**Performing Backups and Recovering Your Database (OEM)**

**Purpose**

This lesson introduces Oracle Database 10*g* features that enable you to more easily manage backup and recovery operations.

**Overview**

**New Features to Support Backup and Recovery Operations**

. It introduces features that unify related recovery files within a specific area and simplify database administrator tasks.

In Oracle Database 10*g*, flashback functionality has been extended. The Flashback Database feature provides a way for you to quickly revert your entire Oracle database to the state it was in at a past point in time. Flashback Database is discussed in detail in this lesson. In addition to flashback operations at the database level, it is also possible to flash back an entire table. You can also quickly recover a table that has been inadvertently dropped. The existing flashback query capabilities have also been enhanced. Refer to the Recovering from Human Error lesson for information on these additional flashback capabilities.

**Performing Backups**

In this section, you will perform the following tasks:

1. Configuring the Flash\_Recovery\_Area
2. Backup the Database

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**Configuring the Flash Recovery Area**

The flash recovery area is a unified storage location for all recovery related files and activities in an Oracle database. All files that are needed to completely recover a database from a media failure are part of the flash recovery area. The recovery related files that can be created in the flash recovery area include: archived redo log files, control files, backups created by Recovery Manager (RMAN), flashback logs, and the change tracking file.

By allocating a storage location and unifying related recovery files within a specific area, the Oracle database server relieves the database administrator from having to manage the disk files created by these components.

Follow the steps below to verify that your database is in ARCHIVELOG mode and configure the flash recovery area.

