

An Experimental Analysis of Different Database Categories According to the Scope of Applications and Its Advantages

Dr. Sunita Chaudhary

Professor, Computer Science and Engineering,
Marudhar Engineering College, Bikaner, Rajasthan,
choudhary.sunita@marudhar.ac.in
ORCID ID-0000-0001-8913-4897

Abstract: - This paper will explain the concept of meaning of data base. In order to store data, companies need a system which has the capacity of storing all the data and information related to the organisation. The system should be such that it can be easily accessed and maintenance is also easy. The system which has the ability to store such data and from which the information can be accessed easily is called database. Each organization will have its own unique set of information; hence the type of database will also be different. There is variety of database available in the market. This paper will focus on variety of database and its advantages and challenges.

Keywords: - Database, Database system, Categories of Database, Advantages, Challenges.

Introduction: - In an organization, there is continuous information flow which is mandatory to store for future purpose. It is very important that whatever communication or information comes in business should be stored properly so that if needed it can be accessed by all the workers of the organization and can be updated easily. The storage system should be such that it should have proper security protocols so that unauthorised access can be identified. Database is the storage system which helps the organizations to store the information in organized structured manner which can be accessed easily at any given time by all.

Database System: It is the concept and technique which is used to store information in an organized manner and can be accessed at any point of time. The data can be stored in the form of rows, columns, tables, diagrams, etc. The technique by which the information is stored identifies the category of the database.

Characteristics of Database System: - [1]

➤ **Unique from other storage mediums:** - The database system is different from old traditional methods of storing information as it has the ability to perform various mathematical calculations which is not possible in manual filing of the data. The data is stored in the form

of rows, columns etc which helps the employees to perform the necessary calculation easily.

- **Dedicated individual access:** - The data is stored in such a way in the database that if the user wants to access particular data than the database will provide only that kind of access to the user. In simple words the user can have access to their interest of data and information.
- **Access to all:** - The database has variety of data and information which can be accessed by multiple users at the same time. Hence it is centralised database system which has access to all authorised users.
- **Security efficiency:** - In an organization there are many types of employees which will not have access to all information of the system. Using database, the access rights can be defined based upon the types of users using it. For some users the data can only be accessed for references and while for other users it can also be modified by them.
- **Facility to recover data:** - The database system also has the ability to recover the data if the system crashes. This can happen as it also provides the facility to back up data.

Challenges of Database System:

Like any other system, database system too has its various shortcomings. Implementation of database system requires a lot of effort and needs efficient knowledge.

- a. Experienced Database developer: - The database developer should have sound knowledge to implement the database system. The cost of hiring such experienced database admins is so high that not all companies can afford it.
- b. High end capacity: - In order to implement efficient database system, the capacity of the network, storage devices, memory should be high otherwise the database will not be able to perform efficiently.
- c. Slow Performance: - If the users are creating a lot of queries at the same time and if the database is not efficient to handle such a high demand of queries then the database might crash.
- d. Monitoring issues: - A separate dedicated team is needed to monitor continuously the performance of the database. This will increase the cost of implementing the database in the organization.
- e. Dependency: - The database system is good practice of storing data and information but at the same time it has its shortcomings. The performance of the database depends upon a lot of factors like network capacity, storage device capacity, quality of user queries. If one of these fails then the whole database will crash as it depends upon all these factors.
- f. Speed issues: - The database will not be able to resolve users query if the factors on which it depends is also not working properly. For instance, if the network has slow speed then the result of the query created by the user will also take longer than usual.

Type of Database: - [3]

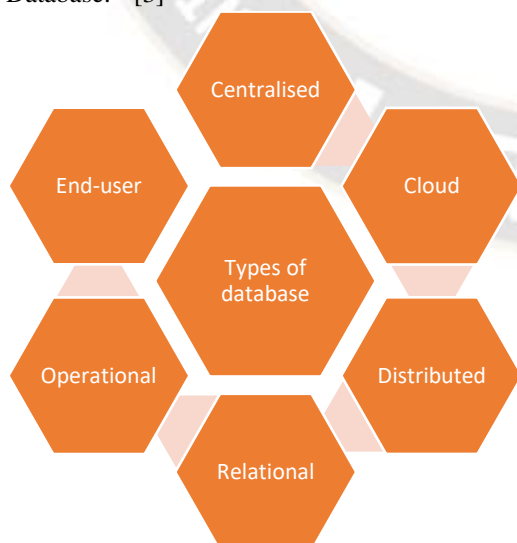


Figure 1 Categories of Database

1. Centralised Database: - In this type of database, the database is centralised within the organization. This is kind of private database which can be accessed by only users of that particular organization. There will be only one centralised database where all the information related to different type of departments is included. These type of database is implemented in schools, colleges, hospitals, companies etc.

