MySQL

Downloading MySQL

```
[tblgrant@silo ~]$ pwd
/u/tblgrant
[tblgrant@silo ~]$ cp /l/www/classes/a202/software/mysql-5.1.58.tar.gz .
[tblgrant@silo ~]$ ls -ld mysql-5.1.58.tar.gz
-rw------- 1 tblgrant projects 24333490 Jun 14 11:59 mysql-5.1.58.tar.gz
[tblgrant@silo ~]$ *
```

Uncompressing

```
[tblgrant@silo ~]$ pwd
/u/tblgrant
[tblgrant@silo ~]$ ls -ld mysql-5.1.58.tar.gz
-rw------- 1 tblgrant projects 24333490 Jun 14 11:59 mysql-5.1.58.tar.gz
[tblgrant@silo ~]$ gunzip mysql-5.1.58.tar.gz
[tblgrant@silo ~]$ ls -ld mysql-5.1.58*
-rw------- 1 tblgrant projects 185845760 Jun 14 11:59 mysql-5.1.58.tar
[tblgrant@silo ~]$ *
```

Unarchiving

```
[tblgrant@silo ~]$ pwd
/u/tblgrant
[tblgrant@silo ~]$ ls -ld mysql-5.1.58*
-rw------- 1 tblgrant projects 185845760 Jun 14 11:59 mysql-5.1.58.tar
[tblgrant@silo ~]$ tar xvf mysql-5.1.58.tar
mysql-5.1.58/
 mysql-5.1.58/dbug/
 mysql-5.1.58/dbug/dbug.c
 mysql-5.1.58/dbug/example3.c
 mysql-5.1.58/dbug/example2.c
 mysql-5.1.58/dbug/main.c
 [...]
 mysql-5.1.58/include/t_ctype.h
```
This takes a bit of time so just keep watching the screen as the information scrolls up. When the process ends you’re ready to start the actual installation.

Installing MySQL

A folder mysql-5.1.58 has been created by tar xvf. We need to go inside it and set up an installation script; then run the script.

```
[tblgrant@silo ~]$ pwd
/u/tblgrant
[tblgrant@silo ~]$ ls -ld mysql-5.1.58*
drx------ 32 tblgrant projects 4096 Jul 1 2011 mysql-5.1.58
-rw------- 1 tblgrant projects 185845760 Jun 14 11:59 mysql-5.1.58.tar
[tblgrant@silo ~]$ cd mysql-5.1.58
[tblgrant@silo mysql-5.1.58]$ pwd
/u/tblgrant/mysql-5.1.58
[tblgrant@silo mysql-5.1.58]$ ls
aclocal.m4 configure.in libmysql netware strings
BUILD COPYING libmysqld plugin support-files
ChangeLog dbug libmysql_r README tests
client depcomp ltmain.sh regex unittest
CMakeLists.txt Docs Makefile.am scripts vio
cmd-line-utils extra Makefile.in server-tools win
config include man sql ylwrap
config.guess install-sh missing sql-bench zlib
config.sub INSTALL-SOURCE mysql-test sql-common
configure INSTALL-WIN-SOURCE mysys storage
[tblgrant@silo mysql-5.1.58]$ pico -w install
```

There’s no file install so we choose that name for our script.

```
[tblgrant@silo mysql-5.1.58]$ pico -w install
[tblgrant@silo mysql-5.1.58]$ ls -ld install
-rw------- 1 tblgrant projects 57 Jun 14 12:42 install
[tblgrant@silo mysql-5.1.58]$ cat install
./configure --prefix=/u/tblgrant/mysql
make
make install
```

```
[tblgrant@silo mysql-5.1.58]$ ls -ld configure
-rwx------ 1 tblgrant projects 1431114 Jul 1 2011 configure
```
The script runs `configure` just like we did for Apache. However this is a different `configure` in a different folder and for a different server. If we take a look at `configure` we see that it is an executable file.

We make our script executable too, so we can run it:

```
[tblgrant@silco mysql-5.1.58]$ chmod 700 install
[tblgrant@silco mysql-5.1.58]$ ls -ld install
-rwx------ 1 tblgrant projects 57 Jun 14 12:42 install
[tblgrant@silco mysql-5.1.58]$ ./.install
checking build system type... x86_64-unknown-linux-gnu
checking host system type... x86_64-unknown-linux-gnu
checking target system type... x86_64-unknown-linux-gnu
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
[...]
make[1]: Leaving directory `/nfs/nfs1/home/tblgrant/mysql-5.1.58/server-tools'
Making install in win
make[1]: Entering directory `/nfs/nfs1/home/tblgrant/mysql-5.1.58/win'
make[2]: Entering directory `/nfs/nfs1/home/tblgrant/mysql-5.1.58/win'
make[2]: Nothing to be done for `install-exec-am'.
make[2]: Nothing to be done for `install-data-am'.
make[2]: Leaving directory `/nfs/nfs1/home/tblgrant/mysql-5.1.58/win'
make[1]: Leaving directory `/nfs/nfs1/home/tblgrant/mysql-5.1.58/win'

Expect this to take even longer than the previous step.

### Configuring MySQL

This process has two steps: first we run `mysql_install_db`, then we need to specify somewhere the server’s port, like we did for Apache. At this stage you need to figure out what port you will be running the MySQL server on. It’s a different server than Apache so it will need its own port number. Here’s the sequence of actions that completes the first step of this stage:

