

Pgbench on PolarDB-Oracle (PolarDB-Postgresql)

今回はPgbenchのベンチマークテストをご紹介します、テスト対象はPolarDB-Oracleです (PolarDB-Postgresqlも同じテスト方法で実行します)

概要

本文章はPgbenchでPolarDB-Oracleをテストする方法をご紹介します。

1 Pgbench環境を準備する

2 PolarDB-Oracleを性能測定する

1 Pgbench環境を準備する

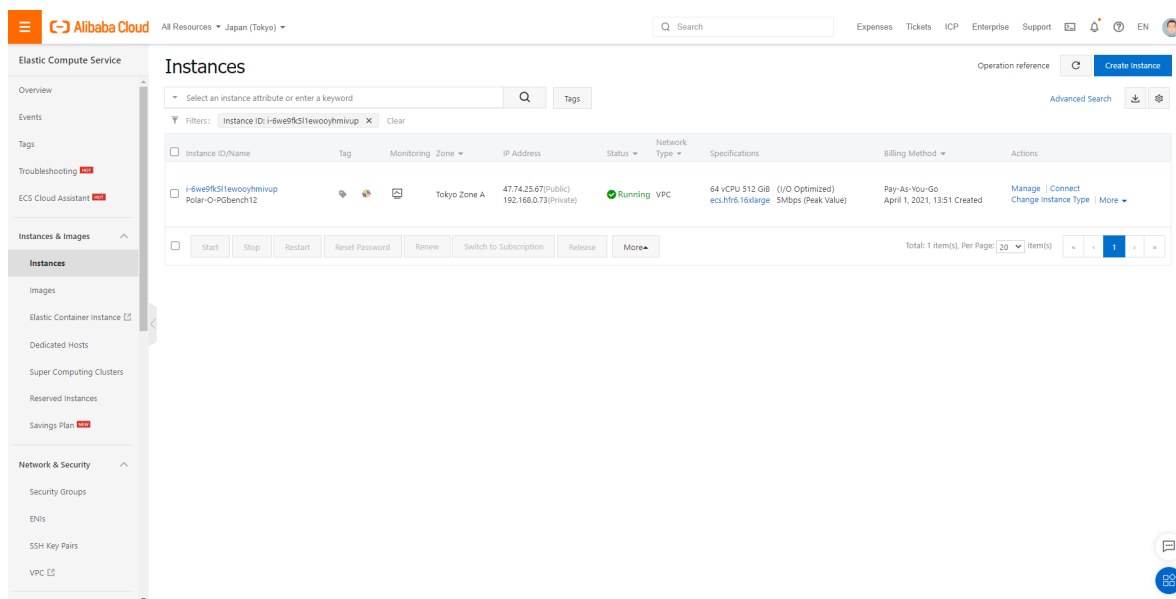
Pgbenchとは

Pgbench はPostgreSQLのベンチマークテストに用いられるプログラムです。

ECSでPgbench環境を用意する

1) ECSインスタンスを作成する

ECS:
Specifications: 64 vCPU 512 GiB ecs.r5.16xlarge
OS: CentOS 7.7 64-bit



2) ECSでPgbench環境をインストールする

①下記コマンドを実行し、ECSでpostgresql-12をインストールする

```
# Install the repository RPM:
```

```
sudo yum install -y https://download.postgresql.org/pub/repos/yum/reporpms/EL-7-x86_64/pgdg-redhat-repo-latest.noarch.rpm
```

```
# Install PostgreSQL:
```

```
sudo yum install -y postgresql12-server
```

```
# Optionally initialize the database and enable automatic start:
```

```
sudo /usr/pgsql-12/bin/postgresql-12-setup initdb
```

```
Welcome to Alibaba Cloud Elastic Compute Service !

[root@izwe9fk3lweoyhmivuz ~]# clear
[root@izwe9fk3lweoyhmivuz ~]# pwd
/root
[root@izwe9fk3lweoyhmivuz ~]# mkdir pgbench
[root@izwe9fk3lweoyhmivuz ~]# ll
total 4
drwxr-xr-x 2 root root 4096 Apr 11 13:53 pgbench
[root@izwe9fk3lweoyhmivuz ~]# cd pgbench/
[root@izwe9fk3lweoyhmivuz pgbench]# ll
total 0
[root@izwe9fk3lweoyhmivuz pgbench]# ll
total 0
[root@izwe9fk3lweoyhmivuz pgbench]# clear
[root@izwe9fk3lweoyhmivuz pgbench]# ll
total 0
[root@izwe9fk3lweoyhmivuz pgbench]# cd ..
[root@izwe9fk3lweoyhmivuz ~]# clear
[root@izwe9fk3lweoyhmivuz ~]# sudo yum install -y https://download.postgresql.org/pub/repos/yum/reporpms/EL-7-x86_64/pgdg-redhat-repo-latest.noarch.rpm
Loaded plugins: fastestmirror
pgdg-redhat-repo-latest.noarch.rpm
Examining /var/tmp/yum-root/f60b/pgdg-redhat-repo-latest.noarch.rpm: pgdg-redhat-repo-42.0-14.noarch
Running /var/tmp/yum-root/f60b/pgdg-redhat-repo-latest.noarch.rpm to be installed
Resolving Dependencies
--> Running transaction check
--> Package pgdg-redhat-repo-42.0-14 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Package Arch Version Repository Size
--
Installing:
pgdg-redhat-repo noarch 42.0-14 /pgdg-redhat-repo-latest.noarch 11 k

Transaction Summary
--
Install 1 Package

Total size: 11 k
Installed size: 11 k
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running Transaction
Warning: RPMDB altered outside of yum.
Installing : pgdg-redhat-repo-42.0-14.noarch
Verifying : pgdg-redhat-repo-42.0-14.noarch

Installed:
pgdg-redhat-repo.noarch 0:42.0-14

Complete!
```

```
Complete!
[root@izwe9fk3lweoyhmivuz ~]# sudo yum install -y postgresql12-server
Loaded plugins: fastestmirror
Determining fastest mirrors
base | 3.6 kB 00:00:00
epel | 4.7 kB 00:00:00
extras | 2.9 kB 00:00:00
pgdg-common | 3.6 kB 00:00:00
pgdg11 | 3.6 kB 00:00:00
pgdg12 | 3.6 kB 00:00:00
pgdg13 | 3.6 kB 00:00:00
pgdg95 | 3.6 kB 00:00:00
pgdg96 | 3.6 kB 00:00:00
updates | 2.9 kB 00:00:00
(1/20): base7f/x86_64/primary.db | 6.1 MB 00:00:00
(2/20): base7f/x86_64/group.gz | 153 kB 00:00:00
(3/20): epel/x86_64/group.gz | 96 kB 00:00:00
(4/20): epel/x86_64/updates.db | 1.0 MB 00:00:00
(5/20): extras7f/x86_64/primary.db | 230 kB 00:00:00
(6/20): epel/x86_64/primary.db | 6.9 MB 00:00:00
(7/20): pgdg107f/x86_64/group.gz | 245 B 00:00:00
(8/20): pgdg127f/x86_64/group.gz | 245 B 00:00:00
(9/20): pgdg-common7f/x86_64/primary.db | 125 kB 00:00:01
(10/20): pgdg117f/x86_64/group.gz | 245 B 00:00:01
(11/20): pgdg117f/x86_64/primary.db | 527 kB 00:00:01
(12/20): pgdg137f/x86_64/group.gz | 246 B 00:00:00
(13/20): pgdg957f/x86_64/group.gz | 249 B 00:00:00
