Practices for Lesson 1: Basics of Multitenant Container Database and Pluggable Databases

Practices for Lesson 1: Overview

Practices Overview

In previous Oracle Database versions, you used to create, configure, and manage non-CDBs. In Oracle Database 12*c*, you need to know how to create, configure, and manage multitenant container databases (CDBs) and pluggable databases (PDBs – PDB1_1.

In this practice, you will explore new types of databases and get familiar with the architecture and structures of multitenant container databases (CDBs) and pluggable databases (PDBs).

Practice 1-1: Exploring CDB Architecture and Structures

Overview

In this practice, you will explore the architecture and structures of `cdb1` and its pluggable databases. Create a Multitenant database called cdb1 with a pluggable database called pdb1_1. Use the Advanced Option so you can select the sample schemas. Instructor Led.

Tasks

1. Explore the `cdb1` instance, the background processes and the multitenant container database.

a. Use the **`ps –ef|grep`** Unix command.

```
$ ps -ef|grep cdb1
oracle 378 375 0 18:05 ? 00:00:00 oraclecdb1
(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))
oracle 390 1 0 18:05 ? 00:00:00 ora_w001_cdb1
oracle 2711 2686 0 18:32 pts/2 00:00:00 grep cdb1
oracle 27530 1 0 13:24 ? 00:00:02 ora_pmon_cdb1
oracle 27534 1 0 13:24 ? 00:00:04 ora_psp0_cdb1
oracle 27538 1 1 13:24 ? 00:05:01 ora_vktm_cdb1
oracle 27544 1 0 13:24 ? 00:00:00 ora_gen0_cdb1
oracle 27548 1 0 13:24 ? 00:00:00 ora_mman_cdb1
oracle 27556 1 0 13:24 ? 00:00:00 ora_diag_cdb1
oracle 27560 1 0 13:24 ? 00:00:00 ora_ofsd_cdb1
oracle 27564 1 0 13:24 ? 00:00:00 ora_dbrm_cdb1
oracle 27568 1 0 13:24 ? 00:00:11 ora_dia0_cdb1
oracle 27572 1 0 13:24 ? 00:00:02 ora_dbw0_cdb1
oracle 27576 1 0 13:24 ? 00:00:01 ora_lgwr_cdb1
oracle 27580 1 0 13:24 ? 00:00:03 ora_ckpt_cdb1
oracle 27584 1 0 13:24 ? 00:00:00 ora_smon_cdb1
oracle 27630 1 0 13:25 ? 00:00:00 ora_tmon_cdb1
oracle 27634 1 0 13:25 ? 00:00:00 ora_tt00_cdb1
oracle 27638 1 0 13:25 ? 00:00:00 ora_fbda_cdb1
oracle 27642 1 0 13:25 ? 00:00:00 ora_aqpc_cdb1
oracle 27651 1 0 13:25 ? 00:00:00 ora_p000_cdb1
oracle 27659 1 0 13:25 ? 00:00:00 ora_p001_cdb1
oracle 27666 1 0 13:25 ? 00:00:00 ora_p002_cdb1
oracle 27670 1 0 13:25 ? 00:00:00 ora_p003_cdb1
oracle 27682 1 0 13:25 ? 00:00:09 ora_cjq0_cdb1
oracle 27734 1 0 13:25 ? 00:00:00 ora_qm01_cdb1
oracle 27738 1 0 13:25 ? 00:00:00 ora_q001_cdb1
oracle 27742 1 0 13:25 ? 00:00:00 ora_q002_cdb1
oracle 27750 1 0 13:25 ? 00:00:00 ora_smco_cdb1
oracle 31695 1 0 17:05 ? 00:00:00 ora_w002_cdb1
$
```

b. Connect to the multitenant container database cdb1.

```
$ . oraenv
ORACLE_SID = [orcl] ? cdb1
The Oracle base remains unchanged with value /u01/app/oracle
$ sqlplus / as sysdba
Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.0.2 -
64bit Production
With the Partitioning, OLAP, Data Mining, Real Application
Testing
SQL>
```

c. Check if the database is a multitenant container database.

```
SQL> select name, cdb, con_id from v$database;
NAME       CDB CON_ID
---------  --- ----------
CDB1       YES 0
SQL>
```

d. Check the instance name.

```
SQL> select INSTANCE_NAME, STATUS, CON_ID from v$instance;
INSTANCE_NAME         STATUS          CON_ID
----------------      ------------    ----------
cdb1                  OPEN            0
SQL> EXIT
$
```

