DATABASE BACKUP AND RECOVERY-ACTIVITY LIST

Written By: Daniel Piche

MARCH 11, 2019

DBAS3080-DATA BACKUP AND RECOVERY

NSCC-IT Campus

Table of Contents

Lab Assignment 1: Create a Logical Backup

As part of assignment 1 we will have the task of completing a Logical Backup. As part of creating a logical hot backup we will use export data pump and import data pump. A hot backup is a backup of a database made in real time as it is running.

Activity List

DATABASE BACKUP AND RECOVERY-ACTIVITY LIST

Project: Database Backup and Recovery Activity List			**Date**: February 24, 2019
Activity ID	**Activity Name**	**Description of Work**	**Responsibility**

Create a Logical Backup : Part 1	Tablespace for Chinook Schema	1. Whenever creating a new schema you should create a tablespace for that schema. Below is a scripts file used to create the directory.
		
		`[oracle@DB-DBAS3080-VM02 work]$ cat cr_tablespace.sh`
		`#!/bin/bash`
		
		`#rm -rf /u03`
		
		`mkdir -p /u03/app/oracle/oradata/orcl`
		
		`chown -R oracle:oinstall /u03`
		
		`chmod -R 775 /u03`
		`[oracle@DB-DBAS3080-VM02 work]$`
		
		2. Below is the sql script for creating the tablespace itself.
		
		`[oracle@DB-DBAS3080-VM02 work]$ cat cr_tablespace.sql`
		`spool cr_tablespace.lst`
		
		`SET ECHO ON`
		`CONN / AS SYSDBA`
		
		`--DROP TABLESPACE LogicalBackup INCLUDING CONTENTS AND DATAFILES CASCADE CONSTRAINTS;`
		
		`CREATE TABLESPACE LogicalBackup`
		`datafile '/u03/app/oracle/oradata/orcl/LogicalBackup.dbf'`
		`size 100M;`
		
		`spool off`
		`[oracle@DB-DBAS3080-VM02 work]$`
		
		3. Next if you navigate to the directory where you created the tablespace you will see a .dbf file.
		
		`[oracle@DB-DBAS3080-VM02 orcl]$ ls`
		`LogicalBackup.dbf`
		`[oracle@DB-DBAS3080-VM02 orcl]$ pwd`
		`/u03/app/oracle/oradata/orcl`
		`[oracle@DB-DBAS3080-VM02 orcl]$ hostname`
		`DB-DBAS3080-VM02`
		`[oracle@DB-DBAS3080-VM02 orcl]$`
		
		4. Once you know that the tablespace was created properly you can now create the user or schema. Below is a screen capture of the script to create the schema.
		
		`CREATE USER chinook IDENTIFIED BY chinook`
		`DEFAULT TABLESPACE LogicalBackup`
		`QUOTA 200M on LogicalBackup;`
		`--TEMPORARY TABLESPACE temp`
		`--QUOTA 200M ON users;`
		
		`GRANT connect to chinook;`
		`GRANT resource to chinook;`
		`GRANT create session TO chinook;`
		`GRANT create table TO chinook;`
		`GRANT create view TO chinook;`
		
		5. Now we can connect as chinook.	

```
SQL> conn chinook
Enter password:
Connected.
SQL>
```

6. To view the tablespaces that chinnok has access to simply run the command below. You will see that the new tablespace shows up when you select from chinook tablespaces.

```
SQL> select tablespace_name from user_tablespaces;

TABLESPACE_NAME
------------------------------
SYSTEM
SYSAUX
UNDOTBS1
TEMP
USERS
EXAMPLE
LOGICALBACKUP

7 rows selected.
```

	All tables exist in new tablespace	1. Once the schema is created and that chinook now has quota on the new tablespace we will run the script provided and make sure to modify it so that all the table creations happen in the right tablespace. 2. So, now connect as chinook. 3. If you run the command below you should see all the tables that belong to chinook. 4. You can also verify that all the tables were created in the proper tablespace by issuing the command below.	

```
SQL> conn chinook
Enter password:
Connected.
SQL>
```

```
SQL> select table_name from user_tables;

TABLE_NAME
------------------------------
ALBUM
CUSTOMER
EMPLOYEE
GENRE
INVOICE
INVOICELINE
MEDIATYPE
PLAYLIST
PLAYLISTTRACK
TRACK

10 rows selected.
```

```
SQL> select table_name from user_tables where tablespace_name = 'LOGICALBACKUP';

TABLE_NAME
------------------------------
TRACK
PLAYLISTTRACK
PLAYLIST
MEDIATYPE
INVOICELINE
INVOICE
GENRE
EMPLOYEE
CUSTOMER
ALBUM

10 rows selected.
```

	Backup CHINOOK SCHEMA	1. Now that all the tables are loaded into the schema we will backup the schema using the export data pump command below.
		`expdp system/123student01$ directory=backup_dir2 dumpfile=schema_chinook3.dmp logfile=schema_chinook3.log.exp schemas=chinook`
		2. As you can see from the screen capture below, the command runs successfully.
		`. . exported "CHINOOK"."TRACK" 241.1 KB 3503 rows`
		`. . exported "CHINOOK"."PLAYLISTTRACK" 98.69 KB 8715 rows`
		`. . exported "CHINOOK"."INVOICELINE" 53.34 KB 2202 rows`
		`. . exported "CHINOOK"."ALBUM" 17.78 KB 347 rows`
		`. . exported "CHINOOK"."CUSTOMER" 16.61 KB 58 rows`
		`. . exported "CHINOOK"."EMPLOYEE" 11.85 KB 8 rows`
		`. . exported "CHINOOK"."GENRE" 5.820 KB 25 rows`
		`. . exported "CHINOOK"."INVOICE" 35.35 KB 405 rows`
		`. . exported "CHINOOK"."MEDIATYPE" 5.554 KB 5 rows`
		`. . exported "CHINOOK"."PLAYLIST" 5.773 KB 18 rows`
		`Master table "SYSTEM"."SYS_EXPORT_SCHEMA_01" successfully loaded/unloaded`
		3. Before running the command above make sure to create the backup directory. The command is below.
		`CREATE OR REPLACE DIRECTORY backup_dir2 AS '/u03/backup';`
		`SELECT * FROM dba_directories WHERE directory_name = 'backup_dir2';`
		4. If you list from the directory you will see a dump file as well as a log file.
		`[oracle@DB-DBAS3080-VM02 backup]$ ls`
		`schema_chinook3.dmp schema_chinook3.log.exp`
		`[oracle@DB-DBAS3080-VM02 backup]$ pwd`
		`/u03/backup`
		`[oracle@DB-DBAS3080-VM02 backup]$`	

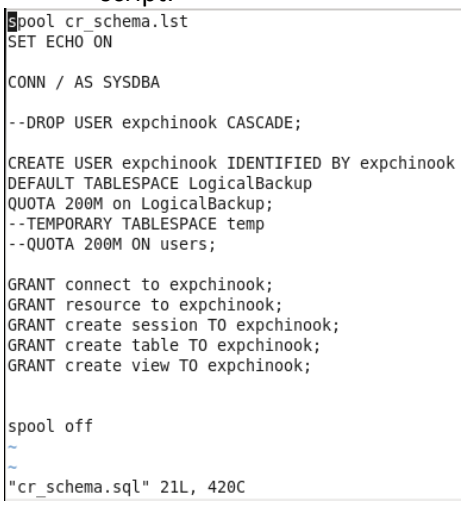
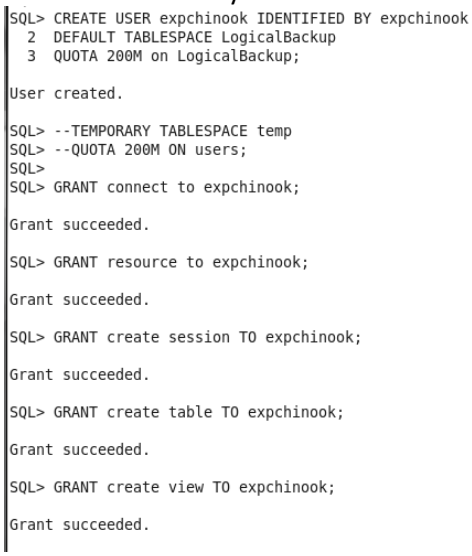
	Parameter file used for Data Pump Export	1. When using the datapump export file it is important to know where it is stored.
		`[oracle@DB-DBAS3080-VM02 bin]$ pwd`
		`/u01/app/oracle/product/11.2.0/db_1/bin`
		`[oracle@DB-DBAS3080-VM02 bin]$ ls -l expdp`
		`-rwxr-x--x. 1 oracle oinstall 167818 Feb 12 17:41 expdp`
		`[oracle@DB-DBAS3080-VM02 bin]$`	

