Duplicating a Database using RMAN - Part II

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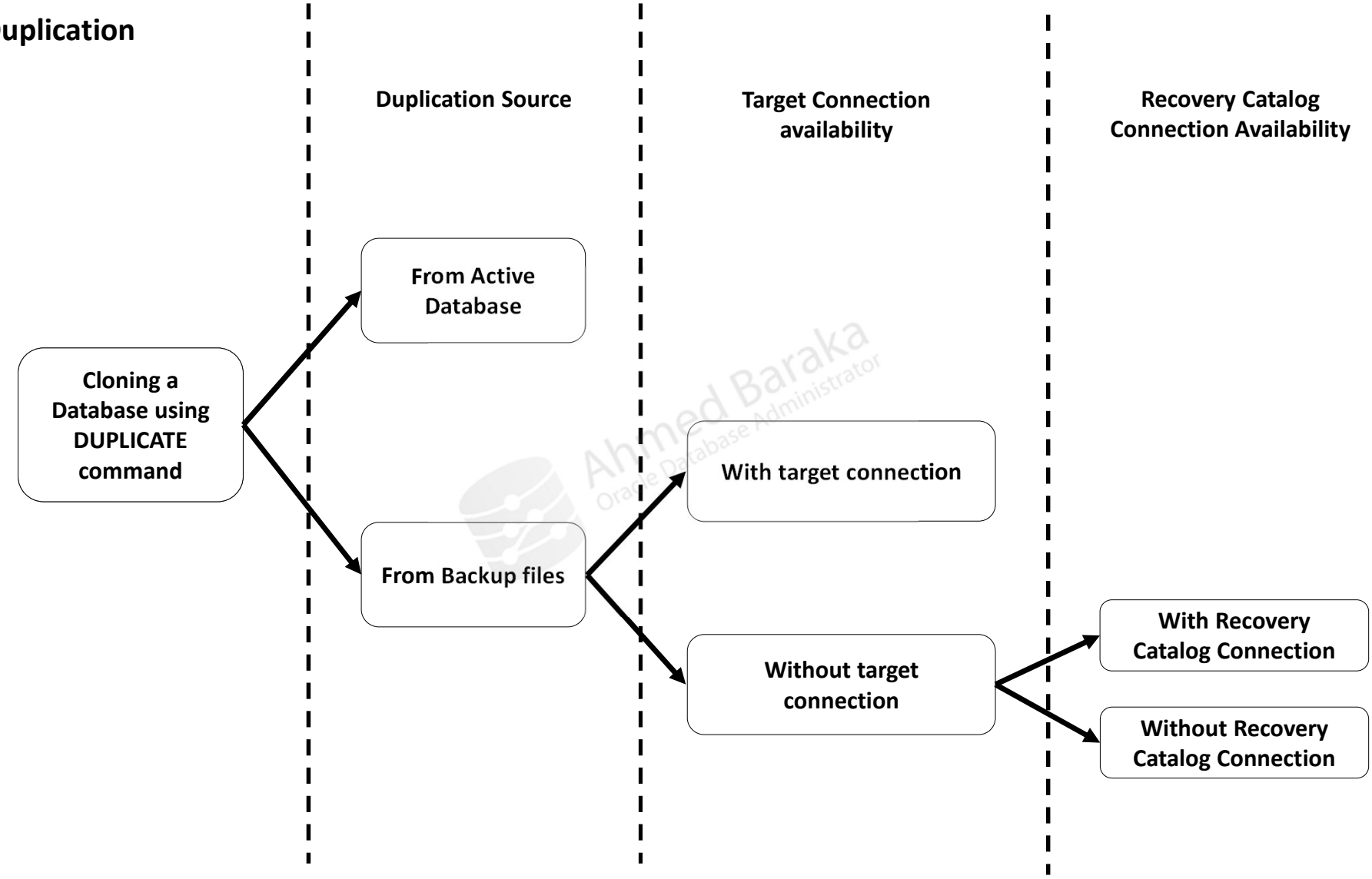
Objectives

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

- Active database duplication
- Backup-based database duplication with connection to a target database
- Backup-based duplication with connection to a recovery catalog
- Backup-based duplication without connection to a target nor to a recovery catalog
- Duplicate one or more active PDBs
- Restarting a failed duplication process

Database Duplication Techniques



About Active Database Duplication

- RMAN performs database duplication by copying the datafiles (as backupsets or image copies) online through the network
  - If backupsets are being used, auxiliary channels perform the duplication (pull) (recommended technique)
  - If image copies are being used, target channels perform the duplication (push)
- The recommended technique if the network bandwidth and stability allows it

Determining Whether Backupsets or Image Copies are Used

- Backupsets are used if **any** of the following is true:
  - The **DUPLICATE** command contains either the **USING BACKUPSET**, **USING COMPRESSED BACKUPSET**, or **SECTION SIZE** clause.
  - The number of auxiliary channels allocated is equal to or greater than the number of target channels allocated.
- Otherwise, image copies are used