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[Move your mouse over this icon to see the image](javascript:;) | | **2.** | The **Oracle Database Home** page allows you to view the current state of the database by displaying a series of metrics that portray the overall health of the database. The Oracle Database Home page provides a launch point for the database status and administration and configuration of the database environment. It contains four pages via subtabs with each page displaying subsections.  Click on the **Maintenance** tab.  [Move your mouse over this icon to see the image](javascript:;) | | **3.** | Select **Backup/Recovery -> Configure Recovery Settings**.  [Move your mouse over this icon to see the image](javascript:;) | | **4.** | Scroll down to the **Media Recovery** and **Flash Recovery Area** sections to observe the new settings. When the flash recovery area and archiving are configured, the flash recovery area (USE\_DB\_RECOVERY\_FILE\_DEST) is configured for archive log destination 10. Scroll up to the top of the page.  [Move your mouse over this icon to see the image](javascript:;) | | **5.** | Click **Database: orcl**.  [Move your mouse over this icon to see the image](javascript:;) | | **6.** | Click **Configure Backup Settings** in the Backup/Recovery section.  [Move your mouse over this icon to see the image](javascript:;) | | **7.** | You will now test your configuration. Select **Image Copy** under Disk Settings for Disk Backup Type. Scroll down to **Host Credentials**.  [Move your mouse over this icon to see the image](javascript:;) | | **8.** | Enter your OS username and password and scroll up to the top of the page.  [Move your mouse over this icon to see the image](javascript:;) | | **9.** | Click on **Test Disk Backup**. The location for the backup test will be the location set for the flash recovery area.  [Move your mouse over this icon to see the image](javascript:;) | | **10.** | Whn you receive the successful notification click on **Database: orcl**.  [Move your mouse over this icon to see the image](javascript:;) |   **Backing Up the Database**  Follow the steps below to take a whole database backup.   |  |  | | --- | --- | | **1.** | Click **Schedule Backup** in the Backup/Recovery section.  [Move your mouse over this icon to see the image](javascript:;) | | **2.** | Choose **Oracle-suggested** for the Backup Strategy. Choose **Disk** under Select your backup destination. Enter your OS username and password. Then click **Continue**.  [Move your mouse over this icon to see the image](javascript:;) | | **3.** | Review the **Setup** page, then click **Next**.  [Move your mouse over this icon to see the image](javascript:;) | | **4.** | Review the **Schedule** page, then click **Next**.  [Move your mouse over this icon to see the image](javascript:;) | | **5.** | Review the **Review** page, then click **Submit Job**.  [Move your mouse over this icon to see the image](javascript:;) | | **6.** | Your backup job has been submitted. Click **OK**.  [Move your mouse over this icon to see the image](javascript:;) | | **7.** | Click on **Jobs** in the Related Linkssection.  [Move your mouse over this icon to see the image](javascript:;) | | **8.** | You can view the status of your backup job on the **Job Activity** page. Click on your Backup job.  [Move your mouse over this icon to see the image](javascript:;) | | **9.** | Then scroll down and click on the **Backup** log.  [Move your mouse over this icon to see the image](javascript:;) | | **10.** | Click on **Show More**.  [Move your mouse over this icon to see the image](javascript:;) | | **11.** | You see what is currently in the log. You may need to click back and select the backup log again to see that the backup is progressing. When the backup is complete, scroll up to the top of the page.  [Move your mouse over this icon to see the image](javascript:;) | | **12.** | Click **Logout**.  [Move your mouse over this icon to see the image](javascript:;) | | **13.** | Click **Login**.  [Move your mouse over this icon to see the image](javascript:;) | | **14.** | Enter**sys/<password>** as **SYSDBA** and click **Login**.  [Move your mouse over this icon to see the image](javascript:;) |   **Performing Recovery of a Datafile**  You can easily recover a datafile or your entire database through Enterprise Manager.  You can use the Flashback Database feature to quickly revert an Oracle database to the state it was in at a previous time without restoring datafiles and performing media recovery. You can use Enterprise Manager or the FLASHBACK DATABASE command to flashback your database.  The Simplified Recovery Through Resetlogs feature is an enhancement to recovery operations so that previous incarnation backups can be used for recovery of the current database incarnation. You no longer need to take a whole database backup after a RESETLOGS operation before you open the database for production use.  In this section you will recover a datafile through Enterprise Manager. You will simulate the loss of a datafile by deleting a datafile from an open database. Perform the steps listed below to simulate the loss of a datafile in your database and recover the datafile:   |  |  | | --- | --- | | **1.** | Invoke SQL\*Plus and connect as the HR user. Query the EMPLOYEES table as follows:  **sqlplus /nolog**  **connect hr/hr@orcl**  **SELECT count(\*) FROM hr.employees;**  **exit**  [Move your mouse over this icon to see the image](javascript:;) | | **2.** | The EMPLOYEES table is stored in the EXAMPLEtablespace. The EXAMPLEtablespace is comprised of the example01.dbf data file. Simulate the loss of the example01.dbf data file by issuing the following command at the operating system prompt:  **rm $ORACLE\_BASE/oradata/orcl/example01.dbf**  [Move your mouse over this icon to see the image](javascript:;) | | **3.** | Verify the loss of the example01.dbf data file. Connect to your database using SQL\*Plus as the HR user. Issue the following query against the DEPARTMENTS table:  **sqlplus /nolog**  **connect hr/hr@orcl**  **SELECT count(\*) FROM hr.departments;**  **exit**  [Move your mouse over this icon to see the image](javascript:;) | | **4.** | You will now use Enterprise Manager to recover your datafile. Switch back to Enterprise Manager. Click on the **Maintenance** tab.  [Move your mouse over this icon to see the image](javascript:;) | | **5.** | Click on **Perform Recovery** in the Backup/Recoverysection.  [Move your mouse over this icon to see the image](javascript:;) | | **6.