

## Practice 3

# Performing RMAN Backups - Part I

### Practice Target

In this practice you will learn the basic fundamentals of taking backups in RMAN.

### Practice Overview

In high level, in this practice, you will perform the following tasks:

- Take a cold/consistent backup of the entire database (in NOARCHIVELOG mode)
- Take a hot/inconsistent backup of the entire database
- Take backups of specific tablespaces
- Specify the backup destination of a `BACKUP` command

### Assumptions

- This practice assumes that you have `srv1` appliance up and running and its database `ORADB` running in `OPEN` state. `winsrv2` is not needed for this practice.

### Note

I recommend taking a snapshot of the appliance before you start implementing the practice.

## A. Taking Whole Database Backup

In the following steps you will take a backup of the whole database using RMAN. You will learn meanwhile how RMAN takes its backups.

1. Open Putty and login to `srv1` as `oracle`.
2. Invoke RMAN and connect to the local database as target.

```
rman target ''/ as SYSBACKUP''
```

3. Try to take backup of the database using the following command.

```
BACKUP DATABASE;
```

- Why the command above fails?
- How can you make it succeed?
- What this type of backup is called?

4. Shutdown the database and start it up in `MOUNT` mode.

`STARTUP` and `SHUTDOWN` commands can be invoked from RMAN command prompt.

```
SHUTDOWN IMMEDIATE
```

```
STARTUP MOUNT
```

5. Try to take backup of the database

```
BACKUP DATABASE;
```

After the backup is finished, examine the RMAN output and try answering the following questions:

- How long did the backup take to finish?
- How many channels RMAN allocated to take its backup?
- Can you recognize the input files and the output files?
- What are the database files that are **not** included in the backup?
- How many output files produced by the command? and why?
- Where the output files have been saved and why?
- Can you recognize the `TAG` assigned to the generated backup piece?
- Does the RMAN output help to know the sizes of the produced backup files?

6. Issue the following command in RMAN.

This command displays all the backupsets registered in RMAN repository. Observe that it displays the sizes of the generated backup pieces.

```
LIST BACKUPSET;
```

You will learn later in the course more about RMAN commands that are used to report about its repository.

7. Issue the following query to obtain information about how much percentage is taken by the backup files from the fast recovery area.

Observe that you can issue SQL queries in RMAN prompt.

```
SELECT FILE_TYPE, PERCENT_SPACE_USED FROM V$RECOVERY_AREA_USAGE WHERE  
PERCENT_SPACE_USED<>0 ORDER BY PERCENT_SPACE_USED DESC;
```

## B. Enabling ARCHIVELOG mode in ORADB database

In the following steps you will enable the ARCHIVELOG mode in ORADB database.

8. Perform the steps below to enable the ARCHIVELOG mode in ORADB database.

```
# in sqlplus login to ORADB as sysdba
sqlplus / as sysdba

# database was mounted in the previous section

# make sure the database is running in MOUNT mode
SELECT OPEN_MODE FROM V$DATABASE;

# verify that the database is operating in NOARCHIVE mode
ARCHIVE LOG LIST;

# define the destination of the archive log files
# this is actually not required in our case because, if the log archive
# destination is not defined, it will go by default to FRA.
ALTER SYSTEM SET LOG_ARCHIVE_DEST_1='LOCATION=USE_DB_RECOVERY_FILE_DEST'
SCOPE=SPFILE;

# Note: because OMF is enabled, setting the
# LOG_ARCHIVE_FORMAT parameter has no effect.

# enable the archivelog mode
ALTER DATABASE ARCHIVELOG;

# restart the database
SHUTDOWN IMMEDIATE
STARTUP OPEN

# verify that the archivelog is enabled
ARCHIVE LOG LIST

# switch the log file
ALTER SYSTEM SWITCH LOGFILE;

# checkout the generated archive log file
SELECT NAME FROM V$ARCHIVED_LOG;
```

## C. Taking Online Database and Tablespace Backups

In the following steps you will use RMAN to take a hot backup of the target database and tablespaces. You will learn more concepts about backups taken by RMAN.

9. Invoke RMAN and connect to the local database as target.

```
rman target ''/ as SYSBACKUP''
```

10. Delete the backupsets taken earlier by RMAN.

Let's take this step as an opportunity to learn about how you can take advantage of the RMAN errors to help you to complete a command if you forget its syntax.

- a. Issue the following command, then press the ENTER key on the keyboard twice.

```
DELETE
```

- b. Examine the errors reported by RMAN. It displays the keywords that are expected to come after the typed command.

Our target is to delete the backupset. Hence, "backupset" is the correct keyword to use.

```
RMAN-01009: syntax error: found "end-of-file": expecting one of: "archivelog,
backuppiece, backupset, backup, controlfilecopy, copy, datafilecopy, expired, force,
foreign, global, noprompt, obsolete, proxy, preplugin, script"
```

- c. Issue the following command, then press the ENTER key on the keyboard twice.

```
DELETE BACKUPSET
```

- d. Again, the returned RMAN error displays the keywords that can come after the typed command.

After reviewing the returned list, we can guess that the correct keyword is "of", because we are after deleting the backupset of the database.

```
RMAN-01009: syntax error: found "end-of-file": expecting one of: "backed, completed,
device, for, guid, like, of, tag, integer, ;"
```

- e. Issue the following command

Type "y" when you are prompted for confirmation. Typing "y" is equivalent to typing "yes".

```
DELETE BACKUPSET OF DATABASE;
```

11. Take backup of the database and the archived redo log files using the following command.

You can take backup of the entire database using a single command and backup of the archive logs using another command.

```
BACKUP DATABASE PLUS ARCHIVELOG;
```

12. Issue the following command. Recognize which archive log files have been included in the produced backup set.

```
SELECT NAME, SEQUENCE# FROM V$ARCHIVED_LOG ORDER BY 2;
```

13. Take a backupset of the database in the shared folder using FORMAT parameter of the BACKUP command.

```
BACKUP DATABASE FORMAT '/media/sf_extdisk/ORADB%U.bck';
```

14. Open the file explorer in the hosting PC and check out the generated file.

15. Take backup of the tablespace SOETBS.

```
BACKUP TABLESPACE soetbs FORMAT '/media/sf_extdisk/soetbs_%U.bck';
```

16. Check out the size of the produced backupset by either issuing the following command or by using the File Explorer.

```
LIST BACKUPSET OF TABLESPACE SOETBS;
```

17. Obtain the full name of the soetbs datafile.

```
SELECT NAME FROM v$DATAFILE WHERE TS# = ( SELECT TS# FROM v$TABLESPACE WHERE  
NAME='SOETBS');
```

18. Exit from RMAN and check out the size of the tablespace datafile.

```
ls -lh <full data file name>
```

- Why do you think the datafile size is greater than the produced backup piece?

19. Delete all the backupsets

```
rman target ''/ as SYSBACKUP''  
DELETE BACKUPSET;
```

20. If you have created a VirtualBox snapshot, consider deleting it at this stage.

## Summary

In this practice, you have used RMAN to perform the following tasks:

- Take a cold/consistent backup of the entire database (in `NOARCHIVELOG` mode)
- Take a hot/inconsistent backup of the entire database
- Take backups of specific tablespaces
- Specify the backup destination of a `BACKUP` command