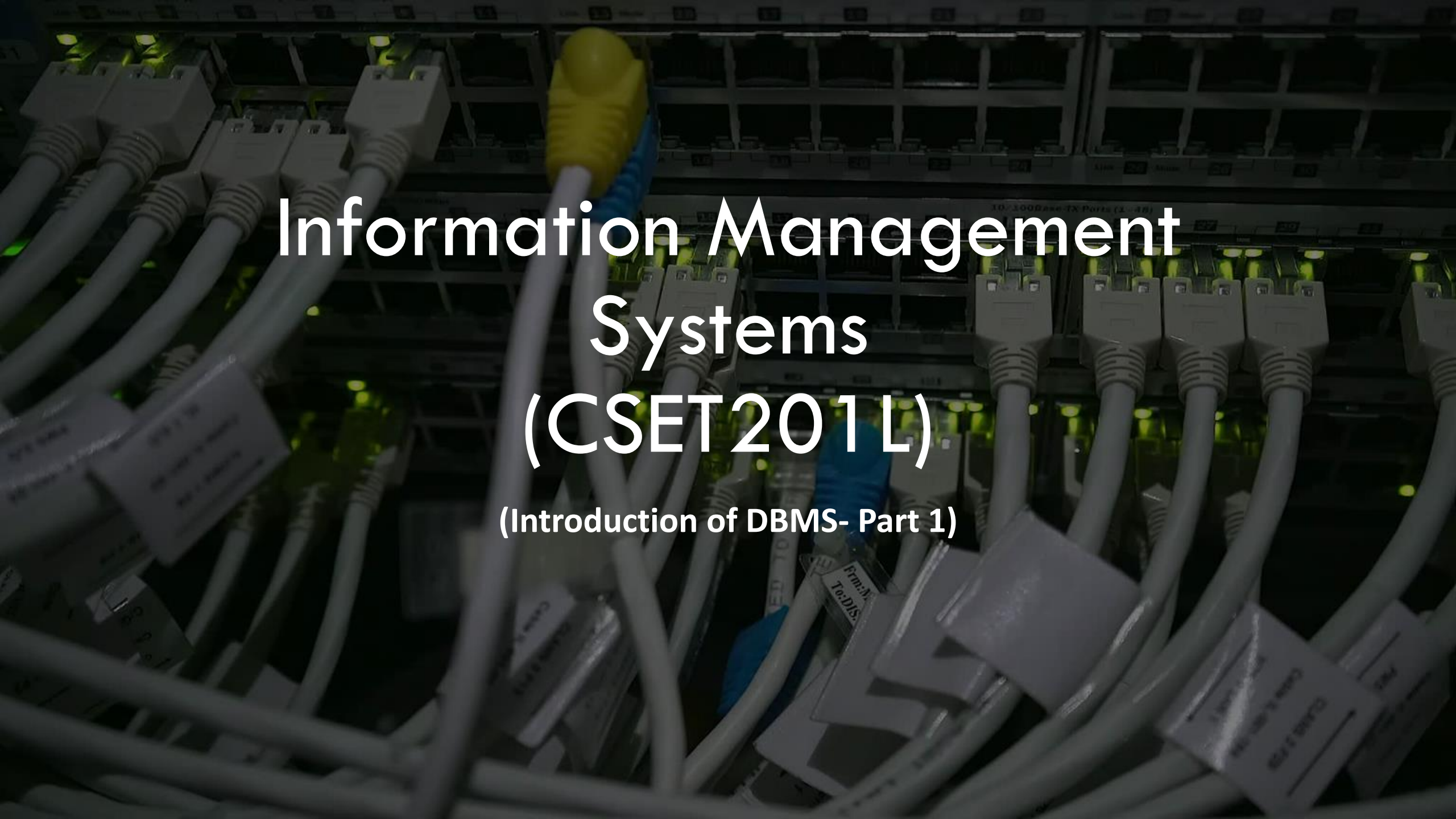
