# CSM To xCAT2 Migration

01/19/2010, 03:16:45 PM

## Table of Contents

## 1.0   Migrating CSM to xCAT2

This document provides instructions to migrate from IBM Cluster System Management (CSM) to xCAT2.  For the migration,  you should have a second machine to be used as the xCAT2 Management Node (MN), not the machine that is your CSM Management Server (MS).  Your CSM MS  should not be defined as a  node in the xCAT cluster.   In xCAT your xCAT MN should not defined as a node in the xCAT cluster.  Since xCAT requires no xCAT code on the cluster nodes,  the migration is only the migration  from the CSM Management Server to the xCAT management Node.

Become familiar with xCAT,  there are many documents  linked from the xCAT website. A good place to start is in the document repository the xCAT Top Doc "Intro to the Cookbooks".  It will give you basic information about the xCAT product and links to other valuable documents.   From the website you can : (1) Join the mailing list.  Many xCAT developers were formerly CSM developers and can answer your questions.   (2)You can hire support from IBM.  The support team for xCAT was

also a support team for CSM,  so they can be a great help.

Check  the supported Operating Systems and Hardware in https://sourceforge.net/apps/mediawiki/xcat/index.php?title=XCAT_Features to make sure xcat supports your hardware and OS.  If your current CSM cluster is using the High Performance Switch (HPS)  then this will need to be replaced with another type of high-speed interconnect, because there is no support for the HPS on xCAT 2.

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Finally, think positive,  the transition is not that bad.

The entire CSM cluster should be ready to be moved to xCAT.  CSM activity should have been stopped.  With two Management nodes, one running CSM and one running xCAT, it is still recommended to transition all your nodes to the new xCAT MN at the same time.

We are not addressing the move of a CSM hierarchical cluster to an xCAT hierarchical cluster, that is CSM install nodes to xCAT service nodes.

Since we are documenting only one scenario,   you will have to  extrapolate to your specific situation,  read the xCAT docs, and post  to the mailing list  specific questions.

There are two RedBooks that discuss CSM to xCAT Migration as part of their general information comparing CSM to xCAT for the CSM admin.     There are also good discussions about  the difference that the admin may expect moving from  CSM to xCAT.

1) The xCAT2 Guide for the System Administrator   ( For Linux) (chapter 3)

The csm2xcatdb routine should not be used. Use  the csm2xcat routine shipped with xCAT.

2)    Configuring and Managing AIX Clusters Using xCAT2  (chapter 4)

The xcfmupdate tool referenced in this document is not supported.  Please follow the instructions in Migrating your CFM setup to xCAT  for moving your CFM configuration to xCAT.

**Note:** you may find more inaccuracies in the two RedBooks,  new function has been implemented in xCAT, since the RedBooks were written.

For example, dynamic groups are   now supported.

## 1.1  Installing the xCAT 2 Management Node

The xCAT top document  gives you instructions for installing and setting up the xCAT Linux

Management Node.   For installing an AIX Management Node,  use xCAT2 on AIX, Creating an xCAT management Node.  Reference  these documents to setup your Management Node, stopping at the point where you would normally start adding nodes to the database.  We will provide you tools in the following sections to aid in moving your node definitions from CSM to xCAT.

At this time you should  setup your cluster network for the  xCAT  MN to access the cluster nodes, switches, HMCs,AMM, etc before the install.  xCAT will initialize  an xCAT  networks table for you during the install of the Management Node on Linux. It will also initialize the networks table on AIX, if you install xCAT2.4.   Do not detach the cluster from the CSM MN,   you will still need to access the nodes from the CSM MS to run some of the migration tools.

xCAT defaults to use the ssh remote shell for both AIX and Linux.  If you are using rsh, it is recommended that you move to ssh, although rsh is supported by xCAT on AIX.   xCAT will automatically perform all the ssh setup (key generation and exchange)  needed on your xCAT Management Node, and compute nodes for system administration using ssh.

