

xCAT2 AIX on JS blade - Howto

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1. Introduction

xCAT already has a cookbook [xCAT2bladecenter.pdf](#) for Blade Center management, and has four cookbooks [xCAT2onAIX.pdf](#), [xCAT2onAIXmksysb.pdf](#), [xCAT2onAIXDiskless.pdf](#) and [xCAT2onAIXinstall.pdf](#) for AIX installation management. All of these documents can be found here: <https://xcat.svn.sourceforge.net/svnroot/xcat/xcat-core/trunk/xCAT-client/share/doc/>.

The document '**xCAT2 AIX on JS blade – Howto**' focuses on the step by step installation introduction for AIX on JS blade center specific scenario. If you have any concern about the operation detail in this document, please refer to the documents mentioned above.

Note: Regarding the chapter 2,3, if you want to know more detail information, please refer to the part 'Install an AIX Management Node with xCAT' of [xCAT2top.pdf](#).

2. Prepare the installation source

2.1. Prepare the installation CD or iso file of AIX

2.1.1 If you have an installation CD of AIX operating system

Put the CD into the CDROM of the management node, and figure out which CDROM device that the CD just put in. If you just have one CDROM, the device name should be '/dev/cd0'.

In the command `mknimimage` which make the NIM image, you can use the '/dev/cd0' as the source directory.

If you like, you also can mount the /dev/cd0 to a directory

```
mount -rv cdrfs /dev/cd0 /mnt
```

And use the /mnt as the source directory of the `mknimimage` command.

2.1.2 If you have an installation iso file of the AIX

Since AIX does not support mount an iso file to a directory, you need to copy this iso file to a Linux

server and mount it to a directory, then copy all the directories and files to a real directory. At last, export the real directory out to the management node.

On the Linux server:

```
mount -o loop dvd.GOLD_SP1_61D.v1.iso /mnt
cp -r /mnt/* /export_cd/*
export the /export_cd directory out to the management node
```

On the management node:

```
mount Linux_server:/export_cd /mnt
```

2.2. Download the xCAT and dependency packages

OpenSSH:

<http://sourceforge.net/projects/openssh-aix>

For example: you download the openssl package: openssl.9.8.801.tar.Z

OpenSSL:

<https://www14.software.ibm.com/webapp/iwm/web/preLogin.do?source=aixbp>

For example: you download the openssh package openssl-5.0_aix61.tar.Z

Get the latest version of xCAT core packages and xCAT dependency packages:

```
dep-aix-*.tar.gz
core-aix-*.tar.gz
```

<http://xcat.sourceforge.net/aix/download.html>

3. Install xCAT and related packages

3.1. Install the dependency packages

Change into the directory that stores the openssh and openssl you just downloaded.

3.1.1 Install the openssl

```
gunzip openssl.9.8.801.tar.Z
tar xvf openssl.9.8.801.tar
cd openssl.9.8.801
installp -a -Y -d . openssl
```

3.1.2 Install openssh

```
gunzip openssh-5.0_aix61.tar.Z
tar xvf openssh-5.0_aix61.tar
```

```
installp -a -Y -d . openssh
```

3.1.3 Update the packages information installed by installp into the rpm database

```
/usr/sbin/updtvpkg
```

3.2. Install xCAT on the AIX

3.2.1 Install the dependency packages of xCAT

```
gunzip dep-aix-*.tar.gz  
tar xvf dep-aix-*.tar  
./instoss
```

3.2.2 Install the core packages of xCAT

```
gunzip core-aix-2.1.1.tar.gz  
tar xvf core-aix-2.1.1.tar  
./instxcat
```

Note: If you want that the file path of xCAT are added into \$PATH immediately, please logout current shell and login again.

3.3. Verify the installation

Run the “lsdef -h” to check if the xCAT daemon is working.

Check to see if the initial xCAT definitions have been created.

```
lsdef -t site -l
```

4. Setup the services for the Management Node

4.1. Setup the services

Refer to the part 'Overview of xCAT support for AIX' of [xCAT2onAIX.pdf](#) to setup the following services on the management node:

```
Syslog setup  
DNS setup  
Remote shell setup  
NTP setup
```

4.2. Verify following xCAT required services are in active status

```
lssrc -s inetd  
lssrc -g nfs
```

If certain services are inoperative or need to be updated, use the following command to restart the service:

```
stopsrc -s <service>
startsrc -s <service>
```

5. An example of the cluster

In order to simplify the introduction of the xCAT management process, an example will be used.

