Practice 19: Performing Application Maintenance Tasks

Practice Overview

In this practice, you will implement the application maintenance tasks on the HR_APP application. Specifically, you will:

- Upgrade the HR_AC application in the application container
- Obtain information about the HR_APP application
- Apply an application patch on HR_APP
- Uninstall the HR_APP application

Practice Assumptions

- `CDB1` database (in `srv1`) is up and running.
- You successfully downloaded the `hr_app_v1.1.sql` script from the lecture downloadable resources.

A. Upgrade HR_APP application

In this section of the practice, you will upgrade the application `HR_APP` in the application root `HR_AC`.

Note: make sure you have only one Putty terminal session connected to the application root. I faced issues with synchronizing an application PDB with the application root when there was another terminal session connected to the application root at the same time.

1. In a Putty terminal window, login to the application root `HR_AC` as `SYSDBA` and verify that the application `HR_APP` is of version 1.0.

```
sqlplus sys/oracle@hr_ac as sysdba

column app_name format a15
column app_version format a10
column app_status format a15
SELECT APP_NAME, APP_VERSION, APP_STATUS
FROM DBA_APPLICATIONS
WHERE APP_IMPLICIT='N';
```

2. Run the following statement to start the upgrade process.

   This statement takes some time to execute because Oracle internally clones the application root. This cloned application is called “application root clone”.

```
ALTER PLUGGABLE DATABASE APPLICATION hr_app BEGIN UPGRADE '1.0' TO '2.0';
```

3. Create the upgrade script and paste its code from the `hr_app_v1.1.sql` file.

   The script creates a new table (`JOB_HISTORY`).

```
host vi /home/oracle/scripts/hr_app_v1.1.sql
```

4. Execute the upgrade script.

```
@/home/oracle/scripts/hr_app_v1.1.sql
```

5. End the upgrade process.

```
ALTER PLUGGABLE DATABASE APPLICATION hr_app END UPGRADE TO '2.0';
```

6. Synchronize the application in the PDB `HR_PDB1`.

```
ALTER SESSION SET CONTAINER= hr_pdb1;
ALTER PLUGGABLE DATABASE APPLICATION hr_app SYNC;
```

Obtain information about the HR_APP application after the upgrade

7. Connect to the CDB root.

```
conn / as sysdba
```

8. Display the list of the PDBs in the CDB.

Observe the new cloned application root that is internally created by Oracle as a result of the upgrade process. This application root is opened in READ ONLY mode. Every time you upgrade the application, a new internal application root will be created and opened in READ ONLY mode.

```
col name format a20

SELECT CON_ID, NAME, APPLICATION_ROOT, OPEN_MODE, APPLICATION_ROOT_CON_ID
FROM V$PDBS
ORDER BY 3,1;

-- observe the datafiles created for the cloned application root:
--  substitute the con_id value with the one returned by your case
col name format a80
SELECT NAME FROM V$DATAFILE WHERE CON_ID=8;
```

9. Switch the current container to the application root `HR_AC` and check the status of the `HR_APP` application.

You will observe that the application version has been upgraded to version 2.0

```
ALTER SESSION SET CONTAINER=HR_AC;

column app_name format a15
column app_version format a5
column app_status format a15

SELECT APP_NAME, APP_VERSION, APP_STATUS
FROM DBA_APPLICATIONS
WHERE APP_IMPLICIT='N';
```

10. Retrieve information about the application in the application PDBs.

Observe that the application in `HR_PDB1` is of version 2 and it is of version 1 in the other PDB.

```
col pdb_name format a10

SELECT PDB.PDB_NAME, APP.APP_NAME, APP.APP_VERSION , APP.APP_STATUS
FROM   DBA_APP_PDB_STATUS APP, DBA_PDBS PDB
WHERE  APP.CON_UID=PDB.CON_UID;
```

11. Verify that the new table was created in `HR_PDB1`, but not in `HR_PDB2`.

```
conn hr/oracle@//srv1:1521/hr_pdb1.localdomain
DESC HR.JOB_HISTORY

conn hr/oracle@//srv1:1521/hr_pdb2.localdomain
DESC HR.JOB_HISTORY
```

12. Synchronize the application in `HR_PDB2`.

```
conn sys/oracle@hr_ac as sysdba
ALTER SESSION SET CONTAINER= hr_pdb2;
ALTER PLUGGABLE DATABASE APPLICATION hr_app SYNC;
```

13. Retrieve information about the application in the application PDBs.

```
conn sys/oracle@hr_ac as sysdba
col pdb_name format a10

SELECT PDB.PDB_NAME, APP.APP_NAME, APP.APP_VERSION , APP.APP_STATUS
FROM   DBA_APP_PDB_STATUS APP, DBA_PDBS PDB
WHERE  APP.CON_UID=PDB.CON_UID;
```

B. Apply an application patch

In this section of the practice, you will apply an application patch on the application HR_APP.

