Creating Pluggable Databases (PDBs)

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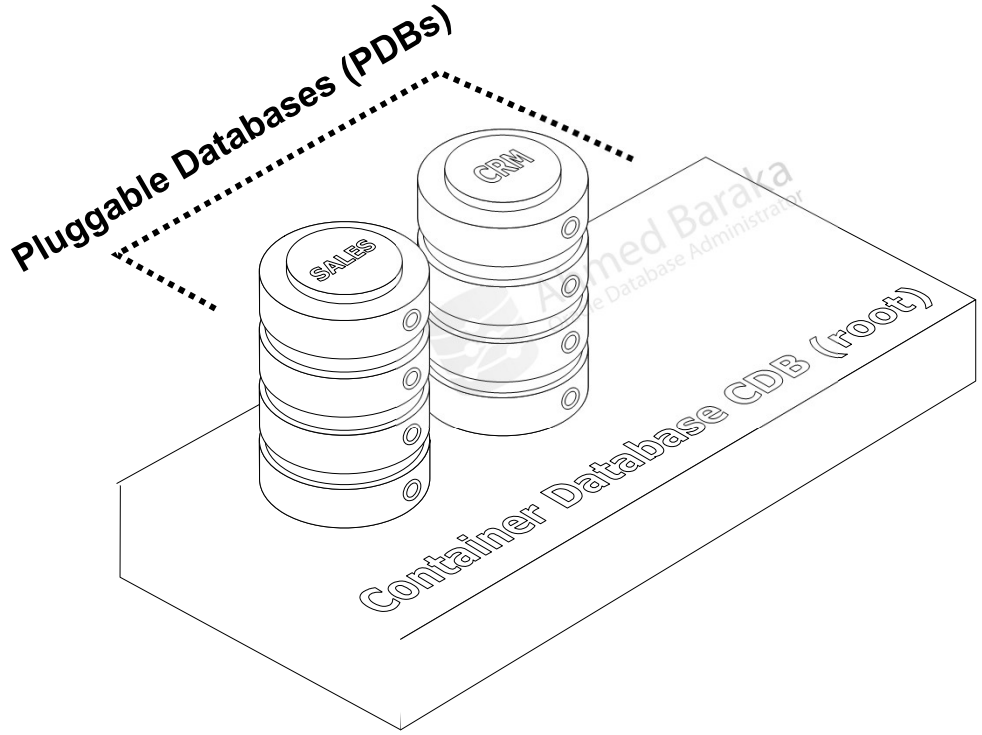
Objectives

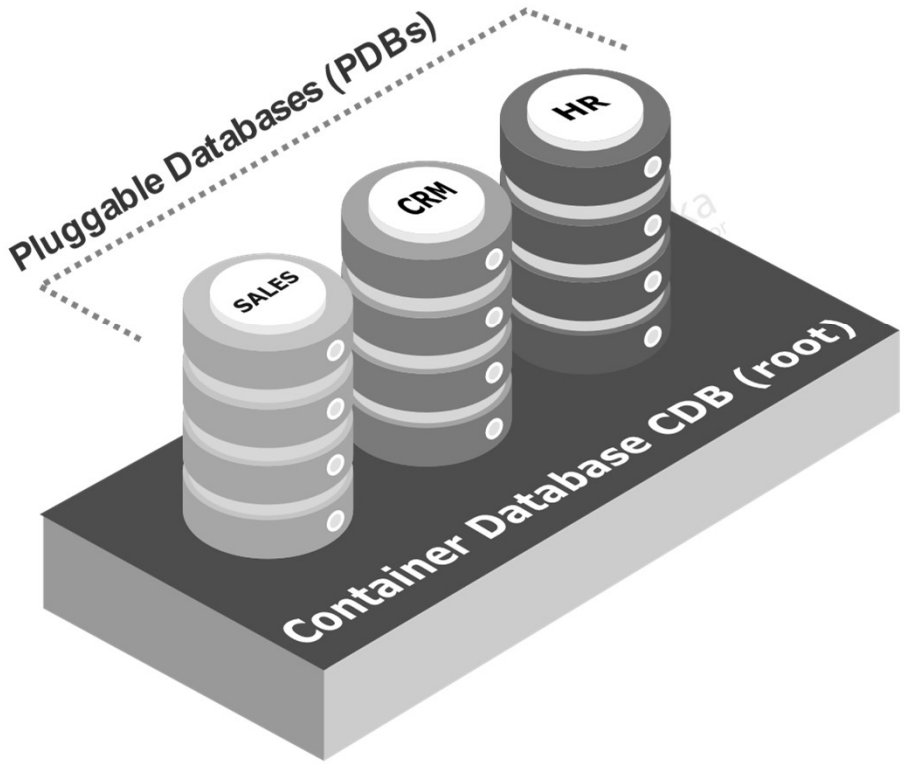
In this lecture, you will learn how to perform the following:

