

DATABASE MANAGEMENT SYSTEM

CONTENT^{DATA VS}

DATABASE

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INFROMATION

VS SQL

RDBMS VS

ATTRIBUTE

DATABASE
MANAGEMENT ENTITY

NRDBMS

01. DATA vs INFORMATION

DATA

It is a collection of facts, such as numbers,

words or observations which are stored in or used by a computer.

Ex :

Kamal

18

Galle

INFORMATION

Information is organized or classified data, which

has some meaningful values for the receiver.

Information is the processed data on which decisions and actions are based

Ex :

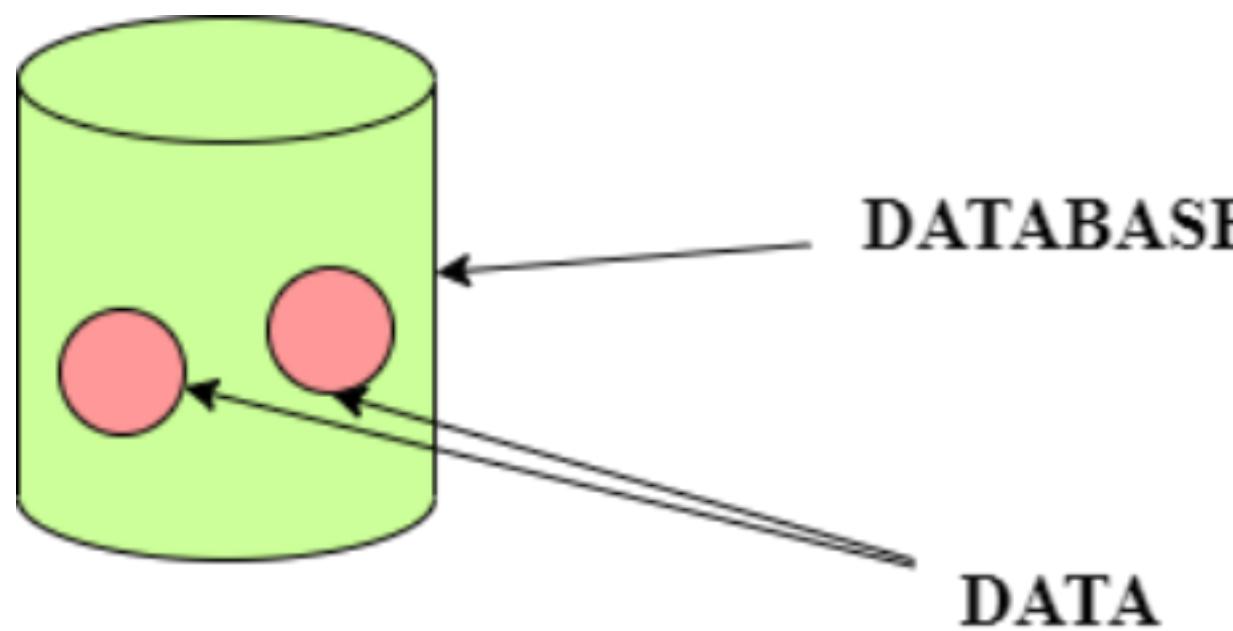
**Kamal is a student.
He is 18 years old.**

02. DATABASE

DATABASE

A database is an organized collection of data, so that it can be easily accessed and managed

You can organize data into tables, rows, columns, and index it to make it easier to find relevant information.

