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dble

3.23.08.xdbletagrelease

gitbook SUMMARY.md

github

PDF

Release

dble

- github: github.com/actiontech/dble
- github: github.com/actiontech/dble-test-suite
- github: github.com/actiontech/dble-docs-cn
- github pages: actiontech.github.io/dble-docs-cn
- DBLE
- QQ group: 669663113
-

dble

dble , :

- : 400-820-6580
- : 86-13910506562,
- : 86-18503063188,
- : 86-18930110869,
- : 86-13540040119,

0

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- 0.4

0.1 dble

0.1.1 dble

dbleMySQL

- dbleMySQL
- **MySQL** MySQLMySQL
- dble
- **SQL** SQL 92MySQLSQLgroup byorder bydistinctjoinunionsub-query
- ER
- XAXAMySQL-5.7XA TransactionMySQL

0.1.2 dble

- dble MyCatMyCat
- MySQL / bugs dbleMyCat

0.1.3 dble

0.2 dbleMyCat

dble

0.2.1 mycatmycatbug

- “double free"JVM #4
- XA #21
- wherewhereselect * from customer wher id=1; #126
- insert into table values(1)(2)mycatSQL
- sql #92
- / #43,#31,#44
- between A and Bhash #23
- alter tableinsert...on duplicate...update...in () #24, #25,#26 ,#5
- #1
- ER, #13
- sharding-join#17

0.2.2

- SQLcreate table if not exists...alter table add/drop [primary] key...
- IO: dbleIO 2
- #56
-
  -
  - ZK
  - ZK ID
  - #489
  -
    - insert into table1(id,name) values(next value for MYCATSEQ_GLOBAL,‘test’);
    - 1insert into table1(name) values(‘test’);
    - 2insert into table1 values(‘test’);
    - bigint
- ERER
- ERER
- schemacheckSQLschema
- conf/index_to_charset.properties
-
- SQLUPDATE/DELETE/INSERT

0.2.3

- ShareJoin(join,union,subquery)/
- showdesccolumnsinsert #7
-
  -
  -
- SQL
  - mysql> explain select * from sharding_two_node a inner join sharding_four_node b on a.id =b.id;

```
+---------------+----------+-------------------------------------------------------------------------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                                                                                   |
+---------------+----------+-------------------------------------------------------------------------------------------+
| dn1.0         | BASE SQL | select `a`.`id`,`a`.`c_char`,`a`.`ts`,`a`.`si` from  `sharding_two_node` `a` ORDER BY `a`.`id` ASC |
| dn2.0         | BASE SQL | select `a`.`id`,`a`.`c_char`,`a`.`ts`,`a`.`si` from  `sharding_two_node` `a` ORDER BY `a`.`id` ASC |
| dn1.1         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn2.1         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn3.0         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn4.0         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| merge.1       | MERGE    | dn1.0, dn2.0                                                                                              |
| merge.2       | MERGE    | dn1.1, dn2.1, dn3.0, dn4.0                                                                                |
| join.1        | JOIN     | merge.1, merge.2                                                                                          |
+---------------+----------+-------------------------------------------------------------------------------------------+
9 rows in set (0.00 sec)
```

- set

- set charset/names
- :XA
-
- DUAL
- (,CC++)
-
- Druid,
- fastjson,
- reload
- MySQLGUI/Driver
- ,
- RocksDB
- mysqldumpslow pt-query-digest
- Trace
- MySQL
- Prepared SQL Statement Syntax
-
    - The Subquery as Scalar Operand
    - Comparisons Using Subqueries
    - Subqueries with ANY, IN, or SOME
    - Subqueries with ALL
    - Subqueries with EXISTS or NOT EXISTS
    - Derived Tables (Subqueries in the FROM Clause)
- dble View
- MySQL8.0
-
-
-
- DDL
-
-

0.2.4

- HASH
-
- set
-
- writeTypewriteType = 1
- handleDistributedTransactions

0.2.5

DBLEMyCAT

0.2.6 2

Nio处理器（处理线程）内部为挂载不定数量个连接，并且循环响应每个连接的请求

在数据处理和数据接收进行线程分割之后(dble 2.18.02)，使得dble可以并发响应挂载在同一个NIO连接器(同一个processor线程)上的请求

e.g.

恰好我们存在场景连接1，2同时有请求过来，旧版本需要循环处理连接1，2的任务，在连接1的任务处理完成之前，连接2的任务无法进行处理

新的IO结构中，连接1的数据被接收完毕之后，NIO线程就可以接收连接2的数据，并且此时连接1的数据已经在executor线程池进行处理中，连接1，2之间的任务执行变成并行

0.3

0.3.0.1

- dbledbledble

0.3.0.2

dble

- MySQL
  dblemysqlmysql
  MySQL
  A:$url=ip1:3306,$user=test,$password=testPsw
  B:$url=ip2:3306,$user=test,$password=testPsw
  /etc/hostsMySQL "NO ROUTE TO HOST"
- JVM
  dblejavadblejava1.8JAVA_HOME

0.3.0.3

- (https://github.com/actiontech/dble/releases)
- dble

```
mkdir -p $working_dir
cd $working_dir
tar -xvf actiontech-dble-$version.tar.gz
cd $working_dir/dble/conf
mv cluster_template.cnf cluster.cnf
mv bootstrap_template.cnf bootstrap.cnf
mv db_template.xml db.xml
mv user_template.xml user.xml
mv sharding_template.xml sharding.xml
```

0.3.0.4 dble

- db.xml instanceM1 instanceM2 MySQL

```
<dbInstance name="instanceM1" url="ip1:3306" user="your_user" password="your_psw" maxCon="1000" minCon="10"
                    primary="true">

<dbInstance name="instanceM2" url="ip2:3306" user="your_user" password="your_psw" maxCon="1000" minCon="10"
                    primary="true"/>
```

0.3.0.5

-

```
cd  $working_dir/dble
bin/dble start
```

- tail -f logs/wrapper.log
- mysqldble654321 mysql -p -P9066 -h 127.0.0.1 -u man1
- mysqlschema

```
 create database @@shardingnode='dn$1-6';
```

- mysqldble123456 mysql -p -P8066 -h 127.0.0.1 -u root
- mysql

```
use testdb;
drop table if exists tb_enum_sharding;
create table if not exists tb_enum_sharding (
  id int not null,
  code int not null,
  content varchar(250) not null,
```

```
  primary key(id)
)engine=innodb charset=utf8;
insert into tb_enum_sharding values(1,10000,'1'),(2,10010,'2'),(3,10000,'3'),(4,10010,'4');
```

0.3.1 (docker)

0.3.1.1

- dockerhubdbledble

0.3.1.2

- docker
- docker-composedocker-compose
- mysql

0.3.1.3

docker

> docker network create -o "com.docker.network.bridge.name"="dble-net" --subnet 172.18.0.0/16 dble-net
>
> docker run --name backend-mysql1 --ip 172.18.0.2 -e MYSQL_ROOT_PASSWORD=123456 -p 33061:3306 --network=dble-net -d mysql:5.7 --server-id=1
>
> docker run --name backend-mysql2 --ip 172.18.0.3 -e MYSQL_ROOT_PASSWORD=123456 -p 33062:3306 --network=dble-net -d mysql:5.7 --server-id=2
>
> sleep 30
>
> docker run -d -i -t --name dble-server --ip 172.18.0.5 -p 8066:8066 -p 9066:9066 --network=dble-net actiontech/dble:latest

docker 33061 33062 mysql 8066 9066
mysqldble

0.3.1.4

mysql80669066docker
8066 (SQL) root/123456
9066 () man1/654321

dble-server /opt/dble/conf/sharding.xml

mysql

```
# dble
mysql -P8066 -u root -p123456 -h 127.0.0.1
# dble
mysql -P9066 -u man1 -p654321 -h 127.0.0.1
#mysql1
mysql -P33061 -u root -p123456 -h 127.0.0.1
#mysql2
mysql -P33062 -u root -p123456 -h 127.0.0.1
```

0.3.1.5

```
docker stop backend-mysql1
docker stop backend-mysql2
docker stop dble-server
docker rm backend-mysql1
docker rm backend-mysql2
docker rm dble-server
docker network rm dble-net
```

0.3.1.6 docker-compose

docker-composegithub

```
wget https://raw.githubusercontent.com/actiontech/dble/master/docker-images/quick-start/docker-compose.yml
```

docker-composemysqldble

```
docker-compose up
```

dble quick-start dble dble-server 8066/9066 root/123456 8066mysql 33061/33062root/123456

```
docker-compose stop
docker-compose rm
```

0.3.1.7 docker-compose

dbledble dble

dblevolumesdockerdble/confdble

docker-compose.ymldble-server

```
volumes:
   - /opt/test/conf:/opt/self_conf
```

/opt/test/conf/opt/self_conf dble-server

```
command: ["/opt/dble/bin/wait.sh", "backend-mysql1:3306","--","/opt/self_conf/docker_init_start.sh"]
```

/opt/dble/bin/docker_init_start.shself_conf

- /opt/dble/conf
- /opt/dble/bin/dble startdble
- /opt/dble/bin/wait-for-it.sh dble 8066 dble
- mysqldble

0.3.2 dble build

0.3.2.1

- dble docker
- docker-compose dble

0.3.2.2

- docker
- docker-compose

0.3.2.3

dockerhub

1. http://blog.luckly-mjw.cn/tool-show/github-directory-downloader/index.html dble https://github.com/actiontech/dble/tree/master/docker-images
2. dble_master_docker-images.zip

```
mkdir -p $working_dir
cd $working_dir
unzip dble_master_docker-images.zip
cd docker-images/dble-image
```

3. dble -t dble tag

```
docker build --build-arg MODE=quick-start --build-arg DBLE_VERSION=latest -t="actiontech/dble:latest" .
```

MODE docker mgrrwSplitquick-start
DBLE_VERSION docker dble

1. MODE $working_dir/docker-images/dble-image
2. 3.20.10.0 3.20.10.0 3.20.10.0

0.3.2.4 docker-compose

dble $working_dir/docker-images mgrquick-startrwSplit docker-compose

- mgrmgr(mysql) dble
- quick-start mysql dble
- rwSplit mysql dble

```
docker-compose up -d
```

```
docker-compose stop
docker-compose rm
```

0.3.2.5

0.3.2.5.1

1.

```
mysql> show slave status\G;
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 10.186.61.151
                  Master_User: user
                  Master_Port: 33306
                Connect_Retry: 60
              Master_Log_File: mysql-bin.000004
          Read_Master_Log_Pos: 154
               Relay_Log_File: 4bad16278f02-relay-bin.000006
                Relay_Log_Pos: 367
        Relay_Master_Log_File: mysql-bin.000004
```

```
              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: 747
              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: 46bb9692-e5f3-11ea-8340-0242ac110002
             Master_Info_File: /var/lib/mysql/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:
           Master_TLS_Version:
1 row in set (0.00 sec)
```

0.3.2.5.2 mgr

1. mgr

```
[root@localhost]docker-images# docker exec mgr-a-1 mysql -h127.0.0.1 -p3306 -uroot -p123456 \
-e "SHOW STATUS LIKE 'group_replication_primary_member';" \
-e "SELECT * FROM performance_schema.replication_group_members;"

+----------------------------------+--------------------------------------+
| Variable_name                    | Value                                |
+----------------------------------+--------------------------------------+
| group_replication_primary_member | 72da84d7-0c4b-11eb-9f0e-0242ac120002 |
+----------------------------------+--------------------------------------+
+---------------------------+--------------------------------------+-------------+-------------+--------------+
| CHANNEL_NAME              | MEMBER_ID                            | MEMBER_HOST | MEMBER_PORT | MEMBER_STATE |
+---------------------------+--------------------------------------+-------------+-------------+--------------+
| group_replication_applier | 72da84d7-0c4b-11eb-9f0e-0242ac120002 | mgr-a-1     |        3306 | ONLINE       |
| group_replication_applier | 7314efdd-0c4b-11eb-ba28-0242ac120004 | mgr-a-3     |        3306 | ONLINE       |
| group_replication_applier | 733b00fe-0c4b-11eb-bbea-0242ac120003 | mgr-a-2     |        3306 | ONLINE       |
+---------------------------+--------------------------------------+-------------+-------------+--------------+

[root@localhost]docker-images# docker exec mgr-b-1 mysql -h127.0.0.1 -p3306 -uroot -p123456 \
-e "SHOW STATUS LIKE 'group_replication_primary_member';" \
-e "SELECT * FROM performance_schema.replication_group_members;"

+----------------------------------+--------------------------------------+
| Variable_name                    | Value                                |
+----------------------------------+--------------------------------------+
| group_replication_primary_member | 728c327d-0c4b-11eb-9300-0242ac120005 |
```

```
+---------------------------------+-------------------------------------+
+--------------------------+-------------------------------------+-------------+-------------+--------------+
| CHANNEL_NAME             | MEMBER_ID                           | MEMBER_HOST | MEMBER_PORT | MEMBER_STATE |
+--------------------------+-------------------------------------+-------------+-------------+--------------+
| group_replication_applier | 728c327d-0c4b-11eb-9300-0242ac120005 | mgr-b-1     |        3306 | ONLINE       |
| group_replication_applier | 732c5b3b-0c4b-11eb-9eb1-0242ac120007 | mgr-b-3     |        3306 | ONLINE       |
| group_replication_applier | 733c6350-0c4b-11eb-b0fb-0242ac120006 | mgr-b-2     |        3306 | ONLINE       |
+--------------------------+-------------------------------------+-------------+-------------+--------------+
```

2. dble, dble-server/opt/dble/logs/

```
[root@localhost]docker-images# docker exec -it dble-server bash
[root@dble-server /]# less /opt/dble/logs/wrapper.log
[root@dble-server /]# less /opt/dble/logs/dble.log

#bootstrap.cnfuseOuterHafalse
[root@dble-server /]# less /opt/dble/logs/custom_mysql_ha.log
```

3. dble-server/opt/dble/conf/db.xml

```
[root@localhost]# docker exec -it dble-server bash
[root@dble-server /]# cat /opt/dble/conf/db.xml

<dbGroup name="dbGroup1" rwSplitMode="2" delayThreshold="10000">
   <heartbeat>show slave status</heartbeat>
   <dbInstance name="instanceM1" url="172.18.0.2:3306" user="root" password="123456" maxCon="300" minCon="10"
               primary="true" readWeight="1" id="xx1">
   </dbInstance>
   <dbInstance name="instanceS1" url="172.18.0.3:3306" user="root" password="123456" maxCon="1000" minCon="10" readWeight="2">
       <property name="testOnCreate">false</property>
   </dbInstance>
   <dbInstance name="instanceS2" url="172.18.0.4:3306" user="root" password="123456" maxCon="1000" minCon="10" readWeight="2">
       <property name="testOnCreate">false</property>
   </dbInstance>
</dbGroup>
```

4. mgr-a-1dble-servercustom_mysql_ha.log172.18.0.2:3066...is not alivedb.xmldbGroup1instanceS1

```
[root@localhost]docker-images# docker-compose stop mgr-a-1
[root@localhost]docker-images# docker exec -it dble-server bash
[root@dble-server /]# less /opt/dble/logs/custom_mysql_ha.log
...
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.2:3306 in dbGroup1 is not alive!
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.3:3306 in dbGroup1 is normal!
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.4:3306 in dbGroup1 is normal!
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.5:3306 in dbGroup2 is normal!
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.6:3306 in dbGroup2 is normal!
2020-10-12 07:05:08 [DBLEDbGroupsCheck] [INFO] DbInstance 172.18.0.7:3306 in dbGroup2 is normal!
...

[root@dble-server /]# cat /opt/dble/conf/db.xml

<dbGroup name="dbGroup1" rwSplitMode="2" delayThreshold="10000">
   <heartbeat>show slave status</heartbeat>
   <dbInstance name="instanceM1" url="172.18.0.2:3306" user="root" password="123456" maxCon="300" minCon="10"
                readWeight="1" id="xx1">
   </dbInstance>
   <dbInstance name="instanceS1" url="172.18.0.3:3306" user="root" password="123456" maxCon="1000" minCon="10" readWeight="2" primary=
"true">
       <property name="testOnCreate">false</property>
   </dbInstance>
   <dbInstance name="instanceS2" url="172.18.0.4:3306" user="root" password="123456" maxCon="1000" minCon="10" readWeight="2">
       <property name="testOnCreate">false</property>
   </dbInstance>
</dbGroup>
```

0.4

0.4.1

- dble
  - mysql
  - mysql
  - mysql

0.4.2

- ,
- joinjoin
- :
  - 23
  - QPSTPS
- QPSTPSSQL

0.4.3

-
-

1.dble

-
  - cluster.cnf:
  - bootstrap.cnf:JVMdble
  - user.xml:dble
  - db.xml
  - sharding.xml
  - log4j.xmllog4j2.xml
  -
  - cache
  -
  -
  -
  - Schema
-
  - /logs/wrapper.logdble
  - /logs/dble.logdbledble
-
  -

dble 3.20.07.0 2.20.04.0

2.

dble_update_config2.20.04.0 3.20.07.02.20.04.0

- AMD——dble_update_config
- ARM——dble_update_config_arm64

```
dble_update_config/dble_update_config_arm64 [-i=read_dir] [-o=write_dir] [-p=rootPath]
```

read_dir/write_dir: rootPath:zk, `/dble` , ucore, `universe/dble`

:
myid.properties
wrapper.conf
server.xml
schema.xml
rule.xml
log4j2.xml
cacheservice.properties(option)
sequence_distributed_conf.properties for type3 (option)
sequence_time_conf.properties for type2 (option)

:
cluster.cnf
bootstrap.cnf
user.xml
db.xml
sharding.xml
log4j2.xml
cacheservice.properties(option)

3.

db.xml
变更：
1 datahost->dbGroup
2 不再使用writehost和readhost， 而是统一命名为dbInstance， 增加primary的boolean属性来区分，各dbInstance平级
3 maxCon,minCon的属性配置下沉到实例， 其他连接池属性使用dbInstance下的property来声明，默认可不配置。
4.writehost/readHost的属性host改成name
5.移除 tempReadHostAvailable功能。默认为读可持续
6. 池的心跳处理，周期及配置放在dbGroup级别，各个周期可不同
7.balance->rwSplitMode
8.keepOrig->disableHA
9. slaveThreshold->delayThreshold
10.weight->readWeight
备注：
当前池级别的心跳用处
1.快速拦截流量，可配置敏感程度
2.延迟检测，需要特殊心跳设置
3.查看是否read only，需要特殊心跳设置
dbInstance
name（原host）
*id
url
user
password
primary
minCon
maxCon
* usingDecrypt
* readWeight
* disabled
write 1:1
read n:1
dbGroup
name
* rwSplitMode
* disableHA
* delayThreshold
* heartbeat
1:n
1:1
sharding.xml
childTable
name
joinColumn
parentColumn
* incrementColumn
* sqlMaxLimit
N;1
shardingTable
name
shardingNode
shardingColumn
function
* incrementColumn
* sqlMaxLimit
* sqlRequiredSharding
N : 1
function
name
+ property
m:n
m:n
globalTable
name
shardingNode
* checkClass
* cron
* sqlMaxLimit
变更：
1.rule.xml删除，function保留，拆分表直接增加shardingColumn列来标识
2. table拆分三类，globalTable，singleTable和sharding table
3.cacheKey功能废弃
4.shardingTable/childTable属性名字由xxKey改为xxColumn
5.废弃globalCheck,.其他两个配置已经能表达含义了,globalCheckClass->checkClass
6.ruleRequired更名为sqlRequiredSharding
7.needAddLimit更名为sqlMaxLimit，默认继承schema，如果-1表示不限制
1:n
singleTable
name
shardingNode
* sqlMaxLimit
shardingNode
name
dbGroup
database
1:1
schema
name
* shardingNode
* sqlMaxLimit
m:n
1:1
user.xml
变更：
1.用户分三类，管理用户，读写分离用户以及分库用户
2.whitehosts较简单，所以冗余在用户内部更合适。
3.增加租户字段，可选，登陆时候检查连接字符串
4.管理用户 审计时需要多个（未来审计）
readonly表示只监控，不配默认可以运维
rwSplitUser
name
* tenant
dbGroup
password
* usingDecrypt
* whiteIPs
* blacklist
* maxCon
managerUser
name
password
* usingDecrypt
* whiteIPs
* readonly
* maxCon
shardingUser
name
* tenant
schemas
password
* usingDecrypt
* whiteIPs
* blacklist
* maxCon
* readonly
* privileges系列
blacklist
name
略
变更
1.连接池有效性心跳移到连接池配置中
2.连接池内部连接的有效性委托连接池处理
3.组级别的配置和myid.properties合并， 更名cluster.cnf
3.1cluster裂变为clusterEnable和clusterMode
3.2ipAddress->clusterIP,port->clusterPort,clusterId->clusterId,clusterHa->needSyncHa
3.3 myid下沉到bootstrap.cnf的instanceName
3.4 serverID沉到bootstrap.cnf的serverID
4.实例级别的配置都放在bootstrap.cnf里，被wrapper.conf引用，wrapper.conf 放在bin下
bootstrap.cnf还包含JVM参数
5.部分可动态变更的参数， 放在 bootstrap.dynamic.cnf,读的时候覆盖bootstrap.cnf
cluster.cnf
Group Parameters整组运维/不可变动
showBinlogStatusTimeout，
sequenceHandlerType
原myid.properties的集群部分，见上面备注
原自增序列的时间戳方式部分配置，参见全局序列章节
增加rootPath
bootstrap.cnf
Instance Parameters实例重启变动生效
* 后端连接socket 配置
* 前端连接socket 配置
* Session预留内存配置
* 堆外内存管理
系统服务基本参数（除了在组配置中的）
* 表结构一致性检查
* processor内部前后端连接检查
* 普通事务日志相关
* 视图相关参数
* XA 事务
* 队列大小参数
* 使用Nest Loop优化
* load data 相关配置
* 统计管理
连接缺省值
* 功能性配置
fakeMySQLVersion
useOuterHa
DBLE_HOME->homePath
增加instanceName对应原myid.properties的myid，并且取代serverNodeId原配置
增加instanceId对应自增序列的实例id配置
增加serverId用于告警
bootstrap.dynamic.cnf
Dynamic Parameters
通过运维命令变动，未来支持多值和落盘
* 慢查询日志相关配置
* 流量控制相关参数
* 告警开关
enableAlert
enableSlowLog
flushSlowLogPeriod
flushSlowLogSize
sqlSlowTime
enableFlowControl
flowControlStartThreshold
flowControlStopThreshold

1.1 cluster.cnf

key=valuedbledblekey/value
dbleDDL

,dble(zk),dble
sequenceHandlerType

	&	/	
clusterEnable		true/falsefalse	clusterIPclusterPortrootPath clusterID
clusterMode		zk/ucoreclusterEnable	zkzookeeperucore
clusterIP	IP	clusterEnable	clusterModezkzk 10.186.19.aa:2281,10.186.60.bb:2281 clusterModecoreucoreipIP
clusterPort			clusterModezkclusterModeucore ucore
rootPath		clusterEnable	
clusterId	dble	clusterEnable	dbledble
needSyncHa	ha	true/falsefalse	trueuseOuterHatrue
showBinlogStatusTimeout	binlog	60000 ,	binlog
sequenceHandlerType		1~42	1MySQL offset-step sequence 2(Snowflake) 3time(Snowflake) 4offset-step
sequenceStartTime		2010-11-04 09:42:54	sequenceHandlerType23
sequenceInstanceByZk	timezkid	true/false,true	sequenceHandlerType3clusterModezk
grpcTimeout	ucoregrpc	10s	clusterModeucore

1.1.1

```
clusterEnable=false
#showBinlogStatusTimeout=60000
sequenceHandlerType=2
#sequenceStartTime=2010-11-04 09:42:54
#sequenceInstanceByZk=true
```

1.1.2 ZK

```
clusterEnable=true
clusterMode=zk
clusterIP=10.186.19.aa:2281,10.186.60.bb:2281
rootPath=/dble
clusterId=cluster-1
#needSyncHa=false
#showBinlogStatusTimeout=60000
sequenceHandlerType=2
#sequenceStartTime=2010-11-04 09:42:54
#sequenceInstanceByZk=true
```

1.1.3 ucore

```
clusterEnable=true
clusterMode=ucore
clusterIP=10.186.19.aa,10.186.60.bb
clusterPort=5700
```

```
rootPath=universe/dble
clusterId=cluster-1
#needSyncHa=false
#showBinlogStatusTimeout=60000
sequenceHandlerType=2
#sequenceStartTime=2010-11-04 09:42:54
#sequenceInstanceByZk=true
#grpcTimeout=10
```

1.2 bootstrap.cnf

dblewrapper.cnfwrapper

1.2.1 jvm

JVM,

```
-agentlib:jdwp=transport=dt_socket,server=y,address=8088,suspend=n
-server
-XX:+AggressiveOpts
-Dfile.encoding=UTF-8
-Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.port=1984
-Dcom.sun.management.jmxremote.authenticate=false
-Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.host=127.0.0.1
-Xmx4G
-Xms1G
-XX:MaxDirectMemorySize=2G
```

JVMJVM

MaxDirectMemorySize81917M79G bufferPoolPageNumber*bufferPoolPageSize

bufferPoolPageNumber = (MaxDirectMemorySize * 0.8 /bufferPoolPageSize), 32767

bufferPoolPageSize = 2M

dble=0.6 *(,)*
Xmx = 0.4 dble
MaxDirectMemorySize = 0.6 * dble

bufferPoolPageNumber bufferPoolPageSize MaxDirectMemorySize

1.2.2 dble

dble,-Dkey=value JSWdbleJSW wrapper.app.parameter_file

sql

			/		
	homePath	slowlogs viewConfxatm xalogsload datatemp	,		,
	instanceName			xa	
	instanceId	id			sequenceHandlerType=2 3. sequenceHandlerType=2 0~1023 sequenceHandlerType=3 0~,511
	serverId		IP	dble	
	bindIp	IP	"0.0.0.0"	IP	IP,

	serverPort		8066		
	managerPort		9066		
	maxCon		0	maxCon0,maxCon,. maxcon maxCon manager	
	NIOFrontRW	NIOprocessors NIOFrontRW processors NIOFrontRW	java ,	IO	
	NIOBackendRW	NIO backendProcessors NIOBackendRW	java ,	IO	
	frontWorker	processorExecutor frontWorker processorExecutor frontWorker	(2,)		
	managerFrontWorker		(2,/2)	&	
	backendWorker	backendProcessorExecu torbackendWorker backendProcessorExecu torbackendWorker	(2,)		
	complexQueryWorker	complexExecutor complexQueryWorker complexExecutor complexQueryWorker	(2,88		
	writeToBackendWorker	SQL writeToBackendExecuto r writeToBackendWorker writeToBackendExecuto r writeToBackendWorker	(2,)	SQL	
	fakeMySQLVersion	DbleMysql	NULL	MySql, + Mysql, + MySQLMySQL 5.7.20<=<8.0.0 ="" =">=8.0.3 1.fakeMySQLVersion 5.7.20 mysql-version 5.7.25 2.fakeMySQLVersion 8.0.3 mysql-version 8.0.23 3.fakeMySQLVersion 5.7.15 mysql-version 8.0.1 **Mysql**	MYSQL

	usePerformanceMode		0/	DbleCPU,	1-0-
	useOuterHa		true	dble	true/false
groupConcatMaxLen	GROUP CONCAT()	1024	GROUP CONCAT()		
	charset		utf8mb4		
	maxPacketSize		4×1024×1024	dble(+1024) dbInstancedbInstance -1024.1024SQL	
	txIsolation		3	SQL dbledbInstancesession sessionSQLsession set	1- READ_UNCOMMITTED 2-READ_COMMITTED 3-REPEATABLE_READ 4-SERIALIZABLE
	autocommit		1	dbledbInstance sessionSQLsession set	0/1
	useCompression		0	mysql	1 - 0 -
	capClientFoundRows	Client_Found_Rows	false	dbleClient_Found_Rows	true - false -
	usingAIO	AIO	0	AIONIO	1 - 0 -
	useThreadUsageStat		0/	show @@thread_used	1-0-
	useCostTimeStat		0/	BTraceCostTime.java ,show @@cost_time	1-0-
	maxCostStatSize		100	show @@cost_time	
	costSamplePercent		1/%	costSamplePercent	
	checkTableConsistency		0	1 DB	1-,0-
	checkTableConsistency Period		30×60×1000 ,		
	sqlExecuteTimeout		300 ,		

processor					
	idleTimeout		10 × 60 × 1000 ,	processor	
	processorCheckPeriod	processor	1000 ,	processor	
socket	backSocketSoRcvbuf		1024×1024×4 ,	buffer	
	backSocketSoSndbuf		1024×1024 ,	buffer	
	backSocketNoDelay	Nagle	1/		1-, 0-
socket	frontSocketSoRcvbuf		1024 × 1024 ,		
	frontSocketSoSndbuf		1024×1024×4 ,	buffer	
	frontSocketNoDelay	Nagle	1		1-,0-
Session	orderMemSize	sessionorder	4,M	sessionorder by	
	otherMemSize	session	4,M	sessionsubQuery distinctd	
	joinMemSize	sessionjoin	4M	sessionjoin	
	bufferPoolChunkSize		4096 ,		
	bufferPoolPageNumber		0.8 × MaxDirectMemorySize / bufferPoolPageSize(default 2M)	bufferPoolPageSize	
	bufferPoolPageSize		1024 * 1024 * 2,	bufferPoolPageNumbe, ***MaxDirectMemorySize( ) bufferPoolPageNumber * bufferPoolPageSize OOM***	
	mappedFileSize		1024×1024×64 ,	,	
maxResultSet		512×1024 ,	SQL		

maxResultSet		512×1024 ,	SQL		
enableSessionActiveRatioStat		1	(-DusePerformanceMode=1)	01	
enableConnectionAssociateThread	/	1	/(-DusePerformanceMode=1)	01	
	recordTxn	log	0	log	1-0-
	transactionLogBaseDir	log	/txlogs	log	
	transactionLogBaseName	log	server-tx		
	transactionRotateSize		16 ,M		
XA	xaRecoveryLogBaseDir	xatm	dble/xalogs/	XADblexa	
	xaRecoveryLogBaseName	xatm	xalog		
	xaSessionCheckPeriod	XA	1000 ms	server session	
	xaLogCleanPeriod	XAlog	1000 ms	server XA log	
	xaRetryCount	XA	0	XA0	
	xaIdCheckPeriod	XA	300s	Xid 0	
	viewPersistenceConfBaseDir		dble/viewConf	,	
	viewPersistenceConfBaseName		viewJson	,	
	joinQueueSize	join,	1024		
	mergeQueueSize	merge,	1024		
	orderByQueueSize	,	1024		
	useJoinStrategy	nest loop		joinwhereSQL	true false
				-1 useJoinStrategy=true useJoinStrategy	

join	joinStrategyType	nest loop	-1nestloop	nestloop0 nestloop(useJoinStrategy)1 useJoinStrategy(useJoinStrategy),2 alwaysTryNestLoop(useJoinStrategy)	-12
	nestLoopConnSize		4		
	nestLoopRowsSize		2000		
	inSubQueryTransformToJoin	injoin	false	indblejoinsql	true false
	enableSlowLog		0		01
	slowLogBaseDir		dble/slowlogs		
	slowLogBaseName		slow-query	(.log)	
	flushSlowLogPeriod		1		
	flushSlowLogSize		1000	1	
	sqlSlowTime		100		0
	slowQueueOverflowPolicy		2	2000 1SQL 2SQL3s	12
load data	maxCharsPerColumn		65535		
	maxRowSizeToFile	load data	100000	load dataOOMload data,	
	enableBatchLoadData	load data	0	load data maxRowSizeToFile	01
	enableFlowControl	true/false	false		true/false
	flowControlHighLevel		41943044096K		
	flowControlLowLevel		262144256K		
	enableCursor	server-side-cursor.	false	prepare statement 4.4	true or false
	maxHeapTableSize	,byte	4096		0
	heapTableBufferChunkSize	buffer cache	bufferPoolChunkSize, byte	buffer	bufferPoolChunkSize

general	enableGeneralLog	genegral	0	sqlgeneral	0/1
	generalLogFile	general	general/general.log	'/'homepath	
	generalLogFileSize	general	16M	general.logyyyy-MM/general-MM-dd-%d.loglog4j	
	generalLogQueueSize	general	4096	log4jAsyncLogger	2
sql statistic	enableStatistic		0		1, 0
	enableStatisticAnalysis	sqlusertablecondition	0	show @@sql.sum.user show @@sql.sum.tableshow @@sql.condition	1, 0
	associateTablesByEntryByUserTableSize	sql_statistic_by_associate_tables_by_entry_by_user	1024		1
	frontendByBackendByEntryByUserTableSize	sql_statistic_by_frontend_by_backend_by_entry_by_user	1024		1
	tableByUserByEntryTableSize	sql_statistic_by_table_by_user_by_entry	1024		1
	statisticQueueSize	sql statistic	4096	log4jAsyncLogger	2
	samplingRate	sql	100	samplingRate100dble 41004	[0,100]
	sqlLogTableSize	sql log	1024	(sql)	
	rwStickyTime	()()	1000(ms), 0()()	SQLSQL rwStickyTimeSQL() .	
	district	dble,	null	db.xmldbInstance dbDistrict	
	dataCenter	dble,	null	db.xmldbInstance dbDataCenter	
	enableMemoryBufferMonitor		0		01
	enableMemoryBufferMonitorRecordPool		1		01

	enableSqlDumpLog		0	()sql	0/1
	sqlDumpLogBasePath	base	sqldump	base	
	sqlDumpLogFileName		sqldump.log	sqldump/sqldump.log	
	sqlDumpLogCompressFilePattern		${date:yyyy-MM}/sqldump-%d{MM-dd}-%i.log.gz	sqldump/2022-10/sqldump-10-11-1.log.gz)	
	sqlDumpLogOnStartupRotate		1	1-0-	1-0-
	sqlDumpLogSizeBasedRotate		50MB	sqldump.log50MB :KBMBGB	
	sqlDumpLogTimeBasedRotate		1	1	
	sqlDumpLogDeleteFileAge		90d	90:d()h()m()s() sqlDumpLogCompressFilePatternlog4j2	
	sqlDumpLogCompressFilePath		*/sqldump-*.log.gz	sqlDumpLogCompressFilePath sqlDumpLogDeleteFileAge	
tcp	tcpKeepIdle	tcp-keepalive	30s,	dbleKeepalivejdk 2.38	
	tcpKeepInterval	tcp-keepalive	10s	dbletcp-keepalivejdk 2.38	
	tcpKeepCount	tcp-keepalive	3	tcp-keepalivejdk 2.38	

1.2.3 bootstrap.dynamic.cnf

bootstrap.dynamic.cnfdblebootstrap.cnf

```
enableAlert
enableSlowLog
flushSlowLogPeriod
flushSlowLogSize
sqlSlowTime
enableFlowControl
flowControlLowLevel
flowControlHighLevel
enableGeneralLog
generalLogFile
enableStatistic
associateTablesByEntryByUserTableSize
frontendByBackendByEntryByUserTableSize
tableByUserByEntryTableSize
enableBatchLoadData
```

```
enableBatchLoadData
maxRowSizeToFile
enableMemoryBufferMonitor
xaIdCheckPeriod
enableSqlDumpLog
```

1.2.4

```
#encoding=UTF-8
-agentlib:jdwp=transport=dt_socket,server=y,address=8088,suspend=n
-server
-XX:+AggressiveOpts
-Dfile.encoding=UTF-8
-Dcom.sun.management.jmxremote
-Dcom.sun.management.jmxremote.port=1984
-Dcom.sun.management.jmxremote.authenticate=false
-Dcom.sun.management.jmxremote.ssl=false
-Dcom.sun.management.jmxremote.host=127.0.0.1
-Xmx4G
-Xms1G
-XX:MaxDirectMemorySize=2G
#  base config
-DhomePath=.
-DinstanceName=1
# valid for sequenceHandlerType=2 or 3
-DinstanceId=1
-DserverId=xxx1
#-DbindIp=0.0.0.0
#-DserverPort=8066
#-DmanagerPort=9066
#-DmaxCon=1024
#-DNIOFrontRW=4
#-DNIOBackendRW=12
#-DfrontWorker=4
#-DmanagerFrontWorker=2
#-DbackendWorker=12
#-DcomplexQueryWorker=8
#-DwriteToBackendWorker=4


-DfakeMySQLVersion=5.7.11

# serverBacklog size,default 2048
-DserverBacklog=2048

#-DusePerformanceMode=0
# if need out HA
-DuseOuterHa=true

# connection
#-Dcharset=utf8mb4
-DmaxPacketSize=167772160
-DtxIsolation=2
#-Dautocommit=1

#parameter for mysql
#-DgroupConcatMaxLen=1024


# option
#-DuseCompression=1
-DusingAIO=0

-DuseThreadUsageStat=1
#  query time cost statistics
#-DuseCostTimeStat=0
#-DmaxCostStatSize=100
#-DcostSamplePercent=1


# consistency
#  check the consistency of table structure between nodes,default not
-DcheckTableConsistency=0
#  check period, he default period is 60000 milliseconds
-DcheckTableConsistencyPeriod=60000

#  processor check conn
```

```
-DprocessorCheckPeriod=1000
-DsqlExecuteTimeout=3000
-DidleTimeout=1800000


#-DbackSocket unit:bytes
#-DbackSocketSoRcvbuf=4194304
#-DbackSocketSoSndbuf=1048576
#-DbackSocketNoDelay=1

#  frontSocket
#-DfrontSocketSoRcvbuf=1048576
#-DfrontSocketSoSndbuf=4194304
#-DfrontSocketNoDelay=1


#  query memory used for per session,unit is M
-DotherMemSize=4
-DorderMemSize=4
-DjoinMemSize=4


#  off Heap unit:bytes
-DbufferPoolChunkSize=32767
-DbufferPoolPageNumber=512
-DbufferPoolPageSize=2097152
#-DmappedFileSize=2097152

#  transaction log
#  1 enable record the transaction log, 0 disable ,the unit of transactionRotateSize is M
-DrecordTxn=0
#-DtransactionLogBaseDir=/txlogs
#-DtransactionLogBaseName=server-tx
#-DtransactionRotateSize=16
#  XA transaction
#  use XA transaction ,if the mysql service crash,the unfinished XA commit/rollback will retry for several times , it is the check period
for ,default is 1000 milliseconds
-DxaSessionCheckPeriod=1000
#  use XA transaction ,the finished XA log will removed. the default period is 1000 milliseconds
-DxaLogCleanPeriod=1000
#  XA Recovery Log path
# -DxaRecoveryLogBaseDir=/xalogs/
#  XA Recovery Log name
#-DxaRecoveryLogBaseName=xalog
#  XA Retry count, retry times in backend, 0 means always retry until success
#-DxaRetryCount=0

#-DviewPersistenceConfBaseDir=/viewPath
#-viewPersistenceConfBaseName=viewJson

#  for join tmp results
#-DmergeQueueSize=1024
#-DorderByQueueSize=1024
#-DjoinQueueSize=1024


#  true is use JoinStrategy, default false
#-DuseJoinStrategy=true
#-DjoinStrategyType=-1
-DnestLoopConnSize=4
-DnestLoopRowsSize=2000


#  if enable the slow query log
-DenableSlowLog=1
#  the slow query log location
#-DslowLogBaseDir=./slowlogs
#-DslowLogBaseName=slow-query
#  the max period for flushing the slow query log from memory to disk  after last time , unit is second
-DflushSlowLogPeriod=1
#  the max records for flushing the slow query log from memory to disk after last time
-DflushSlowLogSize=1000
#  the threshold for judging if the query is slow , unit is millisecond
-DsqlSlowTime=100

#  used for load data,maxCharsPerColumn means max chars length for per column when load data
#-DmaxCharsPerColumn=65535
#  used for load data, because dble need save to disk if loading file contains large size
```

```
if enable the batch load data
#-DenableBatchLoadData=1
#enableFlowControl=false
#-DflowControlHighLevel=4194304
#-DflowControlLowLevel=262144

#  if enable the general log
#-DenableGeneralLog=1
#  general log file path
#-DgeneralLogFile=general/general.log
#  maximum value of file, unit is mb
#-DgeneralLogFileSize=16
#  the queue size must not be less than 1 and must be a power of 2
#-DgeneralLogQueueSize=4096

#  if enable statistic sql
#-DenableStatistic=1
#-DenableStatisticAnalysis=0
#-DassociateTablesByEntryByUserTableSize=1024
#-DfrontendByBackendByEntryByUserTableSize=1024
#-DtableByUserByEntryTableSize=1024
#  processing queue size must not be less than 1 and must be a power of 2
#-DstatisticQueueSize=4096
# samplingRate
#-DsamplingRate=100
# size of sql log table
#-DsqlLogTableSize=1024
#-DmaxResultSet=524288

#-DinSubQueryTransformToJoin=false
#For rwSplitUser, Implement stickiness for read and write instances, the default value is 1000ms
#-DrwStickyTime=1000

# if enable frontend connection activity ratio statistics
#-DenableSessionActiveRatioStat=1
# if enable frontend connection and backend connection are associated with threads
#-DenableConnectionAssociateThread=1
#-Ddistrict=
#-DdataCenter=
#-DxaIdCheckPeriod=300

#  whether enable the memory buffer monitor
#-DenableMemoryBufferMonitor=0
#-DenableMemoryBufferMonitorRecordPool=1


#-DenableSqlDumpLog=0
#-DsqlDumpLogBasePath=sqldump
#-DsqlDumpLogFileName=sqldump.log
#-DsqlDumpLogCompressFilePattern=${date:yyyy-MM}/sqldump-%d{MM-dd}-%i.log.gz
#-DsqlDumpLogOnStartupRotate=1
#-DsqlDumpLogSizeBasedRotate=50MB
#-DsqlDumpLogTimeBasedRotate=1
#-DsqlDumpLogDeleteFileAge=90d
#-DsqlDumpLogCompressFilePath=*/sqldump-*.log.gz

#-DtcpKeepIdle=30
#-DtcpKeepInterval=10
#-DtcpKeepCount=3
```

1.3 user.xml

1.3.1 XML

- managerUser (,)
- shardingUser ()
- rwSplitUser ()
- analysisUser ()
- hybridTAUser ()
- blacklist()

1. user.xmlshardingUserdblesharding.xml(dble)sharding.xml

1.3.2 managerUser()

		/	
name		mysql	
password			
usingDecrypt		true/falsefalse	passwordencrypt.sh 0:{user}:{password} encrypt.sh 0:xxx:123456 fP/nl3XPXrSfWjpQzit5lIOrRU1QRXu LTYtATUG0fGW2k5kdXUhKL5zf02h E6nGjdnSWrufVkJPUZpbQ2qX9uQ== password fP/nl3XPXrSfWjpQzit5lIOrRU1QRXu LTYtATUG0fGW2k5kdXUhKL5zf02h E6nGjdnSWrufVkJPUZpbQ2qX9uQ== user xxx -u xxx -p123456
whiteIPs	ip		whiteIPs
readOnly		true/falsefalse	showselect
maxCon			,0 maxCon

1.3.3 shardingUser()

		/	
name		mysql	
password			
usingDecrypt		true/falsefalse	passwordencrypt.sh 0:{user}:{password} encrypt.sh 0:xxx:123456 fP/nl3XPXrSfWjpQzit5lIOrRU1QRXu LTYtATUG0fGW2k5kdXUhKL5zf02h E6nGjdnSWrufVkJPUZpbQ2qX9uQ== password fP/nl3XPXrSfWjpQzit5lIOrRU1QRXu LTYtATUG0fGW2k5kdXUhKL5zf02h E6nGjdnSWrufVkJPUZpbQ2qX9uQ== user xxx -u xxx -p123456
whiteIPs	ip		whiteIPs
readOnly		true/falsefalse	DMLshowselect
tenant			tenant
schemas	schema		schemaschemasharding.xmlschma

maxCon			,0 maxConmaxCon
blacklist	blacklist		blacklist
privileges	table		privileges

1.3.3.1 user.privileges.schema

user.privileges schemadml

		/	
name	schema		schema
dml	dml	0000	INSERT UPDATE SELECT DELETE 1- 0- 1111
table			tableschema

1.3.3.2 user.privileges.schema.table

		/	
name			key
dml	dml	0000	INSERT UPDATE SELECT DELETE 1- 0- 1111

1.3.4 rwSplitUser()

		/	
name		mysql	
password			
usingDecrypt		true/falsefalse	passwordencrypt.sh 0:{user}:{password} encrypt.sh 0:xxx:123456 fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== password fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== user xxx -u xxx -p123456
whiteIPs	ip		whiteIPs
tenant			tenant
dbGroup	dbGroup		db.xmldbGroup
maxCon			,0 maxConmaxCon
blacklist	blacklist		blacklist

1.3.5 analysisUser()

		/	
name		clickhouse	
password			
usingDecrypt		true/falsefalse	passwordencrypt.sh 0:{user}:{password} encrypt.sh 0:xxx:123456 fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== password fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== user xxx -u xxx -p123456
whiteIPs	ip		whiteIPs
tenant			tenant
dbGroup	dbGroup		db.xmldbGroup dbGrouphybridTAUserapNode
maxCon			,0 maxConmaxCon
blacklist	blacklist		blacklist

1.3.6 hybridTAUser(HTAP)

- HTAP

		/	
name		mysql	
password			
usingDecrypt		true/falsefalse	passwordencrypt.sh 0:{user}:{password} encrypt.sh 0:xxx:123456 fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== password fP/nl3XPXrSfWjpQzit5lIOrRU1QRXuLTYtATUG0fGW2k5kdXUhKL5zf02hE6nGjdnSWrufVkJPUZpbQ2qX9uQ== user xxx -u xxx -p123456
whiteIPs	ip		whiteIPs
readOnly		true/falsefalse	DMLshowselect
tenant			tenant
schemas	schema		schemaschemasharding.xmlschma dbGroupdatabaseTypeclickhouse
maxCon			,0 maxConmaxCon
blacklist	blacklist		blacklist
privileges	table		privileges

1.3.7 blacklist()

		/	
name	blacklist		
property			property

1.3.7.1 blacklist.property()

```
<property name="selectHavingAlwayTrueCheck">true</property>
```

keyvalue

-

useAllow

`multiStatementAllow`		false	true false	sql >1 true false dble Dble		

- sql

					sql		
`insertAllow`	INSERT	true	true false	trueINSERT falseINSERT	insert into t1 valut1 values(4,5);		
`deleteAllow`	DELETE	true	true false	trueDELETE falseDELETE	delete from t1;		
`updateAllow`	UPDATE	true	true false	trueUPDATE falseUPDATE	update t1 set id = 1 where id =10;		
`mergeAllow`	merge	true	true false	truemerge falsemerge	insert into t1 valut1 values(4,5);	mysql,	mysql,
`callAllow`	call	true	true false	truecallfalse call	call proc_arc(1);	hint https://actiontech.github.io/dble-docs-cn/3.SQL_Syntax/3.6_procedure_support.html	
`truncateAllow`	Truncate	true	true false	trueTruncate falseTruncate	truncate table t1;		
`createTableAllow`		true	true false	truefalse	create table t1(id int, age int);		
`renameTableAllow`	Rename	true	true false	trueRename falseRename	rename table t1 to t4;		
`alterTableAllow`	Alter Table	true	true false	ALTER TABLE t1 RENAME t6 sqlrenam t1 to t6, RenameTableAllow trueAlter Tablefalse Alter Table	alter table t1 add d timestamp;		
`dropTableAllow`	DropTable	true	true false	trueDropTable false DropTable	drop table t1;		

`setAllow`	Set	true	true false	trueSetfalse Set	set @name = 1;		
`replaceAllow`	Replace	true	true false	trueReplace falseReplace	replace into t1 values (1, 1);		
`describeAllow`	describe	true	true false	truedescribe falsedescribe	describe t1 id;		
`showAllow`	show	true	true false	trueshow falseshow	show columns from t1;		
`commitAllow`	Commit	true	true false	trueCommit falseCommit	commit;		
`rollbackAllow`	Rollback	true	true false	trueRollback falseRollback	rollback;		
`useAllow`	Use	true	true false	trueUsefalse Use	use db1;		
`hintAllow`	Hint	true	true false	trueHintfalse Hint	select * from t1/*!TEMPORARY */;		
`lockTableAllow`	LockTable	true	true false	trueLockTable false LockTable	lock table t1 write;		
`startTransactionAllow`	StartTransaction	true	true false	true StartTransaction false StartTransaction	start transaction;		
`blockAllow`		true	true false	trueLockTable false LockTable	begin select * from t1 where id=1end;		
`noneBaseStatementAllow`	DDL	false	true false	truefalse			

- sql
  expr

1.

					sql		
`mustParameterized`	where	false	true false	TrueWHERE ID = 1SQL 1.select * from t1 inner join t3 on t1.id = 1; where trueSQL false SQL	select * from t1 where t1.id =1;		
`constArithmeticAllow`		true	true false	truefalse	select * from t1 where 1>1; select * from t1 where id = 3-1; select * from t1 where true & false;		

`limitZeroAllow`	limit 0	false	true false	truelimit 0 falselimit 0	select * from t1 limit 0;		
`selectAllow`	SELECT	true	true false	trueSELECT falseSELECT tips:sqldruid sql	select id from t1;		
`selectAllColumnAllow`		true	true false	1.expr SQLAllColumnExpr 2.exprsqlselect 3.sqlfrom 4.(x.*) 1.select t.* from t1 t; SQLAllColumnExpr 2.select * from t1t3; from 3.select * from t1 inner join t3; from truefalse	select * from t1;		
`commentAllow`		false	true false	truefalse	select * from t1 where id =1 or 1=1 /*dble:sql=select 1 from account */;		
`conditionOpXorAllow`	(wherehaving) XOR	false	true false	select * from t1 inner join t3 on t1.id =(1 xor 1); where having true(where having)XOR false(where having)XOR	select * from t1 where id = (1 xor 1); select * from t1 having id = (1 xor 1);		

`conditionOpBitwseAllow`	"&""~""|""^"	true	true
			false
				true "&""~""|""^" false "&""~""|""^"	select * from t1 where id = (1 & 1);
					select * from t1 where id = (1 & select id from t1 limit1);
					select * from t1 where id = (1 ^ 1);
					select * from t1 where id = (1 ~ 1);
					select * from t1 where id = (1 | 1);		

`conditionDoubleConstAllow`		false	true
			false
				and
				select *from t1 where 3=1 or 3=3; and
				truefalse
					select *from t1 where 3=1 and 3=3;
					select *from t1 where 3=1 or (1=1 and 3=3);
					select *from t1 where 3=1 and (1=1 and 3=3);
					select * from t3 where 1=1 and k like '%'; conditionLikeTrueAllow false
					select * from t3 where 1=1 and 1= (select		

					count(*) from t1 limit1);
					select * from t3 where 2=1 and true = true;
					select * from t3 where id =1 and true = true or id =1 or(1=1 and id =2);		

`deleteWhereNoneCheck`	DELETEwhere	false	true false	1.sqlwhere 2.using 3.from delete from t1 using t1 inner join t2; using delete t1,t2 from t1 left join t2 on t1.id=t2.id; from truewhere falsewhere	delete from t1; delete t1 from t1 left join t2 on t1.id=t2.id;		
`updateWhereNoneCheck`	UPDATEwhere	false	true false	1.limit 1.update t1 set idd =1 limit 1; limit truewhere falsewhere	update t1 set idd =1 ;		
`conditionAndAlwayFalseAllow`	(WHERE/HAVING)AND	false	true false	true (WHERE/HAVING)ANDfalse (WHERE/HAVING)AND	select * from t1 where id = 567 and 2 = 1; select * from t1 having id =1 and 2=1;		

`conditionAndAlwayTrueAllow`	(WHERE/HAVING)AND	false	true
			false
				update t1 set id = 1 where 1=1 and (1 =1 or id =2) ;
				select * from t1 having id =1 and (1 =1 or id =2) ;
				true (WHERE/HAVING)ANDfalse (WHERE/HAVING)AND
					select * from t1 where id = 567 and 1 = 1;
					update t1 set id = 1 where 1=1 and 1=1;
					select * from t3 where id = 567 and k like ‘%’;
					select * from t1 having id =1 and 1=1;		

`conditionLikeTrueAllow`	(WHERE/HAVING)LIKE	true	true false	conditionLikeTrueAllowfalselike ‘%’ conditionAndAlwayTrueAllow true (WHERE/HAVING)LIKEfalse (WHERE/HAVING)LIKE	select * from t3 where id = 5 and k like '%'; select * from t1 having id =1 and k like '%';		
`selectLimit`		-1	-1	selectselct		dble	dble

2.select into

					sql		
					select * into		

selectIntoAllow	SELECTINTO	true	true false	trueselect into falseselect into	@myvar from t1; select * from t1 into @myvar for update; select id, data into @x, @y from test.t1 limit 1;		
selectIntoOutfileAllow	outfilesql SELECT ... INTO OUTFILE	false	true false	outfilesql true SELECT ... INTO OUTFILE falseSELECT ... INTO OUTFILE	select * from t1 where id in(select id into outfile '/exportdata/customers.txt' fields terminated by ',' optionally enclosed by '"' lines terminated by '\n' from t1); sqlsqldruidsql		

3.AlwayTrue

					sql		
selectWhereAlwayTrueCheck	SELECTWHERE AlwayTrue	true	true false	AlwayTrue 1.where 2.sql 3.SQL update t1 set idd =1 where id = id 23 truesqlfalse sql	select id from t1 where id =1 union select 1 /*!dble:sql=select 1 from account */;		
selectHavingAlwayTrueCheck	SELECT HAVING AlwayTrue	true	true false	AlwayTrue selectWhereAlwayTrueCheck truesqlfalse sql	select * from t1 having id = 1 or 1=1 /*!dble:sql=select 1 from account */;		
deleteWhereAlwayTrueCheck	DELETE WHERE AlwayTrue	true	true false	AlwayTrue selectWhereAlwayTrueCheck truesqlfalse sql	delete from t1 where id = 1 or 1=1 /*!dble:sql=select 1 from account */;		
updateWhereAlayTrueCheck	UPDATE WHERE AlwayTrue	true	true false	AlwayTrue selectWhereAlwayTrueCheck truesqlfalse sql	update t1 set idd =1 where id = id or 1=1 /*!dble:sql=select 1 from account */		

4.

					sql		
caseConditionConstAllow		false	true false	1.caseselect 2. truefalse SQL	select id from t1 where id =1 union select 1 /*!dble:sql=select 1 from account */;		
selectUnionCheck	union check	true	true false	SELECT UNION 1.left sqlfrom 2.left sqlwhere 3.right sql from 4.UNION UNION ALL UNION DISTINCT 5.sql trueUNION falseUNION	select id from t1 where id =1 union select 1 /*!dble:sql=select 1 from account */;		

5. functionCheck

`tableCheck`		true	true false	druidble	druiddble
`functionCheck`		true	true false	druidble	druiddble
`objectCheck`	“”	true	true false	druidble	druiddble
`variantCheck`	“”	true	true false	druidble	druiddble
`readOnlyTables`	SELECT INTO DELETEUPDATE INSERTMERGE""			SELECT INTO DELETEUPDATE INSERTMERGE	druiddble
`schemaCheck`	Schema	true	true false	druidble	druiddble

6.

`selectMinusCheck`	SELECT MINUS	true	true false	trueSELECT MINUS falseSELECT MINUS	mysql
`selectExceptCheck`	SELECT EXCEPT	true	true false	trueexceptfalse except	mysql
`selectIntersectCheck`	SELECT INTERSECT	true	true false	trueINTERSECT falseINTERSECT	mysql
`strictSyntaxCheck`		true	true false	Druid SQL ParserSQL SQL	druid
`minusAllow`	SELECT * FROM A MINUS SELECT * FROM B	true	true false	trueMINUSfalse MINUS	mysql
`intersectAllow`	SELECT * FROM A INTERSECT SELECT * FROM B	true	true false	trueintersectfalse intersect	mysql
`completeInsertValuesCheck`	dble1.0.311.2.6	false	true false	druid,	druiddble
`doPrivilegedAllow`	druid	false	true false	druidflag,	druiddble
`wrapAllow`	Connection/Statement/ResultSetisWrapFor unwrap	true	true false	druidflag	druiddble
`metadataAllow`	Connection.getMetadata	true	true false	druidflag	druiddble

1.3.8 tenant

dble

1. : :

```
mysql -u: -p -h
```

```
DriverManager.getConnection("jdbc:mysql://127.0.0.1:8066", "root2:tenant1", "123456");
```

2. JDBC-connectionAttributes `connectionAttributes` tenant

```
DriverManager.getConnection("jdbc:mysql://127.0.0.1:8066?connectionAttributes=tenant:tenant1", "root2", "123456");
```

1/21

1.3.9 whiteIPsIP

IP

ip192.168.1.2,192.168.2.22
IP192.168.1.10-192.168.1.100
192.168.1.%
IP/CIDR192.168.1.1/20

IPV4/IPV6

- 127.0.0.10:0:0:0:0:0:0:1
- IPV6IPv4

1.3.10

```
<?xml version="1.0" encoding="UTF-8"?>
<dble:user xmlns:dble="http://dble.cloud/">
    <managerUser name="man1" password="654321" whiteIPs="127.0.0.1,0:0:0:0:0:0:0:1" readOnly="false"/>
    <managerUser name="user" usingDecrypt="true" readOnly="true" password="AqEkFEuIFAX6g2TJQnp4cJ2r7Yc0Z4/KBsZqKhT8qSz18Aj91e8lxO49BKQElC6
OFfW4c38pCYa8QGFTub7pnw==" />

    <shardingUser name="root" password="123456" schemas="testdb" readOnly="false" blacklist="blacklist1" maxCon="20"/>
    <shardingUser name="root2" password="123456" schemas="testdb,testdb2" maxCon="20" tenant="tenant1">
        <privileges check="true">
            <schema name="testdb" dml="0110">
                <table name="tb01" dml="0000"/>
                <table name="tb02" dml="1111"/>
            </schema>
        </privileges>
    </shardingUser>
    <!--rwSplitUser not work for now-->
    <rwSplitUser name="rwsu1" password="123456" dbGroup="dbGroup1" blacklist="blacklist1"
                 maxCon="20"/>

    <analysisUser name="analysisUser" password="123456" dbGroup="dbGroup3" maxCon="20"/>

    <hybridTAUser name="hysu1" password="111111" schemas="testdb3" maxCon="20"/>
    <hybridTAUser name="hysu2" password="111111" schemas="testdb3" maxCon="20" blacklist="blacklist1" tenant="tenant2">
        <privileges check="true">
            <schema name="testdb3" dml="0110">
                <table name="tb_global1" dml="0000"/>
                <table name="tb_global2" dml="1111"/>
            </schema>
        </privileges>
    </hybridTAUser>

    <blacklist name="blacklist1">
        <property name="selectAllow">true</property>
    </blacklist>
</dble:user>
```

1.4 db.xml

db.xml,

1.4.1 dbGroup

- dbGroup

	&	/	
name			dbGroup
rwSplitMode		0/1/2/3	0, 1 2 3
delayThreshold		-1	1:delayThresholdshow slave status 2:delayPeriodMillisdelayDatabase delay_detection 3:delayThreshold=-1 4:delayPeriodMillisdelayDatabase12
delayPeriodMillis		-1	delayThresholddelayDatabase
delayDatabase	mysqldatabase	null,	mysqlsqlmysqldatabase delayThresholddelayPeriodMillis
disableHA		true/falsefalse	
heartbeat	,		mysql. : 1.select 1 2. select @@read_only 3.show slave status, Seconds_Behind_Mastermysql
dbInstance			

- heartbeat

	&	/	
timeout	heartbeat,	0	dble heartbeatPeriodMillis dbInstance ,timeout :(heartbeatPeriodMillis)22s4s 4stimeout(2. dbletimeout
errorRetryCount	heartbeat,	10	/,errorRetryCount 1. errorOK() 2. okerror 3.
keepAlive	heartbeat,	60	dbleheartbeatPeriodMillisdbInstance,,(+heartbeatPeriodMillis+keepAlive) (heartbeatPeriodMillis)101310 00131120131000 + 10s + 60s

- dbInstance

	&	/	
name			
id	id	name	id
url	ip:port		IPPORT
user			
password			
usingDecrypt	password	false/true,false	truepasswordencrypt.sh 1:{name}:{user}:{password}
minCon			minCondbGroupshardingNode numOfShardingNodesminCon numOfShardingNodes numOfShardingNodes
			maxCondbGroupshardingNode

maxCon			numOfShardingNodes, minCon maxCon numOfShardingNodes minCon ,
readWeight	()		0 0. 0
primary	true	false	
disabled		false	
databaseType		,mysql	mysqlmysqlclickhouseclickhouse, + mysqlshardingUserrwSplitUser + clickhouseanalysisUserapNode hybridTAUser, dbGroupdbInstance databaseType + clickHousedb.xmlclickHouse db.xmlmysqllower_case_table_names 0
property			
dbDistrict	mysql		bootstrap.cnfdistrict
dbDataCenter	mysql		bootstrap.cnfdataCenter

- property

:

```
<?xml version="1.0"?>
<dble:db xmlns:dble="http://dble.cloud/">

    <dbGroup name="dbGroup1" rwSplitMode="1" delayThreshold="10000">
        <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
        <dbInstance name="instanceM1" url="ip4:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
            <property name="testOnCreate">false</property>
            <property name="testOnBorrow">false</property>
            <property name="testOnReturn">false</property>
            <property name="testWhileIdle">true</property>
            <property name="connectionTimeout">30000</property>
            <property name="connectionHeartbeatTimeout">20</property>
            <property name="timeBetweenEvictionRunsMillis">30000</property>
            <property name="idleTimeout">600000</property>
            <property name="heartbeatPeriodMillis">10000</property>
            <property name="evictorShutdownTimeoutMillis">10000</property>
        </dbInstance>

        <!-- can have multi read instances -->
        <dbInstance name="instanceS1" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="false">
            <property name="heartbeatPeriodMillis">60000</property>
        </dbInstance>
    </dbGroup>
    <dbGroup name="dbGroup2" rwSplitMode="1" delayThreshold="1000" delayPeriodMillis="2000" delayDatabase="test">
        <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
        <dbInstance name="instanceM2" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
        </dbInstance>

        <!-- can have multi read instances -->
        <dbInstance name="instanceS2" url="ip6:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="false">
            <property name="heartbeatPeriodMillis">60000</property>
        </dbInstance>
    </dbGroup>
</dble:db>
```

1.4.2 MySQL

dble MySQL

SELECT	
INSERT	
UPDATE	
DELETE	
FILE	load data

CREATE	()
DROP	
ALTER	
LOCK TABLES	lock tables
ALTER ROUTINE	(hint)/
CREATE ROUTINE	(hint)
EXECUTE	(hint)
INDEX	/
SUPER	KILL
SHOW DATABASES	GUIINFORMATION_SCHEMA SCHEMATA
PROCESS	show processlist
REPLICATION CLIENT	: 1., 2.show slave status 3.show @@binlog_status
REFERENCES	()
XA_RECOVER_ADMIN	mysql8.0mysqlXA_RECOVER_ADMIN

1.5 sharding.xml

1.5.1 XML

- schema (schema)
- shardingNode ()
- apNode (ap)
- function ()

1. user.xmlshardingUserhybridTAUserdblesharding.xml(dble)sharding.xml

1.5.2 schema

- schema

		/	
name	schema		schema
shardingNode			xmltable 1tableschema 2schematabledefault single table 3(function)schematabledefault sharding table1.13 Schema
function	sharding table		function(shardingNodefunction) 1.13 Schema
apNode	OLAP(clickHouse)		apNodeOLAP 0apNode 1shardingUserschemaapNode 2hybridTAUserschemaapNode
sqlMaxLimit		-1	SQL 1 (order/group/) 2 shemasqlMaxLimit
logicalCreateADrop		true	trueschema
shardingTable	shardingTable		
globalTable	globalTable		
singleTable	singleTable		

- shardingTable

		/	
name			’,’
shardingNode			xxx$n0-n1 xxxn0, ..., xxxnm, ..., xxxn1 dn$1-6 dn1,dn2, dn3,dn4,dn5,dn6
shardingColumn			
function			function
incrementColumn			
sqlMaxLimit		schemasqlMaxLimit	schemas schema
sqlRequiredSharding	sql	false	truesql
specifyCharset	dbleISO-8859-1	false	true,dbleISO-8859-1
childTable	childTable		ER

- childTable

		/	
name			’,’
joinColumn	joinjoin		
parentColumn	joinjoin		/
incrementColumn			
sqlMaxLimit		schemasqlMaxLimit	schemas schema
specifyCharset	dbleISO-8859-1	false	true,dbleISO-8859-1

childTable	childTable		ER

- globalTable

		/	
name			’,’
shardingNode			xxx$n0-n1 xxxn0, ..., xxxnm, ..., xxxn1 dn$1-6 dn1,dn2, dn3,dn4,dn5,dn6
sqlMaxLimit		schemasqlMaxLimit	schemas schema
specifyCharset	dbleISO-8859-1	false	true,dbleISO-8859-1
checkClass			dbleCHECKSUMCOUNT
cron		0 0 0 * * ?	quartz http://www.quartz-scheduler.org/api/2.4.0-SNAPSHOT/org/quartz/CronScheduleBuilder.html

- singleTable

		/	
name			’,’
shardingNode			shardingNode
sqlMaxLimit		schemasqlMaxLimit	schemas schema
specifyCharset	dbleISO-8859-1	false	true,dbleISO-8859-1

1.5.3 shardingNode

- shardingNode

	&	
name	"dn,dn$0-5"	,,‘,’,X()05,"X$0-5",$name databasedbGroup shadingNodeapNodename
database	shardingNodemysqlschema,"db,db$0-5"	,,‘,’,X()05,"X$0-5",$
dbGroup	shardingNodedb.xmldbGroup,,"dh,dh$0-5"	Host,‘,’X()05,"X$0-5",$

```
<shardingNode name="dn1" dbGroup="localhost1" database="db1" />
```

name, dbGroup, database xxx$n0-n1, xxx, xxxn0... , xxxnm ... ,xxxn1, xxx,

```
n0 < nm < n1
```

```
<shardingNode name="dn1$0-19" dbGroup="localhost1$0-9" database="db1$0-1" />
```

:

```
<shardingNode name="dn10" dbGroup="localhost10" database="db10" />
<shardingNode name="dn11" dbGroup="localhost10" database="db11" />
<shardingNode name="dn12" dbGroup="localhost11" database="db10" />
<shardingNode name="dn13" dbGroup="localhost11" database="db11" />
   ...
<shardingNode name="dn119" dbGroup="localhost19" database="db11" />
```

shardingNode(name)dbGroupdatabase,,name20,dbGroup10,database2;

```
<shardingNode name="dn,dn1$0-19,dnx" dbGroup="localhost,localhost1$0-9" database="db1$0-1" />
```

,name22,dbGroup11,database2

shardingNodedatabasedbGroup(shardingNode)shardingNodenameapNode

1.5.4 apNode

- apNode
  apNodeshardingNode

	&	
name	"dn,dn$0-5"	,,‘,’,X()05,"X$0-5",$name databasedbGroup apNodeshardingNodename
database	apNodeclickHouseschema,"db,db$0-5"	,,‘,’,X()05,"X$0-5",$
dbGroup	apNodedb.xmldbGroup,,"dh,dh$0-5"	Host,‘,’X()05,"X$0-5",$ dbGroupdatabaseTypeclickhouse

```
<apNode name="apNode1" dbGroup="localhost1" database="ap_db1" />
```

name, dbGroup, database xxx$n0-n1, xxx, xxxn0... , xxxnm ... ,xxxn1, xxx,

```
n0 < nm < n1
```

```
<apNode name="apNode1$0-19" dbGroup="localhost1$0-9" database="ap_db1$0-1" />
```

:

```
<apNode name="apNode10" dbGroup="localhost10" database="ap_db10" />
<apNode name="apNode11" dbGroup="localhost10" database="ap_db11" />
<apNode name="apNode12" dbGroup="localhost11" database="ap_db10" />
<apNode name="apNode13" dbGroup="localhost11" database="ap_db11" />
   ...
<apNode name="apNode119" dbGroup="localhost19" database="ap_db11" />
```

apNode(name)dbGroupdatabase,,name20,dbGroup10,database2;

```
<apNode name="dn,dn1$0-19,dnx" dbGroup="localhost,localhost1$0-9" database="db1$0-1" />
```

,name22,dbGroup11,database2

apNodedatabasedbGroup(apNode)apNodenameshardingNode

1.5.5 function

name: class property name

- function

name		
class		Enum,NumberRange,Hash,StringHash,Date,PatternRange,jumpStringHash
property	function	

```
<function name="rang-long""  class="com.actiontech.dble.route.function.AutoPartitionByLong">
         <property name="mapFile">auto-sharding-long.txt</property>
         ...
</function>
```

: hash, stringhash, enum, numberrange, patternrange, datejumpstringhash.

