7/jfs_205p2_lun_en
      LUN: 37
      LUN Size: 15g
      Host Device: hdisk78
      Mode: C
      Multipath Provider: AIX Native
      Multipathing Algorithm: round_robin
-----
host    vservers  AIX      host    vservers  AIX MPIO
path    path      MPIO     path    path
state   type      path     adapter LIF      priority
-----
up      primary   path0    fcs0     fc_aix_1    1
up      primary   path1    fcs0     fc_aix_2    1
up      primary   path2    fcs1     fc_aix_3    1
up      primary   path3    fcs1     fc_aix_4    1
```

## Recommended Settings

Following are some recommended parameter settings for ONTAP LUNs. The critical parameters for ONTAP LUNs are set automatically after installing the NetApp Host Utilities Kit.

Parameter	Environment	Value for AIX	Note
algorithm	MPIO	round_robin	Set by Host Utilities
hcheck_cmd	MPIO	inquiry	Set by Host Utilities
hcheck_interval	MPIO	30	Set by Host Utilities
hcheck_mode	MPIO	nonactive	Set by Host Utilities
lun_reset_spt	MPIO / non-MPIO	yes	Set by Host Utilities
max_transfer	MPIO / non-MPIO	FC LUNs: 0x100000 bytes	Set by Host Utilities
qfull_dly	MPIO / non-MPIO	2-second delay	Set by Host Utilities
queue_depth	MPIO / non-MPIO	64	Set by Host Utilities
reserve_policy	MPIO / non-MPIO	no_reserve	Set by Host Utilities
rw_timeout (disk)	MPIO / non-MPIO	30 seconds	Uses OS Default values
dyntrk	MPIO / non-MPIO	Yes	Uses OS Default values
fc_err_recov	MPIO / non-MPIO	Fast_fail	Uses OS Default values
q_type	MPIO / non-MPIO	simple	Uses OS Default values
num_cmd_elems	MPIO / non-MPIO	1024 for AIX 3072 for VIOS	FC EN1B, FC EN1C

Parameter	Environment	Value for AIX	Note
num_cmd_elems	MPIO / non-MPIO	1024 for AIX	FC EN0G

## Recommended settings for MetroCluster

By default, the AIX operating system enforces a shorter I/O timeout when no paths to a LUN are available. This might occur in configurations including single-switch SAN fabric and MetroCluster configurations that experience unplanned failovers. For additional information and recommended changes to default settings, refer to [NetApp KB1001318](#)

## AIX support with SM-BC

Beginning with ONTAP 9.11.1, AIX is supported with SM-BC. With an AIX configuration, the primary cluster is the "active" cluster.

In an AIX configuration, failovers are disruptive. With each failover, you will need to perform a re-scan on the host for I/O operations to resume.

To configure AIX for SM-BC, refer to the Knowledge Base article [How to configure an AIX host for SnapMirror Business Continuity \(SM-BC\)](#).

## Known issues

The IBM AIX 7.2 and/or PowerVM (VIOS 3.1) with ONTAP release has the following known issues:

NetApp Bug ID	Title	Description	Partner ID
1416221	AIX 7200-05-01 encountered I/O disruption on virtual iSCSI disks(VIOS 3.1.1.x) during storage failover	I/O disruption can happen during storage failover operations on AIX 7.2 TL5 hosts on the virtual iSCSI disks mapped through the VIOS 3.1.1.x. By default, the <code>rw_timeout</code> value of the virtual iSCSI disks (hdisk) on VIOC will be 45 seconds. If an I/O delay greater than 45 seconds happens during storage failover, an I/O failure might occur. To avoid this situation, refer to the workaround mentioned in the BURT. As per IBM, after applying APAR - IJ34739 (upcoming release) we can dynamically change the <code>rw_timeout</code> value using the <code>chdev</code> command.	NA

NetApp Bug ID	Title	Description	Partner ID
1414700	AIX 7.2 TL04 encountered I/O disruption on virtual iSCSI disks(VIOS 3.1.1.x) during storage failover	I/O disruption can happen during storage failover operations on AIX 7.2 TL4 hosts on the virtual iSCSI disks mapped through the VIOS 3.1.1.x. By default, the <code>rw_timeout</code> value of vSCSI adapter on VIOC is 45 seconds. If an I/O delay of more than 45 seconds happens during a storage failover, I/O failure might occur. To avoid this situation, refer to the workaround mentioned in the BURT.	NA
1307653	Seeing I/O issues on VIOS 3.1.1.10 during SFO faults and straight I/O	On VIOS 3.1.1 IO failures may be seen on NPIV client disk which are backed by 16/32Gb FC adapters. Also, a <code>vfchost</code> driver may get into a state where it stops processing I/O requests from the client. Applying IBM APAR IJ22290 IBM APAR IJ23222 will fix the issue.	NA

## Use IBM AIX 7.1 with ONTAP

You can use the ONTAP SAN host configuration settings to configure IBM AIX 7.1 with ONTAP as the target.

