Lab 13: Moving PDBs

Overview

In this lab, you will create a new CDB named `CDBDEV` and several PDBs, then practice moving a PDB from `CDBLAB` to `CDBTEST` using the near-zero downtime PDB relocation feature.

Part A: Creating the New CDB and PDBs

1. **Create the New CDB (`CDBDEV`)**

   a. Open a terminal window and set the environment variables for `CDBLAB` :

   ```
   . oraenv
   ORACLE_SID = [orclcdb] ? CDBLAB
   The Oracle base remains unchanged with value /u01/app/oracle
   ```

   b. Start SQL*Plus and log in as a user with SYSDBA privileges:

   ```
   sqlplus / as sysdba
   ```

   c. Create the new CDB `CDBDEV` :

   ```
   CREATE PLUGGABLE DATABASE cdbdev
   ADMIN USER pdb_admin IDENTIFIED BY password
   FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/CDBLAB/pdbseed',
   '/u01/app/oracle/oradata/CDBDEV');
   ```

   Expected Output:

   ```
   Pluggable database created.
   ```

2. **Create PDBs in `CDBDEV`**

   a. Open a terminal window and set the environment variables for `CDBDEV` :

   ```
   . oraenv
   ORACLE_SID = [orclcdb] ? CDBDEV
   The Oracle base remains unchanged with value /u01/app/oracle
   ```

   b. Start SQL*Plus and log in as a user with SYSDBA privileges:

   ```
   sqlplus / as sysdba
   ```

   c. Create PDBs `PDB1` , `PDB2` , and `PDB3` :

   ```
   CREATE PLUGGABLE DATABASE pdb1 FROM pdb$seed
   ADMIN USER pdb1_admin IDENTIFIED BY password
   FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/CDBDEV/pdbseed',
   '/u01/app/oracle/oradata/CDBDEV/pdb1');

   CREATE PLUGGABLE DATABASE pdb2 FROM pdb$seed
   ADMIN USER pdb2_admin IDENTIFIED BY password
   FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/CDBDEV/pdbseed',
   '/u01/app/oracle/oradata/CDBDEV/pdb2');
   ```

```
CREATE PLUGGABLE DATABASE pdb3 FROM pdb$seed
ADMIN USER pdb3_admin IDENTIFIED BY password
FILE_NAME_CONVERT = ('/u01/app/oracle/oradata/CDBDEV/pdbseed',
'/u01/app/oracle/oradata/CDBDEV/pdb3');
```

Expected Output:

```
Pluggable database created.
```

d. Open the PDBs:

```
ALTER PLUGGABLE DATABASE pdb1 OPEN;
ALTER PLUGGABLE DATABASE pdb2 OPEN;
ALTER PLUGGABLE DATABASE pdb3 OPEN;
```

Part B: Moving a PDB

1. **Prepare for PDB Relocation**

   a. Open a terminal window and set the environment variables for `CDBLAB`:

   ```
   . oraenv
   ORACLE_SID = [orclcdb] ? CDBLAB
   The Oracle base remains unchanged with value /u01/app/oracle
   ```

   b. Start SQL*Plus and log in as a user with SYSDBA privileges:

   ```
   sqlplus / as sysdba
   ```

   c. Verify that the source (`CDBLAB`) is configured to use local undo:

   ```
   SET sqlprompt "CDBLAB1> "
   SELECT property_name, property_value
   FROM database_properties
   WHERE property_name = 'LOCAL_UNDO_ENABLED';
   ```

   Expected Output:

   ```
   PROPERTY_NAME        PROPERTY_VALUE
   -------------------- ---------------
   LOCAL_UNDO_ENABLED   TRUE
   ```

2. **Verify the Test User and Table in `PDB3`**

   a. Connect to the `PDB3` service:

   ```
   connect test@pdb3
   Enter password: password
   ```

   b. Verify the test data:

   ```
   SELECT label, COUNT(*) FROM test.bigtab GROUP BY label;
   ```

Expected Output:

```
LABEL                        COUNT(*)
---------------------------- ----------
DATA FROM test.bigtab        10000
```

