



Focus On: Oracle's Backup and Recovery Solutions

Oracle Backup: Basic Concepts

A backup is a copy of data. This copy can include important parts of the database such as the control file and datafiles. A backup is a safeguard against unexpected data loss and application errors. If you lose the original data, you can reconstruct it by using a backup.

Backups are divided into physical backups and logical backups. Physical backups, which are the primary concern in a backup and recovery strategy, are copies of physical database files. You can make physical backups with either the Recovery Manager (RMAN) utility or operating system utilities. In contrast, logical backups contain logical data (e.g. tables and stored procedures) extracted with the Oracle Export utility and stored in a binary file. You can use logical backups to supplement physical backups.

Oracle Recovery: Basic Concepts

To restore a physical backup of a data file or control file is to reconstruct it and make it available to the Oracle database server. To recover a restored data file is to update it by applying archived redo logs and online redo logs, that is, records of changes made to the database after the backup was taken. If you use RMAN, then you can also recover restored datafiles with incremental backups, which are backups of a data file that contain only blocks that changed after a previous incremental backup.

After the necessary files are restored, the user must initiate media recovery. Media recovery can use both archived redo logs and online redo logs to recover the datafiles. If you use SQL*Plus, then you can run the RECOVER command to perform recovery. If you use RMAN, then you run the RMAN RECOVER command to perform recovery.

Database Archiving Modes

A database can operate in two distinct modes: NOARCHIVELOG mode (media recovery disabled) or ARCHIVELOG mode (media recovery enabled). The database mode has a profound impact on your backup and recovery strategy.

NOARCHIVELOG Mode

If a database is used in NOARCHIVELOG mode, then the archiving of the online redo log is disabled. Information in the control file indicates that archiving is not required for filled groups. Therefore, as soon as a filled group becomes inactive, the group is available for reuse by the LGWR process.

NOARCHIVELOG mode protects a database only from instance failure, not from media failure. Only the most recent changes made to the database, stored in the groups of the online redo log, are available for crash or instance recovery. These changes are sufficient for crash or instance recovery because Oracle will not overwrite an online log that may be needed until its changes have been recorded in the datafiles. However, it will not be possible to perform media recovery by applying archived redo logs.



ARCHIVELOG Mode

If an Oracle database operates in ARCHIVELOG mode, then the archiving of the online redo log is enabled. Information in a database control file indicates that a group of filled online redo log files cannot be reused by LGWR until the group has been archived.

ARCHIVELOG mode permits complete recovery from disk failure as well as instance failure, because all changes made to the database are permanently saved in an archived redo log.

Backup Methods

There are two methods available for performing Oracle backup and recovery: Recovery Manager [RMAN] and user-managed backup and recovery.

RMAN is a utility automatically installed with the database that can back up any Oracle8 or later database. RMAN uses server sessions on the database to perform the work of backup and recovery. RMAN has its own syntax and is accessible either through a command-line interface or through the Oracle Enterprise Manager GUI. RMAN comes with an API that allows it to function with a third-party media manager.

One of the principal advantages of RMAN is that it obtains and stores metadata about its operations in the control file of the production database. You can also set up an independent recovery catalog, which is a schema that contains metadata imported from the control file, in a separate recovery catalog database. RMAN performs the necessary record keeping of backups, archived logs, and so forth using the metadata, so restore and recovery is greatly simplified.

An alternative method of performing recovery is to use operating system commands for backups and SQL*Plus for recovery. This method, also called user-managed backup and recovery, is fully supported by Oracle Corporation, although use of RMAN is highly recommended because it is more robust and greatly simplifies administration.

Whether you use RMAN or user-managed methods, you can supplement your physical backups with logical backups of schema objects made using the Export utility. The utility writes data from an Oracle database to binary operating system files. You can later use Import to restore this data into a database.