Raul Junco • Following
Simplifying System Design
38m •

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.

5. Storage Structures:

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

Indexes accelerate reads.

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.

What Really Happens Inside a Relational Database

This is what separates database users from database engineers.