

系统测试报告，运行截图， 与用户手册

系统测试报告

测试目标

- 检查程序是否可以正常运行，各个服务器能否正常开启并监听网络请求。
- 检查gateServer(网关服务器，自己起的名字)能否正常开启并监听来自clusterServer 与 client 的网络请求。该服务器主要用以接收客户端请求，并转发到clusterServer(集群服务器)。
- 检查clusterServer(集群服务器)能否正常开启并监听来自gateServer 与 levelDBServer 的请求。该服务器主要接收gateServer的请求，并将信息广播到集群中的所有levelDB服务器。
- 检查levelDBServer(数据库服务器)能否接收来自clusterServer的请求，主要作用完成数据库增删查改的功能。

一、测试gateServer

gateServer服务器启动命令如下：(不指定参数，则默认作为master节点，gateServer 从本地启动，绑定端口为9001；clusterServer 从本地启动，绑定端口为8001)

```
./gateserver.out --joip 127.0.0.1 --joinport 8001 --gsport 9001 --csport 8001
```

启动结果如下：

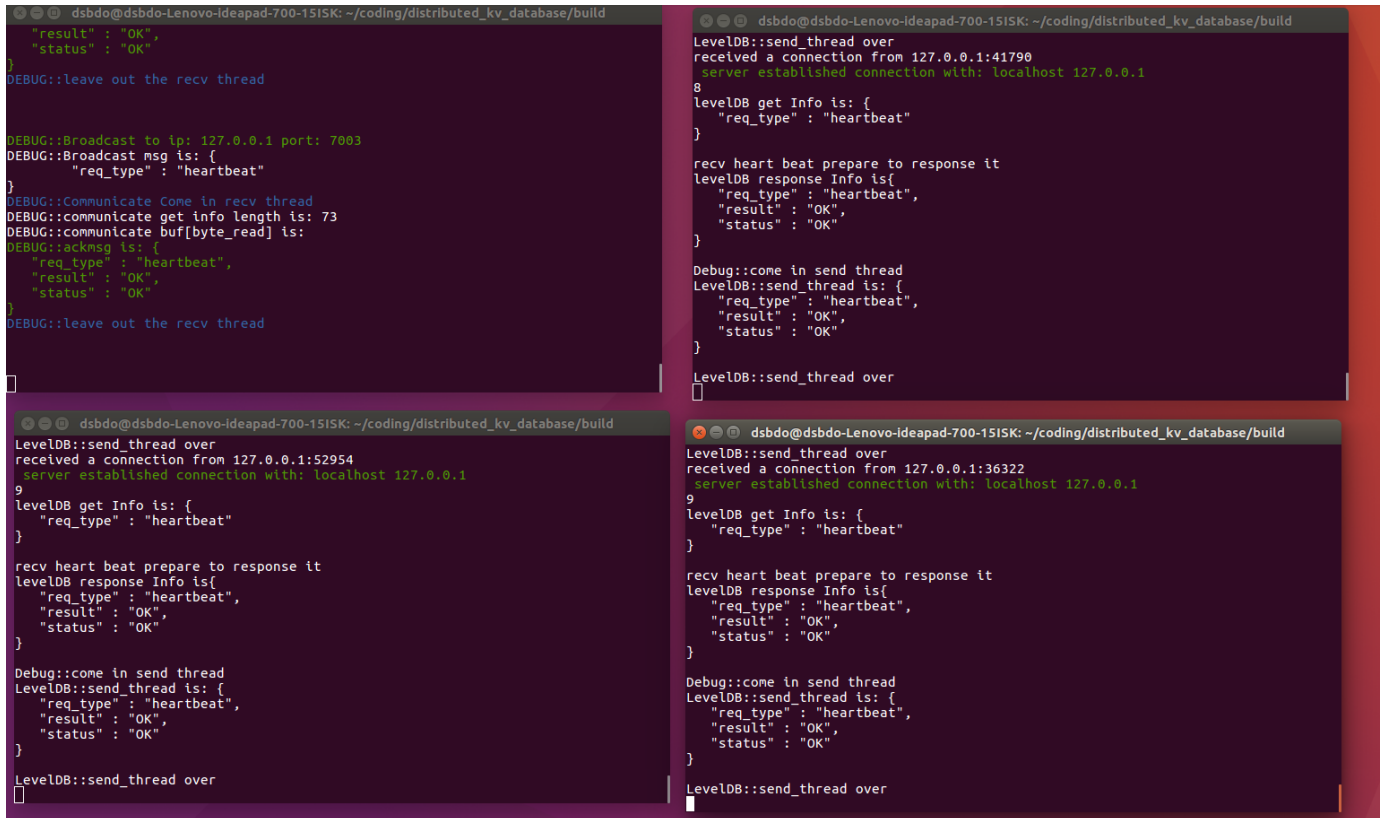


```
dsbdo@dsbdo-Lenovo-ideapad-700-15ISK: ~/coding/distributed_kv_database/build
dsbdo@dsbdo-Lenovo-ideapad-700-15ISK:~/coding/distributed_kv_database/build$ ./g
ateserver.out
获取的网卡名称是: lo
min heap has been created
DEBUG::ClusterServer Init ip is: 127.0.0.1 端口是 port: 8001
DEBUG::GateServer Init: ip is127.0.0.1 port is: 9001
gateways server test
hostname: dsbdo-Lenovo-ideapad-700-15ISK
ip: 127.0.0.1
port: 9001
```