	Log file to show results	1. Below is a screen capture of the log file after a successful import.
		`File Edit View Search Terminal Help`
		`Export: Release 11.2.0.1.0 - Production on Thu Feb 21 19:53:29 2019`
		`Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.`
		`;;;`
		`Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production`
		`With the Partitioning, OLAP, Data Mining and Real Application Testing options`
		`Starting "SYSTEM"."SYS_EXPORT_SCHEMA_01": system/******** directory=backup_dir2 dumpfile=schema_chinook3.dmp logfile=schema_chinook3.log.exp schemas=chinook`
		`Estimate in progress using BLOCKS method...`
		`Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA`
		`Total estimation using BLOCKS method: 1.062 MB`
		`Processing object type SCHEMA_EXPORT/USER`
		`Processing object type SCHEMA_EXPORT/SYSTEM_GRANT`
		`Processing object type SCHEMA_EXPORT/ROLE_GRANT`
		`Processing object type SCHEMA_EXPORT/DEFAULT_ROLE`
		`Processing object type SCHEMA_EXPORT/TABLESPACE_QUOTA`
		`Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA`
		`Processing object type SCHEMA_EXPORT/TABLE/TABLE`
		`Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX`
		`Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT`
		`Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/REF_CONSTRAINT`
		`. . exported "CHINOOK"."TRACK" 241.1 KB 3503 rows`
		`. . exported "CHINOOK"."PLAYLISTTRACK" 98.69 KB 8715 rows`
		`. . exported "CHINOOK"."INVOICELINE" 53.34 KB 2202 rows`
		`. . exported "CHINOOK"."ALBUM" 17.78 KB 347 rows`
		`. . exported "CHINOOK"."CUSTOMER" 16.61 KB 58 rows`
		`. . exported "CHINOOK"."EMPLOYEE" 11.85 KB 8 rows`
		`. . exported "CHINOOK"."GENRE" 5.820 KB 25 rows`
		`. . exported "CHINOOK"."INVOICE" 35.35 KB 405 rows`
		`. . exported "CHINOOK"."MEDIATYPE" 5.554 KB 5 rows`
		`. . exported "CHINOOK"."PLAYLIST" 5.773 KB 18 rows`
		`Master table "SYSTEM"."SYS_EXPORT_SCHEMA_01" successfully loaded/unloaded`
		`******************************************************************************`
		`Dump file set for SYSTEM.SYS_EXPORT_SCHEMA_01 is:`
		`/u03/backup/schema_chinook3.dmp`
		`Job "SYSTEM"."SYS_EXPORT_SCHEMA_01" successfully completed at 19:53:45`
		`[oracle@DB-DBAS3080-VM02 backup]$`	

Create a Logical Backup : Part 2	Copy the dump file into another Database Environment	1. Now that we have the schema exported into a data dump file we will need to transfer it to the other virtual machine in order to import it there. Below is the command. 2. The screen shot below shows that the transfer occurred successfully. 3. Now if you look in the directory where the file was transferred to you will now see the file.	

```
[oracle@DB-DBAS3080-VM02 backup]$ scp oracle@192.168.119.137:/u03/backup/schema_
chinook3.dmp oracle@192.168.119.136:/home/oracle/work/schema_chinook3.dmp
oracle@192.168.119.137's password:
oracle@192.168.119.136's password:
schema_chinook3.dmp                           100%  904KB 904.0KB/s   00:00
Connection to 192.168.119.137 closed.
[oracle@DB-DBAS3080-VM02 backup]$
```

```
[oracle@DB-DBAS3080-VM01 work]$ ls
create_avia2.sql   create_avia.sql  schema_chinook3.dmp
create_avia2.sql~  insert_avia.sql
[oracle@DB-DBAS3080-VM01 work]$ pwd
/home/oracle/work
[oracle@DB-DBAS3080-VM01 work]$
```

Create a Logical Backup : Part 3	Create a new user called EXPCHINOOK	1. Now in the other virtual environment we will go through the process of importing the exported file. 2. At first you will need to create a tablespace for the schema we will be creating. For this you can reuse the scripts from above. 3. Now that the tablespace is created we wil now create the schema. Below is a screen shot of the script.  4. Below is a screen shot of the scripts running successfully in the other virtual environment.  5. Now if you run the command below you should see the new user in the list of dba_users.	

```
spool cr_schema.lst
SET ECHO ON

CONN / AS SYSDBA

--DROP USER expchinook CASCADE;

CREATE USER expchinook IDENTIFIED BY expchinook
DEFAULT TABLESPACE LogicalBackup
QUOTA 200M on LogicalBackup;
--TEMPORARY TABLESPACE temp
--QUOTA 200M ON users;

GRANT connect to expchinook;
GRANT resource to expchinook;
GRANT create session TO expchinook;
GRANT create table TO expchinook;
GRANT create view TO expchinook;


spool off
~
~
"cr_schema.sql" 21L, 420C
```

```
SQL> CREATE USER expchinook IDENTIFIED BY expchinook
  2  DEFAULT TABLESPACE LogicalBackup
  3  QUOTA 200M on LogicalBackup;

User created.

SQL> --TEMPORARY TABLESPACE temp
SQL> --QUOTA 200M ON users;
SQL>
SQL> GRANT connect to expchinook;

Grant succeeded.

SQL> GRANT resource to expchinook;

Grant succeeded.

SQL> GRANT create session TO expchinook;

Grant succeeded.

SQL> GRANT create table TO expchinook;

Grant succeeded.

SQL> GRANT create view TO expchinook;

Grant succeeded.
```

		SQL> select username from dba_users; USERNAME ------------------------------ MGMT_VIEW SYS SYSTEM DBSNMP SYSMAN EXPCHINOOK	
	Import the chinook user and all objects into EXPCHINOOK	1. Before running the import command you should create a directory for the dumpfile and the log file. Below shows the command to create the directory. SQL> CREATE OR REPLACE DIRECTORY backup_dir AS '/u02/backup'; Directory created. SQL> 2. Now that the directory is created you can issue the import data pump command. impdp system/123student01$ schemas=chinook remap_schema=chinook:expchinook dumpfile=backup_dir:schema_chinook3.dmp logfile=backup_dir:schema_expchinook.log.imp 3. Now, if you log into database as "expchinook" and then select all the tables that belong to that schema you should get the results below. SQL> conn expchinook Enter password: Connected. SQL> select table_name from user_tables; TABLE_NAME ------------------------------ ALBUM CUSTOMER EMPLOYEE GENRE INVOICE INVOICELINE MEDIATYPE PLAYLIST PLAYLISTTRACK TRACK 10 rows selected.	
	Provide a screen shot of parameter file used for import	1. Whenever using a utility such as datapump it is important to know where the file actually is located. [root@DB-DBAS3080-VM01 bin]# ls -l impdp -rwxr-x--x. 1 oracle oinstall 179826 Feb 11 10:00 impdp [root@DB-DBAS3080-VM01 bin]# pwd /u01/app/oracle/product/11.2.0/db_1/bin [root@DB-DBAS3080-VM01 bin]#	

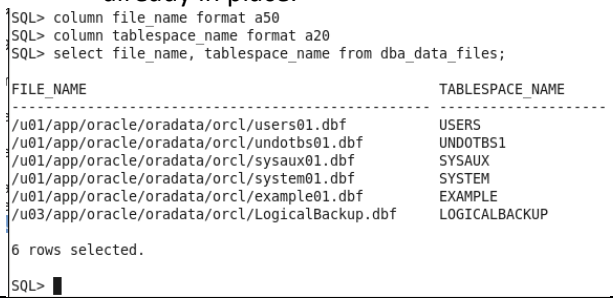
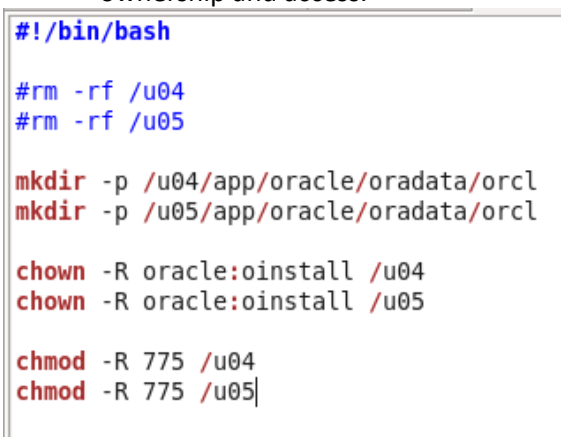
	Provide Log File to show Results	1. The screen capture below represents the log file generated from the import. File Edit View Search Terminal Help [oracle@DB-DBAS3080-VM01 backup]$ cat schema_expchinook.log.imp ;;; Import: Release 11.2.0.1.0 - Production on Sun Feb 24 15:36:10 2019 Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved. ;;; Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production With the Partitioning, OLAP, Data Mining and Real Application Testing options Master table "SYSTEM"."SYS_IMPORT_SCHEMA_01" successfully loaded/unloaded Starting "SYSTEM"."SYS_IMPORT_SCHEMA_01": system/******** schemas=chinook remap_schema=chinook:expchinook dumpfile=backup_dir:schema_chinook3.dmp logfile=backup_dir:schema_expchinook.log.imp Processing object type SCHEMA_EXPORT/USER ORA-31684: Object type USER:"EXPCHINOOK" already exists Processing object type SCHEMA_EXPORT/SYSTEM_GRANT Processing object type SCHEMA_EXPORT/ROLE_GRANT Processing object type SCHEMA_EXPORT/DEFAULT_ROLE Processing object type SCHEMA_EXPORT/TABLESPACE_QUOTA Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA Processing object type SCHEMA_EXPORT/TABLE/TABLE Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA . . imported "EXPCHINOOK"."TRACK" 241.1 KB 3503 rows . . imported "EXPCHINOOK"."PLAYLISTTRACK" 98.69 KB 8715 rows . . imported "EXPCHINOOK"."INVOICELINE" 53.34 KB 2202 rows . . imported "EXPCHINOOK"."ALBUM" 17.78 KB 347 rows . . imported "EXPCHINOOK"."CUSTOMER" 16.61 KB 58 rows . . imported "EXPCHINOOK"."EMPLOYEE" 11.85 KB 8 rows . . imported "EXPCHINOOK"."GENRE" 5.820 KB 25 rows . . imported "EXPCHINOOK"."INVOICE" 35.35 KB 405 rows . . imported "EXPCHINOOK"."MEDIATYPE" 5.554 KB 5 rows . . imported "EXPCHINOOK"."PLAYLIST" 5.773 KB 18 rows Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/REF_CONSTRAINT Job "SYSTEM"."SYS_IMPORT_SCHEMA_01" completed with 1 error(s) at 15:36:16 [oracle@DB-DBAS3080-VM01 backup]$	