** | Notice the indication that one datafile needs recovery in the Current Database Information section. Select **Restore and Recover**. In the Host Credentials section enter**oracle/URin2** and click **Continue**.  [Move your mouse over this icon to see the image](javascript:;) | | **7.** | Select the**/oracle/oradata/orcl/example01.dbf**datafile checkbox and click **Next**.  [Move your mouse over this icon to see the image](javascript:;) | | **8.** | Restore the datafile to its original location by selecting: **No. Restore the files to the default location**. Click **Next**.  [Move your mouse over this icon to see the image](javascript:;) | | **9.** | Review the recovery job you are about to submit. Click **Submit**.  [Move your mouse over this icon to see the image](javascript:;) | | **10.** | View the **Operation Succeeded** page. Click **OK**.  [Move your mouse over this icon to see the image](javascript:;) | | **11.** | You will now verify the recovery. Invoke SQL\*Plus in your terminal window. Connect as the HR user to the orcldatabase. Query the DEPARTMENTS table again.  **sqlplus /nolog**  **connect hr/hr@orcl**  **SELECT count(\*) FROM hr.departments;**  **exit**  [Move your mouse over this icon to see the image](javascript:;) |   **Flashback of the Database**  The Flashback Database feature provides a way for you to quickly revert your entire Oracle database to the state it was in at a past point in time. You can use Flashback Database to back out changes that have resulted in logical data corruption or are a result of user error. Flashback Database is faster than traditional point-in-time recovery using backups and redo log files. The time to restore a database is now proportional to the number of changes that need to be backed out, not the size of the database.  Flashback Database is implemented using a new type of log file called a Flashback Database log. Flashback Database logs contain data block images for changed blocks and other information that enables the operation. The data block images are used to quickly back out changes to the database during the Flashback Database operation.  When you request a flashback of the database, the Oracle database server uses the Flashback Database logs to back out changes. Perform the following steps:   |  |  | | --- | --- | | **1.** | Open a terminal window. Log in to SQL\*Plus as SYSDBA. Create the HR.JOBS\_HIST table by executing the CREATE\_JOBS\_HIST script as follows:  **cd wkdir**  **sqlplus /nolog**  **connect / as sysdba**  **@CREATE\_JOBS\_HIST**  **SELECT count(\*) FROM hr.jobs\_hist;**  [Move your mouse over this icon to see the image](javascript:;) | | **2.** | Determine the current System Change Number (SCN) by issuing the following query. **Write down this number.**  **SELECT current\_scn FROM v$database;**  [Move your mouse over this icon to see the image](javascript:;) | | **3.** | Truncate the HR.JOBS\_HIST table to simulate user error.  **TRUNCATE TABLE hr.jobs\_hist;**  **SELECT count(\*) FROM hr.jobs\_hist;**  [Move your mouse over this icon to see the image](javascript:;) | | **4.** | In preparation for Flashback Database, shut down your instance with the IMMEDIATE option:  **SHUTDOWN IMMEDIATE**  [Move your mouse over this icon to see the image](javascript:;) | | **5.** | In preparation for Flashback Database, start your instance and mount the database:  **STARTUP MOUNT**  [Move your mouse over this icon to see the image](javascript:;) | | **6.** | Exit from SQL\*Plus. Invoke Recovery Manager and connect to your target database:  **rman**  **connect target**  [Move your mouse over this icon to see the image](javascript:;) | | **7.** | Use Recovery Manager to flashback the database to the SCN you found previously.  **FLASHBACK DATABASE TO SCN <scn>;**  [Move your mouse over this icon to see the image](javascript:;) | | **8.** | Open your database with the RESETLOGS option.  **ALTER DATABASE OPEN RESETLOGS;**  [Move your mouse over this icon to see the image](javascript:;) | | **9.** | Verify that you have restored the rows in the HR.JOBS\_HIST table.  **SELECT count(\*) FROM hr.jobs\_hist;**  [Move your mouse over this icon to see the image](javascript:;) |   **Change Tracking for Incremental Backups**  **Overview**  In previous releases of the Oracle database when you backed up the database using incremental backups, RMAN had to examine the entire data file to determine which blocks had changed. Therefore, the time that RMAN took to perform an incremental backup was proportional to the size of the data files involved in the backup.  In Oracle Database 10*g*, you can create a block change tracking file that records the blocks modified since the last backup. RMAN uses the tracking file to determine which blocks to include in the incremental backup. The change tracking file enables RMAN to make the incremental backup time proportional to the amount of content modified since the last backup.  **Enabling Change Tracking**  [Back to Topic List](http://www.oracle.com/technology/obe/obe10gdb/ha/bar/bar.htm#t)  When you enable change tracking, Oracle automatically tracks which datafile blocks have changed in change tracking files. When you execute BACKUP INCREMENTAL, RMAN uses the change tracking file to more quickly identify the blocks changed since the previous incremental backup. As a result, RMAN creates incremental backups much faster than in releases prior to Oracle Database 10*g*.  By default, the change tracking file is created as an Oracle managed file in the location specified by the DB\_CREATE\_FILE\_DEST or DB\_RECOVERY\_FILE\_DEST initialization parameters.   |  |  | | --- | --- | | **1.** | From the **Maintainance** tab in Enterprise Manager, select **Configure Backup Settings** in the Backup/Recovery section.  [Move your mouse over this icon to see the image](javascript:;) | | **2.** | Click on the **Policy** tab.  [Move your mouse over this icon to see the image](javascript:;) | | **3.** | Check **"Enable block change tracking for faster incremental backups**". Specify the following as the name of the change tracking file: **/oracle/oradata/orcl/chg\_trk.dbf**. Scroll to the **Host Credentials** section.  [Move your mouse over this icon to see the image](javascript:;) | | **4.** | Enter your OS username and password and click **OK**.  [Move your mouse over this icon to see the image](javascript:;) | | | |  | | --- | | http://www.oracle.com/technology/admin/images/spacer.gif | | |

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