MySQL

Notes for MySQL

DB's and Users

Create a DB

```
CREATE DATABASE new_database;
```

Drop a DB

```
DROP DATABASE new_database;
```

Create a new user with all prems

```
CREATE USER 'newuser'@'localhost' IDENTIFIED BY 'password';
```

> GRANT [type of permission] ON [database name].[table name] TO ‘[username]’@'localhost’;

> REVOKE [type of permission] ON [database name].[table name] FROM ‘[username]’@‘localhost’;

```
GRANT ALL PRIVILEGES ON * . * TO 'newuser'@'localhost';
```

```
FLUSH PRIVILEGES;
```

Check Grants

```
SHOW GRANTS FOR 'user'@'localhost';
```

```
SHOW GRANTS FOR CURRENT_USER();
```

Add user to 1 DB

```
GRANT ALL PRIVILEGES ON new_database . * TO 'newuser'@'localhost';
```

To drop a user:

```
DROP USER ‘newuser’@‘localhost’;
```

Innodb recovery

What we will need to do for the recovery is to stop mysql and put it in innodb_force_recovery to attempt to backup all databases.

```
service mysqld stop
mkdir /root/mysqlbak
cp -rp /var/lib/mysql/ib* /root/mysqlbak
```

```
vim /etc/my.cnf
```

> You can start from 1 to 4, go up if it does not start and check mysql logs if it keeps crashing.

`innodb_force_recovery = 1`

```
service mysqld start
mysqldump -A > dump.sql
```

> Drop all databases that needs recovery.

```
service mysqld stop
rm /var/lib/mysql/ib*
```

> Comment out innodb_force_recovery in /etc/my.cnf

```
service mysqld start
```

> Then check /var/lib/mysql/server/hostname.com.err to see if it creates new ib's.
> Then you can restore databases from the dump:mysql < dump.sql

MySQL Replication

*** TESTED FOR CENTOS 7 ***

NEED TO HAVE PORT 3306 OPENED! -- MASTER = 10.1.2.117, SLAVE = 10.1.2.118

Master:

```
vi /etc/my.cnf
```

> [mysqld]
> bind-address = 10.1.2.117
> server-id = 1
> log_bin = /var/lib/mysql/mysql-bin.log
> binlog-do-db=mydb
> datadir=/var/lib/mysql
> socket=/var/lib/mysql/mysql.sock
> symbolic-links=0
> sql_mode=NO_ENGINE_SUBSTITUTION,STRICT_TRANS_TABLES
>
> [mysqld_safe]
> log-error=/var/log/mysqld.log
> pid-file=/var/run/mysqld/mysqld.pid

```
systemctl restart mysql
```

If new server without db create before you grant permissions, if you already have a db running keep reading to see how you can move your db to slave.

```
GRANT REPLICATION SLAVE ON *.* TO 'slave_user'@'%' IDENTIFIED BY 'password';
FLUSH PRIVILEGES;
USE mydb;
FLUSH TABLES WITH READ LOCK;
```

Note down the position number you will need it on a future command.

```
SHOW MASTER STATUS;


+------------------+----------+--------------+------------------+
| File             | Position | Binlog_Do_DB | Binlog_Ignore_DB |
+------------------+----------+--------------+------------------+
| mysql-bin.000001 |      665 | newdatabase  |                  |
+------------------+----------+--------------+------------------+
1 row in set (0.00 sec)
```

```
mysqldump -u root -p --opt mysql > mysql.sql
```

```
UNLOCK TABLES;
```

Slave:

```
CREATE DATABASE mydb;
```

Now import the DB from the MASTER

```
mysql -u root -p mydb < /path/to/mydb.sql
```

