

XCAT 2.x MySQL Setup

Date: 09/28/2009

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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` is provided as a convenience to help simplify the installation of MySQL on an AIX system. This RPM is available from <http://dev.mysql.com/downloads/mysql/5.1.html#aix>.

Download `xcat-mysql-2.*.gz`.

To install the packages use the following commands:

```
gunzip xcat-mysql-2*.gz  
./instmysql
```

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
```

```
mkgroup mysql  
mkuser pgrp=mysql 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 ASCII-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 increase `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.

```
ulimit -m 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. If you need 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.

Note: you want to do a GRANT ALL to every ipaddress or nodename that will need to access the database.

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
```

```
chmod 0600 /etc/xcat/cfgloc
```

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 can 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:

```
xhcp service -v /etc/odbcinst.ini /etc/odbcinst.ini
xhcp service -v /etc/odbc.ini /etc/odbc.ini
xhcp service -v /.odbc.ini /.odbc.ini
```

For RH and Fedora:

```
xhcp service -v /etc/odbcinst.ini /etc/odbcinst.ini
xhcp service -v /etc/odbc.ini /etc/odbc.ini
xhcp service -v /root/.odbc.ini /root/.odbc.ini
```

For SLES

```
xhcp service -v /etc/unixODBC/odbcinst.ini /etc/unixODBC/odbcinst.ini
xhcp service -v /etc/unixODBC/odbc.ini /etc/unixODBC/odbc.ini
xhcp 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-dbbck  
dumpxCATdb -p ~/xcat-dbbck
```

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 Migrate to new level MySQL

If you want to migrate to a new xCAT level of MySQL, note the entire setup will have to be redone. It is best to stay on your current level, even though a new one has been made available. In the future, we will be changing the install of MySQL to be more automated so this will not be the case.

If you need to update to the new xCAT MySQL, then do the following:

- 1) Backup your database as you did in Migrate xCAT data to MySQL.
- 2) Download and Install the latest MySQL as indicated in Install MySQL. The link of /usr/local/mysql to the new level will fail, so you will have to manually link the latest mysql directory to /usr/local/mysql. You will have to remove the previous linked directory first.

```
cd /usr/local
rm mysql
ln -s mysql-5.1.37-* mysql
```

- 3) Follow the entire install process outlined in Install MySQL and Configure MySQL. You will not have to create the mysql id or group on AIX, since they already exist.
- 4) Restore your database as you did in Migrate xCAT data to MySQL.
- 5) You will now be running on the new database level. You can remove the old level by going to /usr/local and removing the
- 6) You may want to remove the old mysql directory because it takes up a lot of space but be sure your new level is running and your database is restored, because the old directory does contain the mysql database.

1.8 References

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