XCAT 2.x MySQL Setup

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1.0 Switch to the MySQL database on the Management Node

The xCAT support for Service Nodes requires a database with remote access capabilities. The MySQL database is provided for this purpose. You must be running the xCAT 2.1 or later code to use MySQL.

1.1 Install MySQL

On AIX:

The xCAT RPM called xcat-mysql-5.1-1 is provided as a convenience to help simplify the installation of MySQL on an AIX system. This RPM includes version 5.1.26 of MySQL, (mysql-5.1.26-rc-aix5.3-powerpc.tar.gz) which is available from http://dev.mysql.com/downloads/mysql/5.1.html#aix.

You will also need to install perl-DBD-mysql.

Both of these packages are included in the xcat-deps.tar.gz file that was downloaded when setting up the xCAT management node.

To install the packages use the following commands:

rpm -i xcat-mysql-5.1-1.aix5.3.ppc.rpm
rpm -i perl-DBD-mysql-4.007-1.aix5.3.ppc.rpm

The *xcat-mysql* post processing will automatically unwrap MySQL in the /usr/local directory and will create a link for /usr/local/mysql. I will also update the PATH environment variable in the /etc/profile file.

On Linux:

MySQL comes as part of the OS. Insure that the following rpms are installed on your Management Node:
perl-DBD-MySQL*
mysql-server-5.*
mysql-5.*
mysql-devel-5.*
mysql-bench-5.*
mysql-5.*
mysql-connector-odbc-*
mysql-devel-5.*

1.2 Configure MySQL

To set up the MySQL database on the Management Node follow these steps. (See http://dev.mysql.com/doc/refman/5.1/en/installing-binary.html for additional details.)

This example assumes:

- mn20: hostname of management node
- xcatdb: database name
- mysql: database role (aka user)
- xcatadmin database user id used by xCAT for access
- xcat201: database password for xcatadmin

Substitute your addresses and desired database administration, password and database name as appropriate.

On AIX: The example assumes that **mysql** it was installed in */usr/local and commands and the database is under /usr/local/mysql* directory.
On Linux: mysql is already installed in /usr/bin and the database is in /var/lib/mysql (tested on Redhat).
Set your paths accordingly.

1. For AIX, add a login user and group for **mysqld** (this is probably already there on Linux):
   add the group mysql
   add the user mysql

2. On AIX, Update permissions on installed mysql

cd /usr/local/mysql
chown -R mysql .
chgrp -R mysql .

3. Create the MySQL data directory and initialize the grant tables:
   On AIX: /usr/local/mysql/scripts/mysql_install_db --user=mysql
   On Linux: /usr/bin/mysql_install_db --user=mysql

4. Edit Server config file to run in ASCI-QUOTES mode (required)
   On AIX:
   cp /usr/local/mysql/support-files/my-large.cnf /etc/my.cnf

   On Linux and AIX: edit /etc/my.cnf .

   under the # The MySQL server [mysqld] section

   add the following line: *sql_mode = ANSI_QUOTES*

5. For large systems you may also need to increase max_connections to the database in the my.cnf file. The default is 100. These defaults can be seen with the SHOW VARIABLES statement. (see below). To increate max_connections, add this line to the configuration file:

   max_connections=300
   Other system variables might also need to change:
   http://dev.mysql.com/doc/refman/5.1/en/server-system-variables.html#sysvar_max_connections

6. On AIX:Update permissions for root to own database
   cd /usr/local/mysql
   chown -R root .
   chown -R mysql data

7. Start the MySQL server (running as root must use the --user option):

   On AIX:
   /usr/local/mysql/bin/mysqld_safe --user=mysql &
   On Linux:
   /usr/bin/mysqld_safe --user=mysql & or
   service mysqld start

   Note: if you get errors such as :
   /usr/local/mysql/bin/mysqld: Out of memory (Needed 219486208 bytes)
   /usr/local/mysql/bin/mysqld: Out of memory (Needed 164613120 bytes)
   /usr/local/mysql/bin/mysqld: Out of memory (Needed 123457536 bytes)
   /usr/local/mysql/bin/mysqld: Out of memory (Needed 92593152 bytes)

Run the command ulimit -a and check the setting for memory:
ulimit -a
time(seconds) unlimited
file(blocks) 2097151
data(kbytes) 131072
stack(kbytes) 32768
memory(kbytes) 32768
coredump(blocks) 2097151
nofiles(descriptors) 2000
threads(per process) unlimited

Change the ulimit memory setting to unlimited.