vi /etc/my.cnf

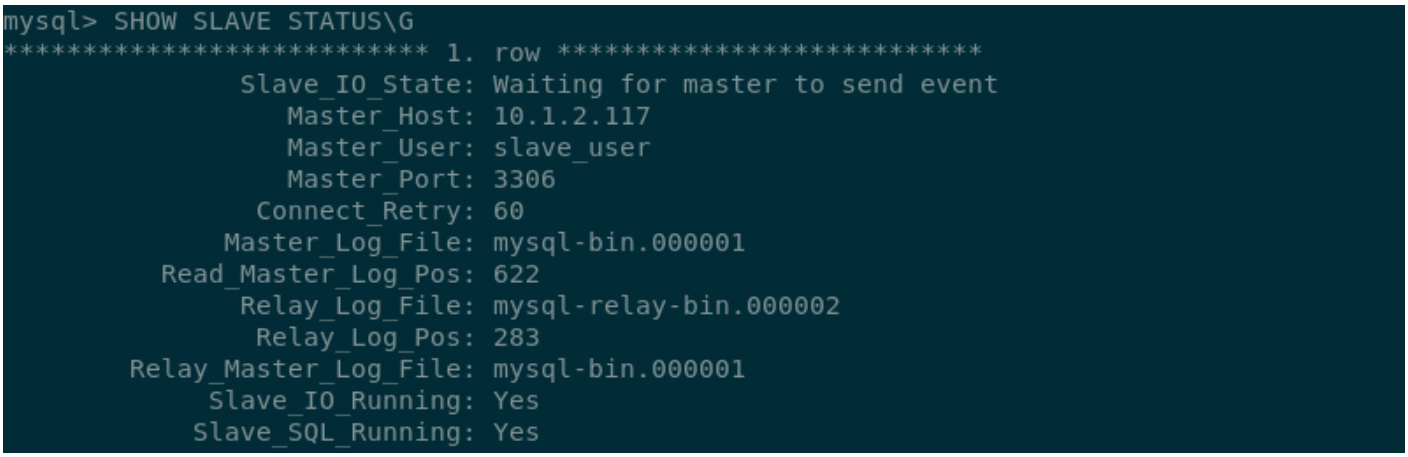
> [mysqld]
> server-id = 2
> relay-log = /var/lib/mysql/mysql-relay-bin.log
> log_bin = /var/lib/mysql/mysql-bin.log
> binlog-do-db=mydb
> datadir=/var/lib/mysql
> socket=/var/lib/mysql/mysql.sock
> symbolic-links=0
> sql_mode=NO_ENGINE_SUBSTITUTION,STRICT_TRANS_TABLES
>
> [mysqld_safe]
> log-error=/var/log/mysqld.log
> pid-file=/var/run/mysqld/mysqld.pid

To add more DB's create another line with the db name: binlog-do-db=mydb2 in my.cnf

```
systemctl restart mysql
```

```
CHANGE MASTER TO MASTER_HOST='10.1.2.117',MASTER_USER='slave_user',
MASTER_PASSWORD='password', MASTER_LOG_FILE='mysql-bin.000001', MASTER_LOG_POS=665;
START SLAVE;
SHOW SLAVE STATUS\G
```