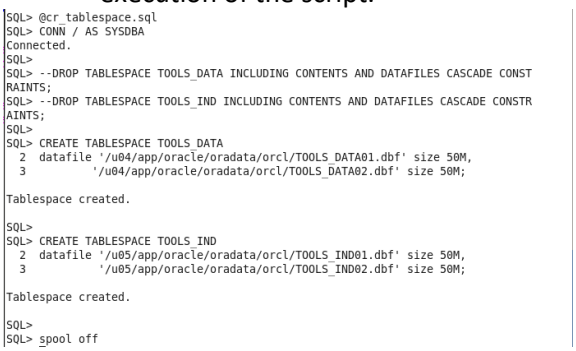
Activity List			
Project: Database Backup and Recovery Activity List			**Date**: February 24, 2019
Activity ID	**Activity Name**	**Description of Work**	**Responsibility**

Lab 2-Working with Control Files	Backup Control File	1. As a database administrator it is vital to be able to backup control files.
		2. Below is the command to back it up
		`--control files backup`
		`alter database backup controlfile to trace;`
		`alter database backup controlfile to '/u02/backup/control_file.bkup';`
		3. The screen shot below shows that the control file was backup up with the directory it was backed up in
		[oracle@DB-DBAS3080-VM02 backup]$ ls
		chinook_album2.dmp chinook_album.log.imp schema_chinook2.log.imp
		chinook_album2.log.exp control_file.bkup schema_chinook.dmp
		chinook_album.dmp parfile schema_chinook.log.exp
		chinook_album.log.exp pfile_backup.ora schema_chinook.log.imp
		[oracle@DB-DBAS3080-VM02 backup]$ pwd
		/u02/backup
		[oracle@DB-DBAS3080-VM02 backup]$	

	Backup PFile or SPFile	1. Below is the cammand to backup the spfile
		`--backup spfile`
		`create pfile='/u02/backup/pfile_backup.ora' from spfile;`
		2. Below shows the directory that the spfile was created in as well as the file itself	

		[oracle@DB-DBAS3080-VM02 backup]$ ls chinook_album2.dmp chinook_album.log.imp schema_chinook2.log.imp chinook_album2.log.exp control_file.bkup schema_chinook.dmp chinook_album.dmp parfile schema_chinook.log.exp chinook_album.log.exp pfile_backup.ora schema_chinook.log.imp [oracle@DB-DBAS3080-VM02 backup]$ pwd /u02/backup [oracle@DB-DBAS3080-VM02 backup]$	
	Backup Listener.ora	1. Listener.ora is a very important database file because it allows your database to be monitored while it is running. There isn't really a command to backup this file so it should be done manually. --tnsnames.ora and lsnrctl.ora path /u01/app/oracle/product/11.2.0/db_1/network/admin 2. Below shows the location of the file and the command issued to back it up [oracle@DB-DBAS3080-VM02 backup]$ cd /u01/app/oracle/product/11.2.0/db_1/network/admin [oracle@DB-DBAS3080-VM02 admin]$ ls listener.ora samples shrept.lst sqlnet.ora tnsnames.ora [oracle@DB-DBAS3080-VM02 admin]$ cp listener.ora /u02/backup/listener.ora.bkup [oracle@DB-DBAS3080-VM02 admin]$ 3. Now we will go to the directory that the file was backed up to and the path it is stored in [oracle@DB-DBAS3080-VM02 admin]$ cd /u02/backup [oracle@DB-DBAS3080-VM02 backup]$ ls chinook_album2.dmp control_file.bkup schema_chinook.dmp chinook_album2.log.exp listener.ora.bkup schema_chinook.log.exp chinook_album.dmp parfile schema_chinook.log.imp chinook_album.log.exp pfile_backup.ora chinook_album.log.imp schema_chinook2.log.imp [oracle@DB-DBAS3080-VM02 backup]$ pwd /u02/backup [oracle@DB-DBAS3080-VM02 backup]$	
	Backup TNSNames.ora	1. TNSNAMES.ora is another important file as it provides important parameters that allow your database to run. Below is the path of the file. --tnsnames.ora and lsnrctl.ora path /u01/app/oracle/product/11.2.0/db_1/network/admin 2. You can see in the screen shot below that the tnsnames.ora file is located in the directory that was described. You can also see the command used to backup the file. [oracle@DB-DBAS3080-VM02 admin]$ ls listener.ora samples shrept.lst sqlnet.ora tnsnames.ora [oracle@DB-DBAS3080-VM02 admin]$ pwd /u01/app/oracle/product/11.2.0/db_1/network/admin [oracle@DB-DBAS3080-VM02 admin]$ cp tnsnames.ora /u02/backup/tnsnames.ora.bkup [oracle@DB-DBAS3080-VM02 admin]$ 3. The screen shot below shows that the file was successfully copied to the backup directory. [oracle@DB-DBAS3080-VM02 backup]$ pwd /u02/backup [oracle@DB-DBAS3080-VM02 backup]$ ls chinook_album2.dmp control_file.bkup schema_chinook.dmp chinook_album2.log.exp listener.ora.bkup schema_chinook.log.exp chinook_album.dmp parfile schema_chinook.log.imp chinook_album.log.exp pfile_backup.ora tnsnames.ora.bkup chinook_album.log.imp schema_chinook2.log.imp [oracle@DB-DBAS3080-VM02 backup]$	

<table>
<tr><th colspan="4">Activity List</th></tr>
<tr><td colspan="3">Project: Database Backup and Recovery Activity List</td><td>Date: February 25, 2019</td></tr>
<tr><th>Activity ID</th><th>Activity Name</th><th>Description of Work</th><th>Responsibility</th></tr>
<tr><td>Working with Tablespaces</td><td>Identify and document the Location of all tablespaces</td><td>1. When working with tablespaces it is important to know how to query the database to see the list of tablespaces already in place.
 
</td><td></td></tr>
<tr><td></td><td>Create two new tablespaces called TOOLS_DATA and TOOLS_IND. For each, include 2 datafiles that will be 50m</td><td>1. The first step in creating a tablespace is to create the directories and set their ownership and access.
 

2. Once the directories are in place you can now create the tablespaces themselves. The screen shot below shows the successful execution of the script.
 

3. Below is a screen shot of the script.</td><td></td></tr>
</table>

```
spool cr_tablespace.lst

SET ECHO ON
CONN / AS SYSDBA

--DROP TABLESPACE TOOLS_DATA INCLUDING CONTENTS AND DATAFILES CASCADE CONSTRAINTS;
--DROP TABLESPACE TOOLS_IND INCLUDING CONTENTS AND DATAFILES CASCADE CONSTRAINTS;

CREATE TABLESPACE TOOLS_DATA
datafile '/u04/app/oracle/oradata/orcl/TOOLS_DATA01.dbf' size 50M,
        '/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf' size 50M;

CREATE TABLESPACE TOOLS_IND
datafile '/u05/app/oracle/oradata/orcl/TOOLS_IND01.dbf' size 50M,
        '/u05/app/oracle/oradata/orcl/TOOLS_IND02.dbf' size 50M;

spool off
```

4. Now that the tablespaces are created you can now query the database for an updated list of tablespaces. You will notice that the newly created tablespaces are there.

```
SQL> column file_name format a50
SQL> column tablespace_name format a20
SQL> select file_name, tablespace_name from dba_data_files;

FILE_NAME                                          TABLESPACE_NAME
-------------------------------------------------- --------------------
/u01/app/oracle/oradata/orcl/users01.dbf           USERS
/u01/app/oracle/oradata/orcl/undotbs01.dbf         UNDOTBS1
/u01/app/oracle/oradata/orcl/sysaux01.dbf          SYSAUX
/u01/app/oracle/oradata/orcl/system01.dbf          SYSTEM
/u01/app/oracle/oradata/orcl/example01.dbf         EXAMPLE
/u03/app/oracle/oradata/orcl/LogicalBackup.dbf     LOGICALBACKUP
/u04/app/oracle/oradata/orcl/TOOLS_DATA01.dbf      TOOLS_DATA
/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf      TOOLS_DATA
/u05/app/oracle/oradata/orcl/TOOLS_IND01.dbf       TOOLS_IND
/u05/app/oracle/oradata/orcl/TOOLS_IND02.dbf       TOOLS_IND

10 rows selected.
```

