# Practices for Lesson 16: Performing Point-in-Time Recovery

Practices for Lesson 16: Overview

Overview

In these practices, you will perform a point-in-time (also known as incomplete) recovery of the database. You will also recover a table from a backup set without affecting other objects in the tablespace or schema.

Practice 16-1: Recovering from Media Failure: Incomplete Recovery

Overview

In this practice, you set up a scenario that requires an incomplete recovery. Then you perform the steps that are needed when an archive log is missing after the last backup (and transactions exist that cannot be re-created); therefore, complete recovery is not possible.

Assumptions

A full backup exists and the archive log files from the time of the backup to the current time are available.

You have two terminal windows open in which $HOME/labs/DBMod\_Recovery is the current directory, and environment variables point to the orclcdb database instance.

You have a recovery catalog instance, rcatpdb, available on your machine.

Tasks

Verify that the rcatcdb and rcatpdb are open.

Set the environment for the rcatcdb database.

Verify that the rcatpdb is open, then exit SQL\*Plus.

Synchronize the catalog with the database.

Set the environment for the orclcdb database instance

Connect to the target (database, orclcdb) and the recovery catalog (rcatpdb) and resynchronize the catalog with the database control file. Refer to the *Course Practice Environment: Security Credentials* for the passwords.

Start RMAN and connect to the ORCLCDB root as the SYS user.

Back up ORCLPDB1.

**Note:** A database backup should be taken after every recovery.

Exit RMAN.

Set up for this practice by executing the setup\_04\_01.sh script from the

$HOME/labs/DBMod\_Recovery directory. This script creates a new tablespace and a new user. The user creates a table and populates it. The script creates a backup of the tablespace, and then updates the table. The script saves its output in the

/tmp/setup.log file.

Cause a failure in the database by executing the break\_04\_01.sh script. Before introducing the failure, the script updates the user table several times. An extended period of time is simulated and several log switches occur. The script saves its output in the

/tmp/break.log file.

**Note:** The last digit of the SALARY column indicates how many times this table has been updated.

Log in to SQL\*Plus, start the database instance, and attempt to open the ORCLPDB1

pluggable database. Notice the error messages.

Note your data file number and name. In this example, it is data file 199, with a file name of bartbs.dbf. **You must use your own data file number for recovery**. Knowing the data file name is helpful for later correlations.

Open a new terminal window. Check the latest DBWR trace file, and then return to the

$HOME/labs/DBMod\_Recovery directory.

Use the RMAN LIST FAILURE command to find more information about the failure. You may see one or more failures listed.

Use the RMAN ADVISE FAILURE command to determine if mandatory manual actions exist, and if automated recovery is available. You may see one or more failures listed.

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Failure ID Priority Status Time Detected Summary

62 HIGH OPEN 03-JUL-19 One or more non-system datafiles are missing

analyzing automatic repair options; this may take some time allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=43 device type=DISK analyzing automatic repair options complete

Mandatory Manual Actions

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If file /u01/app/oracle/oradata/ORCLCDB/orclpdb1/bartbs.dbf was unintentionally renamed or moved, restore it

If you have an export of tablespace BARTBS, then drop and recreate the tablespace and import the data.

Contact Oracle Support Services if the preceding recommendations cannot be used, or if they do not fix the failures selected for repair

Optional Manual Actions

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no manual actions available

Automated Repair Options

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no automatic repair options available RMAN>

The ADVISE FAILURE command indicates that mandatory manual actions exist, in addition to optional manual actions and possibly some automated repair options. The mandatory manual actions include manually restoring the bartbs.dbf data file. This file name is not identified by file number in this advice, but it does correlate to the file number that you recorded in step 6, and that you found in the trace file content in step 7.

Attempt to restore and recover the data file that you identified in the previous steps (in this example the file number is 199, but it might differ in your system). *Be sure to use the correct data file number for your system*.

**Note:** You should expect this restore and recovery to fail. You should look for errors and information that will help you diagnose the cause of this failure.

