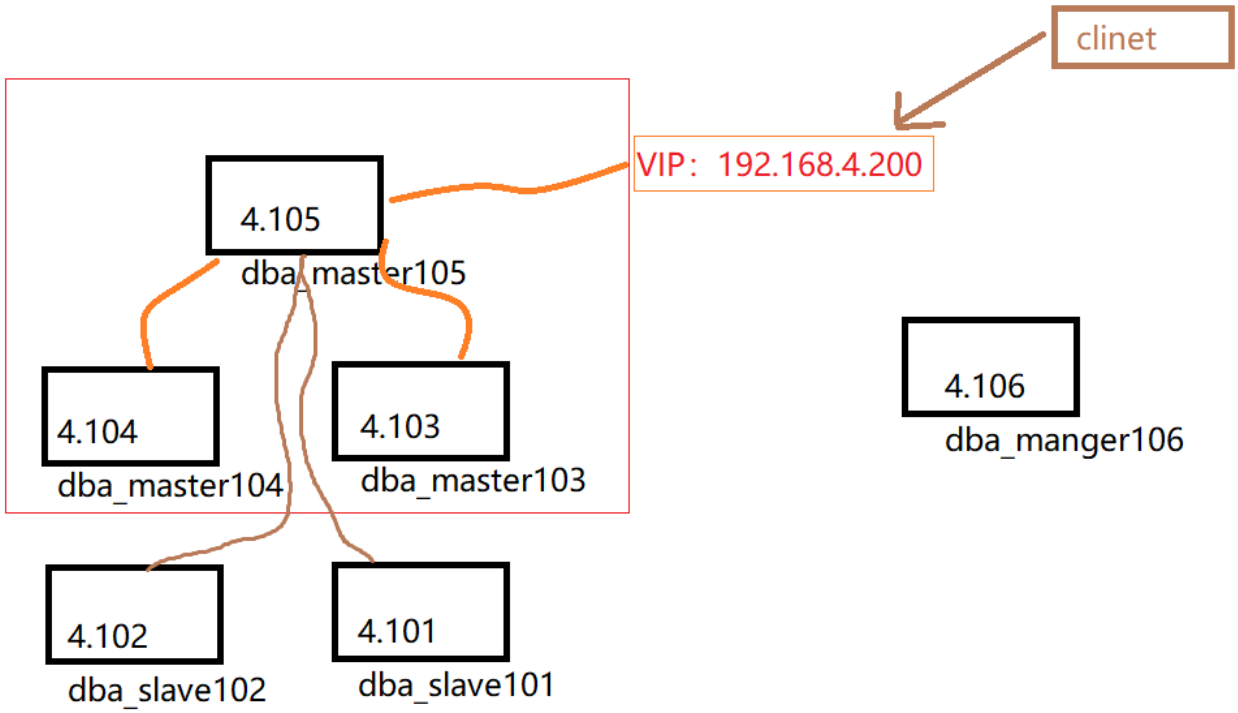
部署MySQL高可用集群 （MHA软件+主从同步实现）

介绍：

作用：高可用集群采用的是主备模式，当主角色的主机宕机后，备用主机自动接替主角色的主机提供服务给客户端，实现数据库的热备。

一、操作步骤

1. 拓扑图体现



2. 配置系统基本环境

2.1.1 配置ip地址， 设置主机名

```
 host1 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.101/24 connection.autoconnect yes  //配置ip地址
host1 ]# nmcli connection up eth0    //激活网卡
host1 ]# hostnamectl  set-hostname  dba_slave101.a.com   //设置主机名
```

```
host2 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.102/24 connection.autoconnect yes
host2 ]# nmcli connection up eth0
host2 ]# hostnamectl  set-hostname  dba_slave102.a.com
```

```
host3 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.103/24 connection.autoconnect yes
host3 ]# nmcli connection up eth0
host3 ]# hostnamectl  set-hostname  dba_master103.a.com
```

```
host4 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.104/24 connection.autoconnect yes
host4 ]# nmcli connection up eth0
host4 ]# hostnamectl  set-hostname  dba_master104.a.com
```

```
host5 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.105/24 connection.autoconnect yes
host5 ]# nmcli connection up eth0
host5 ]# hostnamectl  set-hostname  dba_master105.a.com
```

```
host6 ]# nmcli connection modify  eth0 ipv4.method  manual ipv4.addresses
192.168.4.106/24 connection.autoconnect yes
host6 ]# nmcli connection up eth0
host6 ]# hostnamectl  set-hostname  dba_manager106.a.com
```