In this example, the cluster has one management node and three compute nodes. One compute nodes will be installed by the diskfull method, one will be installed by mkysyb method and the last one will be booted stateless.

Management node

```
Name: mgt_node
IP: 192.168.0.1
```

Compute nodes

```
Name: blade_rte - This node will be installed by diskfull method
IP: 192.168.0.10
Name: blade_mkysyb - This node will be installed by mkysyb method
IP: 192.168.0.20
Name: blade_stateless - This node will be booted in stateless model
IP: 192.168.0.30
```

Note: There three compute nodes can be managed by different management module, or located in different blade centers.

Management module

```
Name: mm_js - The management module which will manage all the three
compute nodes.
IP: 192.168.0.100
```

Group of management module

```
Name: grp_mm - this group includes all the management modules that you
want to manage.
```

Group of blade

```
Name: grp_blade - this group contains all the compute nodes that you
want to manage.
```

```
Name: grp_rte - this group contains all the compute nodes that will be
installed by diskfull method.
```

```
Name: grp_mkysyb - this group contains all the compute nodes that will
be installed by mkysyb method.
```

```
Name: grp_stateless - this group contains all the compute nodes that
will be booted in stateless model.
```

6. Create the NIM image

The xCAT *osimage* definition contains information that can be used to install an AIX operating system. You can create different osimages for different requirements.

6.1. Create default image for NIM

mknimimage command can be used to create the xCAT osimage that defined the required NIM installation resources

6.2. For diskfull installation

You can use following command to create a default osimage for a diskfull installation.

```
mknimimage -V -s /mnt 610image
```

Note: you can refer to the [xCAT2onAIXinstall.pdf](#) to customize the osimage for diskfull installation.

6.3. For mksysb method installation

You can use following two kinds of sources to create the mksysb image:

1. A node with a diskfull install, and that it has been updated and configured as desired.
2. A backup image that created by mksysb command.

In the example, the node which installed by diskfull will be used as the source to create the mksysb image. Since a diskfull installed node is needed, the detail of creating NIM image will be introduced in the section 'Initialize the AIX/NIM nodes' of this document.

Note: you can refer to the part 'Create an operating system image' of [xCAT2onAIXmksysb.pdf](#) to get more detail information.

6.4. For stateless installation

You use following command to create a default osimage for stateless installation.

```
mknimimage -V -t diskless -s /mnt 61cosi
```

Note: you can refer to the part 'Create an operating system image' of [xCAT2onAIXDiskless.pdf](#) to customize the osimage for stateless installation.

6.5. Update the osimage with SSH/SSL software

You will have to install *openssl* and *openssh* along with several additional requisite software packages.

To help facilitate this task xCAT ships two AIX *installp_bundle* files. They are called *xCATaixSSL.bnd* and *xCATaixSSH.bnd*, and they are included in the xCAT tar file.

The basic process is:

- Copy the required software to the *lpp_source* resource that you used to create your SPOT.

- Define the bundle NIM resource
- Install the software in the SPOT. (This step only needed by diskless osimage)
- Add the bundle resources into the xCAT osimage definition

Copy the software

You will need the openssl and openssh packages that you installed on the management server earlier in this process. You will also need some prerequisite RPM packages that were included in the xCAT dependency tar file. The easiest way to copy the software to the correct locations is to use the “nim -o update ..” command. Just provide the directory that contains your software and the NIM lpp_source resource name. (ie. “61cosi_lpp_source”).

For example, update the software into the 610image lpp source:

Copy all the packages which list in the xCATaixSSL.bnd and xCATaixSSH.bnd to directory /tmp/myimages, then run following command:

```
nim -o update -a packages=all -a source=/tmp/myimages 610image_lpp_source
```

Define the bundle resource

Copy the bundle files (xCATaixSN.bnd and xCATaixSSH.bnd) to a location where they can be defined as a NIM resource, for example “/install/nim/installp_bundle”.

To define the NIM resources you can run the following commands.

```
nim -o define -t installp_bundle -a server=master -a
location=/install/nim/installp_bundle/xCATaixSSL.bnd xCATaixSSL
```

```
nim -o define -t installp_bundle -a server=master -a
location=/install/nim/installp_bundle/xCATaixSSH.bnd xCATaixSSH
```

***Note:** You cannot update a SPOT that is currently allocated. To check to see if the SPOT is allocated you could run the following command:*

```
lsnim -l <spot name>
```

Install the software into the SPOT. (For diskless)

To install additional software in the SPOT you can use the “mknimimage -u” command.