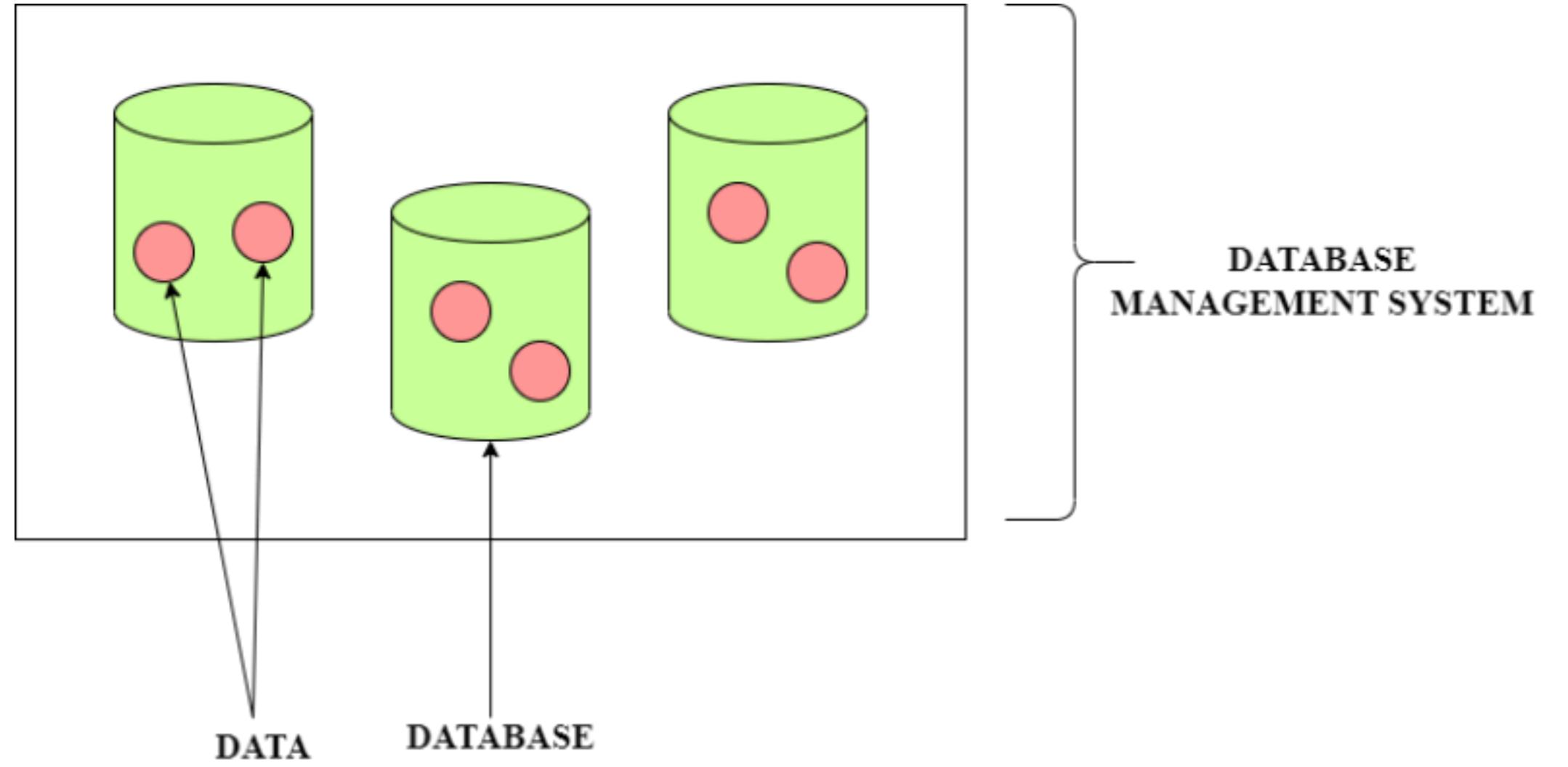


SYSTEM

DATABASE MANAGEMENT SYSTEM

A database management system (DBMS) is system software for creating and managing databases.

A DBMS makes it possible for end users to create, protect, read, update and delete data in a database.



04. RDBMS vs NRDBMS

DBMS



RDBMS

(Relational Database Management System)

An RDBMS is a type of database management system (DBMS) that stores data in a row-based table structure which connects related data elements.



NRDBMS

(Non Relational Database Management System)

Used to store, manage, query and retrieve data stored in a non-relational databases.

DBMS



RDBMS

(Relational Database Management System)

Data store in as a table.

Ex :

MySQL

MsSql

OracleDB

MsAccess

NRDBMS

(Non Relational Database Management System)

Data store in as a document.

