

Backup Rotation Strategies

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WHAT'S COVERED

This lesson explores various database backup strategies, in four parts. Specifically, this lesson will cover:

1. [Introduction](#)
2. [Full Backups](#)
3. [Differential Backup](#)
4. [Incremental Backup](#)

1. Introduction

A **backup strategy** is a plan that specifies what will be backed up and how often. Choosing a backup strategy involves weighing the costs and benefits because no strategy is without its pros and cons. A backup strategy that is easy to restore from, for example, is often where each backup takes a long time and requires a lot of storage space. In contrast, a backup that is quick to perform may be more complicated to manage and may take longer to restore.

The three main backup strategies are full, incremental, and differential. In this lesson, you will learn about each one and compare their benefits and drawbacks.



TERM TO KNOW

Backup Strategy

A plan that specifies what will be backed up and how often.

2. Full Backups

A full backup is the simplest type. It makes a copy of the entire database as of a single point in time.



HINT

The backup can still be made if there are database transactions running, but the backup operation can slow down some of those transactions.

A full backup strategy—that is, one where only full backups are made—is best for small databases that don't take very long to back up. However, if the database is large, a full backup can take hours. Making a full backup every day (or night) can be time consuming for the IT staff who must monitor and manage it and can use a lot of processing and memory resources to create.

A company will usually want to keep several previous versions of the full backup, so they can roll back to an earlier version if there is a serious problem with the database, or if it becomes infected with malware. Therefore, if the database file is large, and you keep multiple backups of it (for example, one for each day of the week or month), the storage required can grow very large.

The main advantage of a full backup is the ease of restoring from it because each backup contains everything, and only one restore operation is required, from one backup file.



TERM TO KNOW

Full Backup

A backup strategy where every backup performed backs up all data.

3. Differential Backup

A **differential backup** strategy is one that makes a full backup only once a week, or perhaps less often. On the in-between days, it backs up only the data that has changed since the last full backup. It backs up everything that has changed since then, even if that data has been backed up on a previous day's differential backup.



HINT

How does the backup utility know what has changed? It looks at the timestamps on the files or transactions and compares them to the timestamp on the last full backup file.



TERM TO KNOW

Differential Backup

A backup strategy that runs a full backup only on certain days and then backs up only the data that has changed since the last full backup.

4. Incremental Backup

An **incremental backup** is similar to a differential one, except that each incremental backup contains the data that has changed since the last backup of ANY kind, not just since the last full backup. It is not cumulative.

For example, suppose we run a full backup on Sunday and then run incremental backups the other days of the week. The incremental backup on Monday contains Monday's data. The incremental backup on Tuesday

contains only Tuesday's data, and so on.

Now suppose the server's storage fails on Saturday. Restoring the database will take quite a while compared to the other strategies because we must do a full restore from Sunday's data, and then incremental restores for Monday through Friday.

The main advantage of an incremental backup is that it takes the least amount of time and the least storage space. The main disadvantage is that it takes the longest to restore. Moreover, if any of the incremental backups are damaged, the incremental backup files that follow them are not useful because we are missing some changes.



TERM TO KNOW

Incremental Backup

A backup strategy that runs a full backup only on certain days and then backs up only the data that has changed since the last backup of any kind.



SUMMARY

In this lesson's **introduction**, you learned that there are three primary backup methods in the context of databases: full, differential, and incremental.

A **full backup** captures an entire database's content, including its schema, data, and any other associated objects. This provides a comprehensive snapshot of the database at a particular point in time. Although full backups ensure complete data recovery, they are resource intensive and time consuming, especially for large databases.

Differential backups capture changes made since the last full backup. Each differential backup takes less time and uses less storage space than a full backup would. The drawback is that in the event that a restore operation is required, you must restore from the full backup and then from the differential backup.

Incremental backups capture changes made since the last backup of any type. Its advantage is that it takes the least time and storage space to complete. Its disadvantage is that when a restore is needed, it takes the most time to restore. It must restore from the last full backup and then every incremental backup since then.

Each backup method offers different trade-offs between speed of backup, storage requirements, and ease of restoration.

Source: THIS TUTORIAL WAS AUTHORED BY DR. VINCENT TRAN, PHD (2020) AND FAITHE WEMPEN (2024) FOR SOPHIA LEARNING. PLEASE SEE OUR [TERMS OF USE](#).

**Backup Strategy**

A plan that specifies what will be backed up and how often.

Differential Backup

A backup strategy that runs a full backup only on certain days and then backs up only the data that has changed since the last full backup.

Full Backup

A backup strategy where every backup performed backs up all data.

Incremental Backup

A backup strategy that runs a full backup only on certain days and then backs up only the data that has changed since the last backup of any kind.