- Describe PDB creation process and its prerequisites
- Create a PDB using dbca and SQL Developer
- Create a PDB using **`CREATE PLUGGABLE DATABASE`** statement
- Create a PDB from the Seed Container
- Clone a Local PDB
- Drop a PDB

A CD Database with Two application PDBs



An Oracle DB Database with Three User PDBs



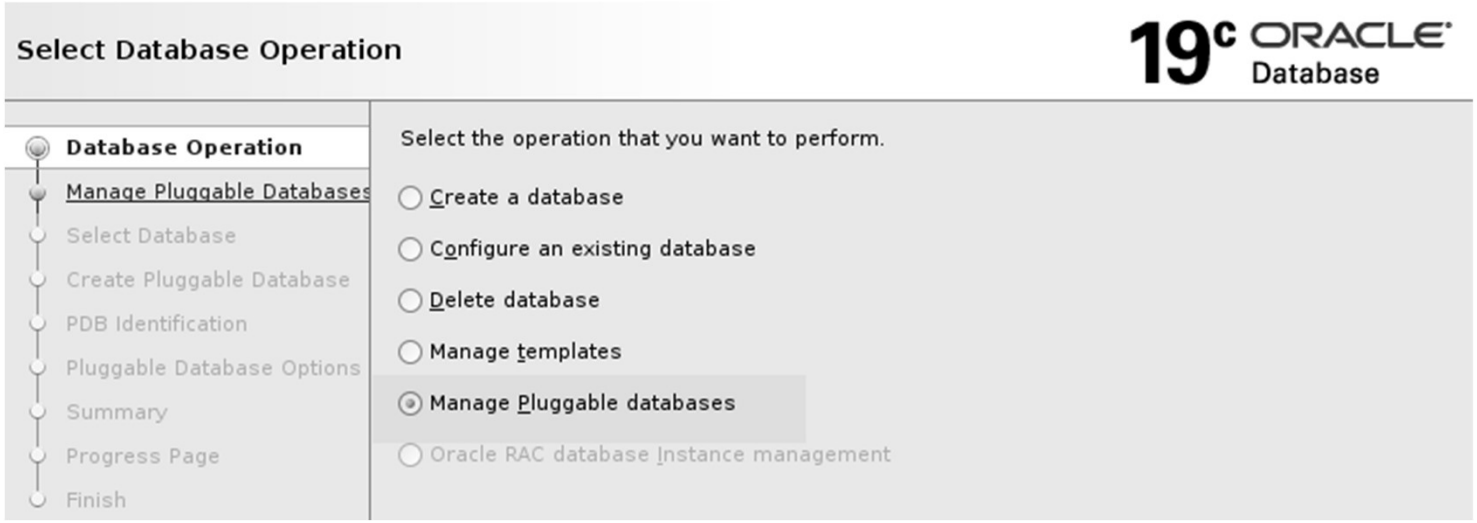
Creating a PDB Prerequisites

- The CDB must be open in read/write mode
- The current user must be a common user
- The current user must have the **`CREATE PLUGGABLE DATABASE`** system privilege

PDB Creation Tools

- SQL*Plus
  - Using **`CREATE PLUGGABLE DATABASE`** statement
- **`dbca`**
  - Copy from seed
  - Plugging from supplied templates (schema templates)
  - Unplugging / plugging method
  - Cloning from a remote PDB (19c)
- SQL Developer
- EM Cloud Control

Duplicating an Active PDB using DBCA



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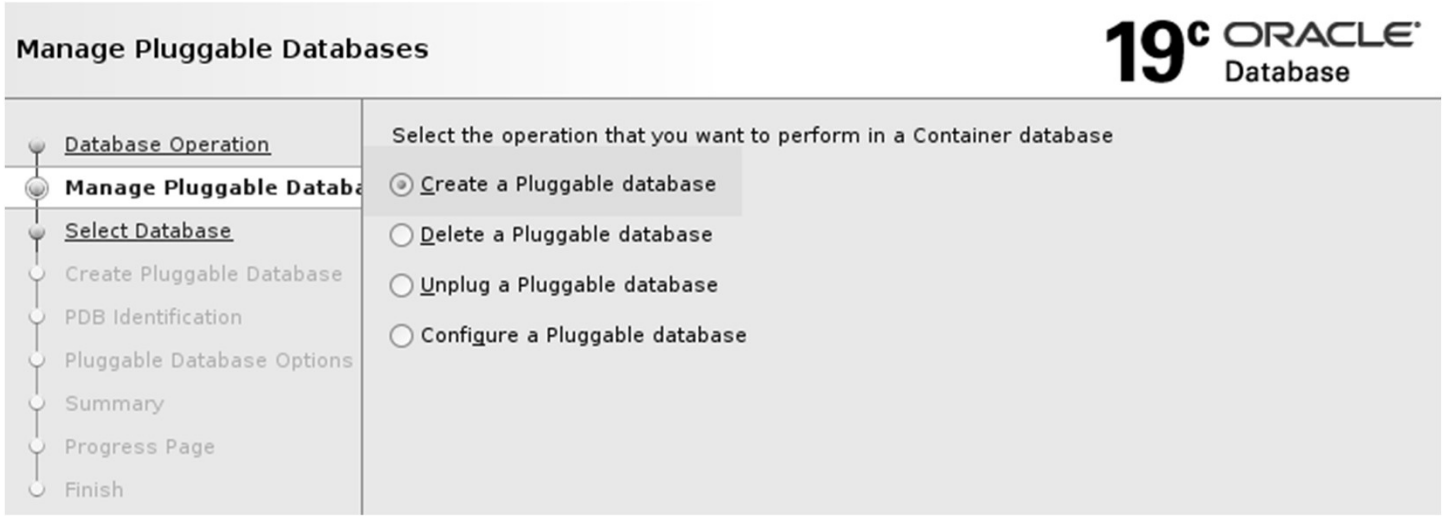