(14/20): pgdg127f/x86_64/primary.db | 188 kB 00:00:00
(15/20): pgdg967f/x86_64/group.gz | 249 B 00:00:00
(16/20): pgdg97f/x86_64/primary.db | 272 kB 00:00:00
(17/20): pgdg967f/x86_64/primary.db | 303 kB 00:00:00
(18/20): updates7f/x86_64/primary.db | 6.5 MB 00:00:00
(19/20): pgdg137f/x86_64/primary.db | 96 kB 00:00:00
(20/20): pgdg117f/x86_64/primary.db | 309 kB 00:00:02
Resolving Dependencies
--> Running transaction check
--> Package postgresql12-server.x86_64 0:12.6-IPDG.rhel7 will be installed
--> Processing Dependency: postgresql12-libs(x86-64) = 12.6-IPDG.rhel7 for package: postgresql12-server-12.6-IPDG.rhel7.x86_64
--> Processing Dependency: libicu.so.51(64bit) for package: postgresql12-server-12.6-IPDG.rhel7.x86_64
--> Processing Dependency: libicu.so.50(64bit) for package: postgresql12-server-12.6-IPDG.rhel7.x86_64
--> Processing Dependency: libicu.so.50(64bit) for package: postgresql12-server-12.6-IPDG.rhel7.x86_64
--> Running transaction check
--> Package libicu.x86_64 0:50.2-4.el7 will be installed
--> Package postgresql12-libs.x86_64 0:12.6-IPDG.rhel7 will be installed
--> Package postgresql12-libs.x86_64 0:12.6-IPDG.rhel7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Package Arch Version Repository Size
--
Installing:
postgresql12-server x86_64 12.6-IPDG.rhel7 pgdg12 5.1 M
Installing for dependencies:
libicu x86_64 50.2-4.el7.7 base 6.9 M
```

```
--> Finished Dependency Resolution

Dependencies Resolved

Package Arch Version Repository Size
--
Installing:
postgresql12-server x86_64 12.6-IPDG.rhel7 pgdg12 5.1 M
Installing for dependencies:
libicu x86_64 50.2-4.el7.7 base 6.9 M
postgresql12 x86_64 12.6-IPDG.rhel7 pgdg12 1.6 M
postgresql12-libs x86_64 12.6-IPDG.rhel7 pgdg12 370 k

Transaction Summary
--
Install 1 Package (+3 Dependent packages)

Total download size: 14 M
Installed size: 54 M
Downloading packages:
(1/4): libicu-50.2-4.el7.7.x86_64.rpm | 6.9 MB 00:00:00
warning: /var/cache/yum/x86_64/7/pgdg12/packages/postgresql12-libs-12.6-IPDG.rhel7.x86_64.rpm: Header V4 DSA/SHA1 Signature, key ID 442df0f8: NOKEY
Public key for postgresql12-libs-12.6-IPDG.rhel7.x86_64.rpm is not installed
(2/4): postgresql12-libs-12.6-IPDG.rhel7.x86_64.rpm | 151 kB/s | 7.1 MB 00:00:45 ETA
(3/4): postgresql12-server-12.6-IPDG.rhel7.x86_64.rpm | 370 kB 00:00:01
(4/4): postgresql12-12.6-IPDG.rhel7.x86_64.rpm | 1.6 MB 00:00:03
Total | 4.0 MB/s | 14 MB 00:00:03
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-PDG
Importing GPG key 0x442df0f8:
Userid : "PostgreSQL RPM Building Project [pgdg@rpmhackers.pgfoundry.org]"
Fingerprint: 0x00 0x37 0x05 0x74 0x70 0x10 0x20 0x42 0x60
Package : pgdg-redhat-repo-42.0-14.noarch (/pgdg-redhat-repo-latest.noarch)
From : /etc/pki/rpm-gpg/RPM-GPG-KEY-PDG
Running transaction check
Running transaction test
Transaction test succeeded
Running Transaction
Installing : postgresql12-libs-12.6-IPDG.rhel7.x86_64 1/4
Installing : libicu-50.2-4.el7.7.x86_64 2/4
Installing : postgresql12-12.6-IPDG.rhel7.x86_64 3/4
Installing : postgresql12-server-12.6-IPDG.rhel7.x86_64 4/4
Verifying : libicu-50.2-4.el7.7.x86_64 1/4
Verifying : postgresql12-libs-12.6-IPDG.rhel7.x86_64 3/4
Verifying : postgresql12-server-12.6-IPDG.rhel7.x86_64 3/4
Verifying : postgresql12-12.6-IPDG.rhel7.x86_64 4/4

Installed:
postgresql12-server.x86_64 0:12.6-IPDG.rhel7

Dependency Installed:
libicu.x86_64 0:50.2-4.el7.7 postgresql12.x86_64 0:12.6-IPDG.rhel7 postgresql12-libs.x86_64 0:12.6-IPDG.rhel7

Complete!
[root@izwe9fk3lweoyhmivuz ~]# sudo /usr/pgsql-12/bin/postgresql-12-setup initdb
Initializing database ... OK
```

