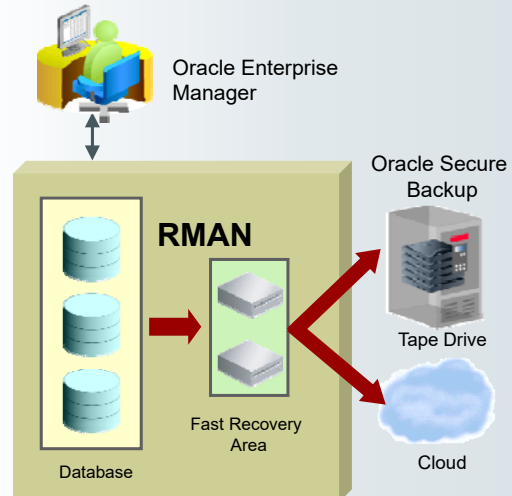# 3

Using Recovery Manager (RMAN)

Objectives

After completing this lesson, you should be able to:

• Describe the features and functions of Recovery Manager (RMAN)

• Configure and manage RMAN settings

Integrated Oracle Recovery Manager (RMAN)

- Intrinsic knowledge of database file formats and recovery procedures
  - Tablespace and data file recovery
  - Block validation
  - Online block-level recovery
  - Online, multistreamed backup
  - Unused block compression
  - Native encryption
- Integrated disk, tape, and cloud backup leveraging the fast recovery area and Oracle Secure Backup

Oracle Enterprise Manager

Oracle Secure Backup

RMAN

Tape Drive

Fast Recovery Area

Cloud

Database

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Connecting to RMAN and a Target Database

```
. oraenv
orcl
$ rman target "'/ as sysbackup'"

RMAN> BACKUP DATABASE;
Starting backup at 10-OCT-18
.
.
RMAN> LIST BACKUP;
BS Key  Type LV Size    Device Type Elapsed Time Completion Time
------- ---- -- ------- ----------- ------------ ---------------
1       Full   1.06G   DISK        00:01:49     10-OCT-18
.
.
RMAN> DELETE OBSOLETE;
.
Do you really want to delete the above objects (enter YES or NO)? YES
deleted archived log
.
.
```

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Using SQL in RMAN

From the RMAN command line:

- Execute SQL commands and PL/SQL procedures
- Use the optional `SQL` prefix to avoid ambiguity

```
RMAN> SELECT NAME, DBID, LOG_MODE
   2> FROM V$DATABASE;

NAME             DBID LOG_MODE
--------- ---------- ------------
ORCL      1297344416 NOARCHIVELOG
```

Types of RMAN Commands

RMAN commands are of the following types:

- Stand-alone command:
  - Is executed individually at the RMAN prompt
  - Cannot appear as subcommands within `RUN`
- Job command:
  - Must be within the braces of a `RUN` command
  - Is executed as a group

Some commands can be executed as both types.

Job Commands: Example

Job commands appear inside a `RUN` command block:

```
RMAN>  RUN
2> {
3>    ALLOCATE CHANNEL c1 DEVICE TYPE DISK
4>      FORMAT "/disk2/%U";
5>    BACKUP AS BACKUPSET DATABASE;
6>    SQL 'alter system archive log current';
7> }
```

Execution of the entire block starts when this line is entered.

Deallocated after the RUN block completes

Configuring Persistent Settings for RMAN

- RMAN is preset with default configuration settings.
- Use the `CONFIGURE` command to:
    - Configure automatic channels
    - Specify the backup retention policy
    - Specify the number of backup copies to be created
    - Set the default backup type to `BACKUPSET` or `COPY`
    - Limit the size of backup pieces
    - Exempt a tablespace from backup
    - Enable and disable backup optimization
    - Configure automatic backups of control files
    - Define the archive log deletion policy
    - Specify the parallelism for a device
    - Set the encryption and compression parameters to be used for backups

Viewing Persistent Settings

To examine the persistent RMAN settings for a database:

- Use the RMAN `SHOW ALL` command to view all configuration settings
- Query the `V$RMAN_CONFIGURATION` view to display configuration settings that have been explicitly set

---

Managing Persistent Settings

- Use multiple streams of data to and from a device:

```
RMAN> CONFIGURE DEVICE TYPE sbt PARALLELISM 3;
```

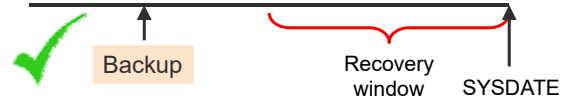- Use the `SHOW` command to list current settings:

```
RMAN> SHOW CONTROLFILE AUTOBACKUP FORMAT;
RMAN> SHOW EXCLUDE;
RMAN> SHOW ALL;
```

- Use the `CLEAR` option of the `CONFIGURE` command to reset any persistent setting to its default value:
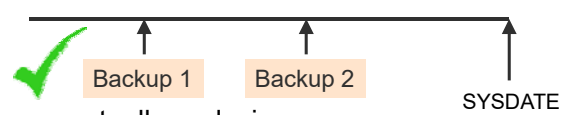
```
RMAN> CONFIGURE BACKUP OPTIMIZATION CLEAR;
RMAN> CONFIGURE MAXSETSIZE CLEAR;
RMAN> CONFIGURE DEFAULT DEVICE TYPE CLEAR;
```

Specifying a Retention Policy

- A retention policy describes which backups will be kept and for how long.
- There are two types of retention policies:
  - **Recovery window:** Establishes a period of time within which point-in-time recovery must be possible

  - **Redundancy:** Establishes a fixed number of backups that must be kept

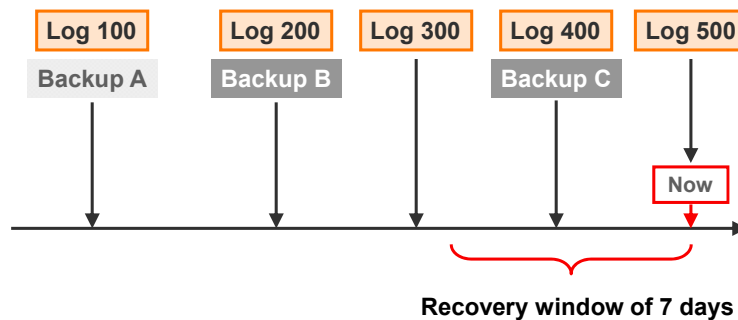- Retention policies are mutually exclusive.

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Recovery Window Retention Policy: Example

Backup B and archive logs 201 through 500 are required to satisfy this retention policy.

Recovery window of 7 days

| Backup | Obsolete |
| Backup | Not obsolete |

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Summary

In this lesson, you should have learned how to:

- Describe the features and functions of Recovery Manager (RMAN)
- Configure and manage RMAN settings

Practice Overview

- Configuring the Default Backup Destination
- Setting the Date and Time Format for RMAN
- Configuring RMAN Settings