8. Setup MySQL to make sure it is started automatically on reboot of the Management Node
   On AIX:
   In the /etc/inittab, add the following line and make sure it is started before the restart of xcatd.

   mysql:2:once:*/usr/local/mysql/bin/mysqld_safe --user=mysql &*

   On Linux:

   chkconfig mysqld on

9. Change Admin password
   ON AIX:
   /usr/local/mysql/bin/mysqladmin -u root password 'new-password'
   On Linux:
   /usr/bin/mysqladmin -u root password 'new-password'

10. If command fails,
    On AIX: check the /usr/local/mysql/data/mn20.err file.
    On Linux: check /var/log/mysqld.log

11. To stop MySQL server run the following command:

```
On AIX: /usr/local/mysql/bin/mysqladmin -u root -p
shutdown
On Linux: /usr/bin/mysqladmin -u root -p shutdown
           or service mysqld stop
```

12. Create the *xcatdb* database.
    On AIX: /usr/local/mysql/bin/mysql -u root -p
    On Linux: /usr/bin/mysql -u root -p
    Enter password:
    mysql > CREATE DATABASE xcatdb;

13. Create the xcat admin id with password xcat201 and set permissions.
    On AIX:*/usr/local/mysql/bin/mysql -u root -p*

    On Linux: /usr/bin/mysql -u root -p

    Enter password:
    mysql > CREATE USER xcatadmin IDENTIFIED BY 'xcat201';

    mysql > GRANT ALL on xcatdb.* TO 'xcatadmin'@'mn20' IDENTIFIED BY 'xcat201';

    mysql > GRANT ALL on xcatdb.* to 'xcatadmin'@'<servicenode ip(s)>' IDENTIFIED BY 'xcat201';

    Substitute your own admin id name and password and management node and service node ip address or name.

14. Check the user table.
    mysql > SELECT host, user FROM mysql.user;

15. Check system variables
    mysql > SHOW VARIABLES

16. Check the defined databases.
    mysql > SHOW DATABASES;

17. To run commands against the *xcatdb* database you can enter MySQL commands as follows:
    mysql > use xcatdb;
    mysql > SHOW TABLES;
    mysql > DESCRIBE <table name>;

To exit:

mysql > quit;

1.3 Migrate xCAT data to MySQL

1. Back up your xCAT data. (This is required even if you have not added anything to your xCAT database yet. Required default entries were created when the xCAT RPMs were installed on the management node and they must be migrated to the new MySQL database.)

   mkdir -p ~/xcat-dbback

   dumpxCATdb -p ~/xcat-dbback

2. /etc/xcat/cfgloc should contain the following line, substituting your specific info. This points the xCAT database access code to the new database.

   mysql:dbname=xcatdb;host=mn20|xcatadmin|xcat201

   Note: may need to use long hostname or ip address

   mysql:dbname=xcatdb;host=mn20.cluster.net|xcatadmin|xcat201

3. Restore your database to MySQL (bypass mode runs the command without xcatd):

   XCATBYPASS=1 restorexCATdb -p ~/xcat-dbback

4. Start the xcatd daemon using the MySQL database

   On AIX: *xcatstart*

   On Linux: *service xcatd restart*

1.4 Hierarchy

If running xCAT with Service Nodes, hierarchical mode, you will also have to install MySQL on the Service Nodes.

For AIX, read the xCAT2onAIXServiceNodes document.
For Linux, read the xCAT2 Advanced Cookbook, section on Postgresql and just substitute MySQL as your database.

1.5 Add ODBC support

1. Install ODBC package and MySQL connector.

On AIX:

You'll need unixODBC and mysql-connector-odbc packages. unixODBC package is included in the dep-aix-xxxx.tar.gz file and mysql-connector-odbc package is included in xcat-mysql-xxxx.tar.gz. Both .gz files were downloaded when setting up the xCAT management node.