DROP tablespace TOOLS_IND

1. The screen shot below shows the command to drop a tablespace.

```
SQL> DROP TABLESPACE TOOLS_IND INCLUDING CONTENTS AND DATAFILES CASCADE CONSTRAINTS;

Tablespace dropped.
```

2. As you can see the dropped tablespace is no longer in the database.

```
SQL> column file_name format a50
SQL> column tablespace_name format a20
SQL> select file_name, tablespace_name from dba_data_files;

FILE_NAME                                          TABLESPACE_NAME
-------------------------------------------------- --------------------
/u01/app/oracle/oradata/orcl/users01.dbf           USERS
/u01/app/oracle/oradata/orcl/undotbs01.dbf         UNDOTBS1
/u01/app/oracle/oradata/orcl/sysaux01.dbf          SYSAUX
/u01/app/oracle/oradata/orcl/system01.dbf          SYSTEM
/u01/app/oracle/oradata/orcl/example01.dbf         EXAMPLE
/u03/app/oracle/oradata/orcl/LogicalBackup.dbf     LOGICALBACKUP
/u04/app/oracle/oradata/orcl/TOOLS_DATA01.dbf      TOOLS_DATA
/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf      TOOLS_DATA

8 rows selected.
```

Activity List			
Project: Database Backup and Recovery Activity List			**Date**: February 28, 2019
Activity ID	**Activity Name**	**Description of Work**	**Responsibility**

Working With Redo Logs	Identify and Document the location of your redo log files	1) Below shows all the redo logs currently configured on the system.
		`SQL> select member from v$logfile;`
		`MEMBER`
		`/u01/app/oracle/oradata/orcl/redo03.log`
		`/u01/app/oracle/oradata/orcl/redo02.log`
		`/u01/app/oracle/oradata/orcl/redo01.log`
		`/u02/oraredo/redo05a.rdo`
		`/u02/oraredo/redo05.rdo`
		`SQL>`	

	Set up Archive Logging On	1) To check the status of the archive log you should issue the command below.
		`SQL> archive log list;`
		`Database log mode No Archive Mode`
		`Automatic archival Disabled`
		`Archive destination USE_DB_RECOVERY_FILE_DEST`
		`Oldest online log sequence 16`
		`Current log sequence 19`
		`SQL>`
		2) The first step in configuring the redo logs is to shutdown the database.
		`SQL> shutdown immediate`
		`Database closed.`
		`Database dismounted.`
		`ORACLE instance shut down.`
		`SQL> startup mount;`
		`ORACLE instance started.`
		3) Then you should start it with the mount command.
		`SQL> startup mount;`
		`ORACLE instance started.`
		`Total System Global Area 1603411968 bytes`
		`Fixed Size 2213776 bytes`
		`Variable Size 989857904 bytes`
		`Database Buffers 603979776 bytes`
		`Redo Buffers 7360512 bytes`
		`Database mounted.`
		4) The command below will turn on the archive log
		`SQL> alter database archivelog;`
		`Database altered.`
		`SQL>`
		5) Once it is on you should open the database.
		`SQL> alter database open;`
		`Database altered.`
		`SQL>`	

		6) Below shows that the archive log is now turned on.
		`SQL> archive log list;`
		`Database log mode Archive Mode`
		`Automatic archival Enabled`
		`Archive destination USE_DB_RECOVERY_FILE_DEST`
		`Oldest online log sequence 16`
		`Next log sequence to archive 19`
		`Current log sequence 19`
		`SQL>`	

	Add a new Online Redo Log group and place files in UNIX folder	1) To add a new redo log issue the command below.
		`SQL> ALTER DATABASE ADD LOGFILE GROUP 4`
		`2 ('/u02/oraredo/redo04a.rdo','/u02/oraredo/redo04b.rdo')SIZE 50M;`
		`Database altered.`
		`SQL>`
		2) As you can see, if you go to the directory the log will be there.
		`[oracle@DB-DBAS3080-VM02 oraredo]$ pwd`
		`/u02/oraredo`
		`[oracle@DB-DBAS3080-VM02 oraredo]$ ls`
		`redo04a.rdo redo04b.rdo redo05a.rdo redo05.rdo`
		`[oracle@DB-DBAS3080-VM02 oraredo]$`
		3) To view all redo logs on the system run the command below.
		`SQL> select member from v$logfile;`
		`MEMBER`
		`/u01/app/oracle/oradata/orcl/redo03.log`
		`/u01/app/oracle/oradata/orcl/redo02.log`
		`/u01/app/oracle/oradata/orcl/redo01.log`
		`/u02/oraredo/redo05a.rdo`
		`/u02/oraredo/redo05.rdo`
		`/u02/oraredo/redo04a.rdo`
		`/u02/oraredo/redo04b.rdo`
		`7 rows selected.`
		`SQL>`
		4) Below is another view that shows information about the redo logs.	

```
    GROUP#    THREAD# STATUS                BYTES ARC
---------- ---------- ---------------- ---------- ---
MEMBER
------------------------------------------------------------
         5          1 CURRENT            52428800 NO
/u02/oraredo/redo05a.rdo

         5          1 CURRENT            52428800 NO
/u02/oraredo/redo05.rdo

         4          1 UNUSED             52428800 YES
/u02/oraredo/redo04a.rdo


    GROUP#    THREAD# STATUS                BYTES ARC
---------- ---------- ---------------- ---------- ---
MEMBER
------------------------------------------------------------
         4          1 UNUSED             52428800 YES
/u02/oraredo/redo04b.rdo


7 rows selected.
```

Relocate/Move one member of group 4 from one directory to another

1) To relocate or move a redo log you must first shut down the database.

```
SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL>
```

2) Then you will issue the move command. As you can see the move actually takes place.

```
[oracle@DB-DBAS3080-VM02 oraredo]$ ls
redo04a.rdo  redo04b.rdo  redo05a.rdo  redo05.rdo
[oracle@DB-DBAS3080-VM02 oraredo]$ mv /u02/oraredo/redo04b.rdo /u02/oraredo/redo
04.rdo
[oracle@DB-DBAS3080-VM02 oraredo]$ ls
redo04a.rdo  redo04.rdo  redo05a.rdo  redo05.rdo
[oracle@DB-DBAS3080-VM02 oraredo]$
```

3) Now to finalize the move we will issue the startup mount command.

```
SQL> startup mount
ORACLE instance started.

Total System Global Area 1603411968 bytes
Fixed Size                  2213776 bytes
Variable Size             989857904 bytes
Database Buffers          603979776 bytes
Redo Buffers                7360512 bytes
Database mounted.
SQL>
```

4) For the full change to take effect you need to rename the file as well.

```
SQL> ALTER DATABASE RENAME FILE '/u02/oraredo/redo04b.rdo' to '/u02/oraredo/redo
04.rdo';

Database altered.

SQL>
```

5) Now issue the command below to verify the expected results.

		SQL> select member from v$logfile; MEMBER ---------- /u01/app/oracle/oradata/orcl/redo03.log /u01/app/oracle/oradata/orcl/redo02.log /u01/app/oracle/oradata/orcl/redo01.log /u02/oraredo/redo05a.rdo /u02/oraredo/redo05.rdo /u02/oraredo/redo04a.rdo /u02/oraredo/redo04.rdo 7 rows selected. SQL>	

Activity List			
Project: Database Backup and Recovery Activity List			**Date**: February 28, 2019
Activity ID	**Activity Name**	**Description of Work**	**Responsibility**

Configure RMAN	Check to see if ArchiveLog mode is on	1) In order to configure RMAN, archiving has to be turned on. You can check with the command below.
		`SQL> select log_mode from v$database;`
		`LOG_MODE`
		`------------`
		`NOARCHIVELOG`
		`Database is in NOARCHIVELOG mode.`	

	Shutdown Database	2) To be able to turn on archiving the database must first be shutdown.
		`SQL> shutdown immediate;`
		`Database closed.`
		`Database dismounted.`
		`ORACLE instance shut down.`	

	Startup Database in Mount state	3) Next we will startup the database in mount mode.
		`SQL> startup mount;`
		`ORACLE instance started.`
		`Total System Global Area 308981760 bytes`
		`Fixed Size 2212896 bytes`
		`Variable Size 163580896 bytes`
		`Database Buffers 138412032 bytes`
		`Redo Buffers 4775936 bytes`
		`Database mounted.`	

	Turn ARCHIVELOG mode ON	4) The command below will turn on archiving
		`SQL> alter database archivelog;`
		`Database altered.`	

	Alter Database to OPEN state	5) Next you will need to open the database
		`SQL> alter database open;`
		`Database altered.`	

	Make sure OPEN_MODE and READ WRITE are enabled	6) You should then make sure that the database is in OPEN_MODE and READ WRITE is turned on
		`SQL> select open_mode from v$databa`
		`OPEN_MODE`
		`--------------------`
		`READ WRITE`	

