Configuring for Recoverability

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Objectives

After completing this lesson, you should be able to:

- RMAN overview.

- RMAN terminology.

- Starting RMAN.

- RMAN related initialization file parameters.

- Connection types with RMAN

- RMAN configuration.

Purpose of using RMAN

Using RMAN you can do the following:

- Back up the database, tablespaces, data files, control files, and archived redo logs.

- Manage backup and recovery tasks.

- Perform incremental block-level backup and block-level media recovery

- Detect corrupted blocks during backup

- Use binary compression when creating backups

RMAN VS user-managed backups

- execute operations as scripts in the database.

- limit incremental backups With block change tracking enabled

- manage the size of backup pieces and save time

- parallelizing the backup operation.

- recover an individual corrupt data block

- Oracle Database Scheduler automate backup operations.

- detect block corruption using the V$BACKUP_CORRUPTION and V$COPY_CORRUPTION dynamic views.

- RMAN provides performance enhancements such as:

— Automatic parallelization of backup, restore, and recovery operations

— No generation of extra redo during online database backups

Typical Backup and Recovery Tasks

To be able to recover from data loss problems with minimal down time:

- Configure the database for recoverability

- Define a backup schedule

- Plan and test different types of failure scenarios

- Monitor, tune, and troubleshoot the backup and recovery environment

- Restore data from backups

- Recover transactions to a desired point in time

Using Recovery Manager

the appropriate options are :

- target: The connect-string for the target database

- catalog: The connect-string for a recovery catalog

- nocatalog: Specifies there is no recovery catalog

- cmdfile: The name of an input command file

- log: The name of the output message log file

$ORACLE_HOME/Bin >rman target /

Connection types with RMAN
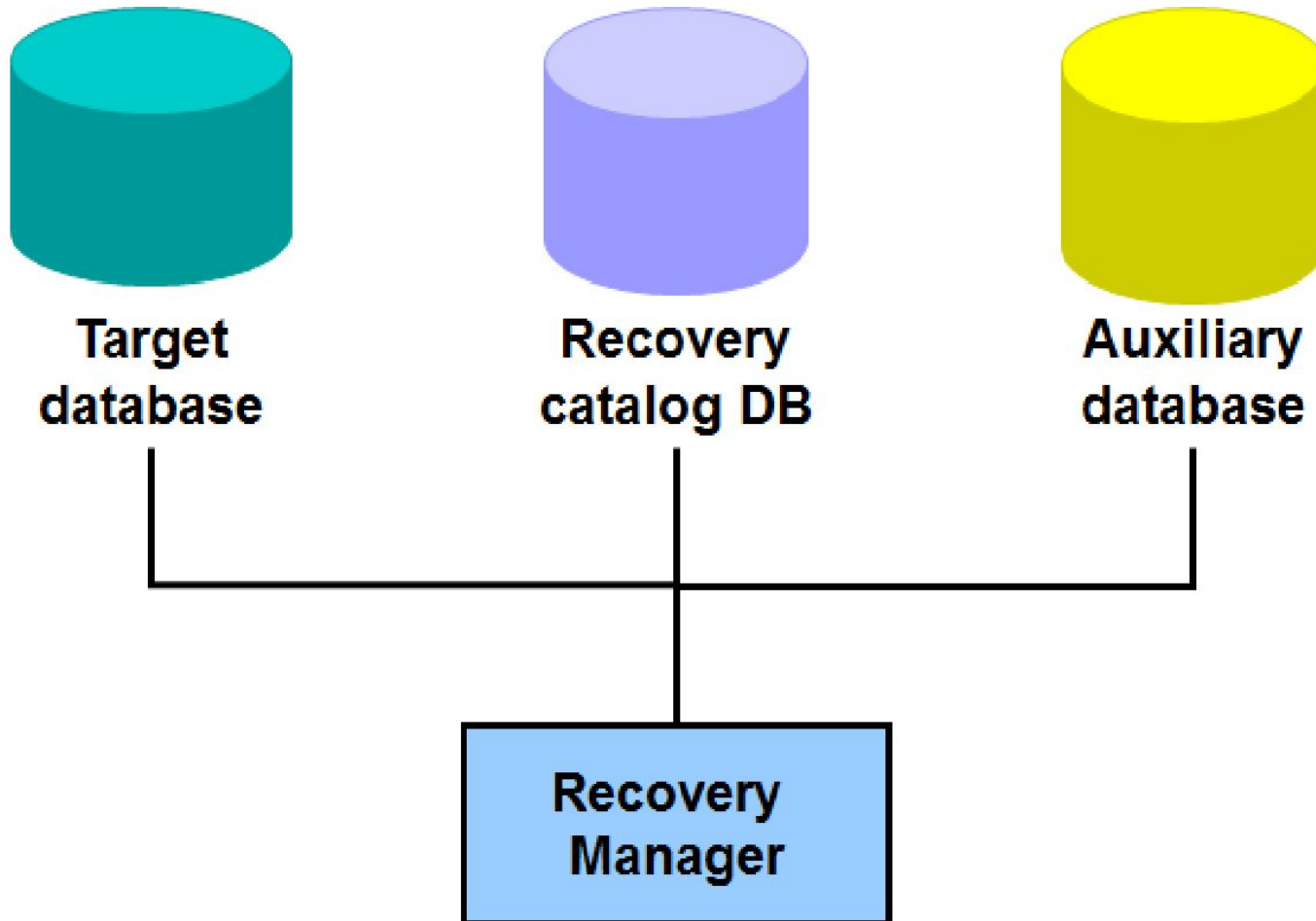
Configuring Persistent Settings for RMAN