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: restoring datafile 00198

input datafile copy RECID=20 STAMP=1012663108 file name=/u01/app/oracle/backup/ORCLCDB/orclpdb1/bartestdata\_D-

ORCLCDB\_I-2778750799\_TS-BARTBS\_FNO-198\_5ju5o0q4

destination for restore of datafile 00199:

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/bartbs.dbf

channel ORA\_DISK\_1: copied datafile copy of datafile 00198, elapsed time: 00:00:01

output file name=/u01/app/oracle/oradata/ORCLCDB/orclpdb1/bartbs.dbf RECID=0 STAMP=0

Finished restore at 03-JUL-19

RMAN> **recover datafile 199;** */\*enter your datafile number\*/*

Starting recover at 03-JUL-19 using channel ORA\_DISK\_1

starting media recovery

archived log for thread 1 with sequence 1 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_1\_gkso7g0z\_.arc

archived log for thread 1 with sequence 2 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_2\_gkso7hok\_.arc

archived log for thread 1 with sequence 3 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_3\_gkso7mvb\_.arc

archived log for thread 1 with sequence 4 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_4\_gkso7pys\_.arc

archived log for thread 1 with sequence 5 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_5\_gkso7t16\_.arc

archived log for thread 1 with sequence 7 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_7\_gkso803n\_.arc

archived log for thread 1 with sequence 8 is already on disk as file

The error message indicates that archive log file 6 is missing.

**Note:** If you get two RMAN-06025 error messages, focus on the latest one, that is, the one with the highest digits also in the following steps.

In a production system, you would determine if there is another copy of this file, possibly in an OS backup that is unknown to RMAN. If the archive log file can be found and restored, a complete recovery is possible. For this practice assume the archive log file is lost.

**Note:** The archive log sequence number that you find may be different than the one shown in the example. Make note of your missing archive log sequence number.

Return to your first terminal window and use your SQL\*Plus session to determine how much data will be lost. Complete recovery is not possible in this situation.

In this example, the current redo log file is sequence number 10. Log number 6 is missing.

So all the data contained in log files 6 through 10 will be lost.

Determine the current SCN by querying V$DATABASE.

**Note:** If you attempt to query the CURRENT\_SCN column of the V$DATABASE view for

orclpdb1, you will get a value of 0 (zero), and not the last "current" SCN. For example:

Determine the starting SCN and start time of your missing log (log 6 in this example). Record the values from the FIRST\_CHANGE# and FIRST\_TIME columns.

The value in FIRST\_TIME can be used to inform users how far back they have to go to recover any transactions that have been lost. Log out of SQL\*Plus.

**Note:** The SCN was displayed in the RMAN error message, but the first time that this archive log was used, it was not displayed.

Also note that the V$ARCHIVED\_LOG view contains historic information of prior database incarnations. The NAME column of the active database incarnation contains the path and name of the archive log; historic incarnations have a null value. The status A is for archived logs, D is for deleted ones.

Return to your second terminal window. It is recommended to always restore the control file first for incomplete recovery so that potential changes in the data structures are known to RMAN. Perform these steps in your window running RMAN.

Bring the database to NOMOUNT state.

Restore the control file from the autobackup.

RMAN> restore controlfile from autobackup;

Starting restore at 03-JUL-19 allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=21 device type=DISK

recovery area destination: /u01/app/oracle/fast\_recovery\_area database name (or database unique name) used for search: ORCLCDB channel ORA\_DISK\_1: AUTOBACKUP

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/autobackup/2019\_07\_03

/o1\_mf\_s\_1012663970\_gkslo2lr\_.bkp found in the recovery area channel ORA\_DISK\_1: looking for AUTOBACKUP on day: 20190703

channel ORA\_DISK\_1: restoring control file from AUTOBACKUP

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/autobackup/2019\_07\_03

/o1\_mf\_s\_1012663970\_gkslo2lr\_.bkp

channel ORA\_DISK\_1: control file restore from AUTOBACKUP complete

output file name=/u01/app/oracle/oradata/ORCLCDB/control01.ctl

output file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/control02.ctl

Finished restore at 03-JUL-19

RMAN>

Mount the database.