	Check ARCHIVELOG destination	7) The command below will show you if you have turned on archiving properly.
		`SQL> archive log list`
		`Database log mode Archive Mode`
		`Automatic archival Enabled`
		`Archive destination USE_DB_RECOVERY_FILE_DEST`
		`Oldest online log sequence 16`
		`Next log sequence to archive 19`
		`Current log sequence 19`
		`SQL>`	

	Set archive log destination	8) To be in full control of the archiving I recommend not using the default location but instaead you should specify a specific path
		`SQL> ALTER system set log_archive_dest_1='location=/u02/Arch_BKP' scope=`
		`System altered.`
		`SQL>`
		9) Below will show you the Archive Destination
		`SQL> archive log list`
		`Database log mode Archive Mode`
		`Automatic archival Enabled`
		`Archive destination /u02/Arch_BKP`
		`Oldest online log sequence 16`
		`Next log sequence to archive 19`
		`Current log sequence 19`
		`SQL>`	

	Ensure the flash/fast recovery area location	10) The command below will show you if the recovery file exists or not
		`SQL> show parameter db_recovery_file_dest`
		`NAME TYPE VALUE`
		`db_recovery_file_dest string /u01/app/oracle/flash_recover_area`
		`db_recovery_file_dest_size big integer 3882M`
		`SQL>`	

	Connect to RMAN prompt	11) Connect to RMAN to make some configurations
		`[oracle@DB-DBAS3080-VM02 rman_files]$ rman target /`
		`Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 4 12:37:50 2019`
		`Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.`
		`connected to target database: ORCL (DBID=1527838127)`
		`RMAN>`	

	Configure RMAN with controlfile auto-backup feature	12) Configure the controlfile with autobackup on
		`RMAN> configure controlfile autobackup on;`
		`using target database control file instead of recovery catalog`
		`new RMAN configuration parameters:`
		`CONFIGURE CONTROLFILE AUTOBACKUP ON;`
		`new RMAN configuration parameters are successfully stored`
		`RMAN>`	

	Enable backup optimization	13) Configure backup optimization
		`RMAN> configure backup optimization on;`
		`new RMAN configuration parameters:`
		`CONFIGURE BACKUP OPTIMIZATION ON;`
		`new RMAN configuration parameters are successfully stored`
		`RMAN>`	

	Configure Retention policy for backup	14) Configure retention policy as indicated below
		`RMAN> CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 7 DAYS`
		`new RMAN configuration parameters:`
		`CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 7 DAYS;`
		`new RMAN configuration parameters are successfully stored`
		`RMAN>`	

	Check Global_Name	15) Below is how you should check the global name of your database.
		`SQL> select global_name from global_name;`
		`GLOBAL_NAME`
		`--------------------------------------------`
		`ORCL`
		`SQL>`	

	Create a Tablespace to store RMAN catalog database objects	16) Before you create a tablespace you need to configure the directory properly
		`mkdir -p /u02/catalogtbs`
		`chown -R oracle:oinstall /u02`
		`chmod -R 775 /u02/catalogtbs`
		17) Then you will use the command below to create the tablespace
		`SQL> CREATE tablespace catalogtbs datafile '/u02/catalogtbs/catalogtbs1.dbf' si`
		`e 100M autoextend on maxsize unlimited;`
		`Tablespace created.`
		`SQL>`	

	Create User recoveryman	18) Below is how you should create the RMAN user.
		`SQL> create user recoveryman identified by recoveryman;`
		`User created.`
		`SQL>`	

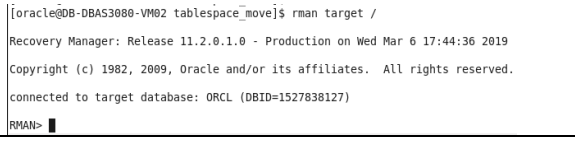
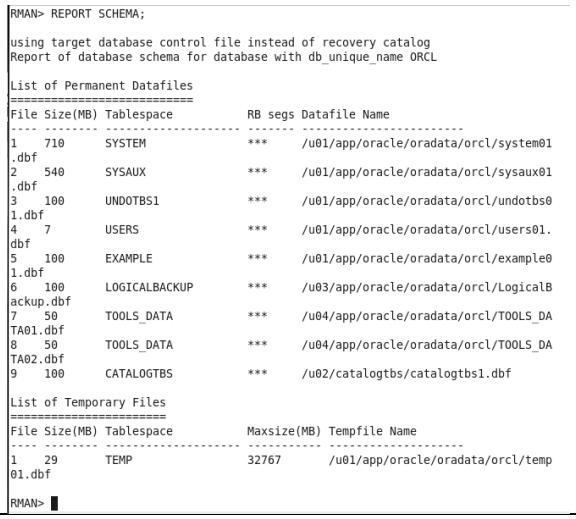
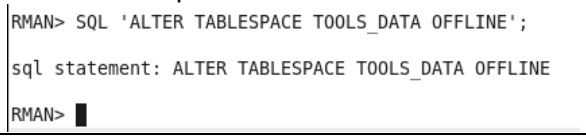
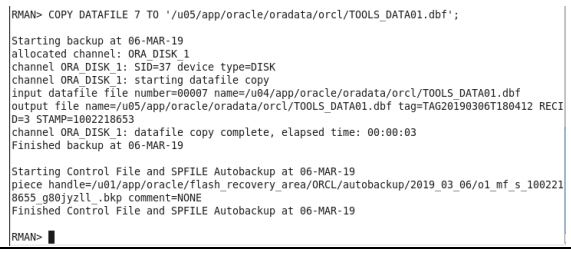
	Configure tablespace for new user	19) Configure this RMAN user to use the proper tablespaces.
		`SQL> alter user recoveryman default tablespace catalogtbs temporary tablespace tem`
		`User altered.`
		`SQL>`	

	Grant recovery_catalog_owner	20) Make the user RMAN part of the “recovery_catalog_owner” group
		`SQL> grant recovery_catalog_owner to recoveryman;`
		`Grant succeeded.`
		`SQL>`	

	Grant Connect and Resource	21) Grant connect and resource to recoveryman
		`SQL> grant connect, resource to recoveryman;`
		`Grant succeeded.`
		`SQL>`	

	Connect to RMAN on target and recovery catalog database	22) Connect to RMAN with new user [oracle@DB-DBAS3080-VM02 rman_files]$ rman target / catalog recoveryman/recoveryman Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 4 15:16:23 2019 Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved. connected to target database: ORCL (DBID=1527838127) connected to recovery catalog database RMAN>	
	Create Catalog	23) Create Catalog RMAN> create catalog recovery catalog created RMAN>	
	Ensure RMAN repository tables by logging in repository as RMAN	24) Connect to database with new user [oracle@DB-DBAS3080-VM02 rman_files]$ sqlplus "recoveryman/recoveryman" SQL*Plus: Release 11.2.0.1.0 Production on Mon Mar 4 15:22:15 2019 Copyright (c) 1982, 2009, Oracle. All rights reserved. Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production With the Partitioning, OLAP, Data Mining and Real Application Testing options SQL> 25) Select user_tables SQL> select table_name from user_tables; TABLE_NAME ------------------------------ DB NODE CONF DBINC CKP TS TSATT DF SITE_DFATT TF SITE_TFATT TABLE_NAME ------------------------------ RSR FB GRSP NRSP VPC_USERS VPC_DATABASES CFS BCR ROUT RCVER TEMPRES 44 rows selected. SQL>	

	Register Database	26) Register Database RMAN> register database; database registered in recovery catalog starting full resync of recovery catalog full resync complete RMAN>	
	Check for successful Registration	27) Check to ensure configurations worked RMAN> report schema; Report of database schema for database with db_unique_name ORCL List of Permanent Datafiles =========================== File Size(MB) Tablespace RB segs Datafile Name ---- -------- -------------------- ------- ------------------------ 1 710 SYSTEM YES /u01/app/oracle/oradata/orcl/system01.dbf 2 540 SYSAUX NO /u01/app/oracle/oradata/orcl/sysaux01.dbf 3 100 UNDOTBS1 YES /u01/app/oracle/oradata/orcl/undotbs01.dbf 4 7 USERS NO /u01/app/oracle/oradata/orcl/users01.dbf 5 100 EXAMPLE NO /u01/app/oracle/oradata/orcl/example01.dbf 6 100 LOGICALBACKUP NO /u03/app/oracle/oradata/orcl/LogicalBackup.dbf 7 50 TOOLS_DATA NO /u04/app/oracle/oradata/orcl/TOOLS_DATA01.dbf 8 50 TOOLS_DATA NO /u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf 9 100 CATALOGTBS NO /u02/catalogtbs/catalogtbs1.dbf List of Temporary Files ======================= File Size(MB) Tablespace Maxsize(MB) Tempfile Name ---- -------- -------------------- ----------- -------------------- 1 29 TEMP 32767 /u01/app/oracle/oradata/orcl/temp01.dbf 28) Another test to show configurations worked RMAN> LIST INCARNATION OF DATABASE; List of Database Incarnations DB Key Inc Key DB Name DB ID STATUS Reset SCN Reset Time ------- ------- -------- ---------- --- ---------- ---------- 2 25 ORCL 1527838127 PARENT 1 15-AUG-09 2 4 ORCL 1527838127 CURRENT 945184 12-FEB-19 RMAN>	

<table>
<tr><th colspan="4">Activity List</th></tr>
<tr><td colspan="3">Project: Database Backup and Recovery Activity List</td><td>Date: March 6th, 2019</td></tr>
<tr><th>Activity ID</th><th>Activity Name</th><th>Description of Work</th><th>Responsibility</th></tr>
<tr><td>Relocate/Move Tablespaces</td><td>Connect to RMAN prompt</td><td>1) The first step in moving a tablespace is to connect to RMAN
 
</td><td></td></tr>
<tr><td></td><td>Get Database Data File</td><td>2) From within RMAN there are many different commands you can use to manage or get info about your system. Before moving a tablespace you need to know its number
 
</td><td></td></tr>
<tr><td></td><td>Offline tablespace you want to move</td><td>3) Once you know the number of the tablespace you are ready to move it. Before you make the move however the tablespace has to be offline.
 