1.5.5.1.hash

function class“hash”“com.actiontech.dble.route.function.PartitionByLong"

```
<function name="hashLong" class="hash">
      <property name="partitionCount">C1[,C2, ...Cn]</property>
      <property name="partitionLength">L1[,L2, ...Ln]</property>
</function>
```

partitionCount: C1 [+C2 + ... + Cn].

partitionLength: [0, L1), [L1, 2*L1)*, ..., *[(C1-1)*L1, C1*L1)*, *[C1*L1, C1*L1+L2)*, *[C1*L1+L2, C1*L1+2*L2), ...

F1

```
<property name="partitionCount">2,3</property>
<property name="partitionLength">100,50</property>
```

[0 , 100) [100, 200) [200, 250) [250, 300) [300, 350)

,F2:

```
<property name="partitionCount">2</property>
<property name="partitionLength">1000</property>
```

[0 , 1000) [1000, 2000)

MC1 *L1* + ... + *Cn* Ln. F1 M350F2M2000 keyM value = key mod M value F1,key =805 ,value = 105,51(0)

N C1 [+C2 + ... + Cn]. F1 N5F2N2

1. M28802880:2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 30, 32, 36, 40, 45, 48, 60, 64, 72, 80, 90, 96, 120, 144, 160, 180, 192, 240, 288, 320, 360, 480, 576, 720, 960, 14402880,
2. NshardingNodeshardingNodeshardingNode="dn1,dn2,dn3,dn4"N4
3. CnLn
4.
5. partitionLength1hashMNpartitionCount
6. NULL0

1.5.5.2.stringhash

class“stringhash”“com.actiontech.dble.route.function.PartitionByString"

```
<function name="hashSting" class="stringhash">
       <property name="partitionCount">C1[,C2, ...Cn]</property>
       <property name="partitionLength">L1[,L2, ...Ln]</property>
       <property name="hashSlice">l:r</property>
</function>
```

partitionCountpartitionLength hash **hashSlice**hashkey0

hashSlice

1. "0:" "0:0"
2. "0:50" 5050
3. "0:-10" 1010

hashSlice

1.

n	n>=0	(0,n)
n	n<0	(n,0)
:r		(0,r)
l:		(l,0)
:		(0:0)
l:r		(l, r)

2.

a.l

l	l>=0	l		l
l	l<0	l=l+length	l<0	l=0

b.r

r	r>0	r	r>length	r=length
r	r<=0	r=r+length		r

length.

3.

		hash
l<r	[l, r)	hash
l>=r		0

hash hashhashhash

1. hash(3
2.

stringhash unicode hash

- partitionLength[] partitionCount[] hashSlice
- DBLE
- partitionCount[]
- hashSlice 4 5 0 3 4 4 5 “->”
- DBLE WHERE 4 5
- 0 31 unicode “->”
-
-

1.5.5.3.enum

class“enum”“com.actiontech.dble.route.function.PartitionByFileMap"

```
<function name="enum" class="enum">
       <property name="mapFile">partition.txt</property>
       <property name="defaultNode">0</property>
       <property name="type">0</property>
```

```
</function>
```

mapFile: **defaultNode**-1 **type**typekey0 0

a. type0

```
#comment //comment this line will be skiped
int1=node0
int2=node1
...
```

b. type0

```
#comment //comment this line will be skiped
string1=node0
string2=node1
...
```

defaultNodedefaultNode

1. “=”.
2. nodex
3.
4.
5. NULLdefaultNodedefaultNode;mysqlnot null, "Sharding column can't be null when the table in MySQL column is not null"

1.5.5.4.numberrange

class“numberrange”“com.actiontech.dble.route.function.AutoPartitionByLong"

```
<function name="rangeLong" class="numberrange">
       <property name="mapFile">partition.txt</property>
       <property name="defaultNode">0</property>
</function>
```

mapFile: **defaultNode**-1

#comment //comment this line will be skiped start1-end1=node1 start2-end2=node2 ...

[start1, end1], [start2, end2], ... 1.defaultNodedefaultNode2.defaultNode

1. “=”
2. nodex
3.
4.
5. NULLdefaultNodedefaultNode;mysqlnot null, "Sharding column can't be null when the table in MySQL column is not null"

1.5.5.5.patternrange

class“patternrange”“com.actiontech.dble.route.function.PartitionByPattern"

```
<function name="pattern" class="patternrange">
       <property name="mapFile">partition.txt</property>
       <property name="patternValue">1024</property>
       <property name="defaultNode">0</property>
</function>
```

mapFile: **patternValue**: 1024 **defaultNode**-1

#comment //comment this line will be skiped start1-end1=node1 start1-end2=node2 ...

numberrangepatternValuenumberrange

1. “=”
2. nodex
3.
4. defaultNode defaultNode

5. NULLdefaultNodedefaultNode;mysqlnot null, "Sharding column can't be null when the table in MySQL column is not null"

1.5.5.6.date

class“date”“com.actiontech.dble.route.function.PartitionByDate"

```
<function name="partbydate" class="date">
       <property name="dateFormat">yyyy-MM-dd</property>
       <property name="sBeginDate">2015-01-01</property>
       [<property name="sEndDate">2015-01-31</property>]
       <property name="sPartionDay">10</property>
       <property name="defaultNode">0</property>
</function>
```

dateFormat: **sBeginDate** **sEndDate**("") **sPartionDay** **defaultNode**-1

1sEndDatesEndDate"" sBeginDate sPartionDay sBeginDatedefaultNodedefaultNodedefaultNode, **2**sEndDate"" sBeginDate sPartionDay sEndDate N sEndDate1sEndDateindex=((key - sBeginDate)/sPartionDay)%N, key index sBeginDated

1. dateFormat
2. sPartionDay86400000
3. 2 (sEndDate - sBeginDate)sPartionDay0
4. NULLdefaultNodedefaultNode;mysqlnot null, "Sharding column can't be null when the table in MySQL column is not null"

1.5.5.7.

class"jumpstringhash""com.actiontech.dble.route.function.PartitionByJumpConsistentHash"

```
<function name="jumphash"
              class="jumpStringHash">
        <property name="partitionCount">2</property>
        <property name="hashSlice">0:2</property>
</function>
```

partitionCount: **hashSlice**:1.5.5.2 Google A Fast, Minimal Memory, Consistent Hash Algorithmhash1/n

1. NULL0;mysqlnot null, "Sharding column can't be null when the table in MySQL column is not null"
2. hashSlice, 3.21.020:-1,3.21.060:0

1.5.6

```
<?xml version="1.0"?>
<!--
  ~ Copyright (C) 2016-2020 ActionTech.
  ~ License: http://www.gnu.org/licenses/gpl.html GPL version 2 or higher.
  -->

<dble:sharding xmlns:dble="http://dble.cloud/" version="4.0">

    <schema name="testdb"  sqlMaxLimit="100">
        <shardingTable name="tb_enum_sharding" shardingNode="dn1,dn2" sqlMaxLimit="200" function="func_enum" shardingColumn="code"/>
        <shardingTable name="tb_range_sharding" shardingNode="dn1,dn2,dn3" function="func_range" shardingColumn="id" specifyCharset= "fals
e"/>
        <!--er tables-->
        <shardingTable name="tb_hash_sharding" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id"/>
        <shardingTable name="tb_hash_sharding_er1" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id"/>
        <shardingTable name="tb_hash_sharding_er2" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id2"/>
        <shardingTable name="tb_hash_sharding_er3" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id" incrementColumn=
"id2"/>

        <shardingTable name="tb_uneven_hash" shardingNode="dn1,dn2,dn3" function="func_uneven_hash" shardingColumn="id"/>

        <shardingTable name="tb_mod" shardingNode="dn1,dn2,dn3,dn4" function="func_mod" shardingColumn="id" sqlRequiredSharding="true"/>

        <shardingTable name="tb_jump_hash" shardingNode="dn1,dn2" function="func_jumpHash" shardingColumn="code"/>
```

```
        <shardingTable name="tb_hash_string" shardingNode="dn1,dn2,dn3,dn4" function="func_hashString" shardingColumn="code"/>

        <shardingTable name="tb_date" shardingNode="dn1,dn2,dn3,dn4" function="func_date" shardingColumn="create_date"/>

        <shardingTable name="tb_pattern" shardingNode="dn1,dn2" function="func_pattern" shardingColumn="id"/>
        <!--global  tables-->
        <globalTable name="tb_global1" shardingNode="dn1,dn2" sqlMaxLimit="103" specifyCharset= "false"/>
        <globalTable name="tb_global2" shardingNode="dn1,dn2,dn3,dn4" cron="0 0 0 * * ?" checkClass="CHECKSUM"/>
        <!--single node table-->
        <singleTable name="tb_single" shardingNode="dn6" sqlMaxLimit="105"specifyCharset= "false"/>
        <!--er tables-->
        <shardingTable name="tb_parent" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id">
            <childTable name="tb_child1" joinColumn="child1_id" parentColumn="id" sqlMaxLimit="201">
                <childTable name="tb_grandson1" joinColumn="grandson1_id" parentColumn="child1_id" specifyCharset= "false"/>
                <childTable name="tb_grandson2" joinColumn="grandson2_id" parentColumn="child1_id2" specifyCharset= "false"/>
            </childTable>
            <childTable name="tb_child2" joinColumn="child2_id" parentColumn="id"/>
            <childTable name="tb_child3" joinColumn="child3_id" parentColumn="id2"/>
        </shardingTable>
    </schema>
    <!-- sharding testdb2 route to database named dn5 in localhost2  -->
    <schema name="testdb2" shardingNode="dn5"/>
    <shardingNode name="dn1" dbGroup="dbGroup1" database="db_1"/>
    <shardingNode name="dn2" dbGroup="dbGroup2" database="db_2"/>
    <shardingNode name="dn3" dbGroup="dbGroup1" database="db_3"/>
    <shardingNode name="dn4" dbGroup="dbGroup2" database="db_4"/>
    <shardingNode name="dn5" dbGroup="dbGroup1" database="db_5"/>
    <shardingNode name="dn6" dbGroup="dbGroup2" database="db_6"/>
    <!-- enum partition -->
    <function name="func_enum" class="Enum">
        <property name="mapFile">partition-enum.txt</property>
        <property name="defaultNode">0</property><!--the default is -1,means unexpected value will report error-->
        <property name="type">0</property><!--0 means key is a number, 1 means key is a string-->
    </function>
    <!-- number range partition -->
    <function name="func_range" class="NumberRange">
        <property name="mapFile">partition-number-range.txt</property>
        <property name="defaultNode">0</property><!--he default is -1,means unexpected value will report error-->
    </function>
    <!-- Hash partition,when partitionLength=1, it is a mod partition, MAX(sum(count*length[i]) must not more then 2880-->
    <function name="func_common_hash" class="Hash">
        <property name="partitionCount">2</property>
        <property name="partitionLength">512</property>
    </function>
    <!-- Hash partition,when partitionLength=1, it is a mod partition, MAX(sum(count*length[i]) must not more then 2880-->
    <function name="func_uneven_hash" class="Hash">
        <property name="partitionCount">2,1</property>
        <property name="partitionLength">256,512</property>
    </function>
    <!-- eg:  mod 4 -->
    <function name="func_mod" class="Hash">
        <property name="partitionCount">4</property>
        <property name="partitionLength">1</property>
    </function>
    <!-- jumpStringHash partition for string-->
    <function name="func_jumpHash" class="jumpStringHash">
        <property name="partitionCount">2</property>
        <property name="hashSlice">0:2</property>
    </function>
    <!-- Hash partition for string-->
    <function name="func_hashString" class="StringHash">
        <property name="partitionCount">4</property>
        <property name="partitionLength">256</property>
        <property name="hashSlice">0:2</property>
        <!--<property name="hashSlice">-4:0</property> -->
    </function>
    <!-- date partition  4 case:
    1.set sEndDate and defaultNode: input <sBeginDate ,router to defaultNode; input>sEndDate ,mod the period
    2.set sEndDate, but no defaultNode:input <sBeginDate report error; input>sEndDate ,mod the period
    3.set defaultNode without sEndDate: input <sBeginDate router to defaultNode;input>sBeginDate + (node size)*sPartionDay-1 will report e
rror(expected is defaultNode,but can't control now)
    4.sEndDate and defaultNode are all not set: input <sBeginDate report error;input>sBeginDate + (node size)*sPartionDay-1 will report er
ror
     -->
    <function name="func_date" class="Date">
        <property name="dateFormat">yyyy-MM-dd</property>
        <property name="sBeginDate">2015-01-01</property>
        <property name="sEndDate">2015-01-31</property> <!--if not set sEndDate,then in fact ,the sEndDate = sBeginDate+ (node size)*sPart
```

```
ionDay-1 -->
        <property name="sPartionDay">10</property>
        <property name="defaultNode">0</property><!--the default is -1-->
    </function>
    <!-- pattern partition : mapFile must contains all value of 0~patternValue-1,key and value must be Continuous increase-->
    <function name="func_pattern" class="PatternRange">
        <property name="mapFile">partition-pattern.txt</property>
        <property name="patternValue">1024</property>
        <property name="defaultNode">0</property><!--contains string which is not number,router to default node-->
    </function>
</dble:sharding>
```

1.6 log4j2.xml

1.6.1

Dblejavalog4j2.xml

1.6.1.1

DefaultRolloverStrategyRollingRandomAccessFileRolloverStrategy

```
<DefaultRolloverStrategy max="100">
      <Delete basePath="logs" maxDepth="2">
          <IfFileName glob="*/dble-*.log.gz">
              <IfLastModified age="2d">
                  <IfAny>
                      <IfAccumulatedFileSize exceeds="1 GB" />
                      <IfAccumulatedFileCount exceeds="10" />
                  </IfAny>
              </IfLastModified>
          </IfFileName>
      </Delete>
  </DefaultRolloverStrategy>
```

:
basePath
maxDepth basePathmaxDepth.../logs/2018-01-01 .../logs/2018-01-02
glob
age
IfAccumulatedFileSize
IfAccumulatedFileCount

logs2" /*dble-*.log.gz"21 GB10

1.6.2

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration status="WARN" packages="com.actiontech.dble.log">
    <Appenders>
        <Console name="Console" target="SYSTEM_OUT">
            <PatternLayout pattern="%d [%-5p][%t] %m %throwable{full} (%C:%F:%L) %n"/>
        </Console>

        <RollingRandomAccessFile name="RollingFile" fileName="logs/dble.log"
                                 filePattern="logs/$${date:yyyy-MM}/dble-%d{MM-dd}-%i.log.gz">
            <PatternLayout>
                <Pattern>%d{yyyy-MM-dd HH:mm:ss.SSS} %5p [%t] (%l) - %m%n</Pattern>
            </PatternLayout>
            <Policies>
                <OnStartupTriggeringPolicy/>
                <SizeBasedTriggeringPolicy size="250 MB"/>
                <TimeBasedTriggeringPolicy/>
            </Policies>
            <DefaultRolloverStrategy max="100">
                <Delete basePath="logs" maxDepth="2">
                    <IfFileName glob="*/dble-*.log.gz">
                        <IfLastModified age="2d">
                            <IfAny>
                                <IfAccumulatedFileSize exceeds="1 GB" />
                                <IfAccumulatedFileCount exceeds="10" />
                            </IfAny>
                        </IfLastModified>
                    </IfFileName>
                </Delete>
            </DefaultRolloverStrategy>
        </RollingRandomAccessFile>

    <RollingFile name="ThreadChecker" fileName="logs/thread.log"
                     filePattern="logs/$${date:yyyy-MM}/thread-%d{MM-dd}-%i.log.gz">
            <PatternLayout>
                <Pattern>%d{yyyy-MM-dd HH:mm:ss.SSS} %5p [%t] (%l) - %m%n</Pattern>
            </PatternLayout>
            <Policies>
                <OnStartupTriggeringPolicy/>
                <SizeBasedTriggeringPolicy size="250 MB"/>
```

```
                <TimeBasedTriggeringPolicy/>
            </Policies>
            <DefaultRolloverStrategy max="10"/>
        </RollingFile>
    </Appenders>
    <Loggers>
        <Logger name="ThreadChecker" additivity="false" includeLocation="false">
            <AppenderRef ref="ThreadChecker"/>
        </Logger>
        <asyncRoot level="debug" includeLocation="true">
            <AppenderRef ref="Console"/>
            <AppenderRef ref="RollingFile"/>
        </asyncRoot>
    </Loggers>
</Configuration>
```

1.7

dble

cluster.cnf

```
sequenceHandlerType=n
```

sequenceHandlerType

- 1:MySQL offset-step
- 2:(Snowflake)
- 3:(Snowflake)
- 4:offset-step

sharding.xml
： incrementColumn

```
//incrementColumn=pidpid
<shardingTable name="table1" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="id" incrementColumn="pid"/>
```

```
insert into table1(name) values('test');
insert into table1 set name = 'test';
```

2.2

MYSQL
MySQLdbledbledbleID
mysql

```
table1aid,bid,cid,did biddble
insert into table1 values(1,2,3)
sql
insert into table1 set aid = 1,cid = 2,did = 3
```

dbleupdatereplace)

1.7.1 MySQL-offset-step

1.7.1.1 MySQL-offset-step

mysqlsequence_db_conf.properties:

#this is comment

`schema1`.`table1`=node1

`schema1`.`table2`=node1

`schema2`.`table1`=node2

...

schemaXdbledble

tableX dbledble

nodeX

1.7.1.2

mysql **nodeX`** **schemaX`.`tableX`**)
nodeX

a. mysql**nodeX**

mysql ...

b. **nodeX**db(1.5 sharding.xml)

use db;

c. dbsql.sqldbseq.sql1.7.1.3

source .../dbseq.sql;

d.

INSERT INTO DBLE_SEQUENCE VALUES ('**`schemaX`.`tableX`**', 1, 1);

...

1.7.1.3 dbseq.sql

dbseq.sql

```
DROP TABLE IF EXISTS DBLE_SEQUENCE;
CREATE TABLE DBLE_SEQUENCE ( name VARCHAR(64) NOT NULL, current_value BIGINT(20) NOT NULL, increment INT NOT NULL DEFAULT 1, PRIMARY KEY (
name) ) ENGINE=InnoDB;

-- ----------------------------
-- Function structure for `dble_seq_currval`
-- ----------------------------
DROP FUNCTION IF EXISTS `dble_seq_currval`;
DELIMITER ;;
CREATE FUNCTION `dble_seq_currval`(seq_name VARCHAR(64)) RETURNS varchar(64) CHARSET latin1
DETERMINISTIC
BEGIN
DECLARE retval VARCHAR(64);
SET retval="-1,0";
SELECT concat(CAST(current_value AS CHAR),",",CAST(increment AS CHAR) ) INTO retval FROM DBLE_SEQUENCE WHERE name = seq_name;
RETURN retval ;
END
;;
DELIMITER ;

-- ----------------------------
-- Function structure for `dble_seq_nextval`
-- ----------------------------
DROP FUNCTION IF EXISTS `dble_seq_nextval`;
DELIMITER ;;
CREATE FUNCTION `dble_seq_nextval`(seq_name VARCHAR(64)) RETURNS varchar(64) CHARSET latin1
DETERMINISTIC
BEGIN
DECLARE retval VARCHAR(64);
```

```
DECLARE val BIGINT;
DECLARE inc INT;
DECLARE seq_lock INT;
set val = -1;
set inc = 0;
SET seq_lock = -1;
SELECT GET_LOCK(seq_name, 15) into seq_lock;
if seq_lock = 1 then
SELECT current_value + increment, increment INTO val, inc FROM DBLE_SEQUENCE WHERE name = seq_name for update;
if val != -1 then
UPDATE DBLE_SEQUENCE SET current_value = val WHERE name = seq_name;
end if;
SELECT RELEASE_LOCK(seq_name) into seq_lock;
end if;
SELECT concat(CAST((val - inc + 1) as CHAR),",",CAST(inc as CHAR)) INTO retval;
RETURN retval;
END
;;
DELIMITER ;

-- ----------------------------
-- Function structure for `dble_seq_setvals`
-- ----------------------------
DROP FUNCTION IF EXISTS `dble_seq_nextvals`;
DELIMITER ;;
CREATE FUNCTION `dble_seq_nextvals`(seq_name VARCHAR(64), count INT) RETURNS VARCHAR(64) CHARSET latin1
DETERMINISTIC
BEGIN
DECLARE retval VARCHAR(64);
DECLARE val BIGINT;
DECLARE seq_lock INT;
SET val = -1;
SET seq_lock = -1;
SELECT GET_LOCK(seq_name, 15) into seq_lock;
if seq_lock = 1 then
SELECT current_value + count INTO val FROM DBLE_SEQUENCE WHERE name = seq_name for update;
IF val != -1 THEN
UPDATE DBLE_SEQUENCE SET current_value = val WHERE name = seq_name;
END IF;
SELECT RELEASE_LOCK(seq_name) into seq_lock;
end if;
SELECT CONCAT(CAST((val - count + 1) as CHAR), ",", CAST(count as CHAR)) INTO retval;
RETURN retval;
END
;;
DELIMITER ;

-- ----------------------------
-- Function structure for `dble_seq_setval`
-- ----------------------------
DROP FUNCTION IF EXISTS `dble_seq_setval`;
DELIMITER ;;
CREATE FUNCTION `dble_seq_setval`(seq_name VARCHAR(64), value BIGINT) RETURNS varchar(64) CHARSET latin1
DETERMINISTIC
BEGIN
DECLARE retval VARCHAR(64);
DECLARE inc INT;
SET inc = 0;
SELECT increment INTO inc FROM DBLE_SEQUENCE WHERE name = seq_name;
UPDATE DBLE_SEQUENCE SET current_value = value WHERE name = seq_name;
SELECT concat(CAST(value as CHAR),",",CAST(inc as CHAR)) INTO retval;
RETURN retval;
END
;;
DELIMITER ;
```

1.7.2

bootstrap.cnf cluster.cnf

bootstrap.cnfinstanceIdinstance id [0,1023]

cluster.cnfsequenceStartTime YYYY-MM-dd HH:mm:ss 2010-10-04 09:42:54

bootstrap.cnfinstanceIddbledble
bigint63

1.7.3

bootstrap.cnf cluster.cnf

bootstrap.cnfinstanceIdinstance id [0,511] **cluster.cnfsequenceInstanceByZk**trueidzk

cluster.cnfsequenceStartTime YYYY-MM-dd HH:mm:ss 2010-10-04 09:42:54

1. cluster.cnfsequenceInstanceByZktruezookeeper(1.1 cluster.cnf)
2. **bootstrap.cnfinstanceId**dble
3. bigint63

1.7.4 offset-step

offset-stepsequence_conf.properties

this is comment
`schema1`.`table1`.MINID=1001
`schema1`.`table1`.MAXID=2000
`schema1`.`table1`.CURID=1000

`schema2`.`table2`.MINID=1001
`schema2`.`table2`.MAXID=20000
`schema2`.`table2`.CURID=1000

schemaXmysqldbledble

tableX mysqldble

1. zkMINID MAXID CURID
2. MINIDCURID1 MINID+1
3. MAXID - MINID + 1zookeeper
4. dblezookeeper 1.1 cluster.cnf

1.8 cache

- 1.8.1 cache
- 1.8.2 ehcache

1.8.1 cache

1.8.1.1 dblecache

dblecache

- SQLRouteCacheSQL schema_user_SQL -> RouteResult
- ER_SQL2PARENTIDSQLERjoinColumn(parentColumn)schema:select * from where parentKey = (value of joinColumn) -> shardingNode

1.8.1.2 dblecache

dblecache

- ehcache, ehcachecache
- leveldb leveldbcache
- mapdb MapDBcache
- rocksdbRocksDBcache

1.8.1.3 dblecache

dblecachecacheservice.properties

:

factory.**cache_type**=**cache_type**

keyvalue

A.SQL

pool.SQLRouteCache=**type**,**max_size**,**expire_seconds**

B.ER

pool.ER_SQL2PARENTID=**type**,**max_size**,**expire_seconds**

1.8.1.4 cache

a. #

b. factory.**cache_type**=**cache_type**cache **cache_type**cacheehcacheleveldbmapdb rocksdbcache cache

,

factory.encache=ehcache
pool.SQLRouteCache=encache,10000,1800
pool.ER_SQL2PARENTID=encache,1000,1800

typeehcache
factory.encache=ehcache
factory.leveldb=leveldb
pool.SQLRouteCache=**encache**,10000,1800
pool.ER_SQL2PARENTID=**leveldb**,1000,1800

typeencacheleveldb

c. pool.SQLRouteCache=**type**,**max_size**,**expire_seconds**pool.ER_SQL2PARENTID=**type**,**max_size**,**expire_seconds**SQLRouteCacheER_SQL2PARENTID **type** **max_size** **expire_seconds**

d. **default**

1.8.1.5

- RocksDB cache dble rocksdb dble

1.8.2 ehcache

ehcachecacheservice.propertiesehcache

1.8.2.1 ehcache

dble2.6.11.

1.8.2.2 ehcache

ehcacheehcache.xml

http://www.ehcache.org/documentation/ehcache-2.6.x-documentation.pdf

```
<ehcache xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="ehcache.xsd" maxEntriesLocalHeap="100000000"
 maxBytesLocalDisk="50G" updateCheck="false">
               <defaultCache maxElementsInMemory="1000000" eternal="false" overflowToDisk="false" diskSpoolBufferSizeMB="30" maxElementsOn
Disk="10000000" diskPersistent="false" diskExpiryThreadIntervalSeconds="120" memoryStoreEvictionPolicy="LRU"/>
</ehcache>
```

1.dbleehcachedefaultCachecache

2.maxEntriesLocalHeap

0 cacheservice.properties**max_size**cacheservice.properties **max_size**

3.timeToIdleSeconds

cacheservice.properties **expire_seconds**

4.dbledefaultCachecache

1.9

1.9.1

1.9.1.1

dble

1. dblesharding.xml class
2. dbleJava$DBLE_HOME/libjarjarclass
3. dblenamesetter—— 2dblesetPartitionCount()“2”
4. dbleselfCheck()
5. dbleinit()

1.9.1.2

SQLDBLESQL

1.9.1.3

9066SHOW @@ALGORITHM WHERE SCHEMA=? AND TABLE=?dblegetAllProperties()

```
mysql> show @@algorithm where schema=testdb and table=seqtest;
+-----------------+-----------------------------------------------------+
| KEY             | VALUE                                               |
+-----------------+-----------------------------------------------------+
| TYPE            | SHARDING TABLE                                      |
| COLUMN          | ID                                                  |
| CLASS           | com.actiontech.dble.route.function.PartitionByLong |
| partitionCount  | 2                                                   |
| partitionLength | 1                                                   |
+-----------------+-----------------------------------------------------+
5 rows in set (0.05 sec)
```

1.9.2

1.9.2.1

AbstractPartitionAlgorithmRuleAlgorithmAbstractPartitionAlgorithmTableConfigDBLE

DBLE DBLEDBLE

1. jarDBLEDBLE
2. DBLEAbstractPartitionAlgorithmRuleAlgorithmDBLEDBLE
3. DBLE

1.9.2.2

jar classlibraryjarclass

DBLE

1. jar$DBLE_HOME/lib
2. jarchownchmod$DBLE_HOME/libjar
3. sharding.xml classFully Qualified Namenet.john.dble.route.functions.NewFunction
4. DBLE

1.9.3

AbstractPartitionAlgorithmRuleAlgorithmcom.actiontech.dble.route.function.PartitionByLong

1.9.3.1 setters

sharding.xmlpartitionCountpartitionLength

```
<function name="hashmod" class="com">
  <property name="partitionCount">4</property>
  <property name="partitionLength">1</property>
</function>
```

dblepartitionCount4partitionLength1PartitionByLongsettersetPartitionCount()setPartitionLength()sharding.xmlXMLStringsetter

```
public void setPartitionCount(String partitionCount) {
  this.count = toIntArray(partitionCount);
    /* getAllProperties() */
  propertiesMap.put("partitionCount", partitionCount);
}

public void setPartitionLength(String partitionLength) {
  this.length = toIntArray(partitionLength);
    /* getAllProperties() */
  propertiesMap.put("partitionLength", partitionLength);
}
```

1.9.3.2 selfCheck()

dbleselfCheck()RuntimeExceptiondbleRuntimeExceptiondble

selfCheck()RuleAlgorithmAbstractPartitionAlgorithm

```
@Override
public void selfCheck() {
}
```

1.9.3.3 init()

dbleinit()

PartitionByLonginit()PartitionUtil

```
@Override
public void init() {
  partitionUtil = new PartitionUtil(count, length);

  initHashCode();
}
```

1.9.3.4 calculate()calculateRange()

dbleSQLSQLcalculate()calculateRange()SQL

IPOInput-Process-Outputcalculate()calculateRange()

- InputSQL
- OutputSQL
- ProcessInputOutput

calculate()calculateRange()

		Input	Output
calculate()	SQL ... WHERE sharding_key = 1	1String	1Integer
calculateRange()	SQL ... WHERE sharding_key BETWEEN 1 AND 5	2String	Integer

```
@Override
public Integer calculate(String columnValue) {
  try {
    if (columnValue == null || columnValue.equalsIgnoreCase("NULL")) {
      return 0;
    }
    long key = Long.parseLong(columnValue);
    return calculate(key);
  } catch (NumberFormatException e) {
    throw new IllegalArgumentException("columnValue:" + columnValue + " Please eliminate any quote and non number within it.", e);
  }
}

@Override
public Integer[] calculateRange(String beginValue, String endValue) {
  long begin = 0;
  long end = 0;
  try {
    begin = Long.parseLong(beginValue);
    end = Long.parseLong(endValue);
  } catch (NumberFormatException e) {
    return new Integer[0];
  }
  int partitionLength = partitionUtil.getPartitionLength();
  if (end - begin >= partitionLength || begin > end) { //TODO: optimize begin > end
    return new Integer[0];
  }
  Integer beginNode = calculate(begin);
  Integer endNode = calculate(end);

  if (endNode > beginNode || (endNode.equals(beginNode) && partitionUtil.isSingleNode(begin, end))) {
    int len = endNode - beginNode + 1;
    Integer[] re = new Integer[len];

    for (int i = 0; i < len; i++) {
      re[i] = beginNode + i;
    }
    return re;
  } else {
    int split = partitionUtil.getSegmentLength() - beginNode;
    int len = split + endNode + 1;
    if (endNode.equals(beginNode)) {
      //remove duplicate
      len--;
    }
    Integer[] re = new Integer[len];
    for (int i = 0; i < split; i++) {
      re[i] = beginNode + i;
    }
    for (int i = split; i < len; i++) {
      re[i] = i - split;
    }
    return re;
  }
}
```

1.9.3.5 getAllProperties()

dbledblegetAllProperties()<, >

getAllProperties()RuleAlgorithmAbstractPartitionAlgorithmpropertiesMap“propertiesMap”getAllProperties()setters<, >put()propertiesMap

```
@Override
public Map<String, String> getAllProperties() {
  return propertiesMap;
}
```

1.9.4

DBLEcom.actiontech.dble.route.functionsharding.xmlXMLRuleLoader7

date	PartitionByDate
enum	PartitionByFileMap
hash	PartitionByLong
jumpstringhash	PartitionByJumpConsistentHash
numberrange	AutoPartitionByLong
patternrange	PartitionByPattern
stringhash	PartitionByString

1.9.5 IntelliJ IDEA

1.9.5.0

1. java
2. dblereleasejar2.19.05.0 https://github.com/actiontech/dble/releases/download/2.19.05.0%2Ftag/actiontech-dble-2.19.05.0.tar.gzlibdblejar

1.9.5.1 java

javaProject

Projectjavanext

1.9.5.2 dble jar

javalib

dble jarlib

libdble jar

lib

1.9.5.3

1.9.5.4 Artifacts

Project StrcuctureArtifactsOK

1.9.5.5 Artifactsdble jardble jarApply/ok

1.9.5.6 jar

BuildBuild ArtifactsArtifactbuild

outartifactjar

1.10

- 3.23.08.0
  -
  -
  - sql_log
- 3.23.04.0
  -
- 3.22.11.0
  -
- 3.22.01.0
  -
  - dble_db_instance
- 3.21.06.0
  -
  -
  -
  - dble_thread_pool
- 3.21.02.0
  - sequence
  -
  -
- 3.20.07.0
  -

3.23.08.0

1

1.1 bootstrap.cnf

1.1.1 sql

	useSqlStat	**3.23.08**		**useSqlStat=0 samplingRate=0 useSqlStat=1 samplingRate=100**
	bufferUsagePercent	**3.23.08**		**80%sqluseSqlStat=1**
	clearBigSQLResultSetMapMs	**3.23.08**		**sqluseSqlStat=1 bufferUsagePercent**
	sqlRecordCount	**3.23.08**		**show @@sql.slow useSqlStat=1**
	samplingRate	**3.23.08**		**0100; 100%sqlsql_log**
	enableStatisticAnalysis	**3.23.08**		**show @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition**

2

2.1 sqlshow

show @@sqlshow @@sql.highshow @@sql.slow show@@sql.largeshow @@sql.resultSetshow @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition; reload @@sqlslow=?reload @@user_stat;

-
  1. 8show `useSqlStat` `samplingRate` sql_log
  2. show @@sqlshow @@sql.highshow @@sql.slowshow @@sql.largeshow @@sql.resultSet show @@sql1024sqlshow @@sql.high, 1024sql5 *N*1024sql N
  3. show @@sqlshow @@sql.highshow @@sql.slowshow @@sql.largeshow @@sql.resultSet true: show @@sql true; reload @@user_stat5
  4. show @@sql.slow reload @@sqlslow=?
-
  - show @@sqlshow @@sql.highshow @@sql.slowshow @@sql.largeshow @@sql.resultSet;

    1. 5sql_logsql_log `samplingRate` `sqlLogTableSize` show @@sql.xx
    2. `sqlLogTableSize` sql_log1024show @@sql.xxsql_logshow @@sql.xx1024
    3. show @@sql.xx true; `truncate sql_log`
    4. show @@sql.slow `sqlSlowTime` reload @@slow_query.time=?;
  - show @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition
    1. `enableStatisticAnalysis` , enable/disable @@statisticAnalysis 3show3sql_log

3 sql_log

result_size

3.23.04.0

1

dble3.23.04.0fakeMySQLVersion(in bootstrap.cnf)

Mysql,
MySQL
MySQL***5.7.20***<=<***8.0.0***>=***8.0.3***
1.fakeMySQLVersion5.7.20 mysql-version5.7.25
2.fakeMySQLVersion8.0.3 mysql-version8.0.23
3.fakeMySQLVersion5.7.15 mysql-version8.0.1

3.22.11.0

1

1.1 db.xml

	delayThreshold	**3.22.11**		

3.22.01.0

1

BusinessExecutorfrontWorkerbackendBusinessExecutorbackendWorkercomplexQueryExecutorcomplexQueryWorker writeToBackendExecutorwriteToBackendWorker BusinessExecutor00-frontWorkerbackendBusinessExecutor00-backendWorker writeToBackendExecutor00-writeToBackendWorker$_NIO_REACTOR_FRONT-00-NIOFrontRW$_NIO_REACTOR_BACKEND-00-NIOBackendRW

1. show @@threadpool;
2. show @@threadpool.task;
3. show @@thread_used;

2 dble_db_instance

- database_typedbInstance

3.21.06.0

1 dble

1.1 bootstrap.cnf

	inSubQueryTransformToJoininjoin	**3.21.06**	
	enableCursor false	**3.21.06**	

inSubQueryTransformToJoin

sqlinjoindbleinjoin
injoininjoinbootstrap.cnf-DinSubQueryTransformToJoin=true
injoin

enableCursor

client

client server server

prepared statement 4.4 prepared statement.

1.2 sharding.xml

	jumpStringHashhashSlice	**3.21.06**	

hashSlice, 0:-1,1.5 stringhash

3.21.060:0

jumpStringHash hashSlice,0:-1

2

dble3.21.06.0

zkvalue

zkvaluejson

```
 {
   "instanceName": "1", //bootstrap.cnf instanceName
   "apiVersion": 1, //
   "createdAt": 1628669627058, //
   "data": { …  } // json
 }
```

dble" `/{rootPath}/{clusterId}` "clusterId

> rootPathclusterId cluster.cnf
>
> dble "you may use old incompatible metadata."

3

1. log @@[file=logname limit=numberOfRow key=keyword regex=regex]
2. show @@syslog limit=?
3. file @@list
4. file @@show filename
5. file @@upload filename content

4 dble_thread_pool

- sizepool_size
- core_pool_size

3.21.02.0

1 sequence

dble3.21.02.0

zksequencekey-valuekeyvalue

zksequencekey-valuekeyvaluejson

sequence(rootPath/clusterId/conf/sequences) ZK

2 dble

3.21.02.0dblexml

dtdxmldbleDocumentBuilderxml

xsdxmldblejaxb2.0xml

xmldb.xml

```
<!DOCTYPE dble:db SYSTEM "db.dtd">sharding.xml<!DOCTYPE dble:sharding SYSTEM "sharding.dtd">user.xml<!DOCTYPE dble:user SYSTEM "user.dtd">
```

3 dble

3.1 bootstrap.cnf

	homePath	**3.21.02**		**bootstrap.cnfhomePath-DhomePath=.**

3.20.07.0

1

dble 3.20.07.0 2.20.04.0

dble_update_config2.20.04.0 3.20.07.02.20.04.0

```
dble_update_config [-i=read_dir] [-o=write_dir] [-p=rootPath]
```

read_dir/write_dir: rootPath:zk, `/dble` , ucore, `universe/dble`

:
myid.properties
wrapper.conf
server.xml
schema.xml
rule.xml
log4j2.xml
cacheservice.properties(option)
sequence_distributed_conf.properties for type3 (option)
sequence_time_conf.properties for type2 (option)

:
cluster.cnf
bootstrap.cnf
user.xml
db.xml
sharding.xml
log4j2.xml
cacheservice.properties(option)

db.xml
变更：
1 datahost->dbGroup
2 不再使用writehost和readhost， 而是统一命名为dbInstance， 增加primary的boolean属性来区分，各dbInstance平级
3 maxCon,minCon的属性配置下沉到实例， 其他连接池属性使用dbInstance下的property来声明，默认可不配置。
4.writehost/readHost的属性host改成name
5.移除 tempReadHostAvailable功能。默认为读可持续
6. 池的心跳处理，周期及配置放在dbGroup级别，各个周期可不同
7.balance->rwSplitMode
8.keepOrig->disableHA
9. slaveThreshold->delayThreshold
10.weight->readWeight
备注：
当前池级别的心跳用处
1.快速拦截流量，可配置敏感程度
2.延迟检测，需要特殊心跳设置
3.查看是否read only，需要特殊心跳设置
dbInstance
name（原host）
*id
url
user
password
primary
minCon
maxCon
* usingDecrypt
* readWeight
* disabled
write 1:1
read n:1
dbGroup
name
* rwSplitMode
* disableHA
* delayThreshold
* heartbeat
1:n
1:1
sharding.xml
childTable
name
joinColumn
parentColumn
* incrementColumn
* sqlMaxLimit
N;1
shardingTable
name
shardingNode
shardingColumn
function
* incrementColumn
* sqlMaxLimit
* sqlRequiredSharding
N : 1
function
name
+ property
m:n
m:n
globalTable
name
shardingNode
* checkClass
* cron
* sqlMaxLimit
变更：
1.rule.xml删除，function保留，拆分表直接增加shardingColumn列来标识
2. table拆分三类，globalTable，singleTable和sharding table
3.cacheKey功能废弃
4.shardingTable/childTable属性名字由xxKey改为xxColumn
5.废弃globalCheck,.其他两个配置已经能表达含义了,globalCheckClass->checkClass
6.ruleRequired更名为sqlRequiredSharding
7.needAddLimit更名为sqlMaxLimit，默认继承schema，如果-1表示不限制
1:n
singleTable
name
shardingNode
* sqlMaxLimit
shardingNode
name
dbGroup
database
1:1
schema
name
* shardingNode
* sqlMaxLimit
m:n
1:1
user.xml
变更：
1.用户分三类，管理用户，读写分离用户以及分库用户
2.whitehosts较简单，所以冗余在用户内部更合适。
3.增加租户字段，可选，登陆时候检查连接字符串
4.管理用户 审计时需要多个（未来审计）
readonly表示只监控，不配默认可以运维
rwSplitUser
name
* tenant
dbGroup
password
* usingDecrypt
* whiteIPs
* blacklist
* maxCon
managerUser
name
password
* usingDecrypt
* whiteIPs
* readonly
* maxCon
shardingUser
name
* tenant
schemas
password
* usingDecrypt
* whiteIPs
* blacklist
* maxCon
* readonly
* privileges系列
blacklist
name
略
变更
1.连接池有效性心跳移到连接池配置中
2.连接池内部连接的有效性委托连接池处理
3.组级别的配置和myid.properties合并， 更名cluster.cnf
3.1cluster裂变为clusterEnable和clusterMode
3.2ipAddress->clusterIP,port->clusterPort,clusterId->clusterId,clusterHa->needSyncHa
3.3 myid下沉到bootstrap.cnf的instanceName
3.4 serverID沉到bootstrap.cnf的serverID
4.实例级别的配置都放在bootstrap.cnf里，被wrapper.conf引用，wrapper.conf 放在bin下
bootstrap.cnf还包含JVM参数
5.部分可动态变更的参数， 放在 bootstrap.dynamic.cnf,读的时候覆盖bootstrap.cnf
cluster.cnf
Group Parameters整组运维/不可变动
showBinlogStatusTimeout，
sequenceHandlerType
原myid.properties的集群部分，见上面备注
原自增序列的时间戳方式部分配置，参见全局序列章节
增加rootPath
bootstrap.cnf
Instance Parameters实例重启变动生效
* 后端连接socket 配置
* 前端连接socket 配置
* Session预留内存配置
* 堆外内存管理
系统服务基本参数（除了在组配置中的）
* 表结构一致性检查
* processor内部前后端连接检查
* 普通事务日志相关
* 视图相关参数
* XA 事务
* 队列大小参数
* 使用Nest Loop优化
* load data 相关配置
* 统计管理
连接缺省值
* 功能性配置
fakeMySQLVersion
useOuterHa
DBLE_HOME->homePath
增加instanceName对应原myid.properties的myid，并且取代serverNodeId原配置
增加instanceId对应自增序列的实例id配置
增加serverId用于告警
bootstrap.dynamic.cnf
Dynamic Parameters
通过运维命令变动，未来支持多值和落盘
* 慢查询日志相关配置
* 流量控制相关参数
* 告警开关
enableAlert
enableSlowLog
flushSlowLogPeriod
flushSlowLogSize
sqlSlowTime
enableFlowControl
flowControlStartThreshold
flowControlStopThreshold

1.11

-
  -
  -
  - Interface Alert
  -
-
  -
  -
  -
-

1.11.1

1.11.1.1

dble

1. dble
2. AlertGeneralConfigdble_alert.properties
3. alert
4. dble
5. dble

1.11.1.2

dble

-
-

“”dbleXA
“”dblexa

dble

- dble
- dble

“dble”dblekill “dble”dble

dble

- -dble
- -dble
- -dble
- -dble

dble

- dble
- dble
- dble
- dble

1.11.1.3 Interface Alert

```
public interface Alert {
    void alertSelf(ClusterAlertBean bean);
    void alert(ClusterAlertBean bean);
    boolean alertResolve(ClusterAlertBean bean);
    boolean alertSelfResolve(ClusterAlertBean bean);
    void alertConfigCheck() throws Exception;
}
```

alertConfigCheck

- alert --- dble
- alertSelf --- dble
- alertResolve --- dble
- alertSelfResolve --- dble

dble
alertalertSelfalertClusterAlertBeanalertComponentTypealertComponentIdalertSelfDBLEserverAlert alertResolvealertSelfResolve

1.11.1.4

```
public class ClusterAlertBean {
    String code;                //
    String level;               //
    String desc;                //
    String sourceComponentType; //
    String sourceComponentId;   //ID
    String alertComponentType;  //
    String alertComponentId;    //ID
    String serverId;            //ID
    long timestampUnix;         //
    long resolveTimestampUnix;  //
     Map<String, String> labels; //
    }
```

dble

1.11.2

1.11.2.1

dbledble

- dbleAlert
- dbledble
- dbleAlert
- dble“”“”“”“”

dble ------Alert

IDEA

1 java

java

2 copylib

javamailjar

3.1 Alert

```
    public MailAlert() {
        //init the mail data and read config file
        properties = AlertGeneralConfig.getInstance().getProperties();
    }
```

AlertMailAlertAlertGeneralConfig.getInstance().getProperties();dble(dble_alert.properties) dble_alert.propertiesAlertkey

3.2 Alert

```
    @Override
    public void alertConfigCheck() throws ConfigException {
        //check if the config is correct
        if (properties.getProperty(MAIL_SENDER) == null
                || properties.getProperty(SENDER_PASSWORD) == null
                || properties.getProperty(MAIL_SERVER) == null
                || properties.getProperty(MAIL_RECEIVE) == null) {
            throw new ConfigException("alert check error, for some config is missing");
        }
    }
```

dble_alert.propertiesMAIL_SENDERSENDER_PASSWORDMAIL_SERVERMAIL_RECEIVE dble

```
properties.getProperty(MAIL_RECEIVE)
```

3.3

send

```
    private boolean sendMail(boolean isResolve, ClusterAlertBean clusterAlertBean) {
        try {
            Properties props = new Properties();
            props.setProperty("mail.debug", "true");
            props.setProperty("mail.smtp.auth", "true");
```

```
            props.setProperty("mail.host", properties.getProperty(MAIL_SERVER));
            props.setProperty("mail.transport.protocol", "smtp");

            MailSSLSocketFactory sf = new MailSSLSocketFactory();
            sf.setTrustAllHosts(true);
            props.put("mail.smtp.ssl.enable", "true");
            props.put("mail.smtp.ssl.socketFactory", sf);

            Session session = Session.getInstance(props);

            Message msg = new MimeMessage(session);
            msg.setSubject("DBLE " + (isResolve ? "RESOLVE\n" : "ALERT\n"));
            StringBuilder builder = new StringBuilder();
            builder.append(groupMailMsg(clusterAlertBean, isResolve));
            msg.setText(builder.toString());
            msg.setFrom(new InternetAddress(properties.getProperty(MAIL_SENDER)));

            Transport transport = session.getTransport();
            transport.connect(properties.getProperty(MAIL_SERVER), properties.getProperty(MAIL_SENDER), properties.getProperty(SENDER_PASS
WORD));

            transport.sendMessage(msg, new Address[]{new InternetAddress(properties.getProperty(MAIL_RECEIVE))});
            transport.close();
            //send EMAIL SUCCESS return TRUE
            return true;
        } catch (Exception e) {
            e.printStackTrace();
        }
        //send fail reutrn false
        return false;
    }

      private String groupMailMsg(ClusterAlertBean clusterAlertBean, boolean isResolve) {
            StringBuffer sb = new StringBuffer("Alert mail:\n");
            sb.append("         Alert type:" + clusterAlertBean.getCode() + " " + (isResolve ? "RESOLVE\n" : "ALERT\n"));
            sb.append("         Alert message:" + clusterAlertBean.getDesc() + "\n");
            sb.append("         Alert componnent:" + clusterAlertBean.getAlertComponentType() + "\n");
            sb.append("         Alert componnentID:" + clusterAlertBean.getAlertComponentId() + "\n");
            sb.append("         Alert source:" + clusterAlertBean.getAlertComponentId() + "\n");
            sb.append("         Alert server:" + clusterAlertBean.getServerId() + "\n");
            sb.append("         Alert time:" + TimeStamp2Date(clusterAlertBean.getTimestampUnix()) + "\n");
            String detail = "|";
            if (clusterAlertBean.getLabels() != null) {
                for (Map.Entry<String, String> entry : clusterAlertBean.getLabels().entrySet()) {
                    detail += entry.getKey() + ":" + entry.getValue();
                }
            }
            sb.append("         Other detail:" + detail + "|\n");
            return sb.toString();
        }
```

javaproperties groupMailMsgclusterAlertBean

3.4

```
@Override
    public void alertSelf(ClusterAlertBean clusterAlertBean) {
        alert(clusterAlertBean.setAlertComponentType(COMPONNENT_TYPE).setAlertComponentId(properties.getProperty(COMPONNENT_ID)));
    }

    @Override
    public void alert(ClusterAlertBean clusterAlertBean) {
        clusterAlertBean.setSourceComponentType(COMPONNENT_TYPE).
                setSourceComponentId(properties.getProperty(COMPONNENT_ID)).
                setServerId(properties.getProperty(SERVER_ID)).
                setTimestampUnix(System.currentTimeMillis() * 1000000);
        sendMail(false, clusterAlertBean);
    }

    @Override
    public boolean alertResolve(ClusterAlertBean clusterAlertBean) {
        clusterAlertBean.setSourceComponentType(COMPONNENT_TYPE).
                setSourceComponentId(properties.getProperty(COMPONNENT_ID)).
                setServerId(properties.getProperty(SERVER_ID)).
                setTimestampUnix(System.currentTimeMillis() * 1000000);
        return sendMail(true, clusterAlertBean);
    }
```

```
    @Override
    public boolean alertSelfResolve(ClusterAlertBean clusterAlertBean) {
        return alertResolve(clusterAlertBean.setAlertComponentType(COMPONNENT_TYPE).setAlertComponentId(properties.getProperty(COMPONNENT_
ID)));
    }
```

3.5 jar

idea File->Project Structure..

dblejarjarjardblejar

IDEA Build->Build Artifacts..outjar

1.11.2.2

jar

- jardblelib
- dble_alert.properties,alert
- dble lib dble_alert.properties,

```
alert=com.actiontech.addtionAlert.MailAlert
mail_sender=123456798@qq.com
sender_pass=qwertyuiop
mail_server=smtp.qq.com
mail_receive=yyyyyyyyyyy@actionsky.com
server_id=dble-server-001
componnent_id=DBLE-FOR-XXX-01
```

dblecom.actiontech.addtionAlert.MailAlert

1.11.2.3

jar

1.11.3 dbleCODE

DBLE_WRITE_TEMP_RESULT_FAIL		/
DBLE_XA_RECOVER_FAIL	XA	/
XA_READ_XA_STREAM_FAIL	XA	/
DBLE_XA_READ_DECODE_FAIL	XA	/
DBLE_XA_READ_IO_FAIL	XA	/
DBLE_XA_WRITE_IO_FAIL	XA	/
DBLE_XA_WRITE_CHECK_POINT_FAIL	XA	/
DBLE_XA_BACKGROUND_RETRY_FAIL	XA	/
DBLE_REACH_MAX_CON		/
DBLE_TABLE_NOT_CONSISTENT_IN_SHARDINGS		/
DBLE_TABLE_NOT_CONSISTENT_IN_MEMORY	dble	/
DBLE_GLOBAL_TABLE_NOT_CONSISTENT		/
DBLE_CREATE_CONN_FAIL	mysql	/
DBLE_DB_INSTANCE_CAN_NOT_REACH		/
DBLE_KILL_BACKEND_CONN_FAIL	Kill	/
DBLE_NIOREACTOR_UNKNOWN_EXCEPTION	NIO	/
DBLE_NIOREACTOR_UNKNOWN_THROWABLE	NIO	/
DBLE_NIOCONNECTOR_UNKNOWN_EXCEPTION	NIO	/
DBLE_TABLE_LACK		/
DBLE_GET_TABLE_META_FAIL		/
DBLE_TEST_CONN_FAIL		/
DBLE_HEARTBEAT_FAIL		/
DBLE_SHARDING_NODE_LACK	shardingNode	/
DBLE_AP_NODE_LACK	apNode	/
DBLE_XA_SUSPECTED_RESIDUE	Xaid	/
DBLE_DB_SLAVE_INSTANCE_DELAY	delayThreshold	/
DBLE_XA_BACKGROUND_RETRY_STOP	XAxaRetryCount	/
SLOW_QUERY_QUEUE_POLICY_ABORT	slowQueueOverflowPolicy1	/
SLOW_QUERY_QUEUE_POLICY_WAIT	slowQueueOverflowPolicy2	/
DBLE_THREAD_SUSPECTED_HANG	TimerTimerSchedulerhang	/

-
-
  - getCountSQL
  - getFetchCols
  - resultEquals
  - failResponse
  - resultResponse
-
-

dbletable_atable_a

-
-

dbletable_a

dbletable_a

- reloadCronScheduler
- GlobalCheckJob
- GlobalCheckJobSQL
  - checkerSQL
  - shardingNodeSQL
- SQLSQLSQLMySQL
- SQL()
- SQLcheckResults
- checkerSQL
- SQL()failResponseSQL()resultResponse

1.SQLString getCountSQL(String dbName, String tName)

SQL
SQLMySQLdatabase
SQL

```
public String getCountSQL(String dbName, String tName) {
      //tablechecksum
      return "checksum table " + tName;
```

```
  }
```

2. getFetchCols()

SQL

list

```
public String[] getFetchCols() {
   //checksumChecksum
   // mysql> checksum table suntest;
   //+-------------+----------+
   //| Table     | Checksum |
   //+-------------+----------+
   //| db1.suntest |1290812451|
   //+-------------+----------+
   //returnChecksum
      return new String[]{"Checksum"};
  }
```

3.SQL boolean resultEquals(result1,result2)

resultresult1,result2

```
SQLQueryResult<List<Map<String, String>>> result

result
     |
     ------ row(List)
                    |
              -------Key-Value(Field-Value)
checksum
result
     |
     ------ row(List<1> checksum table suntest)
                    |
            ------Key-Value(checksum - 1290812451 getFetchCols)
```

list

```
public boolean resultEquals(SQLQueryResult<List<Map<String, String>>> or, SQLQueryResult<List<Map<String, String>>> cr) {
        //checksum
        //
        Map<String, String> oresult = or.getResult().get(0);
        Map<String, String> cresult = cr.getResult().get(0);
        //Mapchecksum
        return (oresult.get("Checksum") == null && cresult.get("Checksum") == null) ||
                (oresult.get("Checksum") != null && cresult.get("Checksum") != null &&
                        oresult.get("Checksum").equals(cresult.get("Checksum")));
    }
```

4. failResponse(resultList)

//

```
public void failResponse(List<SQLQueryResult<List<Map<String, String>>>> res) {
        //
        ////
        String errorMsg = "Global Consistency Check fail for table :" + schema + "-" + tableName;
        System.out.println(errorMsg);
        for (SQLQueryResult<List<Map<String, String>>> r : res) {
            System.out.println("Checksum is : " + r.getResult().get(0).get("Checksum"));
        }
    }
```

5. void resultResponse(errorList)

//
()

```
public void resultResponse(List<SQLQueryResult<List<Map<String, String>>>> elist) {
        //SQLlistSQL
        //SQLSQL
        //
        String tableId = schema + "." + tableName;

        if (elist.size() == 0) {
            System.out.println("Global Consistency Check success for table :" + schema + "-" + tableName);
        } else {
            System.out.println("Global Consistency Check fail for table :" + schema + "-" + tableName);
            StringBuilder sb = new StringBuilder("Error when check Global Consistency, Table ");
            sb.append(tableName).append(" shardingNode ");
            for (SQLQueryResult<List<Map<String, String>>> r : elist) {
                System.out.println("error node is : " + r.getTableName() + "-" + r.getShardingNode());
                sb.append(r.getShardingNode()).append(",");
            }
            sb.setLength(sb.length() - 1);
        }
    }
```

1 java

2 copylib

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
global_customized
dble-2.19.11.0.jar
Project
CheckSumTest.java
global_customized C:\workspace\global_customized
.idea
src
customized
CheckSumTest
dble-2.19.11.0.jar
global_customized.iml
External Libraries
package customized;
public class CheckSumTest {
Create Library
Name:
dble-2.19.11.0
Level:
Project Library
Add to module:
global_customized
OK
Cancel

3 5

global_customized C:\workspace\global_customized
.idea
lib
dble-2.19.11.0.jar
out
src
CustomizeTest
global_customized.iml
External Libraries
import com.actiontech.dble.backend.datasource.check.AbstractConsistencyChecker;
import com.actiontech.dble.sqlengine.SQLQueryResult;
import java.util.List;
import java.util.Map;
public class CustomizeTest extends AbstractConsistencyChecker {
@Override
public String[] getFetchCols() {
return new String[0];
}
@Override
public String getCountSQL(String s, String s1) {
return null;
}
@Override
public boolean resultEquals(SQLQueryResult<List<Map<String, String>>> sqlQueryResult, SQLQueryResult<
return false;
}
@Override
public void failResponse(List<SQLQueryResult<List<Map<String, String>>>> list) {
}
@Override
public void resultResponse(List<SQLQueryResult<List<Map<String, String>>>> list) {
}
}
按照自身的需要个实现这几个方法

4 jar

5 jar

schema.table

:reload

```
<!--dbleCHECKSUM-->
<globalTable name="tb_global1" shardingNode="dn1,dn2" cron = "0 * * * * ?" globalCheckClass="CHECKSUM"/>

<!--dbleCOUNT-->
<globalTable name="tb_global2" shardingNode="dn1,dn2" cron = "0 * * * * ?" globalCheckClass="COUNT"/>

<!--CustomizeTest-->
<globalTable name="tb_global3" shardingNode="dn1,dn2" cron = "0 * * * * ?" globalCheckClass="CustomizeTest"/>
```

jardblejaralgorithmlibdblejavajarjardble

jardblereload

1.13 Schema

1.13.1

3000+pocschemaschema

1.13.2

```
<!-- schema default multi shardingNode[dn1,dn2] and split algorithm[func_common_hash];
In multi shardingNode, loaded tables are called 'default sharding tables'; In fact, equivalent to shardingTable;
But, it is not recommended to configure the Sharding table in the production environment -->
<schema name="testdb3" shardingNode="dn1,dn2" function="func_common_hash"/>
```

1.13.3

1.13.3.1

```
<schema name="TESTDB0" shardingNode="dn9,dn10" function="func_common_hash" sqlMaxLimit="100">
        <shardingTable name="tableA" shardingNode="dn1,dn2" function="func_common_hash" shardingColumn="c1"/>
</schema>
```

1.13.3.2

```
CREATE TABLE `tableA` (
  `c1` int(11) ,
  `c2` varchar(200) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8;

CREATE TABLE `tableB` (
  `c1` int(11) auto_increment,
  `c2` varchar(200) DEFAULT NULL,
  `c3` int(11) ,
  `c4` int(11) ,
  `c5` int(11) ,
  `c6` int(11) ,
  INDEX indexs (c5,c6),
  unique KEY (`c4`),
  KEY `index1` (`c3`),
  primary KEY (`c1`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8;
```

1.13.3.3

- **Dble**
- **shardingNodefunction**shardingTableshardingNodefunction
- schemaDble
  -
    - DDL `create table` DDL
    - (/reload) `show creata table`
  - (auto_increment)->->->id->; (function); tableB'c4'
  - DDL(`reload @@metadata`)()
- **View**schemaschemaDbleView
- **DML&DDL**shardingTable
- (reload)(bootstrap.cnf `-DcheckTableConsistency=1`)
  - shardingNodeDble
  - shardingNodeDble: `has been lost, will remove his metadata`
- **reload**
  - `reload @@metadata [where schema=? [and table=?]]`
  - `reload @@config_all [-s] [-f] [-r]` ()
-
  - dble_schemafunction
  - dble_tabledble_table_sharding_nodedble_sharding_tableid'FC'schema('FC'ididDblereloadid)

```
mysql> select * from dble_schema;
+---------+---------------+------------------+---------------+
| name    | sharding_node | function         | sql_max_limit |
```

```
+---------+---------------+------------------+---------------+
| TESTDB0 | dn9,dn10      | func_common_hash |           100 |
+---------+---------------+------------------+---------------+
1 row in set (0.00 sec)

mysql> select * from dble_table;
+------+--------+---------+-----------+----------+
| id   | name   | schema  | max_limit | type     |
+------+--------+---------+-----------+----------+
| C1   | tableA | TESTDB0 |       100 | SHARDING |
| FC2  | tableB | TESTDB0 |       100 | SHARDING |
+------+--------+---------+-----------+----------+
2 rows in set (0.00 sec)

mysql> select * from dble_table_sharding_node;
+------+---------------+-------+
| id   | sharding_node | order |
+------+---------------+-------+
| C1   | dn1           |     0 |
| C1   | dn2           |     1 |
| FC2  | dn9           |     0 |
| FC2  | dn10          |     1 |
+------+---------------+-------+
4 rows in set (0.01 sec)

mysql> select * from  dble_sharding_table;
+------+------------------+-----------------+-----------------------+------------------+
| id   | increment_column | sharding_column | sql_required_sharding | algorithm_name   |
+------+------------------+-----------------+-----------------------+------------------+
| C1   | NULL             | C1              | false                 | func_common_hash |
| FC2  | NULL             | C4              | false                 | func_common_hash |
+------+------------------+-----------------+-----------------------+------------------+
2 rows in set (0.00 sec)
```

2.

- 2.0
- 2.1
  - 2.1.1 select
  - 2.1.2 set
  - 2.1.3 show
  - 2.1.4 switch
  - 2.1.5 kill
  - 2.1.6 stop
  - 2.1.7 reload
  - 2.1.8 rollback
  - 2.1.9 offline
  - 2.1.10 online
  - 2.1.11 file
  - 2.1.12 log
  - 2.1.13
  - 2.1.14 pause & resume
  - 2.1.15
  - 2.1.16 /
  - 2.1.17 check @@metadata
  - 2.1.18 release @@reload_metadata
  - 2.1.19 split
  - 2.1.20 flow_control
  - 2.1.21
  - 2.1.22
- 2.2
  - 2.2.1 MySQL offset-step
  - 2.2.2
  - 2.2.3
  - 2.2.4 offset-step
- 2.3
- 2.4
- 2.5
  - 2.5.1 XA
  - 2.5.2 XA
  - 2.5.3 XA
  - 2.5.4 XA
  - 2.5.5
  - 2.5.6 XA
- 2.6
- 2.7
- 2.8 &
- 2.9 grpc
- 2.10 meta
  - 2.10.1 Meta
  - 2.10.2 Meta
  - 2.10.3
  - 2.10.4 View Meta
- 2.11
  - 2.11.1
  - 2.11.2
  - 2.11.3
  - 2.11.4
  - 2.11.5 heartbeat
  - 2.11.6
  - 2.11.7 sql
- 2.12
- 2.13
- 2.14 ER
- 2.15 global
- 2.16
- 2.17
- 2.18
- 2.19 reload
- 2.20

- 2.21 SQLtrace
- 2.22 KILL @@DDL_LOCK
- 2.23
- 2.24
- 2.25
- 2.26 client_found_rows
- 2.27 general
- 2.28 sql
- 2.29 load data
- 2.30 injoin
- 2.31 DDL
- 2.32
- 2.33 hint
- 2.34
- 2.35
- 2.36
- 2.37
- 2.38 tcp
- 2.39 HTAP
- 2.40 dble(printkillrecover)

2.0 dble_information

2.0.0

dble_information dbledbleuse dble_information
:
(select)
(where)
(join)
where

use dble_information
show tables [like]
desc|describe table xxx
show databases; show @@database
INSERT/UPDATE/DELETE

2.0.1 dble_information

2.0.1.0 version

- version
- dble
-

version	true	

-
```
- dble
```

2.0.1.1 dble_variables

- dble_variables
-
-

variable_name	true	
variable_value		
comment		
read_only		

-
```
- version_comment
- isOnline:
- heap_memory_max (mb)
- direct_memory_max: -XX:MaxDirectMemorySize

show @@sysparam
```

2.0.1.2 dble_status

- dble_status
-
-

variable_name	true	
variable_value		
comment		

-

```
- uptime: dble()
- current_timestamp: dble
- startup_timestamp: dble
- heap_memory_max:
- heap_memory_used:
- heap_memory_total:
- config_reload_timestamp: config
- direct_memory_max: -XX:MaxDirectMemorySize
- direct_memory_pool_size: bufferpoolpagesizebufferpoolpagenumber
- direct_memory_pool_used: directmemory
- questions:
- transactions:
```

2.0.1.3 thread pool

2.0.1.3.1 dble_thread_pool

- dble_thread_pool
-
-

name	true	
pool_size		
core_pool_size		
active_count		
waiting_task_count		(,)

-
- active_count/waiting_task_count dble frontWorkerwriteToBackendWorker "" "" dble_thread_pool_task

2.0.1.3.2 dble_thread_pool_task

- dble_thread_pool_task
-
-

name	true	
pool_size		
active_task_count		
task_queue_size		(,)
completed_task		
total_task		

-

2.0.1.4 dble_processor

- dble_processor
- processor
-

name	true	
type		(session/backend)
conn_count		
conn_net_in		()
conn_net_out		()

-

2.0.1.5 dble_sharding_node

- dble_sharding_node
- sharding_node
-

name	true	
db_group		db_group
db_schema		db_schema
pause		

-

2.0.1.6 dble_db_group

- dble_db_group
- db_group
-

name	true	
heartbeat_stmt		sql
heartbeat_timeout		()
heartbeat_retry		
rw_split_mode		
delay_threshold		
disable_ha		
active		

-

2.0.1.7 dble_db_instance

- dble_db_instance
- db_instance
-

name	true	
db_group	true	db_group
addr		
port		
primary		
user		
password_encrypt		
encrypt_configured		
active_conn_count		
idle_conn_count		
read_conn_request		
write_conn_request		
disabled		disabled
last_heartbeat_ack_timestamp		
last_heartbeat_ack		init/ok/error/timeout
heartbeat_status		idle/checking
heartbeat_failure_in_last_5min		5,
min_conn_count		
max_conn_count		

read_weight		
db_district		mysql
db_data_center		mysql
id		id
connection_timeout		
connection_heartbeat_timeout		
test_on_create		
test_on_borrow		
test_on_return		
test_while_idle		
time_between_eviction_runs_millis		
evictor_shutdown_timeout_millis		
idle_timeout		
heartbeat_period_millis		
flow_high_level		
flow_low_level		

-

2.0.1.8 dble_schema

- dble_schema
- schema
-

name	true	
sharding_node		dble_sharding_node
ap_node		dble_ap_node
function		
sql_max_limit		
logical_create_and_drop		trueschema

-

2.0.1.9 session_variables

- session_variables
-
-

session_conn_id	true	id
variable_name	true	
variable_value		
variable_type		(sys/user)

-

```
- tx_read_only(mysql8.0)
- transaction_read_only(mysql5.7)
- character_set_client
- collation_connection
- character_set_results
- tx_isolation_level(mysql8.0)
- transaction_isolation (mysql5.7)
- autocommit
-
```

2.0.1.10 session_connections

- session_connections
-
-

session_conn_id	true	id
remote_addr		
remote_port		
local_port		
processor_id		id
user		
tenant		
schema		schema? (/)
sql		sql(10241024)
sql_execute_time		sql, sql(ms)20ms
sql_start_timestamp		sql
sql_stage		,finished
conn_net_in		
conn_net_out		
conn_estab_time		()
conn_recv_buffer		() (, ,)
conn_send_task_queue		() (,)
conn_recv_task_queue		() (,)
in_transaction		
xa_id		xid, XA
entry_id		id

-

2.0.1.11 backend_variables

- backend_variables
-
-

backend_conn_id	true	id
variable_name	true	
variable_type		(sys/user)

