

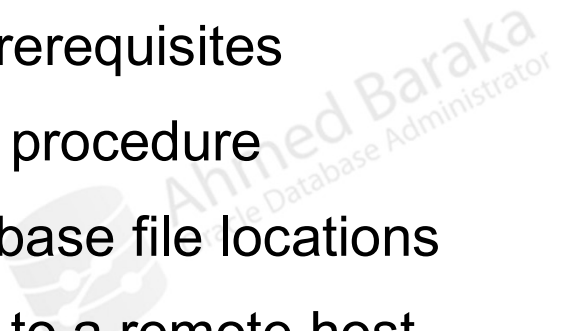
Duplicating a Database using RMAN - Part I

By Ahmed Baraka

Objectives

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

- Database Duplication Techniques
- Database duplication prerequisites
- Duplicating a database procedure
- Defining duplicate database file locations
- Duplicating a database to a remote host
- Duplicating a database into the same host



About Database Duplication with RMAN

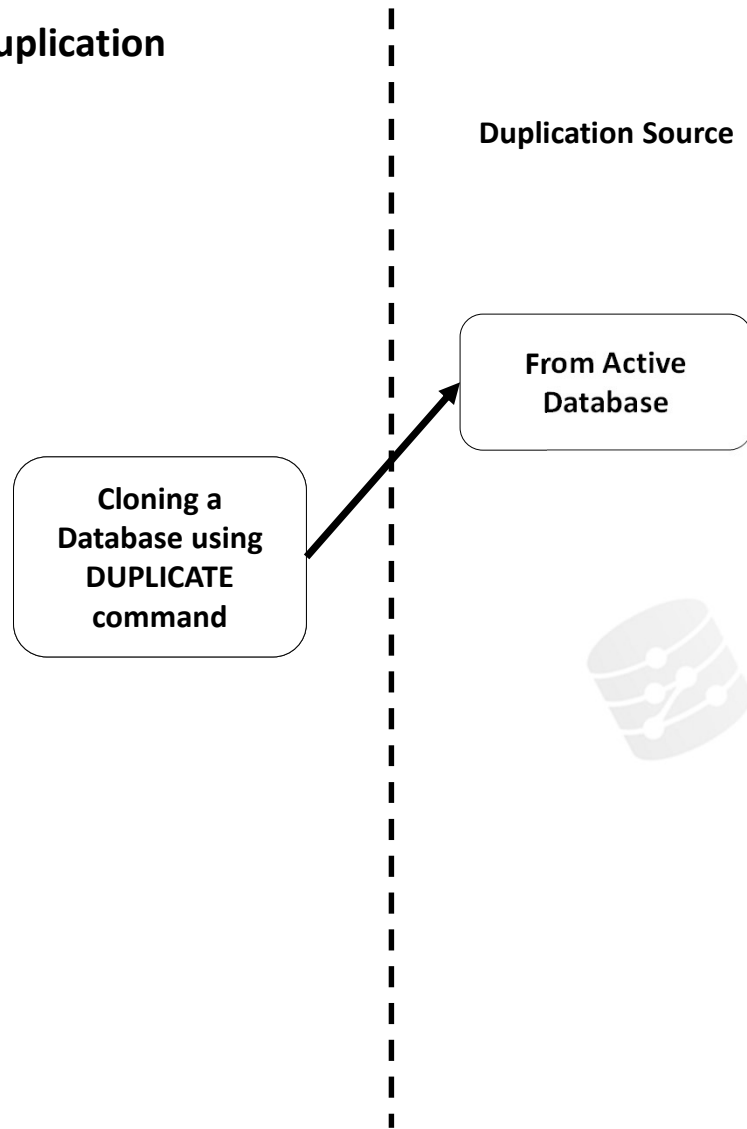
- Is the process of making copies of databases (cloning)
- Normally used to make copies of production databases for testing, development, QC, creating a Data Guard Standby database
- Duplicated database has same architecture as source database
- Is implemented in RMAN using **DUPLICATE** command
- Better than copying database files
- Can be in the same machine or different machine