二、测试clusterServer集群服务器

集群服务器主要用来管理集群中的levelDBServer，主要用以管理数据库服务器的加入与离开，全局服务器信息的同步，接受来自gateServer的请求，并且负责转发并同步到集群内所有levelDB服务器中。同时clusterServer中会根据最先申请原则选举出一个master集群服务器节点，主要负责用以向全局中的levelDB服务器与clusterServer发送心跳包（heartbeat），用来确定与更新全局在线服务器的信息。 集群服务器的启动是在启动gateServer时一并启动的。下面

是全局机器信息同步时，发送心跳包的截图：



The image displays four terminal windows showing the execution of a distributed key-value database. The windows are arranged in a 2x2 grid. Each window shows the process of receiving a heartbeat from a peer node and sending a response. The logs include details such as the IP address of the peer (127.0.0.1), the port (7003), and the JSON structure of the heartbeat request and response. The response includes 'result': 'OK' and 'status': 'OK'. The windows also show the process of sending a heartbeat to a peer node.

```
dsbdo@dsbdo-Lenovo-Ideapad-700-15ISK: ~/coding/distributed_kv_database/build
"result": "OK",
"status": "OK"
DEBUG::leave out the rcv thread

DEBUG::Broadcast to ip: 127.0.0.1 port: 7003
DEBUG::Broadcast msg is: {
  "req_type": "heartbeat"
}
DEBUG::Communicate Come in rcv thread
DEBUG::communicate get info length is: 73
DEBUG::communicate buf[byte_read] is:
DEBUG::ackmsg is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
DEBUG::leave out the rcv thread

LevelDB::send_thread over
received a connection from 127.0.0.1:41790
server established connection with: localhost 127.0.0.1
8
LevelDB get Info is: {