</td><td></td></tr>
<tr><td></td><td>Copy all the datafiles to destination</td><td>4) Now you can issue the copy command below.
 
</td><td></td></tr>
</table>

	SWITCH back to the new datafile copy	5) Now that the copy is complete, you need to use a switch command to manage the move.
		`RMAN> SWITCH DATAFILE 7 TO COPY;`
		`datafile 7 switched to datafile copy "/u05/app/oracle/oradata/orcl/TOOLS_DATA01.dbf"`
		`RMAN>`	

	Bring offline Tablespace to online state	6) At this point you can verify that the tablespace file has been moved. After the move is complete you can bring the tablespace back online
		`RMAN> SQL 'ALTER TABLESPACE TOOLS_DATA ONLINE';`
		`sql statement: ALTER TABLESPACE TOOLS_DATA ONLINE`
		`RMAN>`	

	Verify the changes	7) To verify the change use the "REPORT SCHEMA" command
		`RMAN> REPORT SCHEMA;`
		`Report of database schema for database with db_unique_name ORCL`
		`List of Permanent Datafiles`
		`File Size(MB) Tablespace RB segs Datafile Name`
		`1 710 SYSTEM *** /u01/app/oracle/oradata/orcl/system01.dbf`
		`2 540 SYSAUX *** /u01/app/oracle/oradata/orcl/sysaux01.dbf`
		`3 100 UNDOTBS1 *** /u01/app/oracle/oradata/orcl/undotbs01.dbf`
		`4 7 USERS *** /u01/app/oracle/oradata/orcl/users01.dbf`
		`5 100 EXAMPLE *** /u01/app/oracle/oradata/orcl/example01.dbf`
		`6 100 LOGICALBACKUP *** /u03/app/oracle/oradata/orcl/LogicalBackup.dbf`
		`7 50 TOOLS_DATA *** /u05/app/oracle/oradata/orcl/TOOLS_DATA01.dbf`
		`8 50 TOOLS_DATA *** /u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf`
		`9 100 CATALOGTBS *** /u02/catalogtbs/catalogtbs1.dbf`
		`List of Temporary Files`
		`File Size(MB) Tablespace Maxsize(MB) Tempfile Name`
		`1 29 TEMP 32767 /u01/app/oracle/oradata/orcl/temp01.dbf`
		`RMAN>`	

	Remove old DATA FILE	8) Now that the move is confirmed you can remove the old data file.
		`RMAN> HOST 'rm /u04/app/oracle/oradata/orcl/TOOLS_DATA01.dbf';`
		`host command complete`
		`RMAN>`	

	Verification	9) The screen shot below shows that the old datafile is no longer in the old destination
		`[oracle@DB-DBAS3080-VM02 orcl]$ ls`
		`TOOLS_DATA02.dbf`
		`[oracle@DB-DBAS3080-VM02 orcl]$ pwd`
		`/u04/app/oracle/oradata/orcl`
		`[oracle@DB-DBAS3080-VM02 orcl]$`
		10) The screen shot below shows that the new tablespace file is in the right location
		`[oracle@DB-DBAS3080-VM02 orcl]$ pwd`
		`/u05/app/oracle/oradata/orcl`
		`[oracle@DB-DBAS3080-VM02 orcl]$ ls`
		`TOOLS_DATA01.dbf`
		`[oracle@DB-DBAS3080-VM02 orcl]$`	

Activity List			
Project: Database Backup and Recovery Activity List			**Date**: March 11th, 2019
Activity ID	**Activity Name**	**Description of Work**	**Responsibility**

Hot Backup-RMAN	Determine state of archiving	1) Before beginning this assignment I thought it would be a good idea to demonstrate the state of archiving.
		`SQL> archive log list`
		`Database log mode Archive Mode`
		`Automatic archival Enabled`
		`Archive destination /u02/Arch_BKP`
		`Oldest online log sequence 16`
		`Next log sequence to archive 20`
		`Current log sequence 20`
		`SQL>`
		2) Below shows the location of the "db_recovery_file_dest". This is the directory in which backups will go.
		`SQL> show parameter recovery_file_dest`
		`NAME TYPE VALUE`
		`db_recovery_file_dest string /u01/app/oracle/flash_recovery_area`
		`db_recovery_file_dest_size big integer 3882M`
		`SQL>`	

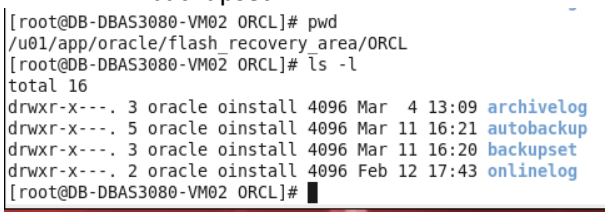
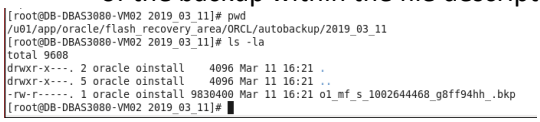
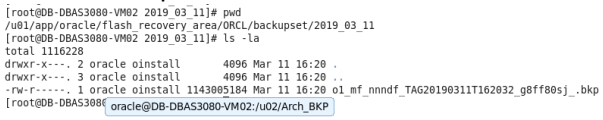
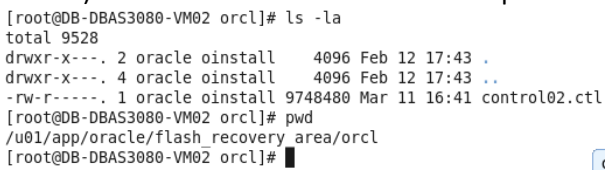
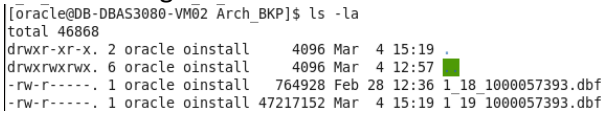
	Review contents of backup directory	3) Below shows the content of the directory in which archiving has been enabled on.
		`[oracle@DB-DBAS3080-VM02 u02]$ cd Arch_BKP/`
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$ ls`
		`1_18_1000057393.dbf 1_19_1000057393.dbf`
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$ pwd`
		`/u02/Arch_BKP`
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$`	

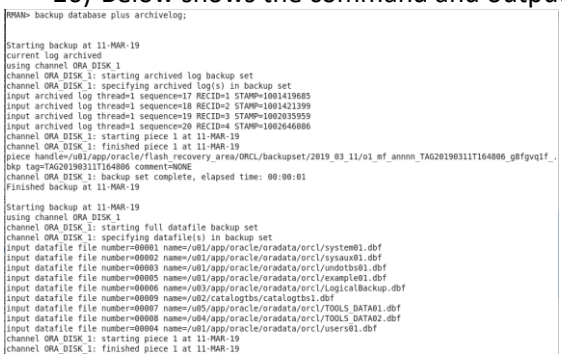
	Turn off Archiving	4) Just as a simple test we will try to backup the database with archiving turned off.
		5) First step is to shutdown the database
		`SQL> shutdown immediate`
		`Database closed.`
		`Database dismounted.`
		`ORACLE instance shut down.`
		`SQL>`
		6) Then you need to mount the database
		`SQL> startup mount`
		`ORACLE instance started.`
		`Total System Global Area 1603411968 bytes`
		`Fixed Size 2213776 bytes`
		`Variable Size 989857904 bytes`
		`Database Buffers 603979776 bytes`
		`Redo Buffers 7360512 bytes`
		`Database mounted.`
		`SQL>`
		7) The line below turns archiving off
		`SQL> alter database noarchivelog;`
		`Database altered.`
		`SQL>`
		8) Once off you should open the database
		`SQL> alter database open;`
		`Database altered.`
		`SQL>`
		9) To view the status of archiving issue the command below.
		`SQL> archive log list;`
		`Database log mode No Archive Mode`
		`Automatic archival Disabled`
		`Archive destination /u02/Arch_BKP`
		`Oldest online log sequence 16`
		`Current log sequence 20`
		`SQL>`	