2.2.1 配置安全防护策略

```
dba_master104 ]# systemctl  disable firewalld.service   //关闭防火墙
dba_master104 ]# sed -i s/SELINUX=enforcing/SELINUX=disabled/  /etc/selinux/config
//关闭selinux，但是需要重启才能生效
```

2.3.1 配置服务器之间ssh免密登录

```
dba_master104 ]# ssh-keygen    //创建ssh密钥
dba_master104 ]# for i in {101..105}:; do     ssh-copy-id root@192.168.4.$i;
 done    //将密钥传送到几台客户机，101-105的机器都需要做这样的操作
```

2.4.1 配置yum仓库

```
dba_slave101 ~]# yum-config-manager  --add ftp://192.168.4.254/rhel7    //创建yum源
dba_slave101 ~]# echo gpgcheck=0 >> /etc/yum.repos.d/192.168.4.254_rhel7.repo
dba_slave101 ~]# yum clean all
dba_slave101 ~]# yum repolist
```

3. 搭建数据库环境以及授权

3.1.1 安装mysql，修改MySQL的密码为123456，以下操作需要在101-105都操作。

```
dba_slave101 ~]# tar xvf mysql-5.7.17-1.el7.x86_64.rpm-bundle.tar  //解压软件包
dba_slave101 ~]# rm -rf mysql-community-server-minimal-5.7.17-1.el7.x86_64.rpm  //删除冲突包，minimal版MySQL
dba_slave101 ~]# yum install perl-JSON  //安装MySQL需要的依赖包
dba_slave101 ~]# rpm -ivh mysql-community-*.rpm  //安装MySQL
dba_slave101 ~]# systemctl start mysqld  //启动MySQL服务
dba_slave101 ~]# a=`grep 'temporary password' /var/log/mysqld.log | awk -F'localhost: ' '{print $2}'` ; mysql -uroot -p$a   //MySQL5.7的数据库初始密码会放在日志文件里面，需要查找出来，直接将结果给到启动进入MySQL

 mysql> set global validate_password_policy=0;     //只验证长度，不验证密码复杂性
Query OK, 0 rows affected (0.00 sec)
```

```
 mysql> set global validate_password_length=6;     //修改密码长度，默认值是8个字符
Query OK, 0 rows affected (0.00 sec)
```

```
 mysql> alter user user() identified by "123456";     //修改登录密码
Query OK, 0 rows affected (0.00 sec)
```

```
`
```

3.2.1 数据库授权；

```
 在主机105 104  103  检查是否有同步数据的用户 repluser
mysql> show  grants  for  repluser@"%" ;
```

```
 在主机101~105 做如下授权
mysql> grant  all on  *.*  to  root@"%"    identified by "123456";
```

```
 在主机101~105 做如下设置
mysql> set global relay_log_purge=off;    //禁止自动删除sql日志
```

