一、安装环境

1.虚拟机环境

1. 个人使用的虚拟机软件版本：VMware Workstation 16 PRO
2. 虚拟机配置建议：处理器4核及以上，内存4 GB及以上，硬盘40 GB及以上，网络适配器可用NAT模式
3. 操作系统版本：Centos-7-x86_64_DVD-1810，下载地址：https://vault.centos.org/7.6.1810/isos/x86_64/，如果用浏览器下载较慢，可用迅雷对种子文件进行下载
4. SOFTWARE SELECTION软件安装选择：在虚拟机中安装OS时，如果想要用图形界面对OS进行操作，就不要选择**Minimal Install**，图形界面安装选择**Server with GUI** 或者 **GNOME Desktop**
5. 操作系统安装具体步骤可参考：https://blog.csdn.net/qq_44714603/article/details/88829423

2.软件环境

需要事先准备好数据库源码，以及编译安装数据库的时候依赖的第三方开源库。第三方开源库官方社区已经提供了编译好的二进制文件，不用自己再编译一遍可以节省数据库编译安装的时间，减少安装过程中的难度。

数据库源码：https://github.com/opengauss-mirror/openGauss-server/archive/refs/tags/v2.1.0.zip

第三方开源库文件：https://opengauss.obs.cn-south-1.myhuaweicloud.com/2.1.0/openGauss-third_party_binarylibs.tar.gz

3.安装依赖

安装完系统后，在终端执行安装依赖包命令：

```
yum -y install libaio-devel flex bison ncurses-devel glibc-devel patch redhat-lsb-core readline-devel unzip gcc-c++ readline lsb_release zlib-devel bzip2-devel openssl-devel sqlite-devel tk-devel gdbm-devel db4-devel libpcap-devel xz-devel
```

可能会遇到的问题：提示db4-devel和lsb_release找不到

解决方法：

```
#db4-devel
#参考：https://blog.csdn.net/Llyp82ndlf/article/details/106633775
yum -y install epel-release
yum -y install db4-devel

#lsb_releas
#参考：https://www.cxybb.com/article/xufengzhu/73330741
yum install -y redhat-lsb
```

二、安装过程

1.创建用户组和用户

```
su root
groupadd dbgrp -g 2000
useradd omm -g 2000 -u 2000
passwd omm
```

2.创建安装目录、数据目录并赋予权限

```
#创建安装目录跟数据目录
mkdir -p {/opt/og,/opt/ogdata}

#赋予omm用户权限
chown -R omm: {/opt/og,/opt/ogdata}
chmod -R 755 /opt/og
chmod -R 700 /opt/ogdata
```

3.数据库源码和第三方开源库

将事先准备好的数据库源码文件和第三方开源库文件放到以下目录：

```
/home/omm/
```

并在/home/omm/目录下，执行赋予权限命令

```
chown omm: openGauss-third_party_binarylibs.tar.gz
chmod 755 openGauss-third_party_binarylibs.tar.gz

chown omm: openGauss-server-2.1.0.zip
chmod 755 openGauss-server-2.1.0.zip
```

4.编译准备

```
#在/home/omm/目录下

#使用omm用户
su omm

#解压
unzip openGauss-server-2.1.0.zip
tar -zxvf openGauss-third_party_binarylibs.tar.gz

#重命名
mv openGauss-third_party_binarylibs binarylibs
mv openGauss-server-2.1.0 openGauss-server

#配置环境变量
export CODE_BASE=/home/omm/openGauss-server
export BINARYLIBS=/home/omm/binarylibs
export GAUSSHOME=/opt/og
export GCC_PATH=$BINARYLIBS/buildtools/centos7.6_x86_64/gcc7.3/
export CC=$GCC_PATH/gcc/bin/gcc
export CXX=$GCC_PATH/gcc/bin/g++
export LD_LIBRARY_PATH=$GAUSSHOME/lib:$GCC_PATH/gcc/lib64:$GCC_PATH/isl/lib:$GCC_PATH/mpc/lib/:$GCC_PATH/mpfr/lib/:$GCC_PATH/gmp/lib/:$LD_LIBRARY_PATH
export PATH=$GAUSSHOME/bin:$GCC_PATH/gcc/bin:$PATH
```

配置环境变量必须在omm用户下执行，由于是在命令行配置的临时环境变量，重启之后会失效，可以配置永久环境变量：

```
#在/home/omm/目录下

#使用omm用户
su omm

vim ~/.bash_profile
#或者
vim ~/.bashrc

#在bash_profile或者bashrc文件末尾添加并保存以下命令：
export CODE_BASE=/home/omm/openGauss-server
export BINARYLIBS=/home/omm/binarylibs
export GAUSSHOME=/opt/og
export GCC_PATH=$BINARYLIBS/buildtools/centos7.6_x86_64/gcc7.3/
export CC=$GCC_PATH/gcc/bin/gcc
export CXX=$GCC_PATH/gcc/bin/g++
export LD_LIBRARY_PATH=$GAUSSHOME/lib:$GCC_PATH/gcc/lib64:$GCC_PATH/isl/lib:$GCC_PATH/mpc/lib/:$GCC_PATH/mpfr/lib/:$GCC_PATH/gmp/lib/:$LD_LIBRARY_PATH
export PATH=$GAUSSHOME/bin:$GCC_PATH/gcc/bin:$PATH

#esc :wq退出后，在终端执行命令，使之立即生效
source ~/.bash_profile
#或者
source ~/.bashrc
```

