

02 - DIFFERENT TYPES OF DATABASE

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Index

Introduction to Database

Definition of different database type

Characteristics & Features

Appropriate Usages

Advantages & Disadvantages



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introduction

1.0

Introduction

- ▶ A database is an organized collection of data, today typically in digital form.
- ▶ Provide a highly efficient method for handling large amount of different types of data with ease.
- ▶ Database allows data to be stored systematically and these data to be easily retrieved, filtered, sorted and updated efficiently and accurately.

Flat file

2.0

Flat file

- ▶ Simple database system that stores record in a plain text file that have no structured relationships between each record.
- ▶ Store all data in one large table.
- ▶ Each line of the text holds one record.
- ▶ The first row in a flat file refers to the field name.
- ▶ The different fields in a record are separated by delimiters, such as vertical bar “|” or a comma “,” or a semi-colon “;”.
- ▶ No folders or paths are used organize the data.
- ▶ Cannot store graphical documents but only text.
- ▶ Data stored in it are searchable by using keywords, phrases or both.

Flat file: when to use it

- ▶ Ideal for storing very small amounts of simple data that could be manually manageable. Store all data in one large table.
- ▶ Or data in Panel form for analysis

```
new 1 x
1 "Mark" → "Company name" → "Country ISO Code" → "NACE Rev. 2 Core code (4 digits)" → "Cons. code" → "Last avail. year" → "Oper
2 "1" → "" → "IBM" → "ELEKTROINSTALATERSKI OBRT, VLASNIK IVAN" → "HR" → "4321" → "NF" → "" → "n.a." → "n.a." → "U" → "" → "CRLE
3 "2" → "" → "SIEMENS INDUSTRIAL TURBOMACHINERY AB FILIALE LATVIJA" → "LV" → "4120" → "LF" → "2010" → "n.a." → "0" → "-" → "" → "CRLE
4 "3" → ", IBM ASIA PACIFIC SERVICE K.K." → "JP" → "" → "NF" → "" → "n.a." → "n.a." → "U" → "" → "CRLE
5 "4" → ", IBM CITY PLANNING Y.K." → "JP" → "" → "LF" → "2016" → "n.a." → "13" → "U" → ""
```

Pro and cons

Advantages

- ▶ Easier to setup and use.
- ▶ Consume less space.
- ▶ No special software or hardware requirements.
- ▶ Often free or cheap.
- ▶ Human readable and easy to edit by hand.

Disadvantages

- ▶ Prone to data corruption or duplication.
- ▶ Prone to error.
- ▶ Hard to massively update or modify.
- ▶ Poor access control.
- ▶ Cannot perform complex process

Relational database

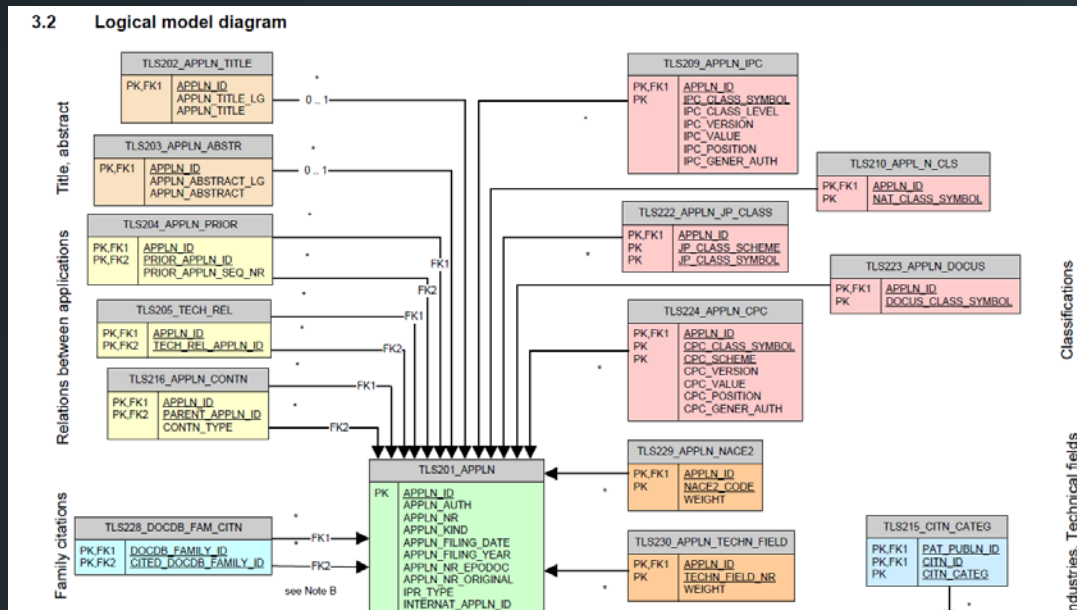
3.0

Relational database

- ▶ More advanced and efficient type of database which can store very large amount of data in a set of tables that are linked together.
- ▶ Use of multiple tables to store records and each table is composed of records in rows & columns.
- ▶ Each column is a field which represents a particular type of information of the entity and each row lists as one record.
- ▶ Each field in a table has its own data type.
- ▶ Each row contains a unique instance of data to uniquely identifies a record.
- ▶ Records within the tables are linked to records held in other tables through a relationship.
- ▶ The statements of inserting, retrieving, updating and deleting data in relational databases are made by queries which are written in SQL.

Relational database: when to use it

- ▶ Complex datasets storing different type of information
- ▶ Entities and relations explicit and easy to define



Pro and cons

Advantages

- ▶ Can store vast amount of data.
- ▶ Ensures data integrity
- ▶ Easily extendable and modifiable
- ▶ Facilitates data accessibility, searchability, and reporting.
- ▶ Better performance
- ▶ Allow multiple users
- ▶ Advanced data security

Disadvantages

- ▶ Steep learning curve.
- ▶ 'Expensive' to set up & maintain.
- ▶ Require sophisticated hardware and networking setups.
- ▶ Presents a double-edged sword.

Document oriented database

4.0

Document oriented database

- ▶ A document-oriented database is a computer program designed for storing, retrieving, and managing document-oriented, or semi structured data, information
- ▶ Among recent standards we can cite XML, elasticsearch, json and rest
- ▶ Document-oriented system relies on internal structure in the document in order to extract metadata that the database engine uses for further optimization
- ▶ The core operations that a document-oriented database supports for documents are (CRUD):
 - ▶ Creation (or insertion)
 - ▶ Retrieval (or query, search, finds)
 - ▶ Update (or edit)
 - ▶ Deletion (or removal)

Document oriented db: when to use it

- ▶ Text, keyword search engines
- ▶ Data formats are not predefined

```
<contact>
  <firstname>Bob</firstname>
  <lastname>Smith</lastname>
  <phone type="Cell">(123) 555-0178</phone>
  <phone type="Work">(890) 555-0133</phone>
  <address>
    <type>Home</type>
    <street1>123 Back St.</street1>
    <city>Boys</city>
    <state>AR</state>
    <zip>32225</zip>
    <country>US</country>
  </address>
</contact>
```

Pro and cons

Advantages

- ▶ Fast for some types of searches
- ▶ Easily extendable
- ▶ Better performance
- ▶ Easy to read

Disadvantages

- ▶ Requires high skills
- ▶ Very 'Expensive' to set up & maintain.
- ▶ Require very sophisticated hardware and networking setups.

THANKS.

Q/A