操作系统:

     Centos7.1

软件包: mysql-cluster-gpl-7.0.8a-linux-i686-glibc23.tar.gz

下载地址： <http://yunpan.cn/cwE5fidjGGUsq>  访问密码 36f1

数据库管理节点: 192.168.1.210  
数据库数据节点: 192.168.1.211,192.168.1.112   
数据库sql节点: 192.168.1.211,192.168.1.212

一．准备工作

1. 删除系统原来的mysql：yum remove mysql（mariadb）
2. 查看/var/lib/mysql是否存在，存在则删除该目录及所有文件
3. rpm –qa |grep mysql查看是否有mysql存在

二．安装节点（包括管理节点、数据节点，三台机子都进行如下操作）

1.配置mysql的安装路径，数据路径以及文件路径，打开/etc/my.cnf，配置如下：

[mysqld]

basedir = /usr/local/mysql/mysqlc

datadir = /usr/local/mysql/ndbdata

socket=/usr/local/mysql/mysqlc/mysql.sock

#socket=/var/lib/mysql/mysql.sock

# Disabling symbolic-links is recommended to prevent assorted security risks

symbolic-links=0

user=mysql

#(此处ip均为管理节点ip，如有多个管理节点，则以逗号连接，如：X.X.X.X,Y.Y.Y.Y)

ndbcluster

ndb-connectstring=192.168.1.210

[mysql\_cluster]

ndb-connectstring=192.168.1.210

[ndbd]

connect-string=192.168.1.210

[ndb\_mgm]

connect-string=192.168.1.210

[ndb\_mgmd]

config-file=/usr/local/mysql/etc/config.ini

[mysqld\_safe]

log-error=/usr/local/mysql/ndbdata/mariadb.log

pid-file=/usr/local/mysql/ndbdata/mariadb.pid

#

# include all files from the config directory

#

!includedir /etc/my.cnf.d

2.在/usr/local创建mysql目录，如果存在则清空mysql里面的所有内容

mkdir mysql

3．#mv mysql-cluster-gpl-7.0.8a-linux-i686-glibc23.tar.gz /usr/local/

  #cd /usr/local/mysql

  #tar zxvf mysql-cluster-gpl-7.0.8a-linux-i686-glibc23.tar.gz

  #rm -f mysql-cluster-gpl-7.0.8a-linux-i686-glibc23.tar.gz

  #mv mysql-cluster-gpl-7.0.8a-linux-i686-glibc23 mysql/mysqlc

4.查看mysql组与mysql用户是否存在，不存在则创建

#groupadd mysql

  #useradd mysql -g mysql

5.改变mysql目录的权限

#chown -R mysql:mysql mysql

6.安装集群

#cd mysqlc

  #scripts/mysql\_install\_db --user=mysql

运行完后，会根据my.cnf文件的路径，在/usr/local/mysql目录下ndbdata目录，此处保存了mysql的所有信息

7.在/usr/local/mysql目录下创建bin目录

#mkdir /usr/local/mysql/bin

将mysqlc/bin下面的ndbd、ndb\_mgm、ndb\_mgmd拷贝到/use/local/mysql/bin目录下

8.对于管理节点如下操作

在/usr/local/mysql下创建etc目录

#mkdir /usr/local/mysql/etc

#vim /usr/local/mysql/etc/config.ini

Etc配置如下：

[ndb\_mgmd default]

datadir = /usr/local/mysql/ndbdata

[ndbd default]

NoOfReplicas = 2

DataMemory = 80M

IndexMemory = 18M

datadir = /usr/local/mysql/ndbdata

[ndb\_mgmd]

NodeId = 1

HostName = 192.168.1.210

[ndbd]

NodeId = 11

HostName = 192.168.1.211

StopOnError=1

heartbeatintervaldbdb = 5000

heartbeatintervaldbapi = 5000

[ndbd]

NodeId = 21

HostName = 192.168.1.212

StopOnError=1

heartbeatintervaldbdb = 5000

heartbeatintervaldbapi = 5000

[mysqld]

NodeId = 81

HostName = 192.168.1.211

[mysqld]

NodeId = 91

HostName = 192.168.1.212

[mysqld] #（此处空余mysql一定要保留）

9.数据节点和sql节点的配置文件为my.cnf，进行如下操作

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

10.启动相关服务(--initial仅仅在修改配置时才需要)

  在管理节点启动相关服务:

#cd /usr/local/mysql/bin

  #./ndb\_mgmd f/usr/local/mysql/mysqlc/config.ini --initial

  #netstat -lntpu

  tcp        0      0 0.0.0.0:1186            0.0.0.0:\*

  LISTEN   22907/ndb\_mgmd

  看到1186端口开放了说明启动是正常的.

  在数据节点启动相关服务:

  #/usr/local/mysql/bin/ndbd --initial

  #netstat -lntpu

可以看到相关的ndbd服务以及mysql已经启动ok了.