②Postgresql-12を起動する

```
sudo systemctl enable postgresql-12
sudo systemctl start postgresql-12
sudo systemctl status postgresql-12
```

```

[root@Zwe9F5S1lwoeyhiv2 ~]# sudo systemctl enable postgresql-12
Created symlink from /etc/systemd/system/multi-user.target.wants/postgresql-12.service to /usr/lib/systemd/system/postgresql-12.service.
[root@Zwe9F5S1lwoeyhiv2 ~]# sudo systemctl start postgresql-12
bash: systemctl: command not found
[root@Zwe9F5S1lwoeyhiv2 ~]# sudo systemctl status postgresql-12
● postgresql-12.service - PostgreSQL 12 database server
   Loaded: /usr/lib/systemd/system/postgresql-12.service; enabled; vendor preset: disabled
   Active: active (running) since Thu 2021-04-01 15:14:41 CST; 27s ago
     Docs: https://www.postgresql.org/docs/12/
   Process: 14296 ExecStartPre=/usr/pgsql-12/bin/postgresql-12-check-db-dir ($PGDATA, code=exited, status=0/SUCCESS)
   Main PID: 14297 (postgres)
   CGroup: /system.slice/postgresql-12.service
           └─ 14297 /usr/pgsql-12/bin/postmaster -D /var/lib/pgsql/12/data/
               ├─ 14298 postgres: logger
               ├─ 14296 postgres: checkpoint
               ├─ 14297 postgres: background writer
               ├─ 14296 postgres: walwriter
               ├─ 14296 postgres: autovacuum launcher
               └─ 14300 postgres: stats collector
               └─ 14301 postgres: logical replication launcher

Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 systemd[1]: Starting PostgreSQL 12 database server...
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 systemd[1]: Starting PostgreSQL(14297): 2021-04-01 15:14:41.821 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.822 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.822 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.822 CST [14297] HINT:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.823 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.826 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.835 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 postmaster[14297]: 2021-04-01 15:14:41.835 CST [14297] LOG:
Apr 01 15:14:41 postgresql-12@Zwe9F5S1lwoeyhiv2 systemd[1]: Started PostgreSQL 12 database server.
[root@Zwe9F5S1lwoeyhiv2 ~]# ll
total 4
drwxr-xr-x 2 root root 4096 Apr 1 11:53 pgbench
[root@Zwe9F5S1lwoeyhiv2 ~]# cd /usr
[root@Zwe9F5S1lwoeyhiv2 ~]# ll
total 68
dr-xr-xr-x. 2 root root 20480 Apr 1 15:16 bin
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 etc
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 games
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 include
dr-xr-xr-x. 26 root root 4096 Apr 26 20:20 lib
dr-xr-xr-x. 39 root root 20480 Apr 1 15:16 lib64
drwxr-xr-x. 25 root root 4096 Apr 26 20:20 libexec
drwxr-xr-x. 13 root root 4096 Apr 26 20:20 local
drwxr-xr-x. 5 root root 4096 Apr 1 15:14 pgsql-12
drwxr-xr-x. 2 root root 12288 Apr 1 15:15 sbin
drwxr-xr-x. 7 root root 4096 Apr 26 20:20 share
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 src
drwxr-xr-x. 17 root root 4096 Apr 26 20:20 tap ->
[root@Zwe9F5S1lwoeyhiv2 ~]# cd /usr -> postgres
bash-4.2$ vi .bash_profile
bash-4.2$ exit
logout
[root@Zwe9F5S1lwoeyhiv2 ~]# ll pgbench -v
total 4
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 etc
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 games
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 include
dr-xr-xr-x. 26 root root 4096 Apr 26 20:20 lib
dr-xr-xr-x. 39 root root 20480 Apr 1 15:16 lib64
drwxr-xr-x. 25 root root 4096 Apr 26 20:20 libexec
drwxr-xr-x. 13 root root 4096 Apr 26 20:20 local
drwxr-xr-x. 5 root root 4096 Apr 1 15:14 pgsql-12
drwxr-xr-x. 2 root root 12288 Apr 1 15:15 sbin
drwxr-xr-x. 7 root root 4096 Apr 26 20:20 share
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 src
drwxr-xr-x. 17 root root 4096 Apr 26 20:20 tap ->
[root@Zwe9F5S1lwoeyhiv2 ~]# cd /usr -> postgres
bash-4.2$ vi .bash_profile
bash-4.2$ exit
logout
[root@Zwe9F5S1lwoeyhiv2 ~]# ll pgbench -v
total 4
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 etc
drwxr-xr-x. 2 root root 4096 Apr 11 20:18 games
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 include
dr-xr-xr-x. 26 root root 4096 Apr 26 20:20 lib
dr-xr-xr-x. 39 root root 20480 Apr 1 15:16 lib64
drwxr-xr-x. 25 root root 4096 Apr 26 20:20 libexec
drwxr-xr-x. 13 root root 4096 Apr 26 20:20 local
drwxr-xr-x. 5 root root 4096 Apr 1 15:14 pgsql-12
drwxr-xr-x. 2 root root 12288 Apr 1 15:15 sbin
drwxr-xr-x. 7 root root 4096 Apr 26 20:20 share
drwxr-xr-x. 4 root root 4096 Apr 26 20:20 src
drwxr-xr-x. 17 root root 4096 Apr 26 20:20 tap ->

```

③bash_profileを設定する

```
su - postgres
vi .bash_profile
export PS1="$USER@`/bin/hostname -s`-> "
export LANG=en_US.utf8
export PGHOME=/usr/pgsql-12
export
LD_LIBRARY_PATH=$PGHOME/lib:/lib64:/usr/lib64:/usr/local/lib64:/lib:/usr/lib:/usr
r/local/lib:$LD_LIBRARY_PATH
export DATE=`date +"%Y%m%d%H%M"`
export PATH=$PGHOME/bin:$PATH:.
export MANPATH=$PGHOME/share/man:$MANPATH
alias rm='rm -i'
alias ll='ls -lh'
unalias vi
```

```
| | Polar Q-Package v12.6 |
```

```
# if /etc/profile ] && source /etc/profile  
PQDATA=/usr/lib/ppsql/12/data  
export PQDATA  
# If you want to customize your settings,  
# use the file below. This is not overridden  
# by the user.  
if [ -f /usr/lib/ppsql/.ppsql_profile ] && source /usr/lib/ppsql/.ppsql_profile  
  
-- INSERT --
```

```

[ -f /etc/profile ] && source /etc/profile
PGDATA=/usr/lib/pgsql12/data
export PGDATA
# If you want to customize your settings,
# use the file below. This is not overridden
# by the PGC.
[ -f /usr/lib/pgsql12/pgsql_profile ] && source /usr/lib/pgsql12/pgsql_profile
export PSL="PSQL=/bin/hostname -s -> "
export LANG=en_US.utf8
export PGHOME=/usr/pgsql-12
export LD_LIBRARY_PATH=/usr/lib64:/usr/local/lib64:/lib:/usr/lib:/usr/local/lib:$LD_LIBRARY_PATH
export PATH=/usr/pgsql-12/bin:$PATH
export MANPATH=/usr/share/man:$MANPATH
alias mv='mv -i'
alias ll='ls -lh'
unalias vi