3.2.2 主放权，所有从同步主master105；

```
    dba_master105 ~]# vim /etc/my.cnf
        plugin-load = "rpl_semi_sync_master=semisync_master.so;rpl_semi_sync_sla
    ve=semisync_slave.so"
        rpl-semi-sync-master-enabled = 1
        rpl-semi-sync-slave-enabled = 1
        server_id=105      // 指定服务器id好
        log-bin=master51    //启用binlog日志，设置日志名
        binlog-format="mixed"   //指定日志格式
```

```
 dba_master105 ~]# systemctl  restart mysqld
dba_master105 ~]# mysql -uroot -p123456
mysql> grant replication slave on *.* to repluser@"%" identified by '123qqq...A';
//设置同步复制的授权用户
Query OK, 0 rows affected, 1 warning (0.00 sec)
```

```
 mysql> show master status\G   //查看master状态
*************************** 1. row ***************************
             File: master51.000001    //日志名
         Position: 154     //偏移量
     Binlog_Do_DB:
 Binlog_Ignore_DB:
Executed_Gtid_Set:
1 row in set (0.00 sec)
```

```
dba_master104 ~]# vim /etc/my.cnf
    plugin-load = "rpl_semi_sync_master=semisync_master.so;rpl_semi_sync_sla
ve=semisync_slave.so"
    rpl-semi-sync-master-enabled = 1
    rpl-semi-sync-slave-enabled = 1
    server_id=104
    log-bin=master41
    binlog-format="mixed"
dba_master104 ~]# systemctl  restart mysqld
dba_master104 ~]# mysql -uroot -p123456
mysql> grant replication slave on *.* to repluser@"%" identified by '123qq
q...A';
mysql> change master to master_host="192.168.4.105",master_user="repluser",m
aster_password="123qqq...A",master_log_file="master51.000001",master_log_pos
=154;  //设置同步的主库
Query OK, 0 rows affected, 2 warnings (0.27 sec)
mysql> start slave;  //开启从库复制模式
Query OK, 0 rows affected (0.01 sec)
mysql> show slave status\G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 192.168.4.105
                  Master_User: repluser
                  Master_Port: 3306
                Connect_Retry: 60
              Master_Log_File: master51.000001
          Read_Master_Log_Pos: 154
               Relay_Log_File: dba_master104-relay-bin.000002
                Relay_Log_Pos: 319
        Relay_Master_Log_File: master51.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
      ...........
1 row in set (0.00 sec)
```

```
dba_master103 ~]# vim /etc/my.cnf
    plugin-load = "rpl_semi_sync_master=semisync_master.so;rpl_semi_sync_sla
ve=semisync_slave.so"
    rpl-semi-sync-master-enabled = 1
    rpl-semi-sync-slave-enabled = 1
    server_id=103
    log-bin=master31
    binlog-format="mixed"
dba_master103 ~]# systemctl  restart mysqld
dba_master103 ~]# mysql -uroot -p123456
mysql> grant replication slave on *.* to repluser@"%" identified by '123qq
q...A';
mysql> change master to master_host="192.168.4.105",master_user="repluser",m
aster_password="123qqq...A",master_log_file="master51.000001",master_log_pos
=154;
Query OK, 0 rows affected, 2 warnings (0.31 sec)
mysql> start slave;
Query OK, 0 rows affected (0.02 sec)
mysql> show slave status \G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 192.168.4.105
                  Master_User: repluser
                  Master_Port: 3306
                Connect_Retry: 60
              Master_Log_File: master51.000001
          Read_Master_Log_Pos: 154
               Relay_Log_File: dba_master103-relay-bin.000002
                Relay_Log_Pos: 319
        Relay_Master_Log_File: master51.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
  ..................................
1 row in set (0.00 sec)
```

```
dba_slave102 ~]# vim /etc/my.cnf
    server_id=102
dba_slave102 ~]# systemctl  restart mysqld
dba_slave102 ~]# mysql -uroot -p123456
mysql> change master to master_host="192.168.4.105",master_user="repluser",m
aster_password="123qqq...A",master_log_file="master51.000001",master_log_pos
=154;
Query OK, 0 rows affected, 2 warnings (0.46 sec)
mysql> start slave;
Query OK, 0 rows affected (0.04 sec)
mysql> show slave status \G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 192.168.4.105
                  Master_User: repluser
                  Master_Port: 3306
                Connect_Retry: 60
              Master_Log_File: master51.000001
          Read_Master_Log_Pos: 154
               Relay_Log_File: dba_slave102-relay-bin.000002
                Relay_Log_Pos: 319
        Relay_Master_Log_File: master51.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
     ..................................
1 row in set (0.00 sec)
```

```
dba_slave101 ~]# vim /etc/my.cnf
    server_id=101
dba_slave101 ~]# systemctl  restart mysqld
dba_slave101 ~]# mysql -uroot -p123456
mysql> change master to master_host="192.168.4.105",master_user="repluser",m
aster_password="123qqq...A",master_log_file="master51.000001",master_log_pos
=154;
Query OK, 0 rows affected, 2 warnings (0.46 sec)
mysql> start slave;
Query OK, 0 rows affected (0.04 sec)
mysql> show slave status \G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 192.168.4.105
                  Master_User: repluser
                  Master_Port: 3306
                Connect_Retry: 60
              Master_Log_File: master51.000001
          Read_Master_Log_Pos: 154
               Relay_Log_File: dba_slave101-relay-bin.000002
                Relay_Log_Pos: 319
        Relay_Master_Log_File: master51.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
    ......................................
1 row in set (0.00 sec)
```