```
[tblgrant@silco mysql-5.1.58]$ pwd
/u/tblgrant/mysql-5.1.58
[tblgrant@silco mysql-5.1.58]$ cd ../mysql
[tblgrant@silco mysql]$ pwd
/u/tblgrant/mysql
[tblgrant@silco mysql]$ ls
bin  ibdata1  include  libexec  mysqld.log  mysql-test  share
docs  ib_logfile0  info  man  mysql.pid  onymind  sql-bench
friday  ib_logfile1  lib  mysql  mysql.sock  project  test
```
[tblgrant@silo mysql]$ pico -w setup
[tblgrant@silo mysql]$ ls -ld setup
-rw------- 1 tblgrant projects 92 Jun 14 13:24 setup
[tblgrant@silo mysql]$ chmod +x setup
[tblgrant@silo mysql]$ ls -ld setup
-rwx------ 1 tblgrant projects 92 Jun 14 13:24 setup
[tblgrant@silo mysql]$ cat setup
/u/tblgrant/mysql/bin/mysql_install_db \
--user=tblgrant \
--datadir=/u/tblgrant/mysql
[tblgrant@silo mysql]$ ./setup
Installing MySQL system tables...
[...]
[tblgrant@silo mysql]$

We created a file (called setup) and placed the actual command (complete with command line arguments and all) in it. Made it executable. Run it. The output is not very large but it has been suppressed because it’s not well formatted and is very wide. Ignore the warnings and move on.

The second step of the configuration is included in the next section where we show how to start the server: the port number can be specified at run time.

Starting MySQL

You will need a port number for this new server. You already have an identity (mine is tblgrant). You also have a port for Apache. My Apache port number is 61200. Yours should be listed on the website along with all the other ports you will need. My mysql port number will be 61230 and let’s decide that Ryan’s will be 61231 while Anna’s 61232.

[tblgrant@silo mysql]$ pwd
/u/tblgrant/mysql
[.tblgrant@silo mysql]$ ls -ld start*
 ls: cannot access start*: No such file or directory
[tblgrant@silo mysql]$ ls stop*
 ls: cannot access stop*: No such file or directory
[ tblgrant@silo mysql]$

We check to see if files named start and stop exist already or not. We also check (using ps -ef) if the server is running already or not1.

[tblgrant@silo mysql]$ pwd
/u/tblgrant/mysql
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
tblgrant 15796  1  0 Jun12 ?  00:00:02 /u/tblgrant/apache/bin/httpd -k start

1It’s not, because we didn’t start it yet.
We create a file, name it `start`, make it executable and run it. Special care must be had with the backslashes at the end of line: their purpose is to escape the newline character, so they must be followed by the end of line so that the entire command looks like it has been typed on one and the same line. A single space placed after one of those would be enough to break this convention.

```bash
[tblgrant@silo mysql]$ pwd
/u/tblgrant/mysql
```

```bash
[tblgrant@silo mysql]$ pico -w start
[tblgrant@silo mysql]$ ls -ld start
-rw------- 1 tblgrant projects 307 Jun 14 13:53 start
[tblgrant@silo mysql]$ cat start
```

```bash
[u/tblgrant/mysql/bin/mysqld_safe \n--user=tblgrant \n--pid-file=/u/tblgrant/mysql/mysqld.pid \n--log=/u/tblgrant/mysql/mysqld.log \n--socket=/u/tblgrant/mysql/mysql.sock \n--basedir=/u/tblgrant/mysql \n--log-error=/u/tblgrant/mysql/mysqld-error.log \n--datadir=/u/tblgrant/mysql \n--port=61230 &
```

We create a file, name it `start`, make it executable and run it. Special care must be had with the backslashes at the end of line: their purpose is to escape the newline character, so they must be followed by the end of line so that the entire command looks like it has been typed on one and the same line. A single space placed after one of those would be enough to break this convention.