## 1.2  Overview: Transition CSM Management Server to the xCAT Management Node

The following steps outline the process to take during this migration. First you should prepare your CSM cluster for the transition.   A good check list is outlined in chapter 4.2.1 whether you are migrating from AIX or Linux in  Configuring and Managing AIX Clusters Using xCAT2 .

1.  Ensure your CSM cluster is stable.  Have all the nodes in the cluster that you are planning to migrate defined, powered up and accessible by ssh.

2.  Setup the Remote Shell on the xCAT MN.   See instructions in Set up Remote Shell on xCAT MN.  See also CSM dsh to xCAT xdsh Migration.

3.  Migrate your users to the xCAT MN.    See instructions in Setting up Users and Groups.

4.  On the CSM Management Node backup CSM using csmbackup.  You may want to run csmsnap, just to have a snapshot of what the CSM cluster contained.  This is good to do even though you have a new node as the xCAT MN.   It could provide you information in the future for reference.

5.  On the CSM MS, run csm2xcat , to capture the CSM database to be copied to the xCAT database.  See instructions in Migrating the CSM database to the xCAT database.

6.  On the CSM MS, run cfm2xcat,  to capture the CFM database information  to be copied to the xCAT MN.  See instructions in Migrating your CFM setup to xCAT.

7. On the CSM MS, capture your RMC monitoring Conditions, EventResponses and Sensors to be copied to the xCAT MN. See Migrating the CSM Monitoring setup to xCAT.

8. Perform the necessary network connectivity for the new xCAT2 MN to be able to access the nodes in the cluster.

9. On the xCAT MN, Setup Name resolution for the cluster. See Setting up Name Resolution to the xCAT Cluster.

10. Verify you have name resolution and network connectivity and remote shell setup to all your cluster nodes,devices,AMM,HMC,etc.
    • You can use xdsh or psh to the cluster nodes, AMMs and HMCs , should not be prompted for a password, if ssh keys are correctly established.

11. On the CSM MS, you should remove CSM from the cluster nodes before migrating them to the xCAT MN. See Uninstalling CSM from your Cluster Nodes.

12. Test Hardware Control to the Cluster Nodes from the xCAT MN. See Verify Hardware Control .

13. Perform the necessary remaining setup of the xCAT Management Node for install. See instructions for an AIX MN in Additional xCAT setup for Cluster Install on AIX. Instructions for a Linux MN in Additional xCAT setup for Cluster Install on Linux.

14. When you are satisfied that your migration is complete, you can uninstall CSM from the CSM Management Server. See Uninstalling CSM from your Management Server.

## 1.3  Set up Remote Shell on xCAT MN

 If your ssh keys for root are already set up on your CSM MS, you can copy those keys to root on the xCAT MN and replace those generated during the xCAT install. The advantage of this is that you will still be set up to ssh to your HMCs, MMs, Switches, and cluster nodes as you did from your CSM MN.
 If you want to use the new root ssh keys generated by xCAT, then the xCAT software will automatically setup your cluster nodes with the keys during node installation. Additionally, at any time you can run xdsh <noderange> -K to set up the keys to the cluster nodes or to other device-types such as the IB switch. To set up the ssh keys on the HMC(s) or the AMM (s), you can use the xCAT rspconfig command. See Setting up ssh keys to your AMMs and HMCs.

 The known_hosts file from the CSM MS will work initially, but as xCAT installs nodes a new host key will be generated and your entries will have to be replaced with the new node ssh hostkeys. If you install all the nodes, this can be done one time after the installation by running the

makeknownhosts <all>,  where all is a group of all cluster nodes to create a new known_hosts file for root.


      Only ssh is supported on Linux,  but if you want to use rsh on AIX,  you need to change the following site table attribute:

      chdef -t site useSSHonAIX=no


## 1.4  Stop CSM Services

   To allow the xCAT MN to take over managing your cluster,  you should now  stop the dhcpd daemon on the Linux CSM  MN and  start it on the xCAT MN.   On AIX, you will need to stop the bootp daemon,  and  start it on the xCAT MN.