2. Explore the services.

a. Start the listener if not yet started.

```
$ lsnrctl status
LSNRCTL for Linux: Version 12.1.0.0.2 - Production on 09-JUL-
2012 02:57:38
Copyright (c) 1991, 2012, Oracle. All rights reserved.
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=IPC)(KEY=EXTPROC1521)))
STATUS of the LISTENER
------------------------
Alias LISTENER
Version TNSLSNR for Linux: Version 12.1.0.0.2
- Production
Start Date 10-JUL-2012 00:15:19
Uptime 0 days 2 hr. 42 min. 19 sec
Trace Level off
Security ON: Local OS Authentication
SNMP OFF
Listener Parameter File
/u01/app/oracle/product/12.1.0/dbhome_1/network/admin/listener.o
ra
Listener Log File
/u01/app/oracle/diag/tnslsnr/yourserver/listener/alert/log.xml
Listening Endpoints Summary...
(DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=1521)
))
```

```
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcps)(HOST=yourserver)(PORT=5500
))(Security=(my_wallet_directory=/u01/app/oracle/admin/orcl/xdb_
wallet)) (Presentation=HTTP)(Session=RAW))
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcps)(HOST=yourserver)(PORT=5502
))(Security=(my_wallet_directory=/u01/app/oracle/admin/cdb1/xdb_
wallet)) (Presentation=HTTP)(Session=RAW))
Services Summary...
Service "cdb1" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
Service "cdb1XDB" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
Service "em12rep" has 1 instance(s).
Instance "em12rep", status READY, has 1 handler(s) for this
service...
Service "em12repXDB" has 1 instance(s).
Instance "em12rep", status READY, has 1 handler(s) for this
service...
Service "orcl" has 1 instance(s).
Instance "orcl", status READY, has 1 handler(s) for this
service...
Service "orcl2" has 1 instance(s).
Instance "orcl2", status READY, has 1 handler(s) for this
service...
Service "orcl2XDB" has 1 instance(s).
Instance "orcl2", status READY, has 1 handler(s) for this
service...
Service "orclXDB" has 1 instance(s).
Instance "orcl", status READY, has 1 handler(s) for this
service...
Service "pdb1_1" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
The command completed successfully
$
```

The listener is already started. If it were not started, you would use the following command to start the listener:

```
$ lsnrctl start
LSNRCTL for Linux: Version 12.1.0.0.2 - Production on 09-JUL-
2012 03:08:50
Copyright (c) 1991, 2012, Oracle. All rights reserved.
Starting /u01/app/oracle/product/12.1.0/dbhome_1/bin/tnslsnr:
please wait...
TNSLSNR for Linux: Version 12.1.0.0.2 - Production
System parameter file is
/u01/app/oracle/product/12.1.0/dbhome_1/network/admin/listener.o
ra
Log messages written to
/u01/app/oracle/diag/tnslsnr/yourserver/listener/alert/log.xml
Listening on:
```

```
(DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
Listening on:
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=1521)
))
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=IPC)(KEY=EXTPROC1521)))
STATUS of the LISTENER
------------------------
Alias LISTENER
Version TNSLSNR for Linux: Version 12.1.0.0.2
- Production
Start Date 09-OCT-2012 03:08:50
Uptime 0 days 0 hr. 0 min. 0 sec
Trace Level off
Security ON: Local OS Authentication
SNMP OFF
Listener Parameter File
/u01/app/oracle/product/12.1.0/dbhome_1/network/admin/listener.o
ra
Listener Log File
/u01/app/oracle/diag/tnslsnr/yourserver/listener/alert/log.xml
Listening Endpoints Summary...
(DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=1521)
))
The listener supports no services
The command completed successfully
$
```