-

```
- tx_read_only, (mysql8.0)
- transaction_read_only, (mysql5.7)
- character_set_client,
- collation_connection,
- character_set_results,
- tx_isolation_level, (mysql8.0)
- transaction_isolation, (mysql5.7)
- autocommit,
-
```

2.0.1.12 backend_connections

- backend_connections
-
-

backend_conn_id	true	id
db_group_name		db
db_instance_name		db
remote_addr		
remote_port		
remote_processlist_id		mysqlid
local_port		
processor_id		id
user		
schema		schema? (/)
session_conn_id		id,
sql		sql(10241024)
sql_execute_time		sql20ms
mark_as_expired_timestamp		, ,
conn_net_in		
conn_net_out		
conn_estab_time		()
borrowed_from_pool		()
state		
conn_recv_buffer		() (, ,)
conn_send_task_queue		() (,)
used_for_heartbeat		
conn_closing		
xa_status		xa
in_transaction		

-

2.0.1.13 dble_table

2.0.1.13.0 dble_table

- dble_table
- table
-

id	true	tableCschemamysqltableMschemamysqltableFC
name		
schema		schema
max_limit		
type		global/single/sharding/child/no sharding

-
  nameschema
-

2.0.1.13.1 dble_global_table

- dble_global_table
-
-

id	true	dble_tableid
check		
checkClass		class
cron		

-

2.0.1.13.2 dble_sharding_table

- dble_sharding_table
-
-

id	true	dble_tableid
increment_column		
sharding_column		
sql_required_sharding		sqlRequiredSharding
algorithm_name		

-

2.0.1.13.3 dble_child_table

- dble_child_table
-
-

id	true	dble_tableid
parent_id		id
increment_column		
join_column		
paren_column		

-

2.0.1.13.4 dble_table_sharding_node

- dble_table_sharding_node
- sharding_node
-

id	true	dble_tableid
sharding_node	true	
order		sharding_node(0)

-

2.0.1.14 dble_algorithm

- dble_algorithm
-
-

name	true	
key	true	
value		
is_file		mapfiletruefilefalsecontentmapfile1024

-

2.0.1.15 dble_entry

2.0.1.15.0 dble_entry

- dble_entry

- (+)
-

id	true	
type		(username/conn_attr),
user_type		//sharding
username		
password_encrypt		
encrypt_configured		
conn_attr_key		tenant
conn_attr_value		
white_ips		
readonly		-
max_conn_count		
blacklist		

-

2.0.1.15.1 dble_entry_schema

- dble_entry_schema
- schema
-

id	true	dble_entryid
schema	true	schema

-

2.0.1.15.2 dble_rw_split_entry

- dble_rw_split_entry
- schema
-

id	true	
type		(username/conn_attr),
username		
password_encrypt		
encrypt_configured		
conn_attr_key		tenant
conn_attr_value		
white_ips		
max_conn_count		
blacklist		
db_group		db_group

- usernameconn_attr_keyconn_attr_value
-

2.0.1.15.3 dble_entry_table_privilege

- dble_entry_table_privilege
- privilege
-

id	true	dble_entryid
schema	true	schema
table	true	table
exist_metas		tabledble
insert		insert
update		update
select		select
delete		delete
is_effective		

-

2.0.1.16 dble_blacklist

- dble_blacklist
-
-

name	true	
property_key	true	key
property_value		value
user_configured		

-

2.0.1.17 processlist

- processlist
- (NULL)
-

front_id	true	id
db_instance		name
mysql_id	true	mysql id
user		
front_host		
mysql_db		mysql 'show processlist' db
command		mysql mysql 'show processlist' command
time		mysqlstate mysql 'show processlist' time
state		mysql mysql 'show processlist' state
info		mysql mysql 'show processlist' info

- (show @@processlist)

2.0.1.18 dble_thread_usage

- dble_thread_usage
-
-

thread_name	true	
last_quarter_min		15s
last_minute		1min
last_five_minute		5min

- (show @@thread_used;)

2.0.1.19 dble_reload_status

- dble_reload_status
- reload
-

index	true	reload[RL]
cluster		dble
reload_type		reload reload_matadata/reload_all/manager_insert/manager_update/mamager_delete
reload_status		reload not_reloading/self_reload/meta_reload/waiting_others
last_reload_start		
last_reload_end		
trigger_type		local_command/cluster_notify
end_type		

- (show @@reload_status)

2.0.1.20 dble_xa_session

- dble_xa_session
- xa
-

front_id	true	id
xa_id		xaid
xa_state		xa
sharding_node	true	xasharding_node,

- (show @@session.xa)

2.0.1.21 dble_ddl_lock

- dble_ddl_lock
- dbleddl
-

schema	true	schema
table	true	table
sql		ddl sql

- (show @@ddl)

2.0.1.22 sql_statistic_by_frontend_by_backend_by_entry_by_user

- sql_statistic_by_frontend_by_backend_by_entry_by_user
- sql
-

entry	true	dble_entryid
user	true	
frontend_host	true	ip
backend_host	true	ip
backend_port	true	
sharding_node	true	
tx_count	false	

tx_rows	false	
tx_time	false	
sql_insert_count	false	insert
sql_insert_rows	false	insert
sql_insert_time	false	insert
sql_update_count	false	update
sql_update_rows	false	update
sql_update_time	false	update
sql_delete_count	false	delete
sql_delete_rows	false	delete
sql_delete_time	false	delete
sql_select_count	false	select
sql_select_rows	false	dble
sql_select_time	false	select
last_update_time	false	

-

```
mysql> select  * from sql_statistic_by_frontend_by_backend_by_entry_by_user;
+-------+------+---------------+--------------+--------------+---------------+-------------+----------+---------+---------+-----------
-------+-----------------+-----------------+------------------+-----------------+-----------------+------------------+----------------
-+-----------------+------------------+-----------------+-----------------+-------------------------+
| entry | user | frontend_host | backend_host | backend_port | sharding_node | db_instance | tx_count | tx_rows | tx_time | sql_insert
_count | sql_insert_rows | sql_insert_time | sql_update_count | sql_update_rows | sql_update_time | sql_delete_count | sql_delete_rows
 | sql_delete_time | sql_select_count | sql_select_rows | sql_select_time | last_update_time        |
+-------+------+---------------+--------------+--------------+---------------+-------------+----------+---------+---------+-----------
-------+-----------------+-----------------+------------------+-----------------+-----------------+------------------+----------------
-+-----------------+------------------+-----------------+-----------------+-------------------------+
|     3 | test | 127.0.0.1     | 10.186.63.8  |        24801 | dn1           | instanceM1  |        1 |       1 |   15293 |
     0 |               0 |               0 |                0 |               0 |               0 |                0 |               0
 |               0 |                1 |               1 |           15293 | 2021-07-09 11:18:10.525 |
|     3 | test | 127.0.0.1     | 10.186.63.7  |        24801 | dn2           | instanceM2  |        1 |       3 |   13819 |
     0 |               0 |               0 |                0 |               0 |               0 |                0 |               0
 |               0 |                1 |               3 |           13819 | 2021-07-09 11:18:10.525 |
+-------+------+---------------+--------------+--------------+---------------+-------------+----------+---------+---------+-----------
-------+-----------------+-----------------+------------------+-----------------+-----------------+------------------+----------------
-+-----------------+------------------+-----------------+-----------------+-------------------------+
2 rows in set (0.00 sec)
```

2.0.1.23 sql_statistic_by_table_by_user_by_entry

- sql_statistic_by_table_by_user_by_entry
- sql
-

entry	true	dble_entryid
user	true	
table	true	
sql_insert_count	false	insert
sql_insert_rows	false	insert
sql_insert_time	false	insert
sql_update_count	false	update
sql_update_rows	false	update
sql_update_time	false	update
sql_delete_count	false	delete
sql_delete_rows	false	delete
sql_delete_time	false	delete
sql_select_count	false	select
sql_select_examined_rows	false	dble
sql_select_rows	false	

sql_select_time	false	select
last_update_time	false	

-

```
mysql> select * from sql_statistic_by_table_by_user_by_entry;
+-------+------+--------------------+-----------------+----------------+----------------+-----------------+----------------+----
-------------+-----------------+----------------+----------------+-----------------+----------------+-------------------------+-
----------------+-------------------------+
| entry | user | table              | sql_insert_count | sql_insert_rows | sql_insert_time | sql_update_count | sql_update_rows | sql
_update_time | sql_delete_count | sql_delete_rows | sql_delete_time | sql_select_count | sql_select_rows | sql_select_examined_rows |
sql_select_time | last_update_time        |
+-------+------+--------------------+-----------------+----------------+----------------+-----------------+----------------+----
-------------+-----------------+----------------+----------------+-----------------+----------------+-------------------------+-
----------------+-------------------------+
|     3 | test | testdb.tb_jump_hash |               0 |              0 |              0 |               0 |              0 |
          0 |               0 |              0 |              0 |               1 |              4 |                        4 |
        290440 | 2021-07-09 11:18:10.536 |
|     3 | test | null               |               0 |              0 |              0 |               0 |              0 |
          0 |               0 |              0 |              0 |               1 |              1 |                        0 |
          2131 | 2021-07-09 11:09:30.755 |
+-------+------+--------------------+-----------------+----------------+----------------+-----------------+----------------+----
-------------+-----------------+----------------+----------------+-----------------+----------------+-------------------------+-
----------------+-------------------------+
2 rows in set (0.01 sec)
```

2.0.1.24 sql_statistic_by_associate_tables_by_entry_by_user

- sql_statistic_by_associate_tables_by_entry_by_user
- sql
-

entry	true	dble_entryid
user	true	
tables	true	
sql_select_count	false	select
sql_select_examined_rows	false	dble
sql_select_rows	false	
sql_select_time	false	select
last_update_time	false	

-

```
mysql> select * from sql_statistic_by_associate_tables_by_entry_by_user;
+-------+------+----------------------------------+-----------------+----------------+-------------------------+----------------+
-------------------------+
| entry | user | associate_tables                 | sql_select_count | sql_select_rows | sql_select_examined_rows | sql_select_time |
 last_update_time        |
+-------+------+----------------------------------+-----------------+----------------+-------------------------+----------------+
-------------------------+
|     3 | test | testdb.tabler,testdb.tb_jump_hash |               1 |            168 |                       46 |           92004 |
 2021-07-09 11:20:16.392 |
+-------+------+----------------------------------+-----------------+----------------+-------------------------+----------------+
-------------------------+
1 row in set (0.00 sec)
```

2.0.1.25 sql_log

- sql_log
- sql
-

sql_id	true	sql id
sql_stmt	false	SQL(1024)
sql_digest	false	SQLdigest(1024)
sql_type	false	SQL

tx_id	true	dbleID
entry	false	dble_entryid
user	false	
source_host	false	IP
source_port	false	port
rows	false	
examined_rows	false	
result_size	false	
start_time	false	
duration	false	

-

```
mysql> select * from sql_log;
+--------+----------------------------------+----------------------------------+----------+-------+-------+------+-------------+------
-------+------+---------------+---------------------+----------+
| sql_id | sql_stmt                         | sql_digest                       | sql_type | tx_id | entry | user | source_host | sourc
e_port | rows | examined_rows | start_time          | duration |
+--------+----------------------------------+----------------------------------+----------+-------+-------+------+-------------+------
-------+------+---------------+---------------------+----------+
|      1 | show databases                   | show databases                   | Show     |     1 |     3 | test | 127.0.0.1   |
  8066 |    7 |             0 | 2021-07-09 11:09:30 |  7919460 |
|      2 | show tables                      | show tables                      | Show     |     2 |     3 | test | 127.0.0.1   |
  8066 |   32 |             0 | 2021-07-09 11:09:30 | 14972767 |
|      3 | select @@version_comment limit 1 | SELECT @@version_comment LIMIT ? | Select   |     3 |     3 | test | 127.0.0.1   |
  8066 |    1 |             0 | 2021-07-09 11:09:30 |  2131628 |
|      4 | show tables                      | show tables                      | Show     |     4 |     3 | test | 127.0.0.1   |
  8066 |   32 |             0 | 2021-07-09 11:09:34 |  1428683 |
+--------+----------------------------------+----------------------------------+----------+-------+-------+------+-------------+------
-------+------+---------------+---------------------+----------+
4 rows in set (0.04 sec)
```

2.0.1.26 sql_log_by_tx_by_entry_by_user

- sql_log_by_tx_by_entry_by_user
- sql log
-

tx_id	false	dbleID
entry	false	dble_entryid
user	false	
source_host	false	IP
source_port	false	port
sql_ids	false	sql_id(1024)
sql_exec	false	SQL
tx_duration	false	
busy_time	false	SQL
examined_rows	false	

-

```
mysql> select * from sql_log_by_tx_by_entry_by_user;
+-------+-------+------+-------------+-------------+---------+----------+-------------+-----------+---------------+
| tx_id | entry | user | source_host | source_port | sql_ids | sql_exec | tx_duration | busy_time | examined_rows |
+-------+-------+------+-------------+-------------+---------+----------+-------------+-----------+---------------+
|     1 |     3 | test | 127.0.0.1   |        8066 | 1       |        1 |     7919460 |   7919460 |             0 |
|     2 |     3 | test | 127.0.0.1   |        8066 | 2       |        1 |    14972767 |  14972767 |             0 |
|     3 |     3 | test | 127.0.0.1   |        8066 | 3       |        1 |     2131628 |   2131628 |             0 |
|     4 |     3 | test | 127.0.0.1   |        8066 | 4       |        1 |     1428683 |   1428683 |             0 |
+-------+-------+------+-------------+-------------+---------+----------+-------------+-----------+---------------+
4 rows in set (0.05 sec)
```

2.0.1.27 sql_log_by_digest_by_entry_by_user

- sql_log_by_digest_by_entry_by_user

- sql log
-

sql_digest	false	sqldigest
entry	false	dble_entryid
user	false	
exec	false	sql digestsql
duration	false	sql
rows	false	
examined_rows	false	
avg_duration	false	sql

-

```
mysql> select * from sql_log_by_digest_by_entry_by_user;
+---------------------------------+-------+------+------+----------+------+---------------+--------------+
| sql_digest                      | entry | user | exec | duration | rows | examined_rows | avg_duration |
+---------------------------------+-------+------+------+----------+------+---------------+--------------+
| SELECT @@version_comment LIMIT ? |     3 | test |    1 |  2131628 |    1 |             0 | 2131628.0000 |
| show databases                  |     3 | test |    1 |  7919460 |    7 |             0 | 7919460.0000 |
| show tables                     |     3 | test |    2 | 16401450 |   64 |             0 |  714341.5000 |
+---------------------------------+-------+------+------+----------+------+---------------+--------------+
3 rows in set (0.02 sec)
```

2.0.1.28 sql_log_by_tx_digest_by_entry_by_user

- sql_log_by_tx_digest_by_entry_by_user
- sql log
-

tx_digest	false	sql_digest
exec	false	tx_digest
entry	false	dble_entryid
user	false	
sql_exec	false	SQL
source_host	false	IP
source_port	false	port
sql_ids	false	sql_id(1024)
tx_duration	false	
busy_time	false	SQL
examined_rows	false	

-

```
mysql> select * from sql_log_by_tx_digest_by_entry_by_user;
+---------------------------------+------+------+-------+----------+-------------+-------------+---------+-------------+-----------+-
--------------+
| tx_digest                       | exec | user | entry | sql_exec | source_host | source_port | sql_ids | tx_duration | busy_time |
examined_rows |
+---------------------------------+------+------+-------+----------+-------------+-------------+---------+-------------+-----------+-
--------------+
| SELECT @@version_comment LIMIT ? |    1 | test |     3 |        1 | 127.0.0.1   |        8066 | 3       |     2131628 |   2131628 |
            0 |
| show databases                  |    1 | test |     3 |        1 | 127.0.0.1   |        8066 | 1       |     7919460 |   7919460 |
            0 |
| show tables                     |    2 | test |     3 |        2 | 127.0.0.1   |        8066 | 2,4     |    16401450 |  16401450 |
            0 |
+---------------------------------+------+------+-------+----------+-------------+-------------+---------+-------------+-----------+-
--------------+
3 rows in set (0.03 sec)
```

2.0.1.29 dble_config

- dble_config

- dbledbshardingusersequence
-

content	false	dbshardingusersequencejson

-
- dble_config

2.0.1.30 dble_xa_recover

- dble_xa_recover
- XA
-

dbgroup	false	
instance	false	
ip	false	ip
port	false	
formatid	false	mysqlxa_recoverformatid
gtrid_length	false	mysqlxa_recovergtrid_length
bqual_length	false	mysqlxa_recoverbqual_length
data	false	mysqlxa_recoverdata

-

2.0.1.31 dble_flow_control

- dble_flow_control
-
-

connection_type	true	MySQLConnection/ServerConnection
connection_id	true	dbleIDID
connection_info	false	IPMySQLID
writing_queue_bytes	false	
reading_queue_bytes	false	null
flow_controlled	false	

-

2.0.1.32 session_connections_active_ratio

- session_connections_active_ratio
- 30s/1min/5min
  30s15000ms(15000ms/30000ms)*100%=50%
-

session_conn_id	true	id
last_half_minute	false	30s
last_minute	false	1min
last_five_minute	false	5min

-

2.0.1.33 session_connections_associate_thread

- session_connections_associate_thread
-

-

session_conn_id	true	id
thread_name	true	

-

2.0.1.34 backend_connections_associate_thread

- backend_connections_associate_thread
-
-

backend_conn_id	true	id
thread_name	true	

-

2.0.1.35 dble_cluster_renew_thread

- dble_cluster_renew_thread
- renew
-

renew_thread	true	renew

-

2.0.1.32 recycling_resource

- recycling_resource
-
-

type	false	dbGroup/dbInstance/backendConnection
info	false	

-

2.0.1.33 dble_memory_resident

- dble_memory_resident
- enableMemoryBufferMonitor
-

id	true	id buffer
stacktrace	false	buffer
buffer_type	false	buffer NORMAL/HEARTBEAT/POOL
allocate_size	false	buffer bufferPoolChunkSize
allocate_time	false	buffer
alive_second	false	buffer
sql	false	buffer sql<<FRONT>><<BACK>>

-

2.0.1.34 dble_ap_node

- dble_ap_node
- ap_node

-

name	true	
db_group		db_group
db_schema		db_schema

-

2.0.2 INSERT/UPDATE/DELETE&

2.0.2.0 INSERT Syntax

```
INSERT
    [INTO] tbl_name
    [(col_name [, col_name] ...)]
    {VALUES | VALUE} (value_list) [, (value_list)] ...

INSERT
    [INTO] tbl_name
    SET assignment_list
```

- INSERT ...SELECT ,LOW_PRIORITY,DELAYED,HIGH_PRIORITY,IGNORE,ON DUPLICATE KEY UPDATE,PARTITION

2.0.2.1 UPDATE Syntax

```
UPDATE table_reference
    SET assignment_list
    WHERE where_condition
value:
    {expr | DEFAULT}
assignment:
    col_name = value
assignment_list:
    assignment [, assignment]
```

-
-
-
- LOW_PRIORITYIGNOREORDER BYLIMIT ,PARTITION
- where
-

2.0.2.2 DELETE Syntax

```
DELETE FROM tbl_name WHERE where_condition
```

-
-
- LOW_PRIORITYIGNOREORDER BYLIMIT ,PARTITION
- where
-

2.0.2.3 TRUNCATE Syntax

```
TRUNCATE [TABLE] tbl_name
```

-

2.0.2.4 INSERT/UPDATE/DELETE

2.0.2.4.0 dble_db_group

- active

2.0.2.4.1 dble_db_instance

- active_conn_countidle_conn_countread_conn_requestwrite_conn_requestlast_heartbeat_ack_timestamplast_heartbeat_ackheartbeat_status heartbeat_failure_in_last_5min

dble_db_groupdble_db_instancedb.xmlMysqldble_db_groupdble_db_instance

2.0.2.4.2 dble_rw_split_entry

- idblacklisttype

2.0.2.4.3 dble_thread_pool

- UPDATEINSERT/DELETE
- core_pool_size

1JDKThreadPoolExecutorcore_pool_size

2AIONIOFrontRW NIOBackendRWNIONIOFrontRW NIOBackendRW

3

2.0.2.5 TRUNCATE

sql_statistic_by_frontend_by_backend_by_entry_by_usersql_statistic_by_table_by_user_by_entrysql_statistic_by_associate_tables_by_entry_by_user sql_log

2.0.1.27 dble_config

dbledbshardingusersequence

```
select * from dble_config\G
```

Json Json

```
*************************** 1. row ***************************
content: {"version":"4.0","dbGroup":[{"rwSplitMode":0,"name":"ha_group1","delayThreshold":100,"disableHA":"true","heartbeat":{"value":"sel
ect user()"},"dbInstance":[{"name":"hostM1","url":"**","password":"123456","user":"root","maxCon":200,"minCon":10,"usingDecrypt":"false","
disabled":"false","id":"hostM1Id","readWeight":"10","primary":true},{"name":"hostM5","url":"**","password":"123456","user":"root","maxCon"
:15,"minCon":15,"disabled":"false","primary":false}]},{"rwSplitMode":0,"name":"ha_group2","heartbeat":{"value":"select user()"},"dbInstanc
e":[{"name":"hostM2","url":"**","password":"123456","user":"root","maxCon":200,"minCon":10,"primary":true}]},{"rwSplitMode":0,"name":"ha_g
roup3","delayThreshold":-1,"heartbeat":{"value":"select user()"},"dbInstance":[{"name":"hostM3","url":"**","password":"123456","user":"roo
t","maxCon":15,"minCon":15,"disabled":"false","primary":true}]}],"schema":[{"name":"testdb","sqlMaxLimit":100,"shardingNode":"dn1","table"
:[{"type":"ShardingTable","properties":{"function":"func_enum","shardingColumn":"code","name":"tb_enum_sharding","shardingNode":"dn1,dn2",
"sqlMaxLimit":200}},{"type":"GlobalTable","properties":{"name":"test1","shardingNode":"dn1,dn2,dn3,dn4"}}]},{"name":"testdb2","shardingNod
e":"dn1"}],"shardingNode":[{"name":"dn1","dbGroup":"ha_group1","database":"db_1"},{"name":"dn2","dbGroup":"ha_group1","database":"db_2"},{
"name":"dn3","dbGroup":"ha_group2","database":"db_3"},{"name":"dn4","dbGroup":"ha_group2","database":"db_4"}],"function":[{"name":"func_en
um","clazz":"Enum","property":[{"value":"partition-enum.txt","name":"mapFile"},{"value":"0","name":"defaultNode"},{"value":"1","name":"typ
e"}]}],"user":[{"type":"ManagerUser","properties":{"readOnly":false,"name":"man1","password":"654321","usingDecrypt":"false","maxCon":10}}
,{"type":"ShardingUser","properties":{"schemas":"testdb","readOnly":false,"blacklist":"blacklist1","name":"root","password":"123456","maxC
on":20}},{"type":"RwSplitUser","properties":{"dbGroup":"ha_group3","blacklist":"blacklist1","name":"rwsu1","password":"123456","maxCon":20
}}],"blacklist":[{"name":"blacklist1"}],"sequence_db_conf.properties":{"`TESTDB`.`GLOBAL`":"dn1","`TESTDB`.`COMPANY`":"dn1","`TESTDB`.`CUS
TOMER`":"dn1","`TESTDB`.`ORDERS`":"dn1","`TESTDB`.`myauto_test`":"dn1"}}
1 row in set (0.33 sec)
```


```
{
    "version":"4.0",
    "dbGroup":[
        {
            "rwSplitMode":0,
            "name":"ha_group1",
            "delayThreshold":100,
            "disableHA":"true",
            "heartbeat":{
                "value":"select user()"
            },
            "dbInstance":[
                {
                    "name":"hostM1",
                    "url":"**",
                    "password":"123456",
                    "user":"root",
                    "maxCon":200,
                    "minCon":10,
                    "usingDecrypt":"false",
                    "disabled":"false",
                    "id":"hostM1Id",
                    "readWeight":"10",
                    "primary":true
                },
                {
                    "name":"hostM5",
                    "url":"**",
                    "password":"123456",
                    "user":"root",
                    "maxCon":15,
                    "minCon":15,
                    "disabled":"false",
                    "primary":false
                }
            ]
        },
        {
            "rwSplitMode":0,
            "name":"ha_group2",
            "heartbeat":{
                "value":"select user()"
            },
```

```
            "dbInstance":[
                {
                    "name":"hostM2",
                    "url":"**",
                    "password":"123456",
                    "user":"root",
                    "maxCon":200,
                    "minCon":10,
                    "primary":true
                }
            ]
        },
        {
            "rwSplitMode":0,
            "name":"ha_group3",
            "delayThreshold":-1,
            "heartbeat":{
                "value":"select user()"
            },
            "dbInstance":[
                {
                    "name":"hostM3",
                    "url":"**",
                    "password":"123456",
                    "user":"root",
                    "maxCon":15,
                    "minCon":15,
                    "disabled":"false",
                    "primary":true
                }
            ]
        }
    ],
    "schema":[
        {
            "name":"testdb",
            "sqlMaxLimit":100,
            "shardingNode":"dn1",
            "table":[
                {
                    "type":"ShardingTable",
                    "properties":{
                        "function":"func_enum",
                        "shardingColumn":"code",
                        "name":"tb_enum_sharding",
                        "shardingNode":"dn1,dn2",
                        "sqlMaxLimit":200
                    }
                },
                {
                    "type":"GlobalTable",
                    "properties":{
                        "name":"test1",
                        "shardingNode":"dn1,dn2,dn3,dn4"
                    }
                }
            ]
        },
        {
            "name":"testdb2",
            "shardingNode":"dn1"
        }
    ],
    "shardingNode":[
        {
            "name":"dn1",
            "dbGroup":"ha_group1",
            "database":"db_1"
        },
        {
            "name":"dn2",
            "dbGroup":"ha_group1",
            "database":"db_2"
        },
        {
            "name":"dn3",
            "dbGroup":"ha_group2",
            "database":"db_3"
```

```
        },
        {
            "name":"dn4",
            "dbGroup":"ha_group2",
            "database":"db_4"
        }
    ],
    "function":[
        {
            "name":"func_enum",
            "clazz":"Enum",
            "property":[
                {
                    "value":"partition-enum.txt",
                    "name":"mapFile"
                },
                {
                    "value":"0",
                    "name":"defaultNode"
                },
                {
                    "value":"1",
                    "name":"type"
                }
            ]
        }
    ],
    "user":[
        {
            "type":"ManagerUser",
            "properties":{
                "readOnly":false,
                "name":"man1",
                "password":"654321",
                "usingDecrypt":"false",
                "maxCon":10
            }
        },
        {
            "type":"ShardingUser",
            "properties":{
                "schemas":"testdb",
                "readOnly":false,
                "blacklist":"blacklist1",
                "name":"root",
                "password":"123456",
                "maxCon":20
            }
        },
        {
            "type":"RwSplitUser",
            "properties":{
                "dbGroup":"ha_group3",
                "blacklist":"blacklist1",
                "name":"rwsu1",
                "password":"123456",
                "maxCon":20
            }
        }
    ],
    "blacklist":[
        {
            "name":"blacklist1"
        }
    ],
    "sequence_db_conf.properties":{
        "`TESTDB`.`GLOBAL`":"dn1",
        "`TESTDB`.`COMPANY`":"dn1",
        "`TESTDB`.`CUSTOMER`":"dn1",
        "`TESTDB`.`ORDERS`":"dn1",
        "`TESTDB`.`myauto_test`":"dn1"
    }
}
```

dble

dble_configdble

2.1

- 2.1.1 select
- 2.1.2 set
- 2.1.3 show
- 2.1.4 switch
- 2.1.5 kill
- 2.1.6 stop
- 2.1.7 reload
- 2.1.8 rollback
- 2.1.9 offline
- 2.1.10 online
- 2.1.11 file
- 2.1.12 log
- 2.1.13
- 2.1.14 pause & resume
- 2.1.15
- 2.1.16 /
- 2.1.17 check @@metadata
- 2.1.18 release @@reload_metadata
- 2.1.19 split
- 2.1.20 flow_control
- 2.1.21
- 2.1.22

2.1.1 select

2.1.1.1 select @@VERSION_COMMENT

select @@VERSION_COMMENT;

dble

```
MySQL [(none)]> select @@VERSION_COMMENT;
+--------------------------+
| @@VERSION_COMMENT        |
+--------------------------+
| dble Server (ActionTech) |
+--------------------------+
1 row in set (0.02 sec)
```

2.1.1.2 select @@SESSION.TX_READ_ONLY / select @@SESSION.Transaction_READ_ONLY

select @@SESSION.TX_READ_ONLY;

select @@SESSION.Transaction_READ_ONLY

readonly

2.1.1.3 select @@max_allowed_packet

select @@max_allowed_packet;

1.mysql+1024dblemysqlmysql max_allowed_packet dble
2.dble
3. show variables like 'max_allowed_packet' mysqldble
4.dblemysql

```
mysql> select @@max_allowed_packet;
+----------------------+
| @@max_allowed_packet |
+----------------------+
|             16776640 |
+----------------------+
1 row in set (0.01 sec)
```

2.1.1.4 select TIMEDIFF(NOW(), UTC_TIMESTAMP())

select TIMEDIFF(NOW(), UTC_TIMESTAMP())

00:00:00

2.1.2 set xxx

set xxx;

xxx

OK

2.1.3 show

2.1.3.1 show @@time.current

show @@time.current;

2.1.3.2 show @@time.startup

show @@time.startup;

2.1.3.3 show @@version

show @@version;

dble

2.1.3.4 show @@server

show @@server;

dble

```
mysql> show @@server;
+------------+-------------+--------------+------------+---------------------+---------+--------+
| UPTIME     | USED_MEMORY | TOTAL_MEMORY | MAX_MEMORY | RELOAD_TIME         | CHARSET | STATUS |
+------------+-------------+--------------+------------+---------------------+---------+--------+
| 1h 4m 47s  |    17414592 |     87031808 | 1840250880 | 2017/10/17 16:42:09 | utf8    | ON     |
+------------+-------------+--------------+------------+---------------------+---------+--------+
1 row in set (0.05 sec)
```

```
UPTIME:
USED_MEMORY:
TOTAL_MEMORY:
MAX_MEMORY:
RELOAD_TIME: config
CHARSET: COLLATE
STATUS:
```

2.1.3.5 show @@threadpool / show @@threadpool.task

show @@threadpool;

```
mysql> show @@threadpool;
+----------------------+-----------+--------------+-----------------+----------------+------------+
| NAME                 | POOL_SIZE | ACTIVE_COUNT | TASK_QUEUE_SIZE | COMPLETED_TASK | TOTAL_TASK |
+----------------------+-----------+--------------+-----------------+----------------+------------+
| Timer                |         1 |            0 |               0 |          22596 |      22596 |
| frontWorker          |         8 |            8 |               0 |            216 |        217 |
| managerFrontWorker   |         2 |            2 |               0 |            216 |        217 |
| backendWorker        |         8 |            8 |               0 |            216 |        217 |
| complexQueryWorker   |         8 |            0 |               0 |              0 |          0 |
| writeToBackendWorker |         8 |            8 |               0 |              0 |          0 |
+----------------------+-----------+--------------+-----------------+----------------+------------+
3 rows in set (0.03 sec)
```

```
NAME:
```

```
POOL_SIZE:
ACTIVE_COUNT:
TASK_QUEUE_SIZE:
COMPLETED_TASK:
TOTAL_TASK:
```

- ACTIVE_COUNT/TASK_QUEUE_SIZE/COMPLETED_TASK/TOTAL_TASK dble frontWorkerwriteToBackendWorker "" "" show @@threadpool.task

show @@threadpool.task;

```
mysql> show @@threadpool.task;
+-------------------------+-----------+-------------------+-----------------+----------------+------------+
| NAME                    | POOL_SIZE | ACTIVE_TASK_COUNT | TASK_QUEUE_SIZE | COMPLETED_TASK | TOTAL_TASK |
+-------------------------+-----------+-------------------+-----------------+----------------+------------+
| Timer                   |         1 |                 0 |               0 |            100 |        100 |
| frontWorker             |         8 |                 8 |               0 |             45 |         46 |
| managerFrontWorker      |         2 |                 2 |               0 |             45 |         46 |
| backendWorker           |         8 |                 8 |               0 |           1631 |       1631 |
| complexQueryWorker      |         8 |                 0 |               0 |             98 |         98 |
| writeToBackendWorker    |         8 |                 8 |               0 |              0 |          0 |
+-------------------------+-----------+-------------------+-----------------+----------------+------------+
5 rows in set (0.00 sec)
```

```
NAME:
POOL_SIZE:
ACTIVE_TASK_COUNT:
TASK_QUEUE_SIZE:
COMPLETED_TASK:
TOTAL_TASK:
```

2.1.3.6 show @@database

show @@database;

schema

2.1.3.7 show @@shardingnode

show @@shardingnode;

shardingnode

```
mysql> show @@shardingnode;
+------+----------------+---------------+--------+------+------+---------+---------------+
| NAME | DB_GROUP        | SCHEMA_EXISTS | ACTIVE | IDLE | SIZE | EXECUTE | RECOVERY_TIME |
+------+----------------+---------------+--------+------+------+---------+---------------+
| dn1  | dh1/dble_test  | true          |      0 |    0 | 1000 |      34 |            -1 |
| dn2  | dh2/dble_test  | true          |      0 |    0 | 1000 |      34 |            -1 |
| dn3  | dh1/dble2_test | false         |      0 |    0 | 1000 |      26 |            -1 |
| dn4  | dh2/dble2_test | true          |      0 |    0 | 1000 |      26 |            -1 |
| dn5  | dh1/nosharding | true          |      0 |    0 | 1000 |       9 |            -1 |
+------+----------------+---------------+--------+------+------+---------+---------------+
5 rows in set (0.09 sec)
```

```
NAME:
DB_GROUP: dbGroupName/schema
SCHEMA_EXISTS: truefalse
ACTIVE:
IDLE: (bug)
SIZE: maxCon
EXECUTE:
RECOVERY_TIME: (stop @@heartbeat )
```

schemashardingnode

show @@shardingnode where schema=xxx;

xxxschema

2.1.3.8 show @@dbinstance

show @@dbinstance

dbinstance

```
mysql> show @@dbinstance;
+------------+--------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| DB_GROUP   | NAME   | HOST         | PORT | W/R  | ACTIVE | IDLE | SIZE | EXECUTE | READ_LOAD | WRITE_LOAD | DISABLED |
+------------+--------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| localhost2 | hostS1 | 10.18x.2x.63 | 3307 | W    |      1 |    9 |  100 |      11 |         0 |          0 |     true |
| localhost1 | hostM1 | 10.18x.2x.64 | 3306 | W    |      1 |    9 |  100 |      17 |         0 |          0 |    false |
+------------+--------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
2 rows in set (0.09 sec)
```

```
DB_GROUP:dbinstanceDB_GROUP
NAME: dbinstance
HOST: host
PORT:
W/R:
ACTIVE: ,dbinstance
IDLE: ,dbinstance(bug)
SIZE: maxCon
EXECUTE: ,dbinstance
READ_LOAD: selectshow ()
WRITE_LOAD: selectshowsqlWRITE_LOAD()
DISABLED: db.xmldbinstance (2.19.09.0disabledtrue)
```

shardingnodedbinstance

show @@dbinstance where shardingnode=xxx;

xxxshardingnode

2.1.3.9 show @@dbinstance.synstatus

show @@dbinstance.synstatus;

dbinstance
: heartbeat show slave statusdb.xml

```
mysql> show @@dbinstance.synstatus \G
*************************** 1. row ***************************
             DB_GROUP: dbGroup2
                 NAME: instanceM3
                 HOST: 111.231.25.141
                 PORT: 30309
          MASTER_HOST: mysql3
          MASTER_PORT: 3306
          MASTER_USER: replicator
SECONDS_BEHIND_MASTER: 0
     SLAVE_IO_RUNNING: Yes
    SLAVE_SQL_RUNNING: Yes
       SLAVE_IO_STATE: Waiting for master to send event
        CONNECT_RETRY: 10
        LAST_IO_ERROR:
1 row in set (0.00 sec)
```

```
DB_GROUP:dbinstanceDB_GROUP
NAME: dbinstance
HOST: /ip
```

```
PORT:
```

mysqlshow slave status

2.1.3.10 show @@dbinstance.syndetail where name=?

show @@dbinstance.syndetail where name=xxx;

xxxdbinstance

24dbinstance

```
mysql> show @@dbinstance.syndetail WHERE name =hostM2;
+------------+--------+--------------+------+--------------+-------------+-------------+---------------------+-----------------------+
| DB_GROUP   | NAME   | HOST         | PORT | MASTER_HOST  | MASTER_PORT | MASTER_USER | TIME                | SECONDS_BEHIND_MASTER |
+------------+--------+--------------+------+--------------+-------------+-------------+---------------------+-----------------------+
| localhost2 | hostM2 | 10.18x.2x.64 | 3320 | 10.18x.2x.62 |        3320 | qrep        | 2017-10-17 18:31:27 |                    -1 |
| localhost2 | hostM2 | 10.18x.2x.64 | 3320 | 10.18x.2x.62 |        3320 | qrep        | 2017-10-17 18:31:57 |                    -1 |
| localhost2 | hostM2 | 10.18x.2x.64 | 3320 | 10.18x.2x.62 |        3320 | qrep        | 2017-10-17 18:32:27 |                    -1 |
| localhost2 | hostM2 | 10.18x.2x.64 | 3320 | 10.18x.2x.62 |        3320 | qrep        | 2017-10-17 18:32:57 |                    -1 |
+------------+--------+--------------+------+--------------+-------------+-------------+---------------------+-----------------------+
4 row in set (0.05 sec)
```

:

```
DB_GROUP:dbinstanceDB_GROUP
NAME: dbinstance
HOST: /ip
PORT:
```

mysqlshow slave status

2.1.3.11 show @@datasource.cluster

show @@datasource.cluster;

2.20.04.0

2.1.3.12 show @@processor

show @@processor;

dbleprocessor

```
mysql> show @@processor\G
*************************** 1. row ***************************
        NAME: frontProcessor0
      NET_IN: 0
     NET_OUT: 0
 REACT_COUNT: 0
     R_QUEUE: 0
     W_QUEUE: 0
 FREE_BUFFER: 1072169008
TOTAL_BUFFER: 1073741824
  BU_PERCENT: 0
    BU_WARNS: 0
    FC_COUNT: 0
    BC_COUNT: 0
*************************** 2. row ***************************
        NAME: frontProcessor1
      NET_IN: 0
     NET_OUT: 267
 REACT_COUNT: 0
     R_QUEUE: 0
     W_QUEUE: 0
 FREE_BUFFER: 1072169008
TOTAL_BUFFER: 1073741824
  BU_PERCENT: 0
    BU_WARNS: 0
    FC_COUNT: 0
    BC_COUNT: 0
*************************** 3. row ***************************
        NAME: frontProcessor2
```

```
       NET_IN: 0
      NET_OUT: 150
  REACT_COUNT: 0
      R_QUEUE: 0
      W_QUEUE: 0
  FREE_BUFFER: 1072169008
 TOTAL_BUFFER: 1073741824
   BU_PERCENT: 0
     BU_WARNS: 0
     FC_COUNT: 0
     BC_COUNT: 0
*************************** 4. row ***************************
         NAME: frontProcessor3
       NET_IN: 0
      NET_OUT: 1548
  REACT_COUNT: 0
      R_QUEUE: 0
      W_QUEUE: 0
  FREE_BUFFER: 1072169008
 TOTAL_BUFFER: 1073741824
   BU_PERCENT: 0
     BU_WARNS: 0
     FC_COUNT: 0
     BC_COUNT: 0
...
```

```
NAME:
NET_IN:
NET_OUT:
REACT_COUNT: 0
R_QUEUE: 0
W_QUEUE:
FREE_BUFFER: BufferPool free
TOTAL_BUFFER: BufferPool
BU_PERCENT: BufferPool
BU_WARNS: 0
FC_COUNT:
BC_COUNT:
```

2.1.3.13 show @@command

show @@command;

processor

```
mysql> show @@command;

+------------+---------+-------+--------------+--------------+------------+------+------+------+-------+
| PROCESSOR  | INIT_DB | QUERY | STMT_PREPARE | STMT_EXECUTE | STMT_CLOSE | PING | KILL | QUIT | OTHER |
+------------+---------+-------+--------------+--------------+------------+------+------+------+-------+
| Processor0 |       0 |     0 |            0 |            0 |          0 |    0 |    0 |    0 |     0 |
| Processor1 |       0 |     0 |            0 |            0 |          0 |    0 |    0 |    0 |     0 |
| Processor2 |       0 |     6 |            0 |            0 |          0 |    0 |    0 |    0 |     0 |
| Processor3 |       0 |     4 |            0 |            0 |          0 |    0 |    0 |    0 |     0 |
+------------+---------+-------+--------------+--------------+------------+------+------+------+-------+
4 rows in set (0.00 sec)
```

```
PROCESSOR: processor
INIT_DB: COM_INIT_DB
QUERY: COM_QUERY
STMT_PREPARE: COM_STMT_PREPARE
STMT_EXECUTE: COM_STMT_EXECUTE
STMT_CLOSE: COM_STMT_CLOSE
PING: COM_PING
KILL: COM_PROCESS_KILL
QUIT: COM_QUIT
OTHER:
```

2.1.3.14 show @@connection where processor=? and front_id=? and host=? and user=?

show @@connection where processor=? and front_id=? and host=? and user=?;

processorfront_idhostuser

```
mysql> show @@connection where processor='frontProcessor4' \G
*************************** 1. row ***************************
            PROCESSOR: frontProcessor4
             FRONT_ID: 4
                 HOST: 192.168.2.190
                 PORT: 9066
           LOCAL_PORT: 52082
                 USER: man1
               SCHEMA:
 CHARACTER_SET_CLIENT: utf8mb4
 COLLATION_CONNECTION: utf8mb4_general_ci
CHARACTER_SET_RESULTS: utf8mb4
               NET_IN: 1438
              NET_OUT: 10925
        ALIVE_TIME(S): 526
          RECV_BUFFER: 32767
           SEND_QUEUE: 0
           RECV_QUEUE: 0
   TX_ISOLATION_LEVEL:
           AUTOCOMMIT:
        SYS_VARIABLES:
       USER_VARIABLES:
                XA_ID: -
1 row in set (0.01 sec)
```

```
PROCESSOR: PROCESSOR
FRONT_ID: ID
HOST: host
PORT: ()
LOCAL_PORT:
USER:
SCHEMA: schema
CHARACTER_SET_CLIENT:
COLLATION_CONNECTION:
CHARACTER_SET_RESULTS :
NET_IN:
NET_OUT:
ALIVE_TIME(S):
RECV_BUFFER: ()
SEND_QUEUE:
RECV_QUEUE:
TX_ISOLATION_LEVEL:
AUTOCOMMIT:
SYS_VARIABLES:
USER_VARIABLES:
```

2.1.3.15 show @@cache

show @@cache;

cache

```
mysql> show @@cache;
+-----------------+-------+------+--------+------+------+-------------+----------+
| CACHE           | MAX   | CUR  | ACCESS | HIT  | PUT  | LAST_ACCESS | LAST_PUT |
+-----------------+-------+------+--------+------+------+-------------+----------+
| ER_SQL2PARENTID |  1000 |    0 |      0 |    0 |    0 |             |          |
| SQLRouteCache   | 10000 |    0 |      0 |    0 |    0 |             |          |
+-----------------+-------+------+--------+------+------+-------------+----------+
2 rows in set (0.09 sec)
```

:

```
CACHE: cache
MAX:
CUR:
```

```
ACCESS:
HIT:
PUT:
LAST_ACCESS:(yyyy/mm/dd hh:mm:ss)
LAST_INPUT: (yyyy/mm/dd hh:mm:ss)
```

2.1.3.16 show @@backend where processor=? and backend_id=? and mysqlid=? and host=? and port=?

show @@backend where processor=? and backend_id=? and mysqlid=? and host=? and port=?;

show @@sessionprocessorbackend_idmysqlidhostport

```
mysql> show @@backend where processor='backendProcessor9' and host='172.18.0.3' \G
*************************** 1. row ***************************
            processor: backendProcessor9
           BACKEND_ID: 29
              MYSQLID: 26
                 HOST: 172.18.0.3
                 PORT: 3306
       LOCAL_TCP_PORT: 34848
               NET_IN: 93
              NET_OUT: 85
       ACTIVE_TIME(S): 699
               CLOSED: false
                STATE: IDLE
           SEND_QUEUE: 0
               SCHEMA: NULL
 CHARACTER_SET_CLIENT: utf8mb4
 COLLATION_CONNECTION: utf8mb4_general_ci
CHARACTER_SET_RESULTS: utf8mb4
   TX_ISOLATION_LEVEL: 2
           AUTOCOMMIT: true
        SYS_VARIABLES:
       USER_VARIABLES:
            XA_STATUS: 0
            DEAD_TIME:
   USED_FOR_HEARTBEAT: false
1 row in set (0.01 sec)
```

```
processor: processor
BACKEND_ID: ID
MYSQLID: mysqlid(show processlistMYSQLID)
HOST:
PORT:
LOCAL_TCP_PORT: tcp
NET_IN:
NET_OUT:
ACTIVE_TIME(S):
CLOSED:
STATE: IN USEIDLEHEARTBEAT CHECKEVICTIN CREATION OR OUT OF POOLUNKNOWN STATE
SEND_QUEUE:
SCHEMA: schema
CHARACTER_SET_CLIENT:
COLLATION_CONNECTION:
CHARACTER_SET_RESULTS:
TX_ISOLATION_LEVEL: -1
AUTOCOMMIT:
SYS_VARIABLES:
USER_VARIABLES:
XA_STATUS: xa
DEAD_TIME
USED_FOR_HEARTBEAT:
```

2.1.3.17 show @@session

show @@session;

session

```
mysql>  show @@session ;
+----------+----------+-------------------------------------------------------------+
```

```
| FRONT_ID | DN_COUNT | DN_LIST                                                                |
+----------+----------+------------------------------------------------------------------------+
| 2        | 2        | BackendConnection[backendId=59, host=172.100.9.5 [,... ]   |
+----------+----------+------------------------------------------------------------------------+
1 row in set (0.00 sec)
```

```
FRONT_ID: ID
DN_COUNT:
DN_LIST: ,
```

DN_LIST

```
BackendConnection[id = 15 host = **** port = 3306 localPort = 56355 mysqlId = 53690 db config = dbInstance[name=hostM1,disabled=false,maxC
on=6000,minCon=17]
```

:

```
id: id
host: host ip
port:
localPort: dbled
mysqlId: idshow processlist
    db configdble
        name
        disabled
        maxCon
        minCon
```

2.1.3.18 show @@connection.sql

show @@connection.sql;

sessionSQL

```
mysql> show @@connection.sql;
+----------+-----------------+------+--------+---------------------+--------------+-----------------------+-----------+
| FRONT_ID | HOST            | USER | SCHEMA | START_TIME          | EXECUTE_TIME | SQL                   | STAGE     |
+----------+-----------------+------+--------+---------------------+--------------+-----------------------+-----------+
|    1     | 0:0:0:0:0:0:0:1 | man  | NULL   | 2017/10/17 17:00:58 |          139 | show @@connection.sql | Read SQL  |
+----------+-----------------+------+--------+---------------------+--------------+-----------------------+-----------+
1 row in set (0.13 sec)
```

:

```
FRONT_ID: ID
HOST: host
USER:
SCHEMA: schema
START_TIME:
EXECUTE_TIME: SQL20ms
SQL10241024
STAGE: ,finished
```

2.1.3.19 show @@sql

show @@sql;

: sql_log

```
mysql> show @@sql;
+------+------+---------------------+--------------+-----------------------------------------+
| ID   | USER | START_TIME          | EXECUTE_TIME | SQL                                     |
+------+------+---------------------+--------------+-----------------------------------------+
|    1 | root | 2017/10/17 17:37:22 |          381 | select * from sharding_two_node LIMIT 100 |
+------+------+---------------------+--------------+-----------------------------------------+
1 row in set (0.02 sec)
```

:

```
ID:
USER:
START_TIME:
EXECUTE_TIME:
SQL
```

SQL

```
select sql_id as ID, user as USER, start_time as START_TIME, duration as EXECUTE_TIME, sql_stmt as SQL from dble_information.sql_log order
 by start_time desc
```

2.1.3.20 show @@sql.high

show @@sql.high;

sql_log

```
mysql> show @@sql.high;
+------+------+-----------+----------+----------+----------+--------------+---------------------+----------------------------------------
+
| ID   | USER | FREQUENCY | AVG_TIME | MAX_TIME | MIN_TIME | EXECUTE_TIME | LAST_TIME           | SQL
|
+------+------+-----------+----------+----------+----------+--------------+---------------------+----------------------------------------
+
|    1 | root |         1 |      381 |      381 |      381 |          381 | 2017/10/17 17:37:23 | SELECT * FROM sharding_two_node LIMIT ?
|
+------+------+-----------+----------+----------+----------+--------------+---------------------+----------------------------------------
+
1 row in set (0.06 sec)
```

```
ID:
USER:
FREQUENCY: sql
AVG_TIME:
MAX_TIME:
MIN_TIME:
EXECUTE_TIME:
LAST_TIME:
SQL
```

SQL

```
select sql_id as ID, user as USER, count(0) as FREQUENCY, avg(duration) AVG_TIME, max(duration) as MAX_TIME, min(duration) as MIN_TIME, du
ration as EXECUTE_TIME, start_time as LAST_TIME, sql_digest as SQL from dble_information.sql_log group by sql_digest,user order by start_t
ime
```

2.1.3.21 show @@sql.slow

show @@sql.slow;

sql_log `sqlSlowTime` (100ms,)sql

```
mysql> show @@sql.slow;
+------+---------------------+--------------+-----------------------------------------+
| USER | START_TIME          | EXECUTE_TIME | SQL                                     |
+------+---------------------+--------------+-----------------------------------------+
| root | 2017/10/17 17:37:22 |          381 | select * from sharding_two_node LIMIT 100 |
+------+---------------------+--------------+-----------------------------------------+
1 row in set (0.07 sec)
```

```
USER:
START_TIME:
EXECUTE_TIME:
SQL
```

SQL

```
select user as USER, start_time as START_TIME, duration as EXECUTE_TIME, sql_stmt as SQL from dble_information.sql_log where duration >= ${slowTime}*1000000 order by start_time
```

2.1.3.22 show @@sql.resultset

show @@sql.resultset;

sql_logsql `maxResultSet` (512K)sql

```
mysql>  show @@sql.resultset;
+------+------+-----------+--------------------------------+----------------+
| ID   | USER | FREQUENCY | SQL                            | RESULTSET_SIZE |
+------+------+-----------+--------------------------------+----------------+
|    1 | root |         1 | SELECT * FROM sharding_two_node | 1048576        |
+------+------+-----------+--------------------------------+----------------+
1 row in set (0.05 sec)
```

```
ID:
USER:
FREQUENCY:sql
SQL:
RESULTSET_SIZE:
```

SQL

```
select sql_id as ID, user as USER, t2.FREQUENCY, sql_stmt as SQL, result_size as RESULT_SIZE from dble_information.sql_log t1
inner join (select max(sql_id) as maxId, count(0) as FREQUENCY from dble_information.sql_log group by sql_digest having result_size >= ${maxResultSet} order by maxId) t2 on  t1.sql_id = t2.maxId;
```

2.1.3.23 show @@sql.sum

show @@sql.sum;

sql, .user.true

```
mysql> show @@sql.sum;
+------+------+------+------+------+------+--------+---------+--------------+--------------+---------------------+
| ID   | USER | R    | W    | R%   | MAX  | NET_IN | NET_OUT | TIME_COUNT   | TTL_COUNT    | LAST_TIME           |
+------+------+------+------+------+------+--------+---------+--------------+--------------+---------------------+
|    1 | root |    1 |    0 | 1.00 | 1    |     41 |     840 | [0, 0, 1, 0] | [0, 0, 1, 0] | 2017/10/17 17:37:23 |
+------+------+------+------+------+------+--------+---------+--------------+--------------+---------------------+
1 row in set (0.26 sec)
```

:

```
ID:
USER:
R:(selectshowdescexplain)
W:(insertupdatedeleteDDLsql)
R%:R/(R+W)*100%
MAX:
NET_IN:
NET_OUT:
TIME_COUNT:query22-06 ,06-13 ,13-18,18-22
TTL_COUNT:query10,10 - 200,1, 1
LAST_TIME:SQL
```

show @@sql.sum true;

2.1.3.24 show @@sql.sum.user

show @@sql.sum;

show @@sql.sum.user true;

2.1.3.25 show @@sql.sum.table

show @@sql.sum.table;

```
mysql> show @@sql.sum.table;
+------+-------------------+------+------+------+-----------+-----------+---------------------+
| ID   | TABLE             | R    | W    | R%   | RELATABLE | RELACOUNT | LAST_TIME           |
+------+-------------------+------+------+------+-----------+-----------+---------------------+
|    1 | sharding_two_node |    1 |    0 | 1.00 | NULL      | NULL      | 2017/10/17 17:37:23 |
+------+-------------------+------+------+------+-----------+-----------+---------------------+
1 row in set (0.06 sec)
```

:

```
ID:
TABLE:
R:(selectshowdescexplain)
W:(insertupdatedeleteDDLsql)
R%:R/(R+W)*100%
RELATABLE:(,NULL)
RELACOUNT:(,NULL)
LAST_TIME:SQL
```

show @@sql.sum.table true;

2.1.3.26 show @@heartbeat

show @@heartbeat;

dbinstanceheartbeat

```
mysql> show @@heartbeat;
+--------+--------------+------+---------+-------+--------+---------+--------------+------------------+-------+-------------+
| NAME   | HOST         | PORT | RS_CODE | RETRY | STATUS | TIMEOUT | EXECUTE_TIME | LAST_ACTIVE_TIME | STOP  | RS_MESSAGE  |
+--------+--------------+------+---------+-------+--------+---------+--------------+------------------+-------+-------------+
| hostM1 | 10.18x.2x.63 | 3320 |      OK |     0 | idle   |       0 | 8,8,8        | NULL             | false | NULL        |
| hostM2 | 10.18x.2x.64 | 3320 |      OK |     0 | idle   |       0 | 9,9,9        | NULL             | false | NULL        |
+--------+--------------+------+---------+-------+--------+---------+--------------+------------------+-------+-------------+
2 rows in set (0.07 sec)
```

```
NAME:dbGroup
HOST:/IP
PORT:
RS_CODE:INIT, OK, ERROR, TIMEOUT
RETRY:
STATUS:checking/idle
TIMEOUT:(db.xmlheartbeattimeout0)
EXECUTE_TIME:311030
LAST_ACTIVE_TIME:
STOP:stop,stop
RS_MESSAGE:RS_CODEINIT, OK, TIMEOUTmessagenullRS_CODEERRORmessage
```

2.1.3.27 show @@heartbeat.detail where name=

show @@heartbeat.detail where name=xxx;

xxxdbinstance

dbinstanceheartbeat
:shardingNodeHeartbeatPeriod

:

```
mysql> show @@heartbeat.detail  where name='hostM1';
+--------+--------------+------+---------------------+--------------+
```

```
| NAME   | HOST         | PORT | TIME                | EXECUTE_TIME |
+--------+--------------+------+---------------------+--------------+
| hostM1 | 10.18x.2x.63 | 3320 | 2017-10-17 17:31:58 | 7            |
| hostM1 | 10.18x.2x.63 | 3320 | 2017-10-17 17:32:59 | 9            |
+--------+--------------+------+---------------------+--------------+
2 row in set (0.00 sec)
```

:

```
NAME:dbGroup
HOST:/IP
PORT:
TIME:
EXECUTE_TIME:()
```

2.1.3.28 show @@sysparam

show @@sysparam;

sysconfig

2.1.3.29 show @@white

show @@white;

```
mysql> show @@white;
+-----------------+------+
| IP              | USER |
+-----------------+------+
| 0:0:0:0:0:0:0:1 | root |
| 127.0.0.1       | root |
| 0:0:0:0:0:0:0:1 | test |
| 127.0.0.1       | test |
+-----------------+------+
4 rows in set (0.00 sec)
```

2.1.3.30 show @@directmemory

show @@directmemory;

```
+---------------------+-------------------------+-------------------------+
| DIRECT_MEMORY_MAXED | DIRECT_MEMORY_POOL_SIZE | DIRECT_MEMORY_POOL_USED |
+---------------------+-------------------------+-------------------------+
| 3GB                 | 1024MB                  | 44KB                    |
+---------------------+-------------------------+-------------------------+
1 row in set (0.16 sec)
```

:

```
DIRECT_MEMORY_MAXED:-XX:MaxDirectMemorySize
DIRECT_MEMORY_POOL_SIZE: bufferPoolPageSizebufferPoolPageNumber
DIRECT_MEMORY_POOL_USEDDirectMemory
```

2.1.3.31 show @@command.count

show @@command.count;

2.1.3.32 show @@connection.count

show @@connection.count;

2.1.3.33 show @@backend.statistics

show @@backend.statistics;

```
MySQL [(none)]> show @@backend.statistics;
+---------------+---------+------------+----------+
| HOST          | PORT    | ACTIVE     | TOTAL    |
+---------------+---------+------------+----------+
| 192.168.2.177 | 3307    | 0          | 10       |
| 192.168.2.177 | 3308    | 0          | 10       |
+---------------+---------+------------+----------+
2 rows in set (0.02 sec)
```

```
HOSTip
PORT
ACTIVE
TOTAL
```

2.1.3.34 show @@backend.old

show @@backend.old;

reload @@config_all
show @@backend

2.1.3.35 show @@binlog.status

show @@binlog.status;

sharding.xmlmysqlbinlog

```
mysql> show @@binlog.status;
+-------------------+------------------+----------+--------------+------------------+-------------------------------------------+
| Url               | File             | Position | Binlog_Do_DB | Binlog_Ignore_DB | Executed_Gtid_Set                          |
+-------------------+------------------+----------+--------------+------------------+-------------------------------------------+
| 10.18x.2x.63:3320 | mysql-bin.000024 | 14128    |              |                  | 7ad71aab-de94-11e5-9488-3a935460da28:1-67646 |
| 10.18x.2x.64:3320 | mysql-bin.000049 | 604440   |              |                  | ba8f8b5c-debf-11e5-a87b-26b8a61f9012:1-91    |
+-------------------+------------------+----------+--------------+------------------+-------------------------------------------+
2 rows in set (0.11 sec)
```

```
Url: Url
show master status
```

2.1.3.36 show @@help

show @@help;

2.1.3.37 show @@sql.large

show @@sql.large;

sql_logselect sql10000

```
mysql> show @@sql.large;
+------+-------+---------------------+--------------+----------------------------------------+
| USER | ROWS  | START_TIME          | EXECUTE_TIME | SQL                                    |
+------+-------+---------------------+--------------+----------------------------------------+
```

```
| root | 20000 |2017/10/17 17:37:23  | 381          | SELECT * FROM sharding_two_node LIMIT ? |
+------+-------+---------------------+--------------+-----------------------------------------+
1 row in set (0.06 sec)
```

:

```
USER:
ROWS:
START_TIME: EXECUTE_TIME:
SQL
```

SQL

```
select user as USER, rows as ROWS, start_time as START_TIME, duration as EXECUTE_TIME, sql_stmt as SQL from dble_information.sql_log where
 sql_type='Select' and rows > 10000;
```

2.1.3.38 show @@sql.condition

show @@sql.condition;

reload @@query_cf table&columnsql.100000
select *from sharding_two_node where id =0; select* from sharding_two_node where id =1;

```
mysql>  show @@sql.condition;
+------+--------------------------------+-------+-------+
| ID   | KEY                            | VALUE | COUNT |
+------+--------------------------------+-------+-------+
|    2 | sharding_two_node.id           | 0     |     1 |
|    3 | sharding_two_node.id           | 1     |     2 |
|    2 | sharding_two_node.id.valuekey  | size  |     2 |
|    3 | sharding_two_node.id.valuecount | total |     3 |
+------+--------------------------------+-------+-------+
4 rows in set (0.05 sec)
```

:

```
ID:
KEY: schema.table schema.table.valuekey  schema.table.valuecount
VALUE: keyvalue
COUNT:
```

2.1.3.39 show @@cost_time;

show @@cost_time;

query,bootstrap.cnfuseCostTimeStat

```
mysql>  show @@cost_time;
+--------------+---------------------------------+----------------------------------+
| OVER_ALL(us) | FRONT_PREPARE                   | BACKEND_EXECUTE                  |
+--------------+---------------------------------+----------------------------------+
|        71496 | Id:9,Time:53135;Id:12,Time:54056 | Id:9,Time:16924;Id:12,Time:16006  |
|        15316 | Id:17,Time:2301;Id:11,Time:3196  | Id:17,Time:10691;Id:11,Time:11397 |
+--------------+---------------------------------+----------------------------------+
2 rows in set (0.05 sec)
```

:

```
OVER_ALL:
FRONT_PREPARE: dble
BACKEND_EXECUTE:
```

2.1.3.40 show @@shardingNodes where schema=? and table=?;

show @@shardingNodes

```
mysql> show @@shardingNodes where schema=testdb and table=seqtest;
+------+----------+---------------+------+-----------------+------+----------+
| NAME | SEQUENCE | HOST          | PORT | PHYSICAL_SCHEMA | USER | PASSWORD |
+------+----------+---------------+------+-----------------+------+----------+
| dn1  | 0        | 10.186.24.113 | 3309 | db1             | root | 123456   |
| dn2  | 1        | 10.186.24.113 | 3309 | db2             | root | 123456   |
+------+----------+---------------+------+-----------------+------+----------+
2 rows in set (0.05 sec)
```

:

```
NAME:
SEQUENCE:
HOST:IP
PORT
PHYSICAL_SCHEMA
USER
PASSWORD
```

2.1.3.41 show @@algorithm where schema=? and table=?;

show @@algorithm

```
mysql> show @@algorithm where schema=testdb and table=seqtest;
+-----------------+---------------------------------------------------+
| KEY             | VALUE                                             |
+-----------------+---------------------------------------------------+
| TYPE            | SHARDING TABLE                                    |
| COLUMN          | ID                                                |
| CLASS           | com.actiontech.dble.route.function.PartitionByLong |
| partitionCount  | 2                                                 |
| partitionLength | 1                                                 |
+-----------------+---------------------------------------------------+
5 rows in set (0.05 sec)
```

:

```
KEY:
VALUE
```

2.1.3.42 show @@thread_used;

show @@thread_used;

```
mysql> show @@thread_used;
+-------------------------+------------------+-------------+------------------+
| THREAD_NAME             | LAST_QUARTER_MIN | LAST_MINUTE | LAST_FIVE_MINUTE |
+-------------------------+------------------+-------------+------------------+
| 0-NIOBackendRW          | 0%               | 0%          | 0%               |
| 0-NIOFrontRW            | 0%               | 0%          | 0%               |
| 0-backendWorker         | 0%               | 0%          | 0%               |
| 0-frontWorker           | 0%               | 0%          | 0%               |
| 0-managerFrontWorker    | 0%               | 0%          | 0%               |
| 0-writeToBackendWorker  | 0%               | 0%          | 0%               |
| 1-backendWorker         | 0%               | 0%          | 0%               |
| 1-frontWorker           | 0%               | 0%          | 0%               |
| 1-managerFrontWorker    | 0%               | 0%          | 0%               |
+-------------------------+------------------+-------------+------------------+
7 rows in set (0.00 sec)
```

:

```
THREAD_NAME:
LAST_QUARTER_MIN15
LAST_MINUTE
LAST_FIVE_MINUTE
```

2.1.3.43 show @@ddl;

show @@ddl;

dbleDDL

```
mysql> show @@ddl;
+--------+--------------------+--------------------------------------------------+
| Schema | Table              | Sql                                              |
+----------------------------+--------------------------------------------------+
| testdb | sharding_two_node  | alter table sharding_two_node add column id2 int  |
| mytest | sharding_four_node | drop table sharding_four_node                     |
+--------+--------------------+--------------------------------------------------+
2 rows in set (0.00 sec)
```

:

```
Schema:Schema
TableTable
Sqlddl sql
```

2.1.3.44 show @@processlist;

show @@processlist;

NULL

```
mysql> show @@processlist;
+----------+--------------+---------+------+-----------------+------+---------+------+-------+------+
| Front_Id | db_instance  | MysqlId | User | Front_Host      | db   | Command | Time | State | Info |
+----------+--------------+---------+------+-----------------+------+---------+------+-------+------+
|        1 | instanceM2   |    2303 | root | 127.0.0.1:33222 | db2  | Sleep   |   17 |       | NULL |
|        2 | instanceM2   |    NULL | man1 | 127.0.0.1:34882 | NULL | NULL    |    0 |       | NULL |
|        3 | instances2   |    2259 | root | 127.0.0.1:33226 | db1  | Sleep   |    4 |       | NULL |
|        3 | instanceS2   |    2308 | root | 127.0.0.1:33226 | db2  | Sleep   |    4 |       | NULL |
|        3 | instanceS2   |    2304 | root | 127.0.0.1:33226 | db1  | Sleep   |    4 |       | NULL |
+----------+--------------+---------+------+-----------------+------+---------+------+-------+------+
5 rows in set (0.05 sec)
```

:

```
Front_IdID
db_instance
MysqlId mysql ID
User
Front_Host
db mysql 'show processlist'  db
Commandmysql mysql 'show processlist'  Command
Timemysqlstate  mysql 'show processlist'  Time
Statemysql mysql 'show processlist'  State
Infomysql mysql 'show processlist'  Info
```

2.1.3.45 show @@session.xa;

show @@session.xa;

xa

```
mysql> show @@session.xa;
+----------+--------------------+------------------------+------------------+
| FRONT_ID | XA_ID              | XA_STATE               | SHARDING_NODES   |
+----------+--------------------+------------------------+------------------+
| 1        | 'Dble_Server.1.1'  | TX_COMMIT_FAILED_STATE  | dn1,dn3          |
+----------+--------------------+------------------------+------------------+
1 rows in set (0.00 sec)
```

:

```
FRONT_IDID
XA_IDxaid
```

```
XA_STATExa
SHARDING_NODESxashardingNode
```

2.1.3.46 show @@reload_status

show @@reload_status

dblereload

```
+-------+----------+-------------+---------------+---------------------+---------------------+---------------+------------+
| INDEX | CLUSTER  | RELOAD_TYPE | RELOAD_STATUS | LAST_RELOAD_START   | LAST_RELOAD_END     | TRIGGER_TYPE  | END_TYPE   |
+-------+----------+-------------+---------------+---------------------+---------------------+---------------+------------+
|     0 |No Cluster| RELOAD_ALL  | NOT_RELOADING | 2020/06/19 14:28:04 | 2020/06/19 14:28:05 | LOCAL_COMMAND | RELOAD_END |
+-------+----------+-------------+---------------+---------------------+---------------------+---------------+------------+
```

:

```
INDEX:reload[RL]
CLUSTER:dble
RELOAD_TYPE:reload RELOAD_ALL/RELOAD_META/MANAGER_INSERT/MANAGER_UPDATE/MANAGER_DELETE
RELOAD_STATUS:reloadnot_reloading/self_reload/meta_reload/waiting_others
LAST_RELOAD_START
LAST_RELOAD_END
TRIGGER_TYPE  LOCAL_COMMAND/CLUSTER_NOTIFY
END_TYPE RELOAD_END/INTERRUPUTED
```

release @@reload_metadata

2.1.3.47 show @@user

show @@user

dble

```
mysql> show @@user;
+----------+---------+----------+----------+
| Username | Manager | Readonly | Max_con  |
+----------+---------+----------+----------+
| man1     | Y       | N        | no limit |
| root     | N       | N        | no limit |
| user     | N       | N        | no limit |
+----------+---------+----------+----------+
3 rows in set (0.03 sec)
```

:

```
Username
Manager
Readonly
Max_con
```

2.1.3.48 show @@user.privilege

show @@user.privilege

dble

