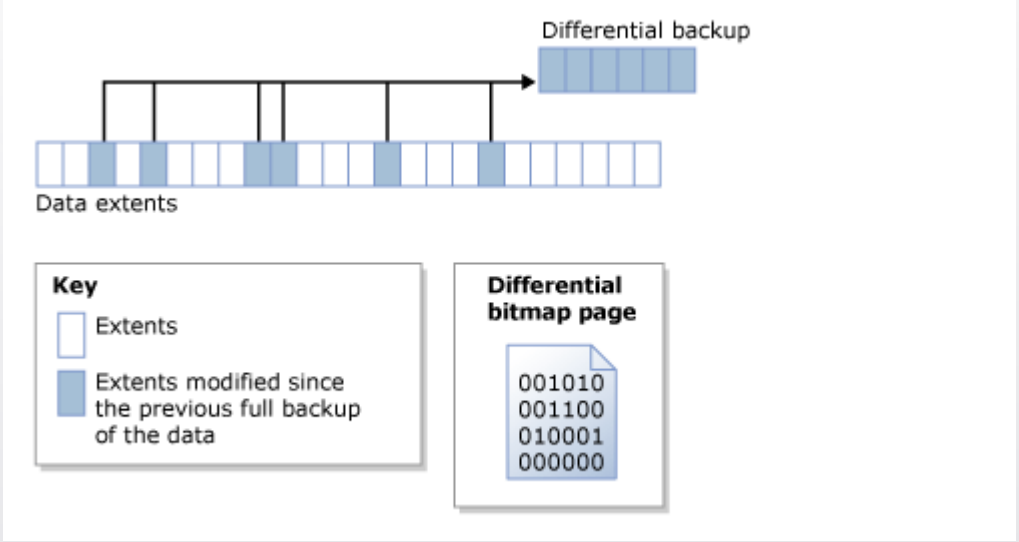
Differential Backups

Differential Backups

- A differential backup is based on the most recent, previous full data backup.
- A differential backup captures only the data that has changed since that full backup.
- The full backup upon which a differential backup is based is known as the *base* of the differential.
- Full backups, except for copy-only backups, can serve as the base for a series of differential backups, including database backups, partial backups, and file backups.
- Creating a differential backups can be very fast compared to creating a full backup.
- This facilitates taking frequent data backups, which decrease the risk of data loss.
- However, before you restore a differential backup, you must restore its base.
- Therefore restoring from a differential backup will necessarily take more steps and time than restoring from a full backup because two backup files are required.
- Under the full recovery model, using differential backups can reduce the number of log backups that you have to restore.

Overview of Differential Backup

- A differential backup captures the state of any *extents* (collections of eight physically contiguous pages) that have changed between when the differential base was created and the when differential backup is created.
- This means that the size of a given differential backup depends on the amount of data that has changed since the base.
- Generally, the older a base is, the larger a new differential backup will be.
- In a series of differential backups, a frequently updated extent is likely to contain different data in each differential backup.
- The figure shows 24 data extents, 6 of which have changed.
- The differential backup contains only these 6 data extents.
- The differential backup operation relies on a bitmap page that contains a bit for every extent.
- For each extent updated since the base, the bit is set to 1 in the bitmap.



Overview of Differential Backup (contd..)

- A differential backup that is taken fairly soon after its base is usually significantly smaller than the differential base which saves storage space and backup time.
- However, as a database changes over time, the difference between the database and a specific differential base increases.
- The longer the time between a differential backup and its base, the larger the differential backup is likely to be.
- This means that the differential backups can eventually approach the differential base in size.
- A large differential backup loses the advantages of a faster and smaller backup.
- As the differential backups increase in size, restoring a differential backup can significantly increase the time that is required to restore a database.
- Take a new full backup at set intervals to establish a new differential base for the data.
- you might take a weekly full backup of the whole database (that is, a full database backup) followed by a regular series of differential database backups during the week.
- At restore time, before you restore a differential backup, you must restore its base. Then, restore only the most recent differential backup to bring the database forward to the time when that differential backup was created.

Differntial Backup database command

- BACKUP DATABASE AdventureWorks TO DISK = 'C:\Temp\DatabaseBackups\AdventureWorks_Full.bak'
- BACKUP DATABASE AdventureWorks TO DISK = 'C:\Temp\DatabaseBackups\AdventureWorks_Diff_1.bak' WITH DIFFERENTIAL
- BACKUP DATABASE AdventureWorks TO DISK = 'C:\Temp\DatabaseBackups\AdventureWorks_Diff_2.bak' WITH DIFFERENTIAL