Ex :

MongoDB

Apache Cassandra

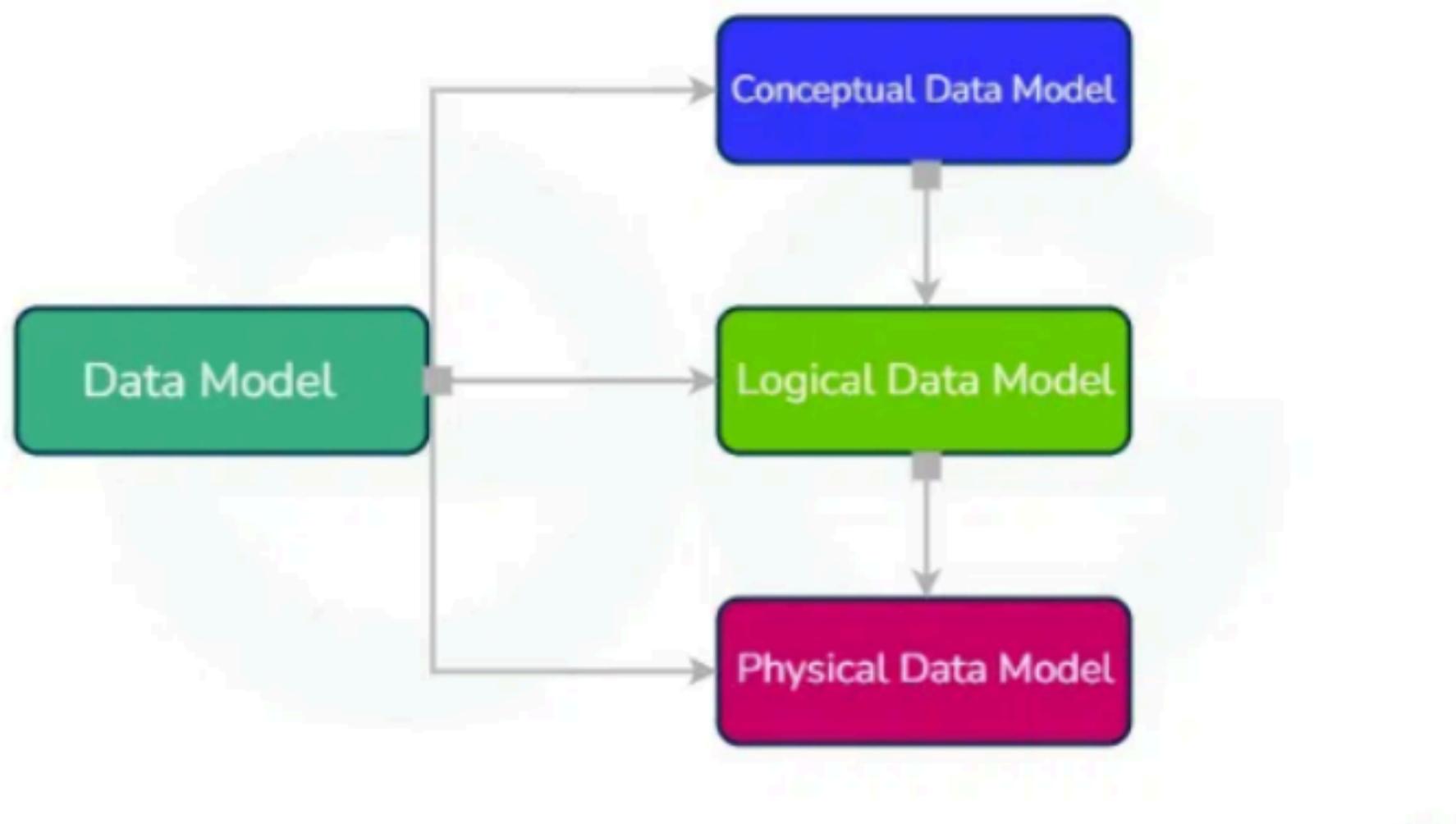
Redis

05. Database Models

Database Models

Defines the logical structure and organization of data within a database management system (DBMS).