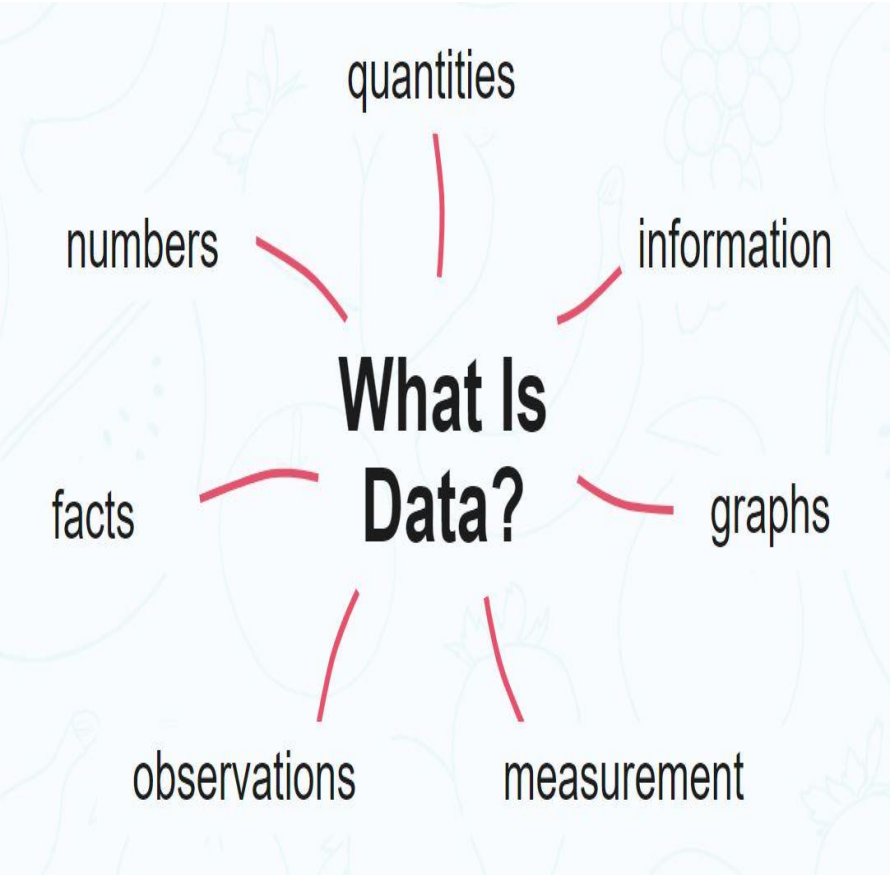


