在 mastera 上已经配置好数据库
mysql> show databases;
```
+--------------------+
| Database           |
+--------------------+
| information_schema |
| db01               |
| db02               |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.13 sec)
```

首先做数据库全库导出
mysqldump -A -uroot -p'Gmcc#123' > /tmp/mysql.all.sql
每个 mysql 都启动起来：
systemctl start mysqld

将导出文件导入
for i in 130 131 132 ;do scp /tmp/mysql.all.sql root@192.168.45.$i:/tmp; done
for i in 130 131 132 ;do ssh root@192.168.45.$i "mysql -uroot -p'Gmcc#123' < /tmp/mysql.all.sql"; done

修改配置文件：
[root@mastera ~]# cat /etc/my.cnf

```
[mysqld]

# innodb_buffer_pool_size = 128M
character_set_server=utf8
init_connect='SET NAMES utf8'
gtid_mode = ON
enforce_gtid_consistency = 1

# These are commonly set, remove the # and set as required.
basedir = /opt/mysql
datadir = /opt/mysql/mysqldata
```

```
port = 3306
server_id = 1
socket = /var/lib/mysql/mysql.sock

log-bin=/opt/mysql/master-binlog
log-bin-index=/opt/mysql/mysql-binlog
sql_mode=NO_ENGINE_SUBSTITUTION,STRICT_TRANS_TABLES
[client]
default-character-set=utf8
```

```
[root@masterb ~]# vi /etc/my.cnf
[mysqld]

# innodb_buffer_pool_size = 128M
character_set_server=utf8
init_connect='SET NAMES utf8'
gtid_mode = ON
enforce_gtid_consistency = 1

basedir = /opt/mysql
datadir = /opt/mysql/mysqldata
port = 3306
server_id = 2
socket = /var/lib/mysql/mysql.sock

log-bin=/opt/mysql/slave-binlog
log-bin-index=/opt/mysql/mysql-binlog
sql_mode=NO_ENGINE_SUBSTITUTION,STRICT_TRANS_TABLES
[client]
default-character-set=utf8
```

```
[root@slavea ~]# vi /etc/my.cnf
[mysqld]
```

```
character_set_server=utf8
init_connect='SET NAMES utf8'

gtid_mode = ON
enforce_gtid_consistency = 1

# These are commonly set, remove the # and set as required.
basedir = /opt/mysql
datadir = /opt/mysql/mysqldata
port = 3306
server_id = 3
master-info-repository=TABLE
relay-log-info-repository=TABLE

socket = /var/lib/mysql/mysql.sock
log-bin=/opt/mysql/master-binlog
log-bin-index=/opt/mysql/mysql-binlog
sql_mode=NO_ENGINE_SUBSTITUTION,STRICT_TRANS_TABLES
[client]
default-character-set=utf8
```

重启 mysql 服务：

```
for i in 130 131 132 ;do ssh root@192.168.45.$i "systemctl restart mysqld";done
```

---

mastera 上操作

```
mysql -uroot -pGmcc#123
grant replication slave on *.* to slave@192.168.45.130 identified by 'Gmcc#123';
grant replication slave on *.* to slave@192.168.45.131 identified by 'Gmcc#123';
grant replication slave on *.* to slave@192.168.45.132 identified by 'Gmcc#123';
grant replication slave on *.* to slave@192.168.45.129 identified by 'Gmcc#123';
```

