



## 数据库系统课程实验报告

实验名称:	实验九：使用 JDBC 连接数据库
实验日期:	2022/5/19
实验地点:	厦门大学德旺图书馆
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学号:	20420192201952
姓名:	庾晓萍
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## 1. 实验目的

- 掌握使用 JDBC 连接 openGauss 数据库的方法

## 2. 实验内容和步骤

(1) 在 openGauss 中创建数据库表。密码为 yuxiaoping@123

```
[omm@ecs-ad18 db1]$ gsql -d postgres -p 26000 -U yuxiaoping -r
Password for user yuxiaoping:
gsql ((openGauss 2.0.0 build 78689da9) compiled at 2021-03-31 21:03:52 commit 0 last mr )
Non-SSL connection (SSL connection is recommended when requiring high-security)
Type "help" for help.

postgres=> create database demo ENCODING 'UTF8' template = template0;
CREATE DATABASE
postgres=>
postgres=> \connect demo;
Password for user yuxiaoping:
Non-SSL connection (SSL connection is recommended when requiring high-security)
You are now connected to database "demo" as user "yuxiaoping".
demo=> █

demo=> CREATE SCHEMA demo;
CREATE SCHEMA
demo=> ^C
demo=> SET search_path TO demo;
SET
demo=> CREATE TABLE websites (
demo(>   id int NOT NULL,
demo(>   name char(20) NOT NULL DEFAULT '',
demo(>   url varchar(255) NOT NULL DEFAULT '',
demo(>   PRIMARY KEY (id)
demo(> );
NOTICE: CREATE TABLE / PRIMARY KEY will create implicit index "websites_pkey" for table "websites"
CREATE TABLE
demo=> COMMENT ON COLUMN websites.name IS '站点名称';
COMMENT
demo=> INSERT INTO websites VALUES
demo-> ('1', 'openGauss', 'https://opengauss.org/zh/'),
demo-> ('2', '华为云', 'https://www.huaweicloud.com/'),
demo-> ('3', 'openEuler', 'https://openeuler.org/zh/'),
demo-> ('4', '华为support中心', 'https://support.huaweicloud.com/');
INSERT 0 4
demo=> \q
```

(2) 使用 jdbc 连接到新创建的数据库。

1、修改数据库的 pg\_hba.conf 文件。

```
[root@ecs-ad18 ~]# cd /gaussdb/data/db1
[root@ecs-ad18 db1]# vi pg_hba.conf
[root@ecs-ad18 db1]# █
```

```
root@114.116.235.207 x
#
# If you want to allow non-local connections, you need to add more
# "host" records. In that case you will also need to make PostgreSQL
# listen on a non-local interface via the listen_addresses
# configuration parameter, or via the -i or -h command line switches.
#
# NOTICE:
# -----
#
# When you configure this file, please configure it from top to bottom,
# higher priority needs to be configured in front.
#
# CAUTION: Configuring the system for local "trust" authentication
# allows any local user to connect as any PostgreSQL user, including
# the database sysadmin. If you do not trust all your local users,
# use another authentication method.
#
# TYPE  DATABASE        USER            ADDRESS           METHOD
# "local" is for Unix domain socket connections only
local   all             all             trust
# IPv4 local connections:
host    all             all             127.0.0.1/32      trust
host    all             all             192.168.0.183/32  trust
host    all             all             0.0.0.0/0         sha256
# IPv6 local connections:
host    all             all             ::1/128           trust
# Allow replication connections from localhost, by a user with the
# replication privilege.
#local   replication      omm             trust
#host    replication      omm             127.0.0.1/32      trust
-- INSERT --
```

## 2、登陆数据库授权退出

```
[omm@ecs-ad18 ~]$ gs_om -t start
Starting cluster.
=====
[SUCCESS] ecs-ad18
2022-05-19 14:51:39.221 6285e8fb.1 [unknown] 281466558283792 [unknown] 0 dn_6001 01000 0 [BACKEND]
WARNING: could not create any HA TCP/IP sockets
=====
Successfully started.
[omm@ecs-ad18 ~]$ gsql -d postgres -p 26000 -r
gsql ((OpenGauss 2.0.0 build 78689da9) compiled at 2021-03-31 21:03:52 commit 0 last mr )
NOTICE : 7 days left before password expired, please change the password.
Non-SSL connection (SSL connection is recommended when requiring high-security)
Type "help" for help.

postgres=# alter role yuxiaoping createrole createdb;
ALTER ROLE
postgres=# \q
[omm@ecs-ad18 ~]$
```