```

```

1 Polar-O-Postgresql12.6
[root@iz6we9fk51lewooyhmivupZ usr]# su - postgres
-bash-4.2$ vi .bash_profile
-bash-4.2$ exit
logout

```

④Postgresqlはデフォルトで/usr/pgsql-12/binにインストールされている、Pathを追加する

```

[root@iz6we9fk51lewooyhmivupZ ~]# /etc/profile
-bash: /etc/profile: Permission denied
[root@iz6we9fk51lewooyhmivupZ ~]# chmod 755 /etc/profile
[root@iz6we9fk51lewooyhmivupZ ~]# /etc/profile
[root@iz6we9fk51lewooyhmivupZ ~]# export PATH=$PATH:/usr/pgsql-12/bin
[root@iz6we9fk51lewooyhmivupZ ~]# pgbench --version
pgbench (PostgreSQL) 12.6

```

```

[root@iz6we9fk51lewooyhmivupZ ~]# /etc/profile
-bash: /etc/profile: Permission denied
[root@iz6we9fk51lewooyhmivupZ ~]# chmod 755 /etc/profile
[root@iz6we9fk51lewooyhmivupZ ~]# /etc/profile
[root@iz6we9fk51lewooyhmivupZ ~]# export PATH=$PATH:/usr/pgsql-12/bin
[root@iz6we9fk51lewooyhmivupZ ~]# pgbench --version
pgbench (PostgreSQL) 12.6

```

ここまでPgbenchがインストール完了しました

下記のサイトをご参照ください

https://help.aliyun.com/document_detail/118338.html

<https://www.postgresql.org/download/linux/redhat/>

2 PolarDB-Oracleを性能測定する

1) PolarDB-Oracleインスタンスを作成する

PolarDB-Oracle

Specifications:polar.o.x4.xlarge 8Core32GB

Primary Endpoints:Pgbenchデータ用意するときはこのホストで接続します

Cluster / Overview

← 8Core32GB | pc-0iwl1g88n9xcz3s3g **Running**

[Log On to Database](#) [Create GDN](#) [Migrate Data to Current Cluster](#) [Clone Cluster](#) [Synchronize Data...](#) [Refresh](#)

Overview

Settings and Management

- Whitelists
- Security Management
- Accounts
- Databases
- Backup and Restore
- Parameters

Diagnostics and Optimization

- Diagnosis
- Monitoring
- Slow SQL Query
- Log and Audit
- SQL Explorer

Region: Japan (Tokyo)

Zones: Tokyo Zone A

Compatibility: Compatible with Oracle Syntax

VPC: vpc-6we4b6gbyr91ahprf59

VSwitch: vsw-6we4b6gbyr91ahprf59

Billing Method: Pay-as-you-go

Created At: Mar 29, 2021, 13:59:00

Maintenance Window: 02:00-03:00 [Modify](#)

GDN: --

Endpoints

Endpoint Type	Internal	Public	Read and Write
Internal	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521
Public	None	None	None

[+ Create Custom Cluster Endpoint](#)

Database Nodes

Node Type	Node Name	Node Status
Writer	Writer 8-Core 32 GB	Running
Reader	Reader1 8-Core 32 GB	Running

[± Add/Remove Node](#) [Change Configurations](#)

Distributed Database Storage

Database Storage Usage: 258.78 GB

[Billing Details](#)

Cluster Endpoints:Pgbenchテストするときはこのホストで接続します

Cluster / Overview

← 8Core32GB | pc-0iwl1g88n9xcz3s3g **Running**

[Log On to Database](#) [Create GDN](#) [Migrate Data to Current Cluster](#) [Clone Cluster](#) [Synchronize Data...](#) [Refresh](#)

Overview

Settings and Management

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Region: Japan (Tokyo)

Zones: Tokyo Zone A

Compatibility: Compatible with Oracle Syntax

VPC: vpc-6we4b6gbyr91ahprf59

VSwitch: vsw-6we4b6gbyr91ahprf59

Billing Method: Pay-as-you-go

Created At: Mar 29, 2021, 13:59:00

Maintenance Window: 02:00-03:00 [Modify](#)

GDN: --

Endpoints

Endpoint Type	Internal	Public	Read and Write
Internal	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521	pc-0iwl1g88n9xcz3s3g.o-polardb-japan.rds.aliyuncs.com:1521
Public	None	None	None

[+ Create Custom Cluster Endpoint](#)

Database Nodes

Node Type	Node Name	Node Status
Writer	Writer 8-Core 32 GB	Running
Reader	Reader1 8-Core 32 GB	Running

[± Add/Remove Node](#) [Change Configurations](#)

Distributed Database Storage

Database Storage Usage: 258.78 GB

[Billing Details](#)

Cluster / Whitelists

← 8Core32GB | pc-0iw1lg88n9xc...

Running

Log On to Database

Create GDN

Migrate Data to Current Cluster

Clone Cluster

Synchronize Data...

Upgrade to Latest Version

Refresh

Overview

Settings and Management

Whitelists

Security Management

Accounts

Databases

Backup and Restore

Parameters

Diagnostics and Optimization

Diagnosis

Monitoring

Slow SQL Query

Log and Audit

SQL Explorer

IP List

Add IP Whitelist

~ default

Modify

Delete

192.168.0.73

192.168.0.66

192.168.0.71

Security Groups

Type	Name	Content	Actions
		No Data	

Cluster / Accounts

← 8Core32GB | pc-0iw1lg88n9xcz3s3g

Running

Log On to Database

Create GDN

Migrate Data to Current Cluster

Clone Cluster

Synchronize Data...

Refresh

Create Account

Customize Permissions

Fuzzy Match (Current Page)

Enter an account name

Account Name	Status	Description	Type	Lock Status	Actions
obtest	Active		Privileged Account		Change Password Delete

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Settings and Management

Whitelists

Security Management

Accounts

Databases

Backup and Restore

Parameters

Diagnostics and Optimization

Diagnosis

Monitoring

Slow SQL Query

Log and Audit

SQL Explorer

Cluster / Databases

← 8Core32GB | pc-0iw1lg88n9xc...