5.编译安装

```
#在/home/omm/目录下
#可用omm用户

cd openGauss-server/

#编译debug版本
./configure  --prefix=/opt/og --3rd=/home/omm/binarylibs --gcc-version=7.3.0 CC=g++ CFLAGS='-O0' --enable-debug --enable-cassert --enable-thread-safety --with-readline --without-zlib

make
#make之后看到All of openGauss successfully made. Ready to install.表示对makefile文件操作成功

#在omm用户环境下，能够执行make install就直接执行make install
#否则，切换root用户
#如果make install命令出错，可以把环境变量配置到root用户的/etc/profile文件中，然后
#source /etc/profile
make install
#make install之后看到openGauss installation complete.表示安装完成
```

安装完成后，可以执行gsql --version查看版本

```
[omm@localhost openGauss-server]$ /opt/og/bin/gsql --version
gsql (GaussDB Kernel V500R002C00 build ) compiled at 2021-11-11 10:12:35 commit 0 last mr  debug
```

6.数据库初始化

```
#数据库初始化，用户密码必须包含三种字符类型且长度大于8
gs_initdb --nodename=master_5432 --pgdata=/opt/ogdata --encoding=UTF-8 --locale=en_US.UTF-8 --dbcompatibility='A' --username=omm --pwpasswd=Mypwd123
```

```
[omm@localhost openGauss-server]$ gs_initdb --nodename=master_5432 --pgdata=/opt/ogdata --encoding=UTF-8 --locale=en_US.UTF-8 --dbcompatibility='A' --username=omm --pwpasswd=Mypwd123
The files belonging to this database system will be owned by user "omm".
This user must also own the server process.

The database cluster will be initialized with locale "en_US.UTF-8".
The default text search configuration will be set to "english".

fixing permissions on existing directory /opt/ogdata ... ok
creating subdirectories ... ok
selecting default max_connections ... 100
selecting default shared_buffers ... 32MB
creating configuration files ... ok
Begin init undo subsystem meta.
[INIT UNDO] Init undo subsystem meta successfully.
creating template1 database in /opt/ogdata/base/1 ... The core dump path is an invalid directory
2021-11-11 17:21:28.579 [unknown] [unknown] localhost 140080647678400 0[0:0#0]
[BACKEND] WARNING:  macAddr is 12/689392226, sysidentifier is 796951/1247982417, randomNum is 537899857
ok
initializing pg_authid ... ok
setting password ... ok
initializing dependencies ... ok
loading PL/pgSQL server-side language ... ok
creating system views ... ok
creating performance views ... ok
loading system objects' descriptions ... ok
creating collations ... ok
creating conversions ... ok
creating dictionaries ... ok
setting privileges on built-in objects ... ok
initialize global configure for bucketmap length ... ok
creating information schema ... ok
loading foreign-data wrapper for distfs access ... ok
loading foreign-data wrapper for hdfs access ... ok
loading foreign-data wrapper for log access ... ok
loading hstore extension ... ok
loading security plugin ... ok
update system tables ... ok
creating snapshots catalog ... ok
```

```
vacuuming database template1 ... ok
copying template1 to template0 ... ok
copying template1 to postgres ... ok
freezing database template0 ... ok
freezing database template1 ... ok
freezing database postgres ... ok

WARNING: enabling "trust" authentication for local connections
You can change this by editing pg_hba.conf or using the option -A, or
--auth-local and --auth-host, the next time you run gs_initdb.

Success. You can now start the database server of single node using:

    gaussdb -D /opt/ogdata --single_node
or
    gs_ctl start -D /opt/ogdata -Z single_node -l logfile
```

