

Most developers know how to use a database.

Few understand how a database works inside.

Here's a quick breakdown of what happens behind the scenes:

1. Query Processor:

Parser: Checks your SQL, builds a syntax tree.

Optimizer: Picks the best execution plan based on data stats.

DDL interpreter and DML compiler

2. Query Executor:

Transaction Manager: Guarantees atomic commits or full rollbacks.

Concurrency Manager: Handles locks, isolation levels, deadlock resolution.

3. Security Manager:

Authentication: Verifies user identity.

Authorization: Checks what actions are allowed.

4. Storage Engine:

Buffer Manager: Caches data pages in memory to minimize disk reads.

Cache Manager: Speeds up frequent access at higher levels.

Recovery Manager: Maintains Write-Ahead Logs (WAL) to survive crashes.

Catalog: Stores metadata about tables, columns, and indexes.

Data files store rows and pages.
Log files ensure durability and recovery.
Every slow query, downtime, and corruption bug starts inside these layers.
- Understanding this architecture makes you:
- Debug faster.
- Design safer.
- Build systems that actually scale.
Learning database internals is leverage.

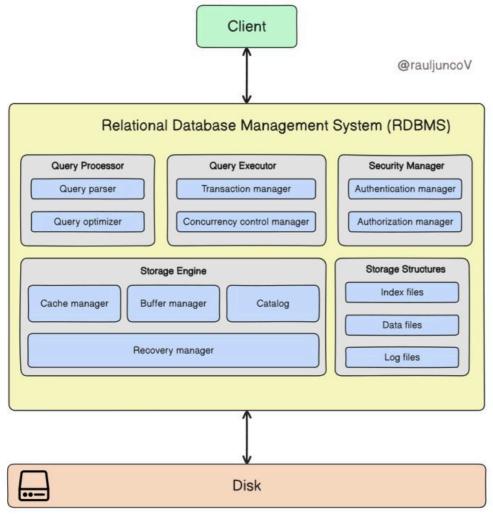
5. Storage Structures:

Indexes accelerate reads.

Index files, data files, and log files live on disk.

What Really Happens Inside a Relational Database

This is what separates database users from database engineers.



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