11.功能测试

  到管理节点查看下相关服务状态

 # ndb\_mgm  
 ndb\_mgm> show  
 Connected to Management Server at: localhost:1186  
 Cluster Configuration  
 ---------------------  
 [ndbd(NDB)]     2 node(s)  
 id=3    @192.168.1.210  (mysql-5.1.37 ndb-7.0.8, Nodegroup: 0)

 [ndb\_mgmd(MGM)] 1 node(s)  
 id=1    @192.168.1.211  (mysql-5.1.37 ndb-7.0.8)

id=1    @192.168.1.212  (mysql-5.1.37 ndb-7.0.8)

 [mysqld(API)]   2 node(s)  
 id=81   @192.168.1.211 (mysql-5.1.37 ndb-7.0.8)  
 id=91   @192.168.1.212  (mysql-5.1.37 ndb-7.0.8)

 可以看到这里的数据节点、管理节点、sql节点都是正常的.

 现在我们在其中一个数据节点上进行相关数据库的创建,然后到另外一个数据节点上看看数据是否同步

 # /usr/local/mysql/bin/mysql -u root -p

 mysql> show databases;  
+--------------------+  
| Database           |  
+--------------------+  
| information\_schema |   
| mysql              |   
| ndb\_2\_fs           |   
| test               |   
+--------------------+  
mysql> create database aa;  
mysql> use aa  
mysql> CREATE TABLE ctest2 (i INT) ENGINE=NDB; //这里必须指定数据库表的引擎为NDB,否则同

                                                 步失败  
mysql> INSERT INTO ctest2 () VALUES (1);  
mysql> SELECT \* FROM ctest2;  
+------+  
| i    |  
+------+  
|    1 |   
+------+

现在到另外一个数据节点查看下aa数据库是否同步过来了.

#/usr/local/mysql/bin/mysql -u root -p

mysql> show databases;  
+--------------------+  
| Database           |  
+--------------------+  
| information\_schema |   
| aa                 |   
| bb                 |   
| mysql              |   
| ndb\_3\_fs           |   
| test               |   
+--------------------+  
mysql> use aa  
mysql> select \* from ctest2;  
+------+  
| i    |  
+------+  
|    1 |   
+------+

从上面可以看到数据已经同步了,mysql集群环境已经搭建完成.

12.破坏性测试

1. 断开一个管理节点的网络连接
2. 断开一个sql节点和一个data节点

13.问题：

（1）2015-07-27 14:05:50 [MgmtSrvr] INFO -- Node 21: Initial start, waiting for 11 to connect, nodes [ all: 11 and 21 connected: 21 no-wait:

注意防火墙有没有关闭，文件的属主与属组是否是mysql

（2）Node 11: Forced node shutdown completed. Caused by error 2305: 'Node lost connection to other nodes and can not form a unpartitioned cluster, please investigate if there are error(s) on other node(s)(Arbitration error). Temporary error, restart node'.

Node 21: Forced node shutdown completed. Caused by error 2305: 'Node lost connection to other nodes and can not form a unpartitioned cluster, please investigate if there are error(s) on other node(s)(Arbitration error). Temporary error, restart node'.

解决办法：

But why the clock becomes faster, because my mysql cluster is placed in the the esx control a bunch of VM which these VM by default to each clock from time to time, do not know how VM's clock slow more powerful, Time moved forward with QQQQ ms, QQQQ> 10000ms the situation when synchronization occurs a few times so will let ndbd forced to withdraw, causing a strange problem.

Find the root cause, the remaining question is how to solve the Internet to find information, adjust ndbd two parameters (default seems to be 100ms, too short.)

heartbeatintervaldbdb = 5000 heartbeatintervaldbapi = 5000, why is 5000ms, rather than 10000ms?

Because

1) The above I guess, maybe it's true, but I'm not 100% sure (is ESX, there may be esx vMotion when suspended automatically result in the delay of the machine), first adjust this parameter (if you network is not good, you can also change the larger) to wait until the next occurrence of the time, find that there is not yyyy ZZZZ, PPPP, QQQQ greater than 5000ms like positioning, and that the issue appears not very frequent (about a once a month, Khan).

2) is determined by YYYY, this figure is rarely more than 5000ms

（3）.注意文件的权限问题，安装后，将属组和属主改成mysql，很多的问题因为权限问题引起的

The server quit without updating PID file (/usr/local/mysql/ndbdata/localhost.localdomain.pid

原因：mysql.sock无法建立，权限问题

[root@vmware-212 mysql]# chown -R mysql:mysql /usr/local/mysql/ndbdata/

[root@vmware-212 mysql]# chmod -R 755 /usr/local/mysql

[root@vmware-212 mysql]# ps -ef |grep mysql

(4) 断掉ndbd1，ndbd2在线，sql1写数据、sql2可以收到数据

（5）断掉sql1 ，ndbd都在线，sql2写数据后，sql1服务开启后可以获取到数据