	Connect to RMAN and perform Full Backup	10) Now we will attempt to backup the database with archiving turned off. [oracle@DB-DBAS3080-VM02 rman_files]$ rman target / catalog recoveryman/recovery man Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 11 16:07:35 2019 Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved. connected to target database: ORCL (DBID=1527838127) connected to recovery catalog database RMAN> 11) As you can see below it cannot be done. You will get an error stating archiving is off RMAN> backup database; Starting backup at 11-MAR-19 starting full resync of recovery catalog full resync complete allocated channel: ORA_DISK_1 channel ORA_DISK_1: SID=34 device type=DISK channel ORA_DISK_1: starting full datafile backup set channel ORA_DISK_1: specifying datafile(s) in backup set RMAN-00571: === RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS =============== RMAN-00571: === RMAN-03009: failure of backup command on ORA_DISK_1 channel at 03/11/2019 16:12:50 ORA-19602: cannot backup or copy active file in NOARCHIVELOG mode RMAN>	

	Turn archiving back on and complete backup	12) Now we will turn archiving back on
		13) The first step is to shutdown the database
		`SQL> shutdown immediate`
		`Database closed.`
		`Database dismounted.`
		`ORACLE instance shut down.`
		`SQL>`
		14) Then we will mount the database
		`SQL> startup mount`
		`ORACLE instance started.`
		`Total System Global Area 1603411968 bytes`
		`Fixed Size 2213776 bytes`
		`Variable Size 989857904 bytes`
		`Database Buffers 603979776 bytes`
		`Redo Buffers 7360512 bytes`
		`Database mounted.`
		`SQL>`
		15) The command below shows you how to enable archiving
		`SQL> alter database archivelog;`
		`Database altered.`
		`SQL>`
		16) Once enabled you should open the database.
		`SQL> alter database open;`
		`Database altered.`
		`SQL>`
		17) If you issue the “archive log list” command you will see the status of the archiving
		`SQL> archive log list;`
		`Database log mode Archive Mode`
		`Automatic archival Enabled`
		`Archive destination /u02/Arch_BKP`
		`Oldest online log sequence 16`
		`Next log sequence to archive 20`
		`Current log sequence 20`
		`SQL>`
		18) Once archiving is on we can now connect to RMAN
		`[oracle@DB-DBAS3080-VM02 rman_files]$ rman target / catalog recoveryman/recoveryman`
		`Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 11 16:19:41 2019`
		`Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.`
		`connected to target database: ORCL (DBID=1527838127)`
		`connected to recovery catalog database`
		`RMAN>`	

		19) If you issue the “database backup” command you will get simmilar output to what is shown below. RMAN> backup database; Starting backup at 11-MAR-19 allocated channel: ORA_DISK_1 channel ORA_DISK_1: SID=34 device type=DISK channel ORA_DISK_1: starting full datafile backup set channel ORA_DISK_1: specifying datafile(s) in backup set input datafile file number=00001 name=/u01/app/oracle/oradata/orcl/system01.dbf input datafile file number=00002 name=/u01/app/oracle/oradata/orcl/sysaux01.dbf input datafile file number=00003 name=/u01/app/oracle/oradata/orcl/undotbs01.dbf input datafile file number=00005 name=/u01/app/oracle/oradata/orcl/example01.dbf input datafile file number=00006 name=/u03/app/oracle/oradata/orcl/LogicalBackup.dbf input datafile file number=00009 name=/u02/catalogtbs/catalogtbs1.dbf input datafile file number=00007 name=/u05/app/oracle/oradata/orcl/TOOLS_DATA01.dbf input datafile file number=00008 name=/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf input datafile file number=00004 name=/u01/app/oracle/oradata/orcl/users01.dbf channel ORA_DISK_1: starting piece 1 at 11-MAR-19 channel ORA_DISK_1: finished piece 1 at 11-MAR-19 piece handle=/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11/o1_mf_nnndf_TAG2 0190311T162032_g8ff80sj_.bkp tag=TAG20190311T162032 comment=NONE channel ORA_DISK_1: backup set complete, elapsed time: 00:00:35 Finished backup at 11-MAR-19 Starting Control File and SPFILE Autobackup at 11-MAR-19 piece handle=/u01/app/oracle/flash_recovery_area/ORCL/autobackup/2019_03_11/o1_mf_s_1002644 468_g8ff94hh_.bkp comment=NONE Finished Control File and SPFILE Autobackup at 11-MAR-19 RMAN>	

	Look for location of backup	20) Now that the full backup has taken place we will validate it by searching for the fiiles. The files should reside in these two directories: • Autobackup • backupset  21) If you go into one of these directories you will see a “bkp” file with the current time of the backup within the file description.  22) It is the same for the second directory. A ‘bkp” file was created with a current time stamp  23) The “control02.ctl” file was also updated  24) As you can see nothing was put in the directory where archiving has been configured to reside. 	

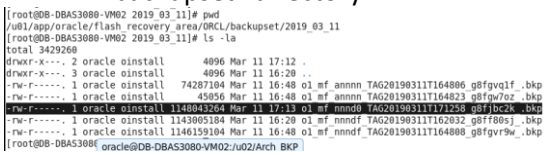
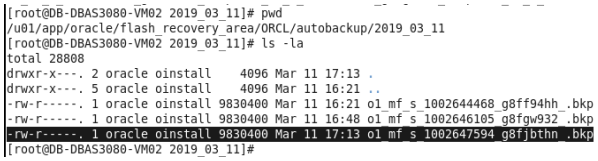
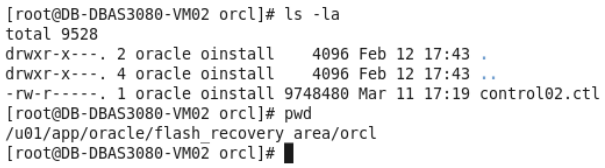
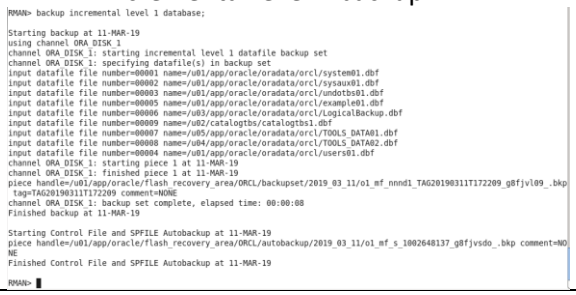
	Complete Full Backup including redo log files	25) To complete a full backup including redo files, it is a bit of a different command. 26) Below shows the command and output.  27) Below is the rest of the screen capture as it does not fit in one capture 	

```
RMAN> backup database plus archivelog;


Starting backup at 11-MAR-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=17 RECID=1 STAMP=1001419685
input archived log thread=1 sequence=18 RECID=2 STAMP=1001421399
input archived log thread=1 sequence=19 RECID=3 STAMP=1002035959
input archived log thread=1 sequence=20 RECID=4 STAMP=1002646086
channel ORA_DISK_1: starting piece 1 at 11-MAR-19
channel ORA_DISK_1: finished piece 1 at 11-MAR-19
piece handle=/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11/o1_mf_annnn_TAG20190311T164806_g8fgvq1f_.
bkp tag=TAG20190311T164806 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
Finished backup at 11-MAR-19

Starting backup at 11-MAR-19
using channel ORA_DISK_1
channel ORA_DISK_1: starting full datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00001 name=/u01/app/oracle/oradata/orcl/system01.dbf
input datafile file number=00002 name=/u01/app/oracle/oradata/orcl/sysaux01.dbf
input datafile file number=00003 name=/u01/app/oracle/oradata/orcl/undotbs01.dbf
input datafile file number=00005 name=/u01/app/oracle/oradata/orcl/example01.dbf
input datafile file number=00006 name=/u03/app/oracle/oradata/orcl/LogicalBackup.dbf
input datafile file number=00009 name=/u02/catalogtbs/catalogtbs1.dbf
input datafile file number=00007 name=/u05/app/oracle/oradata/orcl/TOOLS_DATA01.dbf
input datafile file number=00008 name=/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf
input datafile file number=00004 name=/u01/app/oracle/oradata/orcl/users01.dbf
channel ORA_DISK_1: starting piece 1 at 11-MAR-19
channel ORA_DISK_1: finished piece 1 at 11-MAR-19
```

```
channel ORA_DISK_1: starting piece 1 at 11-MAR-19
channel ORA_DISK_1: finished piece 1 at 11-MAR-19
piece handle=/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11/o1_mf_nnndf_TAG20190311T164808_g8fgvr9w_.
bkp tag=TAG20190311T164808 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:15
Finished backup at 11-MAR-19

Starting backup at 11-MAR-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=21 RECID=5 STAMP=1002646103
channel ORA_DISK_1: starting piece 1 at 11-MAR-19
channel ORA_DISK_1: finished piece 1 at 11-MAR-19
piece handle=/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11/o1_mf_annnn_TAG20190311T164823_g8fgw7oz_.
bkp tag=TAG20190311T164823 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
Finished backup at 11-MAR-19

Starting Control File and SPFILE Autobackup at 11-MAR-19
piece handle=/u01/app/oracle/flash_recovery_area/ORCL/autobackup/2019_03_11/o1_mf_s_1002646105_g8fgw932_.bkp comment
=NONE
Finished Control File and SPFILE Autobackup at 11-MAR-19

RMAN>
```

