File System vs. DBMS

What is File Management System?

A file management system is a collection of programs that manage and store data in files and folders in a computer hard disk. A file management system manages the way of reading and writing data to the hard disk. It is also known as conventional **file system**. This system actually stores data in the isolated files which have their own physical location on the drive, and users manually go to these locations to access these files. It is the easiest way to store the data like text, videos, images, audios, etc. in general files. Data redundancy is high in file management system, and it cannot be controlled easily. Data consistency is not met, and the integration of data is hard to achieve.

Operating System such as **Linux** and **Windows** has its own file system.

For example, **NTFS** is the Windows file system, and **EXT** is the Linux file system.

These operating systems provide less security to these files where they have options such as hide files, locks, and sharing on files.

Advantage of File-oriented system

1. Backup:

- It is possible to take faster and automatic back-up of database stored in files of computer-based systems.
- computer systems provide functionalities to serve this purpose. It is also possible to develop specific application program for this purpose.

2. Compactness:

- It is possible to store data compactly.

3. Data Retrieval:

- Computer-based systems provide enhanced data retrieval techniques to retrieve data stored in files in easy and efficient way.

4. Editing:

- It is easy to edit any information stored in computers in form of files.
- Specific application programs or editing software can be used for this purpose.

5. Remote Access:

- In computer-based systems, it is possible to access data remotely.
- so, to access data it is not necessary for a user to remain present at location where these data are kept.

6. Sharing:

- Data stored in files of computer-based systems ca be shared among multiple users at a same time.

Disadvantage of File-oriented system

1. Data Redundancy:

- It is possible that the same information may be duplicated in different files. This leads to data redundancy results in memory wastage.

2. Data Inconsistency:

- Because of data redundancy, it is possible that data may not be in consistent state.

3. Difficulty in Accessing Data:

- Accessing data is not convenient and efficient in file processing system.

4. Limited Data Sharing:

- Data are scattered in various files. Also different files may have different formats and these files may be stored in different folders may be of different departments.

- So, due to this data isolation, it is difficult to share data among different applications.

5. Integrity Problems:

- Data integrity means that the data contained in the database in both correct and consistent. For this purpose the data stored in database must satisfy correct and constraints.

6. Atomicity Problems:

- Any operation on database must be atomic.
- This means, it must happen in its **entirely** or not at all.

7. Concurrent Access Anomalies:

- Multiple users are allowed to access data simultaneously. this is for the sake of better performance and faster response.

8. Security Problems:

- Database should be accessible to users in limited way.
- Each user should be allowed to access data concerning his requirements only.

What is Database Management System?

- The Database Management System or DBMS is an effective or easy way to store the data, mainly when data maintenance and security are the primary concern of the user.
- The database management system stores the data or information in the form of interrelated tables and files.
- In this type of system, data security is maximized using encryption/decryption, password protection, granting authorized access and others.
- DBMS helps users to easily **retrieve, insert, and manipulate** data in a database.

- It also helps to perform data recovery, transactions, and many more. Handling DBMS is difficult than the file system, but it provides more advantages than a file system.

Advantages of Database Management System (DBMS)

1. Improved data sharing

An advantage of the database management approach is, the DBMS helps to create an environment in which end users have better access to more and better-managed data.

Such access makes it possible for end users to respond quickly to changes in their environment.

2. Improved data security

The more users access the data, the greater the risks of data security breaches. Corporations invest considerable amounts of time, effort, and money to ensure that corporate data are used properly. A DBMS provides a framework for better enforcement of data privacy and security policies.

3. Better data integration

Wider access to well-managed data promotes an integrated view of the organization's operations and a clearer view of the big picture. It becomes much easier to see how actions in one segment of the company affect other segments.

4. Minimized data inconsistency

Data inconsistency exists when different versions of the same data appear in different places. For example, data inconsistency exists when a company's sales department stores a sales representative's name as "Bill Brown" and the company's personnel department stores that same person's name as "William G. Brown," or when the company's regional sales office shows the price of a product as $45.95 and its national sales office shows the same product's price as $43.95. The probability of data inconsistency is greatly reduced in a properly designed database.