To Install the softwares into the SPOT.

```
mknimimage -u 61cosi installp_bundle="xCATaixSSL,xCATaixSSH"
installp_flags=agcQX
```

Refer to the NIM documentation for more information on how to use the NIM commands mentioned above.

Add the bundle resources into the xCAT osimage definition

This step is necessary for diskfull osimage, so that NIM can know which bundles should be installed on the node. For diskless osimage, although it is not required it would be good to add the xCATaixSSL and xCATaixSSH bundle names to the xCAT osimage definition. This is a way to have a record of what additional software has been installed in the SPOT.

To add the nim bundles into the xCAT osimage:

```
chdef -t osimage -o 610image installp_bundle="xCATaixSSL,xCATaixSSH"
```

7. Setup the attributes for the cluster

7.1. Define the AMM object

AMM is the management module of the Blade Center, it's the hardware control point of the blade nodes to be managed for rpower, rcons, rscan, rbootseq funtions.

xCAT requires the AMM management module. It does not support MM's.

In this section, the AMM will be defined as an xCAT node object, then you can use this object in the xCAT commands like rspconfig. In addition, all the management modules will be added into one or multiple group to simplify the operation against multiple management module objects.

7.1.1 Define AMMs as Nodes

Add an AMM named mm_js as a node object and add it into the management module group grp_mm.

```
nodeadd mm_js groups=all,grp_mm
```

7.1.2 Define the hardware control type for the management modules

Define all the management modules in the grp_mm group use the **blade** as their's management model.

```
chdef -t node -o grp_mm mgt=blade
```

7.1.3 Define the mpa (Hardware control attribute) for the management modules

For the management module object, set the mpa attribute as itself.

```
chdef -t node -o mm_js mpa=mm_js
```

7.1.4 Define the ip and hostname of management modules

```
chdef -t node -o mm_js ip=192.168.0.100
```

```
makehosts
```

7.2. Setup the AMMs

Note: Only the AMM is supported. If your blade center just has MM, you need to replace it with AMM to complete the management process.

7.2.1 Enable the snmp and ssh services

Enable the snmp and ssh services for all management modules in the group **grp_mm**.

```
rspconfig grp_mm snmpcfg=enable sshcfg=enable
```

```
rspconfig grp_mm pd1=redwoperf pd2=redwoperf
```


7.2.2 Update the firmware of AMM

If you get this message "SSH supported on AMM with minimum firmware BPET32", that means the firmware needs to be upgraded.

Download it from IBM web site, and unpackage it to the /tftpboot

From the AMM, run the command: `update -i ip_of_src -l cnetrgus.pkt -v -T mm[1]; reset -T mm[1]`

7.3. Create the xcat networks

Specify which network will be used for the installation process.

You need to specify a name for the network and values for the following attributes.

net The network address.

mask The network mask.

gateway The network gateway.

```
mkdef -t network -o xcat_ent1 net=192.168.0.0 mask=255.255.255.0
gateway=192.168.0.1
```

Note: If your cluster has multiple subnets for compute nodes, then corresponding xCAT and NIM network need to be created.

7.4. Set Up the Password Table

Add the needed passwords to the passwd table for installation.

The "system" password will be the password assigned to the root account of new installed node. The "blade" password will be used for communicating with the management module.

```
chtab key=system passwd.username=root passwd.password=cluster
chtab key=blade passwd.username=USERID passwd.password=PASSWORD
```

Note: In above examples, the values of the username and password are for example, you should set them depend on your specific situation.

8. Define the compute node

8.1. Define the nodes of blade by rscan

Use the rscan command to scan all the blades which managed by the management modules in the group grp_mm.

```
rscan grp_mm -z > bld.stanza
```

All the blades definition have been written into the bld.stanza. You can remove the definition of the blades that will not be managed from the bld.stanza. And then perform the following command to define the blade nodes.

```
cat bld.stanza | mkdef -z
lsdef blade
```

After this step, you can find all the blade nodes `blade_rte`, `blade_mksysb` and `blade_stateless` which managed by `grp_mm` have been defined in the management node.

