Report
Database Course Documentation

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The Difference Between Flat File Systems vs. Relational Databases:

First of all, both flat file systems and Relational Databases are used to manage data in this answer I will cover the following Structure, Data Redundancy , Relationships , Example Usage Drawbacks.

Structure:

Flat File System is a big collection of files stored in medium such as a hard drive or we can say is a way of arranging the raw data in storage like hard drives medium. And it depends on the plain text. In the system each filed has a specified width, and also fields are separated by separator character such is ‘,’ , ‘ ‘ . The structure starts with the head which contain columns and also it added in the first line, after that the data which are the rows.

Relational Database are used to store data in a tabular format rows and columns, it used to manage and organize the data and you can perform many operation.

Data Redundancy:

Basically data redundancy happens when the same data is stored different locations or repeated across different files and tables or having many copies of data stored in the database . To solve this redundancy problem in relation database you need to use the normalization concept which is process of organizing database into several tables to reduce the redundancy. But in flat file system it takes time to do the changes for each file.

Relationships:

In flat file system there is no relationship between the files because each record is stored in a single file. On the other hand the table are organized into table with Relationships with other table by keys, and entities and indexes.

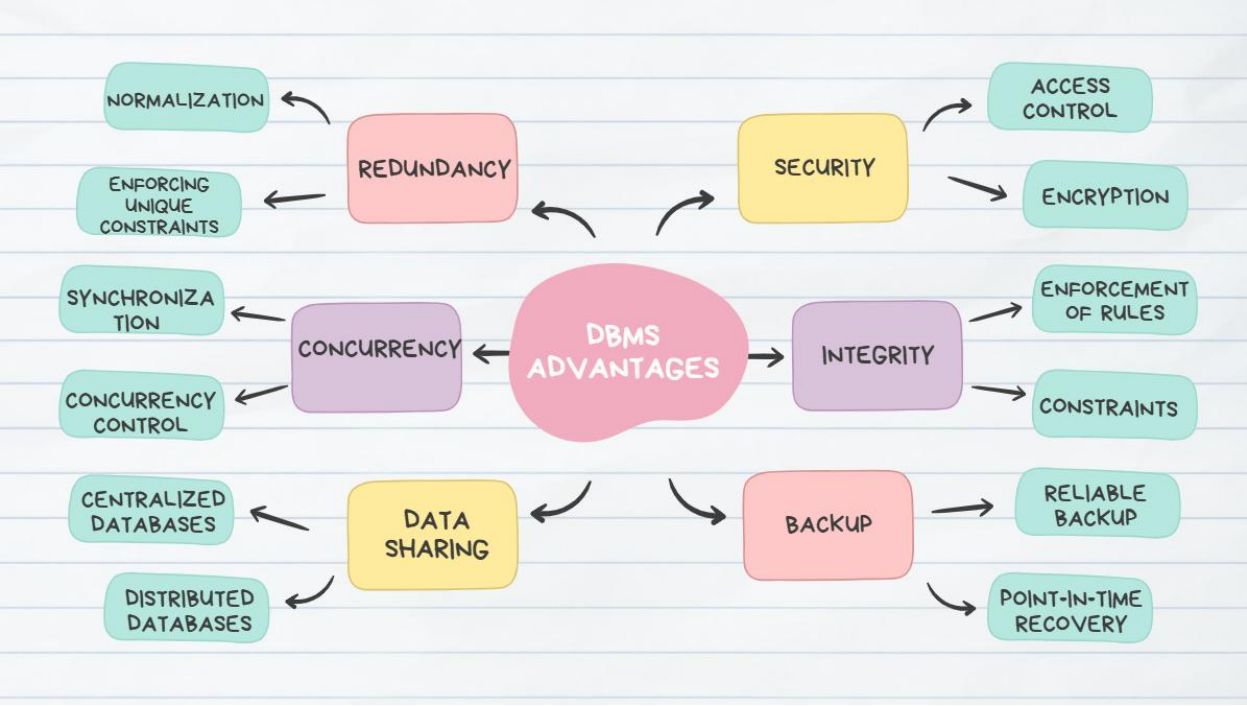
Example Usage:

Flat file usually used in ad hoc reporting or website configuration, while Relation Database used in sales , finance , Banking, schools and colleges, online stores.

Drawbacks:

In the flat file if a data needed to be accessed the entire file must be read sequentially which is less efficient for large data set. In addition, it has limited scalability which cause in case new data added file must be crated. Regarding the relation database it is expensive to set it and maintaining the database system and sometimes setting relation database requires purchasing a special software, structured limits

DBMS Advantages – Mind Map:



Roles in a Database System

A System Analyst role in a Database System basically conducting meetings with non-technical clients and understanding their requirements for the database system then writing it as a report.

A Database designer's role in a Database System is creating a full database design including tables, views, indexes etc ..In addition, drawing entity relation diagram(ERD) .