4. 配置mha高可用数据库集群

4.1 安装mha需要的perl环境包

4.101-4.105 全部安装

```
cd mha-soft-student/
yum -y  install  perl-*.rpm
yum  -y  install   perl-DBD-mysql
rpm -ivh mha4mysql-node-0.56-0.el6.noarch.rpm  //安装mha的node软件包
```

106管理机安装

```
dba_manager106 ~]# cd mha-soft-student/
dba_manager106 ~]# yum -y  install  perl-*.rpm
dba_manager106 ~]# yum  -y  install   perl-DBD-mysql
dba_manager106 ~]# rpm -ivh mha4mysql-node-0.56-0.el6.noarch.rpm   //管理机切记需要先安装mah-node再装manager，否则会报错。
dba_manager106 ~]# yum -y  install    perl-ExtUtils-*     perl-CPAN*
dba_manager106 ~]# tar  -zxvf  mha4mysql-manager-0.56.tar.gz
dba_manager106 ~]# cd mha4mysql-manager-0.56/
dba_manager106 ~]# perl Makefile.PL
dba_manager106 ~]# make
dba_manager106 ~]# make install
dba_manager106 ~]# cp bin/* /usr/local/bin/   //将命令文件拷贝到系统，默认已经有了的
dba_manager106 ~]# mkdir /etc/mha_manager    //创建目录来存放管理文件
dba_manager106 ~]# cp samples/conf/app1.cnf  /etc/mha_manager/     //拷贝主配置文件
dba_manager106 ~]# cp samples/scripts/master_ip_failover  /usr/local/bin/
  //复制故障转移文件

dba_manager106 ~]# vim /etc/mha_manager/app1.cnf
    [server default]
    manager_workdir=/etc/mha_manager    //指定mha管理服务目录
    manager_log=/etc/mha_manager/manager.log   //指定管理服务产生的日志文件路径
    master_ip_failover_script=/usr/local/bin/master_ip_failover    //指定故障转移脚本

    ssh_user=root   //系统账号
    ssh_port=22     //系统端口
    repl_user=repluser    //同步账号
    repl_password=123qqq...A    //同步密码
    user=root     //mysql登录账号
    password=123456   //MySQL登录密码

    [server1]
    hostname=192.168.4.105
    candidate_master=1  //主数据库1

    [server2]
    hostname=192.168.4.104
    candidate_master=1

    [server3]
    hostname=192.168.4.103
    candidate_master=1
```

```
[server4]
hostname=192.168.4.102
no_master=1   //不做主的数据库1

[server5]
hostname=192.168.4.101
no_master=1
```

```
dba_manager106 ~]# vim /usr/local/bin/master_ip_failover    //故障转移脚本主要就是定义虚拟ip跟关闭虚拟ip接口
    my $vip = '192.168.4.200/24';  # Virtual IP
    my $key = "1";
    my $ssh_start_vip = "/sbin/ifconfig eth0:$key $vip";
    my $ssh_stop_vip = "/sbin/ifconfig eth0:$key down";
dba_manager106 ~]# ifconfig  eth0:1 192.168.4.100/24
```

