

Practice

Creating a CDB Database

Practice Target

In this practice you will drop the database in `srv1` and create a CDB database in it.

Practice Assumption

The practice assumes that `srv1` and the database in it are up and running.

Note:

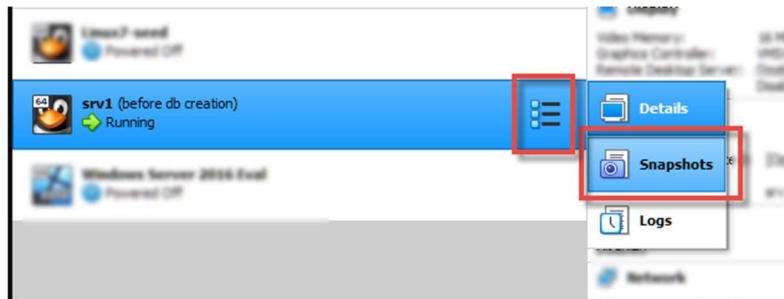
In this course, we are committed to let you gain experience on managing both Oracle non-CDB and CDB databases. For this reason, in this practice, you will create two VirtualBox snapshots for `srv1`. One for the non-CDB database and the other one for the CDB database. Later throughout the course practices, you switch between them based on the course practice targets.



Creating a CDB Database

In the following steps, you will drop the existing database in `srv1` and create a CDB database in it.

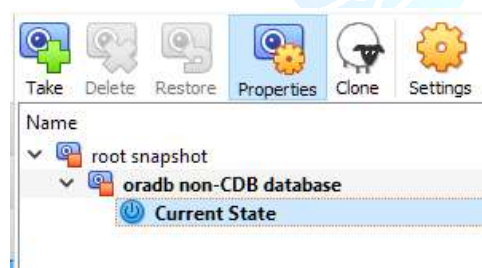
1. In Oracle VirtualBox, create snapshots for `srv1` as follows:
 - 1.1. In Oracle VirtualBox, click on the three-dot menu beside the `srv1` and select Snapshots item, just as follows:



- 1.2. Click on **Take** button > enter the name "**root snapshot**" > click on **OK** button
Wait until the snapshot is taken
 - 1.3. Click on **Take** button > enter the name "**oradb non-CDB database**" > click on **OK** button
Wait until the snapshot is taken

This snapshot represents the non-CDB database. In the incoming course practices, whenever we want to work on a non-CDB database, we restore `srv1` from this snapshot.

The snapshots should now look like the following:



2. Shutdown `srv1`
3. In Oracle VirtualBox manager, restore `srv1` from the "**root snapshot**"
 - 3.1. Click on "**root snapshot**"
 - 3.2. Click on Restore button

4. Open a Putty session to `srv1` as `oracle`.

5. Using `dbca` in silent mode, drop the current database.

```
cd ${ORACLE_HOME}/bin
dbca -silent -deleteDatabase -sourceDB ${ORACLE_SID} -sysDBAUserName sys -
sysDBAPassword ABcd##1234
```

6. Download the file `oradb-cdb.rsp` and copy it to the staging directory.

This response file is the same as the response file created earlier in the course. The only difference is that this response file is for creating a cdb database.

7. Invoke `dbca` in silent mode to create the database as defined in the response file.

The utility will prompt you to enter the passwords for `SYS`, `SYSTEM` and `PDBADMIN` users. In the course practices, the standard password is `ABcd##1234`

```
dbca -createDatabase -silent -responseFile /media/sf_staging/oradb-cdb.rsp -
dbOptions
JSERVER:true,DV:false,APEX:false,OMS:false,SPATIAL:false,IMEDIA:false,ORACLE_TEX
T:false,CWMLITE:false -pdbAdminPassword ABcd##1234
```

8. After the database is created, open the `oratab` file with the `vi` editor

```
vi /etc/oratab
```

9. Change the last field for the database line to `Y`. Save the change and exit from the editor.

We set this field to `Y` in an earlier practice. But when we used the `dbca` to drop the database, the `dbca` automatically removes this line from the `/etc/oratab` file. However, the auto-startup script that we created is not affected.

```
oradb:/u01/app/oracle/product/19.0.0/db_1:Y
```

Note: We do not need to create the scripts that automatically start up the database after the rebooting the machine because we already created them in the "Creating Oracle Databases" practice. If you would like to have a look at those scripts, please refer to that practice.

Note: In real life, after creating the database, we normally set the database to operate in archive log mode. You will learn about this procedure later in the course.