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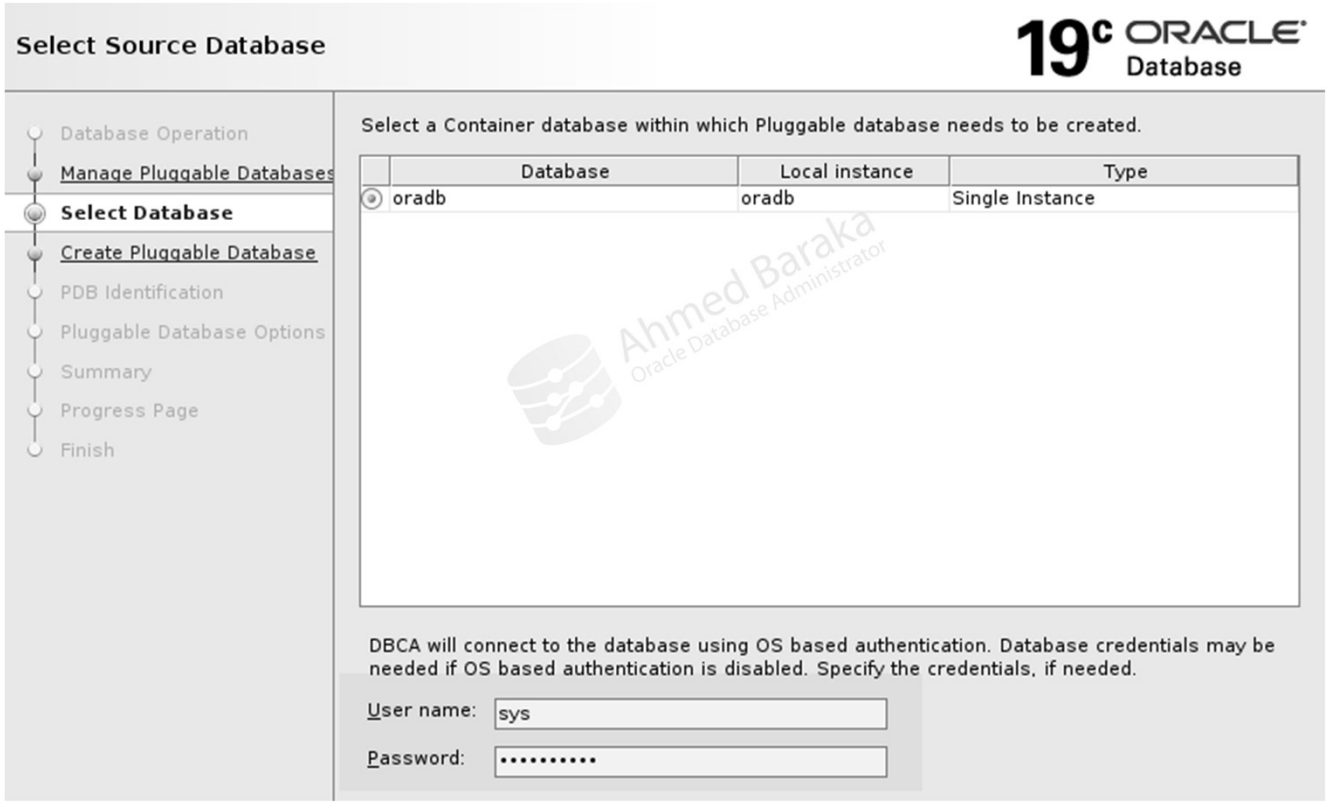