Restore the entire database from a backup that was taken before the missing archive log file with the RESTORE DATABASE UNTIL SEQUENCE *nn* command.

RMAN> **RESTORE DATABASE UNTIL SEQUENCE *6*;** */\*enter your missing log number\*/*

Starting restore at 03-JUL-19

Starting implicit crosscheck backup at 03-JUL-19 allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=25 device type=DISK Crosschecked 36 objects

Finished implicit crosscheck backup at 03-JUL-19

Starting implicit crosscheck copy at 03-JUL-19 using channel ORA\_DISK\_1

Crosschecked 1 objects

Finished implicit crosscheck copy at 03-JUL-19

searching for all files in the recovery area cataloging files...

cataloging done

List of Cataloged Files

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File Name:

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/autobackup/2019\_07\_03

/o1\_mf\_s\_1012663970\_gkslo2lr\_.bkp

using channel ORA\_DISK\_1

skipping datafile 5; already restored to file

/u01/app/oracle/oradata/ORCLCDB/pdbseed/system01.dbf

skipping datafile 6; already restored to file

/u01/app/oracle/oradata/ORCLCDB/pdbseed/sysaux01.dbf

skipping datafile 8; already restored to file

/u01/app/oracle/oradata/ORCLCDB/pdbseed/undotbs01.dbf

skipping datafile 198; already restored to file

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/bartbs.dbf channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00001 to

/u01/app/oracle/oradata/ORCLCDB/system01.dbf

channel ORA\_DISK\_1: restoring datafile 00003 to

/u01/app/oracle/oradata/ORCLCDB/sysaux01.dbf

channel ORA\_DISK\_1: restoring datafile 00004 to

/u01/app/oracle/oradata/ORCLCDB/undotbs01.dbf

channel ORA\_DISK\_1: restoring datafile 00007 to

/u01/app/oracle/oradata/ORCLCDB/users01.dbf

channel ORA\_DISK\_1: reading from backup piece

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019\_07\_02/ o1\_mf\_nnndf\_TAG20190702T163029\_gkq1o677\_.bkp

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

\_07\_02/o1\_mf\_nnndf\_TAG20190702T163029\_gkq1o677\_.bkp tag=TAG20190702T163029

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:35 channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00013 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb2/system01.dbf

channel ORA\_DISK\_1: restoring datafile 00014 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb2/sysaux01.dbf

channel ORA\_DISK\_1: restoring datafile 00015 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb2/undotbs01.dbf

channel ORA\_DISK\_1: restoring datafile 00016 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb2/users01.dbf

channel ORA\_DISK\_1: reading from backup piece

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/8857B419BF707E73E0536 210ED0A54C7/backupset/2019\_07\_02/o1\_mf\_nnndf\_TAG20190702T163029\_ gkq1p6hx\_.bkp

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/8857B419BF707E 73E0536210ED0A54C7/backupset/2019\_07\_02/o1\_mf\_nnndf\_TAG20190702T

163029\_gkq1p6hx\_.bkp tag=TAG20190702T163029 channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:15

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00160 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/system01.dbf

channel ORA\_DISK\_1: restoring datafile 00161 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/sysaux01.dbf

channel ORA\_DISK\_1: restoring datafile 00162 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/undotbs01.dbf

channel ORA\_DISK\_1: restoring datafile 00163 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/users01.dbf

channel ORA\_DISK\_1: restoring datafile 00172 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/INVENTORY01.DBF

channel ORA\_DISK\_1: restoring datafile 00197 to

/u01/app/oracle/oradata/ORCLCDB/orclpdb1/tbs\_app01.dbf

channel ORA\_DISK\_1: reading from backup piece

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/8C28E6F854EB7DBBE0536 210ED0AFDD9/backupset/2019\_07\_02/o1\_mf\_nnndf\_TAG20190702T195850\_ gkqfvtyb\_.bkp

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/8C28E6F854EB7D BBE0536210ED0AFDD9/backupset/2019\_07\_02/o1\_mf\_nnndf\_TAG20190702T 195850\_gkqfvtyb\_.bkp tag=TAG20190702T195850

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:15 Finished restore at 03-JUL-19

RMAN>

Recover the database through your last available log file.