```bash
[tblgrant@silo mysql]$ chmod u+x start
[tblgrant@silo mysql]$ ls -ld start
-rwx------ 1 tblgrant projects 307 Jun 14 13:53 start
```

Now the server is up and we can see that:

```bash
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
```

```bash
[tblgrant@silo mysql]$ ./start
```

```bash
120614 13:54:13 mysqld_safe Logging to '/u/tblgrant/mysqld-error.log'.
120614 13:54:13 mysqld_safe Starting mysqld daemon with databases from /u/tblgrant/mysql
```

Now the server is up and we can see that:

```bash
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
```

```bash
[tblgrant@silo mysql]$ ./start
```

```bash
120614 13:54:13 mysqld_safe Logging to '/u/tblgrant/mysqld-error.log'.
120614 13:54:13 mysqld_safe Starting mysqld daemon with databases from /u/tblgrant/mysql
```

Now the server is up and we can see that:

```bash
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
```

```bash
[tblgrant@silo mysql]$ ./start
```

```bash
120614 13:54:13 mysqld_safe Logging to '/u/tblgrant/mysqld-error.log'.
120614 13:54:13 mysqld_safe Starting mysqld daemon with databases from /u/tblgrant/mysql
```
Checking MySQL

The command to see if something is running is: ps. You will see me using it in the following section as follows:

```
ps -ef | grep tblgrant
```

Obviously, you would need to use your own username if you want to see what you’re running.

Stopping MySQL

Check whether the server is running or not, using ps -ef. Two long lines (clipped below) indicate that it is.

```
[tblgrant@silo mysql]$ pwd
/u/tblgrant/mysql
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
```

```
We create a file (stop) that will hold the instructions to stop the server.
We make it executable, then check one more time to see that the server is still running (and it is) so we run stop, then check to see that the server is no longer visible using ps -ef | grep tblgrant. Replace tblgrant with your own username.

```
[tblgrant@silo mysql]$ ls -ld stop
-rw------- 1 tblgrant projects 113 Jun 14 14:29 stop
[tblgrant@silo mysql]$ chmod 700 stop
[tblgrant@silo mysql]$ ps -ef | grep tblgrant
```
Hit the Enter key when prompted for a password since the password for the root account is not set yet (thus, it’s empty). The next section shows how you can change the root password to a password of your choice: you will create a file that contains the command, make it executable and then run it.

### Connecting

#### Connecting as root

Let’s create a file with the command to connect to the MySQL server as root.

```
[pblgrant@silo mysql]$ pwd
/u/pblgrant/mysql
[pblgrant@silo mysql]$ ls -ld connect*
l: cannot access connect*: No such file or directory
[pblgrant@silo mysql]$ pico -w connect_as_root
[pblgrant@silo mysql]$ ls -ld connect_as_root
[lrwx------ 1 pblgrant projects 76 Jun 14 16:23 connect_as_root
[pblgrant@silo mysql]$ cat connect_as_root
mysql --socket=/u/pblgrant/mysql/mysql.sock --port=61230 -u root -p
[pblgrant@silo mysql]$ chmod +x connect_as_root
[pblgrant@silo mysql]$ ls -ld connect_as_root
[lrwx------ 1 pblgrant projects 76 Jun 14 16:23 connect_as_root
[pblgrant@silo mysql]$
```

We should now be able to run this script from the command line and log into the server. Here’s how I did it. Was I successful?

```
[pblgrant@silo mysql]$ ./connect_as_root
Enter password: 
ERROR 2002 (HY000): Can’t connect to local MySQL server through socket [...] 
[pblgrant@silo mysql]$
```

It looks like I can’t connect. Any idea what went wrong?

Let’s be sure we have a server running:

---

2Is the server in fact running?
Turns out we don’t (but, of course!) so we’d better turn it on³:

³Don’t forget this, when debugging. Also, please remember to not start the server when it’s already running.
Type ‘help;’ or ‘h’ for help. Type ‘\c’ to clear the current input statement.

mysql> exit
Bye

As we can see, the mysql server starts, then connect_as_root is invoked and the password requested in the ensuing dialog is in fact not needed (because it’s empty, so we hit the Enter key when prompted). We should set a real password for the root.

Changing the root password

In order to do that we set up a file (setpass) with the command. Next, we make it executable and run it.

The root password will be sp00n in my case. I will keep this file in case I forget the password. You should do the same to minimize unpleasant surprises. It’s better to do it this way, if we have that option, and we do.
However, there is a way to recover (or rather reset) a lost root password and I will show that later.