To install the packages use the following commands:

*rpm -i mysql-connector-odbc-**
*rpm -i unixODBC-**

On Linux:

These packages comes as part of the OS. Please make sure the following packages are installed on your management node. Please refer to chapter 2.2.18 of the xCAT Top Doc for how to get packages from the distro.

For RedHat and Fedora:

unixODBC-*
mysql-connector-odbc-*

For SLES:

unixODBC-*
mysql-client-*
libmysqlclient*
MyODBC-unixODBC-*

Please note that MyODBC-unixODBC rpm cab be found in SDK CD 1 for SLES 11.

2. Configure ODBC

You need to make changes to *odbc.ini* and *odbcinst.ini* files so that ODBC works with xCAT database. These files come with unixODBC package and are located under /etc directory. (On SLES they are located under /etc/unixODBC directory).

First find the ODBC driver. For AIX, RH and Fedora:

rpm -ql mysql-connector-odbc

For SLES:

rpm -ql MyODBC-unixODBC

It will list the file names come for the MySQL connector. Pick the one that is called libmyodbc#.so as the driver and put it into odbcinst.ini file.

vi odbcinst.ini

```
[MySQL]
Description = ODBC for MySQL
Driver      = /usr/lib64/libmyodbc3.so
```

Next, configure the DSN for ODBC:

vi odbc.ini

```
[xCATDB]
Driver   = MySQL
```

```
SERVER   = mn20
PORT     = 3306
DATABASE = xcatdb
```

Then, put the admin user id and password for xcatdb database on the root's home directory so that user root will not have to specify them when accessing the database through ODBC:

```
vi /root/.odbc.ini
[xCATDB]
SERVER = mn20
DATABASE = xcatdb
USER     = xcatadmin
PASSWORD = xcat201
```

The server, user id and password can be found in /etc/xcat/cfgloc file.

3. Configure the Service Node

[Skip this step if there are no service nodes in the cluster.]

If there are service nodes in the cluster you need to install unixODBC and MySQL connector on them and modify the ODBC configuration files just as we did in step 1 and 2. xCAT has utilities to install additional software on the nodes. To install ODBC and MySQL on to the service nodes, refer to the following documents for details:

Linux: xCAT2-updatenode.pdf

AIX: xCAT2onAIXUpdates.pdf

Then sync the odbcinst.ini and odbc.ini files to the service nodes:

For AIX:

xdcp service -v /etc/odbcinst.ini /etc/odbcinst.ini
xdcp service -v /etc/odbc.ini /etc/odbc.ini
xdcp service -v /.odbc.ini /.odbc.ini

For RH and Ferdora:

xdcp service -v /etc/odbcinst.ini /etc/odbcinst.ini
xdcp service -v /etc/odbc.ini /etc/odbc.ini
xdcp service -v /root/.odbc.ini /root/.odbc.ini

For SLES

xdcp service -v /etc/unixODBC/odbcinst.ini /etc/unixODBC/odbcinst.ini
xdcp service -v /etc/unixODBC/odbc.ini /etc/unixODBC/odbc.ini
xdcp service -v /root/.odbc.ini /root/.odbc.ini

where service is the node group name for all the service nodes.

4. Test ODBC

As user root:

isql -v xCATDB

As a non-root user:

isql -v xCATDB xcatadmin xcat201

Please note that the path for isql command on AIX is /usr/local/bin.

Then
mysql > SHOW TABLES;

To exit:
mysql > quit;

1.6 Removing MySQL database

To remove the database, first backup you copy:

mkdir -p ~/xcat-dbback
dumpxCATdb -p ~/xcat-dbback

Now remove the database:

On AIX:*/usr/local/mysql/bin/mysql -u root -p*
On Linux*: /usr/bin/mysql -u root -p*

Enter password:

To drop the database, enter:

mysql> drop database xcatdb;

1.7 References

- http://www.pantz.org/software/mysql/mysqlcommands.html
- http://dev.mysql.com/doc/refman/5.0/en/tutorial.html