BLOCK

What is a **BLOCK** in an **ORACLE** database?
ORACLE allocates logical database space for all data in a database.
The units of database space allocation are data **blocks**, extents, and segments.
The size of a **block** is decided when the database is initialized using **DB_BLOCK_SIZE**. Typical sizes are: **4096** or **8192** bytes.

BLOCK PROPERTIES

Oracle operates in a variable columnsize this means even though you put a value lets say VARCHAR(50) and you put in 2 characters only 2 bytes of space plus administrative information gets occupied.

When the length of such data sets get changed through **UPDATE** the system needs to create an overflow **block** which is very bad for the performance.

To avoid such a problem a part of the database **block** can be defined as an overflow-area.

PCTFREE

The size of the free area per block can be defined through the PCTFREE parameter which is the area that is only used by UPDATE-operations.

INSERT-operations only fill the block to the point that is specified by PCTFREE.

STATIC / DYNAMIC TABLES

STATIC TABLES are tables whose data is changed rarely (master data)
PCTFREE should be less than 10%.

DYNAMIC TABLES are tables whose data is frequently
changed **PCTFREE** should be up to 60%.

PCTUSED

Is a block storage parameter that indicates at which filling level the system recognizes it as a block that can store new data sets.

It will then be put in the free-block-list. (default value is 40%)

ROWS

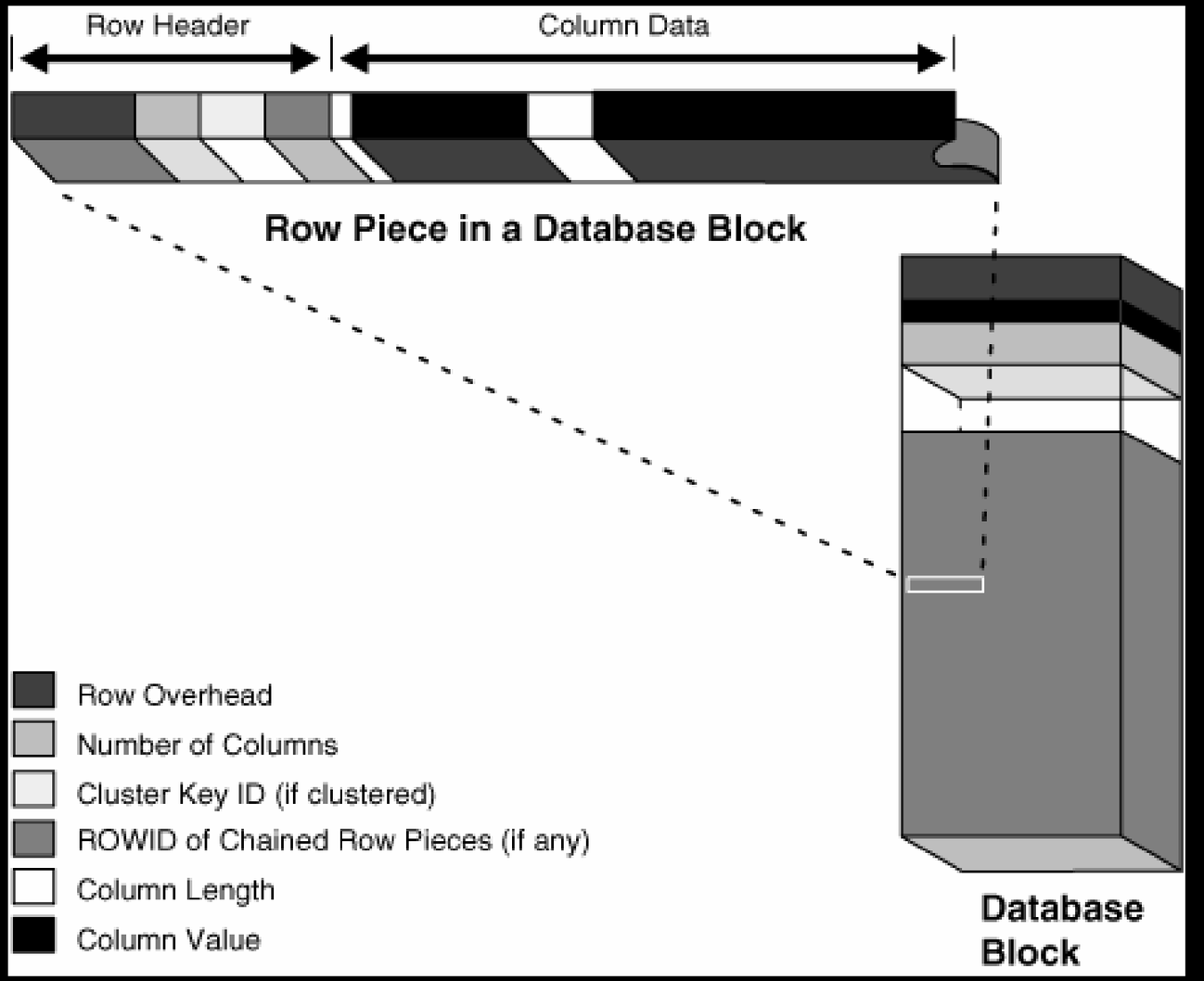
An Oracle row is the smallest physical storage unit.

Oracle will always try to store rows whole to not split them.

Every row starts with a ROW HEADER.

The length of a column is saved in a ROW.

PRIMARY KEYS should be specified first in the CREATE statement. LONG-data should be put last.