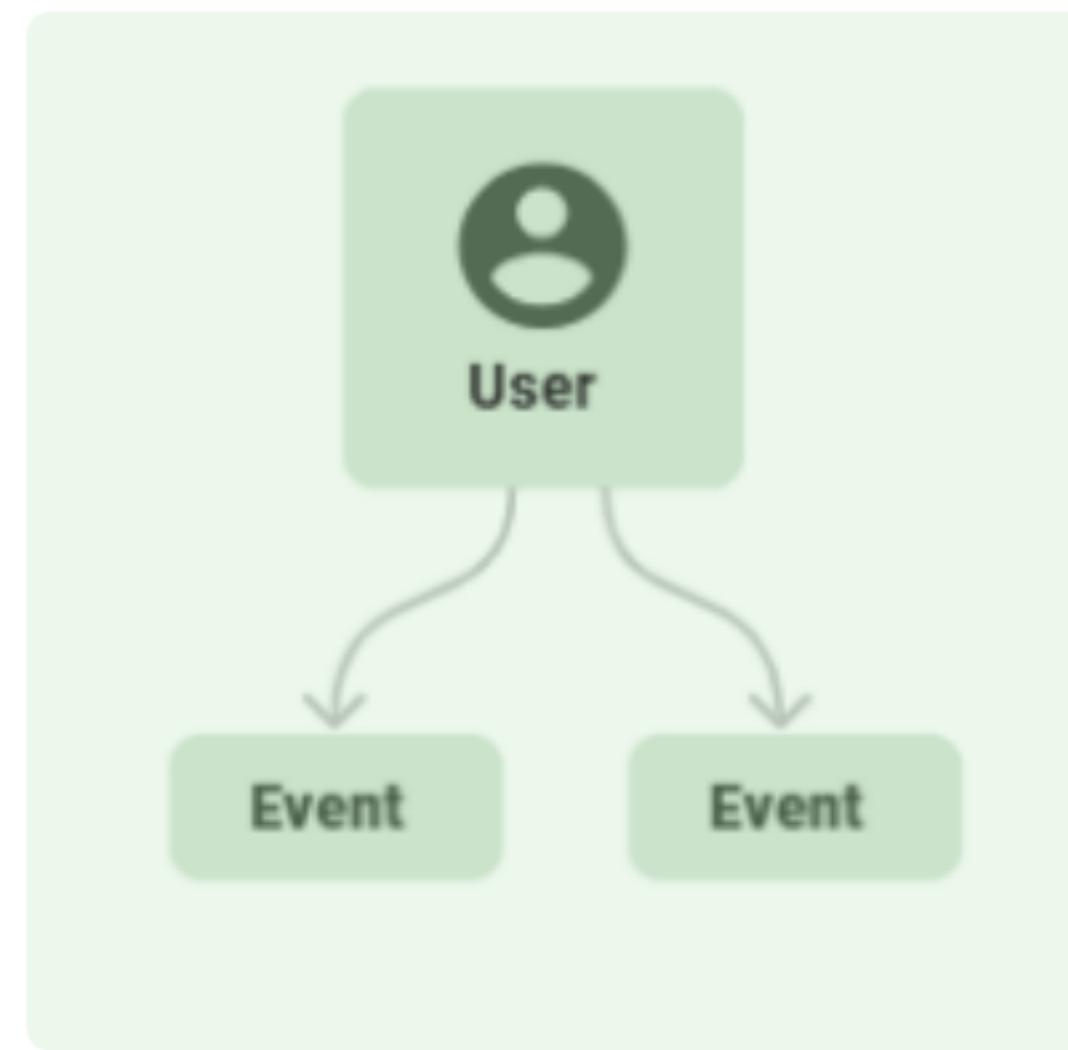
It acts as a blueprint, specifying how data is stored, accessed, and updated, as well as the rules and relationships that ensure data integrity.



1. Conceptual Data Model

The conceptual data model represents data at a high level and focuses on what data is needed, not how it is stored.