Example 1: Duplicating a Database to a Remote Server Using Active Database Duplication

- Two target channels configured on the source database
- Auxiliary host preparation steps performed

```
RMAN> CONNECT TARGET sys@oradb1
RMAN> CONNECT AUXILIARY sys@oradb2
run {
 ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE disk;
 ALLOCATE AUXILIARY CHANNEL c2 DEVICE TYPE disk;
 ALLOCATE AUXILIARY CHANNEL c3 DEVICE TYPE disk;
 DUPLICATE DATABASE TO oradb2
 FROM ACTIVE DATABASE
 PASSWORD FILE
 SPFILE
 SET DB_CREATE_FILE_DEST='+DATA2';
}
```

Example 2: Duplicating a Database to a Remote Server Using Active Database Duplication

- Two target channels configured on the source database
- No auxiliary channels are configured in the destination host
  - Image copies will be used for duplication

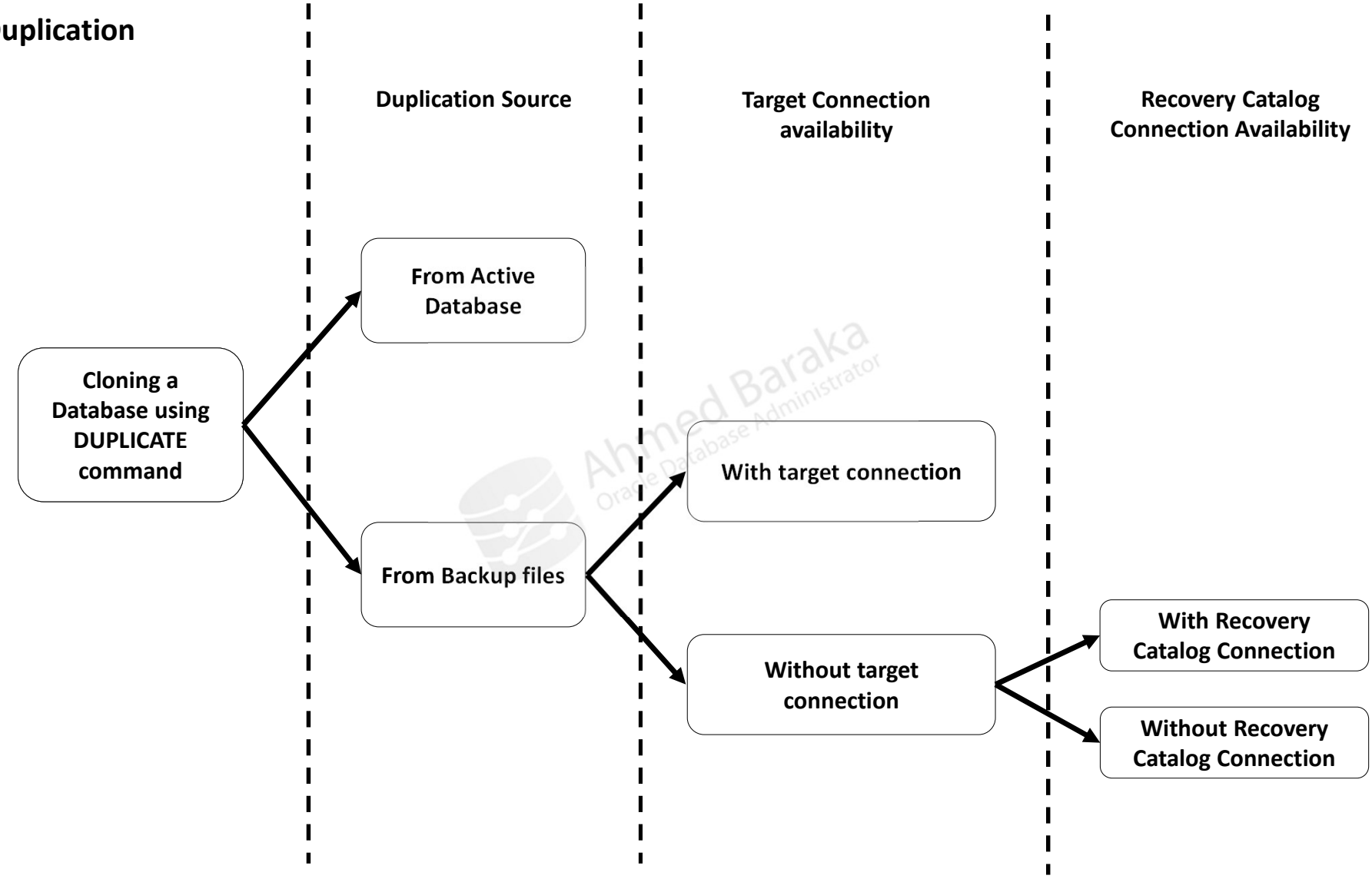
```
RMAN> CONNECT TARGET sys@oradb1
RMAN> CONNECT AUXILIARY sys@oradb2
run {
 DUPLICATE DATABASE TO oradb2
 FROM ACTIVE DATABASE
 PASSWORD FILE
 SPFILE PARAMETER_VALUE_CONVERT='/dbhome1','/dbhome2'
 SET DB_FILE_NAME_CONVERT='/app/dbhome1','/app/dbhome2'
 SET LOG_FILE_NAME_CONVERT='/app/dbhome1','/app/dbhome2';
}
```