Database Duplication Techniques

Cloning a
Database using
DUPLICATE
command

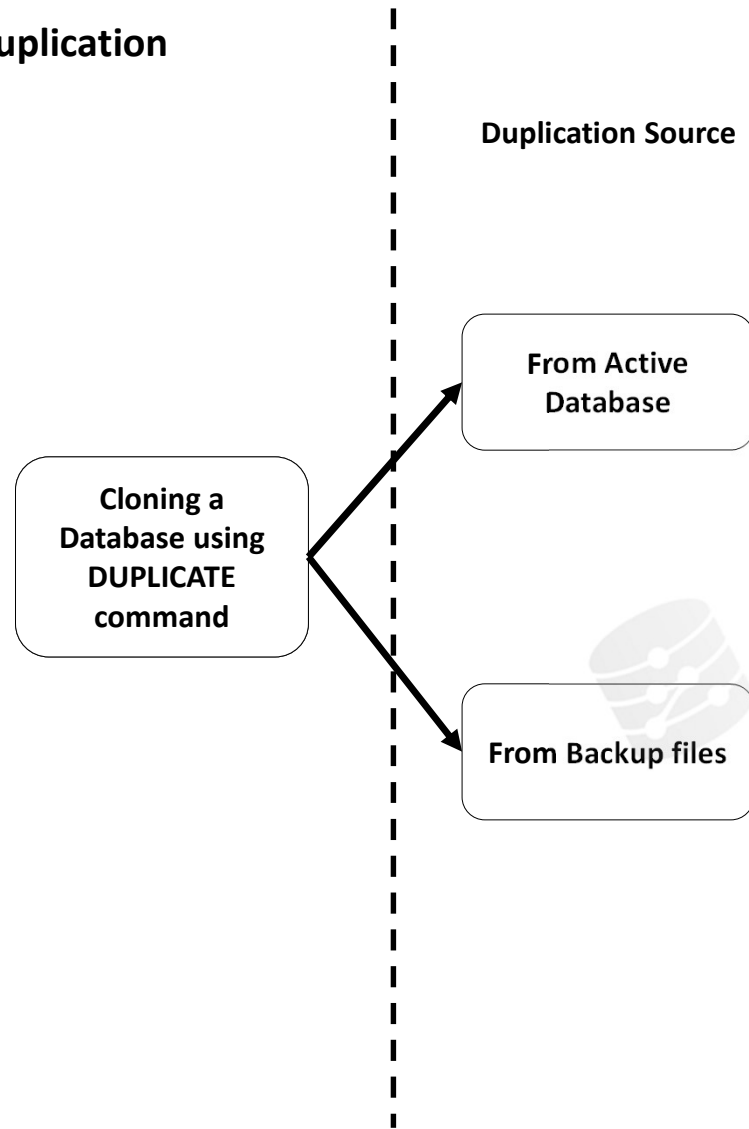