3. **Prepare to Relocate `PDB3` from `CDBLAB` to `CDBTEST`**

   a. In `CDBLAB`, create the database link to access `CDBTEST`:

```
connect / as sysdba
DROP PUBLIC DATABASE LINK link_cdbtest;
CREATE PUBLIC DATABASE LINK link_cdbtest
CONNECT TO system IDENTIFIED BY password
USING 'CDBTEST';
```

   Expected Output:

```
Database link created.
```

   b. List the PDBs to verify they are open:

```
SHOW PDBS;
```

   Expected Output:

```
CON_ID  CON_NAME   OPEN MODE  RESTRICTED
------  ---------- ---------- ----------
2       PDB$SEED   READ ONLY  NO
3       PDB1       READ WRITE NO
4       PDB2       READ WRITE NO
5       PDB3       READ WRITE NO
```

   c. If any of the PDBs are not open, open them:

```
ALTER PLUGGABLE DATABASE ALL OPEN;
```

   d. Save the state of the PDBs:

```
ALTER PLUGGABLE DATABASE ALL SAVE STATE;
```

4. **Create the Directory for `PDB3` in `CDBTEST`**

   a. Open a new terminal window and set the environment variables for `CDBTEST`:

```
. oraenv
ORACLE_SID = [orclcdb] ? CDBTEST
The Oracle base remains unchanged with value /u01/app/oracle
```

   b. Create the directory for `PDB3`:

```
mkdir -p /u01/app/oracle/oradata/CDBTEST/pdb3
```

5. **Relocate `PDB3` from `CDBLAB` to `CDBTEST`**

a. In `CDBTEST`, create the database link to access `PDB3` in `CDBLAB`:

```
connect / as sysdba
DROP PUBLIC DATABASE LINK link_orclcdb;
CREATE PUBLIC DATABASE LINK link_orclcdb
CONNECT TO system IDENTIFIED BY password
USING 'CDBLAB';
```

Expected Output:

```
Database link created.
```

b. Relocate `PDB3` from `CDBLAB` to `CDBTEST`:

```
CREATE PLUGGABLE DATABASE pdb3
FROM pdb3@link_orclcdb relocate
FILE_NAME_CONVERT=('/u01/app/oracle/oradata/CDBLAB/pdb3',
'/u01/app/oracle/oradata/CDBTEST/pdb3');
```

Expected Output:

```
Pluggable database created.
```

6. **Open the Relocated `PDB3` in Read-Only Mode**

a. Open the relocated `PDB3` in read-only mode:

```
ALTER PLUGGABLE DATABASE pdb3 OPEN READ ONLY;
```

Expected Output:

```
Pluggable database altered.
```

b. Set the session to the relocated `PDB3` and verify the data:

```
ALTER SESSION SET CONTAINER=pdb3;
SELECT label, COUNT(*) FROM test.bigtab GROUP BY label;
```

Expected Output:

```
LABEL                          COUNT(*)
------------------------------ ----------
DATA FROM test.bigtab          10000
```

7. **Verify and Finalize the Relocation**

a. In `CDBLAB`, verify that `PDB3` does not exist anymore:

```
SELECT pdb_name, status FROM cdb_pdbs;
```

Expected Output:

```
PDB_NAME      STATUS
------------- ----------
```

```
PDB$SEED        NORMAL
PDB1            NORMAL
PDB2            NORMAL
```

b. In `CDBTEST`, open `PDB3` in read-write mode:

```
ALTER PLUGGABLE DATABASE pdb3 OPEN READ WRITE;
```

Expected Output:

```
Pluggable database altered.
```

8. **Clean Up**

a. Drop the relocated `PDB3` in `CDBTEST`:

```
ALTER SESSION SET CONTAINER=CDB$ROOT;
ALTER PLUGGABLE DATABASE pdb3 CLOSE;
DROP PLUGGABLE DATABASE pdb3 INCLUDING DATAFILES;
```

Expected Output:

```
Pluggable database dropped.
```

b. In `CDBLAB`, revoke the `SYSOPER` privilege from