8.2. Add the nodes into the group `grp_blade`

```
chdef -t node -o blade_rte groups=grp_blade,grp_rte,blade,all
chdef -t node -o blade_mksysb groups=grp_blade,grp_mksysb,blade,all
chdef -t node -o blade_sateless groups=grp_blade,grp_stateless,blade,all
```

8.3. Setup the attributes of the node

8.3.1 Set the IP and hostname of the node

```
chdef -t node -o blade_rte ip=192.168.0.10
chdef -t node -o blade_mksysb ip=192.168.0.20
chdef -t node -o blade_stateless ip=192.168.0.30
```

```
makehosts
```

8.3.2 Set Up the `nodehm` table

Specify that the Blade Center management module should be used for hardware management.

```
chdef -t node -o grp_blade mgt=blade cons=blade
```

8.3.3 Setup the `nodes` table

You need to specify the `installnic` of the compute nodes before the installation.

```
chdef -t node -o grp_blade installnic=eth0 primarynic=eth0
```

Note: The attribute `installnic` is the network adapter on the node that will be used for OS deployment. The attribute `primarynic` is the network adapter on the node that will be used for xCAT management.

8.4. Get MAC addresses

Get the mac address of the all the compute nodes and write them into the mac table.

```
getmacs grp_blade
```

Note: After the executing of the command, check whether the mac of compute nodes have been written into the mac table.

9. Initialize the AIX/NIM nodes

9.1. For a diskfull installation

Create the NIM client definition:

```
xcat2nim -t node grp_rte
```

Initialize the AIX/NIM nodes:

```
nimnodeset -i 610image grp_rte
```

9.2. For a mksysb installation

The mksysb method described here relies on the node blade_rte which was installed diskfull.

*Note: Please make sure the node **blade_rte** has been installed successfully by the diskfull method before starting this step.*

[Prerequisite]: Change the entry 'fsize = 2097151' to 'fsize = -1' in the default section of /etc/security/limits file on the source node blade_rte to make sure it has enough file size to store the mksysb file.

Create the mksysb image

```
mknimimage -m mksysb -n blade_rte 610sysb spot=610image
```

Create the NIM client definition:

```
xcat2nim -t node grp_mksysb
```

Initialize the AIX/NIM nodes:

```
nimnodeset -i 610sysb grp_mksysb
```

9.3. For stateless (diskless) installation

Define and initialize the NIM machines which contained in the grp_stateless

```
mkdsklsnode -i 61cosi grp_stateless
```

After this step, you can use the 'lsnim -l' to display the NIM machines which have been defined.

10. Setup the console

10.1. Setup the conserver

Configure the conserver and start it:

```
makeconservercf
```

10.2. [rte/mksysb] Set the console parameter

Set the CONSOLE to /dev/vty0, so that you can get the console output from the rcons command in the installation process.

```
vi /install/nim/bosinst_data/610image_bosinst_data
```

Modify the attribute CONSOLE from:

```
CONSOLE = Default
```

to

```
CONSOLE = /dev/vty0
```

10.3. Open a console to monitor the installation process

```
rcons blade_rte
```

11. Install the nodes

11.1. Set the boot sequence

Set the network as the first boot sequence, the hard disk as the next boot sequence.

```
rbootseq grp_blade net,hd
```

11.2. Start the installation

Use the rpower command to restart the nodes in the grp_blade group, and then all nodes will boot up from network to start the installation.

```
rpower grp_blade reset
```

12. Advanced management

To get following advanced management functions, please refer to the [xCAT2onAIXmkysb.pdf](#), [xCAT2onAIXDiskless.pdf](#) and [xCAT2onAIXinstall.pdf](#).

- Install additional software
- Add or modify files
- Using other NIM resources
- Booting a "dataless" node
- Specifying additional values for the NIM node initialization
- Updating AIX diskless nodes using xCAT
- Removing NIM machine definitions
- Removing NIM resources

13. troubleshooting tips

- 13.1. rcons command does not display output after installation

run following command on the up running node

```
chcons /dev/vty0
```

- 13.2. Check /etc/bootptab to make sure an entry exists for the node.

- 13.3. Check that the information in /tftpboot/<node>.info is correct.

- 13.4. Stop and restart inetd:

```
stopsrc -s inetd
```

```
startsrc -s inetd
```

- 13.5. Stop and restart tftpd:

```
stopsrc -s tftpd
```

```
startsrc -s tftpd
```