在 masterb 上面 change master:

```
mysql> change master to master_host="192.168.45.129",master_user="slave",master_password="Gmcc#123",master_auto_position=1;
mysql> start slave;
mysql> show slave status\G;
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
```

```
                  Master_Host: 192.168.45.129
                  Master_User: slave
                  Master_Port: 3306
                Connect_Retry: 60
              Master_Log_File: master-binlog.000003
          Read_Master_Log_Pos: 1342
               Relay_Log_File: masterb-relay-bin.000002
                Relay_Log_Pos: 1563
        Relay_Master_Log_File: master-binlog.000003
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
              Replicate_Do_DB:
          Replicate_Ignore_DB:
           Replicate_Do_Table:
       Replicate_Ignore_Table:
      Replicate_Wild_Do_Table:
  Replicate_Wild_Ignore_Table:
                   Last_Errno: 0
                   Last_Error:
                 Skip_Counter: 0
          Exec_Master_Log_Pos: 1342
              Relay_Log_Space: 1772
              Until_Condition: None
               Until_Log_File:
                Until_Log_Pos: 0
           Master_SSL_Allowed: No
           Master_SSL_CA_File:
           Master_SSL_CA_Path:
              Master_SSL_Cert:
            Master_SSL_Cipher:
               Master_SSL_Key:
        Seconds_Behind_Master: 0
Master_SSL_Verify_Server_Cert: No
                Last_IO_Errno: 0
                Last_IO_Error:
               Last_SQL_Errno: 0
               Last_SQL_Error:
  Replicate_Ignore_Server_Ids:
             Master_Server_Id: 1
```

```
                  Master_UUID: ebc5dafa-6fbd-11e7-ab6a-000c295e46a3
             Master_Info_File: /opt/mysql/mysqldata/master.info
                    SQL_Delay: 0
          SQL_Remaining_Delay: NULL
    Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
           Master_Retry_Count: 86400
                  Master_Bind:
    Last_IO_Error_Timestamp:
   Last_SQL_Error_Timestamp:
                Master_SSL_Crl:
            Master_SSL_Crlpath:
            Retrieved_Gtid_Set: ebc5dafa-6fbd-11e7-ab6a-000c295e46a3:1-4
             Executed_Gtid_Set: ebc5dafa-6fbd-11e7-ab6a-000c295e46a3:1-4
                 Auto_Position: 1
         Replicate_Rewrite_DB:
                 Channel_Name:
            Master_TLS_Version:
1 row in set (0.00 sec)

ERROR:
No query specified
-----------------------------------
#在 mastera 上面 change master：
change                                                  master                                                  to
master_host="192.168.45.130",master_user="slave",master_password="Gmcc#123",master_auto_position=1;
mysql> start slave;
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: 192.168.45.130
                     Master_User: slave
                     Master_Port: 3306
                   Connect_Retry: 60
                 Master_Log_File: slave-binlog.000005
           Read_Master_Log_Pos: 154
                Relay_Log_File: mastera-relay-bin.000002
                 Relay_Log_Pos: 373
```

```
           Relay_Master_Log_File: slave-binlog.000005
                Slave_IO_Running: Yes
               Slave_SQL_Running: Yes
                 Replicate_Do_DB:
             Replicate_Ignore_DB:
              Replicate_Do_Table:
          Replicate_Ignore_Table:
         Replicate_Wild_Do_Table:
     Replicate_Wild_Ignore_Table:
                      Last_Errno: 0
                      Last_Error:
                    Skip_Counter: 0
             Exec_Master_Log_Pos: 154
                 Relay_Log_Space: 582
                 Until_Condition: None
                  Until_Log_File:
                   Until_Log_Pos: 0
              Master_SSL_Allowed: No
              Master_SSL_CA_File:
              Master_SSL_CA_Path:
                 Master_SSL_Cert:
               Master_SSL_Cipher:
                  Master_SSL_Key:
           Seconds_Behind_Master: 0
Master_SSL_Verify_Server_Cert: No
                 Last_IO_Errno: 0
                 Last_IO_Error:
                Last_SQL_Errno: 0
                Last_SQL_Error:
   Replicate_Ignore_Server_Ids:
              Master_Server_Id: 2
                   Master_UUID: 54515095-7861-11e7-863d-000c29c67787
              Master_Info_File: /opt/mysql/mysqldata/master.info
                     SQL_Delay: 0
           SQL_Remaining_Delay: NULL
       Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
            Master_Retry_Count: 86400
                   Master_Bind:
       Last_IO_Error_Timestamp:
```

```
        Last_SQL_Error_Timestamp:
                     Master_SSL_Crl:
                 Master_SSL_Crlpath:
                 Retrieved_Gtid_Set:
                  Executed_Gtid_Set: ebc5dafa-6fbd-11e7-ab6a-000c295e46a3:1-4
                      Auto_Position: 1
              Replicate_Rewrite_DB:
                        Channel_Name:
                 Master_TLS_Version:
1 row in set (0.00 sec)

ERROR:
No query specified

mysql>

-------------  测试 -----
在 a 插入数据
mysql> insert into db01.t1 set id=16;
Query OK, 1 row affected (0.01 sec)

在 masterb 上查询
mysql> select * from db01.t1;
+------+-------+
| id     | name    |
+------+-------+
|     10 | zhang |
|      3 | NULL    |
|      4 | NULL    |
|      5 | NULL    |
|      6 | NULL    |
|      7 | NULL    |
|      8 | NULL    |
|      9 | NULL    |
|     11 | NULL    |
|     12 | NULL    |
|     13 | NULL    |
|     14 | NULL    |
|     15 | NULL    |
```

```
|     16 | NULL   |
+------+-------+
14 rows in set (0.00 sec)
```