Used by business analysts and stakeholders

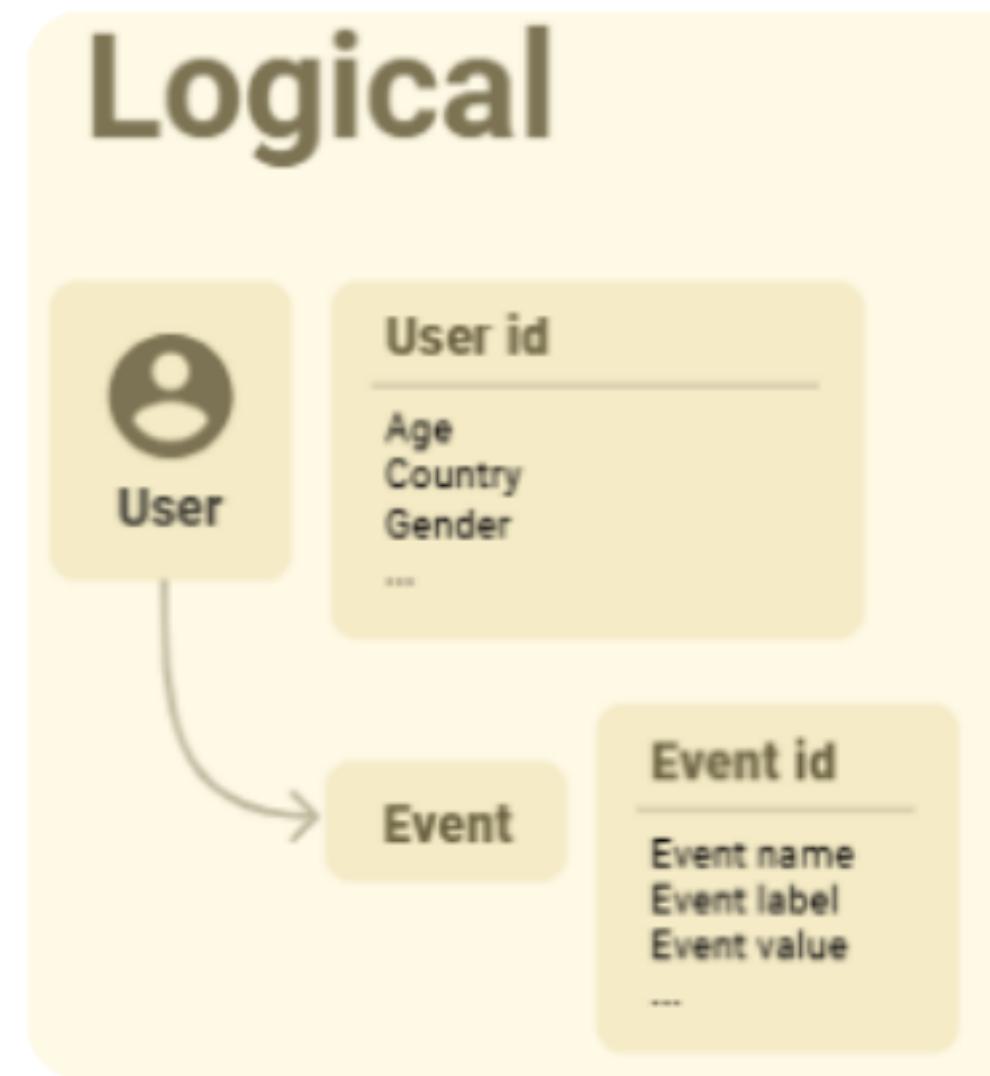


2. Logical Data Model

The logical data model describes the structure of data in more detail but is still

independent of physical storage.

