Microsoft

Pages & Extents
SQL Index

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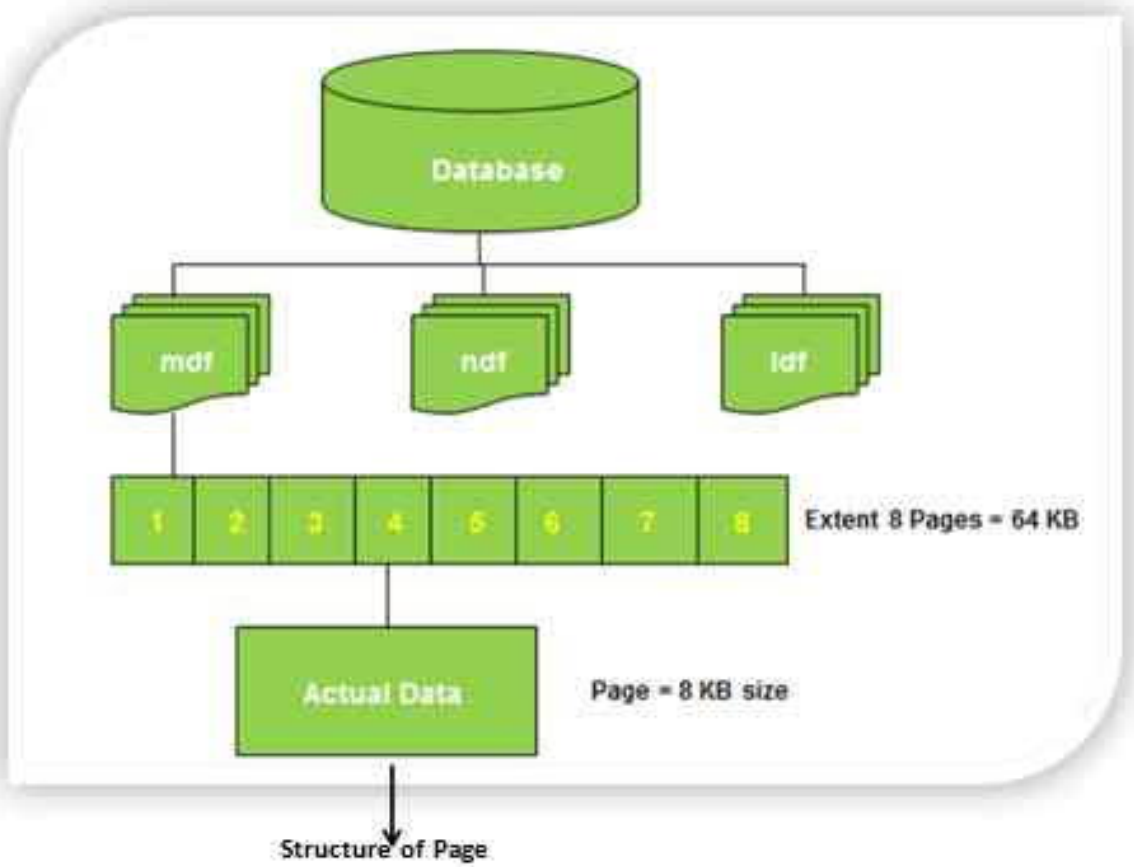
Pages & Extents