在 slavea 上操作

```
change master to master_host="192.168.45.129",master_user="slave",master_password="Gmcc#123",master_log_file='master-binlog.000003',master_log_pos=2011 for channel 'mastera';
change master to master_host="192.168.45.130",master_user="slave",master_password="Gmcc#123",master_log_file='slave-binlog.000005',master_log_pos=306 for channel 'masterb';

mysql> show slave status \G;
*************************** 1. row ***************************
                Slave_IO_State:
                   Master_Host: 192.168.45.129
                   Master_User: slave
                   Master_Port: 3306
                 Connect_Retry: 60
               Master_Log_File: master-binlog.000003
           Read_Master_Log_Pos: 2011
                Relay_Log_File: slavea-relay-bin-mastera.000001
                 Relay_Log_Pos: 4
         Relay_Master_Log_File: master-binlog.000003
              Slave_IO_Running: No
             Slave_SQL_Running: Yes
               Replicate_Do_DB:
           Replicate_Ignore_DB:
            Replicate_Do_Table:
        Replicate_Ignore_Table:
       Replicate_Wild_Do_Table:
   Replicate_Wild_Ignore_Table:
                    Last_Errno: 0
                    Last_Error:
                  Skip_Counter: 0
           Exec_Master_Log_Pos: 2011
               Relay_Log_Space: 154
               Until_Condition: None
```

```
                  Until_Log_File:
                   Until_Log_Pos: 0
              Master_SSL_Allowed: No
              Master_SSL_CA_File:
              Master_SSL_CA_Path:
                 Master_SSL_Cert:
               Master_SSL_Cipher:
                  Master_SSL_Key:
           Seconds_Behind_Master: NULL
Master_SSL_Verify_Server_Cert: No
                  Last_IO_Errno: 1593
                  Last_IO_Error: Fatal error: The slave I/O thread stops because master and slave have equal MySQL
server UUIDs; theseUUIDs must be different for replication to work.
                 Last_SQL_Errno: 0
                 Last_SQL_Error:
  Replicate_Ignore_Server_Ids:
                Master_Server_Id: 1
                     Master_UUID:
                Master_Info_File: mysql.slave_master_info
                       SQL_Delay: 0
             SQL_Remaining_Delay: NULL
       Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
              Master_Retry_Count: 86400
                     Master_Bind:
       Last_IO_Error_Timestamp: 170809 16:29:58
      Last_SQL_Error_Timestamp:
                 Master_SSL_Crl:
             Master_SSL_Crlpath:
             Retrieved_Gtid_Set:
              Executed_Gtid_Set:
                  Auto_Position: 0
          Replicate_Rewrite_DB:
                   Channel_Name: mastera
             Master_TLS_Version:
*************************** 2. row ***************************
                  Slave_IO_State: Waiting for master to send event
                     Master_Host: 192.168.45.130
                     Master_User: slave
                     Master_Port: 3306
```

```
                  Connect_Retry: 60
                Master_Log_File: slave-binlog.000005
            Read_Master_Log_Pos: 306
                 Relay_Log_File: slavea-relay-bin-masterb.000002
                  Relay_Log_Pos: 323
          Relay_Master_Log_File: slave-binlog.000005
               Slave_IO_Running: Yes
              Slave_SQL_Running: Yes
                Replicate_Do_DB:
            Replicate_Ignore_DB:
             Replicate_Do_Table:
         Replicate_Ignore_Table:
        Replicate_Wild_Do_Table:
    Replicate_Wild_Ignore_Table:
                     Last_Errno: 0
                     Last_Error:
                   Skip_Counter: 0
            Exec_Master_Log_Pos: 306
                Relay_Log_Space: 539
                Until_Condition: None
                 Until_Log_File:
                  Until_Log_Pos: 0
             Master_SSL_Allowed: No
             Master_SSL_CA_File:
             Master_SSL_CA_Path:
                Master_SSL_Cert:
              Master_SSL_Cipher:
                 Master_SSL_Key:
          Seconds_Behind_Master: 0
Master_SSL_Verify_Server_Cert: No
                 Last_IO_Errno: 0
                 Last_IO_Error:
                Last_SQL_Errno: 0
                Last_SQL_Error:
  Replicate_Ignore_Server_Ids:
             Master_Server_Id: 2
                  Master_UUID: 54515095-7861-11e7-863d-000c29c67787
             Master_Info_File: mysql.slave_master_info
                    SQL_Delay: 0
```

```
           SQL_Remaining_Delay: NULL
      Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
           Master_Retry_Count: 86400
                  Master_Bind:
      Last_IO_Error_Timestamp:
     Last_SQL_Error_Timestamp:
                Master_SSL_Crl:
            Master_SSL_Crlpath:
            Retrieved_Gtid_Set:
             Executed_Gtid_Set:
                 Auto_Position: 0
          Replicate_Rewrite_DB:
                  Channel_Name: masterb
            Master_TLS_Version:
2 rows in set (0.01 sec)
```