## 1.5  CSM dsh to xCAT xdsh Migration

   Although you will find the xdsh/xdcp commands similar to the dsh/dcp command in CSM,  they do not support all the function that the CSM command supported and they support some function that the CSM commands did not support.

- xdsh/xdcp no longer supports the following:

  - Contexts,  the only context is the default xCAT

  - Interactive input

  - -a,-A option,  you can define a group "all"  in xCAT

  - Syntax has changed, see xdsh/xdcp man page

    - -n, -N, -d , -D flags are no longer used

  - ssh is the default for AIX and Linux.   You can set up  rsh on AIX.

  - Many input environment variables have been dropped.  If you use them in xdsh/xdcp you will get a warning.   You can compare the xdsh/xdcp manpage to the dsh/dcp manpage.

- xdsh/xdcp new support includes the following:

  - You can xdcp/xdcp hierarchically  via service nodes to cluster nodes. The cluster nodes do not have to be directly attached to the xCAT MN.

  - You can use xdcp to rsync your files locally and hierarchically to service nodes and cluster nodes.

  - You can use xdcp and xdsh to update and run commands on install images on your xCAT MN.

  - You can use xdsh to set up ssh keys to cluster nodes for root and userids and set up ssh keys to IB Switch.

On AIX, to aid in the migration of your scripts that have dsh or dcp calls,  we have provided a tool  groupfiles4dsh that will set up group definitions (including -a )  from the xCAT database that you can use run  dsh or dcp  shipped with AIX , until you are able to convert to the xCAT xdsh/xdcp.

## 1.6  Setting up Users and Groups

Copy the following files from the CSM MS to the xCAT2 MN  to replicate your user definitions on the new xCAT2 MN.

Note: although this is an easy way to have the xCAT MN have the same users as the CSM MS,  there are some  problems with copying the entire user setup from one system to the other.  For example,  if you did not have ssh installed  on the CSM MS and do on the xCAT MN,  it will wipe out the sshd id in /etc/passwd and ssh on the xCAT MN. At that point ssh  will no longer work, unless you reinstall to recreate the sshd id.   Also,  any user ids that were common between the two management nodes that may have had different  UID's assigned will result in not being able to access their files because ownership of files and directories are assigned by UID.

 The safest solution here is probably only to copy ids from the CSM MS to the xCAT MN that do not currently exist on the xCAT MN.

For AIX,

- /etc/passwd
- /etc/group
- /etc/security/passwd
- /etc/security/group
- /etc/security/user
- /etc/security/limits

For Linux,

- /etc/passwd
- /etc/group
- /etc/shadow
- /etc/gshadow
- /etc/default/useradd
- /etc/skel
- /etc/login.defs

## 1.7  Migrating the CSM database to the xCAT database

   xCAT2 has provided a tool to help  migrate the database on your CSM cluster to  the xCAT database.   The tool csm2xcat  is in your xCAT install in the /opt/xcat/share/xcat/tools directory. This tool should be copied to your CSM Management Server (MS)  and run.


   On the CSM MS:
   /.../csm2xcat --dir <path to directory to store the data>

    For example:   csm2xcat --dir  /tmp/mydir



   The tool creates two stanza files:


   1)  node.stanza – stanza info to update node info in the the xCAT database.
   2)  device.stanza – device info to update node info in the xCAT database.


   Check the two stanza files and edit out any information you do not want put in the xCAT database. Then copy them to some directory on the xCAT MN.


   On the xCAT MN run the following:
   cat node.stanza | chdef -z  to update the xCAT database with node info.
   cat device.stanza | chdef -z to update the xCAT database with device info.



   At this point, you will have primed the xCAT database with the CSM database information. This is just a starting point for populating the needed xCAT tables to run hardware control and install.


