

# Backup and Recovery in CDB and PDBs

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# Objectives

By the end of this lecture, you should be able to:

- Understand when to use the SYSBACKUP privilege
- Use RMAN to manage CDB and PDB backup and recovery



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# About SYSBACKUP Privilege

- For only backup and recovery operations
- It can be granted to a common user or a local user

```
rman target '"c##backup as sysbackup"'
rman target '"c##backup@pdb1 as sysbackup"'
```



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# About Backing up a CDB

- Same RMAN commands for taking backup of a non-CDB apply in taking backup of the CDB.
- Backup of the ROOT and all the PDBs will be taken.
- The procedure to enable the ARCHIVELOG mode did not change
- RMAN configuration can be displayed using SHOW ALL or by querying the V\$RMAN\_CONFIGURATION view



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```
CONFIGURE CONTROLFILE AUTOBACKUP ON;  
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '..';  
CONFIGURE CHANNEL DEVICE TYPE DISK FORMAT '/dbbackups/%U';  
CONFIGURE DEVICE TYPE DISK BACKUP TYPE TO COMPRESSED BACKUPSET;
```

# Taking CDB Backup Example

```
run
{
  BACKUP AS COMPRESSED BACKUPSET
    FORMAT '/backups/cdb%U' DATABASE TAG='FULLCDB';
  BACKUP AS COMPRESSED BACKUPSET
    FORMAT '/backups/arc%U' ARCHIVELOG ALL TAG='FULLCDB';
  BACKUP FORMAT '/backups/c%U' CURRENT CONTROLFILE TAG='FULLCDB';
}
```



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# About Taking Backups of the PDBs

- You can connect to the root and take backup of specific PDB

```
BACKUP AS BACKUPSET PLUGGABLE DATABASE pdb1, pdb2;  
BACKUP AS COPY PLUGGABLE DATABASE pdb1, pdb2;  
BACKUP COPIES 2 PLUGGABLE DATABASE pdb1 FORMAT '..','..';
```

- Connect to the PDB and perform normal RMAN backups

```
BACKUP DATABASE;
```

- List backup of PDBs

```
LIST BACKUPSET OF PLUGGABLE DATABASE pdb1;  
LIST COPY OF PLUGGABLE DATABASE pdb1;
```



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# Restrictions When Connected to a PDB

In RMAN, when connected to PDB as target:

- You cannot back up, restore, or delete archived logs
- You cannot update the default RMAN configuration



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# Taking Backup of Tablespaces

- Taking backup of a tablespace in the connected container:

```
BACKUP TABLESPACE users;
```

- Taking backup of a tablespace in a specific container:

```
BACKUP TABLESPACE pdb1:users;
```

- Taking backup of both:

```
BACKUP TABLESPACE users, pdb1:users;
```



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# Performing a Complete CDB Recovery

- Similar non-CDB recovery procedure

```
RMAN> STARTUP MOUNT
RMAN> RESTORE DATABASE;
RMAN> RECOVER DATABASE;
RMAN> ALTER DATABASE OPEN;
RMAN> ALTER PLUGGABLE DATABASE ALL OPEN;
```



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# Performing a Complete Recovery of CDB\$ROOT

- If only CDB\$ROOT needs to restore:

```
RMAN> STARTUP MOUNT  
RMAN> RESTORE DATABASE "CDB$ROOT";  
RMAN> RECOVER DATABASE "CDB$ROOT";  
RMAN> ALTER DATABASE OPEN;  
RMAN> ALTER PLUGGABLE DATABASE ALL OPEN;
```

- RESTORE DATABASE ROOT is acceptable.
- Recovering all the PDBs is recommended



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# Performing a Complete PDB Recovery

- When connected to the root:

```
RMAN> ALTER PLUGGABLE DATABASE pdb1 CLOSE;  
RMAN> RESTORE PLUGGABLE DATABASE pdb1;  
RMAN> RECOVER PLUGGABLE DATABASE pdb1;  
RMAN> ALTER PLUGGABLE DATABASE pdb1 OPEN;
```

- If one datafile is missing, you need to take it offline:

```
ALTER PLUGGABLE DATABASE DATAFILE 12 OFFLINE;
```



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# Recover from a Lost PDB Nonsystem Datafile

- If connected to a PDB:

```
RMAN> CONNECT TARGET sys@pdb1
RMAN> ALTER DATABASE DATAFILE 5 OFFLINE
RMAN> RESTORE DATAFILE 5;
RMAN> RECOVER DATAFILE 5;
RMAN> ALTER DATABASE DATAFILE 5 ONLINE;
```



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# Block Change Tracking (BCT) in CDB

- Can only be enabled from CDB

```
SQL> CONN / as sysdba  
ALTER DATABASE ENABLE BLOCK CHANGE TRACKING  
[USING FILE '..'];
```



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# Summary

In this lecture, you should have learnt how to:

- Understand when to use the SYSBACKUP privilege
- Use RMAN to manage CDB and PDB backup and recovery



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