Postgresql

The world's most advanced open source database

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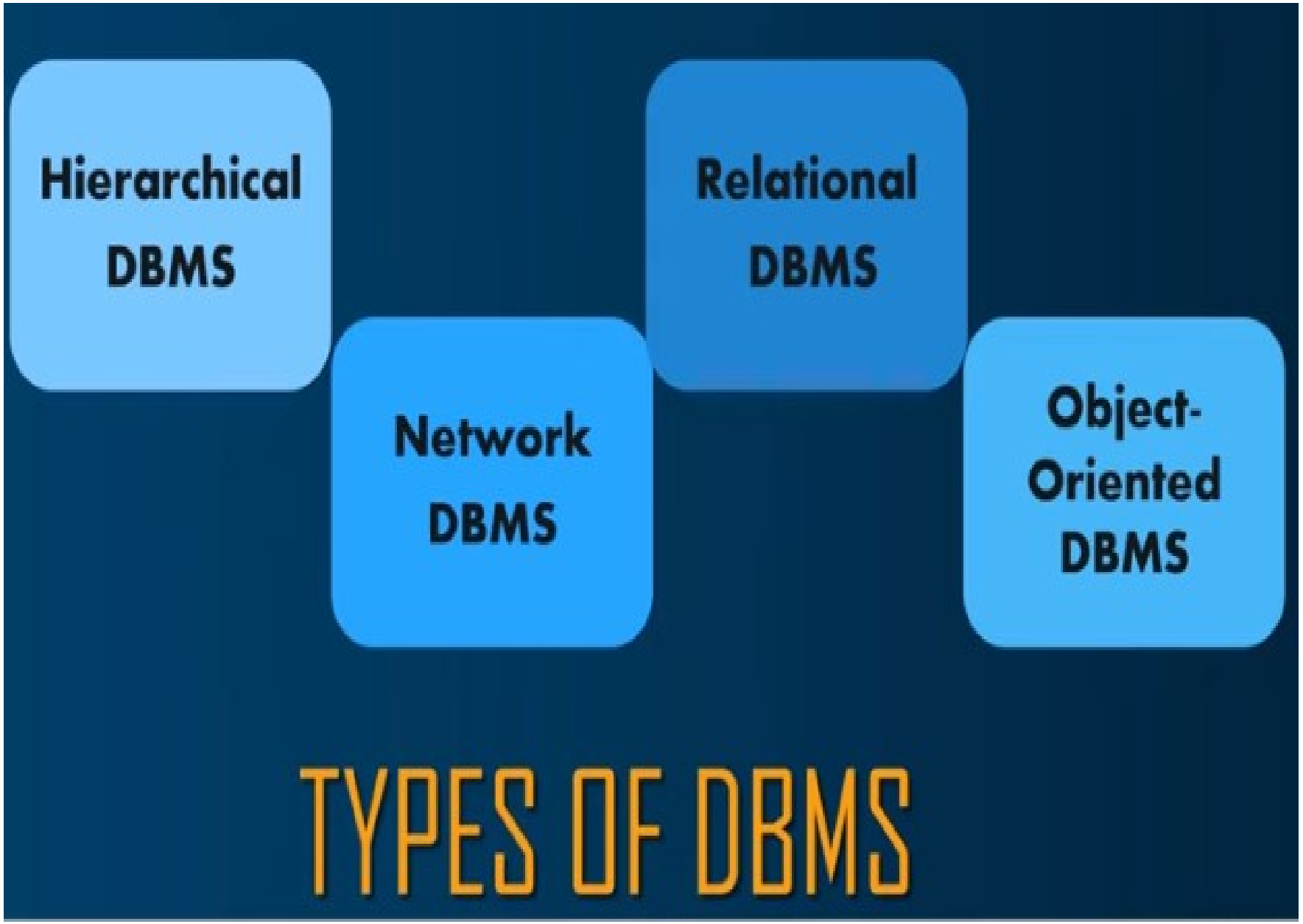
DBMS

- A database management system (**DBMS**) refers to the technology for creating and managing databases.
- **DBMS** is a software tool to organize (create, retrieve, update, and manage) data in a database.


Hierarchical DBMS
Network DBMS
Relational DBMS
Object-Oriented DBMS
TYPES OF DBMS

Hierarchical DBMS

- In a Hierarchical database, model data is organized in a tree-like structure. Data is Stored Hierarchically (top down or bottom up) format. Data is represented using a parent-child relationship. In Hierarchical DBMS parent may have many children, but children have only one parent.