Running

Log On to Database

Create GDN

Migrate Data to Current Cluster

Clone Cluster

Synchronize Data...

Upgrade to Latest Version

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DBLinks

Create Database

Fuzzy Match (Current Page)

Enter a database name

Q

Database Name	Status	Character Set	Owner	Actions
pgtest	Running	UTF8	sbtest	SQL Query Delete

①Pathを設定:

```
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGHOST=pc-0iw1lg88n9xcz3s3g.o.polardb.japan.rds.aliyuncs.com
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGPORT=1521
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGDATABASE=pgtest
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGUSER=sbtest
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGPASSWORD=Test1234
[root@iz6we9fk511ewooyhmivupZ prepare]# pgbench --version
pgbench (PostgreSQL) 12.6
```

```
[root@iz6we9fk511ewooyhmivupZ prepare]# clear
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGHOST=pc-0iw1lg88n9xcz3s3g.o.polardb.japan.rds.aliyuncs.com
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGPORT=1521
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGDATABASE=pgtest
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGUSER=sbtest
[root@iz6we9fk511ewooyhmivupZ prepare]# export PGPASSWORD=Test1234
[root@iz6we9fk511ewooyhmivupZ prepare]# pgbench --version
pgbench (PostgreSQL) 12.6
```

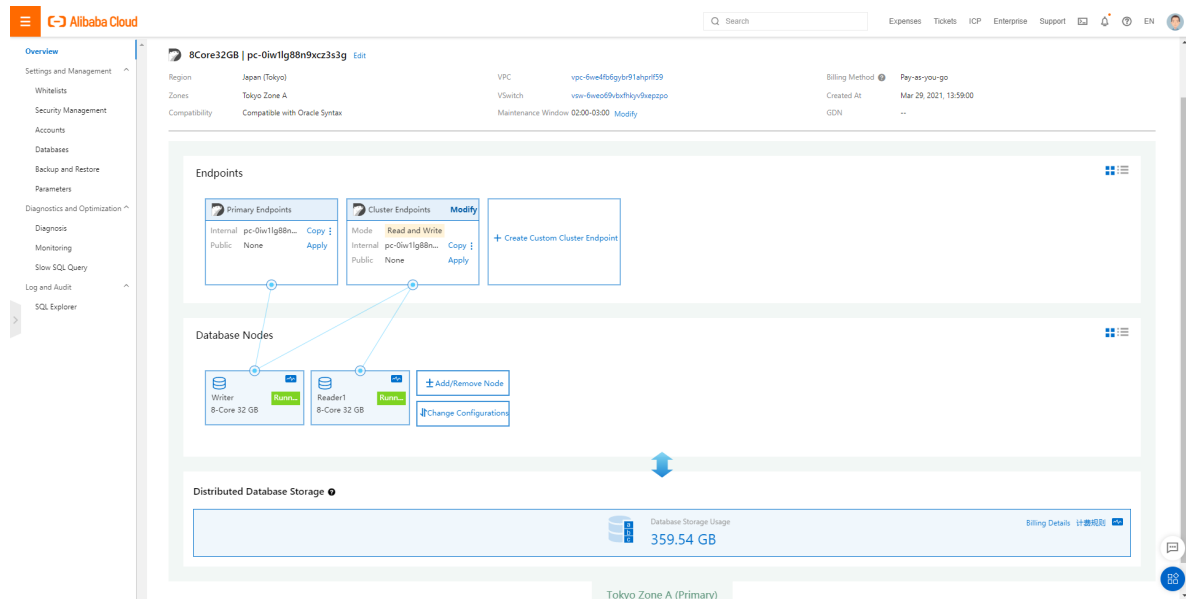
②pgbenchで20億のデータをデータベースpgtestに初期化する

```
[root@iz6we9fk511ewooyhmivupZ prepare]# pwd
/root/pgbench/prepare
[root@iz6we9fk511ewooyhmivupZ prepare]# ll
total 0
[root@iz6we9fk511ewooyhmivupZ prepare]# nohup pgbench -i -s 20000 2>&1&
[1] 14688
[root@iz6we9fk511ewooyhmivupZ prepare]# nohup: ignoring input and appending output to 'nohup.out'
^C
[root@iz6we9fk511ewooyhmivupZ prepare]# ll
total 4
-rw-r--r-- 1 root root 295 Apr  1 16:28 nohup.out
[root@iz6we9fk511ewooyhmivupZ prepare]# tail -f nohup.out
517400000 of 2000000000 tuples (25%) done (elapsed 2837.28 s, remaining 8130.18 s)
517500000 of 2000000000 tuples (25%) done (elapsed 2837.79 s, remaining 8129.51 s)
517600000 of 2000000000 tuples (25%) done (elapsed 2838.28 s, remaining 8128.80 s)
517700000 of 2000000000 tuples (25%) done (elapsed 2838.75 s, remaining 8128.03 s)
517800000 of 2000000000 tuples (25%) done (elapsed 2839.24 s, remaining 8127.31 s)
517900000 of 2000000000 tuples (25%) done (elapsed 2839.71 s, remaining 8126.53 s)
```

```
[root@iz6we9fk511ewooyhmivupZ prepare]# pgbench --version
pgbench (PostgreSQL) 12.6
[root@iz6we9fk511ewooyhmivupZ prepare]# pwd
/root/pgbench/prepare
[root@iz6we9fk511ewooyhmivupZ prepare]# ll
total 0
[1] 14688
[root@iz6we9fk511ewooyhmivupZ prepare]# nohup pgbench -i -s 20000 2>&1&
[root@iz6we9fk511ewooyhmivupZ prepare]# nohup: ignoring input and appending output to 'nohup.out'
^C
[root@iz6we9fk511ewooyhmivupZ prepare]# ll
total 4
-rw-r--r-- 1 root root 295 Apr  1 16:28 nohup.out
[root@iz6we9fk511ewooyhmivupZ prepare]# tail -f nohup.out
517400000 of 2000000000 tuples (25%) done (elapsed 2837.28 s, remaining 8130.18 s)
517500000 of 2000000000 tuples (25%) done (elapsed 2837.79 s, remaining 8129.51 s)
517600000 of 2000000000 tuples (25%) done (elapsed 2838.28 s, remaining 8128.80 s)
517700000 of 2000000000 tuples (25%) done (elapsed 2838.75 s, remaining 8128.03 s)
517800000 of 2000000000 tuples (25%) done (elapsed 2839.24 s, remaining 8127.31 s)
517900000 of 2000000000 tuples (25%) done (elapsed 2839.71 s, remaining 8126.53 s)
518000000 of 2000000000 tuples (25%) done (elapsed 2840.19 s, remaining 8125.81 s)
518100000 of 2000000000 tuples (25%) done (elapsed 2840.69 s, remaining 8125.11 s)
518200000 of 2000000000 tuples (25%) done (elapsed 2841.17 s, remaining 8124.38 s)
518300000 of 2000000000 tuples (25%) done (elapsed 2841.64 s, remaining 8123.61 s)
518400000 of 2000000000 tuples (25%) done (elapsed 2842.20 s, remaining 8123.06 s)
518500000 of 2000000000 tuples (25%) done (elapsed 2842.72 s, remaining 8122.46 s)
518600000 of 2000000000 tuples (25%) done (elapsed 2843.38 s, remaining 8122.23 s)
518700000 of 2000000000 tuples (25%) done (elapsed 2844.11 s, remaining 8122.19 s)
518800000 of 2000000000 tuples (25%) done (elapsed 2844.82 s, remaining 8122.10 s)
518900000 of 2000000000 tuples (25%) done (elapsed 2845.55 s, remaining 8122.07 s)
519000000 of 2000000000 tuples (25%) done (elapsed 2846.29 s, remaining 8122.06 s)
519100000 of 2000000000 tuples (25%) done (elapsed 2847.00 s, remaining 8121.96 s)
519200000 of 2000000000 tuples (25%) done (elapsed 2847.75 s, remaining 8122.02 s)
519300000 of 2000000000 tuples (25%) done (elapsed 2848.47 s, remaining 8121.94 s)
519400000 of 2000000000 tuples (25%) done (elapsed 2849.19 s, remaining 8121.88 s)
519500000 of 2000000000 tuples (25%) done (elapsed 2849.92 s, remaining 8121.87 s)
519600000 of 2000000000 tuples (25%) done (elapsed 2850.64 s, remaining 8121.79 s)
519700000 of 2000000000 tuples (25%) done (elapsed 2851.40 s, remaining 8121.86 s)
519800000 of 2000000000 tuples (25%) done (elapsed 2852.12 s, remaining 8121.78 s)
519900000 of 2000000000 tuples (25%) done (elapsed 2852.85 s, remaining 8121.76 s)
```