其中 chanela 有报错：

Last_IO_Errno: 1593

Last_IO_Error: Fatal error: The slave I/O thread stops because master and slave have equal MySQL server UUIDs; theseUUIDs must be different for replication to work

```
mysql> select uuid();
+--------------------------------------+
| uuid()                               |
+--------------------------------------+
| 0be56c48-7cdd-11e7-92e1-000c290d28e4 |
+--------------------------------------+
1 row in set (0.00 sec)
```

/opt/mysql/mysqldata/auto.cnf 的 uuid 修改和查询出来的 uuid 一致，

stop slave;

systemctl restart mysqld

start slave;

问题解决

在 slaveb 上操作

change master to master_host="192.168.45.129",master_user="slave",master_password="Gmcc#123",master_log_file='master-

binlog.000003',master_log_pos=2011 for channel 'mastera';
change master to master_host="192.168.45.130",master_user="slave",master_password="Gmcc#123",master_log_file='slave-binlog.000005',master_log_pos=306 for channel 'masterb';

mysql> start slave;
Query OK, 0 rows affected (0.02 sec)

mysql> show slave status\G;
*************************** 1. row ***************************
Slave_IO_State:
Master_Host: 192.168.45.129
Master_User: slave
Master_Port: 3306
Connect_Retry: 60
Master_Log_File: master-binlog.000003
Read_Master_Log_Pos: 2011
Relay_Log_File: slaveb-relay-bin-mastera.000001
Relay_Log_Pos: 4
Relay_Master_Log_File: master-binlog.000003
Slave_IO_Running: No
Slave_SQL_Running: Yes
Replicate_Do_DB:
Replicate_Ignore_DB:
Replicate_Do_Table:
Replicate_Ignore_Table:
Replicate_Wild_Do_Table:
Replicate_Wild_Ignore_Table:
Last_Errno: 0
Last_Error:
Skip_Counter: 0
Exec_Master_Log_Pos: 2011
Relay_Log_Space: 154
Until_Condition: None
Until_Log_File:
Until_Log_Pos: 0
Master_SSL_Allowed: No
Master_SSL_CA_File:
Master_SSL_CA_Path:

```
                  Master_SSL_Cert:
                Master_SSL_Cipher:
                   Master_SSL_Key:
            Seconds_Behind_Master: NULL
Master_SSL_Verify_Server_Cert: No
                    Last_IO_Errno: 1593
                    Last_IO_Error: Fatal error: The slave I/O thread stops because master and slave have equal MySQL
server UUIDs; theseUUIDs must be different for replication to work.
                   Last_SQL_Errno: 0
                   Last_SQL_Error:
  Replicate_Ignore_Server_Ids:
                Master_Server_Id: 1
                     Master_UUID:
                Master_Info_File: mysql.slave_master_info
                       SQL_Delay: 0
             SQL_Remaining_Delay: NULL
       Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
             Master_Retry_Count: 86400
                     Master_Bind:
       Last_IO_Error_Timestamp: 170809 16:42:30
      Last_SQL_Error_Timestamp:
                   Master_SSL_Crl:
               Master_SSL_Crlpath:
               Retrieved_Gtid_Set:
                Executed_Gtid_Set:
                    Auto_Position: 0
            Replicate_Rewrite_DB:
                    Channel_Name: mastera
              Master_TLS_Version:
*************************** 2. row ***************************
                   Slave_IO_State: Waiting for master to send event
                      Master_Host: 192.168.45.130
                      Master_User: slave
                      Master_Port: 3306
                    Connect_Retry: 60
                  Master_Log_File: slave-binlog.000005
              Read_Master_Log_Pos: 306
                   Relay_Log_File: slaveb-relay-bin-masterb.000002
                    Relay_Log_Pos: 323
```

```
           Relay_Master_Log_File: slave-binlog.000005
                Slave_IO_Running: Yes
               Slave_SQL_Running: Yes
                 Replicate_Do_DB:
             Replicate_Ignore_DB:
              Replicate_Do_Table:
          Replicate_Ignore_Table:
         Replicate_Wild_Do_Table:
     Replicate_Wild_Ignore_Table:
                      Last_Errno: 0
                      Last_Error:
                    Skip_Counter: 0
             Exec_Master_Log_Pos: 306
                 Relay_Log_Space: 539
                 Until_Condition: None
                  Until_Log_File:
                   Until_Log_Pos: 0
              Master_SSL_Allowed: No
              Master_SSL_CA_File:
              Master_SSL_CA_Path:
                 Master_SSL_Cert:
               Master_SSL_Cipher:
                  Master_SSL_Key:
           Seconds_Behind_Master: 0
Master_SSL_Verify_Server_Cert: No
                 Last_IO_Errno: 0
                 Last_IO_Error:
                Last_SQL_Errno: 0
                Last_SQL_Error:
   Replicate_Ignore_Server_Ids:
              Master_Server_Id: 2
                   Master_UUID: 54515095-7861-11e7-863d-000c29c67787
              Master_Info_File: mysql.slave_master_info
                     SQL_Delay: 0
           SQL_Remaining_Delay: NULL
       Slave_SQL_Running_State: Slave has read all relay log; waiting for more updates
            Master_Retry_Count: 86400
                   Master_Bind:
       Last_IO_Error_Timestamp:
```

```
        Last_SQL_Error_Timestamp:
                  Master_SSL_Crl:
              Master_SSL_Crlpath:
              Retrieved_Gtid_Set:
               Executed_Gtid_Set:
                   Auto_Position: 0
           Replicate_Rewrite_DB:
                     Channel_Name: masterb
              Master_TLS_Version:
2 rows in set (0.00 sec)

ERROR:
No query specified

mysql>
```

---------- 测试整个复制----------

在 mastera 上插入数据在其他节点都可以查到数据

```
mysql> insert into db01.t1 set id=100;
Query OK, 1 row affected (0.01 sec)
```