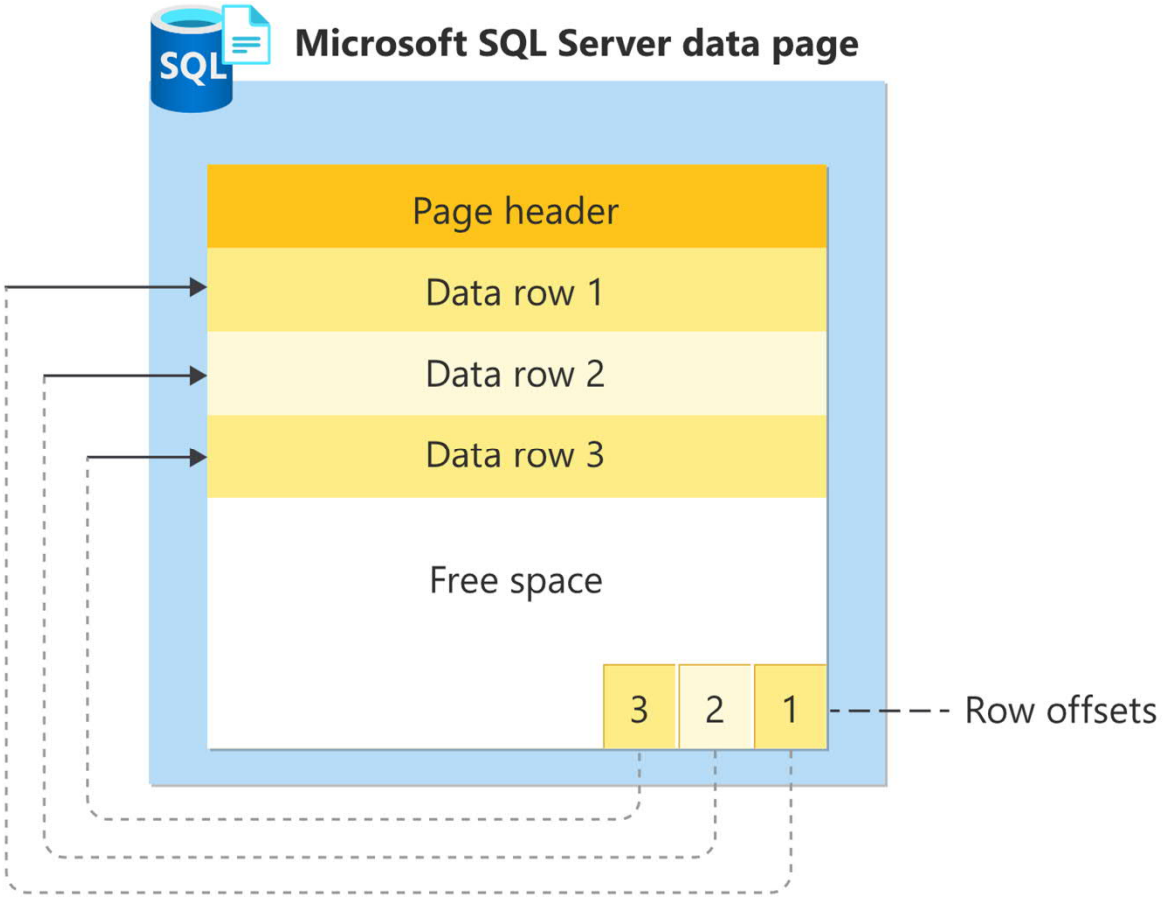
The page is the fundamental unit of data storage in SQL Server.

An extent is a collection of eight physically contiguous pages.



Page Structure

- In a regular book, all content is written on pages.
- Similarly, SQL Server writes all data rows on pages, and all data pages are the same size: 8 KB.
- In a book, most pages contain the data - the main content of the book - and some pages contain metadata about the content (for example, the table of contents and index)