b. Check services.

```
$ lsnrctl services
LSNRCTL for Linux: Version 12.1.0.0.2 - Production on 06-SEP-
2012 23:29:20
Copyright (c) 1991, 2012, Oracle. All rights reserved.
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=IPC)(KEY=EXTPROC1521)))
Services Summary...
Service "cdb1" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
Handler(s):
"DEDICATED" established:2 refused:0 state:ready
LOCAL SERVER
Service "cdb1XDB" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
Handler(s):
"D000" established:0 refused:0 current:0 max:1022
state:ready
DISPATCHER <machine: yourserver, pid: 27840>
(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=29863))
Service "em12rep" has 1 instance(s).
```

```
Instance "em12rep", status READY, has 1 handler(s) for this
service...
Handler(s):
"DEDICATED" established:2748 refused:0 state:ready
LOCAL SERVER
Service "em12repXDB" has 1 instance(s).
Instance "em12rep", status READY, has 1 handler(s) for this
service...
Handler(s):
"D000" established:0 refused:0 current:0 max:1022
state:ready
DISPATCHER <machine: yourserver, pid: 18255>
(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=59402))
Service "orcl" has 1 instance(s).
Instance "orcl", status READY, has 1 handler(s) for this
service...
Handler(s):
"DEDICATED" established:251 refused:0 state:ready
LOCAL SERVER
Service "orcl2" has 1 instance(s).
Instance "orcl2", status READY, has 1 handler(s) for this
service...
Handler(s):
"DEDICATED" established:4 refused:0 state:ready
LOCAL SERVER
Service "orcl2XDB" has 1 instance(s).
Instance "orcl2", status READY, has 1 handler(s) for this
service...
Handler(s):
"D000" established:6 refused:0 current:0 max:1022
state:ready
DISPATCHER <machine: yourserver, pid: 23615>
(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=50200))
Service "orclXDB" has 1 instance(s).
Instance "orcl", status READY, has 1 handler(s) for this
service...
Handler(s):
"D000" established:0 refused:0 current:0 max:1022
state:ready
DISPATCHER <machine: yourserver, pid: 30821>
(ADDRESS=(PROTOCOL=tcp)(HOST=yourserver)(PORT=27384))
Service "pdb1_1" has 1 instance(s).
Instance "cdb1", status READY, has 1 handler(s) for this
service...
Handler(s):
"DEDICATED" established:2 refused:0 state:ready
LOCAL SERVER
The command completed successfully
$
```

c. List the services automatically created for each container.

```
$ sqlplus / as sysdba
```

```
Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.0.2 -
64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real
Application Testing options
SQL> col name format A20
SQL> select name, con_id from v$services;
NAME                 CON_ID
-------------------- ----------
pdb1_1                3
cdb1XDB               1
cdb1                  1
SYS$BACKGROUND        1
SYS$USERS             1
SQL>
```

Notice that the `PDB$SEED` service is not listed. No one should connect to this service because there should be no operations performed on this container. It is reserved as a template to create other PDBs.

3. Display the pluggable databases.
a. Use the new view V$PDBS.

```
SQL> select CON_ID, NAME, OPEN_MODE from v$pdbs;
CON_ID     NAME                           OPEN_MODE
---------- ------------------------------ ----------
2          PDB$SEED                       READ ONLY
3          PDB1_1                         READ WRITE
SQL>
```

Notice that the seed PDB is in READ ONLY open mode.
b. Use the new command SHOW CON_NAME and CON_ID to know which container you are connected to.

```
SQL> show con_name
CON_NAME
------------------------------
CDB$ROOT
SQL> show con_id
CON_ID
------------------------------
1
SQL>
```

You can also use SYS_CONTEXT function to view the CON_NAME and CON_ID attributes of your session context.

```
SELECT sys_context('userenv','CON_NAME') from dual;
SELECT sys_context('userenv','CON_ID') from dual;
```

4. View some of the new family of views CDB_*xxx*:

```
SQL> col PDB_NAME format a8
SQL> col CON_ID format 99
SQL> select PDB_ID, PDB_NAME, DBID, GUID, CON_ID
2 from cdb_pdbs;
PDB_ID PDB_NAME DBID       GUID                   CON_ID
------ -------- ---------- -------------------- ------

3      PDB1_1   3624951709 C3920…..0C3           1
2      PDB$SEED 4029862422 C2CBF…….B141         1
SQL>
```