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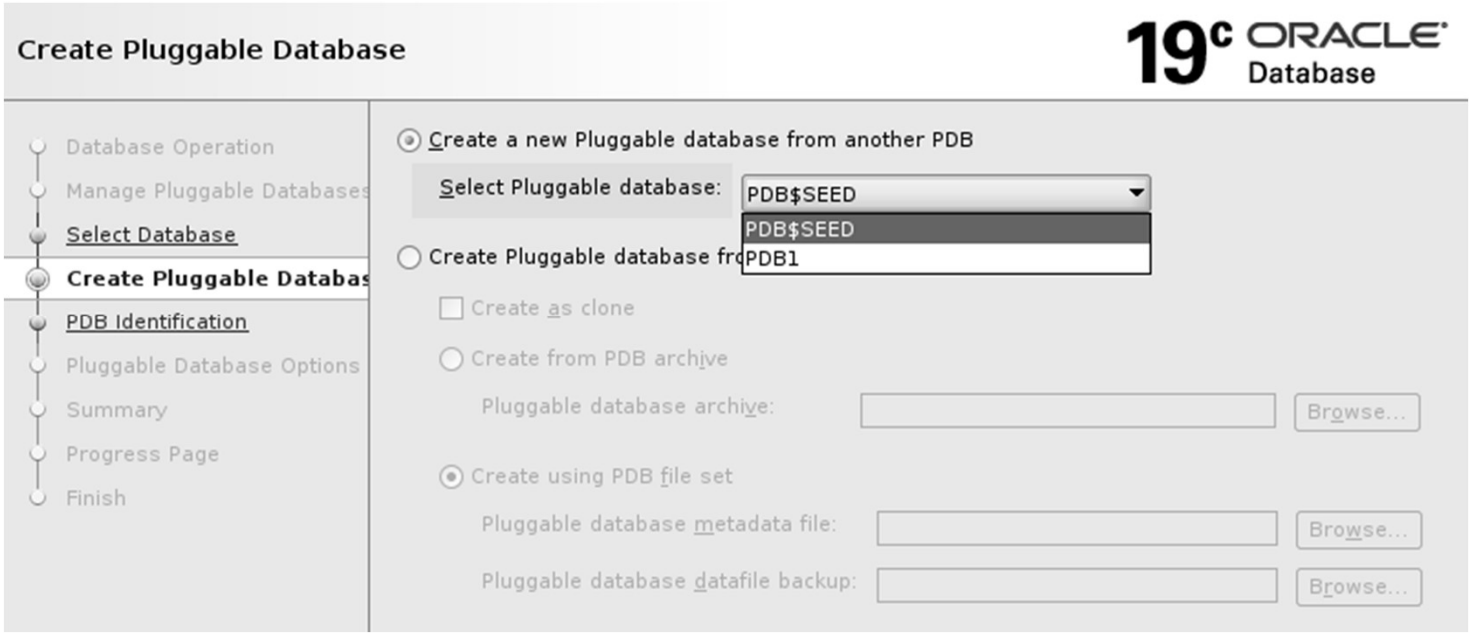

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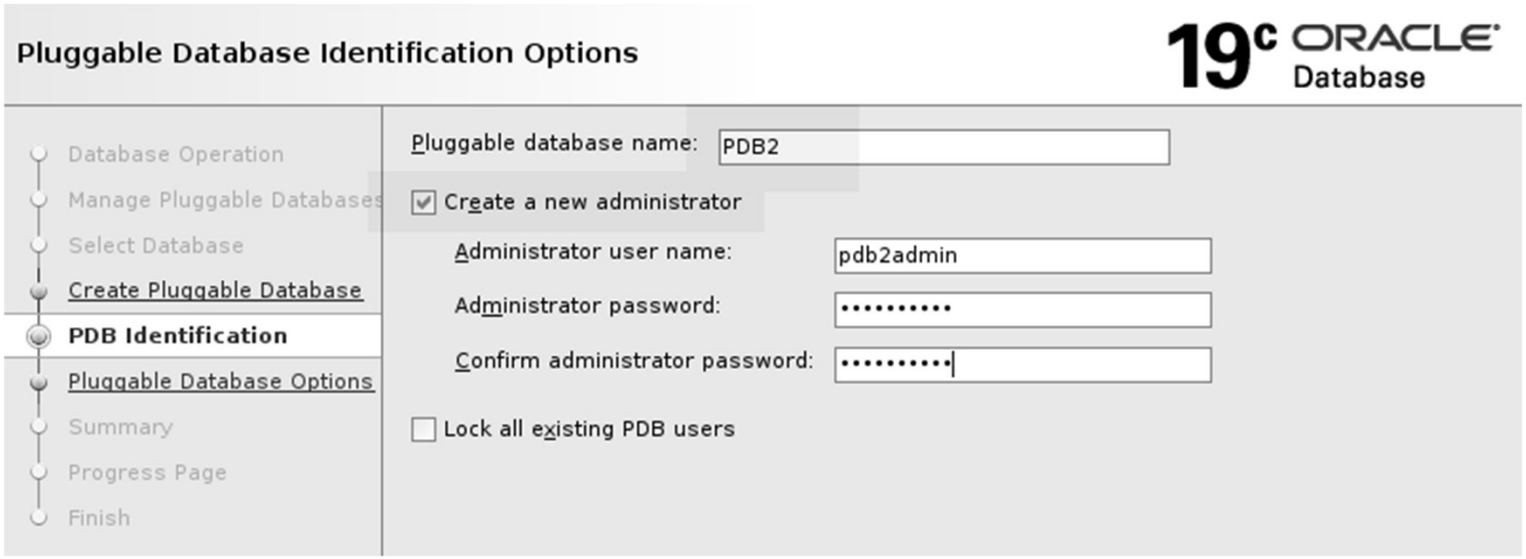