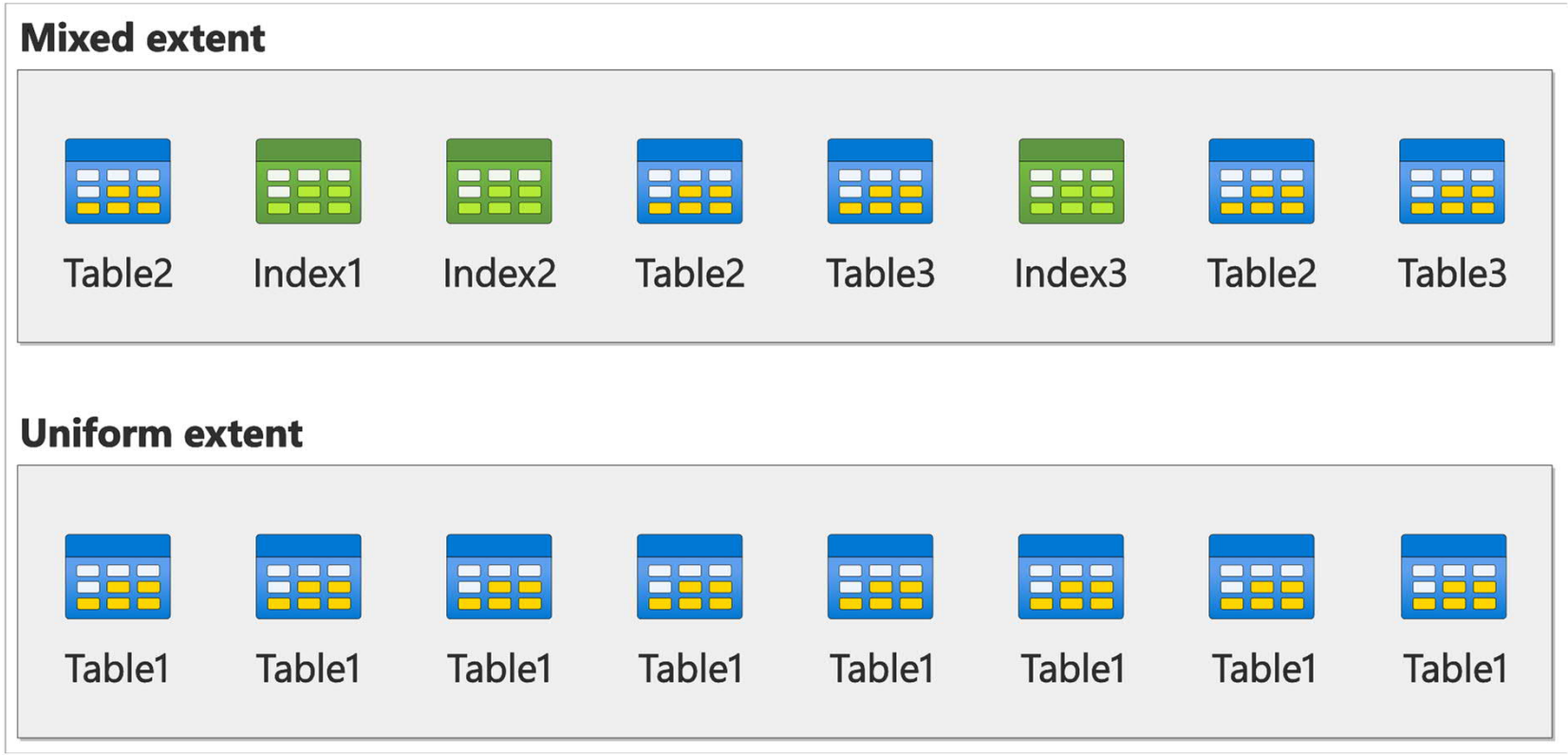
Pages (cont...)

- Most pages contain actual rows of data that were stored by users
  - Data Pages: `Data rows with all data, except text, ntext, image, nvarchar(max), varchar(max), varbinary(max), and xml data`
  - Index Pages: Contain index references about where the data is.
  - System pages: Store various metadata about the organization of the data.
- Log files don't contain pages. They contain a series of log records which don't have a fixed size.

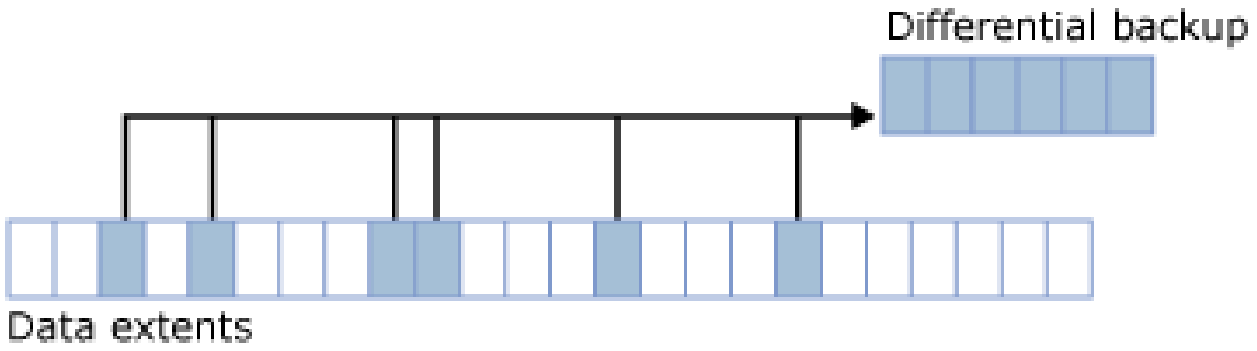
Extents

- Extents are the basic unit in which space is managed.
  - An extent is eight physically contiguous pages, or 64 KB.
  - SQL Server databases have 16 extents per megabyte (16 x 64 = 1024 bytes)
- SQL Server has two types of extents:
  - Uniform extents are owned by a single object; all eight pages in the extent can only be used by the owning object.
  - Mixed extents are shared by up to eight objects. Each of the eight pages in the extent can be owned by a different object.

Extents (cont...)



Extents (Usage by Backup Service)



Key

Extents

Extents modified since the previous full backup of the data

Differential bitmap page

001010
001100
010001
000000