The PDB_ID number 2 is always assigned to the seed PDB because it is the second container to be created after the root container (CON_ID 1).
5. Check all files of the CDB.
a. View the redo log files of the CDB.

```
SQL> col MEMBER format A40
SQL> select GROUP#, CON_ID, MEMBER from v$logfile;
GROUP#     CON_ID MEMBER
---------- ------ ----------------------------------------
3          0      /u01/app/oracle/oradata/cdb1/redo03.log
2          0      /u01/app/oracle/oradata/cdb1/redo02.log
1          0      /u01/app/oracle/oradata/cdb1/redo01.log
SQL>
```

b. View the control files of the CDB.

```
SQL> col NAME format A60
SQL> select NAME , CON_ID from v$controlfile;
NAME                                                  CON_ID
----------------------------------------------------- ------
/u01/app/oracle/oradata/cdb1/control01.ctl            0
/u01/app/oracle/fast_recovery_area/cdb1/control02.ctl 0
SQL>
```

c. View all data files of the CDB, including those of the root and all PDBs.

1) With CDB_DATA_FILES view:

```
SQL> col file_name format A50
SQL> col tablespace_name format A8
SQL> col file_id format 9999
SQL> col con_id format 999
SQL> select FILE_NAME, TABLESPACE_NAME, FILE_ID, con_id
2 from cdb_data_files order by con_id ;
FILE_NAME                                        TS NAME  FILE_ID CON_ID
------------------------------------------------ -------- ------  -----
/$ORACLE_BASE/oradata/cdb1/users01.dbf            USERS    6        1
/$ORACLE_BASE/oradata/cdb1/undotbs01.dbf          UNDOTBS1 4        1
/$ORACLE_BASE/oradata/cdb1/sysaux01.dbf           SYSAUX   3        1
/$ORACLE_BASE/oradata/cdb1/system01.dbf           SYSTEM   1        1
/$ORACLE_BASE/oradata/cdb1/pdbseed/system01.dbf SYSTEM   5        2
/$ORACLE_BASE/oradata/cdb1/pdbseed/sysaux01.dbf SYSAUX   7        2
/$ORACLE_BASE/oradata/cdb1/pdb1_1/system01.dbf  SYSTEM   8        3
/u01/app/oracle/oradata/cdb1/pdb1_1/sysaux01.dbf SYSAUX  9        3
/$ORACLE_BASE/oradata/cdb1/pdb1_1/SAMPLE_SCHEMA_ USERS   10       3
users01.dbf
/$ORACLE_BASE/oradata/cdb1/pdb1_1/example01.dbf EXAMPLE  11       3
10 rows selected.
SQL>
```

2) With **ls** Unix command:

```
SQL> !ls -l $ORACLE_BASE/oradata/cdb1
total 2575988
-rw-r----- 1 oracle oinstall 17874944 Sep 6 23:38
control01.ctl
drwxr-xr-x 2 oracle oinstall 4096 Sep 5 10:54 pdb1_1
drwxr-x--- 2 oracle oinstall 4096 Sep 5 10:37 pdbseed
-rw-r----- 1 oracle oinstall 52429312 Sep 6 23:38 redo01.log
-rw-r----- 1 oracle oinstall 52429312 Sep 6 20:01 redo02.log
-rw-r----- 1 oracle oinstall 52429312 Sep 6 22:23 redo03.log
-rw-r----- 1 oracle oinstall 849354752 Sep 6 23:35 sysaux01.dbf
-rw-r----- 1 oracle oinstall 828383232 Sep 6 23:35 system01.dbf
-rw-r----- 1 oracle oinstall 571482112 Sep 6 23:18 temp01.dbf
-rw-r----- 1 oracle oinstall 246423552 Sep 6 23:36
undotbs01.dbf
-rw-r----- 1 oracle oinstall 5251072 Sep 6 22:29 users01.dbf
SQL> !ls -l $ORACLE_BASE/oradata/cdb1/pdbseed
total 985064
-rw-r----- 1 oracle oinstall 88088576 Sep 5 10:50
pdbseed_temp01.dbf
```

```
-rw-r----- 1 oracle oinstall 671096832 Sep 5 10:50 sysaux01.dbf
-rw-r----- 1 oracle oinstall 262152192 Sep 5 10:50 system01.dbf
SQL>
```