```
mysql> show @@user.privilege;
+----------+---------+-------+--------+--------+--------+--------+
| Username | Schema  | Table | INSERT | UPDATE | SELECT | DELETE |
+----------+---------+-------+--------+--------+--------+--------+
| root     | testdb1 | *     | Y      | Y      | Y      | Y      |
| root     | testdb  | *     | Y      | Y      | Y      | Y      |
| user     | testdb  | *     | N      | Y      | Y      | N      |
+----------+---------+-------+--------+--------+--------+--------+
3 rows in set (0.01 sec)
```

:

```
Username
Schema
Tabledml, *
INSERT
UPDATE
SELECT
DELETE
```

2.1.3.49 show @@data_distribution where table ='schema.table'

show @@data_distribution where table ='schema.table'

```
+---------------+-------+
| SHARDING_NODE | COUNT |
+---------------+--------
| dn1           | 100   |
| dn2           | 101   |
| dn3           | 98    |
| dn4           | 104   |
+---------------+-------+
4 rows in set (0.09 sec)
```

:

```
SHARDING_NODE
COUNT
```

2.1.3.50 show @@Questions

show @@Questions

SQLQUERYTransaction

```
mysql> show @@Questions;
+-----------+--------------+
| Questions | Transactions |
+-----------+--------------+
|         0 |            0 |
+-----------+--------------+
```

:

```
Questions:
Transactions()
```

Transactions:

1. sql; 10641046
2. exit(rollback)
3. set'set autocommit=0,autocommit=n,xxxxxxxxxx;' autocommit=nautocommit=nsql
4. sharding'set xa = on/off/1/0'rwsplit'XA start/end/prepare/commit/rollback XXX'sql
5. rwsplitmulti-query(sql,mysql clientdelimiter)multi-querysql(commit)(Transactions+1Questions+1)

2.1.3.51 show @@connection_pool

show @@connection_pool

```
mysql> show @@connection_pool;
+----------+-------------+------------------------------+--------+
| DB_GROUP | DB_INSTANCE | PROPERTY                     | VALUE  |
+----------+-------------+------------------------------+--------+
| dbGroup1 |  instanceM1 | minCon                       |      2 |
| dbGroup1 |  instanceM1 | maxCon                       |      4 |
| dbGroup1 |  instanceM1 | testOnCreate                 |  false |
| dbGroup1 |  instanceM1 | testOnBorrow                 |  false |
```

```
| dbGroup1 |  instanceM1 | testOnReturn                  |  false |
| dbGroup1 |  instanceM1 | testWhileIdle                 |  false |
| dbGroup1 |  instanceM1 | connectionHeartbeatTimeout    |     20 |
| dbGroup1 |  instanceM1 | connectionTimeout             |  10000 |
| dbGroup1 |  instanceM1 | heartbeatPeriodMillis         |  10000 |
| dbGroup1 |  instanceM1 | idleTimeout                   | 600000 |
| dbGroup1 |  instanceM1 | evictorShutdownTimeoutMillis  |  10000 |
| dbGroup1 |  instanceM1 | timeBetweenEvictionRunsMillis |  30000 |
+----------+-------------+-------------------------------+--------+
12 rows in set (0.01 sec)
```

:

```
DB_GROUPdbinstanceDB_GROUP
DB_INSTANCEdbinstance
PROPERTY
VALUE
```

2.1.3.52 show @@cap_client_found_rows

show @@cap_client_found_rows

cap_client_found_rows

```
mysql> show @@cap_client_found_rows;
+-------------------------+
| @@cap_client_found_rows |
+-------------------------+
| 0                       |
+-------------------------+
1 row in set (0.02 sec)
```

:

```
0-1-
```

2.1.3.53 show @@general_log

show @@general_log

general

```
mysql> show @@general_log;
+------------------+--------------------------------------+
| NAME             | VALUE                                |
+------------------+--------------------------------------+
| general_log      | ON                                   |
| general_log_file | /tmp/dble-general/general/general.log |
+------------------+--------------------------------------+
2 rows in set (0.02 sec)
```

:

```
general_log/
general_log_filegeneral
```

2.1.3.54 show @@statistic;

show @@statistic;

sql statistic

```
mysql> show @@statistic;
+----------------------------------------+-------+
| NAME                                   | VALUE |
+----------------------------------------+-------+
| statistic                              | OFF   |
| statisticAnalysis                      | OFF   |
| associateTablesByEntryByUserTableSize  | 1024  |
```

```
| frontendByBackendByEntryByUserTableSize | 1024  |
| tableByUserByEntryTableSize             | 1024  |
| samplingRate                            | 0     |
| sqlLogTableSize                         | 1024  |
| queueMonitor                      | monitoring  |
+-----------------------------------------+-------+
6 rows in set (0.01 sec)
```

:

```
statisticsql
statisticAnalysissqlusertablecondition
associateTablesByEntryByUserTableSizesql_statistic_by_associate_tables_by_entry_by_user
frontendByBackendByEntryByUserTableSizesql_statistic_by_frontend_by_backend_by_entry_by_user
tableByUserByEntryTableSizesql_statistic_by_table_by_user_by_entry
samplingRate0[0,100] %
sqlLogTableSizesql_log
queueMonitor
```

2.1.3.55 show @@load_data.fail;

show @@load_data.fail

load data

```
show @@load_data.fail;
Empty set (0.01 sec)

if have error file may like
show @@load_data.fail;
+----------------------------------+
| error_load_data_file             |
+----------------------------------+
| ./temp/error/1-data-table-dn1.txt |
| ./temp/error/1-data-table-dn2.txt |
+----------------------------------+
2 rows in set (0.01 sec)
```

:

```
error_load_data_file:
```

2.1.3.56 show @@statistic_queue.usage;

show @@statistic_queue.usage;

()

```
show @@statistic_queue.usage;
+---------------------+-------+
| TIME                | USAGE |
+---------------------+-------+
| 2021-05-31 16:33:30 | 0.00% |
| 2021-05-31 16:33:35 | 0.00% |
| 2021-05-31 16:33:40 | 0.00% |
+---------------------+-------+
3 rows in set (0.01 sec)
```

:

```
TIME
USAGE
```

2.1.4 switch

2.20.04.0

2.1.5 kill

2.1.5.1 kill @@connection

kill @@connection id1,id2,...;

idx idshow @@connection

OK

2.1.5.2 kill @@xa_session;

kill @@xa_session id1,id2,...;

idx session idshow @@session.xa

sessionxasession

OKsession

2.1.5.3 KILL @@DDL_LOCK where schema=? and table=?

KILL @@DDL_LOCK where schema=? and table=?;

schematableddl 2.22 KILL @@DDL_LOCK

OK

2.1.5.4 kill @@load_data

kill @@load_data;

OK

2.1.5.6 kill @@cluster_renew_thread '?'

kill @@cluster_renew_thread '?'

ucore(clusterMode=ucore)DblerenewThread

OK

2.1.6 stop

2.1.6.1 stop @@heartbeat

stop @@heartbeat keys:dbGroup

keys:dbGroupkeydbGroup **key**:dbGroupdbGroup$0-n dbGroup$0-2dbGroup[0],dbGroup[1],dbGroup[2]BUG
value:
dbGroupkeyhostheartbeat n
OK

2.1.7 reload

2.1.7.1 reload @@config

reload @@config;

2.19.09.0()2.19.09.0reload @@config_all

2.1.7.2 reload @@config_all

reload @@config_all [-s] [-f] [-r];

user.xmldb.xmlsharding.xml

-s reloadreload
-f dbGroup-rdbGroup,
-r ,
2.19 reload_all
OK ERROR

metameta

-
-
- shardingNode
- shardingNodedbGroup/dbInstance
- schema
- schema
- schema shardingNode
- schemashardingNodedbGroup/dbInstance

-rmeta
-r-s,metadatadbGroup/dbInstance

,metadata #1002
shardingNodeschemaglobal

(systemouterHAfalse), ,,, 2.12

2.1.7.3 reload @@metadata

reload @@metadata;

OK

reload @@metadata where schema=? [and table=?]

schema
OK
reload @@metadata where table in ('schema1.table1' ,'schema2.table2','schema1.table3',...)

schema1table1,table3schema2table2
OK

2.1.7.4 reload @@sqlslow=N;

reload @@sqlslow=N;

slow sqlN OK

2.1.7.5 reload @@user_stat ()

reload @@user_stat;

3.23.08.0

2.1.7.6 reload @@query_cf

reload @@query_cf[=table&column];

tablecolumn
show @@sql.condition
OK

reload @@query_cf;

reload @@query_cf=NULL;

2.1.7.7 reload @@general_log_file=?

reload @@general_log_file = 'general/general.log';

general'/'homepath
OK

2.1.7.8 reload @@statistic_table_size = ? [where table='?' | where table in (dble_information.tableA,...)]

reload @@statistic_table_size = 90;

sql_statistic_by_frontend_by_backend_by_entry_by_usersql_statistic_by_table_by_user_by_entrysql_statistic_by_associate_tables_by_entry_by_user90
OK

reload @@statistic_table_size = 90 where table = 'sql_statistic_by_table_by_user_by_entry'

sql_statistic_by_table_by_user_by_entry90
OK

reload @@statistic_table_size = 90 where table in(sql_statistic_by_table_by_user_by_entry,sql_statistic_by_associate_tables_by_entry_by_user)

sql_statistic_by_table_by_user_by_entrysql_statistic_by_associate_tables_by_entry_by_user90
OK

reload @@statistic_table_size = 90 where table='sql_log'

sql_log90
OK

2.1.7.9 reload @@samplingRate = ?

0[0,100] %

2.1.7.10 reload @@load_data.num=N

reload @@load_data.num=N

NmaxRowSizeToFilesql

OK

2.1.7.11 reload @@xaIdCheck.period=N

reload @@xaIdCheck.period=N

N>0XA(s)N<=0,; N=6060sXA

OK

2.1.9 offline

offline;

dble, dblepingselect user

OK

2.1.10 online

online

dbleoffline
OK

2.1.13 dryrun

reloaddryrun

sharding.xml reloaddryrun sharding.xml:

```
<?xml version="1.0"?>
<dble:sharding xmlns:dble="http://dble.cloud/">
    <schema name="testdb" sqlMaxLimit="100" >
        <shardingTable name="sharding_two_node" shardingNode="dn1,dn2" shardingColumn="id" function="two-long" />
        <shardingTable name="sharding_two_node2" shardingNode="dn1,dn2" shardingColumn="id" function="two-long" />
        <shardingTable name="sharding_two_node3" shardingNode="dn1,dn2" shardingColumn="id" function="two-long" />
        <shardingTable name="sharding_four_node" shardingNode="dn1,dn2,dn3,dn4" shardingColumn="id" function="rule_simple"  />
        <globalTable name="test_table"shardingNode="dn$1-2"/>
        <shardingTable name="a_test" shardingNode="dn1,dn2,dn3,dn4" shardingColumn="id" function="rule_simple"  />
        <shardingTable name="a_order" shardingNode="dn1,dn2,dn3,dn4" shardingColumn="id" function="rule_simple"  />
        <shardingTable name="test_shard" shardingNode="dn1,dn2,dn3,dn4" shardingColumn="id" function="rule_simple" />
        <globalTable name="test_global" shardingNode="dn1,dn2,dn3,dn4"/>
        <shardingTable name="sbtest1" shardingNode="dn1,dn2,dn3,dn4" shardingColumn="id" function="rule_simple"  />
    </schema>
    <schema name="nosharding_test" sqlMaxLimit="100" shardingNode="dn5">
    </schema>
    <shardingNode name="dn1" dbGroup="dh1" database="ares_test" />
    <shardingNode name="dn2" dbGroup="dh2" database="dble_test" />
    <shardingNode name="dn3" dbGroup="dh1" database="dble_test" />
    <shardingNode name="dn4" dbGroup="dh2" database="dble_test" />
    <shardingNode name="dn5" dbGroup="dh1" database="nosharding" />
    <shardingNode name="dn8" dbGroup="dh1" database="xxxoooxxx" />

<function name="rule_simple" class="Hash">
        <property name="partitionCount">4</property>
        <property name="partitionLength">1</property>
    </function>
</dble:sharding>
<function class="Hash" name="two-long">
        <property name="partitionCount">2</property>
        <property name="partitionLength">1</property>
    </function>
```

dryrun

```
mysql> dryrun;
+------+---------+----------------------------+
| TYPE | LEVEL   | DETAIL                     |
+------+---------+----------------------------+
| Xml  | WARNING | shardingNode dn9 is useless |
| Xml  | WARNING | shardingNode dn8 is useless |
+------+---------+----------------------------+
2 rows in set (0.58 sec)
```

TYPE: XMLxmlBACKEND

LEVAL:WARNNING ERROR,WARNNING

DETAIL :

2.1.14 shardingNode

shardingNodedbGroupshardingNodeshardingNode

2.1.14.0

pausedblequeuewait_limitresume,
pausepausetimeoutsqldblesql
pausedble server pause shardingNode reloaddbledble reload

2.1.14.1

`pause @@shardingNode = 'dn1,dn2' and timeout = 10 ,queue = 10,wait_limit = 10;`

:
timeout:timeoutpause
queue:
wait_limit:wait_limit

2.1.14.2

`RESUME;` OK “No shardingNode paused”

2.1.14.3

`show @@pause;`

```
mysql> show @@pause;
+---------------------+
| PAUSE_SHARDING_NODE |
+---------------------+
| dn1                 |
| dn2                 |
+---------------------+
2 rows in set (0.15 sec)
```

2.1.15

:

2.1.15.1

```
mysql> show @@slow_query_log;
+------------------+
| @@slow_query_log |
+------------------+
| 0                |
+------------------+
1 row in set (0.00 sec)
```

2.1.15.2

```
mysql> enable @@slow_query_log;
Query OK, 1 row affected (0.09 sec)
enable slow_query_log success
```

2.1.15.3

```
mysql> disable @@slow_query_log;
Query OK, 1 row affected (0.03 sec)
disable slow_query_log success
```

2.1.15.4

```
mysql> show @@slow_query.time;
+-------------------+
| @@slow_query.time |
+-------------------+
| 100               |
+-------------------+
1 row in set (0.00 sec)
```

2.1.15.5

```
mysql> reload @@slow_query.time=200;
Query OK, 1 row affected (0.10 sec)
reload @@slow_query.time success

mysql> show @@slow_query.time;
+-------------------+
| @@slow_query.time |
+-------------------+
| 200               |
+-------------------+
1 row in set (0.00 sec)
```

2.1.15.6

```
mysql> show @@slow_query.flushperiod;
+--------------------------+
| @@slow_query.flushperiod |
+--------------------------+
| 1                        |
+--------------------------+
1 row in set (0.00 sec)
```

2.1.15.7

```
mysql> reload @@slow_query.flushperiod=2;
Query OK, 1 row affected (0.05 sec)
reload @@slow_query.flushPeriod success

mysql> show @@slow_query.flushperiod;
+--------------------------+
| @@slow_query.flushperiod |
+--------------------------+
```

```
| 2                        |
+--------------------------+
1 row in set (0.00 sec)
```

2.1.15.8

```
mysql> show @@slow_query.flushsize;
+------------------------+
| @@slow_query.flushsize |
+------------------------+
| 1000                   |
+------------------------+
1 row in set (0.01 sec)
```

2.1.15.9

```
mysql> reload @@slow_query.flushsize=1100;
Query OK, 1 row affected (0.03 sec)
reload @@slow_query.flushSize success

mysql> show @@slow_query.flushsize;
+------------------------+
| @@slow_query.flushsize |
+------------------------+
| 1100                   |
+------------------------+
1 row in set (0.00 sec)
```

2.1.15.10

slowQueueOverflowPolicybootstrap.cnf

```
mysql> reload @@slow_query.queue_policy=1;
Query OK, 1 row affected (0.02 sec)
reload @@slow_query.queue_policy success

mysql> select * from dble_variables where variable_name = 'slowQueueOverflowPolicy';
+-------------------------+----------------+-------------------------------------------------+-----------+
| variable_name           | variable_value | comment                                         | read_only |
+-------------------------+----------------+-------------------------------------------------+-----------+
| slowQueueOverflowPolicy | 1              | Slow log queue overflow policy, the default is 2 | false     |
+-------------------------+----------------+-------------------------------------------------+-----------+
1 row in set (0.01 sec)
```

2.1.15.11

show @@connection.sql.status where FRONT_ID= ?; query `trace` queryquery

```
mysql> show @@connection.sql.status where FRONT_ID= 1;
+--------------------------+-------------+-------------+--------------+---------------+----------------------------+
| OPERATION                | START(ms)   | END(ms)     | DURATION(ms) | SHARDING_NODE | SQL/REF                    |
+--------------------------+-------------+-------------+--------------+---------------+----------------------------+
|                 Read_SQL | 0.0         | 0.082598    | 0.082598     | -             | -                          |
|                Parse_SQL | 0.082598    | 0.676424    | 0.593826     | -             | -                          |
|        Route_Calculation | 0.676424    | 0.895382    | 0.218958     | -             | -                          |
| Prepare_to_Push/Optimize | 0.895382    | 6743.838628 | 6742.943246  | -             | -                          |
|              Execute_SQL | 6743.838628 | 6753.488422 | 9.649794     | dn1           | select * from sharding_4_t1 |
|              Execute_SQL | 6743.838628 | 6751.472835 | 7.634207     | dn3           | select * from sharding_4_t1 |
|              Execute_SQL | 6743.838628 | 6750.981646 | 7.143018     | dn4           | select * from sharding_4_t1 |
|              Execute_SQL | 6743.838628 | 6753.31394  | 9.475312     | dn2           | select * from sharding_4_t1 |
|             Fetch_result | 6753.488422 | 6754.383316 | 0.894894     | dn1           | select * from sharding_4_t1 |
|             Fetch_result | 6751.472835 | 6751.656604 | 0.183769     | dn3           | select * from sharding_4_t1 |
|             Fetch_result | 6750.981646 | 6751.188385 | 0.206739     | dn4           | select * from sharding_4_t1 |
|             Fetch_result | 6753.31394  | 6754.286055 | 0.972115     | dn2           | select * from sharding_4_t1 |
|          Write_to_Client | 6750.981646 | unfinished  | unknown      | -             | -                          |
+--------------------------+-------------+-------------+--------------+---------------+----------------------------+
13 rows in set (0.04 sec)
```

join

```
mysql> show @@connection.sql.status where FRONT_ID= 1;
+--------------------------+-------------+-------------+--------------+-------------------+---------------------------------------------
--------------------------------------+
| OPERATION                | START(ms)   | END(ms)     | DURATION(ms) | SHARDING_NODE     | SQL/REF
```

```
                                        |
+-------------------------+-------------+-------------+--------------+-------------------+---------------------------------------------
---------------------------------------+
|                 Read_SQL | 0.0         | 0.039588    | 0.039588     | -                 | -
                                        |
|                Parse_SQL | 0.039588    | 0.756578    | 0.71699      | -                 | -
                                        |
|        Route_Calculation | 0.756578    | 1.5547      | 0.798122     | -                 | -
                                        |
| Prepare_to_Push/Optimize | 1.5547      | 3.428551    | 1.873851     | -                 | -
                                        |
|              Execute_SQL | 3.428551    | 2362.10579  | 2358.677239  | dn1_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|             Fetch_result | 2362.10579  | unfinished  | unknown      | dn1_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|              Execute_SQL | 3.428551    | 2362.122407 | 2358.693856  | dn2_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|             Fetch_result | 2362.122407 | unfinished  | unknown      | dn2_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|              Execute_SQL | 3.428551    | 2362.307153 | 2358.878602  | dn3_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|             Fetch_result | 2362.307153 | unfinished  | unknown      | dn3_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|              Execute_SQL | 3.428551    | 2364.523615 | 2361.095064  | dn4_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|             Fetch_result | 2364.523615 | unfinished  | unknown      | dn4_0             | select `a`.`age`,`a`.`id`,`a`.`name` from  `sh
arding_4_t1` `a` ORDER BY `a`.`id` ASC |
|          MERGE_AND_ORDER | 2362.639012 | unfinished  | unknown      | merge_and_order_1 | dn1_0; dn2_0; dn3_0; dn4_0
                                        |
|            SHUFFLE_FIELD | 4178.383366 | unfinished  | unknown      | shuffle_field_1   | merge_and_order_1
                                        |
|              Execute_SQL | 3.428551    | 2365.71371  | 2362.285159  | dn1_1             | select `b`.`id` from  `sharding_2_t1` `b` ORDE
R BY `b`.`id` ASC                       |
|             Fetch_result | 2365.71371  | unfinished  | unknown      | dn1_1             | select `b`.`id` from  `sharding_2_t1` `b` ORDE
R BY `b`.`id` ASC                       |
|              Execute_SQL | 3.428551    | 2365.952707 | 2362.524156  | dn2_1             | select `b`.`id` from  `sharding_2_t1` `b` ORDE
R BY `b`.`id` ASC                       |
|             Fetch_result | 2365.952707 | unfinished  | unknown      | dn2_1             | select `b`.`id` from  `sharding_2_t1` `b` ORDE
R BY `b`.`id` ASC                       |
|          MERGE_AND_ORDER | 2366.164823 | unfinished  | unknown      | merge_and_order_2 | dn1_1; dn2_1
                                        |
|            SHUFFLE_FIELD | not started | unfinished  | unknown      | -                 | -
                                        |
|                     JOIN | not started | unfinished  | unknown      | -                 | -
                                        |
|            SHUFFLE_FIELD | not started | unfinished  | unknown      | -                 | -
                                        |
|          Write_to_Client | not started | unfinished  | unknown      | -                 | -
                                        |
+-------------------------+-------------+-------------+--------------+-------------------+---------------------------------------------
---------------------------------------+
23 rows in set (0.04 sec)
```

2.1.16 /

2.1.16.1

dbleshardingNode

```
create database @@shardingNode ='dn......'
```

shardingNode `dn$1-4`

shardingNodeshardingNodeshardingNode $Name does not exists.

shardingNode create database if not exists $databaseNameOK

2.1.16.2

shardingNode

```
drop database @@shardingNode ='dn......'
```

shardingNode `dn$1-4`

shardingNodeshardingNode $Name does not exists.

shardingNode drop database if exists $databaseNameOKshow @@shardingNodeSCHEMA_EXISTSfalse

check

2.1.17.0 check @@metadata

meta

- `check @@metadata`
  1. reload @@metadata datatime
  2. reload @@config_alldatatimedatetime
  3. metadatatime
- `check full @@metadata` ,:
  - `where schema=? and table=?`
  - `where schema=?`
  - `where reload_time='yyyy-MM-dd HH:mm:ss'` , `where reload_time>='yyyy-MM-dd HH:mm:ss'` , `where reload_time<='yyyy-MM-dd HH:mm:ss'`
  - `where reload_time is null`
  - `where consistent_in_sharding_nodes=0`
  - `where consistent_in_sharding_nodes = 1`
  - `where consistent_in_memory=0`
  - `where consistent_in_memory = 1`
  - If no where, retrun all results.
- `check full @@metadata` :

schema	table	reload_time	table_structure	consistent_in_sharding_nodes	consistent_in_memory
schema	table	2018-09-18 11:01:04	CREATE TABLE table`(.....	1	1

column **table_structure** `show create table`
column **consistent_in_sharding_nodes** 01
column **consistent_in_memory** meta01

table_structurenullconsistent_in_sharding_nodesconsistent_in_memory
consistent_in_sharding_nodes0consistent_in_memory

2.1.17.1 check @@global schema = '' [and table = '']

```
mysql> check @@global schema = 'testdb';
+--------+------------+----------------------------+-------------------+
| SCHEMA | TABLE      | DISTINCT_CONSISTENCY_NUMBER | ERROR_NODE_NUMBER |
+--------+------------+----------------------------+-------------------+
| testdb | tb_global1 |                          0 |                 0 |
+--------+------------+----------------------------+-------------------+
```

SCHEMA: SCHEMA
TABLE: TABLE
DISTINCT_CONSISTENCY_NUMBER
ERROR_NODE_NUMBER SQL
SQLDISTINCT_CONSISTENCY_NUMBER1

2.1.18 release

2.1.18.1 release @@reload_metadata

reload_metadatareload/reload config_all/reload metadatareload metadata
hangreload metadatadble OK ERROR

- configtable metareload @@metadatameta
- reloadreload5999SQLCODE“meta”
- dblereload show @@reload_status

2.1.19 split

POCdblesqldble 2.19.09.0mysqldump

dump

1. create database
2. ddldumpbigint
3. insertdbledump
4. ddldump
5.
6.

```
mysql > split src dest [-sschema] [-r500] [-w512] [-l10000] [--ignore] [-t2]

- srcdump
- destdump
- -sdumpschemaschemadumpschemadump                                                    -sschema                  -sschema     -sschema

- -r500
- -w5122
- -lsplitinsertvalues,4000
- --ignoreinsert
- -tinsert
```

-shardingNode-.dump

dump /tmp/mysql_dump.sql /tmp/dump/

```
split /tmp/mysql_dump.sql /tmp/dump/
```

splitdble.logsplitlog4j.xml

```
<Configuration status="WARN">
  <Appenders>
    <!-- dblelog4j.xmlAppenders -->
    <RollingFile name="DumpFileLog" fileName="logs/dump.log"
                 filePattern="logs/$${date:yyyy-MM}/dump-%d{MM-dd}-%i.log.gz">
      <PatternLayout>
        <Pattern>%d{yyyy-MM-dd HH:mm:ss.SSS} %5p [%t] (%l) - %m%n</Pattern>
      </PatternLayout>
      <Policies>
        <OnStartupTriggeringPolicy/>
        <SizeBasedTriggeringPolicy size="250 MB"/>
        <TimeBasedTriggeringPolicy/>
      </Policies>
      <DefaultRolloverStrategy max="10"/>
    </RollingFile>
  </Appenders>
  <Loggers>
    <!-- dblelog4j.xmlLoggersleveldebug -->
    <Logger name="dumpFileLog" level="info" additivity="false" includeLocation="false" >
      <AppenderRef ref="DumpFileLog" />
      <AppenderRef ref="RollingFile"/>
    </Logger>
  </Loggers>
</Configuration>
```

“dump file has bean read d%”

debug

dump file idletimeout kill @@connection id dump file

1.
2.
3. dump

2.1.20 flow_control

2.1.20.1

```
mysql> flow_control @@show;
+-------------------+------------------------+------------------------+
| FLOW_CONTROL_TYPE | FLOW_CONTROL_HIGH_LEVEL | FLOW_CONTROL_LOW_LEVEL |
+-------------------+------------------------+------------------------+
| FRONT_END         |                4194304 |                 262144 |
| dbGroup1-hostM1   |                4194304 |                 262144 |
| dbGroup2-hostM2   |                4194304 |                 262144 |
+-------------------+------------------------+------------------------+
1 row in set (0.00 sec)
```

- FLOW_CONTROL_TYPE “FRONT_END”;-
- FLOW_CONTROL_HIGH_LEVEL
- FLOW_CONTROL_LOW_LEVEL

2.1.20.2

flow_control @@set [enableFlowControl = true/false] [flowControlHighLevel = ?] [flowControlLowLevel = ?]

```
MySQL [(none)]> flow_control @@set enableFlowControl = true flowControlHighLevel= 100000 flowControlLowLevel = 30000;
Query OK, 0 rows affected (0.02 sec)
```

`bootstrap.dynamic.cnf`

- enableFlowControl bootstrap.cnfenableFlowControl
- flowControlHighLevelbootstrap.cnfflowControlHighLevel
- flowControlLowLevelbootstrap.cnfflowControlLowLevel

2.1.20.3

```
MySQL [(none)]> flow_control @@list;
+-----------------+---------------+---------------------------------------+---------------------+---------------------+-----------------+
| CONNECTION_TYPE  | CONNECTION_ID | CONNECTION_INFO                       | WRITING_QUEUE_BYTES | READING_QUEUE_BYTES | FLOW_CONTROLLED |
+-----------------+---------------+---------------------------------------+---------------------+---------------------+-----------------+
| ServerConnection |             1 | 127.0.0.1:50817/schema1 user = root   |              464594 |                NULL | false           |
| MySQLConnection  |             8 | 10.186.65.86:3307/db2 mysqlId = 1287  |                   0 |                   0 | false           |
| MySQLConnection  |            12 | 10.186.65.86:3308/db1 mysqlId = 1557  |                   0 |                   0 | false           |
| MySQLConnection  |             6 | 10.186.65.86:3307/db1 mysqlId = 1285  |                   0 |               86172 | false           |
| MySQLConnection  |            15 | 10.186.65.86:3308/db2 mysqlId = 1559  |                   0 |                   0 | false           |
+-----------------+---------------+---------------------------------------+---------------------+---------------------+-----------------+
```

- CONNECTION_TYPE MySQLConnection/ServerConnection
- CONNECTION_ID dbleIDID
- CONNECTION_INFO IPMySQLID
- WRITING_QUEUE_BYTES
- READING_QUEUE_BYTES null
- FLOW_CONTROLLED

dble_information.dble_flow_control

2.1.21

2.1.21.1 &

mysql/dble

2.1.21.2

fresh conn [forced] where dbGroup ='groupName' [and dbInstance='instanceName'];

- forced
- forced
- dbInstancedbGroupdbInstance
- dbInstancedbInstancedbGroupdbInstance

2.1.22

-
-
-
  - cluster @@detach
  - cluster @@attach
-
  -
  -
  -
-

dble

2.1.22.1

dble zookeeper/ucore

/

<3.21.10 ， dble dble

2.1.22.2

≥3.21.10dble dble

dble dble (2.1.22.4) `reload @@config`

2.1.22.3

cluster @@detach [timeout=10]

-
- (2.1.22.4)"cluster is detached"
- timeout 10s

cluster @@attach [timeout=10]

-
- timeout 10s

2.1.22.4

2.1.22.4.1

1.
2.
3.

(9066)

(9066)

(9066) (9066) (9066) timeout

2.1.22.4.2

"cluster is detached"

2.1.22.4.3

dble dble

A,B,C A B t1reloadCB t1A reload t1 A B A A reload reload B

2.1.22.5

https://actiontech.github.io/dble-docs-cn/2.Function/2.08_cluster.html

- DDL
- reload @@config
- show @@binlog.status
- view
-
-
- xa commit/rollback
- ”offset-step“ table

2.2

dble cluster.cnf

```
sequenceHandlerType=n
```

sequenceHandlerType

- 1 MySQL offset-step
- 2
- 3
- 4 offset-step

```
/*id*/
insert into table1(name) values('test');
```

2.2.1 MySQL offset-step

MySQL offset-step

1. 24
2. SELECT dble_seq_nextval(\'**seqName**\'); **seqName** **increment**[current_value, current_value+increment)
3. 2
4.

1.7.1 offset-step

2.2.2

dbleID
bigint63(63Java0)
63bits

a.29bits	b.10bits	c.12bits	d.12bits

- a - e
- a4129
- b10instance idbootstrap.cnfinstanceId
- c12
- d4112

1. bootstrap.cnfinstanceId1023
2. 40954095
3. java,411288834974657L(2010)
4. 4169

2.2.3

Zookeeper(ID63ID
PS:63Java0

2.2.3.1

63bits

a.9bits	b.9bits	c.6bits	d.39bits

:

- a - e
- aid9
- b9 id(bootstrap.cnfinstanceIdzookeeper, 1.7.3 time)
- c6
- d39(17)

2.2.3.2

cluster.cnfsequenceInstanceByZktrue, bootstrap.cnfinstanceId(2.2.2)

2.2.3.3

cluster.cnfsequenceInstanceByZktruezookeeper,zk, % 32 INSTANCEID.

2.2.4 offset-step

offset-stepzookeeper

1. (**`schemaX`.`tableX`**)
2. zookeepermin
3. (1.7.4 offset-step),max
4. max+1zookeepermin
5.

2.3

3.20.10.0dble3.20.10.0

2.3.1

2.3.1.1

dble user.xml rwSplitUserdbGroupdbGroupdb.xmluser.xmluser.xml

```
<dble:user xmlns:dble="http://dble.cloud/" version="4.0">
    <managerUser name="man1" password="654321" maxCon="100"/>
    <shardingUser name="root" password="123456" schemas="testdb" readOnly="false" maxCon="20"/>
    <rwSplitUser name="rwsu1" password="123456" dbGroup="rwGroup" maxCon="20"/>
</dble:user>
```

1. user.xmlshardingUserdblesharding.xml(dble)sharding.xml
2. dbledbGroupdbGrouprwSplitUserdbGroupdb.xmlshardingUserdbGroupschemassharding.xmlshardingNode
3. rwSplitUserdbGroup
4. dbGroupinstancedbGroupinstance

2.3.1.2

db.xmlsharding.xmldb.xmlsharding.xml

2.3.2

dbledbInstancerwSplitMode0db.xml

1. dbInstance
2.

2.3.2.1 dbInstance

dbInstancesdbInstancedbInstanceshow slave statusdbledelayThresholddbInstancesdelayThreshold=-1

- (primary="true")
  - rwSplitMod2dbInstances
  - (primary primary="false")
    - dbInstances
    - dbInstances
-
  -

2.3.2.2

dbInstancedbInstance

- dbInstance
- dbInstance
  - dbInstance(readWeight), ,
  - dbInstance,

2.3.2.3 dbGrouprwSplitMode

2.3.3

2.3.3.1

1. ddl
2. dml
3. prepared statement
4.

2.3.3.2

1. SQL select show

2.3.4

1. druid - set
2. druid - set session transaction read write, isolation level repeatable read
3. >= dble 3.21.06.x
4. set transaction read write
5. select
6. select ... into load datadble
7. mysqlnulldble
8. set hint
9.
10. ,
11. allowMultiQueries=true (false) jdbc multi-queries , dble MySQL Command-Line client

2.3.5

rwStickyTime

, , .

SQLSQLrwStickyTimeSQL().
Hint SQL

db.xmlrwSplitMode

rwStickyTime=10001000ms

Step	Time Line	SQL	InstanceDB of backend	
0	50ms	Hint_SQL_1(/*master*/ sql)	master	timeA
1	100ms	SQL_1	master	timeA=100ms
2	500ms	SQL_2	master	rwStickyTime>0(500ms-timeA)<=rwStickyTimeSQL
3	600ms	Hint_SQL_2(/*slave*/ sql)	slave	
4	900ms	SQL_3	master	rwStickyTime>0(900ms-timeA)<=rwStickyTimeSQL
5	2000ms	SQL_4	slave	(rwStickyTime>0&& (2000ms-timeA) <=rwStickyTime)

SQLSQL `select... show ...` SQLSQL.

2.3.6

dbleinstanceinstance

2.3.6.1

dblebootstrap.cnfdb.xml

bootstrap.cnf

```
-Ddistrict=district1
-DdataCenter=dataCenterA
```

db.xml

```
<?xml version="1.0"?>
<dble:db xmlns:dble="http://dble.cloud/">

    <dbGroup name="dbGroup1" rwSplitMode="1" delayThreshold="10000">
        <heartbeat errorRetryCount="1" timeout="10" keepAlive="60" >show slave status</heartbeat>
        <dbInstance name="instanceM1" url="ip4:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" dbDistrict="district1"
dbDataCenter="dataCenterA" primary="true">
        </dbInstance>
        <!-- can have multi read instances -->
        <dbInstance name="instanceS1" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" dbDistrict="district1"
dbDataCenter="dataCenterA" primary="false">
        </dbInstance>
        <dbInstance name="instanceS2" url="ip6:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" dbDistrict="district1"
dbDataCenter="dataCenterA" primary="false">
        </dbInstance>
           <dbInstance name="instanceS3" url="ip7:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" dbDistrict="district
1" dbDataCenter="dataCenterB" primary="false">
        </dbInstance>
        <dbInstance name="instanceS4" url="ip8:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" dbDistrict="district2"
dbDataCenter="dataCenterC" primary="false">
        </dbInstance>
    </dbGroup>
</dble:db>
```

1. select
2. rwSplitMode
3. bootstrap.cnfdistrictdbinstancedbDistrict
4.
   4.1 districtdataCenterinstance
   4.2 4.14.1instancedistrictinstance
   4.3 4.24.2instanceinstance
5. hinthint

dbledbGroup1select

dble
district：district1
dataCenter：dataCenterA
符合4.1规则匹配
instanceS1
district：district1
dataCenter：dataCenterA
instanceS2
district：district1
dataCenter：dataCenterA
不符合4.1规则，符合4.2规则匹配
instanceS3
district：district1
dataCenter：dataCenterB
不符合4.2规则,符合4.3规则匹配
instanceS4
district：district2
dataCenter：dataCenterC

2.4 /Hint

Hint, :SQLSQL“”

-
- dbleinsert…select…

SQLSQLSQLSQLSQLSQLSQL

2.4.1 Hint

Hint

1. /*!dble:type=....*/
2. /*#dble:type=...*/
3. /* */()

```
"/*#dble: */" for mybatis and "/*!dble: */"  for mysql
```

Hint

type4shardingnodedb_typesqldb_instance_url

2.4.2 shardingnode

1.
   shardingnode=node
   node,(node1.5 sharding.xml)
2.

2.4.3 db_type

1.
   db_type=masterdb_type=slave
2.

3.
   delete, insert, replace, update, ddldb_type=slave

2.4.4 sql

1.
   sql=**sql_statement**
2.
   sql_statementsql

2.4.5 db_instance_url

1.
   db_instance_url=**ip:port**
2.
   mysql
3.
   delete, insert, replace, update, ddlmysqlread_only

2.4.6

- dbleMySQL, MySQL #1169
- selectSQLdelete/update/insert delete/update/insert SQL
- SQL
- hintDDLreload @@metadata
- hintsession
- SQLSQL select id from tab_a where id='10000'
-
- / *xxx* /(sql)uproxyslavedblemaster

2.5

- 2.5.1 XA
- 2.5.2 XA
- 2.5.3 XA
- 2.5.4 XA
- 2.5.5
- 2.5.6 XA

2.5.1 XA

2.5.1.1 XA

2 DbleMysqlXAMySQL5.7XAMySQL 5.7dbleXA

1. set autocommit=0;
2. XA set xa=on;
3. SQL
4. commit/rollback;

SQL dble SQL 100

JDBCXAdemo
()

```
public class XaDemo {

    public static final String URL = "jdbc:mysql://localhost:8066/testdb";
                                    //jdbc:mysql://127.0.0.1:8066?sessionVariables=xa=1
                                    //set xa = 1
    public static final String USER = "root";
    public static final String PASSWORD = "123456";

    public static void main(String[] args){
        try {
            //1.
            Class.forName("com.mysql.jdbc.Driver");
            //2.
            Connection conn = DriverManager.getConnection(URL, USER, PASSWORD);
            //3.
            Statement stmt = conn.createStatement();
            stmt.execute("set xa = 1");
            //xa
            stmt.execute("begin");
            try {
                //catch
                //rollback
                stmt.execute("insert into xa_test set id = 11,name = '3333'");
                stmt.execute("insert into xa_test set id = 22,name = '333'");
                stmt.execute("insert into xa_test set id = 3,name = '33'");
                //
                stmt.execute("commit");
            }catch (Exception e){
                System.out.println(" error "+e);
                //
                stmt.execute("rollback");
            }finally {
                stmt.close();
                conn.close();
            }

        }catch(Exception e){

        }
    }
}
```

2.5.1.2 XA

xamysql5.7xa

XA BEGIN xid（事务开始）
业务SQL执行
XA END xid(事务结束，事务内容被确定)
在此之前执行事务的所有状态在mysql中未被持久化，若发生重启或者连接断开所有事务内容被放弃
XA PREPARE xid
(xa事务内容持久化)
在此之前所有变更尚未被提交，仍然可以使用rollback回滚事务内容
XA COMMIT xid
(xa事务内容正式提交,事务内容生效)

2.5.2 XA

2.5.2.1 XA

DbleXA

1. XAEND PREPARE COMMIT
2. PREPARE
3. PREPAREROLLBACK
4. COMMIT

2.5.2.2 XA

rollback

2.5.2.3 XA

2.19.03.0dble2.19.03.0

2.5.2.3.1

2.19.03.0bootstrap.cnfxaRetryCountxa

1. xaRetryCount 0
2. xaRetryCount 0xaRetryCount

2.5.2.3.2

2.19.03.0

1. `show @@session.xa` xa
2. `kill @@xa_session id1,id2...` sessionxa

2.5.2.3.3

2.5.3 XA

2.5.3.1 XA

XA dbleXA dbleXAXA

XASQLdble

2.5.3.2 XAxaLogClean

xa bootstrap.cnfxaLogCleanPeriod

2.5.3.3 XAxaSessionCheck

dblecommit(commit,XApreparecommit)rollback xaprepare

2.5.4 XA

2.5.4.1 XA

DbleXADBLEXA

```
1. ID
2.
3. host
4.
5.
6. ()
7.
```

```
{
    "id": "'Dble_Server.1.15'",
    "state": "8",
    "participants": [
        {
            "host": "10.186.24.37",
            "port": "3308",
            "p_state": "8",
            "expires": 0,
            "schema": "db3",
            "tableName": "testdb.test1",
            "repeatTableIndex": 0
        },
        {
            "host": "10.186.24.37",
            "port": "3306",
            "p_state": "8",
            "expires": 0,
            "schema": "db2",
            "tableName": "testdb.test2",
            "repeatTableIndex": 0
        },
        {
            "host": "10.186.24.37",
            "port": "3308",
            "p_state": "8",
            "expires": 0,
            "schema": "db2",
            "tableName": "testdb.test3",
            "repeatTableIndex": 0
        },
        {
            "host": "10.186.24.37",
            "port": "3306",
            "p_state": "8",
            "expires": 0,
            "schema": "db1",
            "tableName": "testdb.test4",
            "repeatTableIndex": 0
        }
    ]
}
```

2.5.4.2 XAstatus

status		
0	`TX_INITIALIZE_STATE`	XA
1	`TX_STARTED_STATE`	XA XA
2	`TX_ENDED_STATE`	XA END
3	`TX_PREPARED_STATE`	XA PREPARED

4	`TX_PREPARE_UNCONNECT_STATE`	XA PREPARED
5	`TX_COMMIT_FAILED_STATE`	XA COMMIT
6	`TX_ROLLBACK_FAILED_STATE`	XA ROLLBACK
7	`TX_CONN_QUIT`	mysql
8	`TX_COMMITTED_STATE`	XA
9	`TX_ROLLBACKED_STATE`	XA
10	`TX_COMMITTING_STATE`	XA
11	`TX_ROLLBACKING_STATE`	XA
12	`TX_PREPARING_STATE`	XA prepare

2.5.4.3 XA

xa

bootstrap.cnf{xaRecoveryLogBaseDir}/{XaRecoveryLogBaseName}.log./xalogs/xalog-1.log

Dble

ZK

ZKDbleZKXAZK

XAdble/{clusterId}/XALOG/{myid} Key

2.5.4.4

1ShardingRwSplit
2()begin
3Modifysql
4Modifysql
Modifysql

2.5.5

mysqlfrontconnectionsessiondblesessionsessiontargetautocommittargetSQLconnectiontargetsessioncommitrollback

Dblemysqlmysqlcommitdn1,dn2,dn3,dn4commitdn1,dn2,dn3dn4dn1,dn2.dn3

:

2.5.6 XA

2.5.6.1 &

Xid

Xid:xa.
ShardingXA(set xa = on)Xid_Session();
Xid_Session: `Dble_Server.{instanceName}.{xaIDInc}` `instanceName` dble, `xaIDInc` id.
, Xid_Session `db` ()Xid, ;
Xid: `Dble_Server.{instanceName}.{xaIDInc}.{db}`
`xaIDInc` : dblexaIDInc1(); xaRecoveryXid, xaIDIncXidxaIDInc+1.
xaRecovery: {xaRecoveryLogBaseDir}/{XaRecoveryLogBaseName}.log, xalogs/xalog-1.log

dbleXid; xaRecoverydble, xaIDInc1; XidxaIDInc, 'The XID alread exists'; dbleXA.

2.5.6.2

ShardingdbGroup Xid: Xid_SessionXid
Xid: `Dble_Server.{instanceName}.(\d)(.[^\s]+)?`
Xid: Suspected residual xa transaction.....

Xid, Xid, ;

XidxaIDIncdble()xaIDInc, Xid.

300sbootstrap.cnf `-DxaIdCheckPeriod=300`

```
reload @@xaIdCheck.period=60; -- ()60s
reload @@xaIdCheck.period=0; -- 0
```

Start XaIdCheckPeriodStop XaIdCheckPeriod

2.5.6.3

xa

, dble_xa_recoverXA.

dbleXid

, session_connections(show @@connection)xa_id, xa_idXid_SessionXA.

2.6

dbleMySQL PhysicalDbInstance PhysicalDbInstance

1.
2. MySQLOneTimeJob

2.6.1 dble

CopyOnWriteArrayList MySQLstateevictor

2.6.1.1

2.6.1.2

2.6.1.3

evictorevictor

minConminConmin(- -) - 0

minConminCon - > 0 && idleTimeout

2.6.1.4

- testOnCreatetruepingconnectionHeartbeatTimeout
- testOnBorrowtruepingconnectionHeartbeatTimeout
- testOnReturntruepingconnectionHeartbeatTimeout
- testWhileIdletruepingconnectionHeartbeatTimeout

2.6.2

CopyOnWriteArrayList MySQLstate

2.6.3

dble 2.25 dble
(flowHighLevel)(flowLowLevel)

2.6.4

testOnCreate	false		
testOnBorrow	false		
testOnReturn	false		
testWhileIdle	false		
connectionTimeout	30000 (30s)		
connectionHeartbeatTimeout	20		
timeBetweenEvictionRunsMillis	30000 (30s)		
idleTimeout	600000 (10 minute)		
heartbeatPeriodMillis	10000 (10s)		
evictorShutdownTimeoutMillis	10000 (10s)		
flowHighLevel	4194304		
flowLowLevel	262144		

```
<?xml version="1.0"?>
<!DOCTYPE dble:db SYSTEM "db.dtd">
<dble:db xmlns:dble="http://dble.cloud/">

    <dbGroup name="dbGroup1" rwSplitMode="1" delayThreshold="10000">
        <heartbeat errorRetryCount="1" timeout="10" keepAlive="60" >show slave status</heartbeat>
        <dbInstance name="instanceM1" url="ip4:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
            <property name="testOnCreate">false</property>
            <property name="testOnBorrow">false</property>
            <property name="testOnReturn">false</property>
            <property name="testWhileIdle">true</property>
            <property name="connectionTimeout">30000</property>
            <property name="connectionHeartbeatTimeout">20</property>
            <property name="timeBetweenEvictionRunsMillis">30000</property>
            <property name="idleTimeout">600000</property>
            <property name="heartbeatPeriodMillis">10000</property>
            <property name="evictorShutdownTimeoutMillis">10000</property>
            <property name="flowHighLevel">4194304 </property>
            <property name="flowLowLevel">262144 </property>
        </dbInstance>

        <!-- can have multi read instances -->
        <dbInstance name="instanceS1" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="false">
            <property name="heartbeatPeriodMillis">60000</property>
        </dbInstance>
```

```
    </dbGroup>
</dble:db>
```

2.6.5 dble

dbleMySQLheartbeatPeriodMillisdbleMySQLevictor

2.6.5.1

-
-

2.6.5.2

dble

- init
- ok
- timeoutHeartbeatTimeout
- errordble

2.6.5.3

- dbleerrorerrorRetryCountok
- dbleerrorRetryCounterror
- timeoutOK, init

2.6.6

dbledbledb.xmldbInstancedble

- dbInstancedbInstancemaxConminCon
- dbInstancemysqldblerwSplitMode=0

```
<dbGroup name="dbGroup1" rwSplitMode="1" delayThreshold="10000">
      <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
      <dbInstance name="instanceM1" url="ip4:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
      </dbInstance>
  </dbGroup>
   <dbGroup name="dbGroup2" rwSplitMode="1" delayThreshold="10000">
      <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
      <dbInstance name="instanceM2" url="ip4:3306" user="your_user" password="your_psw" maxCon="100" minCon="10" primary="true">
      </dbInstance>
  </dbGroup>
   <dbGroup name="dbGroup3" rwSplitMode="1" delayThreshold="10000">
      <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
      <dbInstance name="instanceM3" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
      </dbInstance>
  </dbGroup>
```

1.instanceM1instanceM2mysqldbledbInstance
2.instanceM1instanceM2mysqlinstanceM120050instanceM2100 10

2.7

2.7.1

- On-Heap JVM Xms ,Xmx jvm
- Off-HeapJVM XX:MaxDirectMemorySize
- DirectByteBufferPool = bufferPoolPageNumber*bufferPoolPageSize

  bufferPoolPageNumberbufferPoolPageSizebootstrap.cnf bufferPoolPageSize2M, bufferPoolPageNumber(MaxDirectMemorySize * 0.8 /bufferPoolPageSize),
- JVM

  tmpMin= Min(free)

  =((tmpMin/mappedFileSize))

  = *mappedFileSize (mappedFileSize64M)

  mappedFileSizebootstrap.cnf

2.7.2 DirectByteBufferPool

BufferPool

bufferPoolPage:

1.:

1.1

1.2 buffer

2.

bufferPoolPageNumberbufferPoolPageSize

3.

3.1

(bufferPoolChunkSize 4k,bufferPoolPageSize)

()

M*bufferPoolChunkSize

3.2

N+1bufferPoolPageNumber-1(N)

```
M
```

0N

(bufferPoolPageSize)On-Heap

4.

4.1 On-Heap

clearGC

4.2 Off-Heap

2.7.3

dble session

- JoinjoinMemSize(4M)join
- OrderorderMemSize(4M)
- OtherotherMemSize(4M)distinctgroupnestloop

,Heap4M

mappedFileSize

1:
2:DirectByteBufferPoolchunk

2.8 &

2.8.1

dble/

zookeeper

2.8.2

2.8.2.1 cluster.conf

ZK

```
#
clusterEnable=true
# zk
clusterMode=zk
# zk
clusterIP=10.186.19.aa:2281,10.186.60.bb:2281
#zkdble
rootPath=/dble
#dble
clusterId=cluster-1
# Ha
#needSyncHa=false
# binlog
#showBinlogStatusTimeout=60000
#
sequenceHandlerType=2
#
#sequenceStartTime=2010-11-04 09:42:54
#3instanceIdZK
#sequenceInstanceByZk=true
```

2.8.2.2 bootstrap.conf

instanceName instanceId 01023 0511

2.8.3

1.

init_zk_data.shZK,ZK

2.

ZK,ZK
ZK

2.8.4

A.DDL

DDLZKZK

1. DDL
   DDL,
1. ""
1. DDLtablemetaZKddlmetareload metadata
1. meta

   (meta,reload meta)
1. :view,viewview

B.reload @@config/ reload @@config_all

db.xmlsharding.xml, userxml ,sequence_conf.properties sequence_db_conf.properties

C.binlog

:

binlogshow master statusbinlog

show @@binlog.status session
sessionshow @@binlog.status
sessionsessionshow master status

:session1 tableAsession2tableA DDL metaLock.session3 show @@binlog.status.
session1 session3, session2session1,session3session2.
session3 showBinlogStatusTimeout(60s)

1.ZKzk
2.session
3./ZK
4.,show @@binlog.status
5.ZK

ZK

ZK/zk

D.View

zkviewdble

zkview key schema.table value {"serverId":"create_Server_id", "createSql":"view_create_sql"}

E.online

dbleonlineDDL

1.dble 2.dbleDDLbinlog

F.

needSyncHa

F.1 disable

1.
2.disable
3.

4.disable
5.
6.

F.2 enable

1.
2.enable
3.
4.
5.enable

F.3 switch

1.
2.switch
3.
4.
5.switch

G.

G.1 pause

1. pause_node.lock
2.
3.
4.
5.
6.

G.2 resume

1. pause_node.lock
2.
3.
4.
5.
6.

2.8.5 XA

XAzookeeper

2.8.6 ZK

```
rootPath(cluster.cnf)
    clusterId(cluster.cnf)
        conf
            inited
            status
                operator
                    instanceName(keybootstrap.cnf:reloadid)
            sharding(sharding.xmljson)
            db(db.xmljson)
            user(user.xmljson)
            migration()
                pause
                    instanceName(keybootstrap.cnf:)
                resume
                    instanceName(keybootstrap.cnf:)
            sequences
                instanceid //zk
                incr_sequence//
                    table_name
                common(sequence_conf.properties sequence_db_conf.properties)
        binlog_pause
            status ()
                instanceName(keybootstrap.cnf:)
        lock
            syncMeta.lock(,)
            confInit.lock
            confChange.lock
            binlogStatus.lock
            ddl_lock/schema.table
```

```
            view_lock/`schema`.`table`
            dbGroup_locks/groupName
            pause_node.lock
        online
            instanceName(keybootstrap.cnf)
                ddl
                    schema.table.PREPAREddl
                        instanceName(keybootstrap.cnf:)
                    schema.table2.COMPLETEddl ddl
                        instanceName(keybootstrap.cnf:)
                    schema.table3.PREPARE
        xalog
            node1
            node2
        view
            schema:view
            operator
                schema.view:(update/delete,:createupdate)
                    instanceName(keybootstrap.cnf:)

        dbGroups
            dbGroup_status
                groupName
            dbGroup_response
                instanceName(keybootstrap.cnf:)
```

2.8.7

twitter snowflake ZKinstanceID
offset-step ZKStep

2.8.9

clusterMode=ucore (), ucoredble(renewThread)
clusterMode=zkzkrenew

`renew lock of session success`

dblerenewconf reloadrenew

renew

dble_cluster_renew_threadrenew

```
mysql> select * from dble_cluster_renew_thread;
+-------------------------------------------------------------------+
| renew_thread                                                      |
+-------------------------------------------------------------------+
| UCORE_RENEW_universe/dble-v3/ushard-1/lock/ddl_lock/testdb.tablea |
+-------------------------------------------------------------------+
2 rows in set (0.00 sec)
```

ucore

kill renew

```
mysql> kill @@cluster_renew_thread 'UCORE_RENEW_universe/dble-v3/ushard-1/lock/confChange.lock';
Query OK, 0 rows affected (0.00 sec)
kill cluster renew thread successfully!
```

kill `manual kill cluster renew thread`
dblerenew

2.8.10

2.9 Grpc

2.9.1

Dbleucoredbleucoregrpcucore

2.9.2

cluster.cnfbootstrap.cnf

				/
url	grpcurl	cluster.cnf clusterIP	grpcIP	
port		cluster.cnf clusterPort	grpc	
serverId	ID	$ushard-id(ip1,ip2) ,$ushard-id bootstrap.cnf instanceName		
componentId	ID	$ushard-id bootstrap.cnf instanceName		
componentType		ushard		

2.10 meta

Meta

- 2.10.1 Meta
- 2.10.2 Meta
- 2.10.3
- 2.10.4 View Meta

2.10.1 Meta

dble

2.10.1.1

dbleschematable1.5 sharding.xml

show tables;

show create table ...

2.10.1.2

DbleDble

1 view

2 ZKview

view meta2.10.4 view meta

2.10.1.3

:

- ;
-
-
-
-

2.10.2 Meta

dbleddlddl

- create table
- drop table
- alter table
- truncate table
- create index
- drop index

zookeeper(1.1 cluster.cnf)Meta:

1. zookeeper
   dble
2. zookeeper
   :
   a. dblezookeeper
   b. dblezookeepr
   c. dble

2.10.3

DbledbleDbleDble

tableStructureCheckTaskcheckTableConsistencyPeriod30×60×100030checkTableConsistency0bootstrap.cnf

- schematable
- meta
- SQL “show create table”
- metaSet
- metameta
- metametameta

Dble,

2.10.4 view meta

2.10.4.1 view

- mysqlview
- dbleview

2.10.4.2 view meta

Dble 2.18.11.0 viewviewVIEWselectquerySQLview

MySQLView metaDbleviewDbleviewDbleDbleviewXASQL

-
- ZK

DblemetaZKSQLmeta

Dble 2.19.10.0mysql viewmysql viewdblemysql mysql viewview schema

```
<schema name="schema2" sqlMaxLimit="100" shardingNode="dn5">
</schema>
```

viewshardingNode dn5 mysql viewdbleview metamysql view dblereloaddble

2.10.4.2 view meta

JSONbootstrap.cnfviewPersistenceConfBaseDirviewPersistenceConfBaseName./viewConf/viewJson,

```
[{
    "schema": "testdb",
    "list": [{
        "name": "view_test",
        "sql": "create view view_test as select * from a_test"
    }, {
        "name": "vt2",
        "sql": "create or replace view vt2 as select * from suntest"
    }, {
        "name": "suntest",
        "sql": "create view suntest as select * from sbtest"
    }]
}]
```

ZK K/V

DbleviewkeyZK BASE_PATH/viewkeyschema_name:view_nameviewjsoncreate sqlserverID

```
{
    "serverId":"10010",
    "createSql":"create view view_test as select * from a_test"
}
```

JSONvalue /…./view/testdb:view_test

2.11

- 2.11.1
- 2.11.2
- 2.11.3
- 2.11.4
- 2.11.5 heartbeat
- 2.11.6
- 2.11.7 sql

2.11.1

dble
enableStatisticAnalysis

2.11.1.1

reload @@query_cf=**table**&**column**;

table column

```
reload @@query_cf;
```

2.11.1.2

```
show @@sql.condition;
```

2.11.2

enableStatisticAnalysis

2.11.2.1

-
-
-
-

2.11.2.2

```
show @@sql.sum.table;
```

```
show @@sql.sum.table true;
```

2.11.3

enableStatisticAnalysis

2.11.3.1

-
-
-

2.11.3.2

```
+ show @@sql.sum;
+ show @@sql.sum.user;
```

2.11.4

dble

1. initDB
2. query
3. stmtPrepare
4. stmtSendLongData
5. stmtReset
6. stmtExecute
7. stmtClose
8. ping
9. kill
10. quit
11. heartbeat
12. other

2.11.4.1

- show @@command;
- show @@command.count; 2.1

2.11.5 heartbeat

heartbeatmysqlheartbeatmysqlheartbeat

2.11.5.1

heartbeatheartbeat

2.11.5.2

heartbeat

- show @@heartbeat;
- show @@heartbeat.detail where name=xxx; xxxdbinstance
- show @@dbinstance.synstatus;
- show @@dbinstance.syndetail where name=xxx;xxxdbinstance

2.1

2.11.6

dble

2.11.6.1

-
-
- /

2.11.6.2

- show @@connection;
- show @@backend;
- show @@connection.sql;

2.1

2.11.7 sql

sql, samplingRate=100 sql_log sql

2.11.3.1

1. sql
2. sql
3. sql
4. sql10000 5maxResultSet

2.11.3.2 sql

```
+ show @@sql;
+ show @@sql.high;
+ show @@sql.slow;
+ show @@sql.large;
+ show @@sql.resultset;
```

2.11.3.3

```
truncate sql_log
```

2.12

2.20.04.0,
MySQL:
dblepython3dble,bootstrap.cnfsystemuseOuterHa false
dblesystemuseOuterHa true.

2.12.1

- dblebootstrap.cnfsystemuseOuterHa false
- python3"python"

2.12.2

dbledblepython3db.xmldble

dble

```
show @@custom_mysql_ha
```

python

```
enable @@custom_mysql_ha
```

```
disable @@custom_mysql_ha
```

2.12.2

2.12.2.1 linux

2.12.2.2 reload

reload @@config python
1. `disable @@custom_mysql_ha`
2.
3. `reload @@config`
4. `enable @@custom_mysql_ha`

2.12.2.3 python

custom_mysql_ha.py dblebin,python3,

1Python3,python3

```
/usr/local/bin/python3 --version
/usr/local/bin/pip3 --version
```

2mysqlclient

CentOS

```
yum install mysql-devel
```

or Ubuntu

```
apt-get install libmysqlclient-dev
```

```
pip3 install mysqlclient
```

3six

```
pip3 install six
```

or

```
pip3 install six -i http://pypi.douban.com/simple --trusted-host pypi.douban.com
```

4coloredlogs

```
pip3 install coloredlogs
```

or

```
pip3 install coloredlogs -i http://pypi.douban.com/simple --trusted-host pypi.douban.com
```

5rsa

```
pip3 install rsa
```

or

```
pip3 install rsa -i http://pypi.douban.com/simple --trusted-host pypi.douban.com
```

2.13

2.13.1

- bootstrap.cnfprocessorCheckPeriod
- bootstrap.cnfidleTimeout
-

2.13.2 SQL

- bootstrap.cnfprocessorCheckPeriod
- sqlExecuteTimeout
- DDL

2.14 ER

2.14.1 ER

join,nest loop

join

join

:

ER

```
<shardingTable name="sales" shardingNode="dn1,dn2" function="sharding" shardingColumn="id">
<childTable name="sales_detail" joinColumn="sales_detail_pos_num" parentColumn="sales_pos_num"/>
</table>
```

2.14.2 ER

2dbleERER

```
<!--schema-->
<shardingTable name="tableA" shardingNode="dn1,dn2" function="hash_function" shardingColumn="id_a" />
<shardingTable name="tableB" shardingNode="dn1,dn2" function="hash_function" shardingColumn="id_b" />
<shardingTable name="tableC" shardingNode="dn2,dn1" function="hash_function" shardingColumn="id_c" />
<shardingTable name="tableD" shardingNode="dn3,dn4" function="hash_function" shardingColumn="id_a" />
<shardingTable name="tableE" shardingNode="dn1,dn2" function="hash_function" shardingColumn="id_a" />
<shardingTable name="tableF" shardingNode="dn1,dn2" function="enum_par" shardingColumn="id_a" />

<!--rfunction-->
<function name="enum_par"
   class="com.actiontech.dble.route.function.PartitionByFileMap">
   <property name="mapFile">partition-hash-int.txt</property>
</function>
```

```
<function name="hash_function" class="com.actiontech.dble.route.function.PartitionByLong">
   <property name="partitionCount">2</property>
   <property name="partitionLength">512</property>
</function>
```

functionER

table			function	
tableA	id_a	dn1,dn2	hash_function	1
tableB	id_b	dn1,dn2	hash_function	1
tableC	id_c	dn2,dn1	hash_function	2
tableD	id_a	dn3,dn4	hash_function	3
tableE	id_a	dn1,dn2	hash_function	1
tableF	id_a	dn1,dn2	enum_par	4

ER

```
<tableA.id_a , tableB.id_b, tableE.id_a >

<tableC.id_c>

<tableD.id_a>

<tableF.id_a>
```

PSschemaschemaERER.

2.15 global

“”“”

:

-
-
-

dble “”

-
-
- JOIN

JOIN

:

:,

JOIN.

JOIN (SQL):

```
SELECT ,,COUNT(*)  AS
FROM
JOIN  USING(ID)
WHERE ()
GROUP  BY ,
```

2.16 cache

cache 1.6

2.16.1

[sql,]

KEYpool.SQLRouteCache
VALUE cachefactoryname,

2.16.2 ER

[joinColumn,]

KEYpool.ER_SQL2PARENTID

VALUEcachefactoryname,

2.17

2.17.1

SQLSQL

2.17.2

dbledble
dble: SQLdbleSQLSQLSQL
: MySQL

2.17.3 dble

dbleEXPLAINdble1

```
explain select * from test;
+---------------+----------+-----------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                     |
+---------------+----------+-----------------------------+
| dn1           | BASE SQL | SELECT * FROM test LIMIT 100 |
| dn2           | BASE SQL | SELECT * FROM test LIMIT 100 |
+---------------+----------+-----------------------------+
2 rows in set (0.01 sec)
```

2

```
mysql> explain select * from test where id =1;
+---------------+----------+--------------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                        |
+---------------+----------+--------------------------------+
| dn1           | BASE SQL | select * from test where id =1 |
+---------------+----------+--------------------------------+
1 row in set (0.04 sec)
```

EXPLAINSQL

3:

```
mysql> explain select * from sharding_two_node a inner join sharding_four_node b on a.id =b.id;

+---------------+----------+-------------------------------------------------------------------------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                                                                                   |
+---------------+----------+-------------------------------------------------------------------------------------------+
| dn1.0         | BASE SQL | select `a`.`id`,`a`.`c_char`,`a`.`ts`,`a`.`si` from  `sharding_two_node` `a` ORDER BY `a`.`id` ASC |
| dn2.0         | BASE SQL | select `a`.`id`,`a`.`c_char`,`a`.`ts`,`a`.`si` from  `sharding_two_node` `a` ORDER BY `a`.`id` ASC |
| dn1.1         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn2.1         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn3.0         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| dn4.0         | BASE SQL | select `b`.`id`,`b`.`c_flag`,`b`.`c_decimal` from  `sharding_four_node` `b` ORDER BY `b`.`id` ASC  |
| merge.1       | MERGE    | dn1.0, dn2.0                                                                                              |
| merge.2       | MERGE    | dn1.1, dn2.1, dn3.0, dn4.0                                                                                |
| join.1        | JOIN     | merge.1, merge.2                                                                                          |
+---------------+----------+-------------------------------------------------------------------------------------------+
9 rows in set (0.00 sec)
```

4:

```
mysql> explain select id from single union all select b.si from sharding_four_node a inner join  sharding_two_node b on a.id =b.id
+-----------------+-----------+-------------------------------------------------------------------------+
| SHARDING_NODE   | TYPE      | SQL/REF                                                                 |
+-----------------+-----------+-------------------------------------------------------------------------+
| dn1.0           | BASE SQL  | select `single`.`id` from  `single`                                     |
| dn1.1           | BASE SQL  | select `a`.`id` from  `sharding_four_node` `a` ORDER BY `a`.`id` ASC    |
| dn2.0           | BASE SQL  | select `a`.`id` from  `sharding_four_node` `a` ORDER BY `a`.`id` ASC    |
| dn3.0           | BASE SQL  | select `a`.`id` from  `sharding_four_node` `a` ORDER BY `a`.`id` ASC    |
| dn4.0           | BASE SQL  | select `a`.`id` from  `sharding_four_node` `a` ORDER BY `a`.`id` ASC    |
| dn1.2           | BASE SQL  | select `b`.`si`,`b`.`id` from  `sharding_two_node` `b` ORDER BY `b`.`id` ASC |
| dn2.1           | BASE SQL  | select `b`.`si`,`b`.`id` from  `sharding_two_node` `b` ORDER BY `b`.`id` ASC |
| merge.2         | MERGE     | dn1.1, dn2.0, dn3.0, dn4.0                                              |
| merge.3         | MERGE     | dn1.2, dn2.1                                                            |
```

```
| join.1          | JOIN      | merge.2, merge.3                                                                |
| merge.1         | MERGE     | dn1.0                                                                           |
| union_all.1     | UNION_ALL | join.1, merge.1                                                                 |
+-----------------+-----------+---------------------------------------------------------------------------------+
12 rows in set (0.01 sec)
```

3SHARDING_NODE,TYPESQL/REF

2.17.3.1

12

- **SHARDING_NODE**sharding.xmlshardingNodenamesql
- **TYPE** `BASE SQL` ,
- **SQL/REF**SQL,SQL1limit 100

2.17.3.2

dble3join

```
                        ┌──────────┐
                        │          │
                   ┌────►   join.1  ◄────┐
                   │    │          │    │
                   │    └──────────┘    │
                   │                    │
              ┌────┴─────┐         ┌────┴─────┐
              │          │         │          │
     ┌────────►  merge.1 │   ┌─────►  merge.2 ◄────┐
     │        │          │   │     │          │    │
     │        └────▲─────┘   │     └──▲──▲────┘    │
     │             │         │        │  │         │
     │             │         │        │  │         │
┌────┴────┐   ┌────┴────┐   ┌────┴────┐  ┌────┴────┐  ┌────┴────┐
│         │   │         │   │         │  │         │  │         │
│ dn1.0 │   │ dn2.0 │   │ dn1.1 │  │ dn2.1 │  │ dn3.0 │  │ dn4.0 │
└─────────┘   └─────────┘   └─────────┘  └─────────┘  └─────────┘  └─────────┘
```

- **SHARDING_NODE**sharding.xmlshardingNodenamesqldble
- **TYPE** `BASE SQL` ,
  - MERGE
  - MERGE_AND_ORDER
  - AGGREGATE
  - DISTINCT
  - LIMITn
  - WHERE_FILTERwhere
  - HAVING_FILTERhaving
  - SHUFFLE_FIELD&
  - UNION_ALLunion allsqlunionUNION_ALLDISTINCT
  - ORDER
  - NOT_INnot in
  - JOINjoin
  - DIRECT_GROUPgroup by
  - NEST_LOOPNEST_LOOP join
  - IN_SUB_QUERYin
  - ALL_ANY_SUB_QUERYall/any
  - SCALAR_SUB_QUERY
  - RENAME_DERIVED_SUB_QUERYDERIVED
  - INNER_FUNC_ADD sqldbleLAST_INSERT_ID
  - INNER_FUNC_MERGEsqlselectdbleLAST_INSERT_ID
  - for CHILD in UPDATE_SUB_QUERY.RESULTSupdateselectupdate
  - MERGE UPDATEupdate
- **SQL/REF**SQL,SQL **SHARDING_NODE**,

2.17.4

EXPLAIN2

