Practice - Simplified Data Migration Across Platforms

Target

In this practice, you will implement a few of the simplified PDB and tablespace migration across platforms introduced in Oracle database 23ai.

Before you start

Before starting with the practice, you **must** take a snapshot of the vm. You will restore the vm from this snapshot by the end of the practice.

Practice Setup

To setup for this practice, you will create a new PDB, user, tablespace, and populate it with some testing data.

1. Open Putty, connect to the root CDB as sys:

```
unset TWO_TASK export
ORACLE_SID=FREE
sqlplus / as sysdba
```

2. Run the following to create a new PDB, a new tablespace insider the PDB, new user in it, and populate some testing data owned by the new user.

```sql
-- Create a new pluggable database
CREATE PLUGGABLE DATABASE NEWPDB1
  ADMIN USER pdbadmin IDENTIFIED BY Welcome123
  ROLES = (DBA)
  FILE_NAME_CONVERT = ('/opt/oracle/oradata/FREE/pdbseed/',
'/opt/oracle/oradata/FREE/newpdb1/');
-- Open the new PDB
ALTER PLUGGABLE DATABASE NEWPDB1 OPEN;

-- Save state so it opens automatically on startup
ALTER PLUGGABLE DATABASE NEWPDB1 SAVE STATE;

-- Switch session to the new PDB
ALTER SESSION SET CONTAINER = NEWPDB1;
-- Create a new tablespace in the PDB
CREATE TABLESPACE test_ts
  DATAFILE 'test_ts01.dbf'
  SIZE 50M
  AUTOEXTEND ON
  NEXT 10M MAXSIZE 10G;

-- Create a new user and assign the default tablespace
CREATE USER test_user IDENTIFIED BY User123
  DEFAULT TABLESPACE test_ts
  QUOTA UNLIMITED ON test_ts;

-- Grant privileges to the user
GRANT CONNECT, RESOURCE TO test_user;
```

```
-- Connect as the new user
CONNECT test_user/User123@localhost:1521/NEWPDB1

-- Create and populate a sample
table CREATE TABLE employees (    id
NUMBER PRIMARY KEY,    name
VARCHAR2(50),    salary NUMBER
);

INSERT INTO employees VALUES (1, 'Alice', 5000);
INSERT INTO employees VALUES (2, 'Bob', 6000);
INSERT INTO employees VALUES (3, 'Charlie', 7000); COMMIT;
```

3. Enable the ARCHIVELOG mode in the database.

```
conn / as sysdba SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
ALTER DATABASE ARCHIVELOG;
ALTER DATABASE OPEN;
```

Quickly Transport a PDB in NOCATALOG MODE

In this section of the practice, you will transport the new PDB (NEWPDB1) to the same CDB.

Note: Because we have only one CDB, we are transporting the PDB to the same CDB. But in real life, you would transport it to a new CDB.

4. Connect to the root as a user with the SYSDBA or SYSBACKUP privilege.

```
connect / as sysdba
```

5. Close the PDB that you want to transport to a destination platform. Observe that the application should be down at this point.

```
ALTER PLUGGABLE DATABASE newpdb1 CLOSE IMMEDIATE;
```

6. Exit from SQL*Plus.

7. Create an incremental level 0 backup of the PDB and unplug the PDB from the source CDB.

```
mkdir /tmp/backups

rman target /

BACKUP
UNPLUG INTO '/tmp/backups/newpdb1_metadata.xml'
INCREMENTAL LEVEL 0
PLUGGABLE DATABASE newpdb1
XML BACKUP FORMAT '/tmp/backups/newpdb1_unplug.bck'
TAG 'newpdb1_lvl01';

# verify
SELECT STATUS FROM CDB_PDBS WHERE PDB_NAME='NEWPDB1';

LIST BACKUP TAG 'NEWPDB1_LVL01';
```

8. On the source CDB, use the RESTORE command with the PREVIEW option and the TO TRANSPORT FILE option to create a transport file. The transport file is an XML file that stores information about backups corresponding to the PDB being transported. RMAN requires the transport XML file to restore data files, roll forward, and plug in the PDB on the destination CDB.

```
RESTORE PREVIEW
```

```
TO TRANSPORT FILE '/tmp/backups/newpdb1_transportfile.xml'
PLUGIN TAG 'newpdb1_lvl01'
PLUGGABLE DATABASE newpdb1;
```

The command above in my environment hit the following error:

```
RMAN> RESTORE PREVIEW
TO TRANSPORT FILE '/tmp/backups/newpdb1_transportfile.xml'
PLUGIN TAG 'newpdb1_lvl01'
PLUGGABLE DATABASE newpdb1;
RESTORE PREVIEW
2> TO TRANSPORT FILE '/tmp/backups/newpdb1_transportfile.xml'
3> PLUGIN TAG 'newpdb1_lvl01'
4> PLUGGABLE DATABASE newpdb1;
Starting restore  using
channel ORA_DISK_1

RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: failure of restore command
RMAN-05680: datafile 33 with checkpoint SCN 42852485 not found in plugin
backup
```

After contacting Oracle support, they replied with the following message:

> This error is caused due to below known Bug in 23.4 anf fixed in 25ai release
>
> Bug 36656441 : RESTORE PREVIEW TO TRANSPORT LIST PLUGIN TAG 'PDBA_PTAG' PLUGGABLE DATABASE 'PDBA' FAILS WITH RMAN-05680
>
> 23ai is not released to onprem customers, so you might be using BETA version and there wont be interim patches for Beta version.
>
> Please wait for 23ai to be released to onprem public to include all the fixes from beta

9. Stop the vm and restore it from the taken Snapshot.