There are only the SYSTEM and SYSAUX data files and a temp file for the seed PDB.

d. Still connected to the root, now use DBA_DATA_FILES view.

```
SQL> col file_name format A42
SQL> select FILE_NAME, TABLESPACE_NAME, FILE_ID
2 from dba_data_files;
FILE_NAME                                  TABLESPACE NAME FILE_ID
------------------------------------------ --------------- -----
/u01/app/oracle/oradata/cdb1/users01.dbf   USERS            6
/u01/app/oracle/oradata/cdb1/undotbs01.dbf UNDOTBS1         4
/u01/app/oracle/oradata/cdb1/sysaux01.dbf  SYSAUX           3
/u01/app/oracle/oradata/cdb1/system01.dbf  SYSTEM           1
SQL>
```

Notice that only the root data files are listed.

e. Now use V$TABLESPACE and V$DATAFILE view.

```
SQL> col NAME format A12
SQL> select FILE#, ts.name, ts.ts#, ts.con_id
2 from v$datafile d, v$tablespace ts
3 where d.ts#=ts.ts#
4 and d.con_id=ts.con_id
5 order by 4,3;
FILE#           NAME            TS#             CON_ID
----------      ------------    ----------      ------
1               SYSTEM          0               1
3               SYSAUX          1               1
4               UNDOTBS1        2               1
6               USERS           4               1
5               SYSTEM          0               2
7               SYSAUX          1               2
8               SYSTEM          0               3
9               SYSAUX          1               3
10              USERS           3               3
11              EXAMPLE         4               3
10 rows selected.
SQL>
```

f. List the temp files of the CDB.

```
SQL> col file_name format A47
SQL> select FILE_NAME, TABLESPACE_NAME, FILE_ID
2 from cdb_temp_files;
FILE_NAME TABLESPA
FILE_ID
---------------------------------------------------- --------

/u01/app/oracle/oradata/cdb1/temp01.dbf TEMP
1
/u01/app/oracle/oradata/cdb1/pdbseed/pdbseed_temp01.dbf TEMP
2
/u01/app/oracle/oradata/cdb1/pdb1_1/pdb1_1_temp01.dbf TEMP
```

```
3
SQL>
```

6. List all users created.

a. Verify that the `SYSTEM` user is created.

```
SQL> col username format A22
SQL> select username, common, con_id from cdb_users
2 where username ='SYSTEM';
USERNAME                COM CON_ID
----------------------  --- ------
SYSTEM                  YES 1
SYSTEM                  YES 2
SYSTEM                  YES 3
SQL>
```

Notice that the user `SYSTEM` exists in all containers as a common user.

b. List all common users of the CDB.

```
SQL> select distinct username from cdb_users
2 where common ='YES';
USERNAME
--------------------
DVF
MDSYS
XS$NULL
SYSKM
APEX_040100
DIP
SPATIAL_WFS_ADMIN_USR
FLOWS_FILES
SYSBACKUP
CTXSYS
OUTLN
SPATIAL_CSW_ADMIN_USR
GSMUSER
OLAPSYS
SYSTEM
ORACLE_OCM
DVSYS
AUDSYS
ORDSYS
DBSNMP
OJVMSYS
GSMADMIN_INTERNAL
MDDATA
APEX_PUBLIC_USER
ORDPLUGINS
APPQOSSYS
GSMCATUSER
ORDDATA
SYSDG
XDB
SYS
WMSYS
LBACSYS
ANONYMOUS
SI_INFORMTN_SCHEMA
35 rows selected.
SQL>
```

c. List all local users of the CDB.

```
SQL> select distinct username, con_id from cdb_users
2 where common ='NO';
USERNAME             CON_ID
-------------------- ------
SCOTT                 3
BI                    3
PM                    3
IX                    3
```

```
SH                     3
OE                     3
HR                     3
PDBADMIN               3

SQL>
-------------------- ------
SCOTT                  3
BI                     3
PM                     3
```

d. List local users in the root.

```
SQL> select username, con_id from cdb_users
2 where common ='NO';
USERNAME CON_ID

IX         3
SH         3
OE         3
HR         3
PDBADMIN   3
8 rows selected.
SQL>
```

Notice that there is no local user in the root container because it is impossible to create any local user in the root.