   You can inspect the tables that have been updated from CSM.   Whether these tables contain information depends on your hardware and OS.
   •   tabdump will give you a list of all the tables
   •   tabdump -d <tablename>  will give you the definition of the attributes in the table
      Specific of tables of interest are the following:
   •   tabdump nodelist
   •   tabdump noderes

- tabdump mac
- tabdump nodehm
- tabdump nodetype
- tabdump nodegroup
- tabdump ppc
- tabdump mp
- tabdump mpa
- tabdump ipmi

You can dump the entire xCAT database to readable files by running:

> dumpxCATdb -p /tmp/<your dir>

You can then edit the files.   This is a good backup procedure, if you want to start removing things but have a way to return to the original setup.

To restore run:

> restorexCATdb -p /tmp/<your dir>

You can check your node definitions in the database, to see what has been set up for you.

lsdef  -l <node1>

There are several commands for editing and listing  the xCAT database table information.   For editing, you can use the tabedit, nodech, chdef.   xCAT has provide several commands depending on what level you would like to access the database tables.  The tab* and node* command require you to have more knowledge of the xCAT database schema.   The *def command,  are more abstract and allow you to not to input actual table names.    Similarly,  we have the tabdump, nodels, lsdef command for listing out the database information.   Review the manpages for these commands.

On p-series there are serveral attributes that must be setup,  that cannot be migrated from CSM. These are the id, pprofile and parent attributes.   To update these attributes,  run the xCAT rscan update function. It will update your created node definitions with these attributes.  Reference man rscan.  For example to update all nodes managed by hmc03, run the following:

> rscan -w   hmc03

## 1.7.1  Setting up the  passwd and ppchcp table

You will need to set up the passwords and userids needed in the system, in the xCAT passwd and the ppchcp table.

Run   tabdump -d passwd on the xCAT MN for information on the contents of the passwd table.

Some of the common passwd table entries are :

- · system   - assigned to the root id when a node is installed
- · blade      - the MM userid and password
- · ipmi        - the  BMC userid and password
- · hmc         - the hmc userid and password

So you can define the system default root password as follows:

        chtab key=system passwd.username=root passwd.password=cluster

And your hmc default id and password as follows:
        chdef -t node -o hmc1 username=hscroot password=abc1234


Another option is to put your HMC and IVM userids in the ppchcp table, instead of the passwd table.
If you have HMC's run tabdump -d ppchcp  on xCAT MN for information.


You can check the definition of your HMC or AMM in the xCAT database:
      lsdef  hmc01

      Object name: hmc01
        groups=hmc,all
        mgt=hmc
        nodetype=hmc
        password=abc123
        username=hscroot
        status=defined


      lsdef bca01

      Object name: bca01
        groups=mm
        mgt=blade
        mpa=bca01
        postscripts=syslog,remoteshell
        status=defined


## 1.7.2  Setting up ssh keys to your AMMs  and HMCs

   If you have new root ssh keys on your xCAT MN,  not copied from the CSM MN,  then you will
have to set up the new keys on the AMMs or HMCS.   The xCAT rspconfig command will do this for
you.

Note: the passwd table must be set up with the AMMs and HMCs userids and passwords.  See Setting up the  passwd and ppchcp table.

For example to set up the HMC:

        rspconfig hmc01 sshcfg=enable

      to set up the AMM:
        rspconfig bca01 snmpcfg=enable sshcfg=enable
        rspconfig bca01 pd1=redwoperf pd2=redwoperf
        rpower bca01 reset

        Test the ssh set up on the AMM with:

        psh -l USERID bca01 info -T mm[1]

## 1.8  Setting up Name Resolution to the xCAT Cluster

The nodes, devices, MM, switches,etc that are being migrated to the new xCAT Management Node, need to be added to /etc/hosts on the xCAT MN.  If they are defined in the /etc/hosts on the CSM MS,  then just copy those entries into the /etc/hosts on the xCAT MN.   If a DNS server is used, then set up the new xCAT MN to resolve hostnames using the same DNS server as was set up on the CSM MN by putting the nameservers in /etc/resolv.conf on the MN and setting site.nameservers to the list of nameservers