**Note:** If incremental backups are available they will be applied first, and then the archive logs. The number of log files that need to be applied may vary from the example shown.

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_12\_gkq1wsx3\_.arc

archived log for thread 1 with sequence 13 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_13\_gkq1yz2w\_.arc

archived log for thread 1 with sequence 14 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_14\_gkq1yz3b\_.arc

archived log for thread 1 with sequence 15 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_15\_gkq2bh8q\_.arc

archived log for thread 1 with sequence 16 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_16\_gkq4sxtg\_.arc

archived log for thread 1 with sequence 17 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_17\_gkq4sxvx\_.arc

archived log for thread 1 with sequence 18 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_18\_gkq5g6kc\_.arc

archived log for thread 1 with sequence 19 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_19\_gkq5mt4k\_.arc

archived log for thread 1 with sequence 20 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_20\_gkq5mt5n\_.arc

archived log for thread 1 with sequence 21 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_21\_gkq61tm6\_.arc

archived log for thread 1 with sequence 22 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_22\_gkq61tnw\_.arc

archived log for thread 1 with sequence 23 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_23\_gkq6pb24\_.arc

archived log for thread 1 with sequence 24 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_24\_gkq6pt0j\_.arc

archived log for thread 1 with sequence 25 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_25\_gkq6zwql\_.arc

archived log for thread 1 with sequence 26 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_26\_gkq6zyx8\_.arc

archived log for thread 1 with sequence 27 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_27\_gkq77loz\_.arc

archived log for thread 1 with sequence 28 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_28\_gkq77oq7\_.arc

archived log for thread 1 with sequence 29 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_29\_gkq7tc4z\_.arc

archived log for thread 1 with sequence 30 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_30\_gkq7tc75\_.arc

archived log for thread 1 with sequence 31 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_31\_gkqbsds5\_.arc

archived log for thread 1 with sequence 32 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_32\_gkqbt1p7\_.arc

archived log for thread 1 with sequence 33 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_33\_gkqcsr7k\_.arc

archived log for thread 1 with sequence 34 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_34\_gkqcsr97\_.arc

archived log for thread 1 with sequence 35 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_35\_gkqf45nc\_.arc

archived log for thread 1 with sequence 36 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_36\_gkqf45pb\_.arc

archived log for thread 1 with sequence 37 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_37\_gkqfwy6q\_.arc

archived log for thread 1 with sequence 38 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_38\_gkqfwy8w\_.arc

archived log for thread 1 with sequence 39 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_39\_gkqgcnnh\_.arc

archived log for thread 1 with sequence 40 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_02

/o1\_mf\_1\_40\_gkqgcnpl\_.arc

archived log for thread 1 with sequence 41 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_41\_gkrfmcbx\_.arc

archived log for thread 1 with sequence 1 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_1\_gkso7g0z\_.arc

archived log for thread 1 with sequence 2 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_2\_gkso7hok\_.arc

archived log for thread 1 with sequence 3 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_3\_gkso7mvb\_.arc

archived log for thread 1 with sequence 4 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_4\_gkso7pys\_.arc

archived log for thread 1 with sequence 5 is already on disk as file

/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_07\_03

/o1\_mf\_1\_5\_gkso7t16\_.arc archived log file

name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_

07\_02/o1\_mf\_1\_10\_gkq1qfyq\_.arc thread=1 sequence=10 archived log file

name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_

07\_02/o1\_mf\_1\_11\_gkq1qg2z\_.arc thread=1 sequence=11 archived log file

name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_

07\_02/o1\_mf\_1\_12\_gkq1wsx3\_.arc thread=1 sequence=12 archived log file

name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_

07\_02/o1\_mf\_1\_13\_gkq1yz2w\_.arc thread=1 sequence=13

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_14\_gkq1yz3b\_.arc thread=1 sequence=14

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_15\_gkq2bh8q\_.arc thread=1 sequence=15

