S.Y.B.Tech, Information Technology
Veermata Jijabai Technological Institute

Database Management System

Shreyash Vijaykar
svijaykar185@gmail.com

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Content

Introduction

- **Database**:
  Database is a collection of inter-related data which helps in efficient retrieval, insertion and deletion of data from database and organizes the data in the form of tables, views, schemas, reports etc. For Example, university database organizes the data about students, faculty, and admin staff etc. which helps in efficient retrieval, insertion and deletion of data from it.

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- **Database Management System**:
  The software which is used to manage database is called Database Management System (DBMS). For Example, MySQL, Oracle etc. are popular commercial DBMS used in different applications.

Data Management

Data Management

Two Tire Architecture

- Two tier architecture is similar to a basic client-server model. The application at the client end directly communicates with the database at the server side.
- The server side is responsible for providing query processing and transaction management functionalities. On the client side, the user interfaces and application programs are run.

Three Tire Architecture

- In this type, there is another layer between the client and the server. The client does not directly communicate with the server. Instead, it interacts with an application server which further communicates with the database system and then the query processing and transaction management takes place.
- This intermediate layer acts as a medium for exchange of partially processed data between server and client.

Data Abstraction and Data Independence
Physical

Physical

This is the lowest level of data abstraction. It tells us how the data is actually stored in memory. The access methods like sequential or random access and file organisation methods like B+ trees, hashing used for the same. Usability, size of memory, and the number of times the records are factors which we need to know while designing the database. Suppose we need to store the details of an employee. Blocks of storage and the amount of memory used for these purposes is kept hidden from the user.

Logical

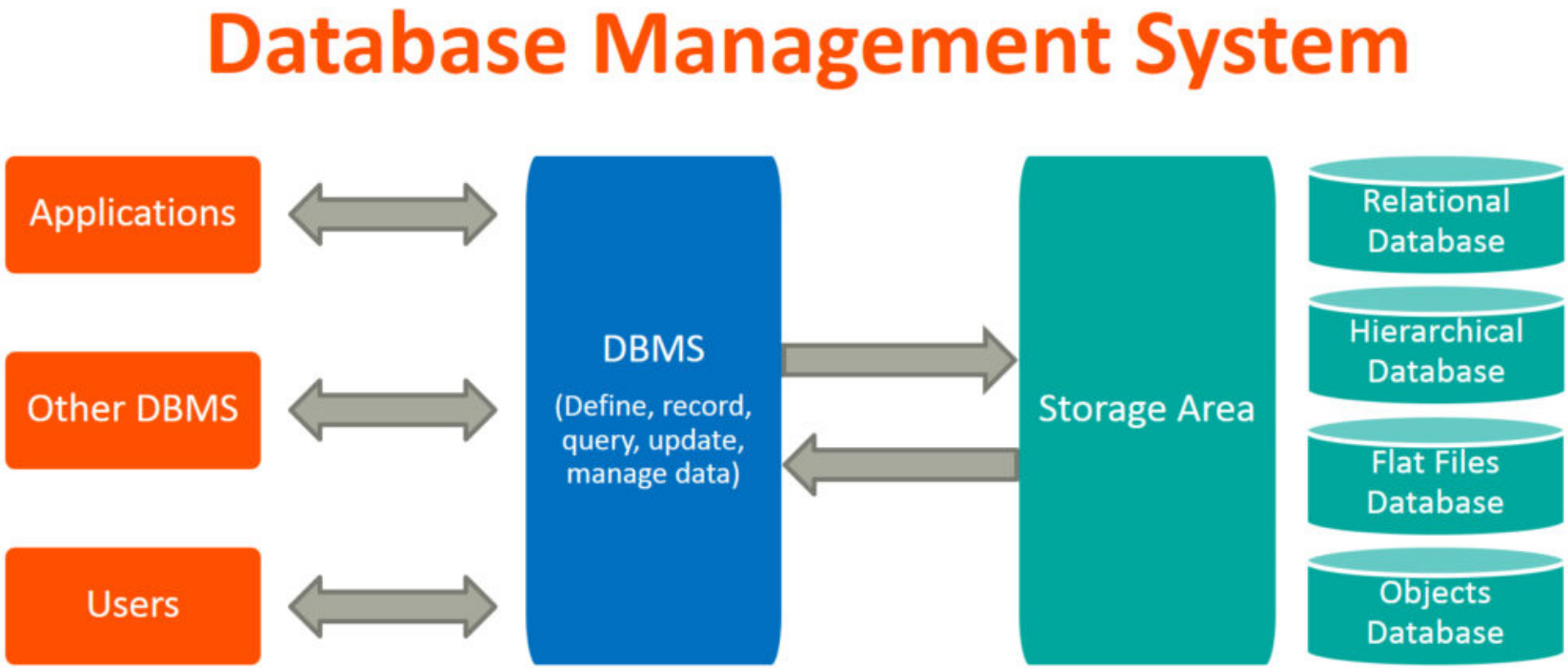
This level comprises of the information that is actually stored in the database in the form of tables. It also stores the relationship among the data entities in relatively simple structures. At this level, the information available to the user at the view level is unknown. We can store the various attributes of an employee and relationships, e.g. with the manager can also be stored.