---------- 安装 mysql.proxy ----------

```
yum install gcc* lua lua-devel libevent libevent-devel glib2 glib2-devel pkgconfig mariadb-devel flex

wget ftp://mysql.cdpa.nsysu.edu.tw/Unix/Database/MySQL/Downloads/MySQL-Proxy/mysql-proxy-0.8.5.tar.gz
tar xf mysql-proxy-0.8.5.tar.gz
cd mysql-proxy-0.8.5

./configure --prefix=/usr/local/mysql-proxy
make
make install


[root@linhai bin]# cd /usr/local/mysql-proxy/
[root@linhai mysql-proxy]# ls
```

```
bin  include  lib  libexec  share
[root@linhai mysql-proxy]# cd bin
[root@linhai bin]# ls
mysql-binlog-dump  mysql-myisam-dump  mysql-proxy
```

主从节点都给 134 赋权

```
grant all on db01.* to 'mysql-proxy'@192.168.45.133 identified by 'Gmcc#123';
```

```
[root@linhai bin]# ./mysql-proxy -P 192.168.45.133:3306 -b 192.168.45.129:3306 -b 192.168.45.130:3306 -r 192.168.45.131:3306 -r 192.168.45.132:3306 &
[1] 12430
[root@linhai bin]# 2017-08-10 00:45:47: (critical) plugin proxy 0.8.5 started
[root@linhai bin]#
[root@linhai bin]# netstat -antup |grep 3306
tcp        0      0 192.168.45.133:3306     0.0.0.0:*               LISTEN      12430/./mysql-proxy
```

测试：

```
mysql -u'mysql-proxy' -p'Gmcc#123' -h192.168.45.133
[root@linhai ~]# mysql -u'mysql-proxy' -p'Gmcc#123' -h192.168.45.133
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 15
Server version: 5.7.14-log Source distribution

Copyright (c) 2000, 2016, Oracle, MariaDB Corporation Ab and others.

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

MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| db01               |
+--------------------+
2 rows in set (0.09 sec)

MySQL [(none)]> select * from db01.t1;
+------+-------+
```

```
| id     | name    |
+------+-------+
|     10 | zhang |
|      3 | NULL    |
|      4 | NULL    |
|      5 | NULL    |
|      6 | NULL    |
|      7 | NULL    |
|      8 | NULL    |
|      9 | NULL    |
|     11 | NULL    |
|     12 | NULL    |
|     13 | NULL    |
|     14 | NULL    |
|     15 | NULL    |
|     16 | NULL    |
|   100 | NULL    |
|   200 | NULL    |
+------+-------+
16 rows in set (0.01 sec)

MySQL [(none)]> insert into db01.t1 set id=300;
Query OK, 1 row affected (0.08 sec)

MySQL [(none)]> select * from db01.t1;
+------+-------+
| id     | name    |
+------+-------+
|     10 | zhang |
|      3 | NULL    |
|      4 | NULL    |
|      5 | NULL    |
|      6 | NULL    |
|      7 | NULL    |
|      8 | NULL    |
|      9 | NULL    |
|     11 | NULL    |
|     12 | NULL    |
|     13 | NULL    |
```

```
|     14 | NULL   |
|     15 | NULL   |
|     16 | NULL   |
|    100 | NULL   |
|    200 | NULL   |
|    300 | NULL   |
+------+-------+
17 rows in set (0.00 sec)
```

去到 slaveb 上查询记录：

```
[root@slaveb ~]# mysql -uroot -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 5.7.14-log Source distribution

Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

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

mysql> select * from db01.t1;
+------+-------+
| id   | name  |
+------+-------+
|    10 | zhang |
|     3 | NULL  |
|     4 | NULL  |
|     5 | NULL  |
|     6 | NULL  |
|     7 | NULL  |
|     8 | NULL  |
|     9 | NULL  |
|    11 | NULL  |
|    12 | NULL  |
|    13 | NULL  |
```

```
|    14 | NULL   |
|   100 | NULL   |
|   200 | NULL   |
|   300 | NULL   |
+------+-------+
15 rows in set (0.00 sec)

mysql>
```