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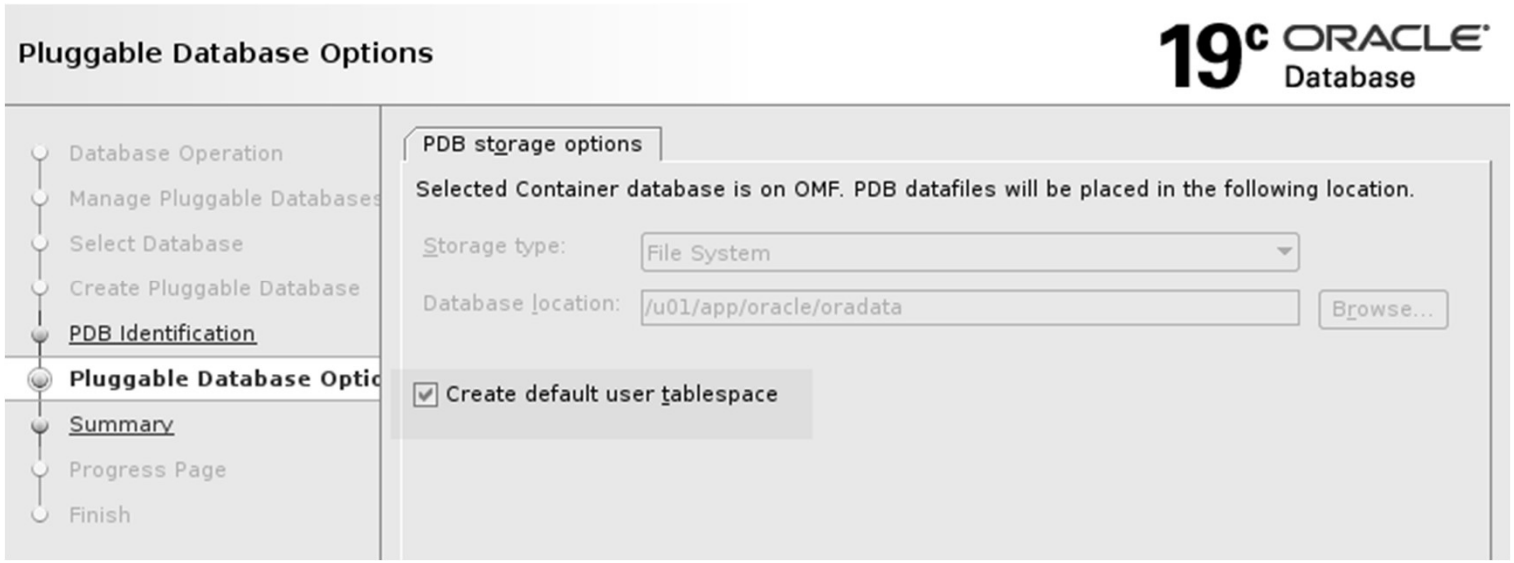

