

Percona Xtradb Cluster 安装

Percona Xtradb Cluster 介绍

Percona XtraDB Cluster 简称:PXC, 是针对 MySQL 用户的高可用性和扩展性解决方案, 基于 Percona Server。其包括了 Write Set REplication 补丁, 使用 Galera 库, 这是一个针对事务性应用程序的同步多主机复制插件。

Percona XtraDB Cluster 特点:

同步复制 (真正的同步), 事务可以在所有节点上提交(多点写入)。
多主机复制, 你可以写到任何节点。每个节点是一个完整的 copy。
任何 query 可以在本地完成

Percona XtraDB Cluster 完全兼容 MySQL 或 Percona Server, 包括:
数据兼容。Percona XtraDB Cluster 可在由 MySQL 或 Percona Server 创建的数据库上使用。
应用程序兼容。如果要使用 Percona XtraDB Cluster, 你的应用程序基本不需要作任何更改。

PXC 和 Replication 的区别

Let's take look into the well known CAP theorem for Distributed systems. Characteristics of Distributed systems:

C - Consistency (all your data is consistent on all nodes),

A - Availability (your system is AVAILABLE to handle requests in case of failure of one or several nodes),

P - Partitioning tolerance (in case of inter-node connection failure, each node is still available to handle requests).

CAP theorem says that each Distributed system can have only two out of these three.

MySQL replication has: Availability and Partitioning tolerance. (这个 p 是指从库上可以不完全同步)

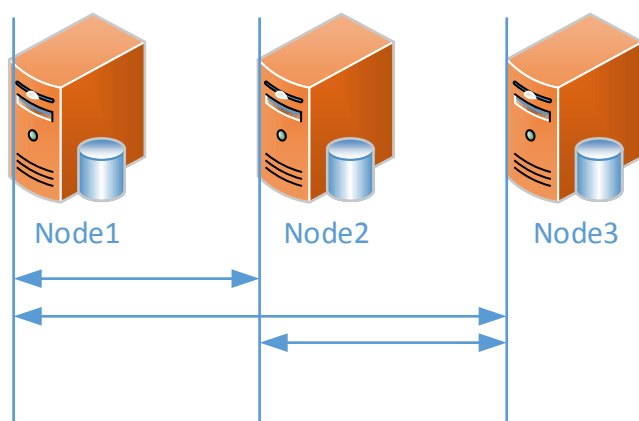
Percona XtraDB Cluster has: Consistency and Availability.

基于以上可以看出来 Replication 并不能真正保证数据一致性, 但 PXC 提供了强的数据一致性, 但牺牲的分区特性。

PXC 安装环境需求

集群名	pxc-wubx
节点 1	192.168.199.77
节点 2	192.168.199.78
节点 3	192.168.199.79

基本架构:



PXC 安装基本步骤

主要软件下载

Percona-Xtradb-Cluster 5.6 版本下载

wget

http://www.percona.com/downloads/Percona-XtraDB-Cluster-56/Percona-XtraDB-Cluster-5.6.21-25.8/binary/tarball/Percona-XtraDB-Cluster-5.6.21-rel70.1-25.8.938.Linux.x86_64.tar.gz

基本软件安装

```
yum install -y perl-DBD-MySQL.x86_64 perl-IO-Socket-SSL.noarch socat.x86_64 nc
```

要留意是否安装成功

```
yum install http://www.percona.com/downloads/percona-release/redhat/0.1-3/percona-release-0.1-3.noarch.rpm
```

```
yum install -y percona-xtrabackup.x86_64
```

(如果 yum 不能用, 请手工下载 xtrabackup 安装)

Percona-XtraDB-Cluster-5.6.21-rel70.1-25.8.938.Linux.x86_64.tar.gz 下载完毕后, 还是解压到 /opt/mysql/ 下面

在 /usr/local/ 下创建 mysql 的软连

```
#ln -s /opt/mysql/ Percona-XtraDB-Cluster-5.6.21-rel70.1-25.8.938.Linux.x86_64 mysql
```

mysql 配置文件:

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

创建 mysql 的用户及组

```
#groupadd mysql
#useradd -g mysql -s /sbin/nologin -d /usr/local/mysql mysql
```

创建启动文件:

```
#cp /usr/local/mysql/support-file/mysql.server /etc/init.d/mysql
```

创建 mysql 需要的基本目录

```
#mkdir /data/mysql/mysql_3306
#mkdir /data/mysql/mysql_3306/data
#mkdir /data/mysql/mysql_3306/logs
#mkdir /data/mysql/mysql_3306/tmp
```

```
./scripts/mysql_install_db
```

确认结果正确

PXC 配置文件

pxc 大多是独占服务器, 使用/etc/my.cnf 配置文件, 相对于以前咱们使用的配置文件多了以下部分。其中 binlog_format 需要修改为 ROW , 其它为添加部分, 增加部分如下:

pxc 的配置文件在原来 my.cnf 上需要添加以下几处:

```
#percona xtradb cluster
binlog_format = ROW #日志格式必须为 ROW
default_storage_engine=InnoDB
innodb_locks_unsafe_for_binlog=1
innodb_autoinc_lock_mode=2

wsrep_cluster_name=pcx_wubx #cluster 的名字
wsrep_cluster_address=gcomm://192.168.11.81,192.168.11.82,192.168.11.83 #cluster 中的节点 ip
wsrep_node_address=192.168.11.82 #cluster 当前节点的 ip

wsrep_provider=/usr/local/mysql/lib/libgalera_smm.so

#wsrep_sst_method=rsync
wsrep_sst_method=xtrabackup-v2
wsrep_sst_auth=sst:wubxwubx
```

PXC 启动和关闭

数据库初始化

配置文件还存放到/etc/my.cnf 中

```
#cd /usr/local/mysql
```

```
#!/script/mysql_db_install
```

```
Installing MySQL system tables...
OK
Filling help tables...
OK

To start mysqld at boot time you have to copy
support-files/mysql.server to the right place for your system

PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER !
To do so, start the server, then issue the following commands:

/usr/local/mysql/bin/mysqladmin -u root password 'new-password'
/usr/local/mysql/bin/mysqladmin -u root -h node83 password 'new-password'

Alternatively you can run:
/usr/local/mysql/bin/mysql_secure_installation

which will also give you the option of removing the test
databases and anonymous user created by default. This is
strongly recommended for production servers.

See the manual for more instructions.

You can start the MySQL daemon with:
cd /usr/local/mysql/ ; /usr/local/mysql/bin/mysqld_safe &

You can test the MySQL daemon with mysql-test-run.pl
cd /usr/local/mysql/mysql-test ; perl mysql-test-run.pl

Please report any problems at
  https://bugs.launchpad.net/percona-xtradb-cluster/+filebug

Percona recommends that all production deployments be protected with a support
contract (http://www.percona.com/mysql-support/) to ensure the highest uptime,
be eligible for hot fixes, and boost your team's productivity.
```

第一个节点启动

```
# cp support-files/mysql.server /etc/init.d/mysql
```

```
#!/etc/init.d/mysql bootstrap-pxc
```

```
[root@node10 mysql]# /etc/init.d/mysql bootstrap-pxc
Bootstrapping PXC (Percona XtraDB Cluster)Starting MySQL (Percona XtraDB Cluster)... SUCCESS!
```

启动后初始化

用户创建

```
delete from mysql.user where user!='root' or host!='localhost';
```

```
truncate mysql.db;
drop database test;
grant all privileges on *.* to 'wubx'@'%' identified by 'wubxwubx';
grant all privileges on *.* to 'sst'@'localhost' identified by 'wubxwubx';
grant reload, lock tables, replication client on *.* to 'sst'@'localhost' identified by 'wubxwubx';
flush privileges;
```

其它节点启动

要确认一下所有的节点的 `iptables` 是关闭的。
进行数据库初始化，然后启动（注意启动方式）
`#!/etc/init.d/mysql start`

启动完毕确认

show global status like "wsrep%";

```
wsrep_local_state          | 4
wsrep_local_state_comment  | Synced
...
wsrep_cluster_status       | Primary
wsrep_connected            | ON
```