Database Duplication Techniques



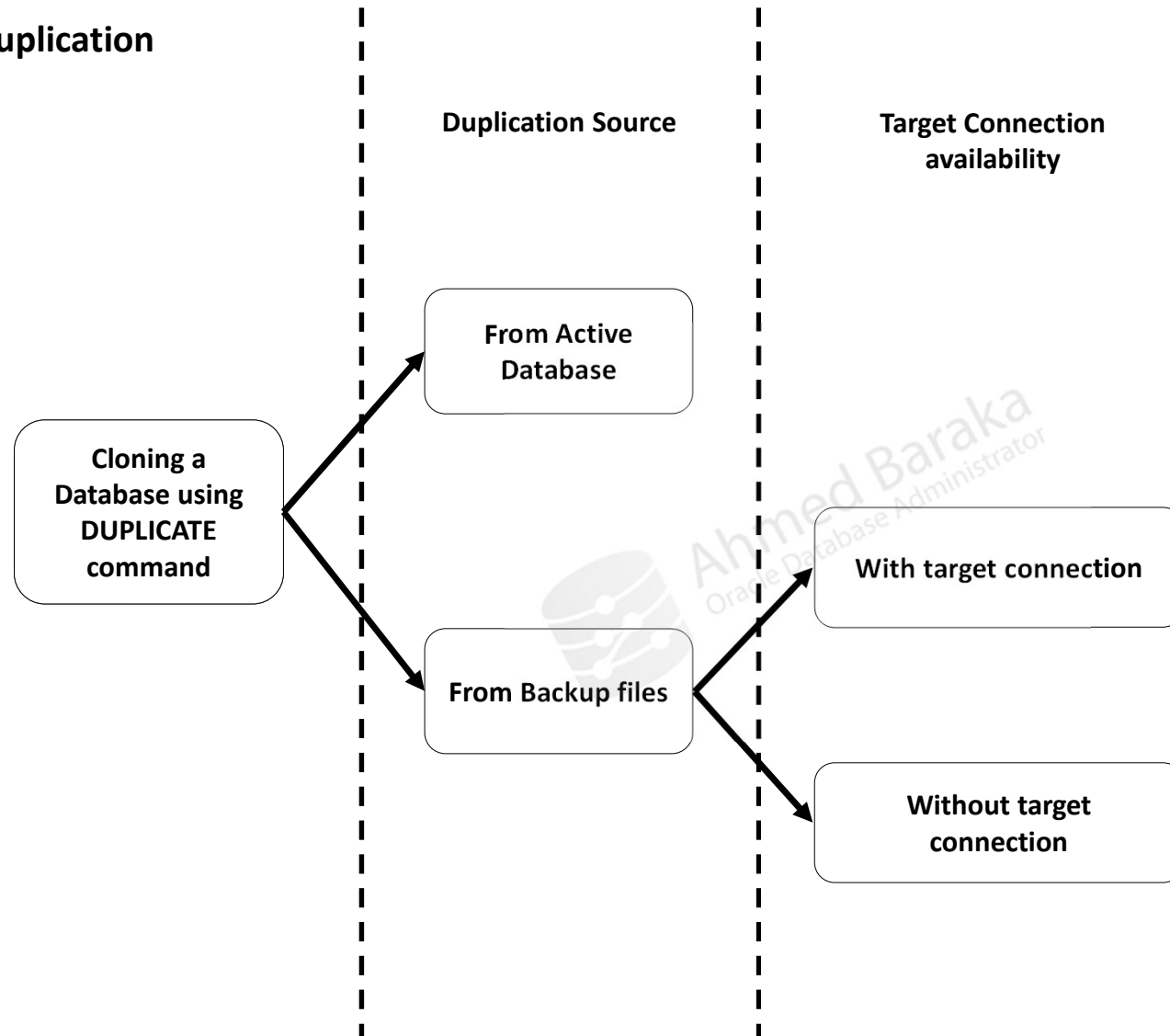
Ahmed Baraka
Oracle Database Administrator