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_16\_gkq4sxtg\_.arc thread=1 sequence=16

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_17\_gkq4sxvx\_.arc thread=1 sequence=17

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_18\_gkq5g6kc\_.arc thread=1 sequence=18

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_19\_gkq5mt4k\_.arc thread=1 sequence=19

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_20\_gkq5mt5n\_.arc thread=1 sequence=20

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_21\_gkq61tm6\_.arc thread=1 sequence=21

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_22\_gkq61tnw\_.arc thread=1 sequence=22

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_23\_gkq6pb24\_.arc thread=1 sequence=23

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_24\_gkq6pt0j\_.arc thread=1 sequence=24

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_25\_gkq6zwql\_.arc thread=1 sequence=25

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_26\_gkq6zyx8\_.arc thread=1 sequence=26

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_27\_gkq77loz\_.arc thread=1 sequence=27

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_28\_gkq77oq7\_.arc thread=1 sequence=28

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_29\_gkq7tc4z\_.arc thread=1 sequence=29

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_30\_gkq7tc75\_.arc thread=1 sequence=30

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_31\_gkqbsds5\_.arc thread=1 sequence=31

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_32\_gkqbt1p7\_.arc thread=1 sequence=32

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_33\_gkqcsr7k\_.arc thread=1 sequence=33

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_34\_gkqcsr97\_.arc thread=1 sequence=34

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_35\_gkqf45nc\_.arc thread=1 sequence=35

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_36\_gkqf45pb\_.arc thread=1 sequence=36

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_37\_gkqfwy6q\_.arc thread=1 sequence=37

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_38\_gkqfwy8w\_.arc thread=1 sequence=38

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_39\_gkqgcnnh\_.arc thread=1 sequence=39

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_02/o1\_mf\_1\_40\_gkqgcnpl\_.arc thread=1 sequence=40

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_03/o1\_mf\_1\_41\_gkrfmcbx\_.arc thread=1 sequence=41

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_03/o1\_mf\_1\_1\_gkso7g0z\_.arc thread=1 sequence=1

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_03/o1\_mf\_1\_2\_gkso7hok\_.arc thread=1 sequence=2

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_03/o1\_mf\_1\_3\_gkso7mvb\_.arc thread=1 sequence=3

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/archivelog/2019\_ 07\_03/o1\_mf\_1\_4\_gkso7pys\_.arc thread=1 sequence=4

Open the database using the RESETLOGS option. Open the ORCLPDB1.

In your first terminal window, start a SQL\*Plus session as sysdba, and query V$DATABASE

to display the CURRENT\_SCN and DBID for both the orclcdb and orclpdb1 containers.

In your window running RMAN, use the Data Recovery Advisor LIST FAILURE command to verify that the failures have been repaired. **Then you must exit so that you can connect to the recovery catalog in the next step.**

Because the break\_04\_01.sh script removed an archive log to create an issue for your learning purpose, crosscheck all archive logs **connected to the recovery catalog.** Refer to *Course Practice Environment: Security Credentials* for the correct password.

$ rman target "'/ as sysbackup'" catalog rcatowner@rcatpdb

…

connected to target database: ORCLCDB (DBID=2778750799) recovery catalog database Password: **<*password>*** connected to recovery catalog database

RMAN> CROSSCHECK ARCHIVELOG ALL;

new incarnation of database registered in recovery catalog starting full resync of recovery catalog

full resync complete allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=4 device type=DISK validation succeeded for archived log

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCL/archivelog/2018\_07\_ 24/o1\_mf\_1\_25\_fogv69kj\_.arc RECID=32 STAMP=982347337

validation succeeded for archived log archived log file

name=/u01/app/oracle/fast\_recovery\_area/ORCL/archivelog/2018\_07\_ 24/o1\_mf\_1\_26\_fogv69m0\_.arc RECID=33 STAMP=982347337

validation succeeded for archived log

archived log file name=/u01/app/oracle/fast\_recovery\_area/ORCL/archivelog/2018\_07\_ 24/o1\_mf\_1\_27\_fogv69n3\_.arc RECID=34 STAMP=982347337

Crosschecked 3 objects

RMAN>

**Note:** Your number of objects might be different.

Delete obsolete backups, and then exit RMAN.