关闭

`#!/etc/init.d/mysql stop`

全部节点关闭后重启

第一个节点启动的节点（如果集群全部关闭，第一个启动也需要用这样的形式）

`#!/etc/init.d/mysql bootstrap-pxc`

其它节点

`#!/etc/init.d/mysql start`

备注：

如集群是不是所有的节点都关闭不用使 `#!/etc/init.d/mysql bootstrap-pxc` 启动。都可以用 `#!/etc/init.d/mysql start` 启动。

新加入节点

新加入节点相当于新启一个节点，在启动时间把自写入 `wsrep_cluster_address` 中，同时在 `wsrep_node_address` 中声明自己的 IP 即可。

FAQ（思考）

Q1. `Binlog_format` 配置成 `MIXED`，不支持，需要配置成 `ROW` 格式

```
Installing MySQL system tables...
140720 16:16:38 [ERROR] WSREP: Only binlog_format = 'ROW' is currently supported. Configured value: 'MIXED'. Please adjust your configuration.
140720 16:16:38 [ERROR] Aborting
```

Q2. 任何节点写入数据看能不能同步？

Q3. PXC 架构中三个节点的 `binlog` 内容是不是一样？
（观察三个节点 `Binlog` 的内容变化）

Q4. PXC 集群如果挂一个从库做备份，集群中那个节点可以担任主库？

报错处理

加载 so 文件加不到

如：

```
Installing MySQL system tables...
/usr/local/mysql/bin/mysqld: error while loading shared libraries: libssl.so.6: cannot open
shared object file: No such file or directory
```

可能的问题：

openssl 没装：

```
yum install -y openssl openssl-devel
```

如果提示已经安装，可以使用

```
#updatedb
```

```
#locate libssl.so 看看能不能找到
```

然后用

```
#ldd /usr/local/mysql/bin/mysqld
```

查看还有那些依赖需安装

```
[root@node10 mysql]# ldd /usr/local/mysql/bin/mysqld
linux-vdso.so.1 => (0x00007ffff213ff000)
libpthread.so.0 => /lib64/libpthread.so.0 (0x0000003562200000)
libaio.so.1 => /lib64/libaio.so.1 (0x0000003561a00000)
libz.so.1 => /lib64/libz.so.1 (0x0000003563200000)
librt.so.1 => /lib64/librt.so.1 (0x0000003562a00000)
libcrypt.so.1 => /lib64/libcrypt.so.1 (0x0000003565200000)
libdl.so.2 => /lib64/libdl.so.2 (0x0000003562600000)
libssl.so.6 => not found
libcrypto.so.6 => not found
libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x0000003563600000)
libm.so.6 => /lib64/libm.so.6 (0x0000003562e00000)
libc.so.6 => /lib64/libc.so.6 (0x0000003561e00000)
/lib64/ld-linux-x86-64.so.2 (0x0000003561600000)
libfreebl3.so => /lib64/libfreebl3.so (0x0000003564e00000)
libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x0000003563a00000)
```

这里 libssl.so.6, libcrypto.so.6 都没有
确认一下：

```
[root@node10 mysql]# locate libssl.so
/usr/lib64/.libssl.so.1.0.1e.hmac
/usr/lib64/.libssl.so.10.hmac
/usr/lib64/libssl.so
/usr/lib64/libssl.so.1.0.1e
/usr/lib64/libssl.so.10
[root@node10 mysql]# locate libcrypto.so
/usr/lib64/.libcrypto.so.1.0.1e.hmac
/usr/lib64/.libcrypto.so.10.hmac
/usr/lib64/libcrypto.so
/usr/lib64/libcrypto.so.1.0.1e
/usr/lib64/libcrypto.so.10
```