Database Duplication Techniques

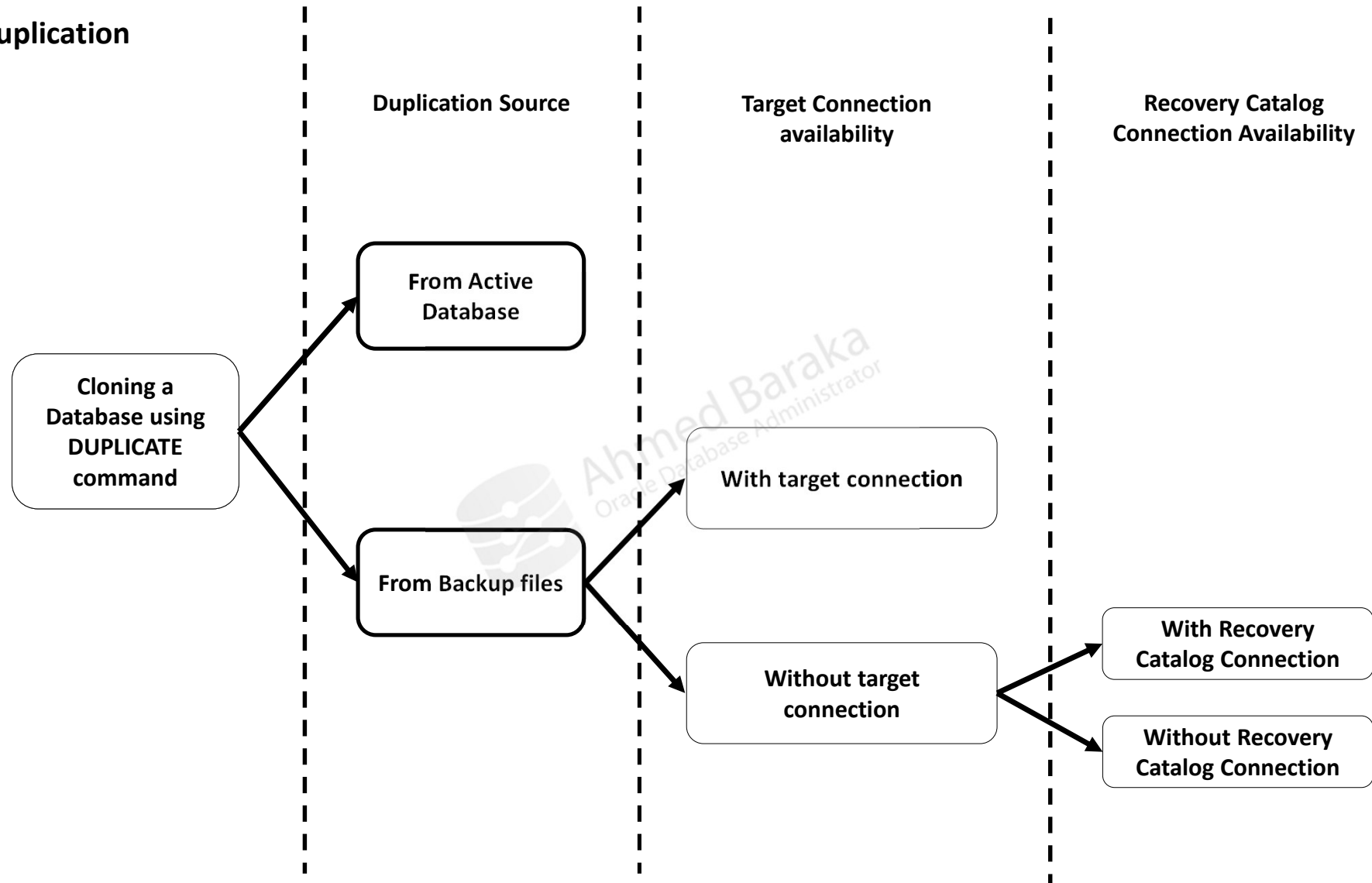


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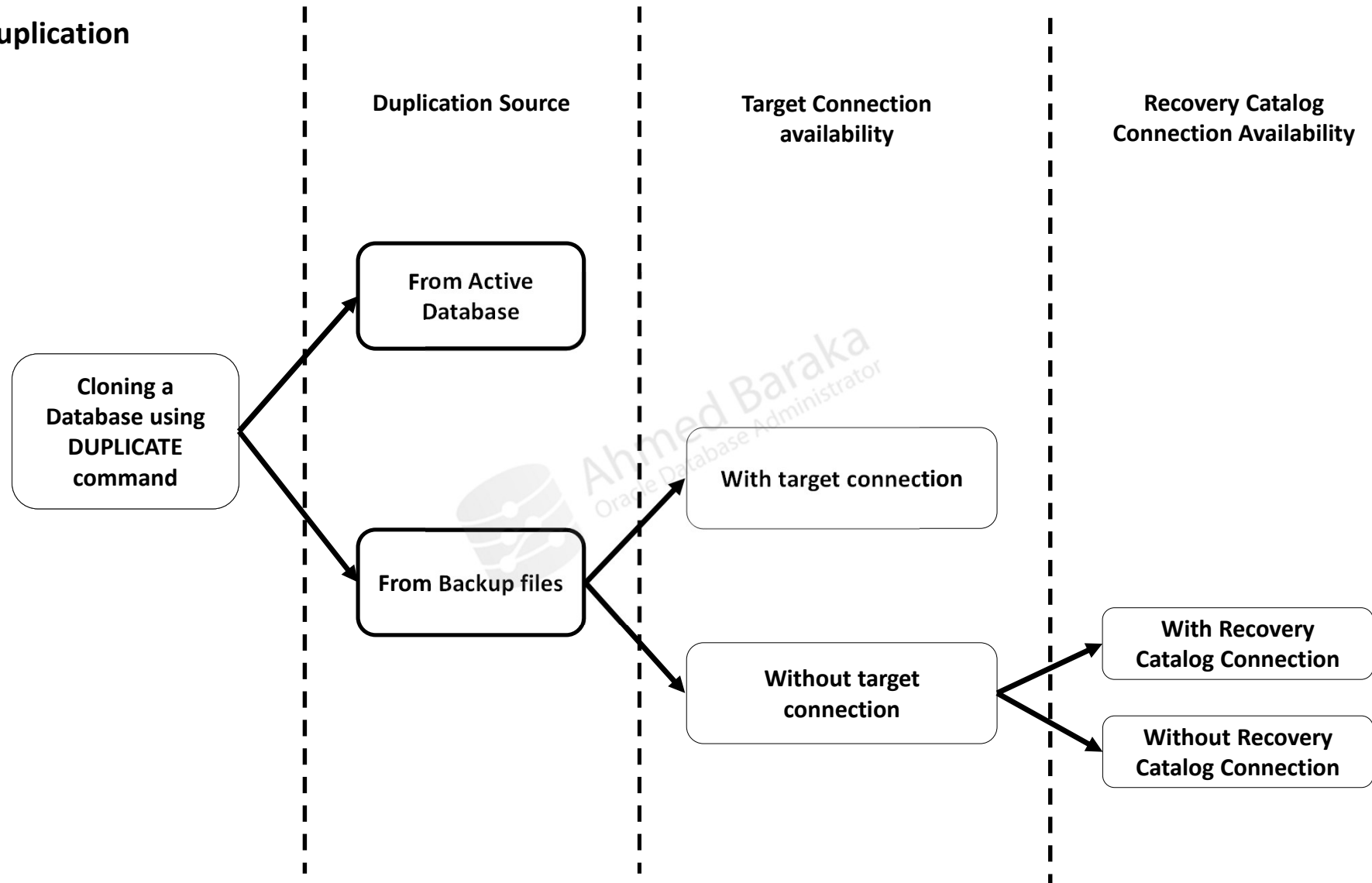
Database Duplication Techniques



Database Duplication Techniques



Database Duplication Techniques



RMAN Duplication Background Actions

- Auxiliary instance started in **NOMOUNT** mode
- Auxiliary channel(s) automatically allocated
- RMAN restores the auxiliary database and performs recovery (if required)
 - Recovery to the last available archive log file
 - Recovery to past point in time
- RMAN resets the DBID of the auxiliary database
- The auxiliary database is opened with **RESETLOGS** option
- Terms used: auxiliary database, target database, source host, destination host, duplicating to local host or remote server

Database Duplication Prerequisites

- The source and duplicate databases must be on the same platform
 - The 32-bit and 64-bit versions of the same platform are considered the same platform but the `utlirp.sql` script must be run
- The auxiliary database must be available through Oracle Net Services and must be **statically** registered in the listener in the following cases:
 - The destination host is different from the source host
 - The duplication technique chosen is active database duplication

Duplicating a Database Procedure

1. Choose a duplication technique
2. Decide on where to save the database files: control files, datafiles, and redo log files
3. Decide on whether to use backupsets or image copies
4. Prepare the auxiliary instance
5. Start RMAN and connect to the source database as **TARGET** (if connection is used) and to the auxiliary instance as **AUXILIARY**. If recovery catalog is available, connect to it as well.
6. Duplicate the database using the **DUPLICATE** command