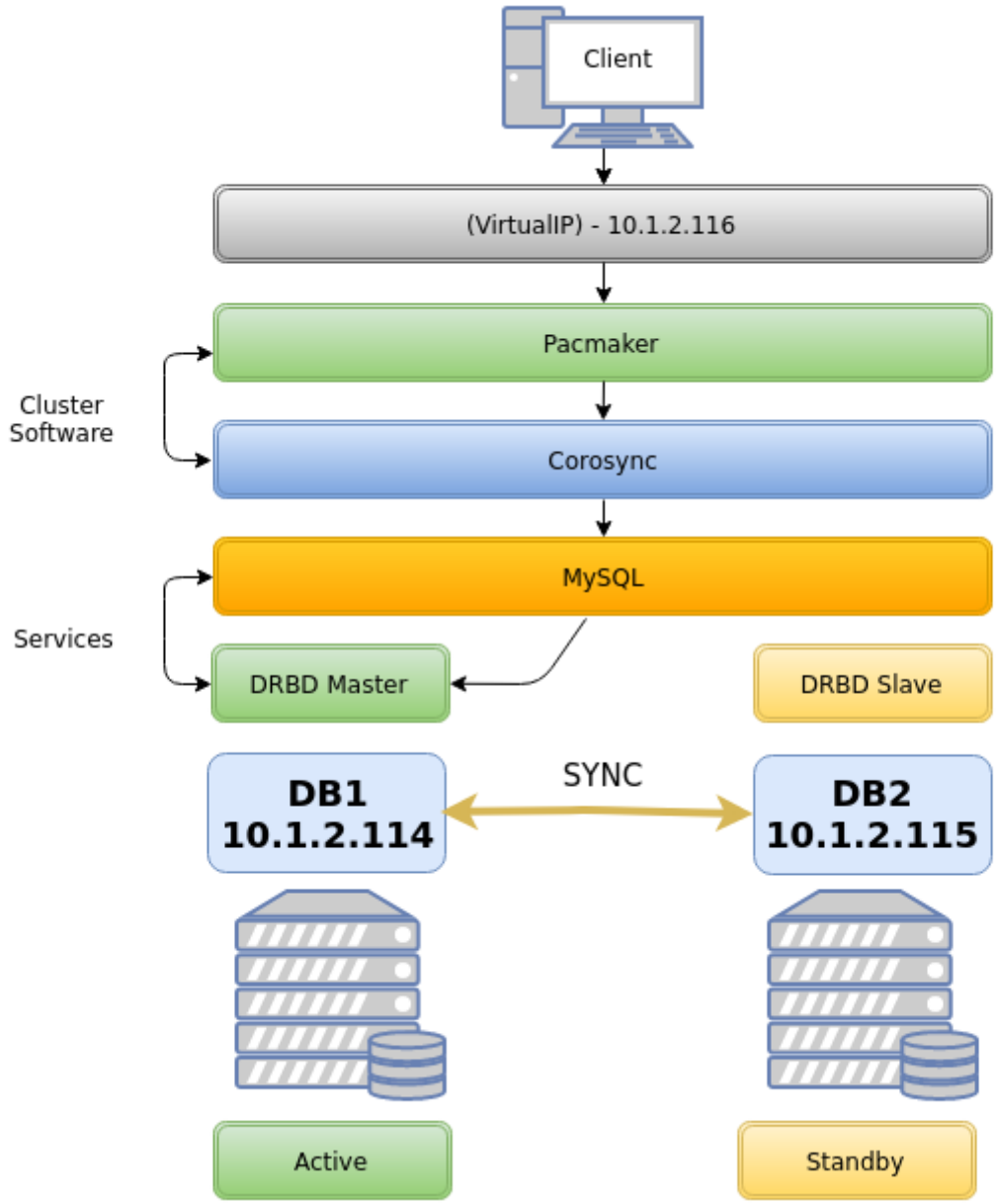
> Look at **Slave_IO_State** & **Slave_IO_Running** & **Slave_SQL_Running** & make sure **Master_LOG** and **Read_Master_Log_Pos** matches the master.



If there is an issue in connecting, you can try starting slave with a command to skip over it:

```
SET GLOBAL SQL_SLAVE_SKIP_COUNTER = 1;
SLAVE START;
```

DRBD + Pacemaker & Corosync MySQL Cluster Centos7



On Both Nodes

Host file

```
vim /etc/hosts
```

> 10.1.2.114 db1 db1.localdomain.com
> 10.1.2.115 db2 db2.localdomain.com

Corosync will not work if you add something like this: ***127.0.0.1 db1 db2.localdomain.com*** - however you do not need to delete 127.0.0.1 localhost

Firewall

Option 1 ***Firewalld***

```
systemctl start firewalld
systemctl enable firewalld
firewall-cmd --permanent --add-service=high-availability
```

*On **DB1***

```
firewall-cmd --permanent --add-rich-rule='rule family="ipv4" source address="10.1.2.115" port
port="7789" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="3306" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="5405" protocol="udp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="2224" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="21064" protocol="tcp" accept'
firewall-cmd --reload
```

*On **DB2***

```
firewall-cmd --permanent --add-rich-rule='rule family="ipv4" source address="10.1.2.114" port
port="7789" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="3306" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
```

```
port="5405" protocol="udp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="2224" protocol="tcp" accept'
firewall-cmd --permanent --add-rich-rule 'rule family="ipv4" source address="10.1.2.0/24" port
port="21064" protocol="tcp" accept'
firewall-cmd --reloadfirewall-cmd --reload
```

Option 2 ***iptables***

```
systemctl stop firewalld.service
systemctl mask firewalld.service
systemctl daemon-reload
yum install -y iptables-services
systemctl enable iptables.service
```

iptables config

```
iptables -F
iptables -P INPUT ACCEPT
iptables -P FORWARD ACCEPT
iptables -P OUTPUT ACCEPT
iptables -A INPUT -p icmp -j ACCEPT
iptables -A INPUT -i lo -j ACCEPT
iptables -A INPUT -p tcp --dport 22 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -p tcp -m multiport --dports 80,443 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -d 10.1.2.0/24 -p udp -m multiport --dports 5405 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -d 10.1.2.0/24 -p tcp -m multiport --dports 2224 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -d 10.1.2.0/24 -p tcp -m multiport --dports 3306 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -p tcp -m multiport --dports 2224 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -p tcp -m multiport --dports 3121 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -p tcp -m multiport --dports 21064 -j ACCEPT
iptables -A INPUT -s 10.1.2.0/24 -d 10.1.2.0/24 -p tcp -m multiport --dports 7788,7789 -j
ACCEPT
iptables -A INPUT -p udp -m multiport --dports 137,138,139,445 -j DROP
iptables -A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
iptables -A INPUT -j DROP
```