```
mysql> explain2 shardingnode=dn1 sql=select * from test where id =1;
+----+-------------+-------+------------+------+---------------+------+---------+------+------+----------+-------------+
```

```
| id | select_type | table | partitions | type | possible_keys | key  | key_len | ref  | rows | filtered | Extra       |
+----+-------------+-------+------------+------+---------------+------+---------+------+------+----------+-------------+
|  1 | SIMPLE      | test  | NULL       | ALL  | NULL          | NULL | NULL    | NULL |    1 |   100.00 | Using where |
+----+-------------+-------+------------+------+---------------+------+---------+------+------+----------+-------------+
1 row in set, 1 warning (0.01 sec)
```

explain2sqlexplainshardingnodeexplainsql

2.18

- Btrace()
- managershow @@thread_used()

2.18.1 Btrace

2.18.1.1

Dble, BTraceCostTime.javaBtrace,Btrace v.1.3
Btrace https://github.com/btraceio/btrace
bootstrap.cnfuseCostTimeStatcostSamplePercentuseCostTimeStat = 1costSamplePercent1%btrace

btracedble

```
profiling:
  Block                          Invocations  SelfTime.Total  SelfTime.Avg  SelfTime.Min  SelfTime.Max  WallTime.Total  WallTime.Avg  WallTime.Min  WallTime.Max
  request->1.startProcess               9073      -638142734        -70334      -1051058        493260       202952071         22368         10565        493260
  request->2.endParse                   9073       234134936         25805         13206        523393       437087007         48174         23771       1016653
  request->3.endRoute                   9073       404389553         44570         20123        121474       841476560         92745         43894       1075553
  request->4.resFromBack                9073          592398            65       -649019       1602901      4805691043        529669        261612       1602901
  request->5.startExecuteBackend        9073       -56808823         -6261      -1749483       2020297      5047581273        556329        350530       2020297
  request->6.response                   9073        59150286          6519          3045        366620      5107315454        562913        353575       2386917
```

Block,Invocations,WallTime. , *SelfTime.* btrace

2.18.1.2

- **0** : 0dble
- **1.startProcess** :
- **2.endParse** : SQL
- **3.endRoute** : SQL
- **3.05 readyToDeliver** : SQL
- **4.resFromBack** :
- **4.X.resFromBack** : ,4.3.resFromBackdble1

- **5.startExecuteBackend** :
- **5.X.startExecuteBackend** : 5.3.startExecuteBackend
- **5.1.allBackendConnReceive** merage
- **6.response** :

:BtraceSQLSQLSQL

2.18.1.3

- 1-0bootstrap.cnffrontWorker 0dble01-0request->1.startProcess
- 4-3bootstrap.cnfNIOBackendRW
- 5-4bootstrap.cnfbackendWorker

2.18.2 Manager

2.18.2.1

Dble 18.02.0managerbootstrap.cnfuseThreadUsageStat
show @@thread_useddble

```
mysql> show @@thread_used;
+-------------------------+------------------+-------------+------------------+
| THREAD_NAME             | LAST_QUARTER_MIN | LAST_MINUTE | LAST_FIVE_MINUTE |
+-------------------------+------------------+-------------+------------------+
| backendBusinessExecutor2 | 0%               | 0%          | 0%               |
| backendBusinessExecutor1 | 0%               | 0%          | 0%               |
| backendBusinessExecutor0 | 0%               | 0%          | 0%               |
| BusinessExecutor3       | 0%               | 0%          | 0%               |
| $_NIO_REACTOR_BACKEND-2 | 0%               | 0%          | 0%               |
| BusinessExecutor1       | 0%               | 0%          | 0%               |
| $_NIO_REACTOR_BACKEND-3 | 0%               | 0%          | 0%               |
| BusinessExecutor2       | 12%              | 3%          | 3%               |
| $_NIO_REACTOR_BACKEND-0 | 0%               | 0%          | 0%               |
| $_NIO_REACTOR_FRONT-0   | 0%               | 0%          | 0%               |
| $_NIO_REACTOR_BACKEND-1 | 0%               | 0%          | 0%               |
| BusinessExecutor0       | 0%               | 0%          | 0%               |
+-------------------------+------------------+-------------+------------------+
12 rows in set (0.00 sec)
```

- BussinessExecutor**X**
  sqlmysql
- backendWorker**X**
  mysqlclient
- $_NIO_REACTOR_FRONT_**X**
  ,,BussinessExecutor
- $_NIO_REACTOR_BACKEND_**X**
  mysqlbackendWorker

2.18.2.2

80%

- NIOFrontRW _NIO_REACTOR_FRONT_**X**
- NIOBackendRW _NIO_REACTOR_BACKEND_**X**
- backendWorker backendWorker**X**
- frontWorker BussinessExecutor**X**

2.19 reload

reload @@config_all dbGroup/dbInstancereload

dbGroup/dbInstancedbGroup/dbInstancedbGroup/dbInstance

2.19.1 reload @@config_all

:

2.19.1.1 dbGroup

,dbGroupschmea,

2.19.1.2 dbGroup

2.19.1.3 dbGroup

show @@backend

2.0.1.32 recycling_resource

2.19.1.4 dbInstance

2.19.1.5 dbInstance

2.0.1.32 recycling_resource

2.19.1.6 dbInstance

2.0.1.32 recycling_resource

2.19.2 reload @@config_all -f

:

2.19.2.1 dbGroup/dbInstance

,dbGroup/dbInstance

2.19.2.2 dbGroup/dbInstance

2.19.2.3 dbGroup/dbInstance

2.19.3 reload @@config_all -r

dbGroup/dbInstance

show @@backend

2.0.1.32 recycling_resource

2.19.4 reload @@config_all -s

dbGroup

2.20

MySQLdble serverMySQL(MySQLmysqldumpslowPerconapt-query-digest)
SQL show @@connection.sql.status where FRONT_ID= ?;

2.20.1 bootstrap.cnf6

```
<!--  -->
-DenableSlowLog=1
<!--  -->
-DslowLogBaseDir=./slowlogs
<!--  -->
-DslowLogBaseName=slow-query
<!--  -->
-DflushSlowLogPeriod=1
<!--  -->
-DflushSlowLogSize=1000
<!--  ,  -->
-DsqlSlowTime=100
```

2.20.2

```
enable @@slow_query_log; --
show @@slow_query_log; --
disable @@slow_query_log; --
show @@slow_query_log; --

show @@slow_query.time;  --
reload @@slow_query.time=200;  --

show @@slow_query.flushperiod; --
reload @@slow_query.flushperiod=2;  --

show @@slow_query.flushsize;--
reload @@slow_query.flushsize=1100;  --
```

2.20.3 MySQL mysqldumpslow Percona pt-query-digest

:

```
/FAKE_PATH/mysqld, Version: FAKE_VERSION. started with:
Tcp port: 3320  Unix socket: FAKE_SOCK
Time                 Id Command    Argument
# Time: 2018-08-23T17:40:10.149000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.132709  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000350  Prepare_Push: 0.116678  dn1_First_Result_F
etch: 0.013686  dn1_Last_Result_Fetch: 0.001422  Write_Client: 0.001995
SET timestamp=1535017210149;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:10.200000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.035600  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000062  Prepare_Push: 0.006733  dn2_First_Result_F
etch: 0.012524  dn1_First_Result_Fetch: 0.010971  dn2_Last_Result_Fetch: 0.015368  dn1_Last_Result_Fetch: 0.005119  Write_Client: 0.017834
SET timestamp=1535017210200;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:10.282000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.045337  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000166  Prepare_Push: 0.003941  dn1_First_Result_F
etch: 0.039652  dn1_Last_Result_Fetch: 0.000300  Write_Client: 0.001578
SET timestamp=1535017210282;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:10.315000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.031232  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.005467  Prepare_Push: 0.001989  dn2_First_Result_F
etch: 0.020240  dn2_Last_Result_Fetch: 0.001900  Write_Client: 0.003536
SET timestamp=1535017210315;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:10.432000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.116672  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.013625  Prepare_Push: 0.024767  dn2_First_Result_F
etch: 0.056395  dn1_First_Result_Fetch: 0.026420  dn2_Last_Result_Fetch: 0.000743  dn1_Last_Result_Fetch: 0.001700  Write_Client: 0.051861
SET timestamp=1535017210432;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
```

```
# Time: 2018-08-23T17:40:10.772000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.338569  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000082  Prepare_Push: 0.258365  dn1_0_First_Result
_Fetch: 0.047494  dn1_0_Last_Result_Fetch: 0.029018  dn2_0_First_Result_Fetch: 0.042964  dn2_0_Last_Result_Fetch: 0.033525  Write_Client:
0.009385
SET timestamp=1535017210772;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:10.821000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.046745  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000059  Prepare_Push: 0.025401  dn1_0_First_Result
_Fetch: 0.011755  dn1_0_Last_Result_Fetch: 0.001180  Generate_New_Query: 0.001706  dn1_1_First_Result_Fetch: 0.004224  dn1_1_Last_Result_F
etch: 0.001213  Write_Client: 0.001384
SET timestamp=1535017210821;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:12.061000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.036952  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001111  Prepare_Push: 0.001132  dn1_First_Result_F
etch: 0.034266  dn1_Last_Result_Fetch: 0.000084  Write_Client: 0.000443
SET timestamp=1535017212061;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:12.091000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.028213  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000666  Prepare_Push: 0.001206  dn2_First_Result_F
etch: 0.025991  dn2_Last_Result_Fetch: 0.000101  Write_Client: 0.000349
SET timestamp=1535017212091;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:12.132000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.040365  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000223  Prepare_Push: 0.001172  dn2_First_Result_F
etch: 0.019852  dn1_First_Result_Fetch: 0.019810  dn2_Last_Result_Fetch: 0.000901  dn1_Last_Result_Fetch: 0.000780  Write_Client: 0.019160
SET timestamp=1535017212132;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:12.145000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.012196  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000115  Prepare_Push: 0.001403  dn1_0_First_Result
_Fetch: 0.006714  dn1_0_Last_Result_Fetch: 0.002561  dn2_0_First_Result_Fetch: 0.006787  dn2_0_Last_Result_Fetch: 0.001806  Write_Client:
0.002280
SET timestamp=1535017212145;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:12.164000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.016979  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000224  Prepare_Push: 0.002236  dn1_0_First_Result
_Fetch: 0.006678  dn1_0_Last_Result_Fetch: 0.000703  Generate_New_Query: 0.000866  dn1_1_First_Result_Fetch: 0.004532  dn1_1_Last_Result_F
etch: 0.000879  Write_Client: 0.001002
SET timestamp=1535017212164;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:13.134000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010213  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000145  Prepare_Push: 0.001520  dn1_First_Result_F
etch: 0.007996  dn1_Last_Result_Fetch: 0.000201  Write_Client: 0.000551
SET timestamp=1535017213134;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:13.153000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.014257  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000080  Prepare_Push: 0.002394  dn2_First_Result_F
etch: 0.008839  dn1_First_Result_Fetch: 0.008837  dn2_Last_Result_Fetch: 0.001424  dn1_Last_Result_Fetch: 0.002407  Write_Client: 0.002945
SET timestamp=1535017213153;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:13.212000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.029822  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000063  Prepare_Push: 0.001128  dn1_First_Result_F
etch: 0.028277  dn1_Last_Result_Fetch: 0.000109  Write_Client: 0.000355
SET timestamp=1535017213212;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:13.240000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027695  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000067  Prepare_Push: 0.000682  dn2_First_Result_F
etch: 0.026582  dn2_Last_Result_Fetch: 0.000078  Write_Client: 0.000364
SET timestamp=1535017213240;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:13.321000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.076093  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000231  Prepare_Push: 0.001334  dn2_First_Result_F
etch: 0.035072  dn1_First_Result_Fetch: 0.035074  dn2_Last_Result_Fetch: 0.018756  dn1_Last_Result_Fetch: 0.001263  Write_Client: 0.039457
SET timestamp=1535017213321;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:13.348000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
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# Query_time: 0.026278  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000335  Prepare_Push: 0.001249  dn1_0_First_Result
_Fetch: 0.011028  dn1_0_Last_Result_Fetch: 0.009279  dn2_0_First_Result_Fetch: 0.019200  dn2_0_Last_Result_Fetch: 0.003441  Write_Client:
0.004600
SET timestamp=1535017213348;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:13.381000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.029152  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000662  Prepare_Push: 0.003189  dn1_0_First_Result
_Fetch: 0.014453  dn1_0_Last_Result_Fetch: 0.001013  Generate_New_Query: 0.000911  dn1_1_First_Result_Fetch: 0.005703  dn1_1_Last_Result_F
etch: 0.001483  Write_Client: 0.002114
SET timestamp=1535017213381;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:14.163000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.012540  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000197  Prepare_Push: 0.001303  dn2_First_Result_F
etch: 0.006452  dn1_First_Result_Fetch: 0.007858  dn2_Last_Result_Fetch: 0.004065  dn1_Last_Result_Fetch: 0.002960  Write_Client: 0.004588
SET timestamp=1535017214163;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:14.220000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027587  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000051  Prepare_Push: 0.000744  dn1_First_Result_F
etch: 0.026441  dn1_Last_Result_Fetch: 0.000104  Write_Client: 0.000350
SET timestamp=1535017214220;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:14.253000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.031984  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000070  Prepare_Push: 0.001144  dn2_First_Result_F
etch: 0.030202  dn2_Last_Result_Fetch: 0.000182  Write_Client: 0.000568
SET timestamp=1535017214253;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:14.292000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.037327  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000272  Prepare_Push: 0.001316  dn2_First_Result_F
etch: 0.014299  dn1_First_Result_Fetch: 0.014331  dn2_Last_Result_Fetch: 0.001148  dn1_Last_Result_Fetch: 0.000753  Write_Client: 0.021440
SET timestamp=1535017214292;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:14.303000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010244  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000050  Prepare_Push: 0.001101  dn1_0_First_Result
_Fetch: 0.004540  dn1_0_Last_Result_Fetch: 0.002781  dn2_0_First_Result_Fetch: 0.004708  dn2_0_Last_Result_Fetch: 0.002592  Write_Client:
0.002092
SET timestamp=1535017214303;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:14.327000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.021078  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000109  Prepare_Push: 0.002098  dn1_0_First_Result
_Fetch: 0.006720  dn1_0_Last_Result_Fetch: 0.000748  Generate_New_Query: 0.001158  dn1_1_First_Result_Fetch: 0.008043  dn1_1_Last_Result_F
etch: 0.001147  Write_Client: 0.001269
SET timestamp=1535017214327;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:15.254000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010569  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000076  Prepare_Push: 0.001050  dn1_First_Result_F
etch: 0.008330  dn1_Last_Result_Fetch: 0.000146  Write_Client: 0.001113
SET timestamp=1535017215254;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:15.321000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.024216  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000081  Prepare_Push: 0.001295  dn1_First_Result_F
etch: 0.021938  dn1_Last_Result_Fetch: 0.000422  Write_Client: 0.000902
SET timestamp=1535017215321;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:15.351000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027796  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000666  Prepare_Push: 0.000760  dn2_First_Result_F
etch: 0.025984  dn2_Last_Result_Fetch: 0.000094  Write_Client: 0.000386
SET timestamp=1535017215351;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:15.392000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.039805  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000217  Prepare_Push: 0.000804  dn2_First_Result_F
etch: 0.017410  dn1_First_Result_Fetch: 0.017468  dn2_Last_Result_Fetch: 0.001490  dn1_Last_Result_Fetch: 0.001223  Write_Client: 0.021374
SET timestamp=1535017215392;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:15.410000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.017384  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000152  Prepare_Push: 0.001183  dn1_0_First_Result
_Fetch: 0.005037  dn1_0_Last_Result_Fetch: 0.007164  dn2_0_First_Result_Fetch: 0.008156  dn2_0_Last_Result_Fetch: 0.004962  Write_Client:
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0.004043
SET timestamp=1535017215410;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:15.434000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.021341  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000318  Prepare_Push: 0.002764  dn1_0_First_Result
_Fetch: 0.010897  dn1_0_Last_Result_Fetch: 0.000544  Generate_New_Query: 0.000798  dn1_1_First_Result_Fetch: 0.004506  dn1_1_Last_Result_F
etch: 0.000790  Write_Client: 0.000845
SET timestamp=1535017215434;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:16.322000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.030106  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000217  Prepare_Push: 0.001253  dn1_First_Result_F
etch: 0.028330  dn1_Last_Result_Fetch: 0.000086  Write_Client: 0.000306
SET timestamp=1535017216322;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:16.353000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.030005  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001306  Prepare_Push: 0.001004  dn2_First_Result_F
etch: 0.027242  dn2_Last_Result_Fetch: 0.000140  Write_Client: 0.000453
SET timestamp=1535017216353;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:16.403000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.049615  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001459  Prepare_Push: 0.000830  dn2_First_Result_F
etch: 0.024286  dn1_First_Result_Fetch: 0.025469  dn2_Last_Result_Fetch: 0.001726  dn1_Last_Result_Fetch: 0.000853  Write_Client: 0.023039
SET timestamp=1535017216403;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:16.526000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.121702  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000337  Prepare_Push: 0.000889  dn1_0_First_Result
_Fetch: 0.009370  dn1_0_Last_Result_Fetch: 0.002010  dn2_0_First_Result_Fetch: 0.009160  dn2_0_Last_Result_Fetch: 0.001779  Write_Client:
0.109753
SET timestamp=1535017216526;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:16.560000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.030306  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001534  Prepare_Push: 0.001759  dn1_0_First_Result
_Fetch: 0.011846  dn1_0_Last_Result_Fetch: 0.001663  Generate_New_Query: 0.003223  dn1_1_First_Result_Fetch: 0.006428  dn1_1_Last_Result_F
etch: 0.002601  Write_Client: 0.002291
SET timestamp=1535017216560;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:17.325000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.017545  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.006231  Prepare_Push: 0.002335  dn1_First_Result_F
etch: 0.008121  dn1_Last_Result_Fetch: 0.000277  Write_Client: 0.000857
SET timestamp=1535017217325;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:17.390000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.026216  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000854  Prepare_Push: 0.000904  dn1_First_Result_F
etch: 0.024157  dn1_Last_Result_Fetch: 0.000081  Write_Client: 0.000301
SET timestamp=1535017217390;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:17.411000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.020095  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000699  Prepare_Push: 0.000711  dn2_First_Result_F
etch: 0.017634  dn2_Last_Result_Fetch: 0.000132  Write_Client: 0.001051
SET timestamp=1535017217411;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:17.491000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.078505  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001702  Prepare_Push: 0.000763  dn2_First_Result_F
etch: 0.018547  dn1_First_Result_Fetch: 0.018482  dn2_Last_Result_Fetch: 0.036637  dn1_Last_Result_Fetch: 0.000566  Write_Client: 0.057558
SET timestamp=1535017217491;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:17.518000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.026112  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000686  Prepare_Push: 0.000872  dn1_0_First_Result
_Fetch: 0.007054  dn1_0_Last_Result_Fetch: 0.001072  dn2_0_First_Result_Fetch: 0.005839  dn2_0_Last_Result_Fetch: 0.017248  Write_Client:
0.016586
SET timestamp=1535017217518;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:17.558000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.038199  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000966  Prepare_Push: 0.005189  dn1_0_First_Result
_Fetch: 0.013137  dn1_0_Last_Result_Fetch: 0.001134  Generate_New_Query: 0.003973  dn1_1_First_Result_Fetch: 0.010228  dn1_1_Last_Result_F
etch: 0.003564  Write_Client: 0.002115
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SET timestamp=1535017217558;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:18.353000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.019048  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.003008  Prepare_Push: 0.000844  dn2_First_Result_F
etch: 0.006415  dn1_First_Result_Fetch: 0.009082  dn2_Last_Result_Fetch: 0.000323  dn1_Last_Result_Fetch: 0.005902  Write_Client: 0.008781
SET timestamp=1535017218353;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:18.410000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.025498  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000060  Prepare_Push: 0.000696  dn1_First_Result_F
etch: 0.024394  dn1_Last_Result_Fetch: 0.000084  Write_Client: 0.000348
SET timestamp=1535017218410;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:18.430000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.018794  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000047  Prepare_Push: 0.001301  dn2_First_Result_F
etch: 0.017073  dn2_Last_Result_Fetch: 0.000099  Write_Client: 0.000373
SET timestamp=1535017218430;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:18.471000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.039810  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000052  Prepare_Push: 0.000661  dn2_First_Result_F
etch: 0.019799  dn1_First_Result_Fetch: 0.019923  dn2_Last_Result_Fetch: 0.000698  dn1_Last_Result_Fetch: 0.000814  Write_Client: 0.019298
SET timestamp=1535017218471;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:18.484000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.012214  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000047  Prepare_Push: 0.001782  dn1_0_First_Result
_Fetch: 0.007109  dn1_0_Last_Result_Fetch: 0.001544  dn2_0_First_Result_Fetch: 0.005518  dn2_0_Last_Result_Fetch: 0.001470  Write_Client:
0.003568
SET timestamp=1535017218484;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:18.507000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.019695  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000046  Prepare_Push: 0.001448  dn1_0_First_Result
_Fetch: 0.006244  dn1_0_Last_Result_Fetch: 0.000988  Generate_New_Query: 0.001564  dn1_1_First_Result_Fetch: 0.007080  dn1_1_Last_Result_F
etch: 0.001306  Write_Client: 0.001137
SET timestamp=1535017218507;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:19.351000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.020937  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000059  Prepare_Push: 0.000800  dn1_First_Result_F
etch: 0.019607  dn1_Last_Result_Fetch: 0.000169  Write_Client: 0.000472
SET timestamp=1535017219351;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:19.370000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.018011  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001184  Prepare_Push: 0.000583  dn2_First_Result_F
etch: 0.015894  dn2_Last_Result_Fetch: 0.000129  Write_Client: 0.000351
SET timestamp=1535017219370;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:19.412000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.041319  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000689  Prepare_Push: 0.000573  dn2_First_Result_F
etch: 0.017735  dn1_First_Result_Fetch: 0.017876  dn2_Last_Result_Fetch: 0.000601  dn1_Last_Result_Fetch: 0.000806  Write_Client: 0.022322
SET timestamp=1535017219412;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:19.423000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010063  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000200  Prepare_Push: 0.001136  dn1_0_First_Result
_Fetch: 0.006820  dn1_0_Last_Result_Fetch: 0.000694  dn2_0_First_Result_Fetch: 0.003519  dn2_0_Last_Result_Fetch: 0.003944  Write_Client:
0.001443
SET timestamp=1535017219423;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:19.454000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027592  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000182  Prepare_Push: 0.012798  dn1_0_First_Result
_Fetch: 0.005960  dn1_0_Last_Result_Fetch: 0.000530  Generate_New_Query: 0.000811  dn1_1_First_Result_Fetch: 0.005659  dn1_1_Last_Result_F
etch: 0.000926  Write_Client: 0.001101
SET timestamp=1535017219454;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:20.312000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.025903  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001470  Prepare_Push: 0.000887  dn1_First_Result_F
etch: 0.022114  dn1_Last_Result_Fetch: 0.000197  Write_Client: 0.001433
SET timestamp=1535017220312;
delete from sharding_two_node where id =15;
```

```
# Time: 2018-08-23T17:40:20.342000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.028503  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.005643  Prepare_Push: 0.001172  dn2_First_Result_F
etch: 0.021342  dn2_Last_Result_Fetch: 0.000074  Write_Client: 0.000346
SET timestamp=1535017220342;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:20.381000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.037424  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000641  Prepare_Push: 0.000959  dn2_First_Result_F
etch: 0.015139  dn1_First_Result_Fetch: 0.015238  dn2_Last_Result_Fetch: 0.000795  dn1_Last_Result_Fetch: 0.000956  Write_Client: 0.020685
SET timestamp=1535017220381;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:20.408000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.016143  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000122  Prepare_Push: 0.001979  dn1_0_First_Result
_Fetch: 0.004408  dn1_0_Last_Result_Fetch: 0.000484  Generate_New_Query: 0.000965  dn1_1_First_Result_Fetch: 0.006059  dn1_1_Last_Result_F
etch: 0.001553  Write_Client: 0.000755
SET timestamp=1535017220408;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:21.214000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.023376  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000073  Prepare_Push: 0.001306  dn1_First_Result_F
etch: 0.021694  dn1_Last_Result_Fetch: 0.000081  Write_Client: 0.000302
SET timestamp=1535017221214;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:21.241000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.025408  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000083  Prepare_Push: 0.001029  dn2_First_Result_F
etch: 0.023856  dn2_Last_Result_Fetch: 0.000122  Write_Client: 0.000440
SET timestamp=1535017221241;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:21.281000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.038482  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000087  Prepare_Push: 0.000871  dn2_First_Result_F
etch: 0.016690  dn1_First_Result_Fetch: 0.016708  dn2_Last_Result_Fetch: 0.000579  dn1_Last_Result_Fetch: 0.000891  Write_Client: 0.020835
SET timestamp=1535017221281;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:21.293000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.011657  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000615  Prepare_Push: 0.001320  dn1_0_First_Result
_Fetch: 0.006906  dn1_0_Last_Result_Fetch: 0.001589  dn2_0_First_Result_Fetch: 0.005105  dn2_0_Last_Result_Fetch: 0.001548  Write_Client:
0.003341
SET timestamp=1535017221293;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:21.312000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.017169  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000635  Prepare_Push: 0.001609  dn1_0_First_Result
_Fetch: 0.006997  dn1_0_Last_Result_Fetch: 0.000728  Generate_New_Query: 0.001037  dn1_1_First_Result_Fetch: 0.004816  dn1_1_Last_Result_F
etch: 0.000709  Write_Client: 0.000703
SET timestamp=1535017221312;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:22.150000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.026153  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000180  Prepare_Push: 0.000771  dn1_First_Result_F
etch: 0.024940  dn1_Last_Result_Fetch: 0.000061  Write_Client: 0.000261
SET timestamp=1535017222150;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:22.170000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.019181  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000180  Prepare_Push: 0.000642  dn2_First_Result_F
etch: 0.018060  dn2_Last_Result_Fetch: 0.000088  Write_Client: 0.000299
SET timestamp=1535017222170;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:22.220000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.049834  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000261  Prepare_Push: 0.000735  dn2_First_Result_F
etch: 0.019862  dn1_First_Result_Fetch: 0.019807  dn2_Last_Result_Fetch: 0.000418  dn1_Last_Result_Fetch: 0.000655  Write_Client: 0.029031
SET timestamp=1535017222220;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:22.240000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.019128  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000934  Prepare_Push: 0.002731  dn1_0_First_Result
_Fetch: 0.013430  dn1_0_Last_Result_Fetch: 0.000521  dn2_0_First_Result_Fetch: 0.003296  dn2_0_Last_Result_Fetch: 0.001243  Write_Client:
0.011072
SET timestamp=1535017222240;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:22.270000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
```

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# Query_time: 0.028479  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.003233  Prepare_Push: 0.004986  dn1_0_First_Result
_Fetch: 0.009870  dn1_0_Last_Result_Fetch: 0.001172  Generate_New_Query: 0.001590  dn1_1_First_Result_Fetch: 0.006060  dn1_1_Last_Result_F
etch: 0.000771  Write_Client: 0.000700
SET timestamp=1535017222270;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:23.097000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.053956  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000056  Prepare_Push: 0.001034  dn1_First_Result_F
etch: 0.052343  dn1_Last_Result_Fetch: 0.000174  Write_Client: 0.000523
SET timestamp=1535017223097;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:23.110000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010839  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000499  Prepare_Push: 0.000680  dn2_First_Result_F
etch: 0.006349  dn1_First_Result_Fetch: 0.009082  dn2_Last_Result_Fetch: 0.000270  dn1_Last_Result_Fetch: 0.000333  Write_Client: 0.003311
SET timestamp=1535017223110;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:23.181000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027573  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000109  Prepare_Push: 0.000980  dn2_First_Result_F
etch: 0.026156  dn2_Last_Result_Fetch: 0.000086  Write_Client: 0.000328
SET timestamp=1535017223181;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:23.231000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.049380  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.002435  Prepare_Push: 0.000670  dn2_First_Result_F
etch: 0.025278  dn1_First_Result_Fetch: 0.025242  dn2_Last_Result_Fetch: 0.000392  dn1_Last_Result_Fetch: 0.000629  Write_Client: 0.021032
SET timestamp=1535017223231;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:23.268000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.025207  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000060  Prepare_Push: 0.001492  dn1_0_First_Result
_Fetch: 0.007693  dn1_0_Last_Result_Fetch: 0.000752  Generate_New_Query: 0.001946  dn1_1_First_Result_Fetch: 0.008776  dn1_1_Last_Result_F
etch: 0.005040  Write_Client: 0.001884
SET timestamp=1535017223268;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:24.121000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027104  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001558  Prepare_Push: 0.001107  dn1_First_Result_F
etch: 0.024084  dn1_Last_Result_Fetch: 0.000085  Write_Client: 0.000356
SET timestamp=1535017224121;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:24.141000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.019191  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000072  Prepare_Push: 0.000673  dn2_First_Result_F
etch: 0.017923  dn2_Last_Result_Fetch: 0.000092  Write_Client: 0.000522
SET timestamp=1535017224141;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:24.182000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.039883  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000483  Prepare_Push: 0.000584  dn2_First_Result_F
etch: 0.017241  dn1_First_Result_Fetch: 0.017320  dn2_Last_Result_Fetch: 0.000603  dn1_Last_Result_Fetch: 0.000767  Write_Client: 0.021575
SET timestamp=1535017224182;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:24.196000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.012406  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000073  Prepare_Push: 0.000958  dn1_0_First_Result
_Fetch: 0.008102  dn1_0_Last_Result_Fetch: 0.001255  dn2_0_First_Result_Fetch: 0.007566  dn2_0_Last_Result_Fetch: 0.001772  Write_Client:
0.002300
SET timestamp=1535017224196;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:24.218000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.021238  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000864  Prepare_Push: 0.001143  dn1_0_First_Result
_Fetch: 0.010305  dn1_0_Last_Result_Fetch: 0.000532  Generate_New_Query: 0.001852  dn1_1_First_Result_Fetch: 0.005359  dn1_1_Last_Result_F
etch: 0.000618  Write_Client: 0.000661
SET timestamp=1535017224218;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:25.093000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.029579  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000106  Prepare_Push: 0.000882  dn1_First_Result_F
etch: 0.028241  dn1_Last_Result_Fetch: 0.000069  Write_Client: 0.000351
SET timestamp=1535017225093;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:25.121000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.027422  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001867  Prepare_Push: 0.001330  dn2_First_Result_F
etch: 0.023887  dn2_Last_Result_Fetch: 0.000102  Write_Client: 0.000338
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SET timestamp=1535017225121;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:25.161000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.038859  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000050  Prepare_Push: 0.000753  dn2_First_Result_F
etch: 0.019091  dn1_First_Result_Fetch: 0.019189  dn2_Last_Result_Fetch: 0.000582  dn1_Last_Result_Fetch: 0.000560  Write_Client: 0.018965
SET timestamp=1535017225161;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:25.191000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.016379  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000043  Prepare_Push: 0.001276  dn1_0_First_Result
_Fetch: 0.007469  dn1_0_Last_Result_Fetch: 0.000678  Generate_New_Query: 0.001327  dn1_1_First_Result_Fetch: 0.003927  dn1_1_Last_Result_F
etch: 0.000787  Write_Client: 0.000893
SET timestamp=1535017225191;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:26.026000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.029878  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000162  Prepare_Push: 0.000916  dn1_First_Result_F
etch: 0.028497  dn1_Last_Result_Fetch: 0.000084  Write_Client: 0.000303
SET timestamp=1535017226026;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:26.051000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.024231  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001105  Prepare_Push: 0.000469  dn2_First_Result_F
etch: 0.022188  dn2_Last_Result_Fetch: 0.000100  Write_Client: 0.000470
SET timestamp=1535017226051;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:26.091000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.039762  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.001669  Prepare_Push: 0.001915  dn2_First_Result_F
etch: 0.018107  dn1_First_Result_Fetch: 0.018187  dn2_Last_Result_Fetch: 0.000633  dn1_Last_Result_Fetch: 0.000832  Write_Client: 0.018071
SET timestamp=1535017226091;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:26.105000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.012664  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000261  Prepare_Push: 0.000935  dn1_0_First_Result
_Fetch: 0.007328  dn1_0_Last_Result_Fetch: 0.000733  dn2_0_First_Result_Fetch: 0.006229  dn2_0_Last_Result_Fetch: 0.002592  Write_Client:
0.003554
SET timestamp=1535017226105;
select count(*) from sharding_two_node;
# Time: 2018-08-23T17:40:26.134000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.028335  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000046  Prepare_Push: 0.003442  dn1_0_First_Result
_Fetch: 0.009563  dn1_0_Last_Result_Fetch: 0.001069  Generate_New_Query: 0.001856  dn1_1_First_Result_Fetch: 0.010875  dn1_1_Last_Result_F
etch: 0.000798  Write_Client: 0.000712
SET timestamp=1535017226134;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
# Time: 2018-08-23T17:40:26.859000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.014882  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000067  Prepare_Push: 0.001351  dn1_First_Result_F
etch: 0.013084  dn1_Last_Result_Fetch: 0.000137  Write_Client: 0.000381
SET timestamp=1535017226859;
select * from sharding_two_node where id =1;
# Time: 2018-08-23T17:40:26.874000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.010509  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000066  Prepare_Push: 0.001761  dn2_First_Result_F
etch: 0.006921  dn1_First_Result_Fetch: 0.008256  dn2_Last_Result_Fetch: 0.000279  dn1_Last_Result_Fetch: 0.000211  Write_Client: 0.001761
SET timestamp=1535017226874;
select * from sharding_two_node;
# Time: 2018-08-23T17:40:26.931000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.028690  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000237  Prepare_Push: 0.001126  dn1_First_Result_F
etch: 0.026194  dn1_Last_Result_Fetch: 0.000640  Write_Client: 0.001133
SET timestamp=1535017226931;
delete from sharding_two_node where id =15;
# Time: 2018-08-23T17:40:26.951000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.018818  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000342  Prepare_Push: 0.001671  dn2_First_Result_F
etch: 0.016482  dn2_Last_Result_Fetch: 0.000063  Write_Client: 0.000323
SET timestamp=1535017226951;
delete from sharding_two_node where id =519;
# Time: 2018-08-23T17:40:26.991000Z
# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.039399  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000082  Prepare_Push: 0.000706  dn2_First_Result_F
etch: 0.019233  dn1_First_Result_Fetch: 0.019167  dn2_Last_Result_Fetch: 0.000426  dn1_Last_Result_Fetch: 0.000739  Write_Client: 0.019444
SET timestamp=1535017226991;
insert into sharding_two_node values(15,'15',15),(519,'519',519);
# Time: 2018-08-23T17:40:27.032000Z
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# User@Host: root[root] @  [0:0:0:0:0:0:0:1]  Id:   2
# Query_time: 0.029495  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0  Read_SQL: 0.000064  Prepare_Push: 0.001349  dn1_0_First_Result
_Fetch: 0.005745  dn1_0_Last_Result_Fetch: 0.000632  Generate_New_Query: 0.001056  dn1_1_First_Result_Fetch: 0.018101  dn1_1_Last_Result_F
etch: 0.002282  Write_Client: 0.000863
SET timestamp=1535017227032;
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
```

2.20.3.1 mysqldumpslow :

```
Reading mysql slow query log from /tmp/slow3.log
Count: 17  Time=0.05s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  insert into sharding_two_node values(N,'S',N),(N,'S',N)

Count: 13  Time=0.05s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  select count(*) from sharding_two_node

Count: 6  Time=0.04s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  select * from sharding_two_node where id =N

Count: 33  Time=0.03s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  delete from sharding_two_node where id =N

Count: 17  Time=0.03s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=N)

Count: 6  Time=0.02s (0s)  Lock=0.00s (0s)  Rows=0.0 (0), root[root]@[0:0:0:0:0:0:0:1]
  select * from sharding_two_node
```

2.20.3.2 pt-query-digest :

```
# 710ms user time, 70ms system time, 23.35M rss, 68.36M vsz
# Current date: Thu Aug 23 17:48:25 2018
# Hostname: 10-186-24-63
# Files: /tmp/slow_query4.log
# Overall: 92 total, 6 unique, 5.41 QPS, 0.18x concurrency _______________
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:27
# Attribute          total     min     max     avg     95%  stddev  median
# ============     ======= ======= ======= ======= ======= ======= =======
# Exec time             3s    10ms   339ms    34ms    75ms    37ms    27ms
# Lock time              0       0       0       0       0       0       0
# Rows sent              0       0       0       0       0       0       0
# Rows examine           0       0       0       0       0       0       0
# Query size         4.91k      31      94   54.64   92.72   20.87   42.48
# Generate New        0.03    0.00    0.00    0.00    0.00    0.00    0.00
# Prepare Push        0.56    0.00    0.26    0.01    0.01    0.03    0.00
# Read SQL            0.07    0.00    0.01    0.00    0.00    0.00    0.00
# Write Client        0.70    0.00    0.11    0.01    0.02    0.01    0.00
# dn1 0 First         0.29    0.00    0.05    0.01    0.01    0.01    0.01
# dn1 0 Last R        0.07    0.00    0.03    0.00    0.01    0.01    0.00
# dn1 1 First         0.12    0.00    0.02    0.01    0.01    0.00    0.01
# dn1 1 Last R        0.03    0.00    0.01    0.00    0.00    0.00    0.00
# dn1 First Re        0.93    0.01    0.05    0.02    0.03    0.01    0.02
# dn1 Last Res        0.04    0.00    0.01    0.00    0.00    0.00    0.00
# dn2 0 First         0.13    0.00    0.04    0.01    0.02    0.01    0.01
# dn2 0 Last R        0.08    0.00    0.03    0.01    0.02    0.01    0.00
# dn2 First Re        0.80    0.01    0.06    0.02    0.03    0.01    0.02
# dn2 Last Res        0.09    0.00    0.04    0.00    0.01    0.01    0.00

# Profile
# Rank Query ID                           Response time Calls R/Call V/M   I
# ==== ================================== ============= ===== ====== ===== =
#    1 0x13233F8ADA41C6E2D889AEE0C2B...  0.8815 28.1%    33 0.0267  0.00 DELETE sharding_two_node
#    2 0xF68D16B46E487184E8FD3BB3912...  0.8525 27.1%    17 0.0501  0.01 INSERT sharding_two_node
#    3 0xB46D813C53609C853F7CBA6D2DB...  0.6306 20.1%    13 0.0485  0.15 SELECT sharding_two_node
#    4 0x3FB41587E746A475282C1ED2606...  0.4335 13.8%    17 0.0255  0.00 SELECT sharding_two_node
#    5 0x04CDF91DDFC4E1DD7A22E312C72...  0.2399  7.6%     6 0.0400  0.05 SELECT sharding_two_node
# MISC 0xMISC                             0.1028  3.3%     6 0.0171   0.0 <1 ITEMS>

# Query 1: 2.06 QPS, 0.06x concurrency, ID 0x13233F8ADA41C6E2D889AEE0C2BC6CB5 at byte 943
# Scores: V/M = 0.00
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:26
# Attribute    pct   total     min     max     avg     95%  stddev  median
# ============ === ======= ======= ======= ======= ======= ======= =======
# Count         35      33
# Exec time     28   882ms    18ms    45ms    27ms    31ms     5ms    27ms
```

```
# Lock time      0       0       0       0       0       0       0       0
# Rows sent      0       0       0       0       0       0       0       0
# Rows examine   0       0       0       0       0       0       0       0
# Query size    27   1.37k      42      43   42.52   42.48    0.50   42.48
# Prepare Push   6    0.04    0.00    0.00    0.00    0.00    0.00    0.00
# Read SQL      35    0.03    0.00    0.01    0.00    0.00    0.00    0.00
# Write Client   2    0.02    0.00    0.00    0.00    0.00    0.00    0.00
# dn1 First Re  45    0.42    0.02    0.04    0.03    0.03    0.01    0.03
# dn1 Last Res   7    0.00    0.00    0.00    0.00    0.00    0.00    0.00
# dn2 First Re  47    0.38    0.02    0.03    0.02    0.03    0.00    0.02
# dn2 Last Res   3    0.00    0.00    0.00    0.00    0.00    0.00    0.00
# String:
# Hosts        0:0:0:0:0:0:0:1
# Users        root
# Query_time distribution
#   1us
#  10us
# 100us
#   1ms
#  10ms  ################################################################
# 100ms
#    1s
#  10s+
# Tables
#    SHOW TABLE STATUS LIKE 'sharding_two_node'\G
#    SHOW CREATE TABLE `sharding_two_node`\G
delete from sharding_two_node where id =15\G
# Converted for EXPLAIN
# EXPLAIN /*!50100 PARTITIONS*/
select * from  sharding_two_node where id =15\G

# Query 2: 1.06 QPS, 0.05x concurrency, ID 0xF68D16B46E487184E8FD3BB3912A3658 at byte 1690
# Scores: V/M = 0.01
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:26
# Attribute    pct   total     min     max     avg     95%  stddev  median
# ============ === ======= ======= ======= ======= ======= ======= =======
# Count         18      17
# Exec time     27   853ms    37ms   117ms    50ms    78ms    21ms    40ms
# Lock time      0       0       0       0       0       0       0       0
# Rows sent      0       0       0       0       0       0       0       0
# Rows examine   0       0       0       0       0       0       0       0
# Query size    21   1.06k      64      64      64      64       0      64
# Prepare Push   7    0.04    0.00    0.02    0.00    0.00    0.01    0.00
# Read SQL      32    0.02    0.00    0.01    0.00    0.00    0.00    0.00
# Write Client  63    0.45    0.02    0.06    0.03    0.05    0.01    0.02
# dn1 First Re  37    0.35    0.01    0.04    0.02    0.03    0.00    0.02
# dn1 Last Res  40    0.01    0.00    0.00    0.00    0.00    0.00    0.00
# dn2 First Re  46    0.37    0.01    0.06    0.02    0.03    0.01    0.02
# dn2 Last Res  72    0.07    0.00    0.04    0.00    0.02    0.01    0.00
# String:
# Hosts        0:0:0:0:0:0:0:1
# Users        root
# Query_time distribution
#   1us
#  10us
# 100us
#   1ms
#  10ms  ################################################################
# 100ms  ####
#    1s
#  10s+
# Tables
#    SHOW TABLE STATUS LIKE 'sharding_two_node'\G
#    SHOW CREATE TABLE `sharding_two_node`\G
insert into sharding_two_node values(15,'15',15) /*... omitted ...*/\G

# Query 3: 0.81 QPS, 0.04x concurrency, ID 0xB46D813C53609C853F7CBA6D2DB4047C at byte 2152
# Scores: V/M = 0.15
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:26
# Attribute    pct   total     min     max     avg     95%  stddev  median
# ============ === ======= ======= ======= ======= ======= ======= =======
# Count         14      13
# Exec time     20   631ms    10ms   339ms    49ms   116ms    84ms    12ms
# Lock time      0       0       0       0       0       0       0       0
# Rows sent      0       0       0       0       0       0       0       0
# Rows examine   0       0       0       0       0       0       0       0
# Query size     9     494      38      38      38      38       0      38
# Prepare Push  48    0.27    0.00    0.26    0.02    0.00    0.07    0.00
```

```
# Read SQL       5    0.00    0.00    0.00    0.00    0.00    0.00    0.00
# Write Client  24    0.17    0.00    0.11    0.01    0.02    0.03    0.00
# dn1 0 First   48    0.14    0.00    0.05    0.01    0.01    0.01    0.01
# dn1 0 Last R  80    0.06    0.00    0.03    0.00    0.01    0.01    0.00
# dn2 0 First  100    0.13    0.00    0.04    0.01    0.02    0.01    0.01
# dn2 0 Last R 100    0.08    0.00    0.03    0.01    0.02    0.01    0.00
# String:
# Hosts        0:0:0:0:0:0:0:1
# Users        root
# Query_time distribution
#   1us
#  10us
# 100us
#   1ms
#  10ms  ################################################################
# 100ms  ###########
#    1s
#  10s+
# Tables
#    SHOW TABLE STATUS LIKE 'sharding_two_node'\G
#    SHOW CREATE TABLE `sharding_two_node`\G
# EXPLAIN /*!50100 PARTITIONS*/
select count(*) from sharding_two_node\G

# Query 4: 1 QPS, 0.03x concurrency, ID 0x3FB41587E746A475282C1ED2606795FB at byte 2596
# Scores: V/M = 0.00
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:27
# Attribute    pct   total     min     max     avg     95%  stddev  median
# ============ === ======= ======= ======= ======= ======= ======= =======
# Count         18      17
# Exec time     13   434ms    16ms    47ms    26ms    38ms     8ms    26ms
# Lock time      0       0       0       0       0       0       0       0
# Rows sent      0       0       0       0       0       0       0       0
# Rows examine   0       0       0       0       0       0       0       0
# Query size    31   1.56k      94      94      94      94       0      94
# Generate New 100    0.03    0.00    0.00    0.00    0.00    0.00    0.00
# Prepare Push  13    0.07    0.00    0.03    0.00    0.01    0.01    0.00
# Read SQL      12    0.01    0.00    0.00    0.00    0.00    0.00    0.00
# Write Client   2    0.02    0.00    0.00    0.00    0.00    0.00    0.00
# dn1 0 First   51    0.15    0.00    0.01    0.01    0.01    0.00    0.01
# dn1 0 Last R  19    0.01    0.00    0.00    0.00    0.00    0.00    0.00
# dn1 1 First  100    0.12    0.00    0.02    0.01    0.01    0.00    0.01
# dn1 1 Last R 100    0.03    0.00    0.01    0.00    0.00    0.00    0.00
# String:
# Hosts        0:0:0:0:0:0:0:1
# Users        root
# Query_time distribution
#   1us
#  10us
# 100us
#   1ms
#  10ms  ################################################################
# 100ms
#    1s
#  10s+
# Tables
#    SHOW TABLE STATUS LIKE 'sharding_two_node'\G
#    SHOW CREATE TABLE `sharding_two_node`\G
# EXPLAIN /*!50100 PARTITIONS*/
select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1)\G

# Query 5: 0.38 QPS, 0.01x concurrency, ID 0x04CDF91DDFC4E1DD7A22E312C72C268D at byte 0
# Scores: V/M = 0.05
# Time range: 2018-08-23T17:40:10 to 2018-08-23T17:40:26
# Attribute    pct   total     min     max     avg     95%  stddev  median
# ============ === ======= ======= ======= ======= ======= ======= =======
# Count          6       6
# Exec time      7   240ms    10ms   133ms    40ms   128ms    43ms    35ms
# Lock time      0       0       0       0       0       0       0       0
# Rows sent      0       0       0       0       0       0       0       0
# Rows examine   0       0       0       0       0       0       0       0
# Query size     5     258      43      43      43      43       0      43
# Prepare Push  22    0.12    0.00    0.12    0.02    0.12    0.04    0.00
# Read SQL       9    0.01    0.00    0.01    0.00    0.01    0.00    0.00
# Write Client   0    0.01    0.00    0.00    0.00    0.00    0.00    0.00
# dn1 First Re  11    0.10    0.01    0.05    0.02    0.05    0.02    0.01
# dn1 Last Res   6    0.00    0.00    0.00    0.00    0.00    0.00    0.00
# String:
```

```
# Hosts        0:0:0:0:0:0:0:1
# Users        root
# Query_time distribution
#   1us
#  10us
# 100us
#   1ms
#  10ms  ################################################################
# 100ms  ############
#    1s
#  10s+
# Tables
#    SHOW TABLE STATUS LIKE 'sharding_two_node'\G
#    SHOW CREATE TABLE `sharding_two_node`\G
# EXPLAIN /*!50100 PARTITIONS*/
select * from sharding_two_node where id =1\G
```

2.20.3.3

mysqldumpslow5.6mysqldumpslow'190428 10:28:16'Timedble'2019-04-28T10:28:16.515000Z'issue: https://github.com/actiontech/dble/issues/908

2.20.4

2.20.4.1 MySQL

MySQL

```
/usr/local/mysql5.7.11/bin/mysqld-debug, Version: 5.7.11-debug-log (MySQL Community Server - Debug (GPL)). started with:

Tcp port: 3320  Unix socket: /tmp/mysql_3320.sock

Time                 Id Command    Argument

# Time: 2018-05-15T10:53:23.798040Z

# User@Host: action[action] @  [192.168.2.206]  Id:   436

# Query_time: 296.145816  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0

use test;

SET timestamp=1526381603;

drop table sharding_two_node;

# Time: 2018-05-15T11:32:25.549290Z

# User@Host: action[action] @  [192.168.2.206]  Id:   451

# Query_time: 129.555883  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0

use nosharding;

SET timestamp=1526383945;

drop table test4;

# Time: 2018-05-15T11:32:25.550190Z

# User@Host: action[action] @  [192.168.2.206]  Id:   454

# Query_time: 84.316518  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0

SET timestamp=1526383945;

insert into test4 values(1,'1');

# Time: 2018-05-15T11:37:01.079214Z

# User@Host: action[action] @  [192.168.2.206]  Id:   483

# Query_time: 49.571983  Lock_time: 0.000000 Rows_sent: 0  Rows_examined: 0

SET timestamp=1526384221;

drop table test3;
```

```
# Time: 2018-07-11T05:28:34.161405Z

# User@Host: action[action] @  [192.168.2.206]  Id: 16421

# Query_time: 10.035706  Lock_time: 0.000000 Rows_sent: 1  Rows_examined: 0

use test;

SET timestamp=1531286914;

insert into test4 values(1,'1');
```

MySQL

1.1

/usr/local/mysql5.7.11/bin/mysqld-debug, Version: 5.7.11-debug-log (MySQL Community Server - Debug (GPL)). started with:

Tcp port: 3320 Unix socket: /tmp/mysql_3320.sock

Time Id Command Argument

MySQLlog-short-formattimesession

1.2 time

```
# Time: 2018-05-15T10:53:23.798040Z
```

1.3 session

```
# User@Host: action[action] @ [192.168.2.206] Id: 436
```

1.4

keyvalue

```
# Query_time: 296.145816 Lock_time: 0.000000 Rows_sent: 0 Rows_examined: 0
```

1.5 Database changedschema

```
use nosharding;
```

1.6 set(mysqldumpslowSET timestamp=)

```
SET timestamp=1526383945;
```

1.6.1 last_insert_id

```
stmt_depends_on_first_successful_insert_id_in_prev_stmt
```

last_insert_id=

1.6.2 insert_id

log-short-format

```
auto_inc_intervals_in_cur_stmt_for_binlog.nb_elements()
```

last_id=

1.6.3 timestamp=

1.7

```
# administrator command
```

is_command

1.8 SQL

```
insert into test4 values(1,'1');
```

2.20.4.2 dble

mysqldumpslowpt-query-digest dble

2.1

```
/FAKE_PATH/mysqld, Version: FAKE_VERSION. started with:

Tcp port: 3320  Unix socket: FAKE_SOCK

Time                 Id Command    Argument
```

2.2 time

java80mysql

```
# Time: 2018-08-23T17:40:10.149000Z
```

2.3 session

```
# User@Host: root[root] @ [0:0:0:0:0:0:0:1] Id: 2
```

2.4

keyvalue.

dble

MySQL

Read_SQL: SQLSQL T1-T0

Prepare_Push//Read_SQL,T2-T1

{$shardingnodeName}_First_Result_Fetch shardingnodeNamePrepare_Push ,T3-T2 shardingnodeName

{$shardingnodeName}_Last_Result_Fetch shardingnodeName{$shardingnodeName}__First_Result_Fetch,T5-T3

Inner_Execute show /set ... commitsql

Write_Client,T6-T4

MySQLQuery_timedbleSQL,T6-T0
Lock_timeRows_sentRows_examined0

```
# Query_time: 0.116672 Lock_time: 0.000000 Rows_sent: 0 Rows_examined: 0 Read_SQL: 0.013625 Prepare_Push: 0.024767 dn2_First_Result_Fetch: 0.056395 dn1_First_Result_Fetch: 0.026420 dn2_Last_Result_Fetch: 0.000743 dn1_Last_Result_Fetch: 0.001700 Write_Client: 0.051861
```

2.5 set(SET timestamp=)

```
SET timestamp=1535017210432;
```

2.6 SQL

```
insert into sharding_two_node values(15,'15',15),(519,'519',519);
```

2.21 SQLtrace

MySQLprofiledbleSQLdble session

1. trace

```
mysql> select @@trace;
+---------+
| @@trace |
+---------+
| 0       |
+---------+
1 row in set (0.02 sec)
```

2. trace

```
mysql> set trace =1;
Query OK, 0 rows affected (0.09 sec)

mysql> select @@trace;
+---------+
| @@trace |
+---------+
| 1       |
+---------+
1 row in set (0.00 sec)
```

3. trace

```
mysql> select * from sharding_two_node where id =1;
+----+--------+-----------+
| id | c_flag | c_decimal |
+----+--------+-----------+
|  1 | 1      |    1.0000 |
+----+--------+-----------+
1 row in set (0.02 sec)

mysql> show trace;
+-------------------+-----------+-----------+--------------+---------------+-------------------------------------------+
| OPERATION         | START(ms) | END(ms)   | DURATION(ms) | SHARDING_NODE | SQL/REF                                   |
+-------------------+-----------+-----------+--------------+---------------+-------------------------------------------+
| Read SQL          | 0.0       | 0.1085    | 0.1085       | -             | -                                         |
| Parse SQL         | 0.1085    | 0.49607   | 0.38757      | -             | -                                         |
| Route Calculation | 0.49607   | 1.274142  | 0.778072     | -             | -                                         |
| Prepare to Push   | 1.274142  | 1.560543  | 0.286401     | -             | -                                         |
| Execute SQL       | 1.560543  | 18.711851 | 17.151308    | dn1           | select * from sharding_two_node where id =1 |
| Fetch result      | 18.711851 | 18.978213 | 0.266362     | dn1           | select * from sharding_two_node where id =1 |
| Write to Client   | 18.711851 | 19.276344 | 0.564493     | -             | -                                         |
| Over All          | 0.0       | 19.276344 | 19.276344    | -             | -                                         |
+-------------------+-----------+-----------+--------------+---------------+-------------------------------------------+
8 rows in set (0.00 sec)
```

4. trace

```
mysql> select * from sharding_two_node ;
+-----+--------+-----------+
| id  | c_flag | c_decimal |
+-----+--------+-----------+
| 513 | 513    |  513.0000 |
| 514 | 514    |  514.0000 |
| 515 | 515    |  515.0000 |
| 516 | 516    |  516.0000 |
|   1 | 1      |    1.0000 |
|   2 | 2      |    2.0000 |
|   3 | 3      |    3.0000 |
|   4 | 4      |    4.0000 |
|   5 | 5      |    5.0000 |
|   7 | 7      |    7.0000 |
|   8 | 8      |    8.0000 |
|   9 | 9      |    9.0000 |
|  10 | 10     |   10.0000 |
|  11 | 11     |   11.0000 |
|  12 | 12     |   12.0000 |
+-----+--------+-----------+
```

```
15 rows in set (0.01 sec)

mysql> show trace;
+-------------------+-----------+----------+--------------+---------------+-----------------------------------------+
| OPERATION         | START(ms) | END(ms)  | DURATION(ms) | SHARDING_NODE | SQL/REF                                 |
+-------------------+-----------+----------+--------------+---------------+-----------------------------------------+
| Read SQL          | 0.0       | 0.079175 | 0.079175     | -             | -                                       |
| Parse SQL         | 0.079175  | 0.637315 | 0.55814      | -             | -                                       |
| Route Calculation | 0.637315  | 1.046389 | 0.409074     | -             | -                                       |
| Prepare to Push   | 1.046389  | 1.465238 | 0.418849     | -             | -                                       |
| Execute SQL       | 1.465238  | 8.141409 | 6.676171     | dn1           | SELECT * FROM sharding_two_node LIMIT 100 |
| Execute SQL       | 1.465238  | 7.59109  | 6.125852     | dn2           | SELECT * FROM sharding_two_node LIMIT 100 |
| Fetch result      | 8.141409  | 8.817824 | 0.676415     | dn1           | SELECT * FROM sharding_two_node LIMIT 100 |
| Fetch result      | 7.59109   | 8.366718 | 0.775628     | dn2           | SELECT * FROM sharding_two_node LIMIT 100 |
| Write to Client   | 7.59109   | 9.324157 | 1.733067     | -             | -                                       |
| Over All          | 0.0       | 9.324157 | 9.324157     | -             | -                                       |
+-------------------+-----------+----------+--------------+---------------+-----------------------------------------+
10 rows in set (0.00 sec)
```

5. SQL trace,,

```
mysql> insert into sharding_two_node values(15,'15',15),(519,'519',519);
Query OK, 2 rows affected (0.06 sec)

mysql> show trace;
+---------------------------------+-----------+-----------+--------------+---------------+---------------------------------------------
--------+
| OPERATION                       | START(ms) | END(ms)   | DURATION(ms) | SHARDING_NODE | SQL/REF
        |
+---------------------------------+-----------+-----------+--------------+---------------+---------------------------------------------
--------+
| Read SQL                        | 0.0       | 0.131959  | 0.131959     | -             | -
        |
| Parse SQL                       | 0.131959  | 0.601637  | 0.469678     | -             | -
        |
| Route Calculation               | 0.601637  | 0.825479  | 0.223842     | -             | -
        |
| Prepare to Push                 | 0.825479  | 1.025374  | 0.199895     | -             | -
        |
| Execute SQL                     | 1.025374  | 27.095675 | 26.070301    | dn1           | INSERT INTO sharding_two_node VALUES (15, '15',
 15)    |
| Execute SQL                     | 1.025374  | 25.023911 | 23.998537    | dn2           | INSERT INTO sharding_two_node VALUES (519, '519
', 519) |
| Fetch result                    | 27.095675 | 27.405046 | 0.309371     | dn1           | INSERT INTO sharding_two_node VALUES (15, '15',
 15)    |
| Fetch result                    | 25.023911 | 26.478398 | 1.454487     | dn2           | INSERT INTO sharding_two_node VALUES (519, '519
', 519) |
| Distributed Transaction Prepare | 27.405046 | 27.736411 | 0.331365     | -             | -
        |
| Distributed Transaction Commit  | 27.736411 | 57.426311 | 29.6899      | -             | -
        |
| Write to Client                 | 25.023911 | 57.428266 | 32.404355    | -             | -
        |
| Over All                        | 0.0       | 57.428266 | 57.428266    | -             | -
        |
+---------------------------------+-----------+-----------+--------------+---------------+---------------------------------------------
--------+
12 rows in set (0.00 sec)
```

6. trace

```
mysql> select count(*) from sharding_two_node;
+----------+
| COUNT(*) |
+----------+
|       20 |
+----------+
1 row in set (0.01 sec)

mysql> show trace;
+-----------------------+-----------+-----------+--------------+----------------+-------------------------------------------------------
------------------+
| OPERATION             | START(ms) | END(ms)   | DURATION(ms) | SHARDING_NODE  | SQL/REF
                  |
+-----------------------+-----------+-----------+--------------+----------------+-------------------------------------------------------
------------------+
| Read SQL              | 0.0       | 0.08553   | 0.08553      | -              | -
```

```
                  |
| Parse SQL             | 0.08553   | 0.56987   | 0.48434      | -               | -
                  |
| Try Route Calculation | 0.56987   | 0.71698   | 0.14711      | -               | -
                  |
| Try to Optimize       | 0.71698   | 1.237487  | 0.520507     | -               | -
                  |
| Execute SQL           | 1.237487  | 9.091029  | 7.853542     | dn1.0           | select COUNT(*) as `_$COUNT$_rpda_0` from  `sharding_tw
o_node` LIMIT 100 |
| Fetch result          | 9.091029  | 10.186782 | 1.095753     | dn1.0           | select COUNT(*) as `_$COUNT$_rpda_0` from  `sharding_tw
o_node` LIMIT 100 |
| Execute SQL           | 1.237487  | 8.348635  | 7.111148     | dn2.0           | select COUNT(*) as `_$COUNT$_rpda_0` from  `sharding_tw
o_node` LIMIT 100 |
| Fetch result          | 8.348635  | 9.342241  | 0.993606     | dn2.0           | select COUNT(*) as `_$COUNT$_rpda_0` from  `sharding_tw
o_node` LIMIT 100 |
| MERGE                 | 8.721543  | 10.289905 | 1.568362     | merge.1         | dn1.0; dn2.0
                  |
| ORDERED_GROUP         | 8.726919  | 10.424309 | 1.69739      | ordered_group.1 | merge.1
                  |
| LIMIT                 | 9.020162  | 10.499574 | 1.479412     | limit.1         | ordered_group.1
                  |
| SHUFFLE_FIELD         | 9.023584  | 10.501529 | 1.477945     | shuffle_field.1 | limit.1
                  |
| Write to Client       | 9.072457  | 11.52055  | 2.448093     | -               | -
                  |
| Over All              | 0.0       | 11.52055  | 11.52055     | -               | -
                  |
+-----------------------+-----------+-----------+--------------+-----------------+-------------------------------------------------------
------------------+
14 rows in set (0.03 sec)
```

7. trace

```
mysql> select count(*) from sharding_two_node where id =(select id from sharding_two_node where id=1);
+----------+
| COUNT(*) |
+----------+
|        1 |
+----------+
1 row in set (0.03 sec)

mysql> show trace;
+-----------------------+-----------+-----------+--------------+--------------------+-------------------------------------------------------
-------------------------------------------------------------+
| OPERATION             | START(ms) | END(ms)   | DURATION(ms) | SHARDING_NODE      | SQL/REF
                                                             |
+-----------------------+-----------+-----------+--------------+--------------------+-------------------------------------------------------
-------------------------------------------------------------+
| Read SQL              | 0.0       | 0.063047  | 0.063047     | -                  | -
                                                             |
| Parse SQL             | 0.063047  | 0.491182  | 0.428135     | -                  | -
                                                             |
| Try Route Calculation | 0.491182  | 0.799576  | 0.308394     | -                  | -
                                                             |
| Try to Optimize       | 0.799576  | 2.347412  | 1.547836     | -                  | -
                                                             |
| Execute SQL           | 2.347412  | 11.183808 | 8.836396     | dn1.0              | select `sharding_two_node`.`id` as `autoalias_scalar
` from  `sharding_two_node` where id = 1 LIMIT 2             |
| Fetch result          | 11.183808 | 12.360691 | 1.176883     | dn1.0              | select `sharding_two_node`.`id` as `autoalias_scalar
` from  `sharding_two_node` where id = 1 LIMIT 2             |
| MERGE                 | 11.889546 | 12.436445 | 0.546899     | merge.1            | dn1.0
                                                             |
| LIMIT                 | 11.894923 | 12.483364 | 0.588441     | limit.1            | merge.1
                                                             |
| SHUFFLE_FIELD         | 11.896389 | 12.48483  | 0.588441     | shuffle_field.1    | limit.1
                                                             |
| SCALAR_SUB_QUERY      | 12.038123 | 12.485808 | 0.447685     | scalar_sub_query.1 | shuffle_field.1
                                                             |
| Generate New Query    | 12.485808 | 13.824463 | 1.338655     | -                  | -
                                                             |
| Execute SQL           | 13.824463 | 26.749647 | 12.925184    | dn1.1              | scalar_sub_query.1; select COUNT(*) as `_$COUNT$_rpd
a_0` from  `sharding_two_node` where sharding_two_node.id = 1 |
| Fetch result          | 26.685134 | 28.753476 | 2.068342     | dn1.1              | scalar_sub_query.1; select COUNT(*) as `_$COUNT$_rpd
a_0` from  `sharding_two_node` where sharding_two_node.id = 1 |
| MERGE                 | 26.954918 | 29.091683 | 2.136765     | merge.2            | dn1.1
                                                             |
| ORDERED_GROUP         | 26.977889 | 29.563316 | 2.585427     | ordered_group.1    | merge.2
                                                             |
```

```
| SHUFFLE_FIELD         | 27.568285 | 29.567226 | 1.998941     | shuffle_field.2    | ordered_group.1
                                                                 |
| Write to Client       | 27.72517  | 30.014911 | 2.289741     | -                  | -
                                                                 |
| Over All              | 0.0       | 30.014911 | 30.014911    | -                  | -
                                                                 |
+-----------------------+-----------+-----------+--------------+--------------------+-------------------------------------------------
-------------------------------------------------------------+
18 rows in set (0.01 sec)
```

2.22 KILL @@DDL_LOCK

dble " There is other session is doing DDL " "xxx is doing DDL " reload

dble ZK DDL universe/dble/{cluster-id}/ddl/{schema.table} json status

1. status INIT table table metakeydble table table meta
2. DDL DDL DDL status SUCCESS FAILED status SUCCESS DDLDDLtable table meta
3. universe/dble/{cluster-id}/ddl/{schema.table}/{dble-id}:SUCCESS

ddl

- universe/dble/{cluster-id}/ddl/{schema.table}/{dble-id}
- universe/dble/{cluster-id}/online/

DDLuniverse/dble/{cluster-id}/ddl/{schema.table}/ online universe/dble/{cluster-id}/ddl/{schema.table}/ DDL ddl

table meta `universe/dble/{cluster-id}/ddl/{schema.table}` kv

kill ddl_lock

ddlddl universe/dble/{cluster-id}/ddl/{schema.table} kv

1. kill
2.