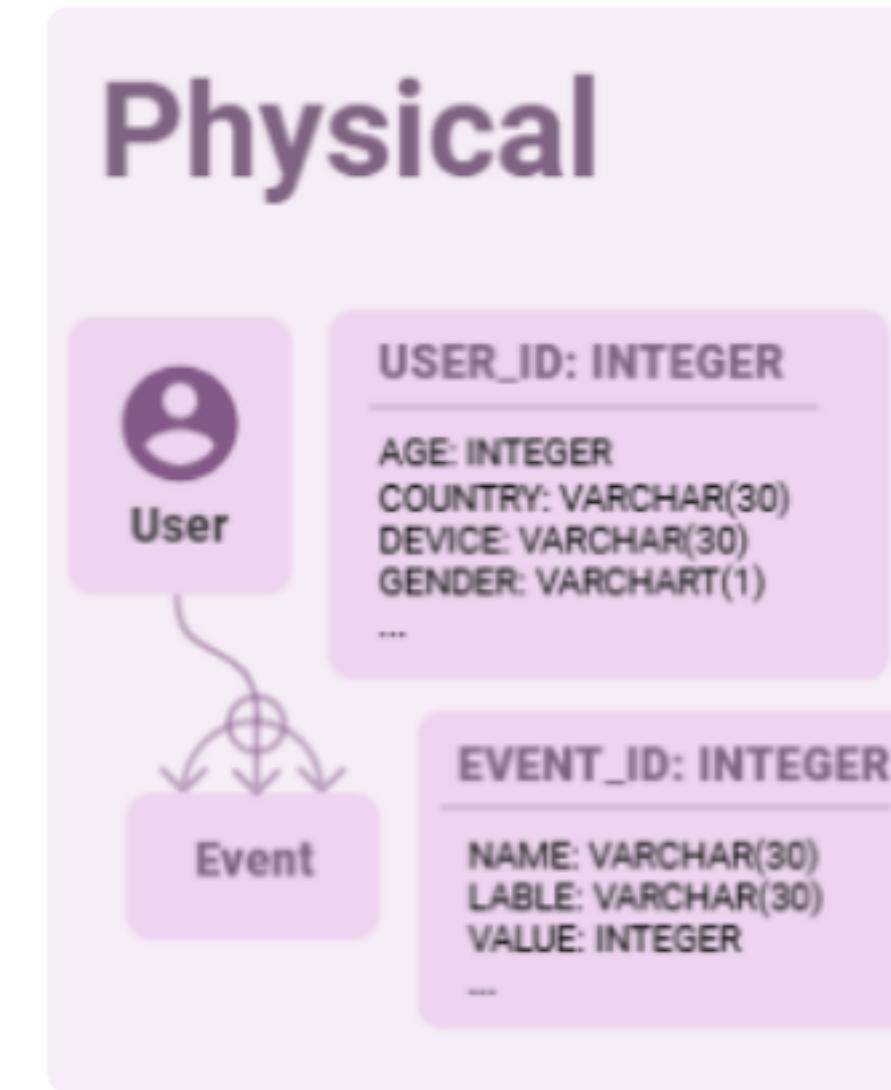
Acts as a bridge between conceptual and physical models.



3. Physical Data Model

The physical data model describes how data is actually stored in the database. We define exactly how data is stored in the database, including data types,

keys, indexes, and constraints.