  "req_type": "heartbeat"
}
rcv heart beat prepare to response it
LevelDB response Info is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
Debug::come in send thread
LevelDB::send_thread is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
LevelDB::send_thread over

LevelDB::send_thread over
received a connection from 127.0.0.1:52954
server established connection with: localhost 127.0.0.1
9
LevelDB get Info is: {
  "req_type": "heartbeat"
}
rcv heart beat prepare to response it
LevelDB response Info is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
Debug::come in send thread
LevelDB::send_thread is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
LevelDB::send_thread over

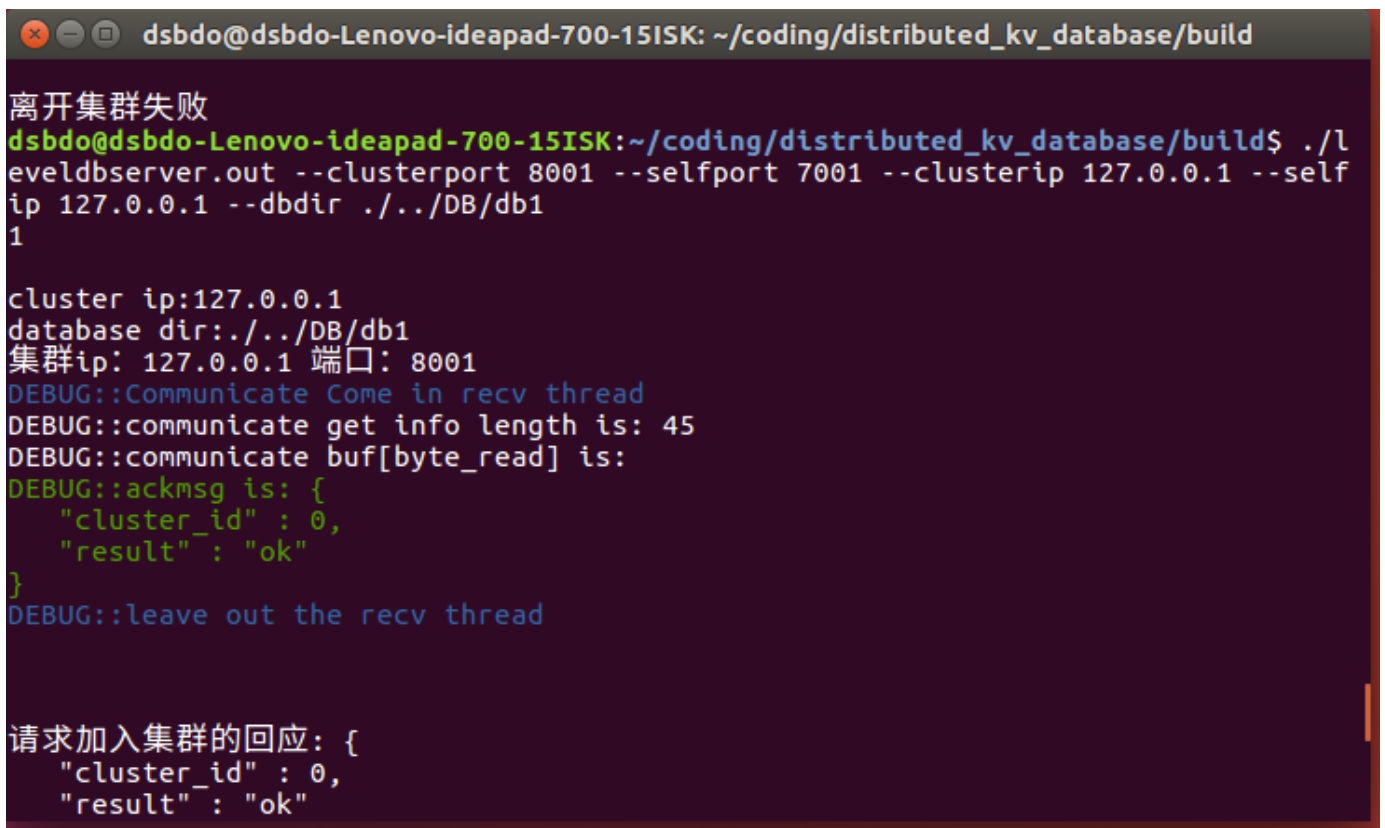
LevelDB::send_thread over
received a connection from 127.0.0.1:36322
server established connection with: localhost 127.0.0.1
9
LevelDB get Info is: {
  "req_type": "heartbeat"
}
rcv heart beat prepare to response it
LevelDB response Info is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
Debug::come in send thread
LevelDB::send_thread is: {
  "req_type": "heartbeat",
  "result": "OK",
  "status": "OK"
}
LevelDB::send_thread over
```

三、测试levelDB服务器

levelDB服务器主要用以加入集群，同时用以存储来自客户端的消息。启动命令如下：（--clusterport 要加入的集群服务器的端口， --clusterip 要加入集群的服务器ip地址； --selfip 自身的ip， --selfport 自身的端口）

```
./leveldbserver.out --clusterport 8001 --selfport 7001 --clusterip 127.0.0.1 --selfip 127.0.0.1
```