## 1.9  Uninstalling CSM from your Cluster Nodes

Uninstall CSM from your managed nodes before starting to manage  them with xCAT.   CSM provides the rmnode script to cleanup CSM on the nodes. The rmnode function runs on the CSM MS, and removes the node definitions from the CSM database.   The -a flag will remove all nodes, and the -u flag will additionally go out to the nodes and cleanup CSM from the nodes. See manpage for rmnode.

        rmnode -a -u

## 1.10 Verify Hardware Control

Adding th CSM data to the xCAT database, setting up ssh  and adding passwords to the passwd and/or ppchcp table; should have defined enough information for you to run hardware control  to the cluster nodes.  Now is time to test,  if you can run hardware control commands, to the nodes.

On the xCAT MN:

        rpower <nodename>  stat
        rpower <nodename>  off

rpower <nodename>  on

## 1.11 Additional xCAT setup for Cluster Install on AIX

With Hardware Control established,  it is time to now set up the xCAT MN to install  your AIX cluster.   In  this document, you will have done some of the setup by migrating from CSM.    It is good to review the entire document listed below to make sure the transition did not miss some of the required setup.

- •   For AIX installation, see  Installing AIX Standalone Nodes.
- • For more references to AIX Cluster install setup,  return to Creating an AIX Management Node.

## 1.12 Additional xCAT setup for Cluster Install on Linux

With Hardware Control established,  it is now time to set up the xCAT MN to install  your Linux cluster.  There are several documents available, depending on the Linux OS and the hardware type.  In these documents, you will have done some of the setup by migrating from CSM.    It is good to review the entire install document you use   to make sure the transition did not miss some of the required setup.

- • For Linux  on pSeries,  see xCAT 2 Cookbook for Linux on IBM System P.
- • For Linux on xSeries,   see xCAT 2 BladeCenter HowTo
- • For IDataplex, see  xCAT2 IDataplex Cookbook

## 1.13 Migrating your CFM setup to xCAT
xCAT2 has a different implementation of file synchronization than the CFM function  available in CSM.   To migrate your CFM setup,  to the new sync file function in xCAT, we have provided the cfm2xcat in the /opt/xcat/share/xcat/tools directory.

Copy cfm2xcat to your CSM Management Server.   Build the sync files for xCAT by running:

cfm2xcat -i /tmp/cfm/cfmdistfiles -o /tmp/cfm/rsyncfiles

Copy the /tmp/cfm directory to your xCAT Management Node.  You can use this directory of files with the xdcp -F  command to perform the CFM function in xCAT.

The ways you can set up to synchronize  files from the Management Node to the nodes  in xCAT are explained in the following   "How to Sync Files in xCAT.."  documentation.

## 1.14 Migrating the CSM Monitoring setup to xCAT

Check to see what Monitoring has been configured in the CSM cluster. To check the current monitoring configuration, run **lscondresp** and **lssensor** on the CSM MS and the nodes. This will display the current conditions and responses that are associated and whether they are Active or Not active.

You can create a copy of your defined Sensor, Conditions and Responses  by running the following RSCT command on your  CSM MS which creates  a file that can be used to make the Sensor, Condition and Response on you new xCAT AIX Management Node.


lsrsrc -i IBM.Sensor | grep -v NodeNameList >  /tmp/xcat/IBM.Sensor.rdef

lsrsrc -i IBM.Condition |  grep -v NodeNameList > /tmp/xcat/IBM.Condition.rdef

lsrsrc -i IBM.EventResponse | grep -v NodeNameList > /tmp/xcat/IBM.EventResponse.rdef


Since you will be moving this Monitoring to a xCAT MN where CSM is not install,   you need to check to each file see which  rely on CSM scripts or your scripts that you have written and installed on the CSM MS.    If you want to port them to  xCAT, then you will also have to port the scripts to xCAT.   If you do not want to port them to xCAT, then they should be edited out of the file.   If you remove Sensors,  you will also need to update the IBM.Condition.rdef file for entries that use the removed sensor.