5. 测试环节

```
dba_manager106 ~]# masterha_check_ssh --conf=/etc/mha_manager/app1.cnf   //测试ssh免密登录情况
Tue Aug 28 15:53:05 2018 - [info] All SSH connection tests passed successfully.
```

```
dba_manager106 ~]# masterha_check_repl --conf=/etc/mha_manager/app1.cnf   //测试repl同步情况是否正常
Tue Aug 28 17:23:21 2018 - [warning] master_ip_failover_script is not defined.
Tue Aug 28 17:23:21 2018 - [warning] shutdown_script is not defined.
Tue Aug 28 17:23:21 2018 - [info] Got exit code 0 (Not master dead).
MySQL Replication Health is OK.
```

```
dba_manager106 ~]# masterha_manager  --conf=/etc/mha_manager/app1.cnf   </dev/null >/data/mha/mag.log 2>&1 &     //开启mha服务器并运行到后台，如果不运行到后台将会占用一个终端不能关闭
dba_manager106 ~]# masterha_check_status --conf=/etc/mha_manager/app1.cnf
 //检查mha状态
app1 (pid:14817) is running(0:PING_OK), master:192.168.4.105
```

6. 错误以及排错方法

6.1 masterha_check_repl --conf=/etc/mha_manager/app1.cnf 检测错误

6.1.1、 xxx原因报错

```
[root@mgm56 ~]# masterha_check_repl  --conf=/etc/mha_manager/app1.cnf
Sat Aug 25 18:59:14 2018 - [warning] Global configuration file /etc/masterha_default.cnf not found. Skipping.
Sat Aug 25 18:59:14 2018 - [info] Reading application default configuration from /etc/mha_manager/app1.cnf..
Sat Aug 25 18:59:14 2018 - [info] Reading server configuration from /etc/mha_manager/app1.cnf..
Sat Aug 25 18:59:14 2018 - [info] MHA::MasterMonitor version 0.56.
Sat Aug 25 18:59:14 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln301] Got MySQL error when connecting 192.168.4.63(192.168.4.63:
3306) :1045:Access denied for user 'root'@'192.168.4.66' (using password: YES), but this is not a MySQL crash. Check MySQL server settings.
 at /usr/local/share/perl5/MHA/ServerManager.pm line 297.
Sat Aug 25 18:59:14 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln301] Got MySQL error when connecting 192.168.4.61(192.168.4.61:
3306) :1045:Access denied for user 'root'@'192.168.4.66' (using password: YES), but this is not a MySQL crash. Check MySQL server settings.
 at /usr/local/share/perl5/MHA/ServerManager.pm line 297.
Sat Aug 25 18:59:14 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln301] Got MySQL error when connecting 192.168.4.64(192.168.4.64:
3306) :1045:Access denied for user 'root'@'192.168.4.66' (using password: YES), but this is not a MySQL crash. Check MySQL server settings.
 at /usr/local/share/perl5/MHA/ServerManager.pm line 297.
Sat Aug 25 18:59:14 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln301] Got MySQL error when connecting 192.168.4.65(192.168.4.65:
3306) :1045:Access denied for user 'root'@'192.168.4.66' (using password: YES), but this is not a MySQL crash. Check MySQL server settings.
 at /usr/local/share/perl5/MHA/ServerManager.pm line 297.
Sat Aug 25 18:59:14 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln301] Got MySQL error when connecting 192.168.4.62(192.168.4.62:
3306) :1045:Access denied for user 'root'@'192.168.4.66' (using password: YES), but this is not a MySQL crash. Check MySQL server settings.
 at /usr/local/share/perl5/MHA/ServerManager.pm line 297.
Sat Aug 25 18:59:15 2018 - [error][/usr/local/share/perl5/MHA/ServerManager.pm, ln309] Got fatal error, stopping operations
Sat Aug 25 18:59:15 2018 - [error][/usr/local/share/perl5/MHA/MasterMonitor.pm, ln424] Error happened on checking configurations.  at /usr/local/
share/perl5/MHA/MasterMonitor.pm line 326.
Sat Aug 25 18:59:15 2018 - [error][/usr/local/share/perl5/MHA/MasterMonitor.pm, ln523] Error happened on monitoring servers.
Sat Aug 25 18:59:15 2018 - [info] Got exit code 1 (Not master dead).

MySQL Replication Health is NOT OK!
```

6.1.1 解决思路就是，重新来一遍。哈哈^_^

6.1.2、 mysql的授权其他机器远程访问的权限没有设置好。