RMAN> delete noprompt obsolete;

RMAN retention policy will be applied to the command RMAN retention policy is set to redundancy 1

using channel ORA\_DISK\_1

Deleting the following obsolete backups and copies:

Type Key Completion Time Filename/Handle

Datafile Copy 245 2018-07-18:21:21:01

/u01/backup/orcl/data\_D-ORCL\_I-1509097982\_TS-USERS\_FNO-7\_0ot8bbn6

Datafile Copy 246 2018-07-18:21:21:01

/u01/backup/orcl/data\_D-ORCL\_I-1509097982\_TS-SYSTEM\_FNO-1\_0dt8bbl0

Datafile Copy 247 2018-07-18:21:21:01

/u01/backup/orcl/data\_D-ORCL\_I-1509097982\_TS-SYSAUX\_FNO-3\_0et8bblf

…

backup piece handle=/u01/app/oracle/fast\_recovery\_area/ORCL/70D3EC602C3B341CE 0532110ED0A1042/backupset/2018\_07\_24/o1\_mf\_nnndf\_TAG20180724T144

503\_foggwsd8\_.bkp RECID=43 STAMP=982334745 deleted backup piece

backup piece handle=/u01/app/oracle/fast\_recovery\_area/ORCL/autobackup/2018\_0 7\_24/o1\_mf\_s\_982334764\_foggxf0g\_.bkp RECID=45 STAMP=982334765

deleted backup piece backup piece

handle=/u01/app/oracle/fast\_recovery\_area/ORCL/autobackup/2018\_0 7\_24/o1\_mf\_s\_982345185\_fogs31l9\_.bkp RECID=52 STAMP=982347185

Deleted 26 objects RMAN> **exit**

…

$

In your SQL\*Plus session that is still connected to orclpdb1, select the SALARY column from one row of the BAR.BARCOPY table. The last digit of the salary indicates the number of times the BARCOPY table has been updated. The difference between this result and the result in step 2 illustrates that multiple updates could be missing after an incomplete recovery. Exit from SQL\*Plus.

Execute the cleanup\_04\_01.sh script from the $HOME/labs/DBMod\_Recovery directory to remove the new user and tablespace created in this practice. The script saves its output in the /tmp/cleanup.log file.

Back up the database. You have a new incarnation of the database and the older backups are obsolete, although there are certain cases where the older backups can be used. A new incarnation of the database was created when the RESETLOGS command was executed.

Use the backup\_orclcdb.sh script to create the backup. The script saves its output in the /tmp/backup.log file. This script runs this RMAN command to back up the database:

BACKUP DATABASE PLUS ARCHIVELOG DELETE INPUT

Keep all terminal windows open for the next practice.

Practice 16-2: Recovering a Table from a Backup

Overview

In this practice, you will recover a table from a backup set (without affecting other objects in the tablespace or schema). The tasks include the following:

Set up your test environment and confirm the configuration, which typically is a one-time task.

In RMAN, perform a level 0 backup plus archive logs and delete obsolete backups.

In SQL\*Plus, create and populate a new TEST\_TABLE. Note the SCN after commit.

In RMAN, perform a level 1 backup.

In SQL\*Plus, create the need to recover a table by purging TEST\_TABLE.

In RMAN, recover your test table to the SCN.

In SQL\*Plus, confirm the success of the recovery.

Clean up your practice environment.

Assumptions

You have two terminal windows open in which you are logged in as the oracle OS user,

$HOME/labs/DBMod\_Recovery is the current directory, and environment variables point to the orclcdb database instance.

Tasks

Prepare for this practice by executing the setup\_04\_02.sh script from the

$HOME/labs/DBMod\_Recovery directory. This script:

Creates a new tablespace and user

As the new user, creates a table and populates it

Saves its output in the /tmp/setup.log file.

Start a SQL\*Plus session and verify your test configuration.

Log in as the SYS user.