③pgbenchデータの初期化を確認する

```
[root@iz6we9fk5l1ewooyhmivupZ prepare]# pwd
/root/pgbench/prepare
[root@iz6we9fk5l1ewooyhmivupZ prepare]# ll
total 1628
-rw----- 1 root root 1666543 Apr  1 22:02 nohup.out
[root@iz6we9fk5l1ewooyhmivupZ prepare]# tail -f nohup.out
1999400000 of 2000000000 tuples (99%) done (elapsed 11030.34 s, remaining 3.31 s)
1999500000 of 2000000000 tuples (99%) done (elapsed 11030.82 s, remaining 2.76 s)
1999600000 of 2000000000 tuples (99%) done (elapsed 11031.31 s, remaining 2.21 s)
1999700000 of 2000000000 tuples (99%) done (elapsed 11031.80 s, remaining 1.66 s)
1999800000 of 2000000000 tuples (99%) done (elapsed 11032.27 s, remaining 1.10 s)
1999900000 of 2000000000 tuples (99%) done (elapsed 11032.80 s, remaining 0.55 s)
2000000000 of 2000000000 tuples (100%) done (elapsed 11033.28 s, remaining 0.00 s)
vacuuming...
creating primary keys...
done.
```



④データを確認する

[illegible]

4) pgbenchで性能測定する

- ①PolarDB-Oracleインスタンスを接続する。
- ②pgbench性能測定

```
[root@iz6we9fk51lewooyhmivupZ run]# export PGHOST=pc-0iwl1g88n9xcz3s3g.rdlb.japan.rds.aliyuncs.com
[root@iz6we9fk51lewooyhmivupZ run]# export PGPORT=1521
[root@iz6we9fk51lewooyhmivupZ run]# export PGDATABASE=pgtest
[root@iz6we9fk51lewooyhmivupZ run]# export PGUSER=sbtest
[root@iz6we9fk51lewooyhmivupZ run]# export PGPASSWORD=Test1234
```

```
[root@iz6we9fk511ewooyhmivupZ run]# nohup sh pgbenchtest.sh 2>&1&
```

[illegible]

③pgbenchtest.sh

```
#!/bin/sh
#DATE=`date '+%Y%m%d%H%M'`
#mkdir $DATE

# thread=500
# echo "prepare data using default settings, ref sysbench SIZE" >>
${DATE}/sysbench_read_write_main.log
```

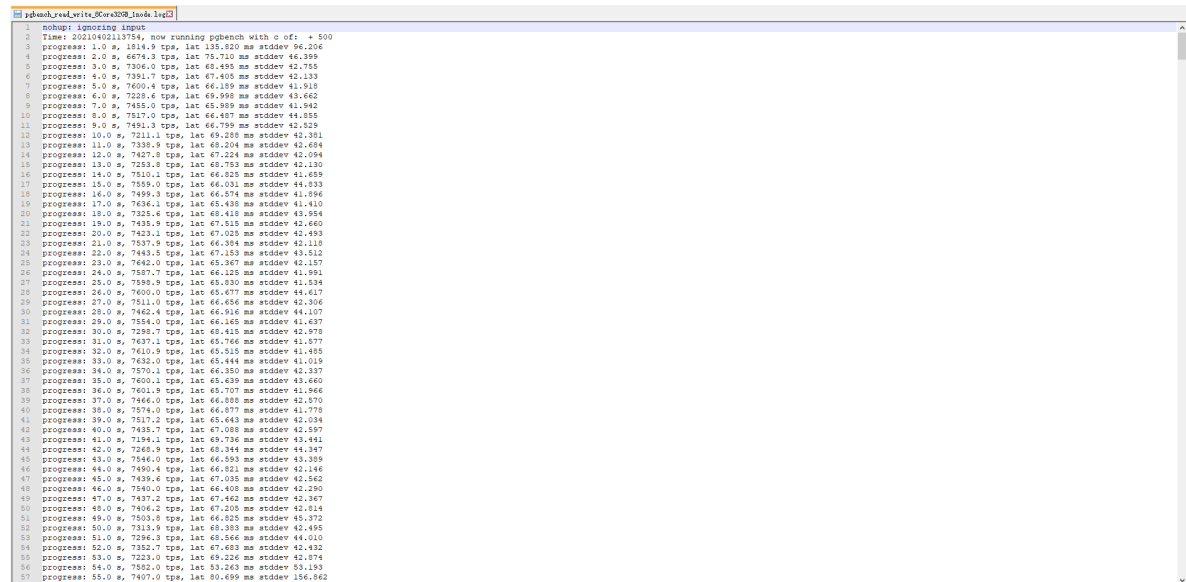
```
# ./sysbench.sh prepare ${thread} >> ${DATE}/sysbench_read_write_main.log

for c in 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000
do
    #echo "Time: $(date +%Y%m%d%H%M%S)", now running pgbench with c of: " +
    ${c} >> ${DATE}/pgbench_read_write_${c}.log
    # pgbench -M prepared -n -r -P 1 -f ./rw.sql -c ${c} -j 25 -T 120 -D
    scale=20000 -D range=2000000000 >> ${DATE}/pgbench_read_write_${c}.log
    echo "Time: $(date +%Y%m%d%H%M%S)", now running pgbench with c of: " + ${c}

    pgbench -M prepared -n -r -P 1 -f ./rw.sql -c ${c} -j 25 -T 120 -D scale=20000
    -D range=2000000000
done
```