### Install the AIX Host Utilities

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```

controller(7mode) / vserver(Cmode) mode	lun-pathname	device filename	host adapter	lun protocol	size
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data_vserver C	/vol/vol2/lun2	hdisk0	fcs0	FCP	20g
data_vserver C	/vol/vol3/lun3	hdisk11	fcs0	FCP	20g
data_vserver C	/vol/vol4/lun4	hdisk14	fcs0	FCP	20g

## SAN Booting

### What you'll need

If you decide to use SAN booting, it must be supported by your configuration. You can use the [NetApp Interoperability Matrix Tool](#) to verify that your OS, HBA, HBA firmware and the HBA boot BIOS, and ONTAP version are supported.

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Host Device: hdisk78
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vs_aix_clus:/vol/chataix_205p2_vol_en_1_7/jfs_205p2_lun_en
      LUN: 37
      LUN Size: 15g
      Host Device: hdisk78
      Mode: C
      Multipath Provider: AIX Native
      Multipathing Algorithm: round_robin

-----
host    vservers  AIX                                     AIX MPIO
path    path      MPIO  host    vservers  path
state   type       path   adapter LIF       priority
-----
up       primary   path0  fcs0    fc_aix_1    1
up       primary   path1  fcs0    fc_aix_2    1
up       primary   path2  fcs1    fc_aix_3    1
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lun_reset_spt	MPIO / non-MPIO	yes	Set by Host Utilities
max_transfer	MPIO / non-MPIO	FC LUNs: 0x100000 bytes	Set by Host Utilities
qfull_dly	MPIO / non-MPIO	2-second delay	Set by Host Utilities
queue_depth	MPIO / non-MPIO	64	Set by Host Utilities
reserve_policy	MPIO / non-MPIO	no_reserve	Set by Host Utilities
re_timeout (disk)	MPIO / non-MPIO	30 seconds	Uses OS Default values
dyntrk	MPIO / non-MPIO	Yes	Uses OS Default values

Parameter	Environment	Value for AIX	Note
fc_err_recov	MPIO / non-MPIO	Fast_fail	Uses OS Default values
q_type	MPIO / non-MPIO	simple	Uses OS Default values
num_cmd_elems	MPIO / non-MPIO	1024 for AIX	FC EN1B, FC EN1C
num_cmd_elems	MPIO / non-MPIO	500 for AIX (standalone/physical) 200 for VIOC	FC EN0G

## Recommended Settings for MetroCluster

By default, the AIX operating system enforces a shorter I/O timeout when no paths to a LUN are available. This might occur in configurations including single-switch SAN fabric and MetroCluster configurations that experience unplanned failovers. For additional information and recommended changes to default settings, refer to [NetApp KB1001318](#)

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To configure AIX for SM-BC, refer to the Knowledge Base article [How to configure an AIX host for SnapMirror Business Continuity \(SM-BC\)](#).

## Known issues

There are no known issues.

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