Network Model

- The network database model allows each child to have multiple parents. It helps you to address the need to model more complex relationships like as the orders/parts many-to-many relationship. In this model, entities are organized in a graph which can be accessed through several paths.

Relational model

- Relational DBMS is the most widely used DBMS model because it is one of the easiest. This model is based on normalizing data in the rows and columns of the tables. Relational model stored in fixed structures and manipulated using SQL.

Object-Oriented Model

- In Object-oriented Model data stored in the form of objects. The structure which is called classes which display data within it. It defines a database as a collection of objects which stores both data members values and operations.

SQL

A standardized programming language which is used for managing relational databases.

With SQL, you can modify databases, add, update or delete rows of data, retrieve subsets of information from a database and ,any more

Relational databases like MySQL Databases, oracle, Ms SQL Server, Sybase etc use SQL.

Queries and other SQL operations are written as statements. Example: select, insert, add, update, delete, create, alter, truncate.

PostgreSQL is an open-source object relational database system with a 30+ years of active development in the industry.

World's Most Advanced Open Source Relational Database

WHAT IS POSTGRESQL?

- PostgreSQL is an advanced, enterprise-class, and open-source relational database system. PostgreSQL supports both SQL (relational) and JSON (non-relational) querying.
- PostgreSQL is a highly stable database backed by more than 20 years of development by the open-source community.
- PostgreSQL is used as a primary database for many web applications as well as mobile and analytics applications.

Common Use cases of PostgreSQL

The following are the common use cases of PostgreSQL.

- **A robust database in the LAPP stack**

  LAPP stands for **L**inux, **A**pache, **P**ostgreSQL, and **P**HP (or Python and Perl). PostgreSQL is primarily used as a robust back-end database that powers many dynamic websites and web applications.

- **General purpose transaction database**

  Large corporations and startups alike use PostgreSQL as primary databases to support their applications and products.

- **Geospatial database**

  PostgreSQL with the PostGIS extension supports geospatial databases for geographic information systems (GIS).

PostgreSQL support most popular programming languages:

- Python
- Java
- C#
- C/C+
- Ruby
- JavaScript (Node.js)
- Perl
- Go
- Tcl

FEATURES OF POSTGRESQL

Compatible with multiple data types:

- PostgreSQL support various data types such as:
  - **Structured:** Array, Date and Time, UUID (Universally Unique Identifier), Array, Range.
  - **Primitives:** String, Integer, Boolean, Numeric.
  - **Customizations:** Custom Types, Composite.
  - **Geometry:** Polygon, Circle, Line, Point,
  - **Document:** XML, JSON/JSONB, Key-value.

Compatible with Data Integrity

It supports data integrity which includes the following:

- Primary Keys
- UNIQUE, NOT NULL
- Foreign Keys
- Explicit Locks, Advisory Locks
- Exclusion Constraints

Support multiple features of SQL

PostgreSQL supports various features of SQL which include the followings:

- MVCC (Multi-Version Concurrency Control).
- It supports multiple Indexing such as Multicolumn, Partial, B-tree, and expressions.
- SQL sub-selects.
- Complex SQL queries.
- Streaming Replication
- It supports transactions, Nested Transactions through Savepoints.
- Just-in-time compilation of expressions
- Table partitioning

Highly Reliable

It is highly reliable and also provide disaster recovery such as:

- Active standbys, PITR (Point in time recovery)
- It supports WAL (Write-ahead Logging)
- Tablespaces
- It supports different types of **Replication**like **Synchronous, Asynchronous, and Logical.**

Secure

It is safe because it follows several security aspects, which are as follows:

- PostgreSQL provides a robust access control system.
- It includes several Authentications such **as Lightweight Directory Access Protocol**(LDAP), **Generic Security Service Application Program Interface** (GSSAPI), **SCRAM-SHA-256, Security Support Provider Interface** (SSPI), Certificate, and so on.
- PostgreSQL supports Column and row-level security.

Highly extensible

PostgreSQL is highly extensible in several phases which are as following:

- It supports procedural Languages such as Perl, PL/PGSQL, and Python, etc.
- JSON/SQL path expressions
- Stored procedures and functions.
- For tables, it supports a customizable storage interface.
- It is compatible with **foreign data wrappers**, which connect to further databases with a standard SQL interface.

Other features

- PostgreSQL supports **Internationalization**, which means that the international character sets include ICU collations, accent- insensitive and case-sensitive collations, and **full-text searches**.
- In PostgreSQL, a table can be set to inherit their characteristics from a "parent" table.
- It is compatible with ANSI-SQL2008.
- PostgreSQL will help us to improve the functionality of Server-Side programming.
- We can install several extensions to add additional functionality to PostgreSQL.