2.23

- 2.23.1 MYSQL-HA
- 2.23.2
- 2.23.3
- 2.23.4 HA

2.23.1 MYSQL-HA

dble2.19.09.0

- HAdble
- HAMYSQL

- (dbGroup @@disable)
- (dbGroup @@enable)
- (dbGroup @@swtich)

:

- (dbGroup @@events)

HA mysqlmysqlDBmysql
zkzkdbleHA

HAdble

:

HA

2.23.2 dbGroup

ha

dbleha

bootstrap.cnf

```
-DuseOuterHa=true
```

:dble

cluster.cnf

needSyncHa = true

- dbledbGroup
- bootstrap.cnf useOuterHatrue
- bootstrap.cnf useOuterHacluster.cnfneedSyncHatruedbledbledble

dble

dbleMySQL

dbInstance“disabled/enable”dbleMySQLMySQL

dbGroup @@disable

dbGroup @@disable name = 'dbGroup_name' [instance = 'instance_name']

- dbGroup_namedb.xmldbGroupinstance_namedbInstancename
- instance = '..'dbGroupdbInstancedisabled
- disabledmysql
- dbInstancedisableshow @@dbInstance
- dbledisable
- 5s
- disable

dbGroup @@enable

dbGroup @@enable name = 'dbGroup_name' [instance = 'instance_name']

- dbGroup_namedb.xmldbGroupinstance_namedbInstancename
- instance = '..'dbGroupdbInstanceenable

dbGroup @@switch

dbGroup @@switch name = 'dbGroup_name' master = 'instance_name'

- dbGroup_namedb.xmldbGroupinstance_namedbInstancename
- namemaster
- dbGroupprimarydbInstance
- dbInstancedisabledbInstanceprimaryprimarydbInstancedbInstance

2.23.3

dbledbGroup

- disablezk
- enable
- switchprimary dbInstance

dbGroup @@disable

dble

-
- dbInstance
-
- dbGroup
- OK

-
- dbInstance
-
- dbGroup

- dbGroupzk
- zkkey
-
- dble
-

dbGroup @@enable

dble

-
- dbInstance
- dbGroup
- OK

ZK

-
- ddbInstance
-
- dbGroup
- dbGroupzk
- zkkey
-
- dble
-

dbGroup @@switch

dble

-
- dbInstance
- primary dbInstance
- dbGroup
- OK

ZK

-
- dbInstance
-
- dbGroup
- dbGroupzk
- zkkey
-
- dble
-

开始收到命令
检查参数
合法性
是
否
获取不到锁
获取全局dbGroup锁
获取锁
zk
变更dbInstance标志
否
完成
删除旧主dbInstance
所有旧有连接
将最新的状态同步到
zk，并对于文件进行
异步落盘
同步最新状态
报错，给出提
示信息
dble-master
返回客户端信
息
订阅更新dbGroup最
新状态
根据最新的dbGroup
状态更新自身信息

2.23.4 mha-dble

dbleMySQLdbGroupMHAMySQL

docker

- MySQL()
- MHAMySQL
- dbleMySQL
- kill MySQLMHA
- dbleMySQL

- dble2.19.09.0
- MHAdble

dockermysqlmysql()

mha

- dockerssh

```
/usr/sbin/sshd -D
```

- ,

```
ssh-keygen -t rsa
ssh-copy-id -i ~/.ssh/id_rsa.pub root@other1
ssh-copy-id -i ~/.ssh/id_rsa.pub root@other2
ssh-copy-id -i ~/.ssh/id_rsa.pub root@self
```

- /usr/bin/mysqlbinlog/usr/bin/mysqlyummysql
- MHA

```
mkdir /etc/masterha/app1 -p
mkdir /var/log/masterha/app2 -p
mkdir /var/log/masterha/app1 -p
```

- mysql

```
grant all on *.* to root@'%' identified by '123456' with grant option;
grant replication slave on *.* to repl@'%' identified by 'repl';
```

- MHArpm

```

https://github.com/yoshinorim/mha4mysql-manager/wiki/Downloads
MHA Manager 0.56 rpm RHEL6
MHA Node 0.56 rpm RHEL6
rpm
yum localinstall rpmyum
NodeManager
rpm
yumrpmyumyum
```

mhaperlmhamhamaster_ip_failover_script
https://github.com/yoshinorim/mha4mysql-manager/wiki/Parameters#master_ip_failover_script

- HAmaster_ip_failoverstatus
- MySQL mastermaster_ip_failoverstopmaster
- masterread_only=0master_ip_failoverstart

mhadble

- MySQL masterdbGroupdisablestopdbledbGroup @@disable
- MySQL masterstartdbGroup @@switchmasterdbGroup

master_ip_failover()

```
#!/usr/bin/env perl

#  Copyright (C) 2011 DeNA Co.,Ltd.
#
#  This program is free software; you can redistribute it and/or modify
#  it under the terms of the GNU General Public License as published by
#  the Free Software Foundation; either version 2 of the License, or
#  (at your option) any later version.
#
#  This program is distributed in the hope that it will be useful,
#  but WITHOUT ANY WARRANTY; without even the implied warranty of
#  MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
#  GNU General Public License for more details.
#
```

```
#  You should have received a copy of the GNU General Public License
#   along with this program; if not, write to the Free Software
#  Foundation, Inc.,
#  51 Franklin Street, Fifth Floor, Boston, MA  02110-1301  USA

## Note: This is a sample script and is not complete. Modify the script based on your environment.

use strict;
use warnings FATAL => 'all';

use Getopt::Long;
use MHA::DBHelper;

my (
  $command,        $ssh_user,         $orig_master_host,
  $orig_master_ip, $orig_master_port, $new_master_host,
  $new_master_ip,  $new_master_port,  $new_master_user,
  $new_master_password
);
GetOptions(
  'command=s'             => \$command,
  'ssh_user=s'            => \$ssh_user,
  'orig_master_host=s'    => \$orig_master_host,
  'orig_master_ip=s'      => \$orig_master_ip,
  'orig_master_port=i'    => \$orig_master_port,
  'new_master_host=s'     => \$new_master_host,
  'new_master_ip=s'       => \$new_master_ip,
  'new_master_port=i'     => \$new_master_port,
  'new_master_user=s'     => \$new_master_user,
  'new_master_password=s' => \$new_master_password,
);

exit &main();

sub main {
  if ( $command eq "stop" || $command eq "stopssh" ) {

    # $orig_master_host, $orig_master_ip, $orig_master_port are passed.
    # If you manage master ip address at global catalog database,
    # invalidate orig_master_ip here.
    my $exit_code = 1;
    eval {

      # dbGroup @@disable name = "dbGroup1" instance='$orig_master_host'
      # disable
      $orig_master_host =~tr/./_/;
      system "mysql -P9066 -u man1 -p654321 -h 172.20.134.1 -e \"dbGroup \@\@disable name = 'dbGroup1' instance='".$orig_master_host."'\""
;
      $exit_code = 0;
    };
    if ($@) {
      warn "Got Error: $@\n";
      exit $exit_code;
    }
    exit $exit_code;
  }
  elsif ( $command eq "start" ) {

    # all arguments are passed.
    # If you manage master ip address at global catalog database,
    # activate new_master_ip here.
    # You can also grant write access (create user, set read_only=0, etc) here.
    my $exit_code = 10;
    eval {
      my $new_master_handler = new MHA::DBHelper();

      # args: hostname, port, user, password, raise_error_or_not
      $new_master_handler->connect( $new_master_ip, $new_master_port,
        $new_master_user, $new_master_password, 1 );

      ## Set read_only=0 on the new master
      $new_master_handler->disable_log_bin_local();
      print "Set read_only=0 on the new master.\n";
      $new_master_handler->disable_read_only();

      ## Creating an app user on the new master
      print "Creating app user on the new master..\n";
      $new_master_handler->enable_log_bin_local();
```

```
      $new_master_handler->disconnect();

      ## try to switch the dbGroup master into new master
      ## dbGroup switchnew_master_host
      $new_master_host =~tr/./_/;
      system "mysql -P9066 -u man1 -p654321 -h 172.20.134.1 -e \"dbGroup \@\@switch name = 'dbGroup1' master='".$new_master_host."'\"";

      $exit_code = 0;
    };
    if ($@) {
      warn $@;

      # If you want to continue failover, exit 10.
      exit $exit_code;
    }
    exit $exit_code;
  }
  elsif ( $command eq "status" ) {
    # test for start command
    exit 0;
  }
  else {
    &usage();
    exit 1;
  }
}

sub usage {
  print
"Usage: master_ip_failover --command=start|stop|stopssh|status --orig_master_host=host --orig_master_ip=ip --orig_master_port=port --new_m
aster_host=host --new_master_ip=ip --new_master_port=port\n";
}
```

/etc/masterha/app1

MHA app1.conf/etc/masterha/app1

```
#mha manager
manager_workdir = /var/log/masterha/app1
manager_log = /var/log/masterha/app1/app1.log
remote_workdir = /var/log/masterha/app2
master_ip_failover_script=/etc/masterha/app1/master_ip_failover
# master_ip_online_change_script=/etc/masterha/app1/master_ip_online_change
# MySQL
user=root
password=123456
# ssh
ssh_user=root

#
repl_user=repl
repl_password= repl

# ()
ping_interval=1
manager_log=/var/log/masterha/app1/manager.log

[server1]
hostname=172.20.134.1
master_binlog_dir = /opt/3306/
port=3306


[server2]
# mysql
hostname=172.20.134.2
master_binlog_dir = /opt/3306/
candidate_master=1
check_repl_delay=0
port=3306

[server3]
# mysql
hostname=172.20.134.3
master_binlog_dir = /opt/3306/
candidate_master=1
check_repl_delay=0
port=3306
```

MHA

```
nohup masterha_manager --conf=/etc/masterha/app1/app1.conf >> /var/log/masterha/app1/manager.log 2>&1 &
```

dble

dblerelease2.19.09.0conf

```
mv cluster_template.cnf cluster.cnf
mv bootstrap_template.cnf bootstrap.cnf
mv db_template.xml db.xml
mv user_template.xml user.xml
mv sharding_template.xml sharding.xml
```

db.xml

db.xml

```
    <dbGroup name="dbGroup1"  delayThreshold="10000">
        <heartbeat>show slave status</heartbeat>
        <dbInstance name="172_20_134_1" url="172.20.134.1:3306" password="123456" user="root" disabled="false" id="udp-1" primary="true" /
>
        <dbInstance name="172_20_134_2" url="172.20.134.2:3306" password="123456" user="root" disabled="false" id="udp-3"  />
        <dbInstance name="172_20_134_3" url="172.20.134.3:3306" password="123456" user="root" disabled="false" id="udp-2"  />
    </dbGroup>
```

dbleman1dble

```
MySQL [(none)]> show @@dbinstance;
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| DB_GROUP  | NAME         | HOST         | PORT | W/R  | ACTIVE | IDLE | SIZE | EXECUTE | READ_LOAD | WRITE_LOAD | DISABLED |
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| dbGroup1  | 172_20_134_1 | 172.20.134.1 | 3306 | W    |      1 |    0 | 1000 |       1 |         0 |          0 | false    |
| dbGroup1  | 172_20_134_3 | 172.20.134.3 | 3306 | R    |      1 |    0 | 1000 |       0 |         0 |          0 | false    |
| dbGroup1  | 172_20_134_2 | 172.20.134.2 | 3306 | R    |      1 |    0 | 1000 |       0 |         0 |          0 | false    |
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
```

172.20.134.1“”

- ps172.20.134.1mysqld
- kill -9 172.20.134.1mysqld
- dble

```
MySQL [(none)]> show @@dbinstance;
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| DB_GROUP  | NAME         | HOST         | PORT | W/R  | ACTIVE | IDLE | SIZE | EXECUTE | READ_LOAD | WRITE_LOAD | DISABLED |
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
| dbGroup1  | 172_20_134_2 | 172.20.134.2 | 3306 | W    |      1 |    0 | 1000 |       0 |         0 |          0 | false    |
| dbGroup1  | 172_20_134_3 | 172.20.134.3 | 3306 | R    |      1 |    0 | 1000 |       0 |         0 |          0 | false    |
| dbGroup1  | 172_20_134_1 | 172.20.134.1 | 3306 | R    |      0 |    0 | 1000 |       0 |         0 |          0 | true     |
+-----------+--------------+--------------+------+------+--------+------+------+---------+-----------+------------+----------+
```

- dble,172_20_134_2

```
<dbGroup name="dbGroup1"  delayThreshold="10000">
        <heartbeat>show slave status</heartbeat>
        <dbInstance name="172_20_134_1" url="172.20.134.1:3306" password="123456" user="root" disabled="false" id="udp-1" />
        <dbInstance name="172_20_134_2" url="172.20.134.2:3306" password="123456" user="root" disabled="false" id="udp-3"  />
        <dbInstance name="172_20_134_3" url="172.20.134.3:3306" password="123456" user="root" disabled="false" id="udp-2" primary="true"
/>
    </dbGroup>
```

- 172.20.134.3mysql172.20.134.2dble

```
MySQL [(none)]> show slave status\G
*************************** 1. row ***************************
               Slave_IO_State: Waiting for master to send event
                  Master_Host: 172.20.134.2
                  Master_User: repl
                  Master_Port: 3306
```

```
                Connect_Retry: 60
              Master_Log_File: mysql-bin.000001
          Read_Master_Log_Pos: 2113
               Relay_Log_File: udp3-relay-bin.000002
                Relay_Log_Pos: 320
        Relay_Master_Log_File: mysql-bin.000001
             Slave_IO_Running: Yes
            Slave_SQL_Running: Yes
.........................
```

2.24 /

dbledbledblemysql

TCPdbledble dble

bootstrap.cnf

- sqlExecuteTimeout()
- idleTimeout
- processorCheckPeriod

- dbleprocessorCheckPeriod
-
  -
  - sqlExecuteTimeout
  - DDLxa
-
  - xacommit/rollback
  - idleTimeout

- DDL,XAsqlExecuteTimeout
- XAidleTimeoutloaddata

SQL

-
- SQL
- load dataidleTimeoutidleTimeout
- processorCheckPeriodSQL

2.25 dble

dbleloaddbledbleOOM
2.20.04@ssxlulu/load

dble

- Load data
  - (flowHighLevel)(flowLowLevel)

- Select
  - ()(flowControlHighLevel),MySQL
  - MySQL(mysql),(flowHighLevel)mysql
  - (flowControlLowLevel)(flowLowLevel),mysql
  -

,nio

bootstrap.cnf bootstrap.cnf

```
enableFlowControl()
flowControlHighLevel()
flowControlLowLevel()
```

- `flow_control @@set [enableFlowControl = true/false] [flowControlHighLevel = ?] [flowControlLowLevel = ?]`
- flowLowLevelflowHighLevelbootstrap.cnfenableFlowControl
-

  - `flow_control @@show`.
- :
  - flow_control @@list
  - `dble_information.dble_flow_control` `flow_control @@list`

2.26 /client_found_rows

2.26.1 &

DBLEdbleclient_found_rows

2.26.1.1 client_found_rows

handshakeclient_found_rowsDML(found rows)(affect rows)

2.26.1.2 client_found_rows

MYSQLclient_found_rowaffect rows)
JDBCclient_found_rowsfound rows

2.26.1.3 JDBCuseAffectedRowsclient_found_row

useAffectedRows=true client_found_rows
useAffectedRows=false() client_found_rows

2.26.2

2.26.2.1 bootstrap.cnf

```
#client_found_rows
-DcapClientFoundRows=false
```

2.26.2.2

```
show @@cap_client_found_rows; -- client_found_row 0- 1-
disable @@cap_client_found_rows; -- client_found_row
enable @@cap_client_found_rows; -- client_found_row
```

dblemysql() insert

2.26.3

step1. dble(client_found_rows)

step2. client_found_rows

```
mysql -uman1 -h192.xx.xx.xx -P9066 -p654321
enable @@cap_client_found_rows;
```

step3.

- 3.20.10.0dbleclient_found_rows

```
mysql -uroot -h192.xx.xx.xx -P8066 -p123456
ERROR 1045 (HY000): The client requested CLIENT_FOUND_ROWS capabilities does not match, in the manager use show @@cap_client_found_row
s check latest status.
```

- 3.20.10.1dble.logdbleclient_found_rowsdbleclient_found_rows

```
the client requested CLIENT_FOUND_ROWS capabilities is 'found rows', dble is configured as 'affect rows',pls set the same.
or
the client requested CLIENT_FOUND_ROWS capabilities is 'affect rows', dble is configured as 'found rows',pls set the same.
```

2.27 general

2.27.1

generaldblesql()file 3%5%sql

1.Executedblelong data16general
2.Executesqlsql

2.27.2 bootstrap.cnfgeneral log

```
# dble/tmp/
-DhomePath=.

#  general long0-1-
#-DenableGeneralLog=1

#  general loggeneral/general.log'/'homepath
#  general/general.log/tmp/general/general.log
#  /general/general.log/general/general.log
#-DgeneralLogFile=general/general.log

#  16mb16MBgeneral.logyyy-MM/general-MM-dd-%d.log
#-DgeneralLogFileSize=16

#  24096
#-DgeneralLogQueueSize=4096
```

2.27.3

2.27.3.1 show @@general_log

generaluse dble_information; select * from dble_variables where variable_name like '%general%';

```
show @@general_log;
+------------------+--------------------------------------+
| NAME             | VALUE                                |
+------------------+--------------------------------------+
| general_log      | ON                                   |
| general_log_file | /tmp/./general/general.log           |
+------------------+--------------------------------------+
2 rows in set (0.03 sec)
```

2.27.3.2 disable @@general_log

general log

```
disable @@general_log;
Query OK, 1 row affected (0.02 sec)
disable general_log success
```

2.27.3.3 enable @@general_log

general log

```
enable @@general_log;
Query OK, 1 row affected (0.02 sec)
enable general_log success
```

2.27.3.4 reload @@general_log_file=?

general log

```
reload @@general_log_file='/tmp/dble-general/general/general.log';
Query OK, 1 row affected (0.00 sec)
reload general log path success
```

2.28 sql

2.28.1

- dblesql(CRUD)()
- sqldblesql
-
  - `-DsamplingRate=100` ()0%~15%(1000wselect)
  - (`-DenableStatisticAnalysis=1` `-DenableStatisticAnalysis=1` `-DsamplingRate=100`)0%~30%(1000wselect)
  -
  - `-DenableStatisticAnalysis=1` sqlshow @@sql.sum.tabletablesqltable
- prometheusdble

2.28.2 bootstrap.cnfsql

```
#  statistic0-1-
#-DenableStatistic=0

#  show @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition0-1-
#-DenableStatisticAnalysis=0

#  1024
#-DassociateTablesByEntryByUserTableSize=1024
#-DfrontendByBackendByEntryByUserTableSize=1024
#-DtableByUserByEntryTableSize=1024

#  24096
#-DstatisticQueueSize=4096

# 100[0,100] %
#-DsamplingRate=100

# sql_log
#-DsqlLogTableSize=1024
```

2.28.3

2.28.3.1 show @@statistic

statistic

```
show @@statistic;
+----------------------------------------+-------+
| NAME                                   | VALUE |
+----------------------------------------+-------+
| statistic                              | OFF   |
| statisticAnalysis                      | OFF   |
| associateTablesByEntryByUserTableSize  | 1024  |
| frontendByBackendByEntryByUserTableSize | 1024  |
| tableByUserByEntryTableSize            | 1024  |
| samplingRate                           | 0     |
| sqlLogTableSize                        | 1024  |
| queueMonitor                      | monitoring  |
+----------------------------------------+-------+
6 rows in set (0.01 sec)
```

2.28.3.2 disable @@statistic

sql

```
disable @@statistic;
Query OK, 1 row affected (0.01 sec)
```

2.28.3.3 enable @@statistic

sql

```
enable @@statistic;
Query OK, 1 row affected (4.26 sec)
```

2.28.3.4 reload @@statistic_table_size = ? [where table='?' | where table in (dble_information.tableA,...)]

```
reload @@statistic_table_size = 90;
Query OK, 1 row affected (0.02 sec)

reload @@statistic_table_size = 90 where table = 'sql_statistic_by_table_by_user_by_entry';
Query OK, 1 row affected (0.02 sec)

reload @@statistic_table_size = 90 where table in(sql_statistic_by_table_by_user_by_entry,sql_statistic_by_associate_tables_by_entry_by_us
er);
Query OK, 1 row affected (0.02 sec)

reload @@statistic_table_size = 90 where table = 'sql_log';
Query OK, 1 row affected (0.02 sec)
```

2.28.3.5 reload @@samplingRate=?

(0)

```
reload @@samplingRate=90;
Query OK, 1 row affected (0.01 sec)
```

2.28.3.2 disable @@statisticAnalysis

show @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition

```
disable @@statisticAnalysis;
Query OK, 1 row affected (0.01 sec)
```

2.28.3.3 enable @@statisticAnalysis

show @@sql.sum.usershow @@sql.sum.tableshow @@sql.condition

```
enable @@statisticAnalysis;
Query OK, 1 row affected (4.26 sec)
```

2.28.4

:
sql_log sql_log_by_digest_by_entry_by_user (sql_log)
sql_log_by_tx_by_entry_by_user (sql_log)
sql_log_by_tx_digest_by_entry_by_user (sql_log)

:
sql_statistic_by_frontend_by_backend_by_entry_by_user
sql_statistic_by_table_by_user_by_entry
sql_statistic_by_associate_tables_by_entry_by_user

()truncate

2.28.5

().

sharding:

- dblesql
- explainexplain2
- exit

rwsplit:

- sql1064
- multi-query(sql,mysql clientdelimiter)multi-querysql(commit)

enableStatistic=0statisticAnalysis=0samplingRate=0sql(sql_logsql_statistic_by_frontend_by_xxxx)

2.28.6

2.28.6.1 start @@statistic_queue_monitor [observeTime = ? [and intervalTime = ?]]

observeTimeintervalTime(:s,m/min,h)

```
start @@statistic_queue_monitor; -- observeTime1minintervalTime5s
start @@statistic_queue_monitor observeTime = 2min; -- observeTime2minintervalTime5s
start @@statistic_queue_monitor observeTime = 2min and intervalTime = 10s; -- observeTime2minintervalTime10s
```

2.28.6.2 stop @@statistic_queue_monitor"

```
stop @@statistic_queue_monitor";
```

2.28.6.3 show @@statistic_queue.usage

()

```
show @@statistic_queue.usage;
+---------------------+-------+
| TIME                | USAGE |
+---------------------+-------+
| 2021-05-31 16:33:30 | 0.00% |
| 2021-05-31 16:33:35 | 0.00% |
| 2021-05-31 16:33:40 | 0.00% |
+---------------------+-------+
3 rows in set (0.01 sec)

TIME
USAGE
```

2.28.6.4 drop @@statistic_queue.usage

```
drop @@statistic_queue.usage;
```

2.28.6.5

1(show @@statisticqueueMonitormonitoring)(statisticOFFsamplingRate0).
2start @@statistic_queue_monitor. 3start @@statistic_queue_monitor.
4(SoftReference)jvm().
5(statisticQueueSize)select * from dble_variables where variable_name='statisticQueueSize'.
6(statisticQueueSize)bootstrap.cnfdble.

2.29 load data

2.29.1

load dataload data”“bootstrap.cnfload dataload dataDBLEload dataload dataDBLEload datasqlload data
:
1. kill @@load_data,/temp/error
2.
3.
4.---.txt1-data-table-dn1.txt1datatabledn1

2.29.2 bootstrap.cnfload data

```
#  BatchLoadData0-1-
#-DenableBatchLoadData=1
#  100000
#-DmaxRowSizeToFile=100000
```

2.29.3

2.29.3.1 show @@load_data.fail

load data

```
show @@load_data.fail;
Empty set (0.01 sec)

if have error file may like
show @@load_data.fail;
+-----------------------------------+
| error_load_data_file              |
+-----------------------------------+
| ./temp/error/1-data-table-dn1.txt |
| ./temp/error/1-data-table-dn2.txt |
+-----------------------------------+
2 rows in set (0.01 sec)
```

2.29.3.2 disable @@load_data_batch

load data

```
disable @@load_data_batch;
Query OK, 1 row affected (0.00 sec)
disable load_data_batch success
```

2.29.3.3 enable @@load_data_batch

load data

```
enable @@load_data_batch;
Query OK, 1 row affected (0.01 sec)
enable load_data_batch success
```

2.29.3.4 reload @@load_data.num=

load data

```
reload @@load_data.num=200000;
Query OK, 1 row affected (0.00 sec)
reload @@load_data.num success
```

2.29.5 kill @@load_data

```
kill @@load_data;
Query OK, 1 row affected (0.00 sec)
kill @@load_data success
```

2.30 injoin

Issue

example

- sql
  explain select a.* from gtest a where 1=1 and a.id in (select b.id from test b) order by a.id;
- inSubQueryTransformToJoin = true in

```
+---------------------------+-------------------------+-------------------------------------------------------------------------------
--------------+
| SHARDING_NODE             | TYPE                    | SQL/REF
             |
+---------------------------+-------------------------+-------------------------------------------------------------------------------
--------------+
| dn1_0                     | BASE SQL                | select `a`.`id`,`a`.`name` from  `gtest` `a` ORDER BY `a`.`id` ASC
             |
| dn2_0                     | BASE SQL                | select `a`.`id`,`a`.`name` from  `gtest` `a` ORDER BY `a`.`id` ASC
             |
| merge_and_order_1         | MERGE_AND_ORDER         | dn1_0; dn2_0
             |
| shuffle_field_1           | SHUFFLE_FIELD           | merge_and_order_1
             |
| dn1_1                     | BASE SQL                | select DISTINCT `b`.`id` as `autoalias_scalar` from  `test` `b` ORDER BY autoali
as_scalar ASC |
| dn2_1                     | BASE SQL                | select DISTINCT `b`.`id` as `autoalias_scalar` from  `test` `b` ORDER BY autoali
as_scalar ASC |
| merge_and_order_2         | MERGE_AND_ORDER         | dn1_1; dn2_1
             |
| distinct_1                | DISTINCT                | merge_and_order_2
             |
| shuffle_field_3           | SHUFFLE_FIELD           | distinct_1
             |
| rename_derived_sub_query_1 | RENAME_DERIVED_SUB_QUERY | shuffle_field_3
             |
| shuffle_field_4           | SHUFFLE_FIELD           | rename_derived_sub_query_1
             |
| join_1                    | JOIN                    | shuffle_field_1; shuffle_field_4
             |
| shuffle_field_2           | SHUFFLE_FIELD           | join_1
             |
+---------------------------+-------------------------+-------------------------------------------------------------------------------
--------------+
```

- inSubQueryTransformToJoin = false in

```
+-------------------+----------------------+-------------------------------------------------------------------------------------------
-------------------------------+
| SHARDING_NODE     | TYPE                 | SQL/REF
                               |
+-------------------+----------------------+-------------------------------------------------------------------------------------------
-------------------------------+
| dn1_0             | BASE SQL             | select DISTINCT `b`.`id` as `autoalias_scalar` from  `test` `b`
                               |
| dn2_0             | BASE SQL             | select DISTINCT `b`.`id` as `autoalias_scalar` from  `test` `b`
                               |
| merge_1           | MERGE                | dn1_0; dn2_0
                               |
| distinct_1        | DISTINCT             | merge_1
                               |
| shuffle_field_1   | SHUFFLE_FIELD        | distinct_1
                               |
| in_sub_query_1    | IN_SUB_QUERY         | shuffle_field_1
                               |
| dn1_1             | BASE SQL(May No Need) | in_sub_query_1; select `a`.`id`,`a`.`name` from  `gtest` `a` where `a`.`id` in ('{NEED_TO_RE
PLACE}') ORDER BY `a`.`id` ASC |
| dn2_1             | BASE SQL(May No Need) | in_sub_query_1; select `a`.`id`,`a`.`name` from  `gtest` `a` where `a`.`id` in ('{NEED_TO_RE
PLACE}') ORDER BY `a`.`id` ASC |
| merge_and_order_1 | MERGE_AND_ORDER      | dn1_1; dn2_1
                               |
| shuffle_field_2   | SHUFFLE_FIELD        | merge_and_order_1
```

```
                                |
+-------------------+-----------------------+-------------------------------------------------------------------------------------------
-------------------------------+
```

Resolution

testgtest select b.id from test b subQuery. sql select a.* from gtest a where 1=1 and a.id in (select b.id from test b) order by a.id; sql. ininSubQueryTransformToJoin = truejoinmysql inSubQueryTransformToJoin = falsesubQuerysqlsubQuerymysqljoinsubQuery

conditions

- Column
- join
- having
- order by
- where
-
- inwheredble

explain comparison

- scalar_sub_query, in_sub_query, all_any_sub_query SQL/REF in_sub_query

example

sql

SELECT a.id, select max(b.id) from test b where b.id in (select distinct d.id from sing1 d) as name FROM sharding_4_t1 a ORDER BY a.id;

step

- sqlColumn
- inwhere

special

any, some ,alldblein

- any some =in
- all!=<> in

example

in

- select * from sharding_4_t1 where id=any(select id from test where age=1) order by name desc;
- select * from sharding_4_t1 where id!=all(select id from test where age=1) order by name desc;

in

- select * from sharding_4_t1 where id!=any(select id from test where age=1) order by name desc;
- select * from sharding_4_t1 where id=all(select id from test where age=1) order by name desc;

in

2.31 DDL

```
>=3.22.01
```

DDL

```
[DDL_{id}{.}] <{{.}}> {}
```

SQL1

```
`CREATE TABLE tableB (id int(11) DEFAULT NULL,id2 int(11) DEFAULT NULL,name varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin
1;`
```

		dbleA	dbleN
init_ddl_trace DDL		[DDL_2] init_ddl_trace	
notice_cluster_ddl_prepare		[DDL_2] notice_cluster_ddl_prepare.start /*ddl.PREPARE*/	
			[DDL_NOTIFIED] receive_ddl_prepare /*ddl.PREPARE*/
			[DDL_NOTIFIED]

ddl ()			add_table_lock.start /**/
			[DDL_NOTIFIED] add_table_lock.succ /**/
		[DDL_2] notice_cluster_ddl_prepare.succ /*ddl.PREPARE*/	
add_table_lock		[DDL_2] add_table_lock.start /**/	
		[DDL_2] add_table_lock.succ /**/	
test_ddl_conn 'select 1'; (tableB)		[DDL_2] test_ddl_conn.start /* */	
		[DDL_2.dn1] test_ddl_conn.start /*dn1 */	
		[DDL_2.dn1] test_ddl_conn.get_conn /*dn1dn2~4 */	
		[DDL_2.dn1] test_ddl_conn.succ /*dn1select 1dn2~4 */	
		[DDL_2] test_ddl_conn.succ /*select 1dn2~4 */	
exec_ddl_sql ddl		[DDL_2] exec_ddl_sql.start /*sql */	
		[DDL_2.dn1] exec_ddl_sql.start /*dn1ddldn2~4 */	
		[DDL_2.dn1] exec_ddl_sql.get_conn /*dn1dn2~4*/	
		[DDL_2.dn1] exec_ddl_sql.succ /*dn1ddldn2~4*/	
		[DDL_2] exec_ddl_sql.succ /*ddl */	
update_table_metadata		[DDL_2] update_table_metadata.start /**/	
		[DDL_2] update_table_metadata.succ /**/	
notice_cluster_ddl_complete DDL ()		[DDL_2] notice_cluster_ddl_complete.start /*ddl.COMPLETE*/	
			[DDL_NOTIFIED] receive_ddl_complete /*ddl.COMPLETE*/
			[DDL_NOTIFIED] update_table_metadata.start /**/
			[DDL_NOTIFIED] update_table_metadata.succ /**/
			[DDL_NOTIFIED] release_table_lock.succ /**/
		[DDL_2] notice_cluster_ddl_complete.succ /*ddl.COMPLETE*/	
release_table_lock		[DDL_2] release_table_lock.succ /**/	
finish_ddl_trace DDL		[DDL_2] finish_ddl_trace	

succ	
fail	
get_conn	

dbleAdbleN()dbleASQL1

dbleA

```
2021-12-23 10:42:05,425 [INFO ][BusinessExecutor1] ================ init_ddl_trace [DDL_2] ================  (:)
2021-12-23 10:42:05,425 [INFO ][BusinessExecutor1] [DDL_2] <init_ddl_trace> Routes end and Start ddl{CREATE TABLE `tableB` (`id` int(11) D
EFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1} execution stage. In Fronten
dConnection[id = 1 port = 8066 host = 127.0.0.1 local_port = 52436 isManager = false startupTime = 1640227316027 skipCheck = false isFlowC
ontrol = false]  (:)
2021-12-23 10:42:05,425 [INFO ][BusinessExecutor1] [DDL_2] <notice_cluster_ddl_prepare.start> Notify and wait for all instances to enter p
hase PREPARE  (:)
2021-12-23 10:42:05,547 [INFO ][BusinessExecutor1] [DDL_2] <notice_cluster_ddl_prepare.succ> All instances have entered phase PREPARE  (:)
2021-12-23 10:42:05,547 [INFO ][BusinessExecutor1] [DDL_2] <add_table_lock.start>   (:)
2021-12-23 10:42:05,547 [INFO ][BusinessExecutor1] [DDL_2] <add_table_lock.succ>   (:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2] <test_ddl_conn.start> Start execute 'select 1' to detect a valid connection for
 shardingNodes[dn1,dn3,dn2,dn4]  (:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn1] <test_ddl_conn.start> In shardingNode[dn1],about to execute sql{select 1}
(:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn1] <test_ddl_conn.get_conn> Get BackendConnection[id = 9 host = 10.186.63.8 po
rt = 24801 localPort = 52423 mysqlId = 5924 db config = dbInstance[name=instanceM1,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn2] <test_ddl_conn.start> In shardingNode[dn2],about to execute sql{select 1}
(:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn2] <test_ddl_conn.get_conn> Get BackendConnection[id = 11 host = 10.186.63.7 p
ort = 24801 localPort = 52426 mysqlId = 3282 db config = dbInstance[name=instanceM2,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn3] <test_ddl_conn.start> In shardingNode[dn3],about to execute sql{select 1}
(:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn3] <test_ddl_conn.get_conn> Get BackendConnection[id = 8 host = 10.186.63.8 po
rt = 24801 localPort = 52424 mysqlId = 5925 db config = dbInstance[name=instanceM1,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn4] <test_ddl_conn.start> In shardingNode[dn4],about to execute sql{select 1}
(:)
2021-12-23 10:42:05,548 [INFO ][BusinessExecutor1] [DDL_2.dn4] <test_ddl_conn.get_conn> Get BackendConnection[id = 10 host = 10.186.63.7 p
ort = 24801 localPort = 52427 mysqlId = 3281 db config = dbInstance[name=instanceM2,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,550 [INFO ][complexQueryExecutor4] [DDL_2.dn1] <test_ddl_conn.succ>   (:)
2021-12-23 10:42:05,550 [INFO ][complexQueryExecutor4] [DDL_2.dn3] <test_ddl_conn.succ>   (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor4] [DDL_2.dn4] <test_ddl_conn.succ>   (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2.dn2] <test_ddl_conn.succ>   (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2] <test_ddl_conn.succ>   (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2] <exec_ddl_sql.start> This ddl will be executed separately in the shardingNo
des[dn1,dn3,dn2,dn4]  (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2.dn1] <exec_ddl_sql.start> In shardingNode[dn1],about to execute sql{CREATE T
ABLE `tableB` (`id` int(11) DEFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1
}  (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2.dn1] <exec_ddl_sql.get_conn> Get BackendConnection[id = 9 host = 10.186.63.8
 port = 24801 localPort = 52423 mysqlId = 5924 db config = dbInstance[name=instanceM1,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2.dn2] <exec_ddl_sql.start> In shardingNode[dn2],about to execute sql{CREATE T
ABLE `tableB` (`id` int(11) DEFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1
}  (:)
2021-12-23 10:42:05,553 [INFO ][complexQueryExecutor2] [DDL_2.dn2] <exec_ddl_sql.get_conn> Get BackendConnection[id = 11 host = 10.186.63.
7 port = 24801 localPort = 52426 mysqlId = 3282 db config = dbInstance[name=instanceM2,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,554 [INFO ][complexQueryExecutor2] [DDL_2.dn3] <exec_ddl_sql.start> In shardingNode[dn3],about to execute sql{CREATE T
ABLE `tableB` (`id` int(11) DEFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1
}  (:)
2021-12-23 10:42:05,554 [INFO ][complexQueryExecutor2] [DDL_2.dn3] <exec_ddl_sql.get_conn> Get BackendConnection[id = 8 host = 10.186.63.8
 port = 24801 localPort = 52424 mysqlId = 5925 db config = dbInstance[name=instanceM1,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,554 [INFO ][complexQueryExecutor2] [DDL_2.dn4] <exec_ddl_sql.start> In shardingNode[dn4],about to execute sql{CREATE T
ABLE `tableB` (`id` int(11) DEFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1
}  (:)
2021-12-23 10:42:05,554 [INFO ][complexQueryExecutor2] [DDL_2.dn4] <exec_ddl_sql.get_conn> Get BackendConnection[id = 10 host = 10.186.63.
7 port = 24801 localPort = 52427 mysqlId = 3281 db config = dbInstance[name=instanceM2,disabled=false,maxCon=10,minCon=3]  (:)
2021-12-23 10:42:05,581 [INFO ][complexQueryExecutor4] [DDL_2.dn3] <exec_ddl_sql.succ>   (:)
2021-12-23 10:42:05,581 [INFO ][complexQueryExecutor2] [DDL_2.dn1] <exec_ddl_sql.succ>   (:)
2021-12-23 10:42:05,583 [INFO ][complexQueryExecutor2] [DDL_2.dn4] <exec_ddl_sql.succ>   (:)
2021-12-23 10:42:05,604 [INFO ][complexQueryExecutor2] [DDL_2.dn2] <exec_ddl_sql.succ>   (:)
2021-12-23 10:42:05,605 [INFO ][complexQueryExecutor2] [DDL_2] <exec_ddl_sql.succ>   (:)
2021-12-23 10:42:05,606 [INFO ][complexQueryExecutor2] [DDL_2] <update_table_metadata.start>   (:)
2021-12-23 10:42:05,608 [INFO ][complexQueryExecutor2] [DDL_2] <update_table_metadata> Start execute sql{show create table} in the shardin
gNodes[dn4] to get table[tableB]’s information  (:)
2021-12-23 10:42:05,615 [INFO ][complexQueryExecutor4] [DDL_2] <update_table_metadata> In shardingNode[dn4], fetching success.  (:)
2021-12-23 10:42:05,616 [INFO ][complexQueryExecutor4] [DDL_2] <update_table_metadata.succ> Successful to update table[testdb.tableB]metad
ata  (:)
2021-12-23 10:42:05,616 [INFO ][complexQueryExecutor2] [DDL_2] <notice_cluster_ddl_complete.start> Notify and wait for all instances to en
ter phase COMPLETE  (:)
2021-12-23 10:42:05,735 [INFO ][complexQueryExecutor2] [DDL_2] <notice_cluster_ddl_complete.succ> All instances have entered phase COMPLET
E  (:)
2021-12-23 10:42:05,735 [INFO ][complexQueryExecutor2] [DDL_2] <release_table_lock.succ>  (:)
2021-12-23 10:42:05,817 [INFO ][complexQueryExecutor2] [DDL_2] <finish_ddl_trace> Execute success  (:)
2021-12-23 10:42:05,817 [INFO ][complexQueryExecutor2] ================ finish_ddl_trace [DDL_2] ================  (:)
```

dbleN

```
2021-12-23 10:47:21,358 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <receive_ddl_prepare> Received: initialize ddl{CREATE TABLE `t
ableB` (`id` int(11) DEFAULT NULL,`id2` int(11) DEFAULT NULL,`name` varchar(100) DEFAULT NULL) ENGINE=InnoDB DEFAULT CHARSET=latin1} of ta
ble[testdb.tableB]  (:)
2021-12-23 10:47:21,358 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <add_table_lock.start>   (:)
2021-12-23 10:47:21,358 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <add_table_lock.succ>   (:)
2021-12-23 10:47:21,461 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <receive_ddl_complete> Received: ddl execute success notice fo
r table[testdb.tableB]  (:)
2021-12-23 10:47:21,461 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <update_table_metadata.start>   (:)
2021-12-23 10:47:21,465 [INFO ][Curator-PathChildrenCache-4] [DDL_NOTIFIED] <update_table_metadata> Start execute sql{show create table} i
n the shardingNodes[dn1,dn2,dn3,dn4] to get table[tableB]’s information  (:)
2021-12-23 10:47:21,469 [INFO ][complexQueryExecutor4] [DDL_NOTIFIED] <update_table_metadata> In shardingNode[dn1], fetching success.  (:)
2021-12-23 10:47:21,469 [INFO ][complexQueryExecutor7] [DDL_NOTIFIED] <update_table_metadata> In shardingNode[dn4], fetching success.  (:)
2021-12-23 10:47:21,469 [INFO ][complexQueryExecutor5] [DDL_NOTIFIED] <update_table_metadata> In shardingNode[dn3], fetching success.  (:)
2021-12-23 10:47:21,470 [INFO ][complexQueryExecutor5] [DDL_NOTIFIED] <update_table_metadata> In shardingNode[dn2], fetching success.  (:)
2021-12-23 10:47:21,471 [INFO ][complexQueryExecutor5] [DDL_NOTIFIED] <update_table_metadata.succ> Successful to update table[testdb.table
B]metadata  (:)
2021-12-23 10:47:21,471 [INFO ][complexQueryExecutor5] [DDL_NOTIFIED] <release_table_lock.succ>  (:)
```

dbleA

```
cat dble.log | grep '[DDL_2' | grep '[DDL_NOTIFIED]'
```

2.32

3.22.01.0dble

2.32.1

2.32.1.1

user.xml analysisUserdbGroupdbGroupdb.xmluser.xmluser.xml

```
<dble:user xmlns:dble="http://dble.cloud/" version="4.0">
    <managerUser name="man1" password="654321" maxCon="100"/>
    <shardingUser name="root" password="123456" schemas="testdb" readOnly="false" maxCon="20"/>
    <rwSplitUser name="rwsu1" password="123456" dbGroup="rwGroup" maxCon="20"/>
    <analysisUser name="analysisUser" password="123456" dbGroup="dbGroup3" blacklist="blacklist1" maxCon="20"/>
</dble:user>
```

1. user.xmlshardingUserdblesharding.xml(dble)sharding.xml
2. analysisUserdbGroup
3. dbGroupinstancedbGroupinstance

2.32.2

dbledbInstancerwSplitMode0db.xml

1. dbInstance
2.

2.3.2.1 dbInstance

dbInstances

- (primary="true")
  - rwSplitMod2dbInstances
  - (primary primary="false")
    - dbInstances
    - dbInstances
-
  -

2.32.2.2

dbInstancedbInstance

- dbInstance
- dbInstance
  - dbInstance(readWeight), ,
  - dbInstance,

2.32.2.3 dbGrouprwSplitMode

2.32.3

clickhousemysqlselectdble

2.32.4

1. clickhouse
2. selectdble
3.

2.23 hint

1:

```
table_a a left join table_b b on a.col_1 = b.col_1 left join table_c c on a.col_2 =c.col_2 where a.col =xxx
```

3.22.01.0:

1. a a.col=xxx
2. b
3. c

dblejoin b sqldble :

1. a
2. b a
3. c a

a b a col_1 c a col_2 b cdblejoindble

2:

```
table_a a left join table_b b on a.col_1 = b.col_1 left join table_c c on a.sharding_col = c.sharding_col where a.col =xxx
```

1 :

1. ac
2. b a col_1

3:

```
table_a a left join table_b b on a.col_1 = b.col_1 left join table_c c on b.col_2 = c.col_2 where a.col =xxx
```

1

:

1. a
2. b a
3. c b

a b a col_1 c b col_2

:

1. a
2. b a
3. c

a b a col_1 c

hint

jdbc

```
import java.sql.*;
import java.util.*;
import java.util.concurrent.LinkedBlockingQueue;
import java.util.concurrent.ThreadPoolExecutor;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicInteger;

public abstract class jdbctest {
    static AtomicInteger index = new AtomicInteger(0);
    static volatile Connection conn = null;
    private static List<Connection> list = new ArrayList<>();
    private static void createConn(String username, String password) {
        String JDBC_DRIVER = "com.mysql.jdbc.Driver";
        String url = "jdbc:mysql://127.0.0.1:8066/test1?useSSL=false";
        try {
            //  JDBC
            Class.forName(JDBC_DRIVER);
```

```
            conn = DriverManager.getConnection(url, username, password);
            list.add(conn);
        } catch (Exception e) {
            e.printStackTrace();
        }
    }


    private static void createTable() {
        Statement stmt;
        try {
            //  JDBC
            Connection conn = list.get(index.incrementAndGet());
            stmt = conn.createStatement();
            stmt.addBatch("drop table if EXISTS t_spec_group ;");
            stmt.addBatch("drop table if EXISTS t_spu ;");
            stmt.addBatch("drop table if EXISTS t_sku ;");
            stmt.addBatch("drop table if EXISTS t_warehouse_sku ;");
            stmt.executeBatch();
            stmt.addBatch("create table t_spec_group(" +
                    "    id     int unsigned primary key  comment ''," +
                    "    spg_id int unsigned not null comment 'ID'," +
                    "    `type` varchar(200) not null comment ''," +
                    "    `name` varchar(200) not null comment ''" +
                    ") comment ='';");
            stmt.addBatch("create table t_spu(" +
                    "    id               int unsigned primary key  comment ''," +
                    "    title            varchar(200) not null comment ''," +
                    "    category_id      int unsigned not null comment 'ID'," +
                    "    saleable         int unsigned not null comment '', " +
                    "    spg_id           int unsigned comment 'ID'" +
                    ") comment ='';");
            stmt.addBatch("create table t_sku(" +
                    "    id               int unsigned primary key  comment ''," +
                    "    spu_id           int unsigned not null comment 'ID'," +
                    "    spg_id           int unsigned not null comment 'ID'," +
                    "    title            varchar(200) not null comment ''," +
                    "    price            int unsigned not null comment ''" +
                    ") comment ='';");
            stmt.addBatch("create table t_warehouse_sku(" +
                    "    warehouse_id int unsigned comment ''," +
                    "    sku_id       int unsigned comment 'ID'," +
                    "    spg_id       int unsigned not null comment 'ID'," +
                    "    title        varchar(200) not null comment ''," +
                    "    type         varchar(200) comment ''," +
                    "    num          int unsigned not null comment ''" +
                    ") comment '';");
            stmt.executeBatch();
            stmt.clearBatch();
            System.out.println("-------end------");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    private static void insertSpec_group() {
        PreparedStatement ps = null;
        try {
            Connection conn = list.get(index.incrementAndGet());
            String sql = "INSERT INTO t_spec_group (id, spg_id,type, name) VALUES (?,?,?,?);";
            ps = conn.prepareStatement(sql);
            int size = 300;
            for (int i = 0; i < size; i++) {

                if (i < 200) {
                    ps.setInt(1, i);
                    ps.setInt(2, i + 2000000);
                    ps.setString(3, "phone");
                    ps.setString(4, "iphone" + i);
                } else {
                    ps.setInt(1, i);
                    ps.setInt(2, i);
                    ps.setString(3, "desk" + i);
                    ps.setString(4, "idesk" + i);
                }
                ps.addBatch();
                if (i % 500 == 0) {
                    //
```

```
                    ps.executeBatch();
                    // sql
                    ps.clearBatch();
                }
            }
            ps.executeBatch();
            // sql
            ps.clearBatch();
            System.out.println("-------insertSpec_group---end------");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    private static void insertT_spu() {
        PreparedStatement ps = null;
        try {
            Connection conn = list.get(index.incrementAndGet());
            String sql = "INSERT INTO t_spu (id, title, category_id,saleable,spg_id) VALUES (?, ?, ?, ?, ?);";
            ps = conn.prepareStatement(sql);
            int size = 1000000;
            for (int i = 0; i < size; i++) {
                ps.setInt(1, i);
                if (i < 200) {
                    ps.setString(2, "this is phone");
                    ps.setInt(5, i + 2000000);
                } else {
                    ps.setString(2, "this is desk" + i);
                    ps.setInt(5, i);

                }
                ps.setInt(3, i);
                ps.setInt(4, 1);

                ps.addBatch();
                if (i % 500 == 0) {
                    //
                    ps.executeBatch();
                    // sql
                    ps.clearBatch();
                }
            }
            ps.executeBatch();
            // sql
            ps.clearBatch();
            System.out.println("-------insertT_spu---end------");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    private static void insertT_sku() {
        PreparedStatement ps = null;
        try {
            Connection conn = list.get(index.incrementAndGet());
            String sql = "INSERT INTO t_sku (id, spu_id,spg_id,title,price) VALUES (?, ?, ?,?, ?);";
            ps = conn.prepareStatement(sql);
            int size = 1000000;
            for (int i = 0; i < size; i++) {
                ps.setInt(1, i);
                ps.setInt(2, i);

                if (i < 200) {
                    ps.setInt(3, i + 2000000);
                    ps.setString(4, "iphone" + i);
                } else {
                    ps.setInt(3, i);
                    ps.setString(4, "idesk" + i);
                }
                ps.setInt(5, new Random().nextInt(2000));
                ps.addBatch();
                if (i % 500 == 0) {
                    //
                    ps.executeBatch();
                    // sql
                    ps.clearBatch();
                }
            }
```

```
            ps.executeBatch();
            // sql
            ps.clearBatch();
            System.out.println("------- insertT_sku---end------");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    private static void insertT_warehouse_sku() {
        PreparedStatement ps = null;
        try {
            Connection conn = list.get(index.incrementAndGet());
            String sql = "INSERT INTO t_warehouse_sku (warehouse_id, sku_id,spg_id, title,type, num) VALUES (?, ?,?,?,?, ?);";
            ps = conn.prepareStatement(sql);
            int size = 1000000;
            for (int i = 0; i < size; i++) {
                ps.setInt(1, i);
                ps.setInt(2, i);
                if(i < 200){

                    ps.setInt(3, i + 2000000);
                    ps.setString(4, "iphone" + i);
                    ps.setString(5, "phone");
                }else {
                    ps.setInt(3, i);
                    ps.setString(4, "idesk" + i);
                    ps.setString(5, "desk");
                }
                ps.setInt(6, new Random().nextInt(200));
                ps.addBatch();
                if (i % 500 == 0) {
                    //
                    ps.executeBatch();
                    // sql
                    ps.clearBatch();
                }
            }
            ps.executeBatch();
            // sql
            ps.clearBatch();
            System.out.println("-------insertT_warehouse_sku---end------");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }


    public static void main(String[] args) throws InterruptedException {
        int size = 6;
        //user.xml
        String username = "aa";
        String password = "123456";
        ThreadPoolExecutor executor = new ThreadPoolExecutor(size, size, 60, TimeUnit.SECONDS, new LinkedBlockingQueue<>());
        for (int i = 0; i < size; i++) {
            createConn(username, password);
        }
         createTable();
        executor.execute(() -> insertSpec_group());
        executor.execute(() -> insertT_warehouse_sku());
        executor.execute(() -> insertT_sku());
        executor.execute(() -> insertT_spu());
    }
}
```

sharding.xml

```
<?xml version="1.0"?>
<!DOCTYPE dble:sharding SYSTEM "sharding.dtd">
<dble:sharding xmlns:dble="http://dble.cloud/">
    <schema name="test1" >
        <shardingTable name="t_spec_group" shardingNode="dn1,dn2" function="sql-mod" shardingColumn="id"></shardingTable>
        <shardingTable name="t_spu" shardingNode="dn1,dn2" function="sql-mod" shardingColumn="id"></shardingTable>
        <shardingTable name="t_sku" shardingNode="dn1,dn2" function="hash-string-into-two" shardingColumn="title"></shardingTable>
        <shardingTable name="t_warehouse_sku" shardingNode="dn1,dn2" function="hash-string-into-two" shardingColumn="title"></shardingTabl
e>
    </schema>
```

```
    <shardingNode dbGroup="dbGroup1" database="db1" name="dn1"/>
    <shardingNode dbGroup="dbGroup2" database="db1" name="dn2"/>
    <shardingNode dbGroup="dbGroup3" database="db1" name="dn3"/>
    <shardingNode dbGroup="dbGroup4" database="db1" name="dn4"/>

    <function name="hash-string-into-two" class="StringHash">
        <property name="partitionCount">2</property>
        <property name="partitionLength">1</property>
    </function>

    <function name="sql-mod" class="Hash">
        <property name="partitionCount">2</property>
        <property name="partitionLength">1</property>
    </function>


</dble:sharding>
```

db.xml

```
<?xml version="1.0"?>
<!--
  ~ Copyright (C) 2016-2020 ActionTech.
  ~ License: http://www.gnu.org/licenses/gpl.html GPL version 2 or higher.
  -->
<!DOCTYPE dble:db SYSTEM "db.dtd">
<dble:db xmlns:dble="http://dble.cloud/" version="4.0">
    <dbGroup name="dbGroup1" rwSplitMode="0" delayThreshold="10000" >
        <heartbeat timeout="30" >show slave status</heartbeat>
        <dbInstance name="M1" url="ip1:3306" user="root" password="123456" maxCon="300" minCon="10" id="100"
                    primary="true" >
        </dbInstance>
    </dbGroup>

    <dbGroup name="dbGroup2" rwSplitMode="0" delayThreshold="10000">
        <heartbeat>show slave status</heartbeat>
        <dbInstance name="M2" url="ip2:3306" user="root" password="123456" id="1" maxCon="2000" minCon="10"
                    primary="true">
        </dbInstance>
    </dbGroup>

        <dbGroup name="dbGroup3" rwSplitMode="0" delayThreshold="10000">
            <heartbeat errorRetryCount="1" timeout="10">show slave status</heartbeat>
            <dbInstance name="M3" url="ip3:3306" user="root" password="123456" id="1" maxCon="2000" minCon="10"
                        primary="true">
            </dbInstance>
        </dbGroup>

    <dbGroup name="dbGroup4" rwSplitMode="2" delayThreshold="10000">
        <heartbeat errorRetryCount="1" timeout="10">show slave status</heartbeat>
        <dbInstance name="M4" user="root" password="123456" url="ip4:3306" maxCon="20" minCon="10"
                    primary="true">
        </dbInstance>
    </dbGroup>
</dble:db>
```

where

```
select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on b.spg_id=c.spg_id where a.type = 'phone';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on b.spg_id=c.spg_i
d where a.type = 'phone';
```

hint a & b & c

1. a
2. ba
3. cab

hint

```
select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id where a.type = 'phone';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id wh
ere a.type = 'phone';
```

hint a & b & c

1. a
2. ba
3. cab

hint

hint

```
/*!dble:plan=a & (b | c) */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id
where a.type = 'phone';
```

hinta & (b | c)

1. a
2. baca

abchint

```
select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on b.spg_id=c.spg_id where a.type = 'pho
ne';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on b.spg_id=c.
spg_id where a.type = 'phone';
```

hint a & b & c

1. a
2. ba
3. cab

hint

hint

```
/*!dble:plan=a & b | c */ select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on b.spg_id=c.
spg_id where a.type = 'phone';
```

hint a & b | c

1. ac
2. ba

acbhint

```
select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on a.spg_id=c.spg_id where a.type = 'pho
ne';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on a.spg_id=c.
spg_id where a.type = 'phone';
```

hint a & b & c

1. a
2. ba
3. cab

hint

hint

```
/*!dble:plan=a & (b | c) */ select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on a.spg_id=
c.spg_id where a.type = 'phone';
```

hint a & (b | c)

1. a
2. ba,ca

abchint

hint

```
/*!dble:plan=a & b | c */ select  *  from t_warehouse_sku a inner join t_sku b on a.sku_id = b.id inner join t_spec_group c on a.spg_id=c.
spg_id where a.type = 'phone';
```

hint a & b | c

1. ac
2. ba

acbhint

```
select  *  from t_warehouse_sku a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on a.title=c.title where a.type = 'phone';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=(a,c) & b*/ select  *  from t_warehouse_sku a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on a.title=c.title
 where a.type = 'phone';
```

hint (a,c) & b

1. ac
2. ba

hint

```
select  *  from t_warehouse_sku a inner join t_spec_group b on a.spg_id = b.spg_id inner join t_sku c on a.title=c.title where a.type = 'p
hone';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=(a,c) & b*/ select  *  from t_warehouse_sku a inner join t_spec_group b on a.spg_id = b.spg_id inner join t_sku c on a.title=
c.title where a.type = 'phone';
```

hint (a,c) & b

1. ac
2. ba

hint

hint

```
/*!dble:plan=(a,c) | b*/ select  *  from t_warehouse_sku a inner join t_spec_group b on a.spg_id = b.spg_id inner join t_sku c on a.title=
c.title where a.type = 'phone';
```

hint (a,c) | b

1. ac,b

acbhint

```
select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id where a.type = 'phone' and b
.category_id < 200;
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id wh
ere a.type = 'phone' and b.category_id < 200;
```

hint a & b & c

1. a
2. bawhere
3. cab

hint

hint

```
/*!dble:plan=a & (b | c) */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id
where a.type = 'phone' and b.category_id < 200;
```

hint a & (b | c)

1. a
2. bawhere
3. ca

abc,hint

```
select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id where a.type = 'phone' and c
.title like 'iphone%';
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id wh
ere a.type = 'phone' and c.title like 'iphone%';
```

hint a & b & c

1. a
2. ba
3. cabwhere

hint

hint

```
/*!dble:plan=a & (b | c) */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id
where a.type = 'phone' and c.title like 'iphone%';
```

hint a & (b | c)

1. a
2. ba
3. cawhere

abc,hint

hint

```
/*!dble:plan=a & b | c */ select  *  from t_warehouse_sku a left join t_spu b on a.spg_id = b.spg_id left join t_sku c on a.sku_id=c.id wh
ere a.type = 'phone' and c.title like 'iphone%';
```

hint a & b | c

1. a,c,
2. ba

acb,hint

where

```
select  *  from t_spec_group a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on b.spg_id=c.spg_id;
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_spec_group a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on b.spg_id=c.spg_id
;
```

hint a & b & c

1. a
2. ba
3. cab

hint

```
select  *  from t_spec_group a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on a.spg_id=c.spg_id;
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=a & b & c */ select  *  from t_spec_group a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on a.spg_id=c.spg_id
;
```

hint a & b & c

1. a
2. ba
3. cab

hint

hint

```
/*!dble:plan=a & ( b | c) */ select  *  from t_spec_group a inner join t_spu b on a.spg_id = b.spg_id inner join t_sku c on a.spg_id=c.spg
_id;
```

hint a & (b | c)

1. a
2. baca

ahint

```
select  *  from t_spec_group a inner join t_warehouse_sku b on a.spg_id = b.spg_id left join t_sku c on b.title=c.title;
```

hint

1. a
2. b
3. c

hint

```
/*!dble:plan=(b,c) & a */ select  *  from t_spec_group a inner join t_warehouse_sku b on a.spg_id = b.spg_id left join t_sku c on b.title=
c.title;
```

hint (b,c) & a

1. bc
2. ab

bcer,hint

hint

```
/*!dble:plan=(b,c) | a */ select  *  from t_spec_group a inner join t_warehouse_sku b on a.spg_id = b.spg_id inner join t_sku c on b.title
=c.title;
```

hint (b,c) | a

1. bc
2. ab

bcerahint

hint

dbledble 3.22.01.0dblehint

hint dble hint

```
/*!dble:plan=a & ( b | c )$left2inner$right2inner$in2join$use_table_index*/ sql
```

a & (b | c) abc sql

&|

- 1: a & (b | c)
- 2: (a,c) & b
- 3: a&b&c (a & b) | c

1. (a,c) acER
2. & nestloop
3. | join
4. left2inner left joininner join

5. right2inner right joininner join
6. in2join injoinbootstrap.cnfinSubQueryTransformToJoin

sql dble use_table_index sql

```
/*!dble:plan=1 & 2 & 3 $use_table_index*/ select * from t1 a left join t2 b on a.id = b.id left join t3 c on a.id=c.id
```

1 a2 b3 c123 sql

```
/*!dble:plan=a & b & c*/ select * from t1 a left join t2 b on a.id = b.id left join t3 c on a.id=c.id
```

hintnestLoop

- hint
  a join b ,a,berhinta & b,
- hint
  a join b on a.col1 = b.col1 join c on c.col2 = a.col2, hint (a & b & c),

1. Hibernate
2. sql join key hint `select * from table_a a, table_b b`
3. sql right join hint
4. sql hint
5. left join inner join `/*!dble:plan=a & c & b */ SELECT * FROM Employee a LEFT JOIN Dept b on a.name=b.manager inner JOIN Info c on a.name=c.name and b.manager=c.name ORDER BY a.name;` a c inner join , b join a b left join c b inner joinsql
6. sqlerhint
   hintdblesqlhint `/*!dble:plan=a | c | b */ SELECT a.Name,a.DeptName,b.Manager,c.salary FROM Employee a LEFT JOIN Dept b on a.DeptName=b.DeptName LEFT JOIN Level c on a.Level=c.levelname and c.salary=10000 order by a.Name ;` `SELECT a.Name,a.DeptName,b.Manager,c.salary FROM Employee a LEFT JOIN Level c on a.Level=c.levelname and c.salary=10000 LEFT JOIN Dept b on a.DeptName=b.DeptName order by a.Name` ,acererhintnestLoop,

2.34 dble

dble

MySQLdbleTLSMySQL ClientMySQLDBLE

- 2.34.1 SSL
- 2.34.2 DBLESSL

2.34.1 SSL

MySQLCACADBLESSL

ca.pem	CA
server-cert.pemserver-key.pem	java
client-vert.pemclient-key.pem	java
truststore.jks	CAJKSjava
serverkeystore.jks	JKSjava
clientkeystore.jks	JKSjava

MySQL[ca.pem]CA[server-cert.pem] [client-cert.pem] [ca.pem]

> openssl
>
> yumyum install openssl -y

```
1CA()
    # CA [ca-key.pem]
    openssl genrsa 2048 > ca-key.pem
    # [ca.pem]
    openssl req -new -x509 -nodes -days 3600 -key ca-key.pem -out ca.pem

2
    # [server-key.pem][server-req.pem]
    openssl req -newkey rsa:2048 -days 3600 -nodes -keyout server-key.pem -out server-req.pem
    # RSA
    openssl rsa -in server-key.pem -out server-key.pem
    # CA[server-cert.pem], CA
    openssl x509 -req -in server-req.pem -days 3600 -CA ca.pem -CAkey ca-key.pem -set_serial 01 -out server-cert.pem

3
    # [client-key.pem][client-req.pem]
    openssl req -newkey rsa:2048 -days 3600 -nodes -keyout client-key.pem -out client-req.pem
    # RSA
    openssl rsa -in client-key.pem -out client-key.pem
    # CA[client-cert.pem], CA
    openssl x509 -req -in client-req.pem -days 3600 -CA ca.pem -CAkey ca-key.pem -set_serial 01 -out client-cert.pem

4OK
    openssl verify -CAfile ca.pem server-cert.pem client-cert.pem

5
    openssl x509 -text -in ca.pem
    openssl x509 -text -in server-cert.pem
    openssl x509 -text -in client-cert.pem
```

openssl pem crt Java keytool p12 jks

keytool JAVA keytool keystore/

```
1CAJKS
    #[ca.pem]JavajavaJKSJCEKSPKCS12PKCS11DKSJKStruststore.jks123456
    keytool -import -noprompt -file ca.pem -keystore truststore.jks -storepass 123456

2JKS
    #[server-cert.pem][server-key.pem]()p12JKS123456
    openssl pkcs12 -export -in server-cert.pem -inkey server-key.pem -out serverkeystore.p12 -passout pass:123456
    keytool -importkeystore -srckeystore serverkeystore.p12 -srcstoretype PKCS12 -destkeystore serverkeystore.jks -srcstorepass 123456 -de
ststorepass 123456
```

```
3JKS
    #[client-cert.pem][client-key.pem]()p12JKS123456
    openssl pkcs12 -export -in client-cert.pem -inkey client-key.pem -out clientkeystore.p12 -passout pass:123456
    keytool -importkeystore -srckeystore clientkeystore.p12 -srcstoretype PKCS12 -destkeystore clientkeystore.jks -srcstorepass 123456 -de
ststorepass 123456
```

2.34.2 DBLESSL

DBLE

boostrap.cnf

```
-DsupportSSL=true
-DserverCertificateKeyStoreUrl=${JKS}
-DserverCertificateKeyStorePwd=${}
-DtrustCertificateKeyStoreUrl=${CAJKS}
-DtrustCertificateKeyStorePwd=${}
```

9066

```
mysql> select * from dble_variables where comment like '%SSL%';
+------------------------------+-------------------------------------------------------------------+-----------------------------------------
-----------------+-----------+
| variable_name                | variable_value                                                    | comment
                 | read_only |
+------------------------------+-------------------------------------------------------------------+-----------------------------------------
-----------------+-----------+
| isSupportSSL                 | true                                                              | Whether support for SSL to establish fron
tend connections | true      |
| serverCertificateKeyStoreUrl | ${JKS}                                                            | Service certificate required for SSL                      | true
    |
| trustCertificateKeyStoreUrl  | ${CAJKS}                                                          | Trust certificate required for SSL
 | true      |
+------------------------------+-------------------------------------------------------------------+-----------------------------------------
-----------------+-----------+
3 rows in set (0.07 sec)
```

: isSupportSSLfalsessldble.logssl

SSL

MySQLSSLDBLE

- ssl-mode=DISABLED

  Client

  client `mysql -u*** -p*** --ssl-mode=DISABLED`

  jdbc `jdbc:mysql://localhost:8066/testdb?useSSL=false`

- ssl-mode=PREFFERED

  client

  client `mysql -u*** -p*** --ssl-mode=PREFFERED`

  jdbc `jdbc:mysql://localhost:8066/testdb?requireSSL=false&useSSL=true&verifyServerCertificate=false`

- ssl-mode=REQUIRED

  ClientClient

  client `mysql -u*** -p*** --ssl-mode=REQUIRED`

  jdbc `jdbc:mysql://localhost:8066/testdb?requireSSL=true&useSSL=true&verifyServerCertificate=false`

- ssl-mode=VERIFY_CA

  -

    Clientca

    client `mysql -u*** -p*** --ssl-mode=VERIFY_CA --ssl-ca='${CA}'`

    jdbc

    ```
      jdbc:mysql://localhost:8066/testdb?
    requireSSL=true
    &useSSL=true
    &verifyServerCertificate=true
    ```

```
&trustCertificateKeyStoreUrl=file:${CAJKS}
&trustCertificateKeyStorePassword=${CAJKS}
```

-

  Clientca

  client `mysql -u*** -p*** --ssl-mode=VERIFY_CA --ssl-ca='${CA}' --ssl-cert='${}' --ssl-key='${}'`

  jdbc

```
  jdbc:mysql://localhost:8066/testdb?
requireSSL=true
&useSSL=true
&verifyServerCertificate=true
&trustCertificateKeyStoreUrl=file:${CAJKS}
&trustCertificateKeyStorePassword=${CAJKS}
&clientCertificateKeyStoreUrl=file:${JKS}
&clientCertificateKeyStorePassword=file:${JKS}
```

- ssl-mode=VERIFY_IDENTITY()

  VERIFY_CA

- MYSQL CLIENT

```
mysql> \s
...
SSL:            Cipher in use is DHE-RSA-AES256-SHA  # SSL
...
```

- DBLE
  - ssl=OpenSSLOpenSSL

```
2022-05-26 11:27:55,557 [INFO ][BusinessExecutor4] FrontendConnection[id = 3 port = 8066 host = 127.0.0.1 local_port = 57752 isMan
ager = false startupTime = 1653535675511 skipCheck = false isFlowControl = false onlyTcpConnect = false ssl = OpenSSL] SSL handsha
ke complete  (SSLHandler.java:248)
```

  - ssl=no

```
2022-05-26 11:32:37,908 [INFO ][BusinessExecutor2] connection id close for reason [quit cmd] with connection FrontendConnection[id
 = 4 port = 8066 host = 192.168.0.109 local_port = 58114 isManager = false startupTime = 1653535957751 skipCheck = false isFlowCon
trol = false onlyTcpConnect = false ssl = no]  (AbstractConnection.java:154)
```

2.35

2.35.1

`>=3.22.11.0`

dble direct memory()io dble

dble dble

direct memory MB

direct memory `show @@directmemory` `DIRECT_MEMORY_POOL_USED`

20%cpu20%

buffer

2.35.2

dble_memory_resident id

2.35.3 bootstrap.cnf

```
#  whether enable the memory buffer monitor
#-DenableMemoryBufferMonitor=0
#-DenableMemoryBufferMonitorRecordPool=1
```

2.35.4

2.35.4.1 enable @@memory_buffer_monitor

```
mysql> enable @@memory_buffer_monitor;
Query OK, 1 row affected (4.26 sec)
```

2.35.4.2 disable @@memory_buffer_monitor

```
mysql> disable @@memory_buffer_monitor;
Query OK, 1 row affected (0.01 sec)
disable MemoryBufferMonitor success
```

2.35.4.3 select * from dble_memory_resident \G

buffer

> buffer 1s buffer

```
mysql> select * from dble_memory_resident \G
*************************** 1. row ***************************
           id: 140185807364096
 alive_second: 29.892
   stacktrace:
com.actiontech.dble.buffer.MemoryBufferMonitor.addRecord(MemoryBufferMonitor.java:80)
com.actiontech.dble.buffer.DirectByteBufferPool.allocate(DirectByteBufferPool.java:58)
com.actiontech.dble.net.connection.AbstractConnection.allocate(AbstractConnection.java:431)
com.actiontech.dble.net.connection.AbstractConnection.findReadBuffer(AbstractConnection.java:529)
com.actiontech.dble.net.connection.FrontendConnection.findReadBuffer(FrontendConnection.java:358)
```

```
com.actiontech.dble.net.impl.nio.NIOSocketWR.asyncRead(NIOSocketWR.java:358)
com.actiontech.dble.services.mysqlauthenticate.MySQLFrontAuthService.register(MySQLFrontAuthService.java:61)
com.actiontech.dble.net.connection.AbstractConnection.register(AbstractConnection.java:601)

  buffer_type: POOL
allocate_size: 4096
allocate_time: 2022-12-07 17:21:39.901
          sql: <<FRONT>>
1 row in set (0.00 sec)
```

2.35.5

buffer_type=NORMAL , sql

```
mysql> select * from dble_memory_resident where buffer_type="NORMAL"\G
Empty set (0.02 sec)
```

- sql alive_second
- sql alive_second buffer dble
- sql `DIRECT_MEMORY_POOL_USED`
- sql `DIRECT_MEMORY_POOL_USED` dble_memory_residentdble

2.36

dblesalvedbInstancesalvedbInstance

2.36.1

db.xmldelayThreshold delayPeriodMillis delayDatabasedb.xml

```
<dbGroup name="dbGroup1" rwSplitMode="1" delayThreshold="1000" delayPeriodMillis="2000" delayDatabase="test">
       <heartbeat errorRetryCount="1" timeout="10" keepAlive="60">show slave status</heartbeat>
       <dbInstance name="instanceM1" url="ip5:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="true">
       </dbInstance>

       <!-- can have multi read instances -->
       <dbInstance name="instanceS1" url="ip6:3306" user="your_user" password="your_psw" maxCon="200" minCon="50" primary="false">
           <property name="heartbeatPeriodMillis">60000</property>
       </dbInstance>
   </dbGroup>
```

1.delayPeriodMillis delayDatabase delayThreshold delayThreshold
2.rwStickyTime
3.