Confirm that the database is in ARCHIVELOG mode.

Confirm that compatibility is set to 19.0 or higher.

Confirm your backup location and size.

Connect to ORCLPDB1, then confirm the setup by executing the lab\_04\_02a.sql script from the $HOME/labs/DBMod\_Recovery directory. The BAR user should own the BARCOPY table.

In your second terminal window, start an RMAN session and connect to your orclcdb

database as the target instance.

**Note:** Some of the following steps generate a lot of output. The easiest way to send RMAN output both to a log file and to standard output is to use the Linux tee command or its equivalent. There is no need to do this if your standard output allows you to scroll as much as you wish. Using the following command example, you can view the output in the

/home/oracle/rman\_04.log file.

Confirm or configure autobackup of the control file and perform a level 0 backup.

RMAN> show CONTROLFILE AUTOBACKUP;

using target database control file instead of recovery catalog

RMAN configuration parameters for database with db\_unique\_name ORCLCDB are:

CONFIGURE CONTROLFILE AUTOBACKUP ON; # default

RMAN> backup incremental level 0 database plus archivelog;

Starting backup at 29-JUN-19 current log archived allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=279 device type=DISK

channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=140 RECID=33 STAMP=1012139222

input archived log thread=1 sequence=141 RECID=34 STAMP=1012139224

input archived log thread=1 sequence=142 RECID=35 STAMP=1012139226

…

input archived log thread=1 sequence=159 RECID=61 STAMP=1012243668

input archived log thread=1 sequence=160 RECID=59 STAMP=1012243664

channel ORA\_DISK\_1: starting piece 1 at 29-JUN-19

channel ORA\_DISK\_1: finished piece 1 at 29-JUN-19 piece

handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

\_06\_29/o1\_mf\_annnn\_TAG20190629T203255\_gkhlqqtq\_.bkp tag=TAG20190629T203255 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03 channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=118 RECID=12 STAMP=1012062683

…

input archived log thread=1 sequence=135 RECID=28 STAMP=1012138240

channel ORA\_DISK\_1: starting piece 1 at 29-JUN-19

channel ORA\_DISK\_1: finished piece 1 at 29-JUN-19 piece

handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

\_06\_29/o1\_mf\_annnn\_TAG20190629T203255\_gkhlqtz1\_.bkp tag=TAG20190629T203255 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:07 channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set input archived log thread=1 sequence=1 RECID=62 STAMP=1012247798 channel ORA\_DISK\_1: starting piece 1 at 29-JUN-19

channel ORA\_DISK\_1: finished piece 1 at 29-JUN-19

piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

\_06\_29/o1\_mf\_annnn\_TAG20190629T203255\_gkhlr231\_.bkp tag=TAG20190629T203255 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03 channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set input archived log thread=1 sequence=2 RECID=63 STAMP=1012249687

…

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01 Finished backup at 29-JUN-19

Starting backup at 29-JUN-19 using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 0 datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00003 name=/u01/app/oracle/oradata/ORCLCDB/sysaux01.dbf

channel ORA\_DISK\_1: finished piece 1 at 29-JUN-19

piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

In your SQL\*Plus session, create and populate a new table named BAR.TEST\_TABLE by executing the lab\_04\_02b.sql script. Note the SCN after the commit.

Be sure to note the SCN value displayed in the CURRENT\_SCN column. You will use it for recovery!

In your RMAN session, perform a level 1 backup. If you started your RMAN session with the tee command, then your output is redirected to the /home/oracle/rman\_04.log file.