Save iptables rules

```
service iptables save
```

Disable SELINUX

```
vim /etc/sysconfig/selinux
```

> SELINUX=disabled

Pacemaker Install

Install PaceMaker and Corosync

```
yum install -y pacemaker pcs
```

Authenticate as the hacluster user

```
echo "H@xorP@assWD" | passwd hacluster --stdin
```

Start and enable the service

```
systemctl start pcsd
systemctl enable pcsd
```

ON DB1

Test and generate the Corosync configuration

```
pcs cluster auth db1 db2 -u hacluster -p H@xorP@assWD
```

```
pcs cluster setup --start --name mycluster db1 db2
```

ON BOTH NODES

Start the cluster

```
systemctl start corosync
systemctl enable corosync
pcs cluster start --all
pcs cluster enable --all
```

Verify Corosync installation

> Master should have ID 1 and slave ID 2

```
corosync-cfgtool -s
```

> **ON DB1**

Create a new cluster configuration file

```
pcs cluster cib mycluster
```

Disable the Quorum & STONITH policies in your cluster configuration file

```
pcs -f /root/mycluster property set no-quorum-policy=ignore
pcs -f /root/mycluster property set stonith-enabled=false
```

Prevent the resource from failing back after recovery as it might increases downtime

```
pcs -f /root/mycluster resource defaults resource-stickiness=300
```

LVM partition setup

> **Both Nodes**

Create a empty partition

```
fdisk /dev/sdb
```

> Welcome to fdisk (util-linux 2.23.2).
>
> Command (m for help): **n**
> Partition type:
> p primary (0 primary, 0 extended, 4 free)
> e extended
> Select (default p):**(ENTER)**
> Partition number (1-4, default 1): **(ENTER)**
> First sector (2048-16777215, default 2048): **(ENTER)**
> Using default value 2048
> Last sector, +sectors or +size{K,M,G} (2048-16777215, default 16777215):
> **(ENTER)**
> Using default value 16777215

> Partition 1 of type Linux and of size 8 GiB is set
>
> Command (m for help): **w**
> The partition table has been altered!

Create LVM partition

```
pvcreate /dev/sdb1
vgcreate vg00 /dev/sdb1
lvcreate -l 95%FREE -n drbd-r0 vg00
```

View LVM partition after creation

```
pvdisplay
```

Look in "/dev/mapper/" find the name of your LVM disk

```
ls /dev/mapper/
```

OUTPUT:

```
control vg00-drbd--r0
```

> **You will use "vg00-drbd--r0" in the "drbd.conf" file in the below steps

DRBD Installation

Install the DRBD package

```
rpm --import https://www.elrepo.org/RPM-GPG-KEY-elrepo.org
rpm -Uvh http://www.elrepo.org/elrepo-release-7.0-3.el7.elrepo.noarch.rpm
yum install -y kmod-drbd84 drbd84-utils
modprobe drbd
echo drbd > /etc/modules-load.d/drbd.conf
```

Edit the DRBD config and add the to hosts it will be connecting to (DB1 and DB2)

```
vim /etc/drbd.conf
```

> Delete all and replace for the following

>

> include "drbd.d/global_common.conf";
> include "drbd.d/*.res";
>
> global {
> usage-count no;
> }
> resource r0 {
> protocol C;
> startup {
> degr-wfc-timeout 60;
> outdated-wfc-timeout 30;
> wfc-timeout 20;
> }
> disk {
> on-io-error detach;
> }
> net {
> cram-hmac-alg sha1;
> shared-secret "**Daveisc00l123313**";
> }
> on **db1.localdomain.com** {
> device /dev/drbd0;
> disk /dev/mapper/vg00-drbd--r0;
> address **10.1.2.114**:7789;
> meta-disk internal;
> }
> on **db2.localdomain.com** {
> device /dev/drbd0;
> disk /dev/mapper/vg00-drbd--r0;
> address **10.1.2.115**:7789;
> meta-disk internal;
> }
> }

```
vim /etc/drbd.d/global_common.conf
```