5. Improved data access

The DBMS makes it possible to produce quick answers to ad hoc queries. From a database perspective, a query is a specific request issued to the DBMS for data manipulation—for example, to read or update the data. Simply put, a query is a question, and an ad hoc query is a spur-of-the-moment question. The DBMS sends back an answer (called the query result set) to the application. For example, end users, when dealing with large amounts of sales data, might want quick answers to questions (ad hoc queries) such as:

- What was the dollar volume of sales by product during the past six months?
- What is the sales bonus figure for each of our salespeople during the past three months?
- How many of our customers have credit balances of 3,000 or more?

6. Improved decision making

Better-managed data and improved data access make it possible to generate better-quality information, on which better decisions are based. The quality of the information generated depends on the quality of the underlying data. Data quality is a comprehensive approach to promoting the accuracy, validity, and timeliness of the data. While the DBMS does not guarantee data quality, it provides a framework to facilitate data quality initiatives.

7. Increased end-user productivity

The availability of data, combined with the tools that transform data into usable information, empowers end users to make quick, informed decisions that can make the difference between success and failure in the global economy.

Till now we have seen different benefits of database management systems. But it has certain limitations or disadvantages.

Let's find various disadvantages of database system.

Disadvantages of Database Management System (DBMS)

Although the database system yields considerable advantages over previous data management approaches, database systems do carry significant disadvantages. For example:

1. Increased cost

one of the disadvantages of dbms is Database systems require sophisticated hardware and software and highly skilled personnel. The cost of maintaining the hardware, software, and personnel required to operate and manage a database system can be substantial. Training, licensing, and regulation compliance costs are often overlooked when database systems are implemented.

2. Management complexity

Database systems interface with many different technologies and have a significant impact on a company's resources and culture. The changes introduced by the adoption of a database system must be properly managed to ensure that they help advance the company's objectives. Given the fact that database systems hold crucial company data that are accessed from multiple sources, security issues must be assessed constantly.

3. Maintaining currency

To maximize the efficiency of the database system, you must keep your system current. Therefore, you must perform frequent updates and apply the latest patches and security measures to all components.

Because database technology advances rapidly, personnel training costs tend to be significant. Vendor dependence. Given the heavy investment in technology and personnel training, companies might be reluctant to change database vendors.

As a consequence, vendors are less likely to offer pricing point advantages to existing customers, and those customers might be limited in their choice of database system components.

4. Frequent upgrade/replacement cycles

DBMS vendors frequently upgrade their products by adding new functionality. Such new features often come bundled in new upgrade versions of the software. Some of these versions require hardware upgrades. Not only do the upgrades themselves cost money, but it also costs money to train database users and administrators to properly use and manage the new features.

Difference between File System and Database Management System

There are following differences between file system and DBMS-

File System	Database Management System (DBMS)
1. It is a software system that manages and controls the data files in a computer system.	1. It is a software system used for creating and managing the databases. DBMS provides a systematic way to access, update, and delete data.
2. File system does not support multi-user access.	2. Database Management System supports multi-user access.
3. Data consistency is less in the file system.	3. Data consistency is more due to the use of normalization.
4. File system is not secured.	4. Database Management System is highly secured.
5. File system is used for storing the unstructured data.	5. Database management system is used for storing the structured data.
6. In the file system, data redundancy is high.	6. In DBMS, Data redundancy is low.

7. No data backup and recovery process is present in a file system.	7. There is a backup recovery for data in DBMS.
8. Handling of a file system is easy.	8. Handling a DBMS is complex.
9. Cost of a file system is less than the DBMS.	9. Cost of database management system is more than the file system.
10. If one application fails, it does not affect other application in a system.	10. If the database fails, it affects all application which depends on it.
11. In the file system, data cannot be shared because it is distributed in different files.	11. In DBMS, data can be shared as it is stored at one place in a database.
12. These system does not provide concurrency facility.	12. This system provides concurrency facility.
13. **Example:** NTFS (New technology file system), EXT (Extended file system), etc.	13. **Example:** Oracle, MySQL, MS SQL Server, DB2, Microsoft Access, etc.