2.36.2

1.dbleprimary="true"mysqlu_delay

```
create table if not exists delaydatabase.u_delay(
source VARCHAR(256)  NOT NULL,
real_timestamp varchar(26) NOT NULL,
logic_timestamp BIGINT default 0);
```

Source :dbledble_dbGgroupName_instanceNameinstanceName-DinstanceName
real_timestamp:dble dble
logic_timestamp:dble

2.delayPeriodMillismaster-mysqlreplace into
3.delayPeriodMillisslave-mysqlselect
4.slave-mysqllogic_timestampmaster-mysqllogic_timestamp *delayPeriodMillis > delayThresholdslave-mysqldbInstance* delayPeriodMillis < delayThresholdsl dbInstanceslave-mysqldbInstanceslave-mysqldbInstance

2.36.2.1

masterlogic_timestampslavelogic_timestamp*delayPeriodMillis

2.36.3

delay_detection

```
+---------------+------+-------------------+-------+--------+-------------------------+---------------------+-----------------+-----------
---+
| db_group_name | name | host              | delay | status | message                 | last_active_time    | backend_conn_id | logic_upda
te |
+---------------+------+-------------------+-------+--------+-------------------------+---------------------+-----------------+-----------
---+
| dbGroup1      | M1   | 10.186.62.41:3312 |     0 | ok     | NULL                    | 2022-12-09 15:09:45 |             293 |
 0 |
| dbGroup1      | S1   | 10.186.62.41:3309 |     0 | ok     | NULL                    | 2022-12-09 15:09:45 |             295 |
 0 |
+---------------+------+-------------------+-------+--------+-------------------------+---------------------+-----------------+-----------
---+
2 rows in set (0.00 sec)
```

db_group_namedbGroup
name:dbInstanceName
hostmysql ip
delay:
status:okerrorinit()timeout()

messageok
last_active_time:
backend_conn_idid
logic_update:
logic_updatemysql

```
update delay_detection set logic_update = 1 where backend_conn_id = 26;
```

2.37 /sql_dump log

2.37.1

()SQLDBLE

2.37.2

```
[][SQL digest hash][SQL][ID][][][IP:][IP:][] SQL
```

- []
- [SQL digest hash] SQLhash
- [SQL] SQLInsertUpdateDeleteSelectShowDDLBeginCommitRollbackOther
- [ID]ID
- []
- [](:)
- [IP:]IPPORT
- [IP:]IPPORT
- []SQL
- SQLSQL1024

2.37.3

```
-DenableSqlDumpLog=0          # 0-()1-
-DsqlDumpLogBasePath=sqldump  # base
-DsqlDumpLogFileName=sqldump.log     # sqldump/sqldump.log
-DsqlDumpLogCompressFilePattern=${date:yyyy-MM}/sqldump-%d{MM-dd}-%i.log.gz  ## sqldump/2022-10/sqldump-10-11-1.log.gz)
-DsqlDumpLogOnStartupRotate=1  # 1-0-
-DsqlDumpLogSizeBasedRotate=50MB   # sqldump.log50MB:KBMBGB
-DsqlDumpLogTimeBasedRotate=1  # 1
-DsqlDumpLogDeleteFileAge=90d   # 90:d()h()m()s()sqlDumpLogCompressFilePatternlog4j2

-DsqlDumpLogCompressFilePath=*/sqldump-*.log.gz  #
```

2.37.4

```
enable @@sqldump_sql; --
disable @@sqldump_sql; --
select * from dble_variables where variable_name like '%sqldump%';  -- sqldump
```

2.37.5

0SQLDBLE
1ExitQuit
3COM_STMT_PREPARE COM_STMT_EXECUTE
4
5DBLEDruidDruidsql“SQL”“Other”
6log4j2

2.38 tcp

2.38.1

dblemysqltcpmysql dbledbledblelinuxkeep-alive dblebootstrap.cnfdble

2.38.2 jdk

oracle jdk 1.8-261
openjdk 1.8-272

2.38.3

```
-DtcpKeepIdle=30   #tcp-keepalive
-DtcpKeepInterval=10 #tcp-keepalive
-DtcpKeepCount=3 #tcp-keepalive
```

2.38.4

1.tcp
2.
3.NAT

2.38.5

1.dblejdkdblewarndble
2.tcpKeepIdletcpKeepIntervaltcpKeepCount

2.39 HTAP

2.39.1

MySQLMySQL
DBLEOLTPMySQLOLAPClickhouseTP/AP DBLESQLSQLTPMySQLAPClickhouseTP/AP

2.39.2

1. user.xmlHTAPhybridTAUser

```
<hybridTAUser name="htap_user1" password="111111" schemas="testdb"/>
```

2. sharding.xmlhybridTAUserschema

```
<!--apNodeClickhouseshardingNodeMySQL-->
<schema name="testdb" apNode="apNode1" shardingNode="dn1">
....
</schema>
<shardingNode name="dn1" dbGroup="dbGroup1" database="db_1"/>
<apNode name="apNode1" dbGroup="dbGroup2" database="ap_db1"/>
```

3. db.xmlHTAPMySQLClickhouse

```
<!--MySQL-->
<dbGroup name="dbGroup1" rwSplitMode="0" delayThreshold="100">
 <heartbeat>select 1</heartbeat>
 <dbInstance name="hostM1" url="ip:port" user="root" password="123456" maxCon="100" minCon="10" primary="true"/>
</dbGroup>
<!--Clickhouse-->
<dbGroup name="dbGroup2" rwSplitMode="0" delayThreshold="100">
<heartbeat>select 1</heartbeat>
<dbInstance name="hostM2" url="ip:port" user="default" password="123456" maxCon="100" minCon="10" primary="true" databaseType="clickho
use"/>
</dbGroup>
```

4. Clickhousebinlog MaterializedMySQL

1. shardingUserschemaapNode
2. hybridTAUserschemaapNode
3. hybridTAUserapNodedbGroupdatabaseTypeclickhouse
4. analysisUserdbGrouphybridTAUserapNode
5. shardingNodeapNodename

2.39.3

MySQLClickhouse

```
mysql> select * from table_1;
+----+---------+
| id | column1 |
+----+---------+
|  1 | abc     |
|  2 | def     |
|  3 | ghi     |
+----+---------+
3 rows in set (0.01 sec)
```

case 1: OLTP

```
#SQLAPOLTPdnMySQL
mysql> explain select id from table_1;
+---------------+----------+------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                |
+---------------+----------+------------------------+
| dn1           | BASE SQL | select id from table_1 |
| dn2           | BASE SQL | select id from table_1 |
| dn3           | BASE SQL | select id from table_1 |
| dn4           | BASE SQL | select id from table_1 |
+---------------+----------+------------------------+
4 rows in set (0.00 sec)
```

```
mysql> select id from table_1;
+----+
| id |
+----+
|  3 |
|  1 |
|  2 |
+----+
3 rows in set (0.01 sec)
```

case 2: OLAP

```
#SQLgroup byOLAPap1Clickhouse
mysql> explain select id from table_1 group by id;
+---------------+----------+-----------------------------------+
| SHARDING_NODE | TYPE     | SQL/REF                           |
+---------------+----------+-----------------------------------+
| ap1           | BASE SQL | select id from table_1 group by id |
+---------------+----------+-----------------------------------+
1 row in set (0.00 sec)

mysql> select id from table_1 group by id;
+------+
| id   |
+------+
|    3 |
|    2 |
|    1 |
+------+
3 rows in set (0.01 sec)
```

2.39.4

SQL

SQLSQLAPTP

1. SELECTAP minsumcountavgmaxSTDDEV_POPSTDDEV_SAMPVAR_POPVAR_SAMPgroup by
2. ClickHouseTP
3. ClickhousebinlogmysqlckmysqlDMLTP

AP/TPTPAPDBLE
OLTPshardingUser 1.3 user.xml
OLAPanalysisUser 1.3 user.xml

DBLESQLSQLDBLESQLSQLSQL
DBLESQLSQLTP/AP

- hybridTAUser

```
mysql> select * from dble_entry a join dble_entry_schema b on a.id = b.id where user_type = 'hybridTAUser'\G
*************************** 1. row ***************************
              id: 4
            type: username
       user_type: hybridTAUser
        username: apuser1
password_encrypt: hWj/raQ08POPSUZykAbUnQVvzwl1IdbQw4fbZxmocW71BW6Y0He0Z0nIZfRkXsbQ4KMPegG4D2KkQnwZpbYMpA==
encrypt_configured: false
   conn_attr_key: NULL
 conn_attr_value: NULL
       white_ips: NULL
        readonly: -
```

```
  max_conn_count: no limit
       blacklist: NULL
              id: 4
          schema: aptest
1 row in set (0.01 sec)
```

- apNode

```
mysql> select * from dble_ap_node;
+------+----------+----------------+
| name | db_group | db_schema      |
+------+----------+----------------+
| ap1  | dbGroup4 | mysql_db_test2 |
+------+----------+----------------+
2 rows in set (0.00 sec)
```

2.39.5

- ClickhouseSQLMySQL
- ClickhouseUNIONClickhouse UNION ClauseMySQLUNIONUNION ALLUNION DISTINCTClickhouse

2.40 dble(printkillrecover)

dble

```
mysql> select * from dble_thread_pool;
+----------------------+-----------+----------------+--------------+--------------------+
| name                 | pool_size | core_pool_size | active_count | waiting_task_count |
+----------------------+-----------+----------------+--------------+--------------------+
| Timer                |         1 |              1 |            0 |                  0 |
| TimerScheduler       |         2 |              2 |            0 |                 15 |
| frontWorker          |         8 |              8 |            1 |                  0 |
| managerFrontWorker   |         4 |              4 |            4 |                  0 |
| backendWorker        |         8 |              8 |            0 |                  0 |
| complexQueryWorker   |         8 |              8 |            1 |                  0 |
| writeToBackendWorker |         8 |              8 |            8 |                  0 |
| NIOFrontRW           |         8 |              8 |            8 |                  0 |
| NIOBackendRW         |         8 |              8 |            8 |                  0 |
+----------------------+-----------+----------------+--------------+--------------------+

mysql> select * from dble_thread_pool_task;
+----------------------+-----------+-------------------+-----------------+----------------+------------+
| name                 | pool_size | active_task_count | task_queue_size | completed_task | total_task |
+----------------------+-----------+-------------------+-----------------+----------------+------------+
| Timer                |         1 |                 0 |               0 |          89208 |      89208 |
| TimerScheduler       |         2 |                 0 |              15 |        1158830 |    1158845 |
| frontWorker          |         8 |                 0 |               0 |              0 |          0 |
| managerFrontWorker   |         4 |                 0 |               0 |             60 |         60 |
| backendWorker        |         8 |                 0 |               0 |          11339 |      11339 |
| complexQueryWorker   |         8 |                 1 |               0 |           2189 |       2190 |
| writeToBackendWorker |         8 |                 0 |               0 |              0 |          0 |
+----------------------+-----------+-------------------+-----------------+----------------+------------+
7 rows in set (0.42 sec)
```

- TimerSchedulerdble
  - (core_pool_size)2active_count0
  - task_queue_sizetask_queue_size
  - xaid
  - 2hangcompleted_tasktask_queue_size
- Timer TimerScheduler
  - 11(65535);pool_size1pool_size2
  - 2hangpool_sizeactive_count2completed_tasktotal_tasktask_queue_size65535
- frontWorker8066
  - active_countpool_sizeRUNNING
  - active_countpool_sizethread @@recover name='0-frontWorker';
- managerFrontWorker9066
  - frontWorker
- writeToBackendWorkerSQL
  - frontWorker
- NIOFrontRWIO
  - frontWorker
- NIOBackendRWIO
  - frontWorker
- backendWorker
  - active_count+1pool_size
- complexQueryWorker
  - active_count+1pool_sizecore_pool_size
-
  - `thread @@print` jstack

2.40.1 dblehang

2.40.1.1

TimerTimerScheduler&
dble"ThreadChecker"2min

1. 10s -- thread.log `Thread[{}] suspected hang, execute time:[{}ms] more than 10s, currentState:[{}]`
2. active_task_countcompleted_taskthread.log `The thread pool where the thread[{}] is located is in the hang state and cannot work. Trigger alarm` ,DBLE_THREAD_SUSPECTED_HANG

3. 2DBLE_THREAD_SUSPECTED_HANG

2.40.1.2 print

`thread @@print`
`thread @@print name=?`

jstackSTWprint

2.40.2 hangdble

`thread @@kill name=?`
`thread @@kill poolname=?` TimerScheduler/Timer
`thread @@recover name=?`
`thread @@recover poolname=?` TimerScheduler/Timer

&

- TimerScheduler
  - 1hang
  -
    1. `thread @@kill name=?` ;
    2. hang
  - 2hangcompleted_task
  -
    1. `thread @@kill poolname=?` shutdownSTOPtrue;
    2. pool_size0shutdown `thread @@recover poolname=?` pool_sizecompleted_tasktotal_task
    3. pool_size2
  - `thread @@kill name='0-TimerScheduler'` + `thread @@kill name='1-TimerScheduler'` `thread @@kill poolname='TimerScheduler'`
- Timer
  - TimerScheduler
- frontWorker
  - 1hang
  -
    1. `thread @@kill name=?`
    2. active_counthang
    3. active_count `thread @@recover name=?` , active_count+1 (name'0-frontWorker''0-frontWorker')
  - killdble
- managerFrontWorker
  - frontWorker
- writeToBackendWorker
  - frontWorker
- NIOFrontRWIO
  - kill/recoverkillNIOFrontRW
- NIOBackendRWIO
  - 1.frontWorker
  - 2.recoverdbleRWfresh conn forced where dbGroup ='groupName' `reload @@config_all -r`
  - killdblesqlhangcan't reach kill
- backendWorker
  - 1hang
  -
    1. `thread @@kill name=?`
    2. hang
    3. `thread @@recover`
- complexQueryWorker
  - backendWorker
- jstack
  - backendWorker `thread @@kill name=?`

printkillrecoverlogs/therad.log

3.

- 3.1 DDL
  - 3.1.1 DDL&Table Syntax
  - 3.1.2 DDL&View Syntax
  - 3.1.3 DDL&Index Syntax
  - 3.1.4 DDL
  - 3.1.5 DDL&Database Syntax
  - 3.1.6 ONLINE DDL
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- 3.10 (alpha)
- 3.11

3.1 DDL

DDL

DDLDMLDDL

- 3.1.1 DDL&Table Syntax
- 3.1.2 DDL&View Syntax
- 3.1.3 DDL&Index Syntax
- 3.1.4 DDL

3.1.1 TABLE DDL

3.1.1.1 CREATE TABLE Syntax

```
CREATE TABLE [IF NOT EXISTS] tbl_name
    (create_definition,...)
    [table_options]
    [partition_options]

create_definition:
    col_name column_definition

column_definition:
    data_type [NOT NULL | NULL] [DEFAULT default_value]
      [AUTO_INCREMENT] [UNIQUE [KEY] | [PRIMARY] KEY]
      [COMMENT 'string']

data_type:
    BIT[(length)]
  | TINYINT[(length)] [UNSIGNED] [ZEROFILL]
  | SMALLINT[(length)] [UNSIGNED] [ZEROFILL]
  | MEDIUMINT[(length)] [UNSIGNED] [ZEROFILL]
  | INT[(length)] [UNSIGNED] [ZEROFILL]
  | INTEGER[(length)] [UNSIGNED] [ZEROFILL]
  | BIGINT[(length)] [UNSIGNED] [ZEROFILL]
  | REAL[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | DOUBLE[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | FLOAT[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | DECIMAL[(length[,decimals])] [UNSIGNED] [ZEROFILL]
  | NUMERIC[(length[,decimals])] [UNSIGNED] [ZEROFILL]
  | DATE
  | TIME[(fsp)]
  | TIMESTAMP[(fsp)]
  | DATETIME[(fsp)]
  | YEAR
  | CHAR[(length)]
  | VARCHAR(length)
  | BINARY[(length)]
  | VARBINARY(length)
  | TINYBLOB
  | BLOB
  | MEDIUMBLOB
  | LONGBLOB
  | TINYTEXT
  | TEXT
  | MEDIUMTEXT
  | LONGTEXT
  | ENUM(value1,value2,value3,...)

table_options:
    table_option [[,] table_option] ...

table_option:
    ENGINE [=] engine_name
  | [DEFAULT] CHARACTER SET [=] charset_name
  | CHECKSUM [=] {0 | 1}
  | [DEFAULT] COLLATE [=] collation_name
  | COMMENT [=] 'string'
  | CONNECTION [=] 'connect_string'
  | KEY_BLOCK_SIZE [=] value
  | MAX_ROWS [=] value
  | MIN_ROWS [=] value
  | PASSWORD [=] 'string'
  | ROW_FORMAT [=] {DEFAULT|DYNAMIC|FIXED|COMPRESSED|REDUNDANT|COMPACT}
  | STATS_AUTO_RECALC [=] {DEFAULT|0|1}
  | STATS_PERSISTENT [=] {DEFAULT|0|1}
partition_options:
      {[LINEAR] HASH(expr)
       | PARTITION BY [linear] KEY (column_list)
       | RANGE{(expr) | COLUMNS(column_list)}
       | LIST{(expr) | COLUMNS(column_list)}
       }
     [(partition_definition [, partition_definition] ...)]
```

- engine_name“InnoDB“
- CREATE TABLE `test` (`id` enum('1','2','3') DEFAULT '1')id'1'1dbleissue https://github.com/actiontech/dble/issues/816

```
create table if not exists test(
id bigint primary key AUTO_INCREMENT,
col1 int not null default 5,
col2 int null COMMENT 'info for col1',
col3 varchar(20) not null,
col4 varchar(20) unique key
);

create table test(
id int primary key,
col_bit    BIT(1),
col_tinyint TINYINT(2) UNSIGNED ZEROFILL,
col_smallint SMALLINT(3) UNSIGNED ZEROFILL,
col_mediumint MEDIUMINT(4) UNSIGNED ZEROFILL,
col_int INT(5) UNSIGNED ZEROFILL,
col_integer INTEGER(6) UNSIGNED ZEROFILL,
col_bigint BIGINT(7) UNSIGNED ZEROFILL,
col_real REAL(8,1) UNSIGNED ZEROFILL,
col_double DOUBLE(9,2) UNSIGNED ZEROFILL,
col_float FLOAT(10,3) UNSIGNED ZEROFILL,
col_decimal DECIMAL(11,4) UNSIGNED ZEROFILL,
col_numeric NUMERIC(12,5) UNSIGNED ZEROFILL,
col_date DATE,
col_time TIME(3),
col_timestamp TIMESTAMP(4),
col_datetime DATETIME(5),
col_year YEAR,
col_char CHAR(10) ,
col_varcgar VARCHAR(20) ,
col_binary BINARY(30),
col_varbinary VARBINARY(40),
col_tinyblob TINYBLOB,
col_blob BLOB,
col_mediumblob MEDIUMBLOB,
col_longblob LONGBLOB,
col_tinytext TINYTEXT ,
col_text TEXT ,
col_mediumtext MEDIUMTEXT ,
col_longtext LONGTEXT ,
col_enum ENUM('a','b','c')
);
```

```
create table test(
id int primary key,
col1 varchar(20)
)ENGINE = innodb
 AVG_ROW_LENGTH = 20
 DEFAULT CHARACTER SET = utf8
 CHECKSUM = 1
 DEFAULT COLLATE = utf8_general_ci
 COMMENT = 'info of table test'
 CONNECTION = '111111'
 DELAY_KEY_WRITE = 1
 INSERT_METHOD = LAST
 KEY_BLOCK_SIZE = 65536
 MAX_ROWS = 3
 MIN_ROWS = 2
 PACK_KEYS = 1
 ROW_FORMAT = DEFAULT;
```

3.1.1.2 ALTER TABLE Syntax

```
ALTER [IGNORE] TABLE tbl_name
    [alter_specification [, alter_specification] ...]

alter_specification:
  | ADD [COLUMN] col_name column_definition
        [FIRST | AFTER col_name ]
  | ADD [COLUMN] (col_name column_definition,...)
```

```
  | ADD {INDEX | KEY} [index_name]
  | CHANGE [COLUMN] old_col_name new_col_name column_definition
        [FIRST|AFTER col_name]
  | MODIFY [COLUMN] col_name column_definition
        [FIRST | AFTER col_name]
  | DROP [COLUMN] col_name
  | DROP {INDEX | KEY} index_name
  | ADD [INDEX|KEY] [index_name] (index_col_name,...)
  | DROP {INDEX|KEY} index_name
  | ADD PRIMARY KEY (index_col_name,...)
  | DROP PRIMARY KEY
  | ALTER [COLUMN] col_name
        {SET DEFAULT {literal | (expr)} | DROP DEFAULT}
  | COMMENT [=] 'string'
```

```
alter table test add column col5 int not null default 1 first,add column col6 int after col4;
alter table test change column col1 col1_new int after col3;
alter table test modify column col1_new varchar(20) after id;
alter table test drop column col6;
alter table test add key idx_col4(col4);
alter table test add index idx_col4(col4);
alter table test drop key idx_col4;
alter table test drop index idx_col4;
alter table test drop primary key;
alter table test add primary key (id);
alter table test alter column col set default 0;
alter table test alter column col drop default;
alter table test comment = 'string';
```

3.1.1.3 DROP TABLE Syntax

```
DROP TABLE [IF EXISTS]
    tbl_name [, tbl_name] ...
    [RESTRICT | CASCADE]
```

```
drop table if exists test cascade;
drop table test restrict;
```

3.1.1.4 TRUNCATE TABLE Syntax

```
TRUNCATE [TABLE] tbl_name
```

```
truncate table test;
```

3.1.2 VIEW DDL

Syntax

create view :

```
CREATE [OR REPLACE] VIEW
        view_name [(column_list)]
        AS select_statement
```

alter view :

```
alter  VIEW
        view_name [(column_list)]
        AS select_statement
```

drop view:

```
DROP VIEW [IF EXISTS] view_name [, view_name]
```

show create view :

```
SHOW CREATE VIEW view_name;
```

3.1.3 INDEX DDL

3.1.3.1 CREATE INDEX Syntax

```
CREATE [UNIQUE|FULLTEXT] INDEX index_name
    [index_type]
    ON tbl_name (index_col_name,...)

index_col_name:
    col_name [(length)] [ASC | DESC]

index_type:
    USING {BTREE | HASH}
```

```
create unique index idx1 using btree on test(col1);
create index idx2 using hash on test(col2);
create fulltext index idx3 on test(col4);
create fulltext index idx4 on test(col4(10));
```

3.1.3.2 DROP INDEX Syntax

```
DROP INDEX index_name ON tbl_name
```

```
drop index idx1 on test;
```

3.1.4 DDL

DDLdblemysqlDDL(eg. ALTER EVENT)
dblemysqlDDL

```
/*!dble:sql=select ... from tbx where id=M*/ ddl statement
```

tbx idM

```
MySQL [TESTDB]> /*!dble:sql=select * from a_test where id=2*/CREATE PROCEDURE account_count()

      BEGIN   SELECT 'Number of accounts:', COUNT(*) FROM mysql.user;

END//
```

3.1.5 DATABASE DDL

3.1.5.1 CREATE DATABASE Syntax

```
CREATE {DATABASE | SCHEMA} [IF NOT EXISTS] db_name
    [create_specification] ...

create_specification:
    [DEFAULT] CHARACTER SET [=] charset_name
  | [DEFAULT] COLLATE [=] collation_name
  | DEFAULT ENCRYPTION [=] {'Y' | 'N'}
```

- schemashema.xml
- create_specification
-

3.1.6 ONLINE DDL

3.1.6.1

1. 3.20.04.0dbleddldbleSQLddldbleshow create table dble
2. SQLdbledbledbledblenullsqlmysqlonlineDDL

3.1.6.2 ONLINE DDL

MySQL 8.0online ddldbleonline ddl

- Index Operations
- Primary Key Operations
- Column Operations
- Generated Column Operations
- Foreign Key Operations
- Table Operations
- Tablespace Operations
- Partitioning Operations

1			CREATE INDEX *name* ON *table* (*col_list*);ALTER TABLE *tbl_name* ADD INDEX *name* (*col_list*);		
2			DROP INDEX *name* ON *table*;ALTER TABLE *tbl_name* DROP INDEX *name*;		
3			ALTER TABLE *tbl_name* RENAME INDEX *old_index_name* TO *new_index_name*, ALGORITHM=INPLACE, LOCK=NONE;		mysql 5.6 online ddl
4		FULLTEXT	CREATE FULLTEXT INDEX *name* ON table(*column*);		mysql
5		SPATIAL	CREATE TABLE geom (g GEOMETRY NOT NULL); ALTER TABLE geom ADD SPATIAL INDEX(g), ALGORITHM=INPLACE, LOCK=SHARED;		mysql
6			ALTER TABLE *tbl_name* DROP INDEX i1, ADD INDEX i1(*key_part,...*) USING BTREE, ALGORITHM=INSTANT;		
7			ALTER TABLE *tbl_name* ADD PRIMARY KEY (*column*), ALGORITHM=INPLACE, LOCK=NONE;		
8			ALTER TABLE *tbl_name* DROP PRIMARY KEY, ALGORITHM=COPY;		COPYdml
9			ALTER TABLE *tbl_name* DROP PRIMARY KEY, ADD PRIMARY KEY (*column*), ALGORITHM=INPLACE, LOCK=NONE;		
10			ALTER TABLE *tbl_name* ADD COLUMN *column_name column_definition*, ALGORITHM=INSTANT;		dble

11			*tbl_name* DROP COLUMN *column_name*, ALGORITHM=INPLACE, LOCK=NONE;		dble
12			ALTER TABLE *tbl* CHANGE *old_col_name new_col_name data_type*, ALGORITHM=INPLACE, LOCK=NONE;		dble
13			ALTER TABLE *tbl_name* MODIFY COLUMN *col_name column_definition* FIRST, ALGORITHM=INPLACE, LOCK=NONE;		
14			ALTER TABLE *tbl_name* CHANGE c1 c1 BIGINT, ALGORITHM=COPY;		dml
15		VARCHAR	ALTER TABLE *tbl_name* CHANGE COLUMN c1 c1 VARCHAR(255), ALGORITHM=INPLACE, LOCK=NONE;		dble
16			ALTER TABLE *tbl_name* ALTER COLUMN *col* SET DEFAULT *literal*, ALGORITHM=INSTANT;		
17			ALTER TABLE *tbl* ALTER COLUMN *col* DROP DEFAULT, ALGORITHM=INSTANT;		
18			ALTER TABLE *table* AUTO_INCREMENT=*next_value*, ALGORITHM=INPLACE, LOCK=NONE;		
19		NULL	ALTER TABLE tbl_name MODIFY COLUMN *column_name data_type* NULL, ALGORITHM=INPLACE, LOCK=NONE;		dble
20		NULL	ALTER TABLE *tbl_name* MODIFY COLUMN *column_name data_type* NOT NULL, ALGORITHM=INPLACE, LOCK=NONE;		dble
21		`ENUM` `SET`	CREATE TABLE t1 (c1 ENUM('a', 'b', 'c')); ALTER TABLE t1 MODIFY COLUMN c1 ENUM('a', 'b', 'c', 'd'), ALGORITHM=INSTANT;		
22			ALTER TABLE *tbl1* ADD CONSTRAINT *fk_name* FOREIGN KEY *index* (*col1*) REFERENCES *tbl2*(*col2*) *referential_actions*;		dble
23			ALTER TABLE *tbl* DROP FOREIGN KEY *fk_name*;		
24	Generated	Generated	ALTER TABLE t1 ADD COLUMN (c2 INT GENERATED ALWAYS AS (c1 + 1) STORED), ALGORITHM=COPY;		
			ALTER TABLE t1 MODIFY COLUMN c2		

25		Generated	INT GENERATED ALWAYS AS (c1 + 1) STORED FIRST, ALGORITHM=COPY;		
26		Generated	ALTER TABLE t1 DROP COLUMN c2, ALGORITHM=INPLACE, LOCK=NONE;		
27		VIRTUAL	ALTER TABLE t1 ADD COLUMN (c2 INT GENERATED ALWAYS AS (c1 + 1) VIRTUAL), ALGORITHM=INSTANT;		
28		VIRTUAL	ALTER TABLE t1 MODIFY COLUMN c2 INT GENERATED ALWAYS AS (c1 + 1) VIRTUAL FIRST, ALGORITHM=COPY;		
29		VIRTUAL	ALTER TABLE t1 DROP COLUMN c2, ALGORITHM=INSTANT;		
30					MySQL
31					dble

3.1.6.3

1. dble druidonline ddl “ALGORITHM=INPLACE, LOCK=NONE” https://github.com/alibaba/druid/issues/3750

3.2 DML

DML

- 3.2.1 INSERT
- 3.2.2 REPLACE
- 3.2.3 DELETE
- 3.2.4 UPDATE
- 3.2.5 SELECT
- 3.2.6 SELECT JOIN syntax
- 3.2.7 SELECT UNION Syntax
- 3.2.8 SELECT Subquery Syntax
- 3.2.9 LOAD DATA
- 3.2.10 DML

3.2.1 INSERT

3.2.1.1 Syntax

INSERT2

```
INSERT
    [INTO] tbl_name
    [(col_name [, col_name] ...)]
    { {VALUES | VALUE} (value_list) [, (value_list)] ... }
    [ON DUPLICATE KEY UPDATE assignment_list]

INSERT
    [INTO] tbl_name
    SET assignment_list
    [ON DUPLICATE KEY UPDATE assignment_list]

value:
    {expr | DEFAULT}

value_list:
    value [, value] ...


assignment:
    col_name =
          value

assignment_list:
    assignment [, assignment] ...
```

```
INSERT
    [INTO] tbl_name
    [(col_name [, col_name] ...)]
    { SELECT ...
      | TABLE table_name
    }
    [ON DUPLICATE KEY UPDATE assignment_list]

assignment:
    col_name =
          value

assignment_list:
    assignment [, assignment] ...
```

3.2.1.2 MySQL

```
INSERT
-   [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    [(col_name [, col_name] ...)]
    { {VALUES | VALUE} (value_list) [, (value_list)] ... }
-   [AS row_alias[(col_alias [, col_alias] ...)]]
    [ON DUPLICATE KEY UPDATE assignment_list]

INSERT
-   [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    SET assignment_list
-   [AS row_alias[(col_alias [, col_alias] ...)]]
    [ON DUPLICATE KEY UPDATE assignment_list]

INSERT
-   [LOW_PRIORITY | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    [(col_name [, col_name] ...)]
    { SELECT ...
```

```
      | TABLE table_name
-     | VALUES row_constructor_list
    }
    [ON DUPLICATE KEY UPDATE assignment_list]

value:
    {expr | DEFAULT}

value_list:
    value [, value] ...

-row_constructor_list:
-   ROW(value_list)[, ROW(value_list)][, ...]

assignment:
    col_name =
          value
-       | [row_alias.]col_name
-       | [tbl_name.]col_name
-       | [row_alias.]col_alias

assignment_list:
    assignment [, assignment] ...
```

3.2.1.3

```
insert into test (col1,col3) values(1,'cust1'),(2,'cust2');
insert into test (col1,col3) values(default,'cust3');
insert into test set col1=4,col3='cust4';
insert into test set col1=default,col3='cust5';
insert into test (col1,col3) values(default,cast(now() as char));
```

3.2.1.4

- ERROW
- dble
- CREATE TABLE `test` (`id` enum('1','2','3') DEFAULT '1')id'1'1dbleissue https://github.com/actiontech/dble/issues/816
- `insert/replace... select` dbleSQL
  -
  -
  - select

3.2.2 REPLACE

3.2.2.1 Syntax

REPLACE2

```
REPLACE
    [INTO] tbl_name
    [(col_name [, col_name] ...)]
    {VALUES | VALUE} (value_list) [, (value_list)] ...

REPLACE
    [INTO] tbl_name
    SET assignment_list

value:
    {expr | DEFAULT}

value_list:
    value [, value] ...


assignment:
    col_name = value

assignment_list:
    assignment [, assignment] ...
```

```
REPLACE
    [INTO] tbl_name
    [(col_name [, col_name] ...)]
    {SELECT ... | TABLE table_name}
```

3.2.1.2 MySQL

```
REPLACE
-   [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    [(col_name [, col_name] ...)]
-   {
     {VALUES | VALUE} (value_list) [, (value_list)] ...
-    |VALUES row_constructor_list
-   }

REPLACE
-   [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    SET assignment_list

REPLACE
-   [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
    [(col_name [, col_name] ...)]
    {SELECT ... | TABLE table_name}

value:
    {expr | DEFAULT}

value_list:
    value [, value] ...

-row_constructor_list:
-   ROW(value_list)[, ROW(value_list)][, ...]

assignment:
    col_name = value

assignment_list:
```

```
    assignment [, assignment] ...
```

3.2.2.3

```
REPLACE INTO test VALUES (1, 'Old', '2014-08-20 18:47:00');
REPLACE INTO test set id = 1, type= 'Old',create_date =  '2014-08-20 18:47:00';
```

3.2.2.4

- replacereplaceIDIDID
- `insert/replace... select` dbleSQL
  -
  -
  - select

3.2.3 DELETE

3.2.3.1 Single-Table Syntax

3.2.3.1.1 Syntax

```
DELETE
    FROM tbl_name [[AS] tbl_alias]
    [WHERE where_condition]
```

3.2.3.1.2 MySQL

```
DELETE
-   [LOW_PRIORITY] [QUICK] [IGNORE]
    FROM tbl_name [[AS] tbl_alias]
-   [PARTITION (partition_name [, partition_name] ...)]
    [WHERE where_condition]
-   [ORDER BY ...]
-   [LIMIT row_count]
```

3.2.3.1.3

```
delete from test where id>5;
```

3.2.3.1.4

- Deletewhere_condition

3.2.3.2 Multiple-Table Syntax

- Join DELETE
- DELETEDELETE
  - update/deletewherewhere
  - update/deletewherewhere“” where

3.2.3.2.1 Syntax

```
DELETE
    tbl_name[.*] [, tbl_name[.*]] ...
    FROM table_references
    [WHERE where_condition]

DELETE
    FROM tbl_name[.*] [, tbl_name[.*]] ...
    USING table_references
    [WHERE where_condition]
```

3.2.3.2.2 MySQL

```
DELETE
-   [LOW_PRIORITY] [QUICK] [IGNORE]
    tbl_name[.*] [, tbl_name[.*]] ...
    FROM table_references
    [WHERE where_condition]

DELETE
-   [LOW_PRIORITY] [QUICK] [IGNORE]
    FROM tbl_name[.*] [, tbl_name[.*]] ...
    USING table_references
    [WHERE where_condition]
```

3.2.4 UPDATE

3.2.4.1 Single-Table Syntax

3.2.4.1.1 Syntax

```
UPDATE
    table_reference
    SET assignment_list
    [WHERE where_condition]

value:
    {expr | DEFAULT}

assignment:
    col_name = value

assignment_list:
    assignment [, assignment] ...
```

3.2.4.1.2 MySQL

```
UPDATE
-   [LOW_PRIORITY] [IGNORE]
    table_reference
    SET assignment_list
    [WHERE where_condition]
-   [ORDER BY ...]
-   [LIMIT row_count]

value:
    {expr | DEFAULT}

assignment:
    col_name = value

assignment_list:
    assignment [, assignment] ...
```

3.2.4.1.3

```
UPDATE  test SET VALUE =1 where id=5;
```

3.2.4.1.4

- UPDATEwhere_condition

3.2.4.2 Multiple-Table Syntax

- Join UPDATE
- updateUPDATE
  - updatewhere where
  - updatewherewhere,“” where
- whereERSQL
- update
  - update
  -
  - setwhere

3.2.4.2.1 Syntax

```
UPDATE
    table_references
    SET assignment_list
    [WHERE where_condition]
```

3.2.4.2.2 MySQL

```
UPDATE
-   [LOW_PRIORITY] [IGNORE]
    table_references
    SET assignment_list
    [WHERE where_condition]
```

3.2.5 SELECT

3.2.5.1 Syntax

```
SELECT
    [ALL | DISTINCT | DISTINCTROW ]
    select_expr [, select_expr] ...
    [FROM table_references]
    [WHERE where_condition]
    [GROUP BY {col_name | expr }, ... ]
    [HAVING where_condition]
    [ORDER BY {col_name | expr }
      [ASC | DESC], ... ]
    [LIMIT {[offset,] row_count | row_count OFFSET offset}]
    [FOR {UPDATE | SHARE}
        [NOWAIT | SKIP LOCKED]
      | LOCK IN SHARE MODE]
```

3.2.5.2 MySQL

```
SELECT
    [ALL | DISTINCT | DISTINCTROW ]
-    [HIGH_PRIORITY]
-    [STRAIGHT_JOIN]
-    [SQL_SMALL_RESULT] [SQL_BIG_RESULT] [SQL_BUFFER_RESULT]
-    [SQL_NO_CACHE] [SQL_CALC_FOUND_ROWS]
    select_expr [, select_expr] ...
-    [into_option]
    [FROM table_references
-      [PARTITION partition_list]
    ]
    [WHERE where_condition]
    [GROUP BY {col_name | expr
-   | position
    }, ...
-    [WITH ROLLUP]
    ]
    [HAVING where_condition]
-    [WINDOW window_name AS (window_spec)
-       [, window_name AS (window_spec)] ...]
    [ORDER BY {col_name | expr
-   | position
    } [ASC | DESC], ...
-      [WITH ROLLUP]
      ]
    [LIMIT {[offset,] row_count | row_count OFFSET offset}]
-    [into_option]
    [FOR {UPDATE | SHARE}
-        [OF tbl_name [, tbl_name] ...]
        [NOWAIT | SKIP LOCKED]
      | LOCK IN SHARE MODE]
-   [into_option]

-into_option: {
-    INTO OUTFILE 'file_name'
-        [CHARACTER SET charset_name]
-        export_options
-  | INTO DUMPFILE 'file_name'
-  | INTO var_name [, var_name] ...
-}
```

3.2.5.3

```
select id,col1,col3 from test where id=3;
select distinct col1,col3 from test where id>=3;
select count(*),max(id),col1 from test group by col1 desc having(count(*)>1) order by col1 desc;
select id,col1,col3 from test order by id limit 2 offset 2;
select id,col1,col3 from test order by id limit 2,2;
select 1+1,'test',id,col1*1.1,now() from test limit 3;
select current_date,current_timestamp;
select * from test where id=3 for update skip locked;
select * from test where id=3 for share;
```

```
select * from test where id=3 LOCK IN SHARE MODE;
```

3.2.6 JOIN Syntax:

`SELECT` `DELETE` `UPDATE` `table_references` `JOIN`

3.2.6.1 Syntax

```
table_references:
    table_reference [, table_reference] ...


table_reference: {
    table_factor
    | joined_table
}

table_factor: {
    tbl_name [[AS] alias]
       | table_subquery [AS] alias
       | ( table_references )
}

joined_table: {
    table_reference {[INNER | CROSS] JOIN | STRAIGHT_JOIN} table_factor [join_specification]
  | table_reference {LEFT|RIGHT} [OUTER] JOIN table_reference join_specification
  | table_reference NATURAL [INNER | {LEFT|RIGHT} [OUTER]] JOIN table_factor
}

join_specification: {
    ON search_condition
  | USING (join_column_list)
}

join_column_list:
    column_name [, column_name] ...
```

table_subquery

3.2.6.2 MySQL

```
table_references:
    escaped_table_reference [, escaped_table_reference] ...

escaped_table_reference: {
    table_reference
-  | { OJ table_reference }
}

table_reference: {
    table_factor
    | joined_table
}

table_factor: {
    tbl_name
-    [PARTITION (partition_names)]
        [[AS] alias]
-       [index_hint_list]
       |
-        [LATERAL]
            table_subquery [AS] alias
-           [(col_list)]
       | ( table_references )
}

joined_table: {
    table_reference {[INNER | CROSS] JOIN | STRAIGHT_JOIN} table_factor [join_specification]
  | table_reference {LEFT|RIGHT} [OUTER] JOIN table_reference join_specification
  | table_reference NATURAL [INNER | {LEFT|RIGHT} [OUTER]] JOIN table_factor
}

join_specification: {
    ON search_condition
```

```
  | USING (join_column_list)
}

join_column_list:
    column_name [, column_name] ...

-index_hint_list:
-   index_hint [, index_hint] ...

-index_hint: {
-   USE {INDEX|KEY}
-     [FOR {JOIN|ORDER BY|GROUP BY}] ([index_list])
-     | {IGNORE|FORCE} {INDEX|KEY}
-     [FOR {JOIN|ORDER BY|GROUP BY}] (index_list)
-}

-index_list:
-   index_name [, index_name] ...
```

3.2.7 UNION Syntax:

MYSQL

```
query_block UNION [ALL | DISTINCT] query_block
    [UNION [ALL | DISTINCT] query_block]
    [...]
```

3.2.8 Subquery

3.2.8.1 The Subquery as Scalar Operand

For example :

```
SELECT (SELECT s2 FROM t1);
SELECT (SELECT s1 FROM t2) FROM t1;
SELECT UPPER((SELECT s1 FROM t1)) FROM t2;
```

3.2.8.2 Comparisons Using Subqueries

:

```
non_subquery_operand comparison_operator (subquery)
```

comparison_operator :

```
=    >    <    >=    <=    <>    !=    <=>
```

MySQL :

```
non_subquery_operand LIKE (subquery)
```

3.2.8.3 Subqueries with ANY, IN, or SOME

Syntax:

```
operand comparison_operator ANY (subquery)
operand IN (subquery)
operand comparison_operator SOME (subquery)
```

comparison_operator :

```
=    >    <    >=    <=    <>    !=
```

3.2.8.4 Subqueries with ALL

Syntax:

```
operand comparison_operator ALL (subquery)
```

3.2.8.5 Subqueries with EXISTS or NOT EXISTS

For example:

```
SELECT column1 FROM t1 WHERE EXISTS (SELECT * FROM t2);
```

3.2.8.6 Derived Tables (Subqueries in the FROM Clause)

For example:

```
SELECT ... FROM (subquery) [AS] tbl_name ...
```

```
SELECT * FROM JSON_TABLE(arg_list) [AS] tbl_name ...
SELECT ... FROM (subquery) [AS] tbl_name (col_list) ...
```

3.2.8.7 Row Subqueries

3.2.8.8 Correlated Subqueries

3.2.9 LOAD DATA

3.2.9.1 Syntax

```
LOAD DATA
    [LOCAL]
    INFILE 'file_name'
    [REPLACE | IGNORE]
    INTO TABLE tbl_name
    CHARACTER SET 'charset_name'
    [{FIELDS | COLUMNS}
        [TERMINATED BY 'string']
        [[OPTIONALLY] ENCLOSED BY 'char']
        [ESCAPED BY 'char']
    ]
    [LINES
        [STARTING BY 'string']
        [TERMINATED BY 'string']
    ]
   [IGNORE number {LINES }]
    [(col_name_or_user_var
        [, col_name_or_user_var] ...)]
    [SET col_name={expr | DEFAULT}
        [, col_name={expr | DEFAULT}] ...]
```

3.2.9.2 MySQL

```
LOAD DATA
-   [LOW_PRIORITY | CONCURRENT]
    [LOCAL]
    INFILE 'file_name'
    [REPLACE | IGNORE]
    INTO TABLE tbl_name
-   [PARTITION (partition_name [, partition_name] ...)]
-   [CHARACTER SET charset_name]
+   CHARACTER SET 'charset_name'
    [{FIELDS | COLUMNS}
        [TERMINATED BY 'string']
        [[OPTIONALLY] ENCLOSED BY 'char']
        [ESCAPED BY 'char']
    ]
    [LINES
        [STARTING BY 'string']
        [TERMINATED BY 'string']
    ]
    [IGNORE number {
        LINES
-     | ROWS
        }]
    [(col_name_or_user_var
        [, col_name_or_user_var] ...)]
    [SET col_name={expr | DEFAULT}
        [, col_name={expr | DEFAULT}] ...]
```

3.2.9.3

```
load data infile 'data.txt' into table test_table CHARACTER SET 'utf8mb4' FIELDS  TERMINATED by ',';
```

3.2.9.4

dbleMySQL,maxRowSizeToFile(bootstrap.cnf) load data local infile

local_infileload data.

#1085

3.2.9.5

- BUGdbleCHARACTER SET charset_name
- dble druid charset_name CHARACTER SET 'utf8mb4' CHARACTER SET "utf8mb4" CHARACTER SET utf8mb4
- mysqldbleload data
- ENCLOSED BYBUG
- loaddata65535bootstrap.cnfmaxCharsPerColumn

- load data,,,dble.issue: https://github.com/actiontech/dble/issues/770
- load data,druid,,druid,.issue: https://github.com/actiontech/dble/issues/1248
- load data: https://github.com/actiontech/dble/issues/1507
- load dataissue https://github.com/actiontech/dble/issues/1761

3.2.10 DML

3.2.10.1 MySQL

DO Statement
EXCEPT Clause
HANDLER Statement
IMPORT TABLE Statement
INTERSECT Clause
LOAD XML Statement
Parenthesized Query Expressions
TABLE Statement
VALUES Statement
WITH (Common Table Expressions)

3.2.10.2

1. Set Operations with UNION, INTERSECT, and EXCEPT
   dbleUNION

1. CALL Statement

3.6_procedure_support

3.3 Prepared Statements

3.3.1 PREPARE Statement

MySQL

```
PREPARE stmt_name FROM preparable_stmt
```

```
prepare stmt1 from "select * from a_test where id=?";
```

3.3.2 EXECUTE Statement

MySQL

```
EXECUTE stmt_name
[USING @var_name [, @var_name] ...]
```

```
SET @a = 1;
EXECUTE stmt1 USING @a;
```

3.3.3 DEALLOCATE PREPARE Statement

MySQL

```
{DEALLOCATE | DROP} PREPARE stmt_name
```

```
DROP PREPARE stmt1;
```

3.4 Transactional and Locking Statements

Transactional and Locking Statements

- 3.4.1
- 3.4.2
- 3.4.3 SAVEPOINT
- 3.4.4 Lock&unlock
- 3.4.5 SET TRANSACTION Syntax
- 3.4.6 XA
- 3.4.7

3.4.1 START TRANSACTION, COMMIT, and ROLLBACK Statements

3.4.1.1 Syntax

```
START TRANSACTION

BEGIN

SET autocommit = {0 | 1}
```

```
COMMIT
```

```
ROLLBACK
```

3.4.1.2 MySQL

```
START TRANSACTION
-    [transaction_characteristic [, transaction_characteristic] ...]

-transaction_characteristic: {
-    WITH CONSISTENT SNAPSHOT
-  | READ WRITE
-  | READ ONLY
-}

BEGIN
-[WORK]

COMMIT
-[WORK] [AND [NO] CHAIN] [[NO] RELEASE]

ROLLBACK
-[WORK] [AND [NO] CHAIN] [[NO] RELEASE]

SET autocommit = {0 | 1}
```

3.4.1.3

- 2PC(xa)commit,XA

3.4.2 Implicit commit SQL

3.4.2.1

1064,1046.

3.4.2.2 sharding

- 3.1.1 DDL&Table Syntax
- 3.1.2 DDL&View Syntax
- 3.1.3 DDL&Index Syntax
- Lock tables…

3.4.2.3 rwsplitmysql:

3.4.3 SAVEPOINT, ROLLBACK TO SAVEPOINT, and RELEASE SAVEPOINT Syntax

3.4.3.1 Syntax

MySQL

```
SAVEPOINT identifier
ROLLBACK [WORK] TO [SAVEPOINT] identifier
RELEASE SAVEPOINT identifier
```

3.4.2.2 MySQL

3.4.3.2

```
# start transaction
set autocommit = 0;

# savepoint
savepoint s0;
insert into test value(1);
savepoint s1;
insert into test value(2);
savepoint s2;
insert into test value(3);

# rollback to
rollback to s0

# release
release savepoint s0
```

3.4.3.3

1. mysql,savepoint,savepoint.dblesavepoint,.
2. ROLLBACK TO [SAVEPOINT] *identifier* work .

3.4.4 Lock&unlock

3.4.4.1 Syntax

```
LOCK TABLES
    tbl_name [[AS] alias] lock_type

lock_type: {
    READ  |  WRITE
}

UNLOCK TABLES
```

3.4.4.2 MySQL

```
LOCK TABLES
    tbl_name [[AS] alias] lock_type
-    [, tbl_name [[AS] alias] lock_type] ...

lock_type: {
    READ
-  [LOCAL]
  |
-  [LOW_PRIORITY]
    WRITE
}

UNLOCK TABLES
```

3.4.4.3

```
lock tables test_table read;
unlock tables;
```

3.4.4.4

1. session
2.

3.4.5 SET TRANSACTION Syntax

3.4.5.1 Syntax

```
SET SESSION TRANSACTION ISOLATION LEVEL level



level: {
     REPEATABLE READ
   | READ COMMITTED
   | READ UNCOMMITTED
   | SERIALIZABLE
}
```

```
SET @@SESSION.TX_ISOLATION = 'level_str'

level_str:
     REPEATABLE-READ
   | READ-COMMITTED
   | READ-UNCOMMITTED
   | SERIALIZABLE
```

3.4.5.2 MySQL

```
SET
-   [GLOBAL |
    SESSION
-   ]
    TRANSACTION
    transaction_characteristic
-    [, transaction_characteristic] ...

transaction_characteristic: {
    ISOLATION LEVEL level
-  | access_mode
}

level: {
     REPEATABLE READ
   | READ COMMITTED
   | READ UNCOMMITTED
   | SERIALIZABLE
}

-access_mode: {
-     READ WRITE
-   | READ ONLY
-}
```

sessionsession

3.4.6 XA

dbleXAxa

3.4.6.1 Syntax

XA

```
set xa = {0|1}
```

```
START TRANSACTION;

BEGIN

SET autocommit = {0 | 1}
```

```
COMMIT
```

```
ROLLBACK
```

3.4.6.2

- xasql

3.4.7

LOCK INSTANCE FOR BACKUP and UNLOCK INSTANCE Statements

3.5 DAL

DAL

- 3.5.1 SET
- 3.5.2 SHOW
- 3.5.3 KILL
- 3.5.4 DAL

3.5.1 SET

3.5.1.1 XA

```
set xa=value

value:
  0
 | off
 | false
 | 1
 | on
 | true
```

```
set xa=1
```

XA

3.5.1.2 AUTOCOMMIT

```
set autocommit=value

value:
  0
 | off
 | false
 | 1
 | on
 | true
```

```
set autocommit=1
```

AUTOCOMMIT

3.5.1.3 NAMES

```
SET NAMES {'charset_name' [COLLATE 'collation_name'] | DEFAULT}
```

```
set names utf8;

set names utf8 collate utf8_general_ci;

set names default;
```

3.5.1.4 CHARSET

```
SET {CHARACTER SET | CHARSET}
{'charset_name' | DEFAULT}
```

```
set CHARACTER SET utf8;
```

3.5.1.5 COLLATION_CONNECTION/CHAESET_SET_X

```
SET COLLATION_CONNECTION='collation_name'

SET CHARSET_SET_CLIENT='charset_name'

SET CHARSET_SET_RESULTS='charset_name'  'charset_name' NULL

SET CHARSET_SET_CONNECTION='charset_name'
```

```
set collation_connection=utf8_general_ci;

set CHARSET_SET_CLIENT=utf8

set CHARSET_SET_RESULTS=utf8;

set CHARSET_SET_CONNECTION=utf8;
```

3.5.1.6 TRANSACTION ACCESS MODE

```
SET SESSION { TX_READ_ONLY |  TRANSACTION_READ_ONLY}=value

value:
  0
 | off
 | false
 | 1
 | on
 | true
```

```
set session @@tx_read_only=1;
```

MySQLdble

3.5.1.7 TRANSACTION ISOLATION LEVEL

```
SET SESSION {TRANSACTION_ISOLATION | TX_ISOLATION}=level

level:

READ-UNCOMMITTED | READ-COMMITTED | REPEATABLE-READ | SERIALIZABLE
```

```
SET SESSION TX_ISOLATION=READ-COMMITTED;
```

3.5.1.8 USER/SYSTEM VARIABLE

```
SET variable_assignment[, variable_assignment ] ...

variable_assignment:

  @user_var_name = expr

 | SESSION system_var_name = expr

 | system_var_name = expr

 | @@system_var_name = expr

 | @@session.system_var_name = expr
```

1.
2.

```
audit_log_current_session
audit_log_filter_id
auto_increment_increment
auto_increment_offset
autocommit
big_tables
binlog_direct_non_transactional_updates
binlog_error_action
binlog_format
binlog_row_image
```

```
binlog_rows_query_log_events
binlogging_impossible_mode
block_encryption_mode
bulk_insert_buffer_size
character_set_client
character_set_connection
character_set_database
character_set_filesystem
character_set_results
character_set_server
collation_connection
collation_database
collation_server
completion_type
debug
debug_sync
default_storage_engine
default_tmp_storage_engine
default_week_format
disconnect_on_expired_password
div_precision_increment
end_markers_in_json
eq_range_index_dive_limit
error_count
explicit_defaults_for_timestamp
external_user
foreign_key_checks
group_concat_max_len
gtid_next
gtid_owned
identity
innodb_create_intrinsic
innodb_ft_user_stopword_table
innodb_lock_wait_timeout
innodb_optimize_point_storage
innodb_strict_mode
innodb_support_xa
innodb_table_locks
innodb_tmpdir
insert_id
interactive_timeout
join_buffer_size
keep_files_on_create
last_insert_id
lc_messages
lc_time_names
lock_wait_timeout
long_query_time
low_priority_updates
max_allowed_packet
max_delayed_threads
max_error_count
max_execution_time
max_heap_table_size
max_insert_delayed_threads
max_join_size
max_length_for_sort_data
max_seeks_for_key
max_sort_length
max_sp_recursion_depth
max_statement_time
max_user_connections
min_examined_row_limit
myisam_repair_threads
myisam_sort_buffer_size
myisam_stats_method
ndb-allow-copying-alter-table
ndb_autoincrement_prefetch_sz
ndb-blob-read-batch-bytes
ndb-blob-write-batch-bytes
ndb_deferred_constraints
ndb_force_send
ndb_fully_replicated
ndb_index_stat_enable
ndb_index_stat_option
ndb_join_pushdown
ndb_log_bin
ndb_log_bin
```

```
ndb_table_no_logging
ndb_table_temporary
ndb_use_copying_alter_table
ndb_use_exact_count
ndb_use_transactions
ndbinfo_max_bytes
ndbinfo_max_rows
ndbinfo_show_hidden
ndbinfo_table_prefix
net_buffer_length
net_read_timeout
net_retry_count
net_write_timeout
new
old_alter_table
old_passwords
optimizer_prune_level
optimizer_search_depth
optimizer_switch
optimizer_trace
optimizer_trace_features
optimizer_trace_limit
optimizer_trace_max_mem_size
optimizer_trace_offset
parser_max_mem_size
preload_buffer_size
profiling
profiling_history_size
proxy_user
pseudo_slave_mode
pseudo_thread_id
query_alloc_block_size
query_cache_type
query_cache_wlock_invalidate
query_prealloc_size
rand_seed1
rand_seed2
range_alloc_block_size
range_optimizer_max_mem_size
rbr_exec_mode
read_buffer_size
read_rnd_buffer_size
session_track_gtids
session_track_schema
session_track_state_change
session_track_system_variables
show_old_temporals
sort_buffer_size
sql_auto_is_null
sql_big_selects
sql_buffer_result
sql_log_bin
sql_log_off
sql_mode
sql_notes
sql_quote_show_create
sql_safe_updates
sql_select_limit
sql_warnings
storage_engine
thread_pool_high_priority_connection
thread_pool_prio_kickup_timer
time_zone
timestamp
tmp_table_size
transaction_alloc_block_size
transaction_allow_batching
transaction_prealloc_size
transaction_write_set_extraction
tx_isolation
tx_read_only
unique_checks
updatable_views_with_limit
version_tokens_session
version_tokens_session_number
wait_timeout
warning_count
```

```
set @a=20

SET SESSION sql_mode = 'TRADITIONAL';

SET sql_mode = 'TRADITIONAL';
```

1. insert_id sql_auto_is_null insert_id issue https://github.com/actiontech/dble/issues/1252.

3.5.1.9 TRACE

SQL, `show trace` `select @@trace` SQLtrace

```
set trace=value

value:
  0
 | off
 | false
 | 1
 | on
 | true
```

```
set trace=1
```

3.5.2 SHOW

3.5.2.1 dbleSHOW

- SHOW DATABASES
  sharding.xml schema
- SHOW CREATE DATABASE [IF NOT EXISTS] schema
  sharding.xml schemadble
- SHOW [FULL|ALL] TABLES [FROM db_name] [LIKE 'pattern'| WHERE expr]
  schmeaschematables
  schemaschematables
- SHOW ALL TABLES [FROM db_name] [LIKE 'pattern'| WHERE expr]
  dbleSHOW FULL TABLES Table_type SHARDING TABLEsharding table GLOBAL TABLE 6.Differernce_from_MySQL_Server.md
- SHOW [FULL] {COLUMNS | FIELDS} FROM tbl_name [{FROM|IN} db_name] [LIKE 'pattern' | WHERE expr]
  schemaschema
- SHOW { INDEX | INDEXES | KEYS} {FROM | IN} tbl_name [{FROM | IN} db_name] [WHERE expr]
  schemaschema
- SHOW CREATE TABLE tbl_name
  schemaschema
- SHOW [GLOBAL | SESSION] VARIABLES [LIKE 'pattern' | WHERE expr]
  global
- SHOW CREATE VIEW view_name
  dbleview
- SHOW CHARSET
  show character set
- SHOW TABLE STATUS [{FROM | IN} db_name] [LIKE 'pattern' | WHERE expr]
  SQLyognameshow tables
- SHOW TRACE
  trace SQLtrace

explain

```
show databases
show full tables
show columns from a_test;
show index from a_test;
show create table a_test;
show variables;
show charset;
```

3.5.2.2 dbleSHOW

dbleSHOWSHOWMySQL

```
SHOW CHARACTER SET;
SHOW CHARACTER SET like 'utf8';
SHOW CHARACTER SET where maxlen=2;
```

3.5.3 KILL

MySQL

```
    KILL [CONNECTION | QUERY] processlist_id
```

3.5.3.1 KILL [CONNECTION] conn_id

conn_id idshow @@connection

3.5.3.1.1

```
kill 1;
```

3.5.3.1.2

- KillOK
- KillXA
- MYSQL KILL processlist_id

3.5.3.2 KILL query conn_id

conn_id idshow @@connection

3.5.3.2.1

```
kill query 1;
```

3.5.3.2.3

- dble kill query
- mysql

3.5.3.2.2

- ddl
- dml

3.5.4 DAL

3.5.4 .1 MySQL

Account Management Statements
Resource Group Management Statements
Table Maintenance Statements
Component, Plugin, and Loadable Function Statements
CLONE Statement
BINLOG Statement
CACHE INDEX Statement
FLUSH Statement
LOAD INDEX INTO CACHE Statement
RESET Statement
RESET PERSIST Statement
RESTART Statement
SHUTDOWN Statement

3.6

3.6.1 Syntax

Create procedure

```
/Hint/
CREATE
    [DEFINER = user]
    PROCEDURE [IF NOT EXISTS] sp_name ([proc_parameter[,...]])
    [characteristic ...] routine_body

/Hint/
CREATE
    [DEFINER = user]
    FUNCTION [IF NOT EXISTS] sp_name ([func_parameter[,...]])
    RETURNS type
    [characteristic ...] routine_body

proc_parameter:
    [ IN | OUT | INOUT ] param_name type

func_parameter:
    param_name type

type:
    Any valid MySQL data type

characteristic: {
    COMMENT 'string'
  | LANGUAGE SQL
  | [NOT] DETERMINISTIC
  | { CONTAINS SQL | NO SQL | READS SQL DATA | MODIFIES SQL DATA }
  | SQL SECURITY { DEFINER | INVOKER }
}

routine_body:
    Valid SQL routine statement
```

MySQL,hint

```
+ /Hint/
CREATE
    [DEFINER = user]
    PROCEDURE [IF NOT EXISTS] sp_name ([proc_parameter[,...]])
    [characteristic ...] routine_body

+ /Hint/
CREATE
    [DEFINER = user]
    FUNCTION [IF NOT EXISTS] sp_name ([func_parameter[,...]])
    RETURNS type
    [characteristic ...] routine_body

proc_parameter:
    [ IN | OUT | INOUT ] param_name type

func_parameter:
    param_name type

type:
    Any valid MySQL data type

characteristic: {
    COMMENT 'string'
  | LANGUAGE SQL
  | [NOT] DETERMINISTIC
  | { CONTAINS SQL | NO SQL | READS SQL DATA | MODIFIES SQL DATA }
  | SQL SECURITY { DEFINER | INVOKER }
}

routine_body:
    Valid SQL routine statement
```

drop procedure

```
   /Hint/    DROP {PROCEDURE | FUNCTION} [IF EXISTS] sp_name
```

MySQL,hint

```
+    /Hint/
    DROP {PROCEDURE | FUNCTION} [IF EXISTS] sp_name
```

call procedure

```
  [/Hint/]   CALL sp_name([parameter[,...]])

  [/Hint/]   CALL sp_name[()]
```

MySQL,hint

```
+  [/Hint/]
   CALL sp_name([parameter[,...]])

+  [/Hint/]
   CALL sp_name[()]
```

3.6.2

```
/*!dble:sql=select 1 from account */drop procedure if exists proc_arc;

/*!dble:sql=select 1 from account */create procedure proc_arc(userid1 int)
begin
  insert into account_arc select * from account where userid=userid1;
  update account set arc_flag=true,arc_time=now() where userid=userid1;
end;

/*!dble:sql=select 1 from account */call proc_arc(1);
```

3.6.3

- dbleMySQLMySQL
-
- dble

3.7 Utility Statements

3.7.1 USE Statement

MySQL

```
USE db_name
```

```
use TESTDB;
```

3.7.2 EXPLAIN Statement

EXPLAIN dble 2.17_explain

```
EXPLAIN explainable_stmt

explainable_stmt: {
    SELECT statement
  | DELETE statement
  | INSERT statement
  | REPLACE statement
  | UPDATE statement
}
```

MySQL

```
-{EXPLAIN | DESCRIBE | DESC}
-   tbl_name [col_name | wild]

-{
EXPLAIN
-  | DESCRIBE | DESC}
-   [explain_type]
-   {
    explainable_stmt
-    | FOR CONNECTION connection_id}

-{EXPLAIN | DESCRIBE | DESC} ANALYZE [FORMAT = TREE] select_statement

-explain_type: {
-    FORMAT = format_name
-}

-format_name: {
-    TRADITIONAL
-  | JSON
-  | TREE
-}

explainable_stmt: {
    SELECT statement
-  | TABLE statement
  | DELETE statement
  | INSERT statement
  | REPLACE statement
  | UPDATE statement
}
```

```
explain SELECT select * from a_test where id=1;
```

1. INSERT
2. dbleEXPLAIN DESC

3.7.3 DESC

DESCdble

```
{DESCRIBE | DESC} tbl_name [col_name | wild]
```

MySQL

```
{EXPLAIN | DESCRIBE | DESC}
   tbl_name [col_name | wild]

-{
-EXPLAIN
-  | DESCRIBE | DESC}
-   [explain_type]
-   {
-    explainable_stmt
-    | FOR CONNECTION connection_id}

-{EXPLAIN | DESCRIBE | DESC} ANALYZE [FORMAT = TREE] select_statement

-explain_type: {
-    FORMAT = format_name
-}

-format_name: {
-    TRADITIONAL
-  | JSON
-  | TREE
-}

-explainable_stmt: {
-    SELECT statement
-  | TABLE statement
-  | DELETE statement
-  | INSERT statement
-  | REPLACE statement
-  | UPDATE statement
-}
```

```
DESC a_test id;
```

: dbleEXPLAIN DESC

3.7.4 EXPLAIN2

22.17_explain

```
EXPLAIN2 shardingNode=node_name sql=sql_stmt
```

```
explain2 shardingNode=dn2 sql=select * from a_test where id=1;
```

3.7.5 HELP Statement

3.8 Hint

3.8.1 -Syntax

```
/* { ! | #}dble: {sql=SELECT select_expr  FROM  table_references  WHERE  where_condition

                  |shardingNode=shardingNode_name

                  |db_type={slave|master}}

*/   ordinary_sql
```

3.8.2 -Syntax

```
/* { ! | #}dble: {db_type={slave|master}}

                  |db_instance_url={ip:port}}

*/   ordinary_sql
/* master */  ordinary_sql
/* uproxy_dest: ip:port */  ordinary_sql
```

- sql `/* master */  /* uproxy_dest: ip:port */` sql

3.8.3

```
/*!dble:sql=select 1 from sbtest */ call p_show_time();
/*!dble:shardingNode=dn1*/ update sbtest set name = 'test';
/*!dble:db_type=master*/ select count(*) from sbtest;
/*!dble:db_instance_url=127.0.0.1:3307*/ select count(*) from sbtest;
/*#dble:sql=select 1 from sbtest */ call p_show_time();
/*#dble:shardingNode=dn1*/ update sbtest set name = 'test';
/*#dble:db_type=master*/ select count(*) from sbtest;
/*#dble:db_instance_url=127.0.0.1:3307*/ select count(*) from sbtest;
select /* master */ * from sbtest;
show processlist /* uproxy_dest: 127.0.0.1:3307 */
```

3.9

- Compound-Statement Syntax
- Replication Statements
- DDL
  - databasealter databasedrop databasecreate database schemaok
  - databasealter database
  - create tabletable optionDATA DIRECTORYALGORITHMtable optionalter table
  - ALTER TABLE ... LOCK ...
  - ALTER TABLE ... ORDER BY ...
  - create table ... select ...
  -
  -
  -
  -
  -
- DML
  - INSERT... VALUES(expr)expr
  - INSERT... SELECT...