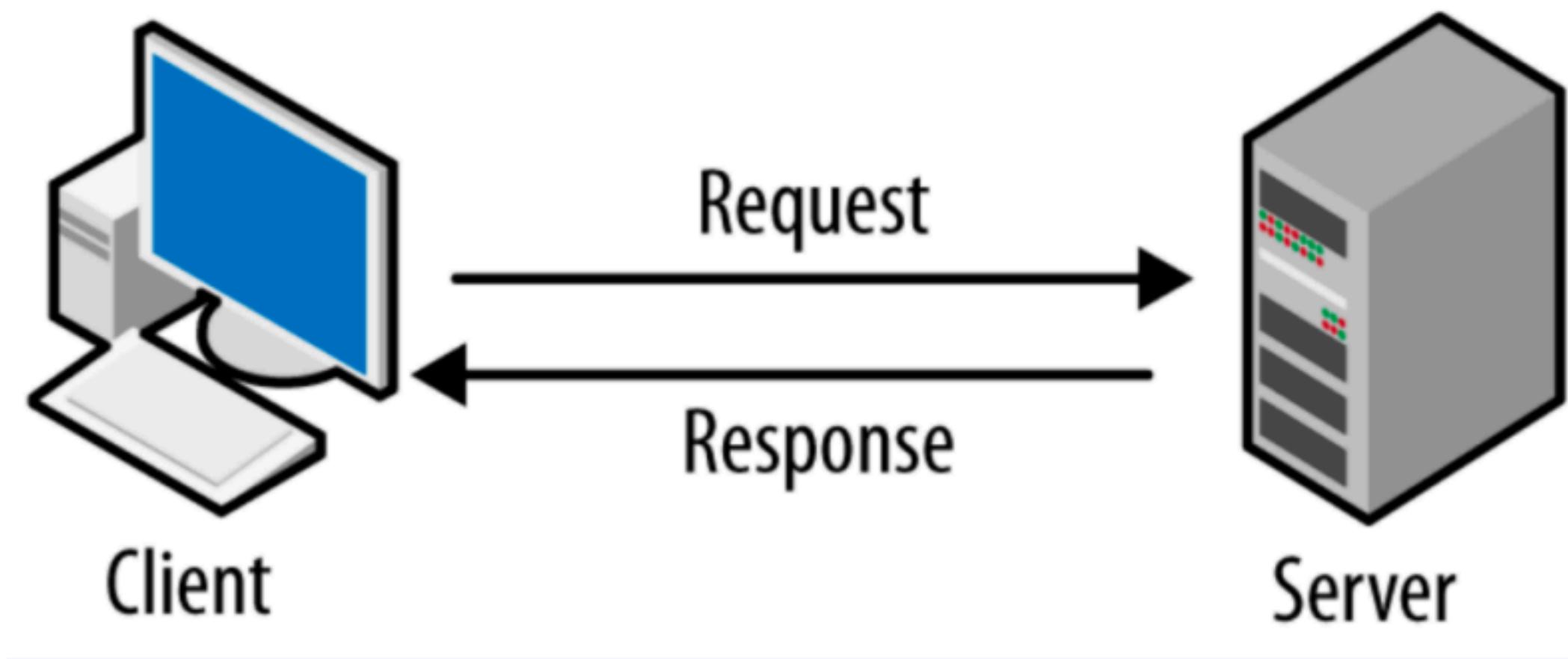


06. Client Server Architecture

3. Client-Server Architecture

In database systems, applications follow a client–server architecture.

It is a **distributed computing model** where **clients** (user devices/apps) **request services/data from a central server**, which stores, manages, and provides resources, communicating over a network using protocols like HTTP.



Client:

Application or tool used by the user
Sends requests to the database

Server:

Database server that processes requests
Stores and manages data

Example:

Client: DataGrip / MySQL Workbench
Server: MySQL / PostgreSQL
database

Key Advantages:

Centralized Management & Maintenance: Administrators manage data, applications, and security from a single server, simplifying updates, patches, and monitoring.

Enhanced Security: Centralized control allows for strong access permissions, firewalls, and data encryption, protecting sensitive information.

Scalability & Flexibility: Easily add new clients or upgrade server resources (like RAM, storage) to handle increased demand without disrupting the network.

Cost-Efficiency (Client Side): Clients require less processing power and storage, as the server handles intensive tasks, making client devices cheaper.

07.Database As A Server

Database As A Server

Using a dedicated machine (hardware/software) to run database management systems (DBMS) like MySQL or SQL Server, centralizing data storage, security, and access for multiple users/apps

A database server:

Listens for client requests

Executes SQL queries

Returns results to clients
Manages concurrent users

Databases usually run as background services and communicate using network protocols (TCP/IP).

08. MySQL vs SQL

SQL

Database language for storing, manipulating and retrieving data in a relational database.

A database *language*.

Does not change as it is a language.

MySQL

Open source Relational Database Management System (RDBMS)

that allows managing relational databases.

A **software**.

Update frequently as it is a

09. Installing & Setting Up Database Environment

9. Introduction to the Relational Model

Relational Model

The Relational Model is the foundation of most modern databases.

Key Concepts:

1. **Tables**

A table represents an entity.

Example: STUDENT table | student_id | name | email |

2. **Rows**

Each row represents a single record.

Example: One student record

3. **Columns**

Each column represents a property of the entity.

Example: name, email

10. DATA TYPES

DATA TYPES

Each column in a database table is **required** to have a name and a data type.

VARCHAR

INT

DECIMAL

DATE

TASK 01

The first table should be named **employee** and should include at least four fields such as **employee_id**, **first_name**, **last_name**, **department**.

TASK 02

The second table should be named **project** and

should include at least four fields such as
project_id,
project_name,
start_date,
end_date.

TASK 03

The third table should be named **assignment** and should include at least four fields such as **assignment_id**, **employee_id**,

project_id,
assignment_date.

TASK 04

**After creating the tables, insert 04 sample values
into project table to populate them with data.**