10. After the database creation are finished, verify the database is up and running by logging to it as `sysdba`

```
sqlplus / as sysdba
```

11. Verify that the database is a CDB database.

```
SELECT CDB FROM V$DATABASE;
```

12. If all went well, delete the response file.

```
host rm /media/sf_staging/oradb-cdb.rsp
```

13. Submit the following query to retrieve the options installed in the database.

```
set linesize 180
col COMP_NAME for a40
col STATUS for a15
col VERSION for a10

SELECT COMP_NAME, STATUS, VERSION FROM DBA_REGISTRY ORDER BY 1;
```

14. Display the PDBs in the database.

Observe the following:

- o "show pdbs" is a SQL*Plus command to list the existing PDBs.
- o CDB_PDBS and v&pdbs are views that provide details on the PDBs in the database. However, they do not retrieve the root container.
- o V\$CONTAINERS view provides information about all the PDBs, including the root container.
- o The CON_ID of the root container is always 1. The CON_ID of the seed PDB is always 2. The CON_ID of user PDBs is always greater than or equal to 3.

Consider displaying the structure of each view to obtain an idea about what information retrieved by the view.

```
show pdbs
col NAME for a10

SELECT CON_ID, NAME FROM V$PDBS;
SELECT PDB_ID, PDB_NAME NAME FROM CDB_PDBS;
SELECT CON_ID, NAME FROM V$CONTAINERS;
```

15. Retrieve the properties of PDB1.

```
set linesize 180
col PROPERTY_NAME for a35
col PROPERTY_VALUE for a35

SELECT PROPERTY_NAME, PROPERTY_VALUE FROM CDB_PROPERTIES WHERE CON_ID=3;
```

16. Retrieve the datafiles for each container in the database.

Observe the following:

- The root datafiles are created under the OMF directory (set by `DB_CREATE_FILE_DEST`).
- The PDB datafiles are created in a subdirectory of the root datafiles directory. The directory names is taken from the `GUI` of the PDB.
- The tablespaces `SYSTEM`, `SYSAUX`, `UNDOTBS1`, and `USERS` are there in the `root` as well as in the pluggable database `PDB1`.

```
COL PDB_ID FOR 999
COL PDB_NAME FOR A8
COL FILE_ID FOR 9999
COL TABLESPACE_NAME FOR A10
COL FILE_NAME FOR A45

SELECT p.CON_ID, p.NAME PDB_NAME, d.FILE_ID, d.TABLESPACE_NAME, d.FILE_NAME
FROM V$CONTAINERS p, CDB_DATA_FILES d
WHERE p.CON_ID = d.CON_ID
ORDER BY p.CON_ID;
```

17. Change the current container to `PDB1` and create the `HR` schema in it.

When you are prompted, enter the password `ABcd##1234`, the default tablespace is `users`, the temporary tablespace as `temp`, and the log file as `hr.log`.

```
conn / as sysdba

ALTER SESSION SET CONTAINER=PDB1;

@ $ORACLE_HOME/demo/schema/human_resources/hr_main.sql
```

18. Retrieve the tables owned by the `HR` user in `PDB1`.

Because the current container is `PDB1`, `CDB_TABLES` retrieve the data for the `PDB1` only.

```
col TABLE_NAME for a25

SELECT CON_ID, T.TABLE_NAME
FROM CDB_TABLES T
WHERE T.OWNER='HR'
ORDER BY T.TABLE_NAME;
```

19. Change the current container to the root container.

```
ALTER SESSION SET CONTAINER=CDB$ROOT;
```

20. Retrieve the tables owned by the user `HR` in the PDBs associated with the CDB.

Because the current container is the root, `CDB_TABLES` returns the data of all the opened PDBs.

This query returns only rows where the PDB has an ID greater than 2 to avoid showing the tables in the root and seed containers.

If a pluggable database is closed, the query does not return an error. It just does not include the tables in that PDB in its output.

```
set linesize 180
COL PDB_NAME FOR A15
COL OWNER FOR A15
COL TABLE_NAME FOR A30
SELECT P.PDB_ID, T.OWNER, P.PDB_NAME, T.TABLE_NAME
FROM DBA_PDBS P, CDB_TABLES T
WHERE P.PDB_ID > 2 AND
      P.PDB_ID = T.CON_ID AND
      T.OWNER='HR'
ORDER BY P.PDB_ID, T.OWNER;
```

21. Exit from SQL*Plus.

```
quit
```

22. In Oracle VirtualBox, create a snapshot for `srv1`. Give it the name "**oradb CDB database**".

Click on **Take** button > enter the name "**oradb CDB database**" > click on **OK** button

Wait until the snapshot is taken

This snapshot represents the CDB database. In the incoming course practices, whenever we want to work on a CDB database, we restore `srv1` from this snapshot.

By reaching to this point, you should have two snapshots for the `srv1` as follows:





Summary

The procedure of creating a CDB database using `dbca` is very similar to the procedure of creating a non-CDB database.