启动后，结果截图如下：



The image shows a terminal window with the following output:

```
dsbdo@dsbdo-Lenovo-ideapad-700-15ISK: ~/coding/distributed_kv_database/build
离开集群失败
dsbdo@dsbdo-Lenovo-ideapad-700-15ISK:~/coding/distributed_kv_database/build$ ./leveldbserver.out --clusterport 8001 --selfport 7001 --clusterip 127.0.0.1 --selfip 127.0.0.1 --dbdir ../../DB/db1
1
cluster ip:127.0.0.1
database dir:../../DB/db1
集群ip: 127.0.0.1 端口: 8001
DEBUG::Communicate Come in rcv thread
DEBUG::communicate get info length is: 45
DEBUG::communicate buf[byte_read] is:
DEBUG::ackmsg is: {
  "cluster_id": 0,
  "result": "ok"
}
DEBUG::leave out the rcv thread

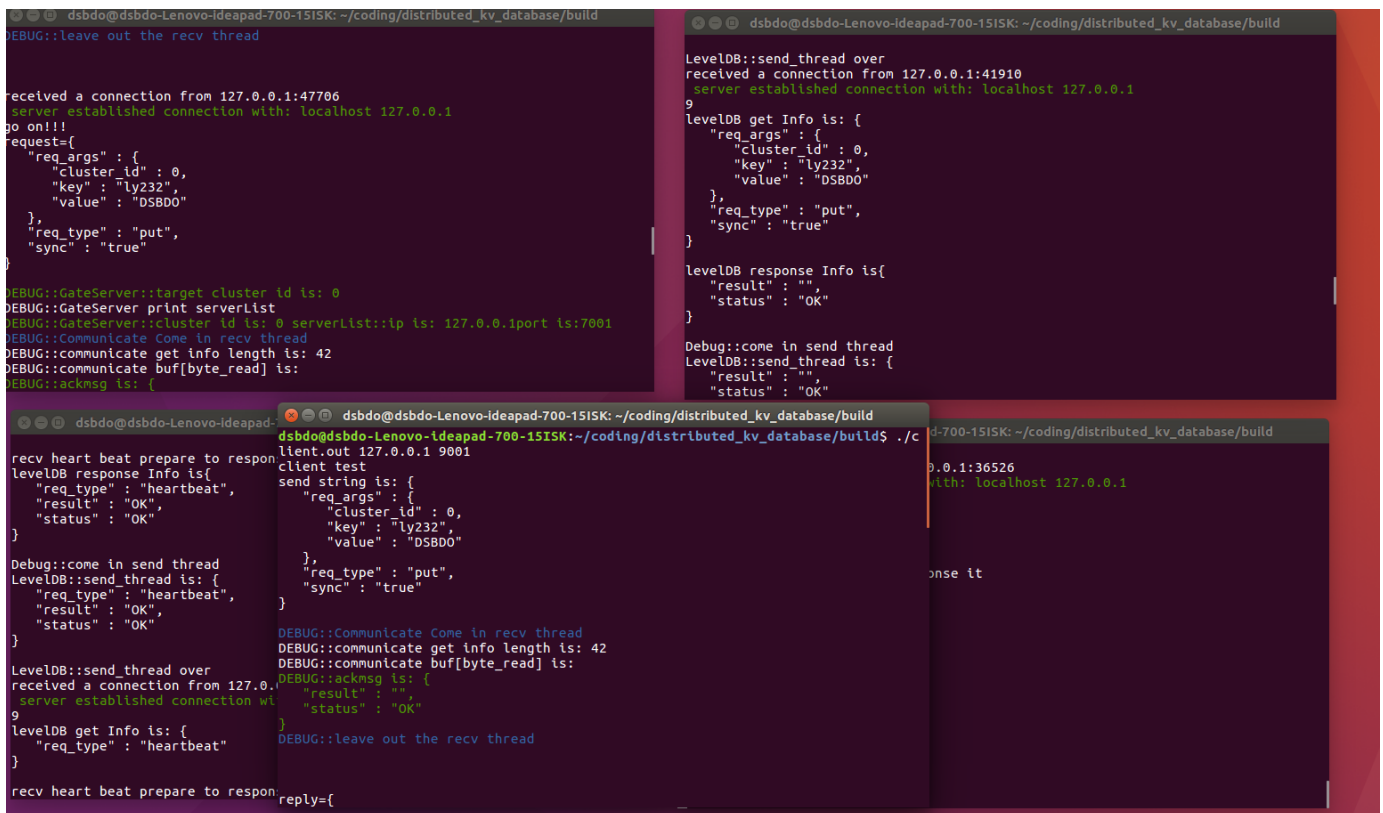
请求加入集群的回应: {
  "cluster_id": 0,
  "result": "ok"
}
```

四、测试客户端

客户端主要目的在于向gateServer 发起请求，并将准备存储的信息以 JSON 格式发送给gateServer, 由其转发给集群服务器。这个的启动命令便是直接运行我们的客户端测试程序，同时指定gateServer的ip与端口：

```
./client.out 127.0.0.1 9001
```

启动结果截图：



五、运行截图与用户手册

运行截图均在上面的测试报告中，因为时间比较紧，我们没有完成用户GUI客户端，就只有命令行，所以用户手册也就是上面的服务器启动命令与客户端测试命令。