A Database developer role in a Database System builds and designs Database based on the given ERD from the designer and during the building he done testing to ensure that the database is according to the requirements, maintenance after delvering .in addition, they create some methods to the data secure and up to date.

Database Administrator role in a Database System managing and organizing the database and having central control define roles, and ensures the database runs without aby issues.

Application Developer role in a Database System the induvial who responsible on developing web or mobile application with user-friendly interface and then linking the database to application.

BI Developer role in a Database System specialized in developing , deploying and maintaining BI interfaces including reporting software, data analytics and visualization tools. They transform the raw data into a meaningful information.

Types of Databases:

Relational Database:

It known as relational database or relational database management system (RDMS) it stores information in a tabular or structure format of column contains type of information for example name age etc. in below in the row there are information. In addition, as name suggests relation database which means there is relation between tables via unique keys.

Example of Relational Database:

- MySQL
- PostgreSQL
- Microsoft SQL SERVER
- SQLite
- Oracle

Use Case Example of Relational Database:

Relational Database are used when working with structured data because they are easy to store within the table. In addition, relational databases are used when working with small or medium volume of data , moreover, if the relationship between the entities is crucial.

Non-Relational Database:

It is a kind of database that doesn't store data in a tabular format which is known also as unstructured database, the way it works the data is stored in collection. In addition, it does not structured query language as the Relational Database. moreover , here are some types of Non-Relational database, key value database this one of the most basic types of database the it work it contains two parts key it used to retrieve information from the database, value which is the information. Secondly, Column-oriented database follows the some concept of relation database but there are slight changes it uses group or sets of columns instead of using rows.

Example of Non - Relational Database:

- MongoDB
- Amazon DynamoDB
- Redis
- Google Cloud Bigtable

Use Case Example of Non-Relational Database:

If you planning to store a data that must be flexible in terms of shape and size or with large amount of data here the non-relational database is the best option, and it commonly used in work with unstructured data or both structured and unstructured data. It use by professionals and experts.

Cloud Storage and Databases:

Cloud Storage:

Its type of service that might be paid or unpaid allows the user to save his data on a server. The server off-site that is created by third party who is responsible for hosting and maintaining the server and you don't need to think about if the data is secured or not because securing the stored data is their responsibility. and the user can store backups documents, files, videos, images, etc….. Example of platforms provide this service such google drive, OneDrive, iCloud.

How does it support database functionality?

Cloud storage allows for the data to be stored in and accessed through the internet, rather than having it physically. First of all, one of the best advantages is that data can be accessed through any location from the world you just need a network, it well known in being easy to set-up and to scale up.

Advantages of cloud databases:

Optimized costs: cloud databases helps in reducing the need for setting up database locally because it is very expensive and needs maintenance and a specified room and most be cold etc… third party company provide service of a could database in an affordable price.

Improved Security: To protect the data cloud uses both access control and data encoding to secure data that is stored in the database. access control ensures the authorized user only can access the data , encryption makes sure that data is protected during the transition which done in the internet.

Challenges with cloud-based databases:

Latency and network dependency : meanwhile the cloud database is internet based so cloud database can face problem such as latency issues which could affect the speed and the performance. The latency problem may happens because of network congestion or distance.

Data migration: Moving data from a local database to a cloud database or moving between cloud databases can be a time-consuming process and complected. In addition, in the worse scenario you lose your whole while moving data which makes it risky.

Resources

https://www.youtube.com/watch?v=Ko9FzjG2v10&ab_channel=DatabaseTown

https://www.youtube.com/watch?v=U5Gg9R-Dc0Q&list=PLBlnK6fEyqRiyryTrbKHX1Sh9luYI0dhX&index=4&ab_channel=NesoAcademy

https://www.youtube.com/watch?v=Le92WgLdAnM&list=PLXj4XH7LcRfBF0sREiXwZPmbyCnLSM18K

https://www.geeksforgeeks.org/dbms/difference-between-file-system-and-dbms/

https://www.guru99.com/ar/difference-between-file-system-and-dbms.html#:

https://www.freecodecamp.org/news/database-normalization-1nf-2nf-3nf-table-examples/

https://www.techwalla.com/articles/disadvantages-of-a-relational-database

Advantages Of DBMS In Data Management - ScaleGrid

Advantages of Database Management System - GeeksforGeeks

Understanding Data Sharing in Databases - chantcourse

Role: Database Designer

DBA Full Form - Database Administrator - GeeksforGeeks

Relational vs. Non-Relational Database: The Difference Explained | Coursera

Relational Vs. Non-Relational Databases | MongoDB | MongoDB

Relational VS Nonrelational Databases – the Difference Between a SQL DB and a NoSQL DB

What is a Cloud Database? Key Benefits, Types, and Examples

What is Cloud Storage & How Does it Work? | Google Cloud | Google Cloud

What is Cloud Storage? - GeeksforGeeks

Codeline introduction to database