    ```
    <shardingTable name="test10" shardingNode="dn2,dn3,dn4" function="hash-three" shardingColumn="id"/>
    <shardingTable name="test11" shardingNode="dn2,dn3,dn4" function="hash-three" shardingColumn="id"/>
    <shardingTable name="test12" shardingNode="dn3,dn4" function="hash-two" shardingColumn="id"/>
    <singleTable name="test20" shardingNode="dn2" />
    <singleTable name="test22" shardingNode="dn1" />
    <globalTable name="test30" shardingNode="dn1,dn2,dn3,dn4" />
    <globalTable name="test31" shardingNode="dn1,dn2,dn3,dn4" />
    ```

    - insert into test10(id,name) select id,name from test11; insert into test30(id,name) select id,name from test31;
    - insert into test30(id,score) select id,score from test10;
    - insert into test20(id,score) select id,score from test22;insert into test10(id,score) select id,score from test12;
  - INSERT
  - HANDLER
  -
  - DELETE ... ORDER BY ... LIMIT ...
  - DELETE/UPDATE ...LIMIT
  - DO
-
  - select ... use/ignore index ...
  - select ... group by ... with rollup
  - select ... for update | lock in share mode
  - select ... into outfile ...
  - Row Subqueries
  - select ... union [all] select ... order by ...(select ...) union [all] (select ...) order by ...
  - sessionset @rowid=0;select @rowid:=@rowid+1,id from user;
-
  -
  - ANALYZE/CHECK/CHECKSUM/OPTIMIZE/REPAIR TABLE
  - INSTALL/UNINSTALL PLUGIN
  - BINLOG
  - CACHE INDEX/ LOAD INDEX INTO CACHE
  - FLUSH TABLES [WITH READ LOCK]FLUSHFLUSH TABLE
  - RESET
  - SHOWSHOW PROFILESSHOW ERRORS

3.10 (alpha)

3.10.0

1. SQLMySQL.
2. 2.18.09.0 bug
3.
4.

3.10.1 Operators

Name	Description	Support
AND, &&	Logical AND	Y
=	Assign a value (as part of a SET statement, or as part of the SET clause in an UPDATE statement)	Y
:=	Assign a value	N
BETWEEN ... AND ...	Check whether a value is within a range of values	Y
BINARY	Cast a string to a binary string	N
&	Bitwise AND	Y
~	Bitwise inversion	Y
|	Bitwise OR	Y
^	Bitwise XOR	Y
CASE	Case operator	Y
DIV	Integer division	Y
/	Division operator	Y
=	Equal operator	Y
<=>	NULL-safe equal to operator	Y
>	Greater than operator	Y
>=	Greater than or equal operator	Y
IS	Test a value against a boolean	Y
IS NOT	Test a value against a boolean	Y
IS NOT NULL	NOT NULL value test	Y
IS NULL	NULL value test	Y
->	Return value from JSON column after evaluating path; equivalent to JSON_EXTRACT().	N
->>	Return value from JSON column after evaluating path and unquoting the result; equivalent to JSON_UNQUOTE(JSON_EXTRACT()).	N
<<	Left shift	Y
<	Less than operator	Y
<=	Less than or equal operator	Y
LIKE	Simple pattern matching	Y
-	Minus operator	Y
%, MOD	Modulo operator	Y
NOT, !	Negates value	Y
NOT BETWEEN ... AND ...	Check whether a value is not within a range of values	Y
!=, <>	Not equal operator	Y
NOT LIKE	Negation of simple pattern matching	Y
NOT REGEXP	Negation of REGEXP	Y
||, OR	Logical OR	Y
+	Addition operator	Y
REGEXP	Whether string matches regular expression	Y
>>	Right shift	Y
RLIKE	Whether string matches regular expression	N
SOUNDS LIKE	Compare sounds	N

*	Multiplication operator	N
-	Change the sign of the argument	Y
XOR	Logical XOR	Y
COALESCE()	Return the first non-NULL argument	Y
GREATEST()	Return the largest argument	Y
IN()	Check whether a value is within a set of values	Y
INTERVAL()	Return the index of the argument that is less than the first argument	Y
ISNULL()	Test whether the argument is NULL	Y
LEAST()	Return the smallest argument	Y
STRCMP()	Compare two strings	Y

3.10.2 Control Flow Functions

Name	Description	Support
CASE	Case operator	Y
IF()	If/else construct	Y
IFNULL()	Null if/else construct	Y
NULLIF()	Return NULL if expr1 = expr2	Y

3.10.3 String Functions

Name	Description	Support
ASCII()	Return numeric value of left-most character	Y
BIN()	Return a string containing binary representation of a number	N
BIT_LENGTH()	Return length of argument in bits	Y
CHAR()	Return the character for each integer passed	Y
CHAR_LENGTH()	Return number of characters in argument	Y
CHARACTER_LENGTH()	Synonym for CHAR_LENGTH()	Y
CONCAT()	Return concatenated string	Y
CONCAT_WS()	Return concatenate with separator	Y
ELT()	Return string at index number	Y
EXPORT_SET()	Return a string such that for every bit set in the value bits, you get an on string and for every unset bit, you get an off string	N
FIELD()	Return the index (position) of the first argument in the subsequent arguments	Y
FIND_IN_SET()	Return the index position of the first argument within the second argument	Y
FORMAT()	Return a number formatted to specified number of decimal places	Y
FROM_BASE64()	Decode base64 encoded string and return result	N
HEX()	Return a hexadecimal representation of a decimal or string value	Y
INSERT()	Insert a substring at the specified position up to the specified number of characters	Y
INSTR()	Return the index of the first occurrence of substring	Y
LCASE()	Synonym for LOWER()	Y
LEFT()	Return the leftmost number of characters as specified	Y
LENGTH()	Return the length of a string in bytes	Y
LIKE	Simple pattern matching	Y
LOAD_FILE()	Load the named file	N
LOCATE()	Return the position of the first occurrence of substring	Y
LOWER()	Return the argument in lowercase	Y
LPAD()	Return the string argument, left-padded with the specified string	Y

LTRIM()	Remove leading spaces	Y
MAKE_SET()	Return a set of comma-separated strings that have the corresponding bit in bits set	Y
MATCH	Perform full-text search	N
MID()	Return a substring starting from the specified position	N
NOT LIKE	Negation of simple pattern matching	Y
NOT REGEXP	Negation of REGEXP	Y
OCT()	Return a string containing octal representation of a number	N
OCTET_LENGTH()	Synonym for LENGTH()	N
ORD()	Return character code for leftmost character of the argument	Y
POSITION()	Synonym for LOCATE()	N
QUOTE()	Escape the argument for use in an SQL statement	Y
REGEXP	Whether string matches regular expression	Y
REPEAT()	Repeat a string the specified number of times	Y
REPLACE()	Replace occurrences of a specified string	Y
REVERSE()	Reverse the characters in a string	Y
RIGHT()	Return the specified rightmost number of characters	Y
RLIKE	Whether string matches regular expression	N
RPAD()	Append string the specified number of times	Y
RTRIM()	Remove trailing spaces	Y
SOUNDEX()	Return a soundex string	Y
SOUNDS LIKE	Compare sounds	Y
SPACE()	Return a string of the specified number of spaces	Y
STRCMP()	Compare two strings	Y
SUBSTR()	Return the substring as specified	Y
SUBSTRING()	Return the substring as specified	Y
SUBSTRING_INDEX()	Return a substring from a string before the specified number of occurrences of the delimiter	Y
TO_BASE64()	Return the argument converted to a base-64 string	N
TRIM()	Remove leading and trailing spaces	Y
UCASE()	Synonym for UPPER()	Y
UNHEX()	Return a string containing hex representation of a number	Y
UPPER()	Convert to uppercase	Y
WEIGHT_STRING()	Return the weight string for a string	N

3.10.3.1 HEX

MySQL HEX <=64string >64MySQL 8.0 MySQL 5.7 dble HEX MySQL 8

3.10.4 Numeric Functions and Operators

Name	Description	Support
ABS()	Return the absolute value	Y
ACOS()	Return the arc cosine	Y
ASIN()	Return the arc sine	Y
ATAN()	Return the arc tangent	Y
ATAN2(), ATAN()	Return the arc tangent of the two arguments	Y
CEIL()	Return the smallest integer value not less than the argument	Y
CEILING()	Return the smallest integer value not less than the argument	Y
CONV()	Convert numbers between different number bases	Y
COS()	Return the cosine	Y
COT()	Return the cotangent	Y

CRC32()	Compute a cyclic redundancy check value	Y
DEGREES()	Convert radians to degrees	Y
DIV	Integer division	Y
/	Division operator	Y
EXP()	Raise to the power of	Y
FLOOR()	Return the largest integer value not greater than the argument	Y
LN()	Return the natural logarithm of the argument	Y
LOG()	Return the natural logarithm of the first argument	Y
LOG10()	Return the base-10 logarithm of the argument	Y
LOG2()	Return the base-2 logarithm of the argument	Y
-	Minus operator	Y
MOD()	Return the remainder	N (If the SQL pass through, still supported)
%, MOD	Modulo operator	Y
PI()	Return the value of pi	Y
+	Addition operator	Y
POW()	Return the argument raised to the specified power	Y
POWER()	Return the argument raised to the specified power	Y
RADIANS()	Return argument converted to radians	Y
RAND()	Return a random floating-point value	Y
ROUND()	Round the argument	Y
SIGN()	Return the sign of the argument	Y
SIN()	Return the sine of the argument	Y
SQRT()	Return the square root of the argument	Y
TAN()	Return the tangent of the argument	Y
*	Multiplication operator	Y
TRUNCATE()	Truncate to specified number of decimal places	Y
-	Change the sign of the argument	Y

3.10.5 Date and Time Functions

Name	Description	Support
ADDDATE()	Add time values (intervals) to a date value	Y
ADDTIME()	Add time	Y
CONVERT_TZ()	Convert from one time zone to another	N
CURDATE()	Return the current date	Y
CURRENT_DATE()	Synonyms for CURDATE()	Y
CURRENT_TIME()	Synonyms for CURTIME()	Y
CURRENT_TIMESTAMP()	Synonyms for NOW()	Y
CURTIME()	Return the current time	Y
DATE()	Extract the date part of a date or datetime expression	Y
DATE_ADD()	Add time values (intervals) to a date value	Y
DATE_FORMAT()	Format date as specified	Y
DATE_SUB()	Subtract a time value (interval) from a date	Y
DATEDIFF()	Subtract two dates	Y
DAY()	Synonym for DAYOFMONTH()	N
DAYNAME()	Return the name of the weekday	Y
DAYOFMONTH()	Return the day of the month (0-31)	Y
DAYOFWEEK()	Return the weekday index of the argument	Y
DAYOFYEAR()	Return the day of the year (1-366)	Y
EXTRACT()	Extract part of a date	Y
FROM_DAYS()	Convert a day number to a date	Y
FROM_UNIXTIME()	Format Unix timestamp as a date	Y

GET_FORMAT()	Return a date format string	Y
HOUR()	Extract the hour	Y
LAST_DAY	Return the last day of the month for the argument	N
LOCALTIME()	Synonym for NOW()	Y
LOCALTIMESTAMP()	Synonym for NOW()	Y
MAKEDATE()	Create a date from the year and day of year	Y
MAKETIME()	Create time from hour, minute, second	Y
MICROSECOND()	Return the microseconds from argument	Y
MINUTE()	Return the minute from the argument	Y
MONTH()	Return the month from the date passed	Y
MONTHNAME()	Return the name of the month	Y
NOW()	Return the current date and time	Y
PERIOD_ADD()	Add a period to a year-month	Y
PERIOD_DIFF()	Return the number of months between periods	Y
QUARTER()	Return the quarter from a date argument	Y
SEC_TO_TIME()	Converts seconds to 'HH:MM:SS' format	Y
SECOND()	Return the second (0-59)	Y
STR_TO_DATE()	Convert a string to a date	Y
SUBDATE()	Synonym for DATE_SUB() when invoked with three arguments	Y
SUBTIME()	Subtract times	Y
SYSDATE()	Return the time at which the function executes	Y
TIME()	Extract the time portion of the expression passed	Y
TIME_FORMAT()	Format as time	Y
TIME_TO_SEC()	Return the argument converted to seconds	Y
TIMEDIFF()	Subtract time	Y
TIMESTAMP()	With a single argument, this function returns the date or datetime expression; with two arguments, the sum of the arguments	N
TIMESTAMPADD()	Add an interval to a datetime expression	Y
TIMESTAMPDIFF()	Subtract an interval from a datetime expression	Y
TO_DAYS()	Return the date argument converted to days	Y
TO_SECONDS()	Return the date or datetime argument converted to seconds since Year 0	Y
UNIX_TIMESTAMP()	Return a Unix timestamp	Y
UTC_DATE()	Return the current UTC date	Y
UTC_TIME()	Return the current UTC time	Y
UTC_TIMESTAMP()	Return the current UTC date and time	Y
WEEK()	Return the week number	Y
WEEKDAY()	Return the weekday index	Y
WEEKOFYEAR()	Return the calendar week of the date (1-53)	Y
YEAR()	Return the year	Y
YEARWEEK()	Return the year and week	Y
CURRENT_DATE	Synonyms for CURDATE()	N
CURRENT_TIME	Synonyms for CURTIME()	N
CURRENT_TIMESTAMP	Synonyms for NOW()	N
LOCALTIME	Synonym for NOW()	N
LOCALTIMESTAMP()	Synonym for NOW()	N

3.10.6 Cast Functions and Operators

Name	Description	Support
BINARY	Cast a string to a binary string	N
CAST()	Cast a value as a certain type	Y

CONVERT()	Cast a value as a certain type	Y

3.10.6.1 CAST

BINARY
CHAR[(N)] [charset_info] charset_info
JSON
SIGNED [INTEGER] INTEGER(druid)
UNSIGNED [INTEGER] INTEGER (druid)

3.10.6.2 CONVERT

BINARY
CHAR[(N)] [charset_info] charset_info
JSON
SIGNED [INTEGER] INTEGER(druid)
UNSIGNED [INTEGER] INTEGER (druid)

3.10.7 Bit Functions and Operators

Name	Description	Support
BIT_COUNT()	Return the number of bits that are set	Y
&	Bitwise AND	Y
~	Bitwise inversion	Y
|	Bitwise OR	Y
^	Bitwise XOR	Y
<<	Left shift	Y
>>	Right shift	Y

3.10.8 Aggregate (GROUP BY) Functions

Name	Description	Support
AVG()	Return the average value of the argument	Y
BIT_AND()	Return bitwise AND	Y
BIT_OR()	Return bitwise OR	Y
BIT_XOR()	Return bitwise XOR	Y
COUNT()	Return a count of the number of rows returned	Y
COUNT(DISTINCT)	Return the count of a number of different values	Y
GROUP_CONCAT()	Return a concatenated string	Y
JSON_ARRAYAGG()	Return result set as a single JSON array	N
JSON_OBJECTAGG()	Return result set as a single JSON object	N
MAX()	Return the maximum value	Y
MIN()	Return the minimum value	Y
STD()	Return the population standard deviation	Y
STDDEV()	Return the population standard deviation	Y
STDDEV_POP()	Return the population standard deviation	Y
STDDEV_SAMP()	Return the sample standard deviation	Y
SUM()	Return the sum	Y
VAR_POP()	Return the population standard variance	Y
VAR_SAMP()	Return the sample variance	Y
VARIANCE()	Return the population standard variance	Y

: STD VARIANCE `STD()` / `STDDEV()` / `STDDEV_POP()` / `STDDEV_SAMP()` / `VAR_POP()` / `VAR_SAMP()` / `VARIANCE()` result precision is not corr
AVG\SUMdbleMySQL
MySQLMySQL,
for data type float, dble and mysql may get different results

3.10.9 JSON Functions

Name	Description	Support

JSON_EXTRACT()	selected from the parts of the json document matched by the path arguments	Y
JSON_UNQUOTE()	Unquotes JSON value and returns the result as a utf8mb4 string.	Y

3.10.10 Full-Text Search Functions

not supported

3.10.11 XML Functions

not supported

3.10.12 Encryption and Compression Functions

not supported

3.10.13 Information Functions

not supported

3.10.14 Spatial Analysis Functions

not supported

3.10.15 Functions Used with Global Transaction IDs

not supported

3.10.16 MySQL Enterprise Encryption Functions

not supported

3.10.17 Miscellaneous Functions

not supported

MySQL5.7

3.11

3.11.1

1. workbench
2. dbeaver
3. mysqldump
4. navicat
5. mysqlsourceload data

3.11.2

1. mysqldump mysqldump dble

```
./mysqldump -h127.0.0.1 -utest -P3306 -p111111 --default-character-set=utf8mb4 --master-data=2 --single-transaction --set-gtid-purged=off
--hex-blob --databases schema1 > export.sql
```

1.

2. dbledble

4

- 4.1
- 4.2
- 4.3
- 4.4 (Prepared Statements)
- 4.5

4.1

-
- 16M
- , bootstrap.cnf
-

4.2

4.2.1 Authentication Plugin

a.(,mysql_native_password 8.0caching_sha2_password)

b.mysql_native_password

c.caching_sha2_password

4.2.2 Capabilities

dble
jdbcdbleCLIENT_FOUND_ROWS
dbleIGNORE_SPACE select @@sql_mode IGNORE_SPACE
MySQL issue-972
IGNORE_SPACEsessionsql_mode

dble

CLIENT_LONG_PASSWORD	1	Use the improved version of Old Password Authentication.Assumed to be set since 4.1.1.	Y	Y
CLIENT_FOUND_ROWS	2	Send found rows instead of affected rows in EOF_Packet	Y	Y
CLIENT_LONG_FLAG	4	Get all column flags.	Y	Y
CONNECT_WITH_DB	8	Database (schema) name can be specified on connect in Handshake Response Packet.	Y	Y
CLIENT_NO_SCHEMA	16	Don't allow database.table.column.	N	N
CLIENT_COMPRESS	32	Compression protocol supported	bootstrap.cnfuseCompression	
CLIENT_ODBC	64	Special handling of ODBC behavior.No special behavior since 3.22.	Y	Y
CLIENT_LOCAL_FILES	128	Can use LOAD DATA LOCAL.	Y	Y
CLIENT_IGNORE_SPACE	256	Ignore spaces before '('.	Y	Y
CLIENT_PROTOCOL_41	512	New 4.1 protocol	Y	Y
CLIENT_INTERACTIVE	1024	This is an interactive client.	Y	Y
CLIENT_SSL	2048	Use SSL encryption for the session	N	N
CLIENT_IGNORE_SIGPIPE	4096	Client only flag.Not used.	Y	Y
CLIENT_TRANSACTIONS	8192	Client knows about transactions	Y	Y
CLIENT_RESERVED	16384	DEPRECATED:Old flag for 4.1 protocol.	N	N
CLIENT_RESERVED2	32768	DEPRECATED:Old flag for 4.1 authentication.	Y	Y
CLIENT_MULTI_STATEMENTS	65536	Enable/disable multi-stmt support	Y	Y
CLIENT_MULTI_RESULTS	131072	Enable/disable multi-results	Y	Y
CLIENT_PS_MULTI_RESULTS	262144	Multi-results and OUT parameters in PS-protocol	N	N
CLIENT_PLUGIN_AUTH	524288	Client supports plugin authentication.	N	Y
CLIENT_CONNECT_ATTRS	1048576	Client supports connection attributes.	N	N

CLIENT_PLUGIN_AUTH_LENENC_CLIENT_DATA	2097152	Enable authentication response packet to be larger than 255 bytes.	N	N
CLIENT_CAN_HANDLE_EXPIRED_PASSWORDS	4194304	Don't close the connection for a user account with expired password.	N	N
CLIENT_SESSION_TRACK	8388608	Capable of handling server state change information.	N	N
CLIENT_DEPRECATE_EOF	16777216	Client no longer needs EOF_Packet and will use OK_Packet instead.	N	N
CLIENT_SSL_VERIFY_SERVER_CERT	1UL << 30	Verify server certificate	N	N
CLIENT_REMEMBER_OPTIONS	1UL << 31	Don't reset the options after an unsuccessful connect.	N	N

:

https://dev.mysql.com/doc/dev/mysql-server/8.0.13/group__group__cs__capabilities__flags.html

4.3

4.3.1 Supported

- COM_INIT_DB
  Specifies the default schema for the connection.
- COM_PING
  Sends a packet containing one byte to check that the connection is active.
- COM_QUERY
  Sends the server an SQL statement to be executed immediately.Support Multi-Statement.
- COM_QUIT
  Client tells the server that the connection should be terminated.
- COM_SET_OPTION
  Enables or disables server option.
- COM_CHANGE_USER
  Resets the connection and re-authenticates with the given credentials.
- COM_RESET_CONNECTION
  Resets a connection without re-authentication.
  - (rollback & unlock)
  -
  -
  -
  - prepare
  - ()
  - LAST_INSERT_ID
- COM_FIELD_LIST
  MySQL Doc said that it is deprecated from 5.7.11 . But some tools are still use it, like OGG or MariaDB client.

4.3.1.1 Multi-Statement

- Supported
  - DML:select/insert/update/replace/delete
  - DDL
  - OTHER
    - BEGIN;
    - COMMIT;
    - LOCK TABLE
    - UNLOCK TABLES
    - START
    - KILL
    - USE
    - ROLLBACK
    - MYSQL_CMD_COMMENT
    - MYSQL_COMMENT
    - SELECT VERSION_COMMENT (SELECT @@VERSION_COMMENT)
    - SELECT DATABASE select database()
    - SELECT USERselect user()
    - SELECT VERSION (select version())
    - SELECT SESSION_INCREMENT(select @@session.auto_increment_increment)
    - SELECT SESSION_ISOLATION(select @@session.tx_isolation)
    - SELECT LAST_INSERT_ID(select last_insert_id(#) as `id`)
    - SELECT IDENTITY(select @@identity)
    - SELECT SESSION_TX_READ_ONLYselect @@session.tx_read_only
- Not Supported
  - EXPLAIN
  - EXPLAIN2
  - DESCRIBE
  - SET
  - SHOW DATABASES/TABLES/TABLE_STATUS/COLUMNS/INDEX/CREATE_TABLE/VARIABLES/CREATE_VIEW/CHARSET
  - HELP
  - LOAD_DATA_INFILE_SQL
  - CREATE_VIEW
  - REPLACE_VIEW
  - ALTER_VIEW
  - DROP_VIEW

4.3.2 Not Supported

- COM_DEBUG
  Forces the server to dump debug information to stdout
- COM_STATISTICS
  Get internal server statistics.
- COM_CREATE_DB
- COM_DROP_DB

4.3.3 Internal

- COM_SLEEP
  Used inside the server only.
- COM_CONNECT an internal command in the server.
- COM_TIME an internal command in the server.
- COM_DAEMON an internal command in the server.
- COM_DELAYED_INSERT an internal command in the server.

4.3.4 Deprecated

- COM_PROCESS_INFO
  Deprecated from 5.7.11.
- COM_PROCESS_KILL
  Deprecated from 5.7.11.
- COM_SHUTDOWN
  Deprecated from 5.7.9.
- COM_REFRESH
  Deprecated from 5.7.11.

4.4 (Prepared Statements)

4.4.1

- jdbcuseServerPrepStmts server-side prepare client-side prepare
- driver

java

```
PreparedStatement preparedStatement = con.prepareStatement("select t1.id from no_sharding_t1 t1 where t1.id=?"); //dble  prepare assert pr
eparedStatement instanceof ServerPreparedStatement;
```

4.4.2

mysql

4.4.4

- server-side prepare client PS server server
- client-side prepare : client PS prepare SQL server server ”“

4.4.5 MySQL

- urluseCursorFetch=trueserver
- jdbcfetchSize0jdbcfetchSize > 0fetchprepareStatement

4.4.6 Dble

client <-> dble server-side preparedble <-> mysql client-side prepare

4.4.7

- COM_STMT_CLOSE
  Closes a previously prepared statement.
- COM_STMT_EXECUTE
  Executes a previously prepared statement.
- COM_STMT_RESET
  Resets a prepared statement on client and server to state after preparing.
- COM_STMT_SEND_LONG_DATA
  When data for a specific column is big, it can be sent separately.
- COM_STMT_PREPARE
  Prepares a statement on the server

  > NOTICE: Although COM_STMT_PREPARE works , but dble will not do pre-compile .

- COM_STMT_FETCH
  Fetches rows from a prepared statement

4.4.8 Dble

>

4.4.8.1

- server-side cursorserverclient
- client-side cursor: client tcp socket(server client
- client-side cursorclient client cursor cursor API client

4.4.8.2

DBLE

- <3.21.02,
- =3.21.02,
- >3.21.02, bootstrap.cnf-DenableCursor=true

1. drivermysqljdbc driver
2. jdbcuseServerPrepStmtsuseCursorFetch
3. prepareStatement fetchSize 0.
4. execute

resultSet fetchSize dble

4, useServerFetch

```
final ResultSet resultSet = preparedStatement.executeQuery();
//server-side
Method method = com.mysql.cj.jdbc.StatementImpl.class.getDeclaredMethod("useServerFetch");
method.setAccessible(true);
Boolean useServerFetch = (Boolean) method.invoke(preparedStatement);
assert useServerFetch==true;
```

4.4.8.3 Dble Server-side Cursor Flow

1. preparesql client
2. execute
3. fetch

4.4.8.4

- maxHeapTableSize
- heapTableBufferChunkSize

https://actiontech.github.io/dble-docs-cn/1.config_file/1.02_bootstrap.cnf.html

4.5

- EOF_Packet
- ERR_Packet
- OK_Packet
- LOCAL_INFILE Packet
- PACKET_LOCAL_INFILE
- PACKET_RESULTSET

5.

- 5.1 druid
- 5.2

5.1 druid

1. INSERT ... VALUE ... INSERT ... VALUES ...VALUE[S]
   druidbugVALUES[S]druid
   druidissue2218
   dbleissue dble_issue_379.
2. `SHOW ALL TABLES` dble
3.
   dble_issue_788

5.2

1.
   : ,parentkey
   issue : https://github.com/actiontech/dble/issues/12
2. JDBCrewriteBatchedStatements=true
   :
   insert : insertinsert.. values(),(),com_query dble
3. JDBCuseServerPrepStmts=true
   : dbleBinary Protocol Text Protocol
4. lock/unlock
   issue : https://github.com/actiontech/dble/issues/38
5. schema.xml3.20.07.0
   : schema.xml
   issue : https://github.com/actiontech/dble/issues/70
6. dbletabledble, dble
7. /
   : sql
   issue : https://github.com/actiontech/dble/issues/85
8.
   : dropjavatcp_keeplive
   issue : https://github.com/actiontech/dble/issues/87
9. /
   :
   issue : https://github.com/actiontech/dble/issues/100
10. `order by lock in share mode/for update` , lock clause is ignored
    :
    issue : https://github.com/actiontech/dble/issues/127
11. _charset_name ‘string’ `_charset_name+b'val'`
    issue : https://github.com/actiontech/dble/issues/262
    issue : https://github.com/actiontech/dble/issues/267
12. set sql_select_limit
    issue : https://github.com/actiontech/dble/issues/331
13. sEndDatedefault node
    :
    issue : https://github.com/actiontech/dble/issues/357
14. selece @@sql_mode IGNORE_SPACE
    : 4.2
    issue : https://github.com/actiontech/dble/issues/364
15. replace ... into
    replace replaceIDIDID
16. kill sessionok
17. 2.19.01rule/schema/server.xmlversionBUG2.19.01zkversion
18. mysql `set global local_infile = 0` ,dble load data
    : dbleload data `load data local infile ...` mysql `local_infile`
    issue : https://github.com/actiontech/dble/issues/1111
19. set @@sql_auto_is_null=on; : set @@sql_auto_is_null=on null,dble
    issue : https://github.com/actiontech/dble/issues/978
20. explain . issue https://github.com/actiontech/dble/issues/1449
21. enableCursor prepareStatement prepare mysql
22. XAsql
23. `select group by` truefalse
    `group by` truefalsemysqlInnoDBPRIMARY KEYPRIMARY KEYINSERTdbleINSERTmysql
    issue : https://github.com/actiontech/dble/issues/3177

6. MySQL Server

MySQL ServerbugMySQL

- 6.1
- 6.2 INSERT
- 6.3 "show all tables"
- 6.4 message
- 6.5 information_schema

6.1 MySQL

:

MYSQL:

```
[test_yhq]>select * from char_columns_4;
+----+--------+
| id | c_char |
+----+--------+
|  1 | xx |
|  4 | z  |
+----+--------+
2 rows in set (0.02 sec)
[test_yhq]>begin;
Query OK, 0 rows affected (0.01 sec)

[test_yhq]>insert into char_columns_4 values(1,'yy');
ERROR 1062 (23000): Duplicate entry '1' for key 'PRIMARY'
[test_yhq]>insert into char_columns_4 values(2,'yy');
Query OK, 1 row affected (0.00 sec)

[test_yhq]>commit;
Query OK, 0 rows affected (0.02 sec)
```

dble:

```
[testdb]>select * from sharding_four_node order by id;
+----+--------+-----------+
| id | c_flag | c_decimal |
+----+--------+-----------+
|  1 | 1_1    |    1.0000 |
|  2 | 2      |    2.0000 |
|  3 | 3      |    3.0000 |
+----+--------+-----------+
3 rows in set (0.28 sec)

begin;
Query OK, 0 rows affected (0.01 sec)

[testdb]>insert into sharding_four_node values(1,'1',1.0);
ERROR 1062 (23000): Duplicate entry '1' for key 'PRIMARY'
[testdb]>insert into sharding_four_node values(13,'13',13.0);
ERROR 1003 (HY000): Transaction error, need to rollback.Reason:[ errNo:1062 Duplicate entry '1' for key 'PRIMARY']
[testdb]>commit;
ERROR 1003 (HY000): Transaction error, need to rollback.Reason:[ errNo:1062 Duplicate entry '1' for key 'PRIMARY']
```

6.2 INSERTdbleMySQL

:

MySQL:

```
desc mysql_autoinc;
+--------+------------+------+-----+---------+----------------+
| Field  | Type       | Null | Key | Default | Extra          |
+--------+------------+------+-----+---------+----------------+
| c_char | char(255)  | YES  |     | NULL    |                |
| id     | bigint(20) | NO   | PRI | NULL    | auto_increment |
+--------+------------+------+-----+---------+----------------+
2 rows in set (0.02 sec)

[test_yhq]>insert into mysql_autoinc values('1',1);
Query OK, 1 row affected (0.01 sec)
```

dble

```
desc sharding_four_node_autoinc;
+--------+------------+------+-----+---------+----------------+
| Field  | Type       | Null | Key | Default | Extra          |
+--------+------------+------+-----+---------+----------------+
| c_char | char(255)  | YES  |     | NULL    |                |
| id     | bigint(20) | NO   | PRI | NULL    | auto_increment |
+--------+------------+------+-----+---------+----------------+
2 rows in set (0.01 sec)
[testdb]>insert into sharding_four_node_autoinc values('2',2);
ERROR 1064 (HY000): In insert Syntax, you can't set value for Autoincrement column!
```

6.3 ADD "show all tables"

The optional ALL modifier causes SHOW TABLES to display a second output column with values of BASE TABLE for a table ,VIEW for a view, SHARDING TABLE for a sharding table and GLOBAL TABLE for a global table.

:

```
[testdb]>show all tables;
+----------------------------+----------------+
| Tables in testdb           | Table_type     |
+----------------------------+----------------+
| global_four_node           | GLOBAL TABLE   |
| global_four_node_autoinc   | GLOBAL TABLE   |
| global_two_node            | GLOBAL TABLE   |
| sbtest1                    | SHARDING TABLE |
| sharding_four_node         | SHARDING TABLE |
| sharding_four_node2        | SHARDING TABLE |
| sharding_four_node_autoinc | SHARDING TABLE |
| sharding_two_node          | SHARDING TABLE |
| single                     | SHARDING TABLE |
| customer                   | BASE TABLE     |
| district                   | BASE TABLE     |
+----------------------------+----------------+
11 rows in set (0.02 sec)
```

6.4 message

:

MySQL:

```
mysql> insert into sharding_two_node values(9,'9',9.0),(10,'10',10.0);
Query OK, 2 rows affected (0.24 sec)
Records: 2  Duplicates: 0  Warnings: 0
```

dble:

```
mysql> insert into sharding_two_node values(11,'11',11.0),(12,'12',12.0);
Query OK, 2 rows affected (0.49 sec)
```

6.5 information_schema

Navicat Premium 12 dbleNavicat Premium 12 information_schemamysql
dble driver

Navicat Premium12

1. SELECT SCHEMA_NAME, DEFAULT_CHARACTER_SET_NAME, DEFAULT_COLLATION_NAME FROM information_schema.SCHEMATA;

mysql schemecharacter set collationNavicat Premium 12
dblescheme SchemeConfig scheme scheme character set collation
1dbleschemeshardingNodeshardingNode character set collation character set collation ,MySQL
2dble SCHEMATA

driver

0

```
1. SELECT TABLE_SCHEMA, TABLE_NAME, TABLE_TYPE
    FROM information_schema.TABLES WHERE TABLE_SCHEMA = 'testdb'
    ORDER BY TABLE_SCHEMA, TABLE_TYPE
2. SELECT TABLE_SCHEMA, TABLE_NAME, COLUMN_NAME, COLUMN_TYPE
    FROM information_schema.COLUMNS
    WHERE TABLE_SCHEMA = 'testdb'
    ORDER BY TABLE_SCHEMA, TABLE_NAME
3. SELECT DISTINCT ROUTINE_SCHEMA, ROUTINE_NAME, PARAMS.PARAMETER
    FROM information_schema.ROUTINES LEFT JOIN
    ( SELECT SPECIFIC_SCHEMA, SPECIFIC_NAME,
        GROUP_CONCAT(CONCAT(DATA_TYPE, ' ', PARAMETER_NAME) ORDER BY ORDINAL_POSITION SEPARATOR ', ') PARAMETER, ROUTINE_TYPE
    FROM information_schema.PARAMETERS GROUP BY SPECIFIC_SCHEMA, SPECIFIC_NAME, ROUTINE_TYPE
    )PARAMS
    ON ROUTINES.ROUTINE_SCHEMA = PARAMS.SPECIFIC_SCHEMA AND
    ROUTINES.ROUTINE_NAME = PARAMS.SPECIFIC_NAME AND
    ROUTINES.ROUTINE_TYPE = PARAMS.ROUTINE_TYPE
    WHERE ROUTINE_SCHEMA = 'testdb' ORDER BY ROUTINE_SCHEMA
4. SELECT TABLE_NAME, CHECK_OPTION, IS_UPDATABLE, SECURITY_TYPE, DEFINER
    FROM information_schema.VIEWS
    WHERE TABLE_SCHEMA = 'testdb' ORDER BY TABLE_NAME ASC
5. SELECT * FROM information_schema.ROUTINES
    WHERE ROUTINE_SCHEMA = 'testdb' ORDER BY ROUTINE_NAME
6. SELECT EVENT_CATALOG, EVENT_SCHEMA, EVENT_NAME, DEFINER, TIME_ZONE,
    EVENT_DEFINITION, EVENT_BODY, EVENT_TYPE, SQL_MODE, STATUS, EXECUTE_AT,
    INTERVAL_VALUE, INTERVAL_FIELD, STARTS, ENDS, ON_COMPLETION, CREATED,
    LAST_ALTERED, LAST_EXECUTED, ORIGINATOR, CHARACTER_SET_CLIENT,
    COLLATION_CONNECTION, DATABASE_COLLATION, EVENT_COMMENT
    FROM information_schema.EVENTS WHERE EVENT_SCHEMA = 'testdb'
    ORDER BY EVENT_NAME ASC
7. SELECT COUNT(*) FROM information_schema.TABLES
    WHERE TABLE_SCHEMA = 'testdb' UNION
    SELECT COUNT(*)
     FROM information_schema.COLUMNS
     WHERE TABLE_SCHEMA = 'testdb' UNION
    SELECT COUNT(*) FROM information_schema.ROUTINES WHERE ROUTINE_SCHEMA = 'testdb'
```

7

- 7.1 SQL
- 7.2 dbleDemo
- 7.3

7.1 SQL

- SQLSQLSQL

1

dbledbleSQLSQL SQLdbleSQLSQLSQL dbleMySQL dbleEXPLAINdble

```
explain select id,accountno from account where userid=2;
```

EXPLAINSQL EXPLAIN2

```
explain2 shardingNode=dn1 sql=select id,accountno from account where userid=2;
```

explain2sqlexplainshardingNodeexplain

2SQL

SQL:

- SQL
-
- INININ
- SQLDISTINCTGROUP BYORDER BYSQL
-

3

- Join
-
-

-
- JoinJoinJoin
- Join
- JoinJoin
- limit a,b
- GROUP
-
- Join

7.2 dbleDemo

ibatis

ibatisdbleMySQL JDBC

```
jdbc.driverClass=com.mysql.jdbc.Driver
jdbc.jdbcUrl=jdbc: mysql://127.0.0.1:8066/TESTDB?useUnicode=true&characterEncoding=utf-8
jdbc.user=root
jdbc.password=123456
```

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper
PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
"http://mybatis.org/dtd/mybatis-3-mapper.dtd">
<mapper namespace="com.mapper.UserMapper">
  <insert id="saveUser" parameterType="com.bean.User">
    insert into user(id,name,phone,birthday)
    values (0,#{name},#{phone},#{birthday})
    <selectKey keyProperty="id" order="after" resultType="int">
      select last_insert_id() as id
    </selectKey>
  </insert>
  <delete id="deleteUserById" parameterType="java.lang.String">
    delete from user where id=#{id}
  </delete>
  <update id="updateUser" parameterType="com.bean.User">
    update user set name=#{name},phone=#{phone},birthday=#{birthday} where id=#{id}
  </update>
  <update id="updateUsers">
    /\*!dble:sql=select * from user;\*/update users set usercount=(select count(\*) from user),ts=now()
  </update>
  <select id="getUserById" parameterType="java.lang.String" resultType="com.bean.User">
    select \* from user where id=#{id}
  </select>
  <select id="getUsers" resultType="com.bean.User">
    select \* from user
  </select>
```

select last_insert_id() as idID updateUsers dbleibatis##

hibernate

hibernatedbleMySQL hibernate.cfg.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE hibernate-configuration PUBLIC
  "-//Hibernate/Hibernate Configuration DTD 3.0//EN"
  "http://www.hibernate.org/dtd/hibernate-configuration-3.0.dtd">
<hibernate-configuration>
  <session-factory>
    <property name="hibernate.connection.driver_class">com.mysql.jdbc.Driver</property>
    <property name="hibernate.connection.url">jdbc: mysql://192.168.58.51:8066/testdb?
useUnicode=true&characterEncoding=utf-8</property>
    <property name="hibernate.connection.username">root</property>
    <property name="hibernate.connection.password">123456</property>
    <property name="hibernate.dialect">org.hibernate.dialect.MySQLInnoDBDialect</property>
  <property name="hibernate.format_sql">true</property>
    <property name="hibernate.hbm2ddl.auto">update</property>
    <mapping resource="com/actiontech/test/News.hbm.xml"/>
  </session-factory>
</hibernate-configuration>
```

News.hbm.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE hibernate-mapping PUBLIC
  "-//Hibernate/Hibernate Mapping DTD 3.0//EN"
  "http://www.hibernate.org/dtd/hibernate-mapping-3.0.dtd">
<hibernate-mapping>
  <class name="com.actiontech.test.News" table="news_table">
    <id name="id" type="java.lang.Integer">
      <column name="id" />
    </id>
    <property name="title" type="java.lang.String">
      <column name="title" />
    </property>
    <property name="content" type="java.lang.String">
      <column name="content" />
    </property>
  </class>
</hibernate-mapping>
```

News.java

```
package com.actiontech.test;
public class News {
  private Integer id;
  private String title;
  private String content;
  public Integer getId() {
    return id;
  }
  public void setId(Integer id) {
    this.id = id;
  }
  public String getTitle() {
    return title;
  }
  public void setTitle(String title) {
    this.title = title;
  }
```

public String getContent() { return content; } public void setContent(String content) { this.content = content; } }</pre> NewsManager.java

```
package com.actiontech.test;
import org.hibernate.Session;
import org.hibernate.SessionFactory;
import org.hibernate.Transaction;
import org.hibernate.cfg.Configuration;
public class NewsManager {
  public static void main(String[] args)
    throws Exception {
    Configuration config = new Configuration().configure();
    SessionFactory factory = config.buildSessionFactory();
    Session session = factory.openSession();
    Transaction transaction = session.beginTransaction();
    News news = new News();
    news.setId(10);
    news.setTitle("dble");
    news.setContent("Hibernate dble");
    session.save(news);
    transaction.commit();
    session.close();
    factory.close();
  }
}
```

dbleHibernateHibernateHibernateSQLSQL

JDBC

JDBCdbleMySQL

```
package com.actiontech.test;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;
import java.util.Properties;
import java.util.concurrent.CountDownLatch;
import java.util.concurrent.atomic.AtomicLong;
public class SingleMixEngine {
  public static void main(String[] args) throws Exception {
    Class.forName("com.mysql.jdbc.Driver");
    Properties props = new Properties();
    props.setProperty("user", "root");
    props.setProperty("password", "123456");
    SingleMixEngine engine = new SingleMixEngine();
    engine.execute(props,"jdbc:mysql://192.168.58.51:8066/testdb");
  }
  final AtomicLong tmAl = new AtomicLong();
  final String tableName="news_table";
  public void execute(Properties props,String url) {
    CountDownLatch cdl = new CountDownLatch(1);
    long start = System.currentTimeMillis();
    for (int i = 0; i < 1; i++) {
      TestThread insertThread = new TestThread(props,cdl, url);
      Thread t = new Thread(insertThread);
      t.start();
      System.out.println("Test start");
    }
    try {
      cdl.await();
      long end = System.currentTimeMillis();
      System.out.println("Test end,total cost:" + (end-start) + "ms");
    } catch (Exception e) {
    }
  }

  class TestThread implements Runnable {
    Properties props;
    private CountDownLatch countDownLatch;
    String url;
    public TestThread(Properties props,CountDownLatch cdl,String url) {
      this.props = props;
      this.countDownLatch = cdl;
      this.url = url;
    }
    public void run() {
      Connection connection = null;
      PreparedStatement ps = null;
      Statement st = null;
      try {
        connection = DriverManager.getConnection(url,props);
        connection.setAutoCommit(true);
        st = connection.createStatement();
        String dropSql = "drop table if exists " + tableName;
        System.out.println("Execute SQL:\n\t"+dropSql);
        st.execute(dropSql);

        String createSql = "create table " + tableName + "(id int,title varchar(20),content varchar(50))";
        System.out.println("Execute SQL:\n\t"+createSql);
        st.execute(createSql);

        String insertSql = "insert into " + tableName + " (id,title,content) values(?,?,?)";
        System.out.println("Prepared SQL:\n\t"+insertSql);
        ps = connection.prepareStatement(insertSql);
        for (int i = 1; i <= 3; i++) {
          ps.setInt(1,i);
          ps.setString(2, ""+i);
          ps.setString(3, ""+i+"");
          ps.execute();
          System.out.println("Insert data:\t"+i+","+""+i+","+""+i+"");
        }
```

```
        String querySQL = "select * from " + tableName + " order by id";
        System.out.println("Execute SQL:\n\t"+querySQL);
        ResultSet rs = st.executeQuery(querySQL);
        int colcount = rs.getMetaData().getColumnCount();
        System.out.println("Current Data:");
        while(rs.next()){
          for(int i=1;i<=colcount;i++){
            System.out.print("\t"+rs.getString(i));
          }
          System.out.println();
        }

        String updateSql = "update " + tableName + " set title='test1' where id=1";
        System.out.println("Execute SQL:\n\t"+updateSql);
        st.execute(updateSql);
        rs = st.executeQuery(querySQL);
        System.out.println("Current Data:");
        while(rs.next()){
          for(int i=1;i<=colcount;i++){
            System.out.print("\t"+rs.getString(i));
          }
          System.out.println();
        }

        String deleteSql = "delete from " + tableName + " where id=2";
        System.out.println("Execute SQL:\n\t"+deleteSql);
        st.execute(deleteSql);
        rs = st.executeQuery(querySQL);
        System.out.println("Current Data:");
        while(rs.next()){
          for(int i=1;i<=colcount;i++){
            System.out.print("\t"+rs.getString(i));
          }
          System.out.println();
        }

        String createIndexSql = "create index idx_1 on " + tableName + "(title)";
        System.out.println("Execute SQL:\n\t"+createIndexSql);
        st.execute(createIndexSql);

        String dropIndexSql = "drop index idx_1 on " + tableName;
        System.out.println("Execute SQL:\n\t"+dropIndexSql);
        st.execute(dropIndexSql);
      } catch (Exception e) {
        System.out.println(new java.util.Date().toString());
        e.printStackTrace();
      } finally {
        if (ps != null)
          try {
            ps.close();
          } catch (SQLException e1) {
            e1.printStackTrace();
          }
        if (connection != null)
          try {
            connection.close();
          } catch (SQLException e1) {
            e1.printStackTrace();
          }
        this.countDownLatch.countDown();
      }
    }
  }
}
```

7.3

-
- MySQL
-
- DDLDDL

8

- 8.1
- 8.2 MySQL-offset-step

8.1

tbidid

1cluster.conf

```
sequenceHandlerType=2
sequenceStartTime=2010-10-01 09:42:54
...
```

2bootstrap.conf

```
instanceId=1
...
```

3user.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<dble:user xmlns:dble="http://dble.cloud/">
    <managerUser name="test" password="test"/>
    <shardingUser name="abc" password="abc" schemas="myschema" maxCon="1000000">
    </shardingUser>

</dble:user>
```

4db.xml

```
<?xml version="1.0"?>
<dble:db xmlns:dble="http://dble.cloud/" >
    <dbGroup name="host_1" rwSplitMode="0" delayThreshold="10000">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM1" url="172.100.10.101:3306" user="test1" password="test1" maxCon="1000" minCon="1000" primary="true" />
    </dbGroup>
    <dbGroup name="host_2" rwSplitMode="0" delayThreshold="10000">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM2" url="172.100.10.102:3306" user="test1" password="test1" maxCon="1000" minCon="1000" primary="true" />
    </dbGroup>
</dble:db>
```

5sharding.xml

```
<?xml version="1.0"?>
<dble:sharding xmlns:dble="http://dble.cloud/">
    <schema name="myschema" shardingNode="dn1">
    <shardingTable name="sbtest1"  shardingNode="dn1,dn2" function="mod" shardingColumn="id" incrementColumn="id" />
    </schema>
    <shardingNode name="dn1" dbGroup="host_1" database="dble"/>
    <shardingNode name="dn2" dbGroup="host_2" database="dble"/>
    <function name="mod" class="Hash">
                <property name="partitionCount">2</property>
                <property name="partitionLength">1</property>
        </function>
</dble:sharding>
```

6

```mysql mysql -utest -p111111 -h127.0.0.1 -P8066 -Dmyschema mysql> drop table if exists sbtest1; Query OK, 0 rows affected (0.05 sec) mysql> create table sbtest1(id bigint(20), k int unsigned not null default '0', primary key(id)); Query OK, 0 rows affected (0.05 sec)

mysql> insert into sbtest1 values(2); Query OK, 1 row affected (0.11 sec)

mysql> select * from sbtest1;

bigint
```

8.2 MySQL-offset-step

sbtest1idMySQL-offset-stepid

1cluster.conf

```
sequenceHandlerType=1
...
```

2user.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<dble:user xmlns:dble="http://dble.cloud/" >
    <managerUser name="test" password="test"/>

    <shardingUser name="abc" password="abc" schemas="myschema" maxCon="1000000">
    </shardingUser>

</dble:user>
```

3db.xml

```
<?xml version="1.0"?>
<dble:db xmlns:dble="http://dble.cloud/" >
    <dbGroup name="host_1" rwSplitMode="0" delayThreshold="10000">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM1" url="172.100.10.101:3306" user="test1" password="test1" maxCon="1000" minCon="1000" primary="true" />
    </dbGroup>
    <dbGroup name="host_2" rwSplitMode="0" delayThreshold="10000">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM2" url="172.100.10.102:3306" user="test1" password="test1" maxCon="1000" minCon="1000" primary="true" />
    </dbGroup>
</dble:db>
```

4sharding.xml

```
<?xml version="1.0"?>
<dble:sharding xmlns:dble="http://dble.cloud/" >
    <schema name="myschema" shardingNode="dn1">
    <shardingTable name="sbtest1"  shardingNode="dn1,dn2" function="mod" shardingColumn="id" incrementColumn="id" />
    </schema>
    <shardingNode name="dn1" dbGroup="host_1" database="dble"/>
    <shardingNode name="dn2" dbGroup="host_2" database="dble"/>

    <function name="mod" class="Hash">
                <property name="partitionCount">2</property>
                <property name="partitionLength">1</property>
        </function>
</dble:sharding>
```

5sequence_db_conf.properties

```
#sequence stored in shardingNode
`myschema`.`sbtest1`=dn1
```

myschema, sbtest1, dn1sharding.xml

dn1host_1/dbledbleconf/dbseq.sql()

```
mysql -h172.100.10.101 -utest1 -ptest1 -Ddble
mysql>source conf/dbseq.sql
```

sqlDBLE_SEQUENCE

```
mysql -h172.100.10.101 -utest1 -ptest1 -Ddble
mysql>INSERT INTO DBLE_SEQUENCE VALUES ('`myschema`.`sbtest1`', 16, 1);
```

DBLE_SEQUENCE

- namesequence_db_conf.properties
- current_value
- increment1

6

dble

```
mysql -utest -p111111 -h127.0.0.1 -P8066 -Dmyschema
mysql> drop table if exists sbtest1;
Query OK, 0 rows affected (0.05 sec)
mysql> create table sbtest1(id int, k int unsigned not null default '0', primary key(id));
Query OK, 0 rows affected (0.05 sec)

mysql> insert into sbtest1 values(2);
Query OK, 1 row affected (0.11 sec)

mysql> select * from sbtest1;
+----+---+
| id | k |
+----+---+
| 17 | 2 |
+----+---+
1 row in set (0.01 sec)
```

sqlDBLE_SEQUENCEcurrent_value16insert17

- sequence_db_conf.properties

```
`myschema`.`sbtest1`=dn1
```

- sequence_db_conf.propertiesdn1dbseq.sql

9 sysbenchdble

- 9.1
- 9.2 dble
- 9.3 sysbench

9.1

- Sysbench version: 1.0
- Dble version: 5.6.23-dble-2.19.11.0-2d7c4911b7a4fecaa9eb0299f49c32ec11e97c42-20200228124218
- MySQL version: 5.7.25

- sysbench172.20.134.1
- dble172.20.134.2
- 3mysql172.20.134.3172.20.134.4172.20.134.5

9.2 dble

2.18

1. bootstrap.cnf

-DNIOFrontRW=10 -DNIOBackendRW=10 -DfrontWorker=8 -DbackendWorker=6 -DsqlExecuteTimeout=3000000

2.user.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<dble:user xmlns:dble="http://dble.cloud/" version="4.0">
    <managerUser name="root" password="111111" />
    <shardingUser name="test" password="111111" schemas="sbtest" maxCon="1000000">
    </shardingUser>
</dble:user>
```

3.db.xml

```
<?xml version="1.0"?>
<dble:db xmlns:dble="http://dble.cloud/" version="4.0">
    <dbGroup name="host_1" rwSplitMode="0" delayThreshold="-1">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM1" url="172.20.134.3:3306" user="test1" password="test1" maxCon="1000" minCon="100" primary="true"/>
    </dbGroup>
    <dbGroup name="host_2" rwSplitMode="0" delayThreshold="-1">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM1" url="172.20.134.4:3306" user="test1" password="test1" maxCon="1000" minCon="100" primary="true"/>
    </dbGroup>
    <dbGroup name="host_3" rwSplitMode="0" delayThreshold="-1">
        <heartbeat >select USER()</heartbeat>
        <dbInstance name="hostM1" url="172.20.134.5:3306" user="test1" password="test1" maxCon="1000" minCon="100" primary="true"/>
    </dbGroup>
</dble:db>
```

4.sharding.xml

```
<?xml version="1.0"?>
<dble:sharding xmlns:dble="http://dble.cloud/" version="4.0">
<schema name="sbtest">
    <shardingTable name="sbtest1" shardingNode="dn$1-9" function="hash-sysbench" shardingColumn="id" />
</schema>
<shardingNode name="dn$1-3" dbGroup="host_1" database="dbledb$1-3" />
<shardingNode name="dn$4-6" dbGroup="host_2" database="dbledb$4-6" />
<shardingNode name="dn$7-9" dbGroup="host_3" database="dbledb$7-9" />
<function name="hash-sysbench" class="Hash">
        <property name="partitionCount">9</property>
        <property name="partitionLength">1</property>
    </function>
</dble:sharding>
```

5.mysql

- 172.20.134.3:3306 dbledb1, dbledb2, dbledb3
- 172.20.134.4:3306 dbledb4, dbledb5, dbledb6
- 172.20.134.5:33066 dbledb7, dbledb8, dbledb9

9.3 sysbench

how about a sysbench-testing-quick-start; issue

sysbench

```
FATAL: mysql_drv_query() returned error 1062 (Duplicate entry '49823' for key 'PRIMARY') for query 'INSERT INTO sbtest1 (id, k, c, pad) VA
LUES (49823, 58210, '27111667985-11552069038-79242882109-05602914209-02374993639-32242662584-65155028223-08319627673-44873060047-222151189
36', '07405724915-32799061660-96650146042-59717172693-66753749407')'
```

> /usr/share/sysbench/oltp_read_write.lua --mysql-db=sbtest --mysql-host=172.20.134.2 --mysql-port=8066 --mysql-user=test --mysql-password=111111 --auto_inc=off --tables=1 --table-size=100000 --threads=4 --time=30 --report-interval=1 --max-requests=0 --percentile=95 --db-ps-mode=disable --skip-trx=on cleanup

> /usr/share/sysbench/oltp_read_write.lua --mysql-db=sbtest --mysql-host=172.20.134.2 --mysql-port=8066 --mysql-user=test --mysql-password=111111 --auto_inc=off --tables=1 --table-size=100000 --threads=4 --time=30 --report-interval=1 --max-requests=0 --percentile=95 --db-ps-mode=disable --skip-trx=on prepare

> /usr/share/sysbench/oltp_read_write.lua --mysql-db=sbtest --mysql-host=172.20.134.2 --mysql-port=8066 --mysql-user=test --mysql-password=111111 --auto_inc=off --tables=1 --table-size=100000 --threads=4 --time=30 --report-interval=1 --max-requests=0 --percentile=95 --db-ps-mode=disable --skip-trx=on run

- A.1 ErrorCode
- A.2
- A.3

- Max Connections
- Out Of Memory Error
- The Problem Of Hint
- NestLoop Parameters Lead To Temptable Exception
- Can't Get Variables From ShardingNode
- Port Already In Use 1984
- Sharding Column Cannot Be Null

dble-MaxConnections

Issue

- [Err] 3009 - java.io.IOException: the max activeConnnections size can not be max than maxconnections.

Resolution

1.
   > dble
2. maxConmaxCon

		/	
maxCon		1024	,.maxcon maxConmanager

Root Cause

Relevant Content

1. **maxWait**

   > maxActive
2. **connectionProperties**
   connectTimeout socketTimeout connectTimeout TCP socketTimeout

   > socket socket DB
3. **maxActive**

   > maxWait 0

dble-OutOfMemoryError

Setting

load data17G4K
load data

Issue

- INFO | jvm 1 | 2019/06/28 14:55:37 | Exception in thread "backendBusinessExecutor17" java.lang.OutOfMemoryError: GC overhead limit exceeded.

Special instructionsbackendBusinessExecutor17 17-backendWorker

Resolution

1. maxRowSizeToFile

maxCharsPerColumn		65535	
maxRowSizeToFile		10000	load dataOOM

1. wrapper.confXmx
   > OOM

Root Cause

1. maxRowSizeToFile
2. Xmx
   > On-Heap JVM Xms ,Xmx jvm

Relevant Content

load data

load dataOOM

JVM

1. dble=0.6 (,)
2. Xmx = 0.4 dble
3. MaxDirectMemorySize = 0.6 * dble

1. JVM-Xms1/64
2. JVM-Xmx1/4
3. 40%JVM-Xmx70%JVM-Xms

dble-TheProblemOfHint

Setting

- mysql> */#dble:sql=select 1 from rp_cre_data_mobile_track_cmcc* / call update_track();
- sql
-

Issue

- mysql> show @@processlist;

Front_Id	shardingNode	BconnID	user	Front_Host	db	Command	Time	State	Info
33	NULL	NULL	root		NULL	NULL	0	updating	NULL
34	NULL	NULL	root		NULL	NULL	0	updating	NULL
35	NULL	NULL	root		NULL	NULL	0	updating	NULL
41	dn9	9372	root		db9	Query	0	updating	NULL
42	NULL	NULL	root		NULL	NULL	0	updating	NULL
43	NULL	NULL	root		NULL	NULL	0	updating	NULL
30	NULL	NULL	admin		NULL	NULL	0	updating	NULL

Resolution

1. */#dble:type=..../*
   /!dble:type=..../
2. mysql client -c

> mysql --help
> -c, --comments
> Preserve comments. Send comments to the server. The default is --skip-comments (discard comments), enable with --comments.

Root Cause

1. */#dble:type=..../* mysql
2. -c skip

Relevant Content

hint

1.
2. dbleinsert…select…

Hint

Hint

1. /*!dble:type=....*/
2. /*#dble:type=...*/
3. /* */()

type4shardingNodedb_typesqldb_instance_url
type https://actiontech.github.io/dble-docs-cn/2.Function/2.04_hint.html

Hint

- selectSQLdelete/update/insert delete/update/insert SQL
- SQL
- hintDDLreload @@metadata
- hintsession
- dbleMySQL, MySQL#1169
- SQLSQL select id from tab_a where id='10000'
-

dble-NestLoop Parameters Lead To Temptable Exception

Setting

- NestLoopNestLoop4
- joinstudentclass
- studentidnameclass_nameid
- classidclass_nameteacher_name
- `SELECT class.teacher_name FROM student LEFT JOIN class on student.class_name=class.class_name WHERE student.name=""`

Issue

- com.actiontech.dble.plan.common.exception.TempTableException: temptable too much rows,[rows size is 5].

Resolution

- NestLoop

		/	
useJoinStrategy	nestLoop		joinwhereSQL
nestLoopConnSize		4	
nestLoopRowsSize		2000	

- NestLoop
  - `<property name="useJoinStrategy">false</property>`
-

Root Cause

- NestLoopNestLoopNestLoop
- NestLoop

>
>
> - joinNestLoop join
> - wherewhere
> - wherewhereNestLoop
> - NestLoop

- SQL
- `SELECT class.teacher_name FROM student LEFT JOIN class on student.class_name=class.class_name WHERE student.name=""`

dbleNestLoop

1. SQLstudentclass
2. wherestudentNestLoopstudent
3. SQLstudentNestLoop

Relevant Content

MySQLNestLoop

1. NestLoop:
   - Nested Loop
   - Nested LoopJoinJoin Nested Loop
   - Nested Loop“”——
2. NestLoop

NestLoop		CPUI/O		

dble-Can't get variables from shardingNode

Setting

- db.xml

```
<dbGroup name="localhost1" rwSplitMode="0" delayThreshold="10000">
<heartbeat>show slave status</heartbeat>
<dbInstance host="hostM1" url="localhost:3306" user="root"  password="nE7jA%5m" maxCon="1000" minCon="10" primary="true" >  </dbInstance>
</dbGroup>
<dbGroup name="localhost2" rwSplitMode="0" delayThreshold="10000">
<heartbeat>show slave status</heartbeat>
<dbInstance host="hostM2" url="localhost:3306" user="root"  password="nE7jA%5m" maxCon="1000" minCon="10" primary="true">  </dbInstance>
</dbGroup>
```

Issue

- dble

```
Running dble-server...
wrapper | --> Wrapper Started as Console
wrapper | Launching a JVM...
jvm 1   | Wrapper (Version 3.2.3)
http://wrapper.tanukisoftware.org
jvm 1   | Copyright 1999-2006 Tanuki Software, Inc. All Rights Reserved.
jvm 1   |
jvm 1   | java.io.IOException:Can't get variables from shardingNode  ...
wrapper | <-- Wrapper Stopped
```

Resolution

1. mysqlmysql5.1mysql,
2. db.xmlrootmysql
3. root
4. mysqlshow variables
5. dbGroupdble

Root Cause

- db.xml mysqlshow variables
- mysql 5.7

Relevant Content

1. mysql5.7
2. mysqlmysqlMysql
3.
    - mysql> show databases;
    - ERROR 1820 (HY000): You must reset your password using ALTER USER statement before executing this statement.
    - mysql > set password = password('xxxxxx');

dble-Port already in use:1984

Issue

- wrapper.log-Error1

```
STATUS | wrapper | 2019/07/23 16:37:06 | --> Wrapper Started as Daemon
STATUS | wrapper | 2019/07/23 16:37:06 | Launching a JVM...
INFO | jvm 1 | 2019/07/23 16:37:06 | OpenJDK 64-Bit Server VM warning: ignoring option MaxPermSize=64M; support was removed in 8.0
INFO | jvm 1 | 2019/07/23 16:37:07 | : : java.rmi.server.ExportException: Port already in use: 1984; nested exception is:
INFO | jvm 1 | 2019/07/23 16:37:07 | java.net.BindException: Address already in use (Bind failed)
INFO | jvm 1 | 2019/07/23 16:37:07 | sun.management.AgentConfigurationError: java.rmi.server.ExportException: Port already in use: 198
4;
```

- wrapper.log-Error2

```
STATUS | wrapper  | 2019/07/26 16:12:48 | --> Wrapper Started as Daemon
STATUS | wrapper  | 2019/07/26 16:12:49 | Launching a JVM...
INFO   | jvm 1    | 2019/07/26 16:12:49 | Wrapper (Version 3.2.3) http://wrapper.tanukisoftware.org
INFO   | jvm 1    | 2019/07/26 16:12:49 |   Copyright 1999-2006 Tanuki Software, Inc.  All Rights Reserved.
INFO   | jvm 1    | 2019/07/26 16:12:49 |
INFO   | jvm 1    | 2019/07/26 16:12:51 | java.net.BindException: Address already in use
INFO   | jvm 1    | 2019/07/26 16:12:51 |       at sun.nio.ch.Net.bind0(Native Method)
INFO   | jvm 1    | 2019/07/26 16:12:51 |       at sun.nio.ch.Net.bind(Net.java:433)
INFO   | jvm 1    | 2019/07/26 16:12:51 |       at sun.nio.ch.Net.bind(Net.java:425)
INFO   | jvm 1    | 2019/07/26 16:12:51 |       at sun.nio.ch.ServerSocketChannelImpl.bind(ServerSocketChannelImpl.java:223)
INFO   | jvm 1    | 2019/07/26 16:12:51 |       at com.actiontech.dble.net.NIOAcceptor.<init>(NIOAcceptor.java:46)
```

Resolution

- Error1
  wrapper.conf1984
  -Dcom.sun.management.jmxremote.port=1984
- Error2
  netstat -nap pid80669066
  kill -9 pid
- dble

Root Cause

- jmxjavadble
- dblejvmjmx
- jmxjconsolejvmjvm

Relevant Content

1. JVM
   JVMJavaJava
   JavaJavacc++
2. JMX
   JMXJava Management ExtensionsJava
   JPAJMS
3. Jconsole
   JconsoleJDKJVMjava

dble-Sharding column can't be null

Setting

- sharding.xml

```
<sharingTable shadingColumn="number" ... >
...
<function name="rangeLong" class="NumberRange">
  <property name="mapFile">partition.txt</property>
  <property name="defaultNode">0</property>
</function>
```

- create table account (id int(10),number int(10) not null,name varchar(20) not null);
- insert into account (id,number,name) values (1,NULL,'aaa');

Issue

ERROR 1064 (HY000): Sharding column can't be null when the table in MySQL column is not null

Resolution

- numbernameNULL
- numberNULL;
  ALTER TABLE `account` MODIFY `number` VARCHAR (20);
-
  blacklistalterTableAllow;

```
<blacklist name="bk1">
    <property name="alterTableAllow">true</property>
</blacklist>
```

sharding-by-rangedbleERalter

```
<sharingTable shadingColumn="id" ... >
```

- alter

Root Cause

1. MySQLinsert
   ERROR 1048 (23000): Column 'number' cannot be null
2. descnumbername

Field	Type	Null	Key	Default	Extra
id	int(10)	YES		NULL	
number	int(10)	NO		NULL	
name	varchar(20)	NO		NULL	

- How To Use Explain To Resolve The Distribution Rules Of Group Gy
- Hash And ConsistentHashing And Jumpstringhash

dble-How To Use Explain To Resolve The Distribution Rules Of Group Gy

Questions

group by

Conclusions

-
  1. explainsql
  2. dble explainmycatSQL

For Example

1.

sharding.xml

```
<shardingTable name="eee" shardingNode="dn1,dn2"  function="hashLong" shardingColumn="id"/>
...
<function name="hashLong" class="Hash">
       <property name="partitionCount">2</property>
       <property name="partitionLength">128</property>
   </function>
```

1. dble client eee mysql> select * from eee;

   | id | name | | -- | -- | | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 130 | | | 131 | | | 132 | | | 133 | | | 134 | |

mysql> select name,count(name) from eee group by name;

name	COUNT(name)
	4
	4
	1
	1

1. explainsql

SHARDING_NODE	TYPE	SQL/REF
dn1_0	BASE SQL	`select eee . name` ,COUNT(name) as `_$COUNT$_rpda_0` from `eee` GROUP BY `eee . name` ASC
dn2_0	BASE SQL	`select eee . name` ,COUNT(name) as `_$COUNT$_rpda_0` from `eee` GROUP BY `eee . name` ASC
merge_1	MERGE	dn1_0; dn2_0
aggregate_1	AGGREGATE	merge_1
shuffle_field_1	SHUFFLE_FIELD	aggregate_1

Instructions

explain

1. dblesqlshardingnode
2. shardingnodemerge
3. mergegroup by
4. SHUFFLE_FIELD
   > SHUFFLE_FIELD

Relevant Content

dble

1. dbleappmyslq
2.

- /
- dblejoingroup by
- https://opensource.actionsky.com/dble-lesson-one/

dble

1. IO MySQLsql
2. MySQL
3. MySQL

> PSdble

dble-Hash And ConsistentHashing And Jumpstringhash

Questions

- dblehashhash
- hash

Conclusions

- dblehashhash
- hashhash

Instructions

dble-hash

-

- sharding.xml

```
<function name="hashLong" class="hash">
<property name="partitionCount">1,2</property>
<property name="partitionLength">10,20</property>
</function>
```

-

```
<function name="hashLong" class="hash">
<property name="partitionCount">4</property>
<property name="partitionLength">10</property>
</function>
```

> partitionCount
> partitionLength
> MC1L1 + ... + CnLn

dble-hash

Count=2,Length=2 -> [0,2)[2,4) -> =4
key1,2,3,4,5,6,7,8

node1	node2
1,4,5,8	2,3,6,7

Count=3,Length=2 -> [0,2)[2,4)[4,6) -> =6 key1,2,3,4,5,6,7,8

node1	node2	node3
1,6,7	2,3,8	4,5

count

summary

node

Consistent Hashing

NodeANode BNode CNode DABCDANode ABNode BCNode CDNode D:

> A ——> NodeA
> B ——> NodeB
> C ——> NodeC
> D ——> NodeD

Node CABDCNode D Node X:

> A ——> NodeA
> B ——> NodeB
> ——> NodeX
> C ——> NodeC
> D ——> NodeD

ABDCNode X

Hash node

“”

NodeANode B “Node A#1”“Node A#2”“Node A#3”“Node B#1”“Node B#2”“Node B#3”
“Node A#1”“Node A#2”“Node A#3”Node A,“Node B#1”“Node B#2”“Node B#3”Node B

> Node A#1 ——> NodeA
> Node A#2 ——> NodeA
> Node A#3 ——> NodeA
> Node B#1 ——> NodeB
> Node B#2 ——> NodeB
> Node B#3 ——> NodeB

“”“”

summary

hashnode

Jumpstringhash

-
- sharding.xml

```
<function name="jumphash" class="jumpStringHash">
<property name="partitionCount">2</property>
<property name="hashSlice">0:2</property>
</function>
```

> partitionCount hashSlice

GoogleA Fast, Minimal Memory, Consistent Hash Algorithmhash1/n

- 0,1,2,3
- (0)1(1)1/(n+1)1/2(2)1/(n+1)1/3(3)1/(n+1)1/4
- n/(n+1) 1/(n+1) n+1
- indexmaxa0,1,2,33

0,1,2,30,1,2,3,4

summary

Jumpstringhashhash

> - Jumpstringhashhash
> - Jumpstringhashhash
> - Jumpstringhashhashdble-hash
> - dble-hashJumpstringhashhash

- ToBeContinued2