RMAN is preset with default configuration settings.

- 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
- Except a tablespace from backup
- Enable and disable backup optimization
- Configure automatic backups of control files
- Define the archivelog deletion policy
- Specify the parallelism for a device
- Set the encryption and compression parameters to be used for backups

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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;
```

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Specifying a Backup Destination

Backups can be written to:

- Disk directory

```
RMAN> CONFIGURE DEFAULT DEVICE TYPE TO DISK;
```

- Tape, using Oracle Secure Backup

- Media Management Library

  - Tape

```
RMAN> CONFIGURE DEFAULT DEVICE TYPE TO TAPE;
```

  - Disk or tape, using proxy copy

- Fast Recovery Area: Disk area set aside for backup and recovery and flashback database purposes

  - Define the location and the size.

  - Files are automatically retained and deleted as necessary.

Configuring and Allocating Channels

- Configure automatic channels with the `CONFIGURE` command:

```
RMAN> CONFIGURE DEVICE TYPE sbt;
RMAN> CONFIGURE DEFAULT DEVICE TYPE TO sbt;
RMAN> CONFIGURE CHANNEL DEVICE TYPE sbt ...
RMAN> BACKUP DATABASE;
```

- Allocate channels manually with the `ALLOCATE CHANNEL` command within a `RUN` block:
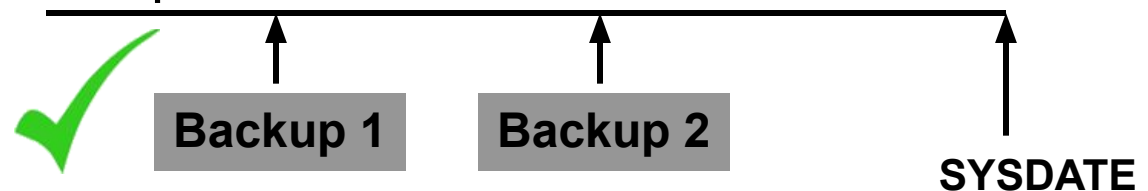
```
RMAN> RUN
{
ALLOCATE CHANNEL ch1 DEVICE TYPE DISK;
BACKUP DATABASE PLUS ARCHIVELOG;
}
```

Specifying a Retention Policy

- Retention policy: Describes which backups will be kept and for how long

- Two types of retention policies:

  - **Recovery window:** Establishes a period of time within which point-in-time recovery must be possible

    Backup   **Recovery window**   **SYSDATE**
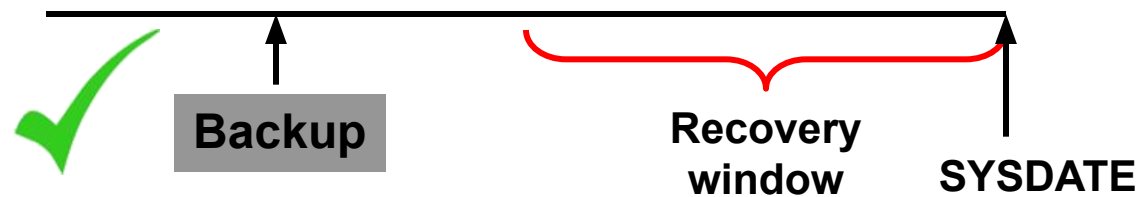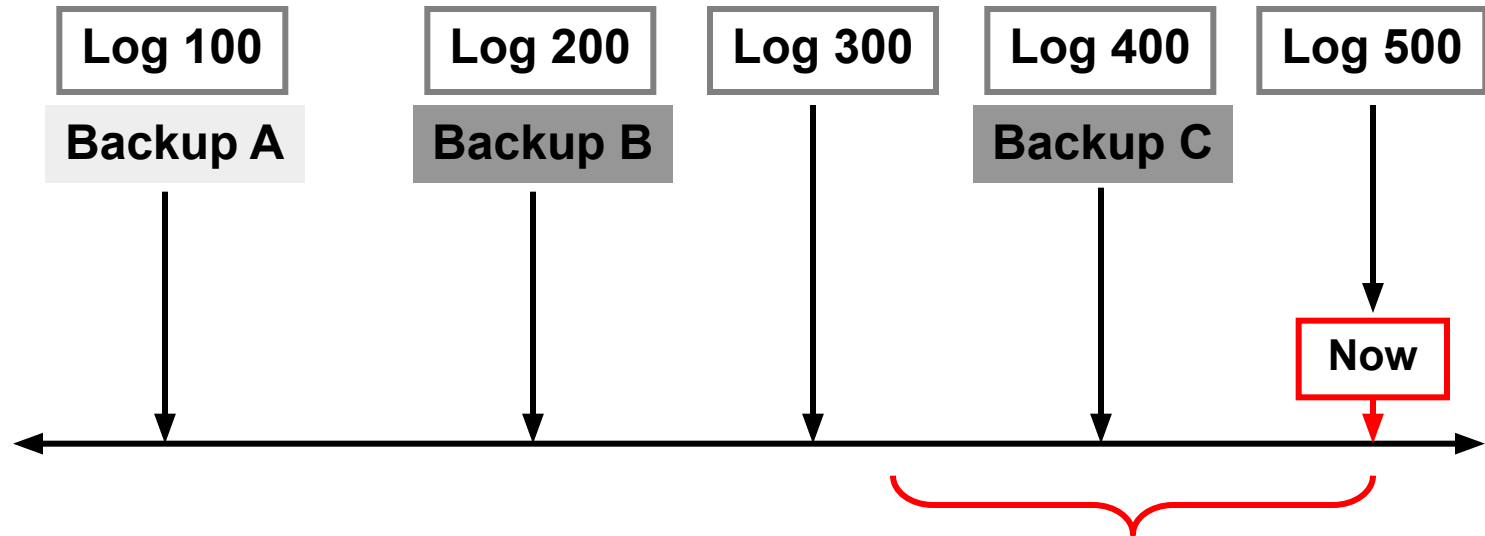
  - **Redundancy:** Establishes a fixed number of backups that must be kept

    Backup 1   **Backup 2**   **SYSDATE**

- Retention policies are mutually exclusive.

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A Recovery Window