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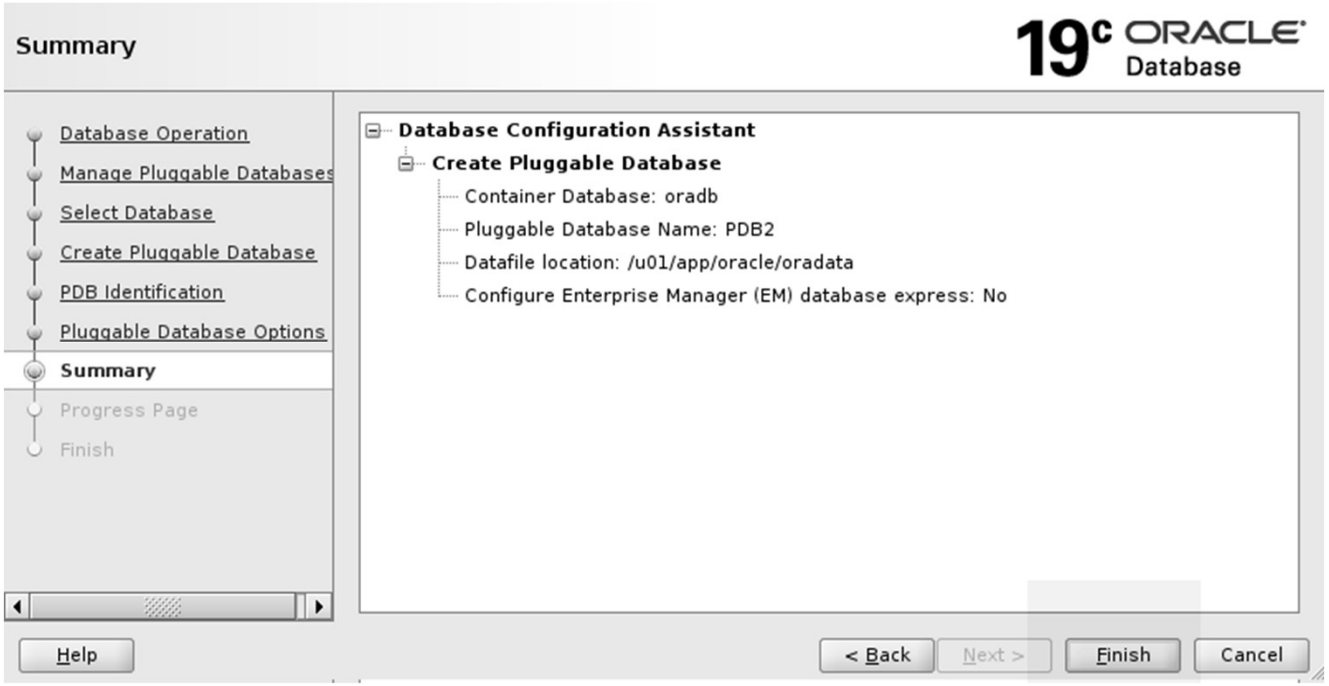
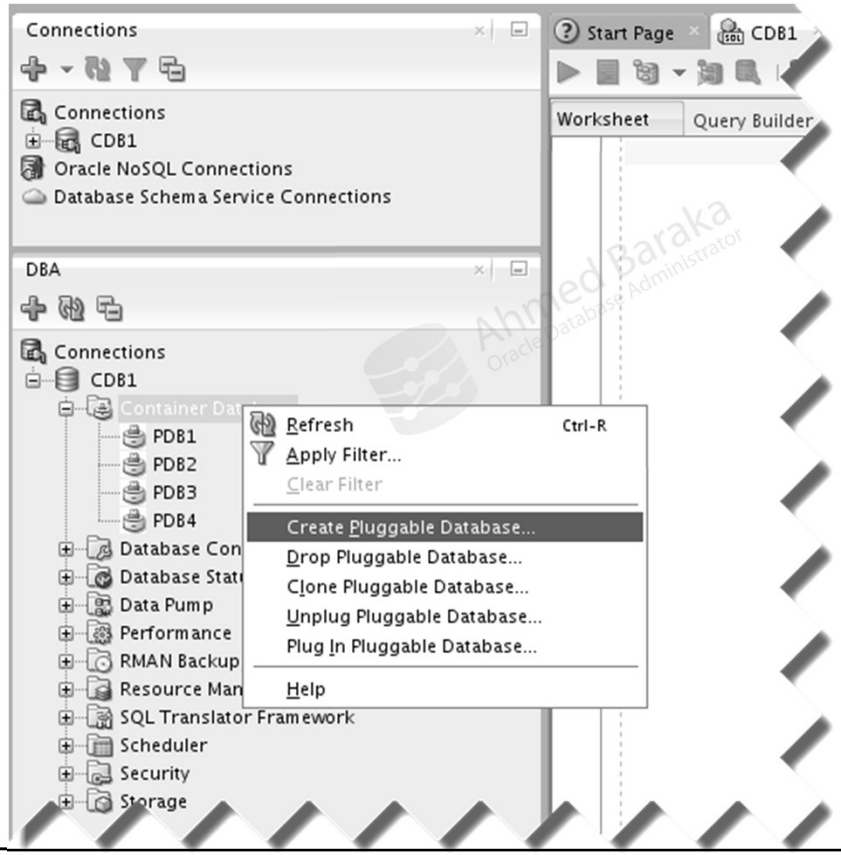


Creating a PDB using SQL Developer



Options for Creating a PDB using `CREATE PLUGGABLE DATABASE` command

Category	Option	Description
Copying	**From the seed**	By using the files of the CDB seed or application seed.
	Clone a local PDB	By cloning a source local PDB.
	Clone a remote PDB	By cloning a remote PDB.
	Clone a non-CDB	By cloning a non-CDB.
Plugging In	**Plugging in an Unplugged PDB**	By plugging in an unplugged PDB
	Adopting a Non-CDB as a PDB (Using the DBMS_PDB)	By creating an unplugged PDB from a non-CDB and then plug the unplugged PDB into the CDB.
Relocating	**Relocating a PDB**	By moving the files associated with the PDB to a new location.
Proxy PDB	**Creating a PDB as a proxy PDB**	By referencing a different PDB with a database link