Advantages of Centralised Database: -

- The cost of implementation of this type of database is low as compared to another available database.
- As the database is centralised among the boundaries of organisation, it can be easily accessed at any point of time.
- The maintenance is also low and there is no need to separate dedicated team to monitor it.
- The security parameter is also high in these types of databases as it is stored in one place.
- The query handling of such database is also easy.

Disadvantages of Centralised Database: -

- As the data is stored only in one place and the data is stored centralised, so if something goes wrong then the whole database will crash.
- The efficiency of such database is less as everything is stored at one place so it will not be able to attend lot of queries at the same time.
- The response time taken to answer a query will take some time as so many users will be creating queries at the same time, so in some cases the database can crash.
- Such kind of database works slow and if the network is also slow then there might be situation of system crash.

2. Cloud based database: -

In such kind of database, the data is stored on a storage device and then that data can be accessed online from anywhere. This type of database is more in use now-a-days. Few businesses store their data themselves and then access it online but few other companies will ask from cloud database vendors to store their data and make it available online. As the data is available online so it should be protected from unauthorised access. There might be security attacks which can be prevented by using high end encryption of the data.

Advantages of Cloud base database: -

- Since the data can be accessed online so there is no need of separate dedicated database administrators

to monitor the database. Hence the cost and time taken to maintain and monitor the database is less.

- Since the data is encrypted so there is less chances of security attacks.
- The efficiency of cloud database to handle the queries is advanced and the response time to answer a query created by many users at the same time is less.
- Multiple users can access the data at the same time from any part.
- Since the data is available online, it is easy to update and share the data online.
- The data restoring is easy as the data can be stored in any number of storage devices and then made available online.

Disadvantages of Cloud Database: -

- The cost to implement the cloud base database system is higher than centralised database.
- The cloud database software needs to be updated from time to time. If not then it will give poor performance and also the system might fail.
- If the information stored is not secured properly using latest cryptography then there are chances of unauthorised access to the system.
- The data access is dependent on internet, so if the network is down nobody can access the data till the time network is up and running.

3. Distributed Database: -

As the name suggests the data is distributed among many storage devices and which can be accessed within the organisation or across the network. Hence distributed database helps to store data in many devices and then can be accessed easily.

Advantages of Distributed database: -

- Since the data is stored in many devices so the speed performance of the databases increases many times.
- The quality of communication also improves using such kind of database.
- The user interface of such database is friendly as compared to other databases.
- If one of the devices fails then whole database will not crash as the data can be accessed through other distributed devices.

Disadvantages of Distributed Database: -

- Since the data is distributed among many devices so the co-ordination of query answering can sometimes be difficult.

- The security level of such database is less as the data is stored in many devices and hence there is risk of security attacks.
- The cost of implementing such database is high as it will need many storage devices.
- The training of using such database will consume time and efforts.

4. Relational Database: -

This type of database will have rows and columns where they are related to each other. The data stored in such database is related to each other in many ways.

Advantages of Relational Database: -

- It is very easy to access data from relational database.
- The accessed data is accurate and up to the mark.
- The data stored in such database is flexible which makes it easy to make any modifications very easily.

Disadvantages of Relational Database: -

- The main disadvantage of using such database is the dependency issue as the data stored is dependent on other data.
- It has complex implementation issues.
- If some of the data is lost then all the data related to that particular data will not give correct response.

5. Operational Database: -

In this type of database, the users will have the facility to add, remove or modify the data at any point of time. The query is executed in batches which makes it easy to understand and monitor the database.

6. End-user database: -

This type of database is used for personnel use. There are few tasks which requires personnel storage system. In those scenarios, the user can store the information using these types of databases and can access and update it as per his needs.

Conclusion: - The database is the centralised system which helps to store the data which can be accessed at any point of time by the users. There are many advantages to have such a system which helps to update, modify the data in structured manner. There are many types of available database which can be implemented based on the business needs and requirements.

References: -

1. <https://courses.lumenlearning.com/santaana-informationsystems/chapter/characteristics-and-benefits-of-a-database/>

2.<https://www.dnsstuff.com/database-problems>

3.<https://www.indeed.com/career-advice/career-development/types-of-databases>