rw.sql:

```
\set aid random_gaussian(1, :range, 10.0)
\set bid random(1, 1 * :scale)
\set tid random(1, 10 * :scale)
\set delta random(-5000, 5000)
BEGIN;
UPDATE pgbench_accounts SET abalance = abalance + :delta WHERE aid = :aid;
SELECT abalance FROM pgbench_accounts WHERE aid = :aid;
UPDATE pgbench_tellers SET tbalance = tbalance + :delta WHERE tid = :tid;
UPDATE pgbench_branches SET bbalance = bbalance + :delta WHERE bid = :bid;
INSERT INTO pgbench_history (tid, bid, aid, delta, mtime) VALUES (:tid, :bid,
:aid, :delta, CURRENT_TIMESTAMP);
END;
```



```
pgbench_read_write_6000_test01.log
1 nohelp: ignoring input
2 Time: 20210402113754, now running pgbench with c of: 4 500
3 progress: 1.0 s, 1514.9 tps, lat 135.820 ms stddev 94.206
4 progress: 2.0 s, 6676.3 tps, lat 75.710 ms stddev 46.399
5 progress: 3.0 s, 7390.0 tps, lat 69.495 ms stddev 42.755
6 progress: 4.0 s, 7391.7 tps, lat 67.405 ms stddev 42.133
7 progress: 5.0 s, 7600.4 tps, lat 66.189 ms stddev 41.918
8 progress: 6.0 s, 7225.4 tps, lat 69.998 ms stddev 41.662
9 progress: 7.0 s, 7455.0 tps, lat 65.989 ms stddev 41.942
10 progress: 8.0 s, 7517.0 tps, lat 66.487 ms stddev 44.055
11 progress: 9.0 s, 7491.3 tps, lat 66.799 ms stddev 42.529
12 progress: 10.0 s, 7211.1 tps, lat 69.288 ms stddev 42.381
13 progress: 11.0 s, 7339.9 tps, lat 69.204 ms stddev 42.084
14 progress: 12.0 s, 7427.8 tps, lat 67.224 ms stddev 42.094
15 progress: 13.0 s, 7233.8 tps, lat 69.753 ms stddev 42.130
16 progress: 14.0 s, 7510.1 tps, lat 66.823 ms stddev 41.459
17 progress: 15.0 s, 7559.0 tps, lat 66.031 ms stddev 44.833
18 progress: 16.0 s, 7499.3 tps, lat 66.574 ms stddev 41.596
19 progress: 17.0 s, 7636.1 tps, lat 65.438 ms stddev 41.410
20 progress: 18.0 s, 7525.6 tps, lat 68.418 ms stddev 43.954
21 progress: 19.0 s, 7435.9 tps, lat 67.518 ms stddev 42.460
22 progress: 20.0 s, 7423.1 tps, lat 67.025 ms stddev 42.493
23 progress: 21.0 s, 7537.9 tps, lat 66.384 ms stddev 42.118
24 progress: 22.0 s, 7443.5 tps, lat 67.153 ms stddev 43.512
25 progress: 23.0 s, 7642.0 tps, lat 65.367 ms stddev 42.157
26 progress: 24.0 s, 7587.7 tps, lat 66.125 ms stddev 41.991
27 progress: 25.0 s, 7589.9 tps, lat 65.830 ms stddev 41.534
28 progress: 26.0 s, 7600.0 tps, lat 65.677 ms stddev 41.617
29 progress: 27.0 s, 7511.0 tps, lat 66.656 ms stddev 42.306
30 progress: 28.0 s, 7462.4 tps, lat 66.916 ms stddev 44.107
31 progress: 29.0 s, 7554.0 tps, lat 66.165 ms stddev 41.637
32 progress: 30.0 s, 7289.7 tps, lat 69.415 ms stddev 42.978
33 progress: 31.0 s, 7637.1 tps, lat 65.766 ms stddev 41.577
34 progress: 32.0 s, 7610.9 tps, lat 65.513 ms stddev 41.495
35 progress: 33.0 s, 7632.0 tps, lat 65.444 ms stddev 41.019
36 progress: 34.0 s, 7570.1 tps, lat 66.350 ms stddev 42.237
37 progress: 35.0 s, 7600.1 tps, lat 65.639 ms stddev 43.660
38 progress: 36.0 s, 7601.8 tps, lat 65.707 ms stddev 41.966
39 progress: 37.0 s, 7446.0 tps, lat 66.058 ms stddev 42.570
40 progress: 38.0 s, 7574.0 tps, lat 66.877 ms stddev 41.778
41 progress: 39.0 s, 7517.2 tps, lat 65.443 ms stddev 42.034
42 progress: 40.0 s, 7435.7 tps, lat 67.088 ms stddev 42.597
43 progress: 41.0 s, 7194.1 tps, lat 69.736 ms stddev 43.441
44 progress: 42.0 s, 7260.9 tps, lat 68.344 ms stddev 44.347
45 progress: 43.0 s, 7546.0 tps, lat 66.593 ms stddev 43.389
46 progress: 44.0 s, 7490.4 tps, lat 66.821 ms stddev 42.146
47 progress: 45.0 s, 7439.6 tps, lat 67.035 ms stddev 42.562
48 progress: 46.0 s, 7440.0 tps, lat 66.408 ms stddev 42.290
49 progress: 47.0 s, 7437.2 tps, lat 67.462 ms stddev 42.347
50 progress: 48.0 s, 7406.2 tps, lat 67.205 ms stddev 42.514
51 progress: 49.0 s, 7503.8 tps, lat 66.825 ms stddev 45.372
52 progress: 50.0 s, 7513.9 tps, lat 65.383 ms stddev 42.495
53 progress: 51.0 s, 7296.3 tps, lat 68.566 ms stddev 44.010
54 progress: 52.0 s, 7552.7 tps, lat 67.483 ms stddev 42.432
55 progress: 53.0 s, 7223.0 tps, lat 69.226 ms stddev 42.074
56 progress: 54.0 s, 7552.0 tps, lat 59.263 ms stddev 53.193