Row Header
Column Data
Row Piece in a Database Block
Row Overhead
Number of Columns
Cluster Key ID (if clustered)
ROWID of Chained Row Pieces (if any)
Column Length
Column Value
Database Block

FLASHBACK QUERY

In the UNDO tablespace older versions of a data block are stored. (before image)

When a user saves his changes using COMMIT the before image is no longer needed.

Beacause of performance reasons the before image only gets deleted when new UNDO tablespace is needed.

Until this happens the old data can be accessed through FLASHBACK QUERY.

When the user goes past the before image creation data an error occurs.

INSERT (PHYSICAL LAYER)

When a new data set is created the system decides in which block it gets stored.

The sets get stored until no new set fits in the data area (sets get stored historically).

DELETE operations effect is that data sets get removed and a new free area is created.

Available space = DB block size - block header - pctfree - stored data.

UPDATE

Every UPDATE operation is basically done inside the block the data set is stored.

When a data set is is increased thorugh an UPDATE operation the PCTFREE is used.

Is the storage space not enough an overflow block is created which was mentioned above.

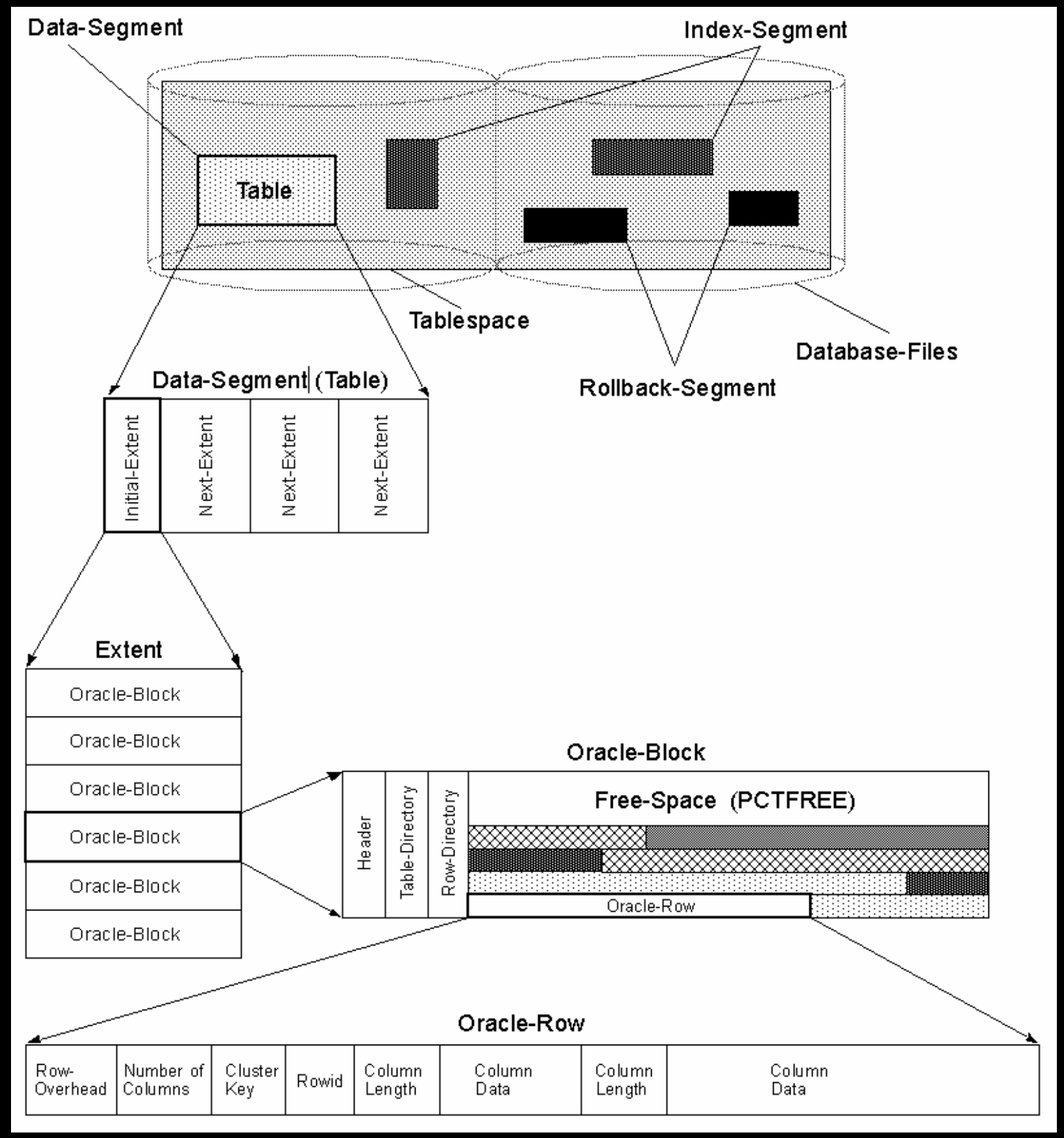
Oracle then splits the sets evenly between these two blocks.

DELETE

The according data set gets removed from the data base block.

If the boundary falls below the PCTFREE parameter the block gets added to the free DB block list so it can be taken into account for the next INSERT operation.

SUMMARY


Data-Segment
Index-Segment
Table
Tablespace
Database-Files
Rollback-Segment
Data-Segment (Table)
Initial-Extent
Next-Extent
Next-Extent
Next-Extent
Extent
Oracle-Block
Oracle-Block
Oracle-Block
Oracle-Block
Oracle-Block
Oracle-Block
Oracle-Block
Header
Table-Directory
Row-Directory
Free-Space (PCTFREE)
Oracle-Row
Oracle-Row
Row-Overhead
Number of Columns
Cluster Key
Rowid
Column Length
Column Data
Column Length
Column Data