User-Managed Backup and Recovery

All DBAs should know how to back up databases. Even more critical, you must be able to restore and recover a database. When there is a media failure, everybody looks to the DBA to successfully perform a restore and recovery. You can use two very different Oracle approaches for backup and recovery (B&R):

- The user-managed approach
- The Oracle Recovery Manager (RMAN) approach

User-managed backups are called that because you manually perform all steps associated with the backup and/or recovery. There are two types of user-managed backups: cold backups and hot backups. Cold backups are sometimes called offline backups because the database is shut down during the backup process. Hot backups are also referred to as online backups because the database is available during the backup procedure.

RMAN is Oracle’s flagship B&R tool. It automates and manages most aspects of B&R. For Oracle B&R, you should use RMAN. So, why have a chapter about user-managed backups when this approach has been gathering dust for over a decade? Consider the following reasons for understanding user-managed B&R:

- You still find shops using user-managed B&R techniques. Therefore, you’re required to be knowledgeable about this technology.

- Manually executing a user-managed backup, restore, and recovery solidifies your knowledge of the Oracle B&R architecture. This helps immensely when you’re troubleshooting issues with any B&R tool and lays the foundation of core knowledge for key Oracle tools such as RMAN and Data Guard.

- You’ll more fully appreciate RMAN and the value of its features.

- Nightmarish database-recovery stories recounted by the old DBAs will now make sense.

For these reasons, you should be familiar with user-managed B&R techniques. Manually working through the scenarios in this chapter will greatly increase your understanding of which files are backed up and how they’re used in a recovery. You’ll be much better prepared to understand and use RMAN. RMAN makes much of B&R automated and push-button. However, knowledge of how to manually back up and recover a database helps you think through and troubleshoot any issues with any type of backup technology.

This chapter begins with cold backups. These types of backups are viewed as the simplest form of user-managed backups because even a system administrator can implement them. Next, the chapter
discusses hot backups. You also investigate several common restore and recover scenarios. These examples build your base knowledge of Oracle B&R internals. Finally, this chapter covers Oracle’s flashback technology and how that complements many user-managed recovery scenarios.

Implementing a Cold-Backup Strategy for a Noarchivelog-Mode Database

You perform a user-managed cold backup by copying files after the database has been shut down. This type of backup is also known as an offline backup. Your database can be in either noarchivelog mode or archivelog mode when you make a cold backup.

For some reason, DBAs tend to think of a cold backup as being synonymous with a backup of a database in noarchivelog mode. That isn’t correct. You can make a cold backup of a database in archivelog mode, and that’s a backup strategy that many shops employ. The differences between a cold backup with the database in noarchivelog and in archivelog mode are detailed in the following sections.

Making a Cold Backup of a Noarchivelog-Mode Database

One main reason to make a cold backup of a database in noarchivelog mode is to give you a way to restore a database back to a point in time in the past. You should use this type of backup only if you don’t need to recover transactions that occurred after the backup. This type of B&R strategy is acceptable only if your business requirements allow for the loss of data and downtime. Rarely would you ever implement this type of B&R solution for a production business database.

Having said that, there are some good reasons to implement this type of backup. One common use is to make a cold backup of a development/test/training database and periodically reset the database back to the baseline. This gives you a way to restart a performance test or a training session with the same point-in-time snapshot of the database.

Tip Consider using the Flashback Database feature to set your database back to a point in time in the past. Flashback Database is discussed later in this chapter.

The example in this section shows you how to make a backup of every critical file in your database: all control files, datafiles, temporary datafiles, and online-redo log files. With this type of backup, you can easily restore your database back to the point in time when the backup was made. The main advantages of this approach are that it’s conceptually simple and easy to implement. Here are the steps required for a cold backup of a database in noarchivelog mode:

1. Determine where to copy the backup files and how much space is required.
2. Determine the locations and names of the database files to copy.
3. Shut down the database with the IMMEDIATE, TRANSACTIONAL, or NORMAL clause.
4. Copy the files (identified in step 2) to the backup location (determined in step 1).
5. Restart your database.