Data Abstraction and Data Independence
View

View

- This is the highest level of abstraction. Only a part of the actual database is viewed by the users. This level exists to ease the accessibility of the database by an individual user. Users view data in the form of rows and columns. Tables and relations are used to store data. Multiple views of the same database may exist. Users can just view the data and interact with the database, storage and implementation details are hidden from them.

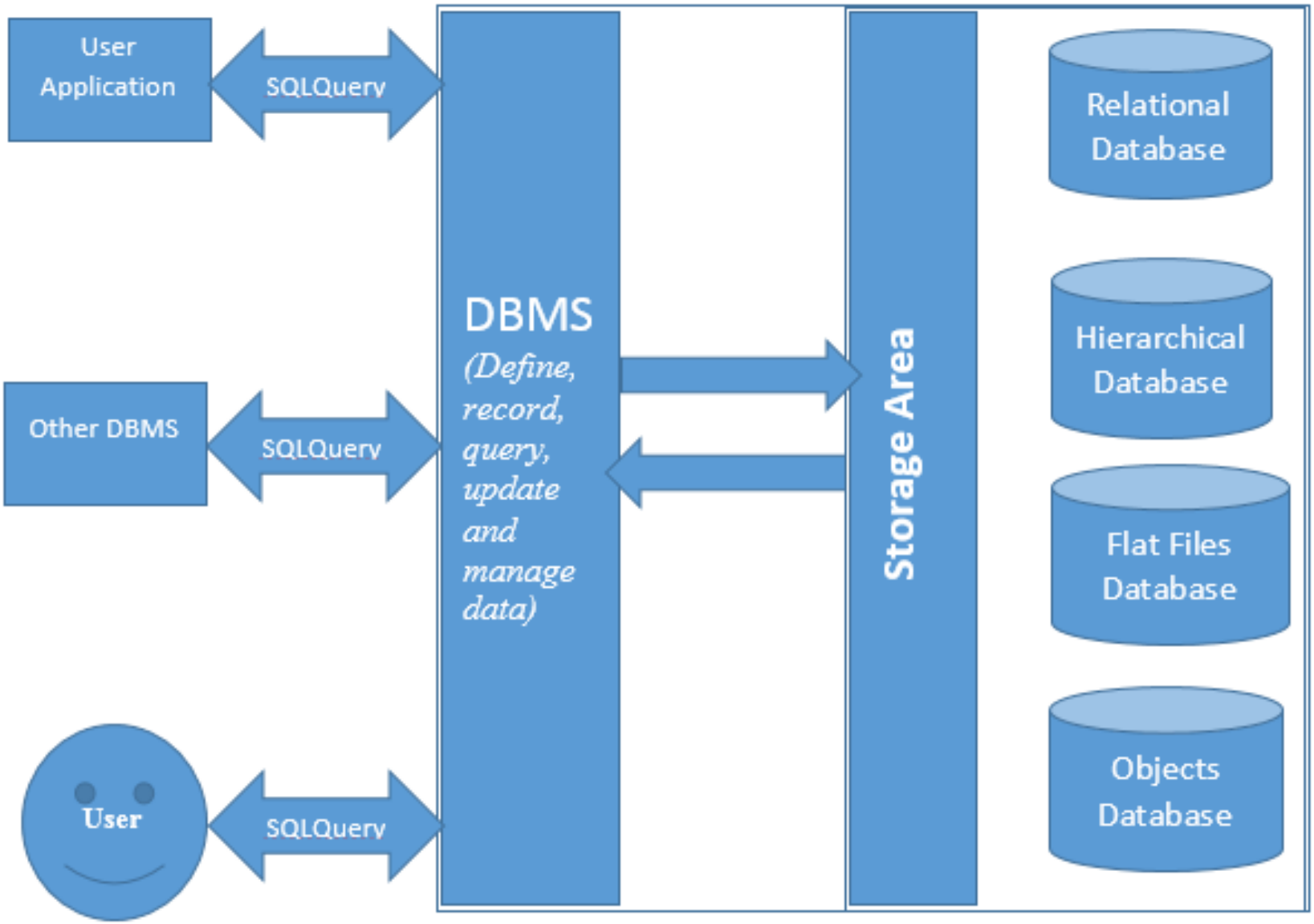
DBMS



DBMS

diagram

DBMS


User Application
SQLQuery
Other DBMS
SQLQuery
User
SQLQuery
DBMS
(Define, record, query, update and manage data)
Storage Area
Relational Database
Hierarchical Database
Flat Files Database
Objects Database

SQL

Structured Query Language or SQL is a standard Database language which is used to create, maintain and retrieve the relational database. It is particularly used to work with structured data where there is relations associated within the data itself.


Thank you!