57 progress: 55.0 s, 7407.0 tps, lat 80.699 ms stddev 156.162
```

```

pgbench_read_write_8Core32GB_node.log2
91 progress: 89.0 s, 7703.0 tps, lat 64.798 ms stddev 41.921
92 progress: 90.0 s, 7575.0 tps, lat 65.244 ms stddev 42.027
93 progress: 91.0 s, 7631.4 tps, lat 65.476 ms stddev 41.410
94 progress: 92.0 s, 7511.5 tps, lat 66.373 ms stddev 44.664
95 progress: 93.0 s, 7663.2 tps, lat 65.539 ms stddev 41.959
96 progress: 94.0 s, 7340.8 tps, lat 67.769 ms stddev 42.959
97 progress: 95.0 s, 7633.0 tps, lat 65.338 ms stddev 41.713
98 progress: 96.0 s, 7462.2 tps, lat 67.170 ms stddev 42.539
99 progress: 97.0 s, 7545.8 tps, lat 66.166 ms stddev 42.164
100 progress: 98.0 s, 7656.0 tps, lat 65.429 ms stddev 41.725
101 progress: 99.0 s, 7560.1 tps, lat 66.167 ms stddev 44.127
102 progress: 100.0 s, 7402.2 tps, lat 67.642 ms stddev 45.102
103 progress: 101.0 s, 7263.7 tps, lat 68.721 ms stddev 43.389
104 progress: 102.0 s, 7516.1 tps, lat 66.404 ms stddev 41.758
105 progress: 103.0 s, 7578.8 tps, lat 66.211 ms stddev 42.404
106 progress: 104.0 s, 7506.1 tps, lat 65.810 ms stddev 42.086
107 progress: 105.0 s, 7385.4 tps, lat 68.811 ms stddev 42.094
108 progress: 106.0 s, 7182.4 tps, lat 68.678 ms stddev 44.512
109 progress: 107.0 s, 7385.2 tps, lat 68.627 ms stddev 45.429
110 progress: 108.0 s, 7548.0 tps, lat 66.874 ms stddev 43.985
111 progress: 109.0 s, 7682.0 tps, lat 64.392 ms stddev 40.910
112 progress: 110.0 s, 7360.0 tps, lat 68.394 ms stddev 42.047
113 progress: 111.0 s, 7199.4 tps, lat 69.396 ms stddev 41.845
114 progress: 112.0 s, 7667.7 tps, lat 64.911 ms stddev 41.443
115 progress: 113.0 s, 7616.9 tps, lat 65.736 ms stddev 41.755
116 progress: 114.0 s, 7694.0 tps, lat 64.869 ms stddev 44.474
117 progress: 115.0 s, 7723.0 tps, lat 64.849 ms stddev 41.493
118 progress: 116.0 s, 7597.0 tps, lat 65.039 ms stddev 41.493
119 progress: 117.0 s, 7629.3 tps, lat 66.096 ms stddev 43.073
120 progress: 118.0 s, 7681.7 tps, lat 64.850 ms stddev 41.574
121 progress: 119.0 s, 7626.2 tps, lat 65.605 ms stddev 41.189
122 progress: 120.0 s, 7726.1 tps, lat 64.912 ms stddev 41.786
123 transaction type: ./rw.sql
124 scaling factor: 1
125 query mode: prepared
126 number of clients: 500
127 number of threads: 25
128 duration: 120 s
129 number of transactions actually processed: 891338
130 latency average = 67.135 ms
131 latency stddev = 45.410 ms
132 tps = 7409.484987 (including connections establishing)
133 tps = 7410.637337 (excluding connections establishing)
134 statement latencies in milliseconds
135      0.001  \set aid random_gaussian(1, :range, 10.0)
136      0.001  \set bid random(1, 1 * :scale)
137      0.000  \set tid random(1, 10 * :scale)
138      0.000  \set delta random(-5000, 5000)
139      8.193  BEGIN;
140      11.062  UPDATE pgbench_accounts SET abalance = abalance + :delta WHERE aid = :aid;
141      0.429  SELECT abalance FROM pgbench_accounts WHERE aid = :aid;
142      8.460  UPDATE pgbench_tellers SET tbalance = tbalance + :delta WHERE tid = :tid;
143      8.030  UPDATE pgbench_branches SET bbalance = bbalance + :delta WHERE bid = :bid;
144      9.480  INSERT INTO pgbench_history (tid, bid, aid, delta, mtime) VALUES (:tid, :bid,
145      19.470  :aid, :delta, CURRENT_TIMESTAMP);
146      19.470  END;

```

④tpsが実行ログから取得します。QPSではtps*5になる

tps = 7409.484987 (including connections establishing)

⑤rw.sqlは五つのSQLを実行しているため、qps=tps*5

rw.sql:

```

\set aid random_gaussian(1, :range, 10.0)
\set bid random(1, 1 * :scale)
\set tid random(1, 10 * :scale)
\set delta random(-5000, 5000)
BEGIN;
UPDATE pgbench_accounts SET abalance = abalance + :delta WHERE aid = :aid;
SELECT abalance FROM pgbench_accounts WHERE aid = :aid;
UPDATE pgbench_tellers SET tbalance = tbalance + :delta WHERE tid = :tid;
UPDATE pgbench_branches SET bbalance = bbalance + :delta WHERE bid = :bid;
INSERT INTO pgbench_history (tid, bid, aid, delta, mtime) VALUES (:tid, :bid,
:aid, :delta, CURRENT_TIMESTAMP);
END;

```

ここまでPolarDB-Oracleをpgbenchで性能測定をご紹介しました