0---------- 笔试题 ----------

MYSQL 考试

笔试满分100分，60分及格，90分优秀
上机满分100分，附加题20分，80及格，100优秀

一、笔试部分

1. 什么是mysql？(14)
   MySQL是一种关系数据库管理系统，关系数据库将数据保存在不同的表中

2. 什么是存储引擎？(2)
   数据库存储引擎是数据库底层软件组织，数据库管理系统（DBMS）使用数据引擎进行创建、查询、更新和删除数据。不同的存储引擎提供不同的存储机制、索引技巧、锁定水平等功能

3. myisam和innodb的区别？1）事务 2）锁精度 3）适用场景(6)
   innodb 存储引擎：面向OLTP(online transaction processing)、行锁、支持外键、非锁定读、默认采用repeaable级别（可重复读）通过nextkeylocking策略避免幻读、插入缓冲、二次写、自适应哈希索引、预读
   myisam 存储引擎：不支持事务、表锁、全文索引、适合olap（在线分析处理），其中myd:放数据文件，myi:放索引文件

4. 备份的分类(6)
   冷备、热备、异地灾备
   或者物理备份和逻辑备份

5. 冷备和热备的区别(8)

热备份针对归档模式的数据库,在数据库仍旧处于工作状态时进行备份.而冷备份指在数据库关闭后,进行备份,适用于所有模式的数据库.热备份的优点在于当备份时,数据库仍旧可以被使用并且可以将数据库恢复到任意一个时间点.冷备份的优点在于它的备份与恢复操作相当简单,并且由于冷备份的数据库

6. 冷备的分类(4)
离线冷备可以分为：tar包，lvm镜像

7. 如何查看二进制日志？如何通过参数截取binlog的某些行？(6)
mysqlbinlog工具查看
可以用 --start-datetime和 --stop-datetime 或者--start-position 和--stop-position

8. mysqldump命令的用法(10)
1）备份所有数据库
Mysqldump –A –uroot –p'password' >/tmp/dump-all.sql
2）myisam存储引擎保证数据一致
mysqldump -uroot -p'password' -A --lock-all-tables >/tmp/dump-all.sql
3）innodb存储一切保证数据一致
Mysqldump –A --single-transaction –uroot –p'password' >/tmp/dump-all.sql
4）备份的时候记录二进制日志的信息
Mysqldump –A –uroot –p'password' --master-data=2 >/tmp/dump-all.sql
5）刷新日志
Mysqldump –A --flush-logs –uroot –p'password' >/tmp/dump-all.sql

9. mysqladmin命令的用法(6)
1）mariadb5.5初始化状态下如何修改root用户密码
mysqladmin -uroot password 'uplooking'
2）mariadb5.5root密码为uplooking如何修改成uplooking123
mysqladmin -uroot -p'uplooking' password 'uplooking123'

10. innobackupex命令的用法(8)
1）全备份
innobackupex user=root password=password /tmp/backup
2）增量备份
innobackupex --user=root --password=uplooking --incrementalbasedir=/tmp/backup/ --incremental /tmp/backup
3）还原数据
innobackupex applylog /tmp/backup/2016*

11. 还原数据的标准流程(10)
1）将mysqldump备份的数据还原
直接导入： mysql –uroot –ppassword </tmp/backup.sql
2）将perconna xtrabackup备份的数据还原
innobackupex applylog /tmp/backup/2016*

12. 冗余环境的搭建步骤，单主从(8)

```
  # 主服务器
1）修改配置文件 log-bin server-id=1（重启服务）
2）授权从机 grant replication slave to slave@172.25.0.12 uplooking
3）初始化数据一致 mysqldump--->》传输给从机器
# 从服务
1）install
2）修改配置文件 server-id=2
3）初始化数据一致 导入全备数据
4）> change master master_host='172.25.0.11'
master_user='slave'
master_password='uplooking'
master_log_file=''
master_log_pos=''
5)> start slave;
6)> show slave status\G;
```

13. mysql 或 mariadb 不同版本对主从同步中的延迟问题的解决方法(6)

mysql5.5之前没有解决方案——单线程
mysql5.6（mariadb10）开始——一库一线程
mysql5.7（mariadb10.1）真正解决了——一组一线程