Day 2 : Command Types in PostgreSQL

"30 Days, 30 Lessons: Unlock the Power of SQL!"

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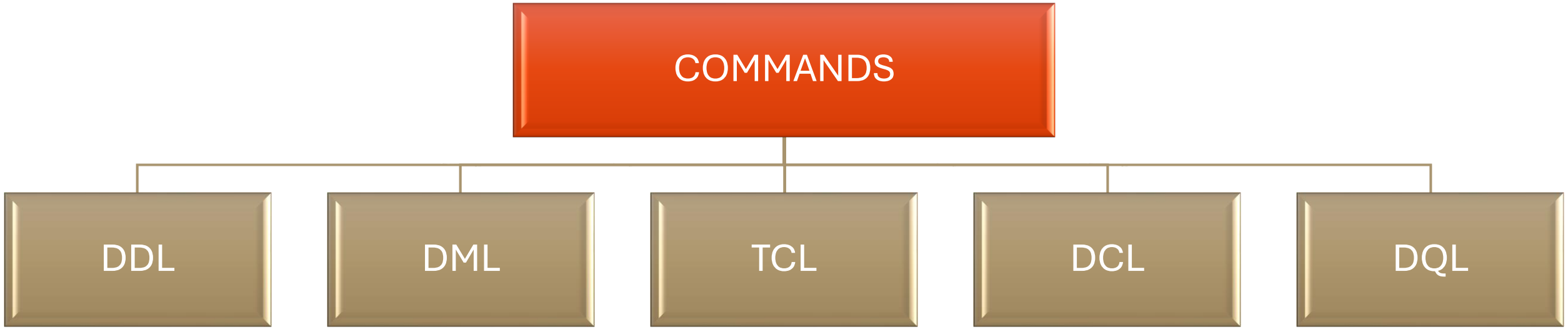
5 types Commands in SQL



Data Definition Language (DDL)

DDL commands define, modify, and manage database objects like tables, schemas, and indexes.

Command	Description	Example
CREATE	Creates a new database object like a table.	CREATE TABLE employees (id INT, name TEXT);
ALTER	Modifies the structure of existing objects.	ALTER TABLE employees ADD COLUMN age INT;
DROP	Deletes database objects like tables or views.	DROP TABLE employees;
TRUNCATE	Removes all records from a table quickly.	TRUNCATE TABLE employees;

Data Manipulation Language (DML)

DML commands handle data within tables, such as inserting, updating, or deleting rows.

Command	Description	Example
INSERT	Adds new records to a table.	INSERT INTO employees (id, name, age) VALUES (1, 'John', 30);
UPDATE	Modifies existing data in a table.	UPDATE employees SET age = 31 WHERE id = 1;
DELETE	Removes specific records from a table.	DELETE FROM employees WHERE id = 1;
SELECT	Retrieves data from the database.	SELECT * FROM employees;

Transaction Control Language (TCL)

TCL commands manage database transactions, ensuring data consistency and integrity.

Command	Description	Example
BEGIN	Starts a transaction.	BEGIN;
COMMIT	Saves all changes made in the transaction.	COMMIT;
ROLLBACK	Reverts changes made in the transaction.	ROLLBACK;
SAVEPOINT	Sets a point within a transaction for rollback.	SAVEPOINT sp1;

Data Control Language (DCL)

DCL commands control user access and permissions to the database objects.

Command	Description	Example
GRANT	Gives specific permissions to users.	GRANT SELECT, INSERT ON employees TO user1;
REVOKE	Removes specific permissions from users.	REVOKE INSERT ON employees FROM user1;

Data Query Language (DQL)

- DQL focuses on querying data from the database. Though technically part of DML, it’s often separated to emphasize its importance

Command	Description	Example
SELECT	Retrieves data from one or more tables.	**SELECT** name, age FROM employees WHERE age > 25;

- **Pro Tip for Beginners**
- Always use COMMIT and ROLLBACK carefully to avoid unintended changes, especially in critical databases. Practice using SELECT frequently to understand your data before making changes with DML commands.

Difference Between SQL and NoSQL Databases

Data Storage and Structure:

SQL:

Data is stored in tables with rows and columns (structured data).

SQL Databases:

Banking systems, ERP systems, and applications requiring complex queries and transactions.

SQL :

PostgreSQL, MySQL, Oracle, SQL Server.

NoSQL:

Data can be stored as key-value pairs, JSON documents, wide-column stores, or graphs.

NoSQL Databases:

Social media platforms, IoT data storage, real-time analytics, and big data applications.

NoSQL

: MongoDB, Cassandra, Redis, Couchbase.

Aspect	SQL Databases	NoSQL Databases
Data Model	Relational (Table-based)	Non-relational (Document, Key-Value, Graph, Column)
Structure	Structured data stored in rows and columns.	Unstructured or semi-structured data.
Schema	Fixed schema (predefined structure).	Flexible schema (dynamic structure).
Query Language	Uses SQL for querying data.	Uses various query methods (e.g., JSON-like queries).
Scalability	Vertically scalable (add more resources to a server).	Horizontally scalable (add more servers/nodes).
ACID Compliance	Strong ACID compliance (Atomicity, Consistency, Isolation, Durability).	Eventual consistency (some NoSQL support ACID).
Use Cases	Suitable for complex queries and transactional data.	Ideal for large-scale data, real-time analytics, and big data.
Examples	PostgreSQL, MySQL, Oracle, SQL Server.	MongoDB, Cassandra, Redis, Couchbase.
Performance	Optimized for structured data and complex queries.	Optimized for large volumes of data and fast reads/writes.
Relationships	Supports relationships between tables (foreign keys).	Stores data without predefined relationships.
Data Integrity	Ensures high data integrity and consistency.	Prioritizes scalability and speed over strict consistency.
Transactions	Supports multi-row transactions.	Limited or no support for multi-document transactions.