Performing RMAN Backups - Part I

By Ahmed Baraka

Summary

In this lecture, you will learn how to perform the following:

- Describe available backup strategies, backup types, and backup modes
- Describe the possible RMAN backup types
- Use RMAN to make a whole database backup
- Use RMAN to make a partial backup
- Specify a Format for RMAN Backups

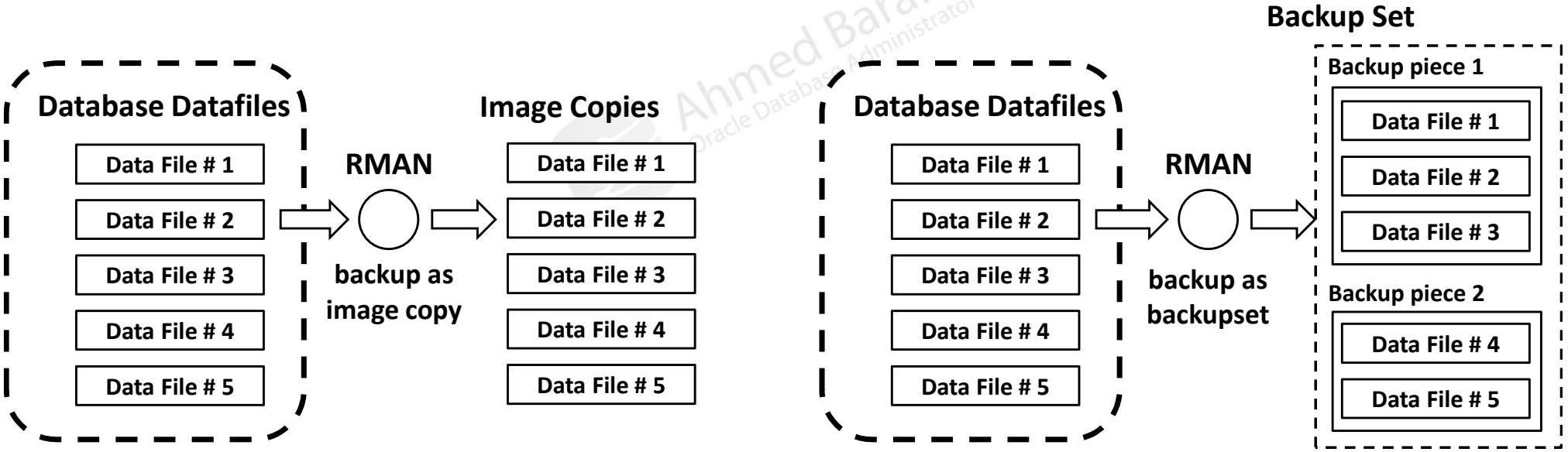
Backup Terminology

- Backup strategy may include:
  - **Whole**: entire database
  - **Partial**: portion of the database
- Backup type may indicate inclusion of:
  - **Full**: all data blocks within your chosen files
  - **Incremental**: only information that has changed since a previous backup
    - **Differential**: changes since last incremental
    - **Cumulative**: changes since last level 0
- Backup mode may be:
  - **Offline** (consistent, cold)
  - **Online** (inconsistent, hot)

Backup Terminology: RMAN Output Types

RMAN backups may be stored as:

- **Image copies**
- **Backup sets**



Backupsets and Image Copies: Comparison

	Backup Sets	Image Copies
File Contents	One or more backup piece. Each backup piece has backup of one or more database data files.	Bit-by-bit copy of the database data files.
Size	Only used blocked are included. Smaller size than image copies.	Same size as the data files
Direct Destination Device	Disk or tape	Disk only
Granular Restore	Entire backup set must be retrieved	Only needed data file is retrieved
Provides Quick Data File Switch	No	Yes
Incremental backup option	Yes	Yes

RMAN Supported Backup Target Files

- The following file types can be backed up with RMAN:
  - Data files (not temp files)
  - Control files
  - Server parameter file
  - Archived redo logs
  - RMAN backups
- The following files cannot be backed up by RMAN:
  - Online redo log files
  - Auxiliary files: network configuration files, password files, Keystore (wallet)

Backing Up a Whole Database with RMAN

- The database must be open (online, hot) or mounted (offline, cold)
- In simple form:

```
BACKUP [AS BACKUPSET] DATABASE;
```

```
BACKUP DATABASE PLUS ARCHIVELOG;
```

- If the default RMAN persistence settings have not been changed:
  - One channel is established to disk
  - Backup set and backup piece(s) are created
  - The destination device type is disk
  - Not-changed tablespace since last backup will not be backed up
  - No encryption or advanced compression are used

Inconsistent and Consistent Backup

- **Inconsistent (online, hot) backup**:
  - Is taken while the database is open
  - The database must be running in **`ARCHIVELOG`** mode.
  - Archived redo log file are required for recovery
- **Consistent (offline, cold) backup**:
  - Can only be taken while the database is **mounted** after a **clean** shutdown
  - The only database backup option when it is running in **`NOARCHIVELOG`** mode. When recovery is performed from consistent backup, changes made after the backup time are lost

Inconsistent and Consistent Backup (cont)

- **Inconsistent (online, hot) backup**:

```
BACKUP DATABASE PLUS ARCHIVELOG;
```

- **Consistent (offline, cold) backup**:

```
SHUTDOWN IMMEDIATE;
STARTUP MOUNT;
BACKUP DATABASE;
ALTER DATABASE OPEN;
```

Backing Up Tablespaces and Data Files

- Use **`TABLESPACE`** or **`DATAFILE`** option
- Can be read/write or read only

```
BACKUP TABLESPACE users, tools;
```

```
BACKUP DATAFILE 1,2,3,4;
```

```
BACKUP DATAFILE '/u01/app/oradata/ORADB/users01.dbf';
```

- Is this considered a whole backup or partial backup?
- Is this considered a whole full or incremental backup?

Specifying a Format for RMAN Backups

- **FORMAT** option of the backup command controls the location and filename of the generated backup files
- Specifying **FORMAT** in **BACKUP** command:

```
BACKUP DATABASE FORMAT "/u02/orcl_%U";
```

```
BACKUP DATABASE FORMAT '+BACKUP1';
```

- List of the substitution variables are in the documentation "*Oracle Database Backup and Recovery Reference*". Lookup the semantics "formatSpec".

Summary

In this lecture, you should have learnt how to perform the following:

- Describe available backup strategies, backup types, and backup modes
- Describe the possible RMAN backup types
- Use RMAN to make a whole database backup
- Use RMAN to make a partial backup
- Specify a Format for RMAN Backups