For example, in the IBM.Sensor.rdef file generated above you will see that  the ErrorLogSensor in the IBM.Sensor.rdef file requires the "/opt/csm/csmbin/monerrorlog"  script which will not be available on the xCAT MN.


xCAT has predefined Sensors, Conditions and Response,  some of which are common with CSM. For a full list of all the RMC Sensors, Conditions and Response defined in xCAT,  go to the /opt/xcat/lib/perl/xCAT_monitoring/rmc/resources  directory on your xCAT MN and look in the subdirectories.   There is no need to migrate the CSM version of these resources, so they should be edited out of the migration files.

The current predefined Sensors in xCAT common with CSM , at the writing of the document, are the following:

- ErrorLogSensor

The current predefined Conditions in xCAT common with CSM , at the writing of the document, are the following:

- AIXNodeCoreDump
- AllServiceableEvents
- AnyNodeAnyLoggedError
- AnyNodeFileSystemInodesUsed
- AnyNodeFileSystemSpaceUsed
- AnyNodeNetworkInterfaceStatus
- AnyNodePagingPercentSpaceFree
- AnyNodeProcessorsIdleTime
- AnyNodeTmpSpaceUsed
- AnyNodeVarSpaceUsed
- NodeReachability

The current predefined EventResponses  in xCAT common with CSM , at the writing of the document, are the following:

- BroadcastEventsAnyTime
- LogOnlyToAuditLogAnyTime
- EmailRootAnyTime


Set up RMC monitoring on your xCAT MN.   Use  steps outlined in either of the following two references.

- [Configuring and Managing AIX Clusters Using xCAT2](#) (chap2 "Monitoring Infrastructure " and  chap 4 "Configure RMC Monitoring")
- [xCAT2 Monitoring How-To](#)

Copy the /tmp/xcat directory of files to your AIX xCAT MN,  and run the following RSCT commands, to recreate the Sensors, Conditions and Responses:


mkrsrc -f  /tmp/xcat/IBM.Sensor.rdef  IBM.Sensor

mkrsrc -f  /tmp/xcat/IBM.Condition.rdef  IBM.Condition

mkrsrc -f /tmp/xcat/IBM.EventResponse.rdef   IBM.EventResponse

The associations (which conditions are active and associated with what responses) must be added manually on the xCAT  MN using the startcondresp command

## 1.15	Testing your xCAT Cluster

Once you cluster is setup,   you should test to see that  it can perform the functions you need before shutting down your CSM MS.

- Make sure the remote commands xdsh, xdcp,psh,etc work to the cluster nodes.
- Make sure your hardware control commands  rpower, rinv, etc work to the cluster nodes.
- Make sure you can install your nodes.
- Run updatenode to the nodes, to update software,  and sync files.  See the following docs:
   - xCAT 2 How to Install Additional Software
   - Updating AIX cluster nodes
   - How to sync files in xCAT

## 1.16	Uninstalling CSM from your Management Server

Uninstall CSM from the CSM Management Server, when you have finished your migration, using the uninstallms command, which will remove CSM from the MS, its cluster definitions,log files, predefined conditions and responses.  See man uninstallms for details.

uninstallms

# 2.0	References

- XCAT Top Doc –  installing a Linux MN and pointer to additional  xCAT documentation.
- Creating an AIX MN – installing an AIX MN and pointer to additional  AIX xCAT docs.
- Linux on System-P  -  setting up  P-series xCAT

# 3.0	Appendix A:  xCAT Migration Tools

These tools can aid in your migration from CSM to xCAT2.

- csm2xcat - Migrates a CSM database to a xCAT database.

- cfm2xcat – Migrates a CSM CFM setup to the syncfile function in xCAT.
- groupfiles4dsh - Creates a directory of nodegroup files to be used with AIX dsh. This will allow your scripts to continue to run dsh/dcp shipped with AIX, while you convert them to use the new xdsh/xdcp.