Preparing the Auxiliary Instance Host

- Create directories for the duplicate database
- Create an initialization parameter file for the auxiliary instance
- Create a password file for the auxiliary instance
 - Create it from scratch
 - Copy the password file from the source database
 - Use **PASSWORD FILE** option in the **DUPLICATED** command
- Establish Oracle net connectivity between the databases
- Create a static entry of the auxiliary instance in the listener

Preparing the Auxiliary Instance Host (cont)

- In backup-based techniques: make sure the backup files are accessible to the destination host
- Start the auxiliary instance



Specifying Restored Datafile Locations

- Configuring auxiliary instance data file names:

```
CONFIGURE AUXNAME FOR DATAFILE 2 TO '/u02/datafiles/df2.df';
```

- Specifying the new datafile names in a run block:

```
run { ..  
    SET NEWNAME FOR DATAFILE 2 TO '/u02/datafiles/df2.df';  
    SET NEWNAME FOR TABLESPACE USERS TO '/u01/%U';  
    SET NEWNAME FOR DATABASE TO '/oradata/%U';
```

- Using the parameter DB_FILE_NAME_CONVERT

```
DB_FILE_NAME_CONVERT = ('ORADB1','ORADB2');
```

Substitution Variables for SET NEWNAME

Substitution Variable	Description
%b	Specified the file name without the directory path
%f	Specifies the absolute file number of the data file for which the new name is generated
%I	Specifies the ODBID
%N	Specifies the tablespace name
%U	Specifies a system-generated file name

Specifying Redo Log File Locations

- Specify new redo log files:

```
DUPLICATE ..  
LOGFILE  
  '/u02/oradata/oradb2/redo01.log' size 50m,  
  '/u02/oradata/oradb2/redo02.log' size 50m,  
  '/u02/oradata/oradb2/redo03.log' size 50m  
..
```

- Configure string pattern conversion:

```
LOG_FILE_NAME_CONVERT=(' /u01/oradata/oradb1',  
                      ' /u02/oradata/oradb2');
```

About Duplicating To a Remote Host

- **DB_NAME** can be the same as the target
- If the datafiles are created in the same locations as their locations in the target database, use the **nofilenamecheck** option
- Backup files location:
 - Backup files location is obtained from the target database control file
 - If the auxiliary database host cannot access the backup files location, make them available to the machine and register them in RMAN repository using **catalog** command
 - If you do not connect to the target database and recovery catalog, then you must designate a backup location for the duplication by using the **BACKUP LOCATION** clause.

About Duplicating To a Remote Host (cont)

- Add static service information in the listener for the auxiliary database
- In `tnsnames.ora` specify the auxiliary `SID_NAME` instead of the `SERVICE_NAME`

```
MYDB =  
(DESCRIPTION =  
  (ADDRESS = (PROTOCOL = TCP)(HOST =myhost.mydomain.com)  
    (PORT = 1521))  
  (CONNECT_DATA = (SID = MYDB))  
  )
```

About Duplicating into the Same Host

- **DB_NAME** must be different
- Database files should be in different locations:
 - Control files
 - Datafiles
 - Redo log files
- Auxiliary database can be run from different Oracle home



About Duplicating Subset of the Target Database Tablespaces

DUPLICATE Command Clause	Description
SKIP READONLY	Skip datafiles of read-only tablespace
SKIP TABLESPACE '<tablespace name>', ..	Skip provided tablespaces SYSTEM,SYSAUX, and Undo tablespaces cannot be skipped Tablespaces not referred by included tablespaces
TABLESPACE '<tablespace name>', ..	Include only provided tablespaces (SYSTEM,SYSAUX, and Undo tablespaces are automatically included). Tablespaces must be self-contained

Summary

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

- Database Duplication Techniques
- Database duplication prerequisites
- Duplicating a database procedure
- Duplicating a database to a remote host
- Duplicating a database into the same host
- Defining duplicate database file locations