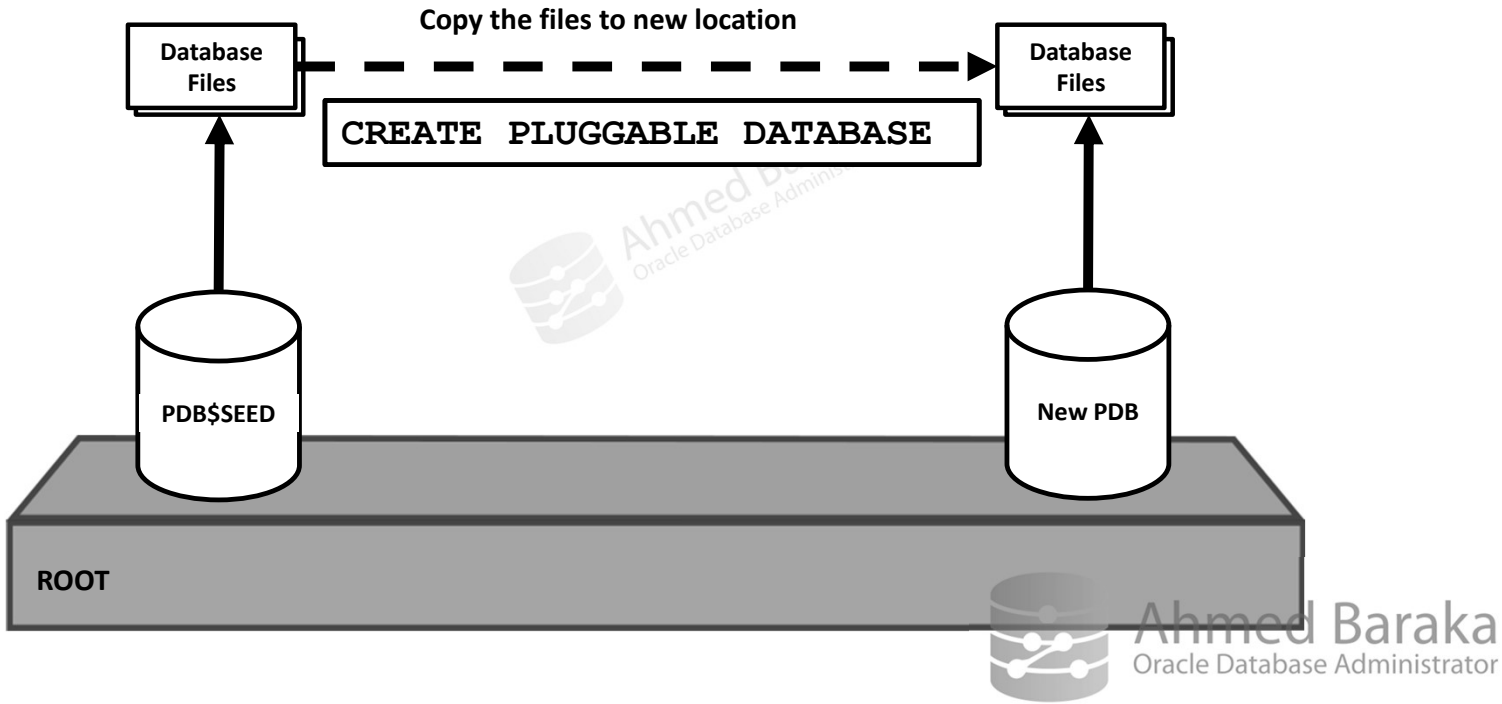
File Location of the New PDB

Clause or Initialization Parameter	Precedence Order	Description
FILE_NAME_CONVERT clause	1	Filenames and destination of the data files are defined by converting specific string in the source filenames to another defined string.
CREATE_FILE_DEST clause	2	Sets the OMF destination in the new PDB and creates the new datafiles in it.
DB_CREATE_FILE_DEST initialization parameter	3	When defined in the root, it specifies the default location for Oracle Managed Files (OMF) for the CDB.
PDB_FILE_NAME_CONVERT initialization parameter	4	This initialization parameter maps names of existing files to new file names when processing a CREATE PLUGGABLE DATABASE statement.

More CREATE PLUGGABLE DATABASE Optional Clauses

Clause	Task/Description
DEFAULT TABLESPACE	Create a new tablespace and make it the default tablespace for the new PDB.
STORAGE	Limit the amount of storage that the PDB can use. If omitted, no limit is set.
ROLES	Define the roles that you want to grant to the local role PDB_DBA. PDB_DBA role is in turn granted to the local administrator.
NO DATA	Clone the data model definition of the source PDB without cloning its data

About Creating a PDB from the Seed Container



Creating a PDB from the Seed Procedure

1. Login to the root container as a common user (like **SYSTEM**)
2. Run the **CREATE PLUGGABLE DATABASE** statement. You must specify a local administrator for the PDB.
3. Open the new PDB in read/write mode.

```
ALTER PLUGGABLE DATABASE pdb2 OPEN;
```

4. Back up the PDB.

Creating a PDB from the Seed Example 1

```
CREATE PLUGGABLE DATABASE pdb1
 ADMIN USER pdb1admin IDENTIFIED BY mypassword
 ROLES=(CONNECT,DBA);
```

- Assumptions:
  - Either **DB_CREATE_FILE_DEST** for the CDB, or the **PDB_FILE_NAME_CONVERT** initialization parameter are set.
  - No storage limit is required