## 3、修改数据库监听地址

```
root@114.116.235.207 x
WARNING: could not create any HA TCP/IP sockets
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 01000 0 [BACKEND]
WARNING: No explicit IP is configured for listen_addresses GUC.
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: InitNuma numaNodeNum: 1 numa_distribute_mode: none inheritThreadPool: 0.
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: reserved memory for backend threads is: 340 MB
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: reserved memory for WAL buffers is: 320 MB
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: Set max backend reserve memory is: 660 MB, max dynamic memory is: 1518 MB
2022-05-19 14:56:00.014 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: shared memory 1901 Mbytes, memory context 2178 Mbytes, max process memory 4096 Mbytes
2022-05-19 14:56:00.031 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [CACHE] L
OG: set data cache size(12582912)
2022-05-19 14:56:00.032 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [CACHE] L
OG: set metadata cache size(4194304)
2022-05-19 14:56:00.112 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: gaussdb: fsync file "/gaussdb/data/db1/gaussdb.state.temp" success
2022-05-19 14:56:00.112 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: create gaussdb state file success: db state(STARTING STATE), server mode(Normal)
2022-05-19 14:56:00.175 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: max_safe_fds = 977, usable_fds = 1000, already_open = 13
The core dump path is an invalid directory
2022-05-19 14:56:00.177 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: the configure file /opt/gaussdb/app/etc/gscgroup_omm.cfg doesn't exist or the size of configure file has changed. Please create it by root user!
2022-05-19 14:56:00.177 6285e9ff.1 [unknown] 281460380532752 [unknown] 0 dn_6001 00000 0 [BACKEND]
LOG: Failed to parse cgroup config file.

[2022-05-19 14:56:00.904][5196][][gs_ctl]: done
[2022-05-19 14:56:00.904][5196][][gs_ctl]: server started (/gaussdb/data/db1)
[omm@ecs-ad18 db1]$
```

#### 4、确定 26000 端口是否放开

添加方向规则 教我设置

安全组方向规则为白名单（允许），放通方向网络流量。

安全组 Sys-WebServer

如您要添加多条规则，建议单击导入规则以进行批量导入。

优先级	策略	协议端口	类型	源地址	描述	操作
1-100	允许	TCP 26000	IPv4	IP地址 0.0.0.0/0		复制 删除

增加1条规则

确定 取消

#### 5、在 java 程序中改变数据库中的值或者输出数据库中的值。公网 IP 是 114.116.235.207。

```
d:\Download>javac -encoding utf-8 -cp d:\Download\postgresql.jar openGaussDemo.java
d:\Download>java -cp .;D:\Download\postgresql.jar openGaussDemo
连接数据库...
五月 19, 2022 3:37:57 下午 org.postgresql.core.v3.ConnectionFactoryImpl.openConnectionImpl
信息: [69cb4cc9-960a-4482-bc20-61467ff8ee47] Try to connect. IP: 114.116.235.207:26000
五月 19, 2022 3:38:02 下午 org.postgresql.core.v3.ConnectionFactoryImpl.openConnectionImpl
信息: [10.30.75.2:61979/114.116.235.207:26000] Connection is established. ID: 69cb4cc9-960a-4482-bc20-61467ff8ee47
五月 19, 2022 3:38:02 下午 org.postgresql.core.v3.ConnectionFactoryImpl.openConnectionImpl
信息: Connect complete. ID: 69cb4cc9-960a-4482-bc20-61467ff8ee47
实例化Statement对象...
ID: 1, 站点名称: openGauss, 站点 URL: https://opengauss.org/zh/
ID: 2, 站点名称: 华为云, 站点 URL: https://www.huaweicloud.com/
ID: 3, 站点名称: openEuler, 站点 URL: https://openeuler.org/zh/
ID: 4, 站点名称: 华为support中心, 站点 URL: https://support.huaweicloud.com/
Goodbye!
d:\Download>
```



## 3. 实验总结

### 3.1 实验思考

- 简述使用 jdbc 连接到 openGauss 数据库的主要步骤。

答：1、加载 jdbc 驱动程序；2、创建数据库的连接；3、创建 preparedStatement；4、执行 SQL 语句；5、遍历结果集；6、处理异常，关闭 JDBC 对象资源。

### 3.2 对实验的认识

通过实验我对 openGauss 中的一些语句更熟悉了。如

如 `SELECT * FROM customer_t1;` 可以用来查询表 `customer_t1` 的所有数据。`gsql -d sale -p 26000 -U yuxiaoping -W yuxiaoping@123 -r` 或者 `gsql -d sale -p 26000 -U user1 -W user1@123 -r` 可以用来将新用户连接到数据库。可以使用 `gsql -d postgres -p 26000 -r`、`gsql -d postgres -p 26000 -U yuxiaoping -r` 连接到 postgres。`gs_om -t start` 可以开启数据库。

### 3.3 遇到的困难及解决方法

要更改当前会话的默认 Schema，请使用 SET 命令。执行如下命令 `SET SEARCH_PATH To icebear,public;` 将搜索路径设置为 `myschema`、`public`，首先搜索 `myschema`。

```
sale=> SET SEARCH_PATH TO icebear, public;  
SET
```

高斯默认有 session 超时时间，若想要 session 一直保持，需要修改配

置项：ALTER DATABASE sale SET session\_timeout TO 0;

```
postgres=# ALTER DATABASE postgres SET session_timeout TO 0;  
ALTER DATABASE
```

修改 java 的 IP 地址时应该用弹性公网，否则会出现连接超时

```
static final String JDBC_DRIVER = "org.postgresql.Driver";  
static final String DB_URL = "jdbc:postgresql://114.116.235.207:26000/demo?ApplicationName=app1";  
// 数据库的用户名与密码，需要根据自己的设置  
static final String USER = "yuxiaoping";  
static final String PASS = "yuxiaoping@123";
```