7. List all roles and privileges of the CDB.

a. List all roles of the CDB.

```
SQL> col role format A30
SQL> select role, common, con_id from cdb_roles;
ROLE                           COM CON_ID
------------------------------ --- ------
CONNECT                        YES 1
RESOURCE                       YES 1
DBA                            YES 1
AUDIT_ADMIN                    YES 1
AUDIT_VIEWER                   YES 1
SELECT_CATALOG_ROLE            YES 1
EXECUTE_CATALOG_ROLE           YES 1
DELETE_CATALOG_ROLE            YES 1
PROF_ADMIN                     YES 1
EXP_FULL_DATABASE              YES 1
IMP_FULL_DATABASE              YES 1
CDB_DBA                        YES 1
…
DV_XSTREAM_ADMIN               YES 2
DV_GOLDENGATE_REDO_ACCESS      YES 2
DV_AUDIT_CLEANUP               YES 2
DV_REALM_OWNER                 YES 2
PDB_DBA                        YES 2
…
DV_AUDIT_CLEANUP               YES 3
```

```
DV_REALM_RESOURCE                YES 3
DV_REALM_OWNER                   YES 3
PDB_DBA                          YES 3
252 rows selected.
SQL>
```

Notice that there is no local role in the root container because it is impossible to create any local role in the root.

b. Check that the privileges are neither common nor local by nature.

```
SQL> desc sys.system_privilege_map
Name                           Null?      Type
------------------------------ --------   ----------------------
PRIVILEGE                      NOT NULL   NUMBER
NAME NOT                       NULL       VARCHAR2(40)
PROPERTY                       NOT NULL   NUMBER
SQL> desc sys.table_privilege_map
Name                           Null?      Type
------------------------------ --------   ----------------------
PRIVILEGE                      NOT NULL   NUMBER
NAME                           NOT NULL   VARCHAR2(40)
SQL>
```

Notice that there is no `COMMON` column.

c. Verify that the privilege, when granted, becomes a common or local privilege.

```
SQL> desc CDB_SYS_PRIVS
Name                           Null?      Type
------------------------------ -------- --------------------
GRANTEE                                   VARCHAR2   (128)
PRIVILEGE                                 VARCHAR2(40)
ADMIN_OPTION                              VARCHAR2(3)
COMMON                                    VARCHAR2(3)
CON_ID                                    NUMBER
SQL> desc CDB_TAB_PRIVS
Name Null? Type
------------------------------ -------- --------------------
GRANTEE                                   VARCHAR2(128)
OWNER                                     VARCHAR2(128)
TABLE_NAME                                VARCHAR2(128)
GRANTOR                                   VARCHAR2(128)
PRIVILEGE                                 VARCHAR2(40)
GRANTABLE                                 VARCHAR2(3)
HIERARCHY                                 VARCHAR2(3)
COMMON                                    VARCHAR2(3)
TYPE                                      VARCHAR2(24)
CON_ID                                    NUMBER
SQL>
```

There is a **COMMON** column.

d. Notice that the role, though common or local depending on how the role was created is also, like privileges, either granted commonly or locally.

```
SQL> col grantee format A10
SQL> col granted_role format A28
SQL> select grantee, granted_role, common, con_id
2 from cdb_role_privs
3 where grantee='SYSTEM';
GRANTEE    GRANTED ROLE                 COM CON_ID
---------- ---------------------------- --- ------
SYSTEM     DBA                          YES 1
SYSTEM     AQ_ADMINISTRATOR_ROLE        YES 1
SYSTEM     DBA                          YES 2
SYSTEM     AQ_ADMINISTRATOR_ROLE        YES 2
SYSTEM     DBA                          YES 3
SYSTEM     AQ_ADMINISTRATOR_ROLE        YES 3
6 rows selected.
SQL> EXIT
$
```