Delete all and replace for the following

> common {
> handlers {
> }
> startup {
> }

```
        options {
        }
        disk {
        }
        net {
                after-sb-0pri discard-zero-changes;
                after-sb-1pri discard-secondary;
                after-sb-2pri disconnect;
         }
    }
```

On DB1

Create the DRBD partition and assign it primary on DB1

```
drbdadm create-md r0
drbdadm up r0
drbdadm primary r0 --force
drbdadm -- --overwrite-data-of-peer primary all
drbdadm outdate r0
mkfs.ext4 /dev/drbd0
```

On DB2

Configure r0 and start DRBD on db2

```
drbdadm create-md r0
drbdadm up r0
drbdadm secondary all
```

Pacemaker cluster resources

On DB1

Add resource r0 to the cluster resource

```
pcs -f /root/mycluster resource create r0 ocf:linbit:drbd drbd_resource=r0 op monitor
interval=10s
```

Create an additional clone resource r0-clone to allow the resource to run on both nodes at the same time

```
pcs -f /root/mycluster resource master r0-clone r0 master-max=1 master-node-max=1 clone-max=2
clone-node-max=1 notify=true
```

Add DRBD filesystem resource

```
pcs -f /root/mycluster resource create drbd-fs Filesystem device="/dev/drbd0"
directory="/data" fstype="ext4"
```

Filesystem resource will need to run on the same node as the r0-clone resource, since the pacemaker cluster services that runs on the same node depend on each other we need to assign an infinity score to the constraint:

```
pcs -f /root/mycluster constraint colocation add drbd-fs with r0-clone INFINITY with-rsc-
role=Master
```

Add the Virtual IP resource

```
pcs -f /root/mycluster resource create vip1 ocf:heartbeat:IPaddr2 ip=10.1.2.116
cidr_netmask=24 op monitor interval=10s
```

The VIP needs an active filesystem to be running, so we need to make sure the DRBD resource starts before the VIP

```
pcs -f /root/mycluster constraint colocation add vip1 with drbd-fs INFINITY
pcs -f /root/mycluster constraint order drbd-fs then vip1
```

Verify that the created resources are all there

```
pcs -f /root/mycluster resource show
pcs -f /root/mycluster constraint
```

And finally commit the changes

```
pcs cluster cib-push mycluster
```

> **On Both Nodes**

Installing Database

Option 1 **MySQL**

> It is important to verify that you do not have a repo enabled for MySQL 5.7 as MySQL 5.7 does not work with pacemaker, you will not if you're using a vanilla image however some hosting providers may alter the repos to insert another MySQL version, so verify in /etc/yum.repo.d

```
yum install -y wget
wget http://repo.mysql.com/mysql-community-release-el7-5.noarch.rpm
sudo rpm -ivh mysql-community-release-el7-5.noarch.rpm
yum install -y mysql-server
systemctl stop mysqld
systemctl disable mysqld
```

Option 2 **Mariadb 10.3**

```
vim /etc/yum.repos.d/MariaDB.repo
```

> [mariadb]
> name = MariaDB
> baseurl = http://yum.mariadb.org/10.3/centos7-amd64
> gpgkey=https://yum.mariadb.org/RPM-GPG-KEY-MariaDB
> gpgcheck=1

```
yum install MariaDB-server MariaDB-client -y
```

Setup **MySQL/MariaDB**

Setup MySQL config for the DRBD mount directory (/data/mysql)

```
vim /etc/my.cnf
```

> [mysqld]
> back_log = 250
> general_log = 1
> general_log_file = /data/mysql/mysql.log
> log-error = /data/mysql/mysql.error.log
> slow_query_log = 0

```
slow_query_log_file = /data/mysql/mysqld.slowquery.log
max_connections = 1500
table_open_cache = 7168
table_definition_cache = 7168
sort_buffer_size = 32M
thread_cache_size = 500
long_query_time = 2
max_heap_table_size = 128M
tmp_table_size = 128M
open_files_limit = 32768
datadir=/data/mysql
socket=/data/mysql/mysql.sock
skip-name-resolve
server-id = 1
log-bin=/data/mysql/drbd
expire_logs_days = 5
max_binlog_size = 100M
max_allowed_packet = 16M
```