7.启动服务

```
/opt/og/bin/gs_ctl start -D /opt/ogdata
```

```
[omm@localhost openGauss-server]$ /opt/og/bin/gs_ctl start -D /opt/ogdata
[2021-11-11 17:35:05.007][59714][][gs_ctl]: gs_ctl started,datadir is
/opt/ogdata
[2021-11-11 17:35:05.071][59714][][gs_ctl]: waiting for server to start...
.0 LOG:  [Alarm Module]can not read GAUSS_WARNING_TYPE env.

0 LOG:  [Alarm Module]Host Name: localhost.localdomain

0 LOG:  [Alarm Module]Host IP: 127.0.0.1

0 LOG:  [Alarm Module]Get ENV GS_CLUSTER_NAME failed!

0 LOG:  [Alarm Module]Invalid data in AlarmItem file! Read alarm English name
failed! line: 55

0 WARNING:  failed to open feature control file, please check whether it exists:
FileName=gaussdb.version, Errno=2, Errmessage=No such file or directory.
0 WARNING:  failed to parse feature control file: gaussdb.version.
0 WARNING:  Failed to load the product control file, so gaussdb cannot
distinguish product version.
The core dump path is an invalid directory
2021-11-11 17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  when starting as multi_standby mode, we couldn't support data
replicaton.
gaussdb.state does not exist, and skipt setting since it is optional.2021-11-11
17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]  0 [BACKEND]
LOG:  [Alarm Module]can not read GAUSS_WARNING_TYPE env.

2021-11-11 17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  [Alarm Module]Host Name: localhost.localdomain

2021-11-11 17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  [Alarm Module]Host IP: 127.0.0.1
```

```
2021-11-11 17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  [Alarm Module]Get ENV GS_CLUSTER_NAME failed!

2021-11-11 17:35:05.244 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  [Alarm Module]Invalid data in AlarmItem file! Read alarm
English name failed! line: 55

2021-11-11 17:35:05.249 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  loaded library "security_plugin"
2021-11-11 17:35:05.250 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] WARNING:  could not create any HA TCP/IP sockets
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] WARNING:  No explicit IP is configured for listen_addresses GUC.
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  InitNuma numaNodeNum: 1 numa_distribute_mode: none
inheritThreadPool: 0.
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  reserved memory for backend threads is: 220 MB
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  reserved memory for WAL buffers is: 128 MB
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  Set max backend reserve memory is: 348 MB, max dynamic memory
is: 11069 MB
2021-11-11 17:35:05.253 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  shared memory 358 Mbytes, memory context 11417 Mbytes, max
process memory 12288 Mbytes
2021-11-11 17:35:05.278 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [CACHE] LOG:  set data cache  size(402653184)
2021-11-11 17:35:05.296 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [CACHE] LOG:  set metadata cache  size(134217728)
2021-11-11 17:35:05.320 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [SEGMENT_PAGE] LOG:  Segment-page constants: DF_MAP_SIZE: 8156, DF_MAP_BIT_CNT:
65248, DF_MAP_GROUP_EXTENTS: 4175872, IPBLOCK_SIZE: 8168, EXTENTS_PER_IPBLOCK:
1021, IPBLOCK_GROUP_SIZE: 4090, BMT_HEADER_LEVEL0_TOTAL_PAGES: 8323072,
BktMapEntryNumberPerBlock: 2038, BktMapBlockNumber: 25, BktBitMaxMapCnt: 512
2021-11-11 17:35:05.371 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  gaussdb: fsync file "/opt/ogdata/gaussdb.state.temp" success
2021-11-11 17:35:05.390 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  create gaussdb state file success: db state(STARTING_STATE),
server mode(Normal)
2021-11-11 17:35:05.600 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  max_safe_fds = 977, usable_fds = 1000, already_open = 13
The core dump path is an invalid directory
2021-11-11 17:35:05.621 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  user configure file is not found, it will be created.
2021-11-11 17:35:05.630 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  the configure file /opt/og/etc/gscgroup_omm.cfg doesn't exist
or the size of configure file has changed. Please create it by root user!
2021-11-11 17:35:05.630 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [BACKEND] LOG:  Failed to parse cgroup config file.
2021-11-11 17:35:05.698 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] WARNING:  Failed to obtain environment value $GAUSSLOG!
2021-11-11 17:35:05.698 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] DETAIL:  N/A
2021-11-11 17:35:05.698 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] CAUSE:  Incorrect environment value.
2021-11-11 17:35:05.698 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] ACTION:  Please refer to backend log for more details.
```

```
2021-11-11 17:35:05.701 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] WARNING:  Failed to obtain environment value $GAUSSLOG!
2021-11-11 17:35:05.701 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] DETAIL:  N/A
2021-11-11 17:35:05.701 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] CAUSE:  Incorrect environment value.
2021-11-11 17:35:05.701 [unknown] [unknown] localhost 140623308097984 0[0:0#0]
0 [EXECUTOR] ACTION:  Please refer to backend log for more details.

[2021-11-11 17:35:06.137][59714][][gs_ctl]:  done
[2021-11-11 17:35:06.137][59714][][gs_ctl]: server started (/opt/ogdata)
```

使用omm用户登陆postgres数据库

```
/opt/og/bin/gsql -p 5432 -Uomm postgres
```

```
[omm@localhost openGauss-server]$ /opt/og/bin/gsql -p 5432 -Uomm postgres
gsql ((GaussDB Kernel V500R002C00 build ) compiled at 2021-11-11 10:12:35 commit
0 last mr  debug)
Non-SSL connection (SSL connection is recommended when requiring high-security)
Type "help" for help.

openGauss=#
```

三、参考资料

更具体的安装过程以及对openGauss数据库更深入的了解，请参考官网的官方文档：

[Quickstart | openGauss]