I try to log in below with the empty password: it no longer works. Only when I type the correct, new password am I allowed to get in. Once I get in I simply exit to make sure I know how to do it.

```
[tblgrant@silo mysql]$ ls
bin   ibdata1   info     mysql   mysql-test  setup   stop
connect_as_root  ib_logfile0  lib  mysqlld.log  onymind  share  test
docs  ib_logfile1  libexec  mysqlld.pid  project  sql-bench
friday  include  man  mysql.sock  setpass  start
[tblgrant@silo mysql]$ ./setpass
[tblgrant@silo mysql]$ ./connect_as_root
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: NO)
[tblgrant@silo mysql]$ ./setpass
/u/tblgrant/mysql/bin/mysqladmin: connect to server at 'localhost' failed
error: 'Access denied for user 'root'@'localhost' (using password: NO)'
[tblgrant@silo mysql]$ ./connect_as_root
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.1.58-log Source distribution

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> exit
Bye
[tblgrant@silo mysql]$
```

Creating a user account

Only the superuser (root) can create a new user account (or those that have been authorized to do so). The following snapshot shows how we connect as root, create a new database (called thursday, any other name would have worked just as well), a new user (username: fabregas, password: c3sc) and grant the new user all rights on this newly created database. I log in with the new password.

```
[tblgrant@silo mysql]$ ./connect_as_root
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
```
Your MySQL connection id is 8
Server version: 5.1.58-log Source distribution

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Type 'help;' or '
\h' for help. Type '
c' to clear the current input statement.

mysql> show databases like 'thursday';
Empty set (0.01 sec)

mysql> create database thursday;
Query OK, 1 row affected (0.06 sec)

mysql> create user 'fabregas'@'silo.cs.indiana.edu' identified by 'c3sc';
Query OK, 0 rows affected (0.00 sec)

mysql> grant all on thursday.* to 'fabregas'@'silo.cs.indiana.edu';
Query OK, 0 rows affected (0.00 sec)

mysql> show databases like 'thursday';
+---------------------+
| Database (thursday) |
+---------------------+
| thursday            |
+---------------------+
1 row in set (0.01 sec)

mysql> select * from mysql.user;
+----------+----------+------------------------------------------------+----
| Host     | User     | Password                                       | Sel |
| localhost| root     | *42BD54D7AE52C67E243AE04CBB8ECC68369C8FAD       | Y   |
| silo.cs.indiana.edu | root | | Y   |
| silo.cs.indiana.edu | | | N   |
| localhost | | | N   |
| silo.cs.indiana.edu | fabregas | *F668E44781BF3BA35CCA17C1A68565428CE0A574 | N   |
+----------+----------+------------------------------------------------+----
7 rows in set (0.00 sec)

Note that the software comes with more than one account without password so in a production environment those holes should definitely be plugged in. We are writing SQL and we can restrict the output by selection: only those records that satisfy a certain criteria will be shown.

At the same time, by projection, the number of columns shown also can be restricted. Additionally we can list all the rights given to a specific user.
Creating a database

The command (issued above with the right authority) is:

```sql
create database thursday
```

The first two words are keywords, and part of the syntax hence, non-negotiable. The third one is the name you chose for the database you want to create. The only restriction there is for the name to not have been used yet.

Creating a user

Here’s the command I used:

```sql
create user 'fabregas'@'silo.cs.indiana.edu' identified by 'c3sc';
```

The general syntax of these commands\(^4\) can be very complex so we think it’s better to learn from simple examples such as the one above. We create a user that has a username and a host of origin. The user identifies herself/himself with a password. Literals are written inside single quotes.

Granting access rights

The following command grants all access rights to a certain user with a certain host of origin on all the components of a certain database.

```sql
grant all on thursday.* to 'fabregas'@'silo.cs.indiana.edu';
```

\(^4\)http://dev.mysql.com/doc/refman/5.1/en/create-user.html
Connecting as a regular user

Now that we have a user with a password and a database that the user is authorized to access we should connect to the database as the regular user who has access to it and see what we can do with it:

```
[tblgrant@silo mysql]$ pwd
/u/tblgrant/mysql
[tblgrant@silo mysql]$ ls -ld conn*
-rwx------ 1 tblgrant projects 76 Jun 14 16:23 connect_as_root
[tblgrant@silo mysql]$ pico -w connect_as_fabregas
-tblgrant@silo mysql]$ ls -ld connect_as_fabregas
-rw------- 1 tblgrant projects 107 Jun 14 21:06 connect_as_fabregas
[tblgrant@silo mysql]$ chmod 700 connect_as_fabregas
[tblgrant@silo mysql]$ ls -ld connect_as_fabregas
-rwx------ 1 tblgrant projects 107 Jun 14 21:06 connect_as_fabregas
[tblgrant@silo mysql]$ ./connect_as_fabregas
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 5.1.58-log Source distribution
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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> show databases;
+--------------------+
<table>
<thead>
<tr>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>information_schema</td>
</tr>
<tr>
<td>test</td>
</tr>
<tr>
<td>thursday</td>
</tr>
</tbody>
</table>
+--------------------+
3 rows in set (0.00 sec)

mysql> use thursday;
Database changed
mysql> show tables;
Empty set (0.00 sec)

mysql> exit
Bye
[tblgrant@silo mysql]$
```