14. Login to the application root HR_AC as SYSDBA and verify that the application HR_APP is of version 2.0.

```
conn sys/oracle@hr_ac as sysdba

column app_name format a15
column app_version format a10
column app_status format a15
SELECT APP_NAME, APP_VERSION, APP_STATUS
FROM DBA_APPLICATIONS
WHERE APP_IMPLICIT='N';
```

15. Run the following statement to start the patch process.

```
ALTER PLUGGABLE DATABASE APPLICATION hr_app
  BEGIN PATCH 201 MINIMUM VERSION '2.0';
```

16. Apply the patch modifications by adding a column to the JOB_HISTORY table.

```
ALTER TABLE HR.JOB_HISTORY ADD ( NOTES VARCHAR2(20));
```

17. End the application patch

```
ALTER PLUGGABLE DATABASE APPLICATION hr_app END PATCH 201;
```

18. Synchronize the application in HR_PDB1 and HR_PDB2.

```
ALTER SESSION SET CONTAINER= hr_pdb1;
ALTER PLUGGABLE DATABASE APPLICATION hr_app SYNC;
ALTER SESSION SET CONTAINER= hr_pdb2;
ALTER PLUGGABLE DATABASE APPLICATION hr_app SYNC;
```

19. Switch the current container to the application root HR_AC and display information about the patches applied on the HR_APP application.

```
ALTER SESSION SET CONTAINER=HR_AC;

SELECT APP_NAME, PATCH_NUMBER, PATCH_MIN_VERSION, PATCH_STATUS
FROM   DBA_APP_PATCHES
WHERE  APP_NAME='HR_APP';

column name format a15
column app_name format a15
column app_version format a10
SELECT C.NAME, APS.APP_NAME, APS.APP_VERSION, APS.APP_STATUS
FROM   DBA_APP_PDB_STATUS APS
JOIN   V$CONTAINERS C ON C.CON_UID = APS.CON_UID
WHERE  APS.APP_NAME = 'HR_APP';
```

20. Display the list of the PDBs in the CDB.

Observe no internal application root was created as a result to applying the patch.

```
conn / as sysdba
col name format a20

SELECT CON_ID, NAME, APPLICATION_ROOT, OPEN_MODE, APPLICATION_ROOT_CON_ID
FROM V$PDBS
ORDER BY 3,1;
```

21. Verify that the new column has been added to the table in `HR_PDB1` and `HR_PDB2`.

```
conn hr/oracle@//srv1:1521/hr_pdb1.localdomain
DESC HR.JOB_HISTORY

conn hr/oracle@//srv1:1521/hr_pdb2.localdomain
DESC HR.JOB_HISTORY
```

C. Uninstall the application

In this section of the practice, you will uninstall the HR_APP application.

Note: Unfortunately, the uninstall process will fail and return an error. I have reported this issue to Oracle support but they did not provide a patch to fix it nor a workaround. I am presenting this section in this practice to, first, demonstrate the uninstall process and, second, to demonstrate the issue.

If you find a solution to this issue or a workaround, please drop me a line.

22. Exit from the Putty sessions connected to srv1.

23. Take a snapshot of the VirtualBox appliance. Give the snapshot the name “Before Uninstall”.

24. Start Putty, login as SYSDBA to HR_AC and start uninstalling HR_APP.

```
sqlplus sys/oracle@hr_ac as sysdba

ALTER PLUGGABLE DATABASE APPLICATION hr_app BEGIN UNINSTALL;
```

25. Perform the actions required to remove the application components.

This step does not remove the components from the application PDBs. It removes it from the application root.

```
DROP USER hr CASCADE;
DROP TABLESPACE hr_tbs INCLUDING CONTENTS AND DATAFILES;
```

26. End the uninstall process.

The command should return the following error:

```
ORA-65344: cannot uninstall an application that has objects, users, roles,
and profiles
```

Obviously the error complains that there are still objects that belong to the application and therefore the application cannot be uninstalled.

```
ALTER PLUGGABLE DATABASE APPLICATION hr_app END UNINSTALL;
```

27. List the objects that belong to HR_APP application.

You will observe that the auditing objects (owned by AUDSYS) are the root cause of the error. Oracle support has considered this a bug and has not yet provided a patch to fix it.

```
col object_name format a25
col owner format a10

SELECT OWNER, OBJECT_NAME, OBJECT_TYPE
FROM DBA_OBJECTS
WHERE CREATED_APPID IS NOT NULL;
```

28. Display the list of the PDBs in the CDB.

Observe the new cloned application root that is internally created by Oracle as a result of the uninstall process.

```
conn / as sysdba
col name format a20

SELECT CON_ID, NAME, APPLICATION_ROOT, OPEN_MODE, APPLICATION_ROOT_CON_ID
FROM V$PDBS
ORDER BY 3,1;
```

29. Because we cannot proceed to finish this tasks successfully, shutdown the appliance and revert it in Oracle VirtualBox to the snapshot taken in the beginning of this practice section.

Summary

In this practice, you have implemented the procedures to perform the following application maintenance tasks:

- Upgrade the HR_AC application in the application container
- Apply an application patch on HR_APP
- Uninstall the HR_APP application