Enabling Compression in Active Database Duplication

- Compressed backupsets reduce the produced network traffic
- To enable it, use the **`USING COMPRESSED BACKUPSET`** clause

```
RMAN> run {
 DUPLICATE DATABASE TO oradb2
 FROM ACTIVE DATABASE
 USING COMPRESSED BACKUPSET
...
}
```

Database Duplication Techniques



About Backup-Based Duplication

- Target database backup files are used for duplication
- An option when connection to the source database is not available or when the network bandwidth is a constraint
- Available Options:
  - With connection to the target database:
    - Uses target database control file to determine which backupsets or copies must be used to perform the duplication
  - Without target connection
    - Uses recovery catalog, if it exists
    - Uses the **`BACKUP LOCATION`** clause of the **`DUPLICATE`** command

Example: Backup-based Duplication to a Remote Host with a Target Connection

- The duplicate database uses the same directory structure and file names as the source database to store database files.

```
RMAN> CONNECT TARGET sys@oradb
RMAN> CONNECT AUXILIARY /
RMAN> run {
 ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE disk;
 ALLOCATE AUXILIARY CHANNEL c2 DEVICE TYPE disk;
 DUPLICATE DATABASE TO oradb1
 SPFILE
 SKIP TABLESPACE HR, SH
 NOFILENAMECHECK;
}
```

Example: Backup-based Duplication to a Remote Host with a Recovery Catalog

- Connection to the target database is not available
- Directory structure is different
- **DB_CREATE_FILE_DEST** is defined in the PFILE

```
RMAN> CONNECT CATALOG rco@catdb
RMAN> CONNECT AUXILIARY /
RMAN> run {
 ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE disk;
 ALLOCATE AUXILIARY CHANNEL c2 DEVICE TYPE disk;
 DUPLICATE DATABASE oradb1 TO oradb2
 SKIP READONLY;
}
```

Example: Backup-based Duplication to a Remote Host with a Recovery Catalog

- More than one registered database in the recovery catalog has the same **DB_NAME**

```
SELECT DBID, NAME, RESETLOGS_TIME FROM RC_DATABASE;
```

```
RMAN> CONNECT CATALOG rco@catdb
RMAN> CONNECT AUXILIARY /
RMAN> DUPLICATE DATABASE oradb1 TO oradb2
      DBID 3304509660;
```

Example: Backup-based Duplication to a Remote Host without Conn. to Target or Recovery Catalog

- Connection to target database and recovery catalog is not available
- Directory structure is different

```
RMAN> CONNECT AUXILIARY /
RMAN> run {
 SET NEWNAME FOR DATABASE TO '/u01/oradb2/%b';
 DUPLICATE DATABASE 'oradb1' to 'oradb2'
 LOGFILE GROUP 1
('/u01/oradb2/logs/r11.f','/u01/oradb2/logs/r12.f') SIZE 4M,
 GROUP 2 ('/u01/oradb2/logs/r21.f','/u01/oradb2/logs/r22.f')
 SIZE 4M
 BACKUP LOCATION '/tmp/db_files';
}
```

Duplicating PDBs

- Using RMAN DUPLICATE command, you can duplicate a PDB, a set of PDBs, or a set of tablespaces within a PDB
- The auxiliary instance must be started with the ENABLE_PLUGGABLE_DATABASE=TRUE in the init parameter file
- The root and the seed will also be duplicated

DUPLICATE Option	Description
PLUGGABLE DATABASE	Names of the PDB(s) to duplicate
SKIP PLUGGABLE DATABASE	Duplicate all the PDB(s) except the ones listed in this parameter. List of PDB names are comma separated
TABLESPACE pdb_name:tablespace_name	Duplicates specified tablespaces within a PDB.
SKIP TABLESPACE ..	Duplicates all tablespaces except the specified tbs.

Duplicating PDBs: Examples

- To duplicate the PDB pdb1 to the CDB cdb1:

```
DUPLICATE DATABASE TO cdb2 PLUGGABLE DATABASE pdb1;
```

- To duplicate the PDBs pdb1 and pdb3 to the database cdb1:

```
DUPLICATE DATABASE TO cdb2 PLUGGABLE DATABASE pdb1,pdb3;
```

- To duplicate all the PDBs in the CDB, except pdb3:

```
DUPLICATE DATABASE TO cdb2 SKIP PLUGGABLE DATABASE pdb3;
```

Restarting a Failed Duplication Process

- Abort the auxiliary instance
- Fix the reported issue
- Delete files created by the failed session
- Start the duplication again

Summary

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

- Active database duplication
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- Duplicate one or more active PDBs
- Restarting a failed duplication process