Retention Policy: Example

Log 100	Log 200	Log 300	Log 400	Log 500
Backup A	Backup B		Backup C	

Now

Recovery window of 7 days

Backup Obsolete

Backup Not obsolete

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

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Control File Autobackups

The control file autobackup file name has a default format of %F for all device types, so that RMAN can infer the file location and restore it without a repository. This variable format translates into c-IIIIIIIII-YYYYMMDD-QQ, where :IIIIIIIII stands for the DBID YYYYMMDD is a time stamp of the day the backup is generated QQ is the hex sequence that starts with 00 and has a maximum of FF

You can change the default format by using the CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE *type* TO *'string'* command. The value of string must contain the substitution variable %F and cannot contain other substitution variables. For example:

> CONFIGURE CONTROLFILE AUTOBACKUP
> FORMAT FOR DEVICE TYPE DISK TO
> '/u01/oradata/cf_ORCL_auto_%F';

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Control File Autobackups

Control file autobackups are stored in the Flash Recovery Area, unless otherwise specified.

With a control file autobackup, RMAN can recover the database even if the current control file, recovery catalog, and server parameter file are inaccessible. Because the path used to store the autobackup follows a well-known format, RMAN can search for and restore the server parameter file or control file from that autobackup.

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Viewing Persistent Settings

To examine the persistent RMAN settings for a database:

- Connected only to the target, you enter SHOW ALL at the RMAN prompt.

  Or:

- Logged in to the target database instance, you query the V$RMAN_CONFIGURATION view.

- Example:

  SQL> select * from V$RMAN_CONFIGURATION

   2 /

   CONF# NAME   VALUE

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      1 CONTROLFILE AUTOBACKUP ON

      2 CHANNEL   DEVICE TYPE 'SBT_TAPE'
  PARMS
  'SBT_LIBRARY=oracle.disksbt,ENV=(BACKUP_DIR)