	Validate Full backup with redo logs	28) As you can see this command created a few “dbf” files in the directory where the archiving has been configured to reside.
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$ ls -la`
		`total 72196`
		`drwxr-xr-x. 2 oracle oinstall 4096 Mar 11 16:48 .`
		`drwxrwxrwx. 6 oracle oinstall 4096 Mar 4 12:57 ..`
		`-rw-r-----. 1 oracle oinstall 764928 Feb 28 12:36 1_18_1000057393.dbf`
		`-rw-r-----. 1 oracle oinstall 47217152 Mar 4 15:19 1_19_1000057393.dbf`
		`-rw-r-----. 1 oracle oinstall 25887232 Mar 11 16:48 1_20_1000057393.dbf`
		`-rw-r-----. 1 oracle oinstall 43520 Mar 11 16:48 1_21_1000057393.dbf`
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$ pwd`
		`/u02/Arch_BKP`
		`[oracle@DB-DBAS3080-VM02 Arch_BKP]$`
		29) Below shows a timestamp of the control file.
		`[root@DB-DBAS3080-VM02 orcl]# pwd`
		`/u01/app/oracle/flash_recovery_area/orcl`
		`[root@DB-DBAS3080-VM02 orcl]# ls -la`
		`total 9528`
		`drwxr-x---. 2 oracle oinstall 4096 Feb 12 17:43 .`
		`drwxr-x---. 4 oracle oinstall 4096 Feb 12 17:43 ..`
		`-rw-r-----. 1 oracle oinstall 9748480 Mar 11 16:54 control02.ctl`
		`[root@DB-DBAS3080-VM02 orcl]#`
		30) As you can see below, a new “bkp” file was created in the “autobackup” directory
		`[root@DB-DBAS3080-VM02 2019_03_11]# pwd`
		`/u01/app/oracle/flash_recovery_area/ORCL/autobackup/2019_03_11`
		`[root@DB-DBAS3080-VM02 2019_03_11]# ls -la`
		`total 19208`
		`drwxr-x---. 2 oracle oinstall 4096 Mar 11 16:48 .`
		`drwxr-x---. 5 oracle oinstall 4096 Mar 11 16:21 ..`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 16:21 o1_mf_s_1002644468_g8ff94hh_.bkp`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 16:48 o1_mf_s_1002646105_g8fgw932_.bkp`
		`[root@DB-DBAS3080-VM02 2019_03_11]#`
		31) And a new “bkp” file was also created in the “backupset” directory
		`[root@DB-DBAS3080-VM02 2019_03_11]# pwd`
		`/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11`
		`[root@DB-DBAS3080-VM02 2019_03_11]# ls -la`
		`total 2308120`
		`drwxr-x---. 2 oracle oinstall 4096 Mar 11 16:48 .`
		`drwxr-x---. 3 oracle oinstall 4096 Mar 11 16:20 ..`
		`-rw-r-----. 1 oracle oinstall 74287104 Mar 11 16:48 o1_mf_annnn_TAG20190311T164806_g8fgvq1f_.bkp`
		`-rw-r-----. 1 oracle oinstall 45056 Mar 11 16:48 o1_mf_annnn_TAG20190311T164823_g8fgw7oz_.bkp`
		`-rw-r-----. 1 oracle oinstall 1143005184 Mar 11 16:20 o1_mf_nnndf_TAG20190311T162032_g8ff80sj_.bkp`
		`-rw-r-----. 1 oracle oinstall 1146159104 Mar 11 16:48 o1_mf_nnndf_TAG20190311T164808_g8fgvr9w_.bkp`
		`[root@DB-DBAS3080-VM02 2019_03_11]#`	

	Complete Differential Incremental backup level 0	32) Below is the command to create a differential incremental backup of level 0
		`RMAN> backup incremental level 0 database;`
		`Starting backup at 11-MAR-19`
		`allocated channel: ORA_DISK_1`
		`channel ORA_DISK_1: SID=35 device type=DISK`
		`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=00001 name=/u01/app/oracle/oradata/orcl/system01.dbf`
		`input datafile file number=00002 name=/u01/app/oracle/oradata/orcl/sysaux01.dbf`
		`input datafile file number=00003 name=/u01/app/oracle/oradata/orcl/undotbs01.dbf`
		`input datafile file number=00005 name=/u01/app/oracle/oradata/orcl/example01.dbf`
		`input datafile file number=00006 name=/u03/app/oracle/oradata/orcl/LogicalBackup.dbf`
		`input datafile file number=00009 name=/u02/catalogtbs/catalogtbs1.dbf`
		`input datafile file number=00007 name=/u05/app/oracle/oradata/orcl/TOOLS_DATA01.dbf`
		`input datafile file number=00008 name=/u04/app/oracle/oradata/orcl/TOOLS_DATA02.dbf`
		`input datafile file number=00004 name=/u01/app/oracle/oradata/orcl/users01.dbf`
		`channel ORA_DISK_1: starting piece 1 at 11-MAR-19`
		`channel ORA_DISK_1: finished piece 1 at 11-MAR-19`
		`piece handle=/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11/o1_mf_nnnd0_TAG20190311T171258_g8fjbc2k_.`
		`bkp tag=TAG20190311T171258 comment=NONE`
		`channel ORA_DISK_1: backup set complete, elapsed time: 00:00:15`
		`Finished backup at 11-MAR-19`
		`Starting Control File and SPFILE Autobackup at 11-MAR-19`
		`piece handle=/u01/app/oracle/flash_recovery_area/ORCL/autobackup/2019_03_11/o1_mf_s_1002647594_g8fjbthn_.bkp comment`
		`=NONE`
		`Finished Control File and SPFILE Autobackup at 11-MAR-19`
		`RMAN>`	

	Validate Differential Incremental backup level 0	33) After running the command to create a level 0 incremental backup there is now another “bkp” file residing in the “backupset” directory  34) And there is also a new file residing in the “autobackup” directory with a “dbf” extension  35) The incremental backup seems to have updated the control file as well. 	
	Complete Differential Incremental backup level 1	36) The command below issues a differential incremental level 1 backup 	

	Validate Differential Incremental backup level 1	37) As you can see the control file was updated again
		`[root@DB-DBAS3080-VM02 orcl]# pwd`
		`/u01/app/oracle/flash_recovery_area/orcl`
		`[root@DB-DBAS3080-VM02 orcl]# ls -la`
		`total 9528`
		`drwxr-x---. 2 oracle oinstall 4096 Feb 12 17:43 .`
		`drwxr-x---. 4 oracle oinstall 4096 Feb 12 17:43 ..`
		`-rw-r-----. 1 oracle oinstall 9748480 Mar 11 17:23 control02.ctl`
		`[root@DB-DBAS3080-VM02 orcl]#`
		38) There is also a new “bkp” file residing in the “autobackup” directory
		`[root@DB-DBAS3080-VM02 2019_03_11]# pwd`
		`/u01/app/oracle/flash_recovery_area/ORCL/autobackup/2019_03_11`
		`[root@DB-DBAS3080-VM02 2019_03_11]# ls -la`
		`total 38408`
		`drwxr-x---. 2 oracle oinstall 4096 Mar 11 17:22 .`
		`drwxr-x---. 5 oracle oinstall 4096 Mar 11 16:21 ..`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 16:21 o1_mf_s_1002644468_g8ff94hh_.bkp`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 16:48 o1_mf_s_1002646105_g8fgw932_.bkp`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 17:13 o1_mf_s_1002647594_g8fjbthn_.bkp`
		`-rw-r-----. 1 oracle oinstall 9830400 Mar 11 17:22 o1_mf_s_1002648137_g8fjvsdo_.bkp`
		`[root@DB-DBAS3080-VM02 2019_03_11]#`
		39) There is also a new file “bkp” file residing in the “backupset” directory
		`[root@DB-DBAS3080-VM02 2019_03_11]# pwd`
		`/u01/app/oracle/flash_recovery_area/ORCL/backupset/2019_03_11`
		`[root@DB-DBAS3080-VM02 2019_03_11]# ls -la`
		`total 3430548`
		`drwxr-x---. 2 oracle oinstall 4096 Mar 11 17:22 .`
		`drwxr-x---. 3 oracle oinstall 4096 Mar 11 16:20 ..`
		`-rw-r-----. 1 oracle oinstall 74287104 Mar 11 16:48 o1_mf_annnn_TAG20190311T164806_g8fgvq1f_.bkp`
		`-rw-r-----. 1 oracle oinstall 45056 Mar 11 16:48 o1_mf_annnn_TAG20190311T164823_g8fgw7oz_.bkp`
		`-rw-r-----. 1 oracle oinstall 1148043264 Mar 11 17:13 o1_mf_nnnd0_TAG20190311T171258_g8fjbc2k_.bkp`
		`-rw-r-----. 1 oracle oinstall 1318912 Mar 11 17:22 o1_mf_nnnd1_TAG20190311T172209_g8fjvl09_.bkp`
		`-rw-r-----. 1 oracle oinstall 1143005184 Mar 11 16:20 o1_mf_nnndf_TAG20190311T162032_g8ff80sj_.bkp`
		`-rw-r-----. 1 oracle oinstall 1146159104 Mar 11 16:48 o1_mf_nnndf_TAG20190311T164808_g8fgvr9w_.bkp`
		`[root@DB-DBAS3080-VM02 2019_03_11]#`	