On DB1

Configure DB for /data mount

```
mkdir /data
mount /dev/drbd0 /data
mkdir /data/mysql
chown mysql:mysql /data/mysql
mysql_install_db --no-defaults --datadir=/data/mysql --user=mysql
rm -rf /var/lib/mysql
ln -s /data/mysql /var/lib/
chown -h mysql:mysql /var/lib/mysql
chown -R mysql:mysql /data/mysql
```

```
systemctl start mariadb
```

or

```
systemctl start mysqld
```

Run base installation

```
mysql_secure_installation
```

Connect to MySQL and give grants to allow a connection from the VIP

```
mysql -u root -p -h localhost
```

Grant Access to anything connecting to root

```
DELETE FROM mysql.user WHERE User='root' AND Host NOT IN ('localhost', '127.0.0.1', '::1');
CREATE USER 'root'@'%' IDENTIFIED BY 'P@SSWORD';
GRANT ALL ON *.* TO root@'%' IDENTIFIED BY 'P@SSWORD';
flush privileges;
```

Create a user for a future DB

```
CREATE USER 'testuser'@'%' IDENTIFIED BY 'P@SSWORD';
GRANT ALL PRIVILEGES ON * . * TO 'testuser'@'%';
```

MySQL 5.7 / MariaDB

```
pcs -f /root/mycluster resource create db ocf:heartbeat:mysql binary="/usr/sbin/mysqld"
config="/etc/my.cnf" datadir="/data/mysql" socket="/data/mysql/mysql.sock"
additional_parameters="--bind-address=0.0.0.0" op start timeout=45s on-fail=restart op stop
timeout=60s op monitor interval=15s timeout=30s
pcs -f /root/mycluster constraint colocation add db with vip1 INFINITY
pcs -f /root/mycluster constraint order vip1 then db
pcs -f /root/mycluster constraint order promote r0-clone then start drbd-fs
pcs resource cleanup
pcs cluster cib-push mycluster
```

For MySQL 5.6 - You will need to change the bin path like this

```
pcs -f /root/mycluster resource create db ocf:heartbeat:mysql binary="/usr/bin/mysqld_safe"
config="/etc/my.cnf" datadir="/data/mysql"
```

Both Nodes

```
vim /root/.my.cnf
```

> [client]
> user=root
> password=**P@SSWORD!**
> host=10.1.2.116

```
systemctl disable mariadb
systemctl disable mysql
```

> Then reboot db1 and then db2 and make sure all resources are working using the command "**pcs status**" + "**drbdadm status**", and verify the resources can failover by creating a DB in db1, move the resource to db2, verify db2 has the created DB, then move back resources on db1. You can also do a reboot test.

Test failover

```
pcs resource move drbd-fs db2
```

Other notes on DRBD

To update a resource after a commit

```
cibadmin --query > tmp.xml
```

> Edit with vi tmp.xml or do a pcs -f tmp.xml %do your thing%

```
cibadmin --replace --xml-file tmp.xml
```

Delete a resource

```
 pcs -f /root/mycluster resource delete db
```

Delete cluster

```
pcs cluster destroy
```

Recover a split brain

Secondary node
drbdadm secondary all
drbdadm disconnect all
drbdadm -- --discard-my-data connect all

Primary node
drbdadm primary all
drbdadm disconnect all
drbdadm connect all

On both
drbdadm status
cat /proc/drbd

Reset MySQL root password

Stop MySQL

```
systemctl stop mysqld
```

Set the MySQL environment option

```
systemctl set-environment MYSQLD_OPTS="--skip-grant-tables"
```

Start MySQL using the options you just set

```
systemctl start mysqld
```

Login as root

```
mysql -u root
```

For MySQL 5.7 or later

```
UPDATE mysql.user SET authentication_string = PASSWORD('MyNewPassword') WHERE User = 'root'
AND Host = 'localhost';
```

Or for lower versions

```
ALTER USER 'root'@'localhost' IDENTIFIED BY 'MyNewPass';
```

Flush privilege

```
FLUSH PRIVILEGES;
exit
```

Stop MySQL

```
systemctl stop mysqld
```

Unset the MySQL environment option so it starts normally next time

```
systemctl unset-environment MYSQLD_OPTS
```

Start MySQL

```
systemctl start mysqld
```