看样子都是存在的，但版本不对。做一个软链接就可以修复了。

#cd /usr/lib64/

```
[root@node10 lib64]# ls -l libssl*
-rwxr-xr-x 1 root root 257120 Oct 16 22:32 libssl3.so
lrwxrwxrwx 1 root root    16 Nov  6 22:34 libssl.so -> libssl.so.1.0.1e
lrwxrwxrwx 1 root root    16 Nov  6 22:34 libssl.so.10 -> libssl.so.1.0.1e
-rwxr-xr-x 1 root root 444168 Nov  6 20:36 libssl.so.1.0.1e
[root@node10 lib64]# ln -s libssl.so libssl.so.6
[root@node10 lib64]# ls -l libssl*
-rwxr-xr-x 1 root root 257120 Oct 16 22:32 libssl3.so
lrwxrwxrwx 1 root root    16 Nov  6 22:34 libssl.so -> libssl.so.1.0.1e
lrwxrwxrwx 1 root root    16 Nov  6 22:34 libssl.so.10 -> libssl.so.1.0.1e
-rwxr-xr-x 1 root root 444168 Nov  6 20:36 libssl.so.1.0.1e
lrwxrwxrwx 1 root root    16 Nov 13 18:03 libssl.so.6 -> libssl.so
```



```
[root@node10 lib64]# ls -l libcrypto.so*
lrwxrwxrwx 1 root root      19 Nov  6 22:34 libcrypto.so -> libcrypto.so.1.0.1e
lrwxrwxrwx 1 root root      19 Nov  6 22:34 libcrypto.so.10 -> libcrypto.so.1.0.1e
-rwxr-xr-x 1 root root 1965824 Nov  6 20:36 libcrypto.so.1.0.1e

[root@node10 lib64]# ln -s libcrypto.so libcrypto.so.6
[root@node10 lib64]# ls -l libcrypto.so*
lrwxrwxrwx 1 root root      19 Nov  6 22:34 libcrypto.so -> libcrypto.so.1.0.1e
lrwxrwxrwx 1 root root      19 Nov  6 22:34 libcrypto.so.10 -> libcrypto.so.1.0.1e
-rwxr-xr-x 1 root root 1965824 Nov  6 20:36 libcrypto.so.1.0.1e
lrwxrwxrwx 1 root root      12 Nov 13 18:04 libcrypto.so.6 -> libcrypto.so
```

最后在用 `ldd /usr/local/mysql/bin/mysqld` 去确认是否有没加载的 so, 如果存在同样的方法修复。

安装中 socat 找不到

```
WSREP_SST: [INFO] Streaming with tar (20141108 02:02:06.128)
WSREP_SST: [INFO] Using socat as streamer (20141108 02:02:06.129)
which: no socat in (/usr/sbin:/sbin:/opt/mysql/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64/bin:/usr/bin:/usr/local/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64/bin)
WSREP_SST: [ERROR] socat not found in path: /usr/sbin:/sbin:/opt/mysql/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64/bin:/usr/bin:/usr/local/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64/bin (20141108 02:02:06.131)
141108 2:02:06 [ERROR] WSREP: Failed to read 'ready <addr>' from: wsrep_sst_xtrabackup --role 'joiner' --address '10.37.129.6' --auth 'sst:wubxwubx' --datadir '/data/mysql/mysql3306/data/' --defaults-file '/etc/my.cnf' --parent '23283'
```

socat 包没装上, 可以把 epel 的源加入就可以安装。

启动报错, 找不到 my_print_defaults 的

```
[root@node5 data]# /etc/init.d/mysql start
/etc/init.d/mysql: line 266: my_print_defaults: command not found
ERROR! MySQL (Percona XtraDB Cluster) is not running, but lock file (/var/lock/subsys/mysql) exists
/etc/init.d/mysql: line 333: cd: /usr/local/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64: No such file or directory
Starting MySQL (Percona XtraDB Cluster) ERROR! Couldn't find MySQL server (/usr/local/Percona-XtraDB-Cluster-5.5.39-rel36.0-25.11.828.Linux.x86_64/bin/mysqld_safe)
```

可以更改/etc/my.cnf 在[mysqld]中添加 basedir=/usr/local/mysql/

如果还不行, 可以通过在/etc/init.d/mysql 中找到 basedir 定义为:

basedir=/usr/local/mysql/

参考

官方文档: <http://www.percona.com/doc/percona-xtradb-cluster/5.6/>