RMAN> backup incremental level 1 database plus archivelog;

Starting backup at 29-JUN-19 current log archived

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=140 RECID=33 STAMP=1012139222

…

Starting backup at 29-JUN-19 current log archived

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set input archived log thread=1 sequence=7 RECID=68 STAMP=1012250592 channel ORA\_DISK\_1: starting piece 1 at 29-JUN-19

channel ORA\_DISK\_1: finished piece 1 at 29-JUN-19

piece handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/backupset/2019

\_06\_29/o1\_mf\_annnn\_TAG20190629T204312\_gkhmc0cl\_.bkp tag=TAG20190629T204312 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01 Finished backup at 29-JUN-19

Starting Control File and SPFILE Autobackup at 29-JUN-19 piece

handle=/u01/app/oracle/fast\_recovery\_area/ORCLCDB/autobackup/201 9\_06\_29/o1\_mf\_s\_1012250593\_gkhmc1pv\_.bkp comment=NONE

Finished Control File and SPFILE Autobackup at 29-JUN-19

RMAN>

In your SQL\*Plus session, create the need to recover a table by purging it. Optionally, view your SCN before and after the DROP TABLE command.

Optionally, view the current tables that the BAR user owns. The TEST\_TABLE should not be displayed.

In your RMAN session, recover your test table to **YOUR SCN** that you recorded in **Step 5**. Provide the following input with the RECOVER command:

Names of tables or table partitions to be recovered

SCN (or point in time) to which the tables or table partitions need to be recovered

Whether the recovered tables or table partitions must be imported into the target database (default is Yes.)

Auxiliary destination '/u01/app/oracle/backup/test'.

First, confirm that the directory of the auxiliary destination is empty and then execute your

RECOVER command. The recover command takes approximately 4 minutes.

**Note:** This positive error prior to the RECOVER command confirms that the auxiliary destination is empty.

RMAN> **RECOVER TABLE BAR.TEST\_TABLE OF PLUGGABLE DATABASE ORCLPDB1 UNTIL SCN 2239129** <<Your SCN from Step 5

2> AUXILIARY DESTINATION '/u01/app/oracle/backup/test';

Starting recover at 29-JUN-19 using channel ORA\_DISK\_1

RMAN-05026: warning: presuming following set of tablespaces applies to specified point-in-time

List of tablespaces expected to have UNDO segments Tablespace SYSTEM

Tablespace ORCLPDB1:SYSTEM Tablespace UNDOTBS1 Tablespace ORCLPDB1:UNDOTBS1

Creating automatic instance, with SID='mcFq'

initialization parameters used for automatic instance: db\_name=ORCLCDB db\_unique\_name=mcFq\_pitr\_ORCLPDB1\_ORCLCDB

…

auxiliary instance file

/u01/app/oracle/backup/test/ORCLCDB/8C28E6F854EB7DBBE0536210ED0A FDD9/datafile/o1\_mf\_undotbs1\_gkhmrq50\_.dbf deleted

auxiliary instance file

/u01/app/oracle/backup/test/ORCLCDB/datafile/o1\_mf\_undotbs1\_gkhm qn2h\_.dbf deleted

auxiliary instance file

/u01/app/oracle/backup/test/ORCLCDB/8C28E6F854EB7DBBE0536210ED0A FDD9/datafile/o1\_mf\_system\_gkhmrq4t\_.dbf deleted

auxiliary instance file

/u01/app/oracle/backup/test/ORCLCDB/datafile/o1\_mf\_system\_gkhmqn 21\_.dbf deleted

auxiliary instance file

/u01/app/oracle/backup/test/ORCLCDB/controlfile/o1\_mf\_gkhmqfrp\_. ctl deleted

auxiliary instance file tspitr\_mcFq\_44423.dmp deleted Finished recover at 29-JUN-19

RMAN>

**Note:** RMAN uses your input to automate the process of recovering the specified table. RMAN performs the following tasks:

Determines the backup based on the SCN you provide

Creates an auxiliary instance

Recovers your tables or table partitions, up to the specified point in time, into this auxiliary instance

Creates a Data Pump export dump file that contains the recovered objects

Imports the recovered objects into the target database

Removes the auxiliary instance

Delete obsolete archive logs and then exit RMAN.

In your SQL\*Plus session, query all rows of the test table to confirm the success of the recovery. Then exit SQL\*Plus.

Clean up the practice environment by executing the cleanup\_04\_02.sh script. This script removes the original and the transported tablespace, as well as the backup and dump files. The script saves its output in the /tmp/cleanup.log file.

Keep all terminal windows open for the next practice.