Creating a PDB from the Seed Example 2

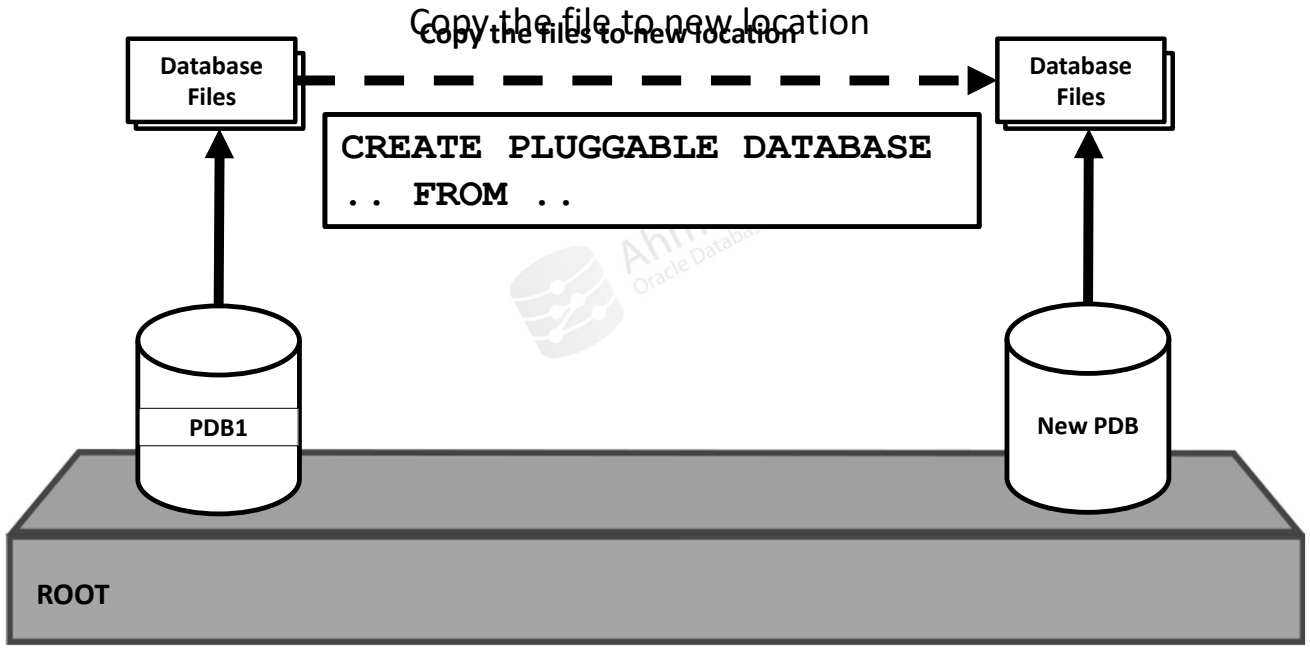
```
CREATE PLUGGABLE DATABASE pdb1
 ADMIN USER pdb1admin IDENTIFIED BY mypassword
 ROLES=(DBA)
 CREATE_FILE_DEST='/u01/oradata/cdb1/pdb1';
```

- Assumptions:
  - No storage limit is required

Creating a PDB from the Seed Example 3

```
CREATE PLUGGABLE DATABASE pdb2
 ADMIN USER pdb2admin IDENTIFIED BY mypassword
 STORAGE (MAXSIZE 2G)
 DEFAULT TABLESPACE HR
 DATAFILE '/u01/oracle/dbs/pdb2/hr01.dbf' SIZE 250M AUTOEXTEND ON
 FILE_NAME_CONVERT = ('/u01/oracle/dbs/pdbseed/',
'/u01/oradata/cdb1/pdb2/');
```

About Cloning from a Local PDB



Cloning from a PDB Considerations

- In 12.1: the source PDB must be in a READ-ONLY state.
- In 12.2: the source PDB can be open, providing that the CDB is in **`ARCHIVELOG`** mode with local UNDO enabled.
- Each PDB in a CDB must be uniquely identifiable.

Cloning from a Local PDB Procedure

1. Connect to the root as a common user
2. Close the source PDB then start it in READ ONLY (if needed)

```
ALTER PLUGGABLE DATABASE pdb1 CLOSE;
ALTER PLUGGABLE DATABASE pdb1 OPEN READ ONLY;
```

3. Clone the PDB

```
CREATE PLUGGABLE DATABASE pdb2 FROM pdb1;
```

```
CREATE PLUGGABLE DATABASE pdb2 FROM pdb1
 FILE_NAME_CONVERT=('/u01/pdb1','/u01/pdb2');
```

4. Open the PDB in read/write mode

Dropping a PDB

- The PDB must be closed
- Must be done from the root
- Use the following statement:

```
DROP PLUGGABLE DATABASE PDB1 [ [ KEEP | INCLUDING ] DATAFILES];
```

  - **KEEP DATAFILES** requires the PDB to be unplugged
  - **INCLUDING DATAFILES** requires the PDB to be in mounted mode (closed) or unplugged
- The dbca and SQL Developer can also be used

Summary

In this lecture, you should have learnt how to perform the following:

- Describe PDB creation process and its prerequisites
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