Information Management Systems (CSET201L)

(Introduction of DBMS- Part 1)

What is Data?

- Different view points:
  - A sequence of characters stored in computer memory or storage.
  - Interpreted sequence of characters stored in computer memory or storage
  - Interpreted set of objects
  - Word 'Data' is originated from the word 'datum' that means 'single piece of information.'



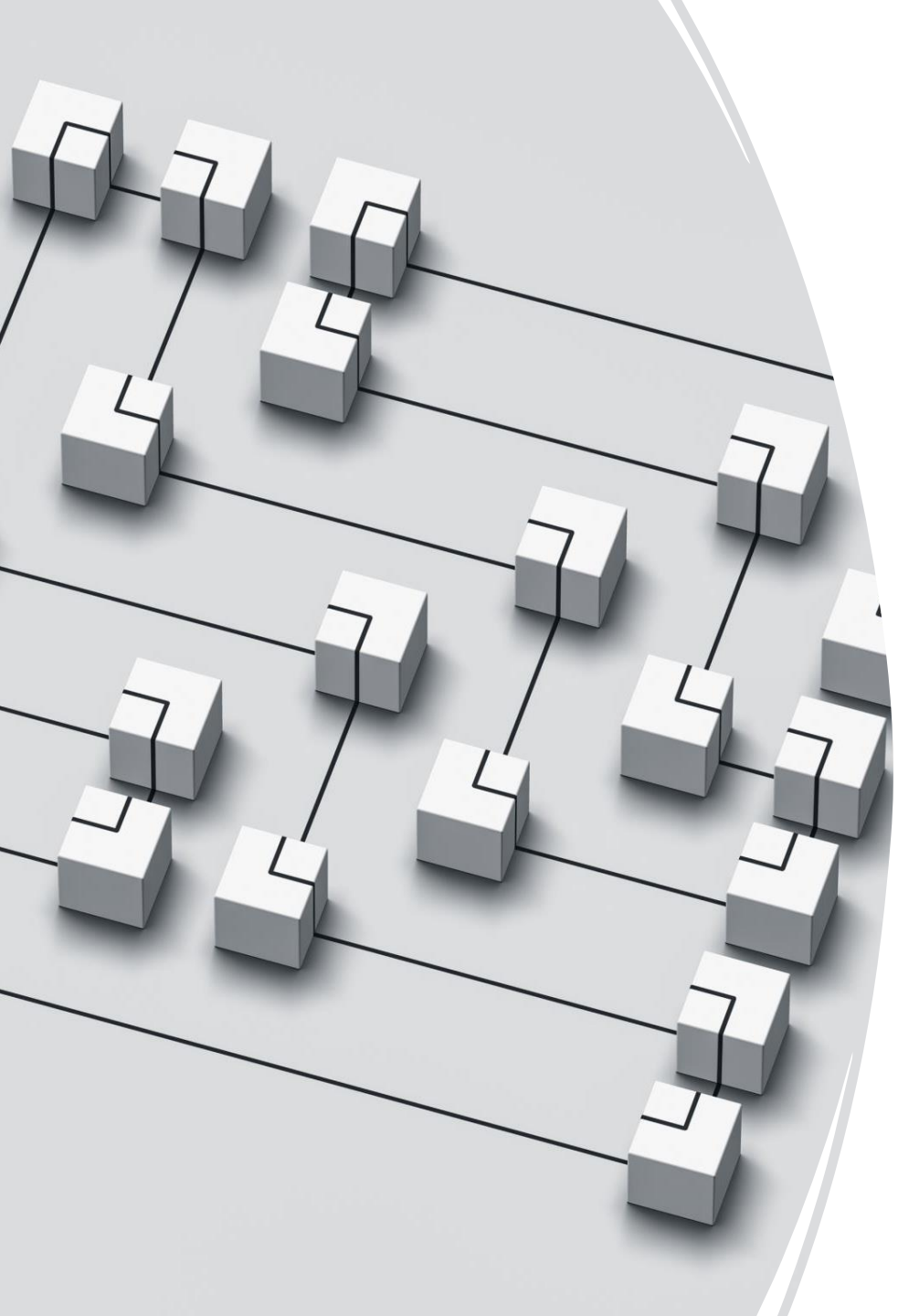
- This maybe one of the most profound questions in computer science! It is still open and keep evolving!!

Data is the fact or information which is storable.

What is 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.



DBMS

- DBMS stands for Database Management System. We can break it like this
- **DBMS = Database + Management System.**
- Database is a collection of data, and Management System is a set of programs to store and retrieve those data.

- Based on this we can define DBMS like this: DBMS is a collection of inter-related data and set of programs to store & access those data in an easy and effective manner.
- DBMS provides an interface to perform various operations like database creation, storing data in it, updating data, creating a table in the database and a lot more.
- For example: MySQL, Oracle, etc are a very popular commercial database which is used in different applications.

Users in a DBMS environment

Component Name	Task
Application Programmers	The Application programmers write programs in various programming languages to interact with databases.
Database Administrators	Database Admin is responsible for managing the entire DBMS system. He/she is called Database admin or DBA.
End-Users	The end users are the people who interact with the database management system. They conduct various operations on database like retrieving, updating, deleting, etc.

Characteristics of DBMS

- It uses a **digital repository established** on a server to store and manage the information.
- It can provide **a clear and logical view** of the process that manipulates data.
- DBMS contains **automatic backup and recovery procedures**.
- It contains **ACID properties** which maintain data in a healthy state in case of failure.
- It can **reduce the complex relationship between data**.
- It is used to **support manipulation and processing of data**.
- It is used to provide **security of data.**
- It can view the **database from different viewpoints according to the requirements of the user**

Advantages of DBMS

Controls database redundancy: It can control data redundancy because it stores all the data in one single database file and that recorded data is placed in the database.

Data sharing: In DBMS, the authorized users of an organization can share the data among multiple users.

Easily Maintenance: It can be easily maintainable due to the centralized nature of the database system.

Reduce time: It reduces development time and maintenance need.

Backup: It provides backup and recovery subsystems which create automatic backup of data from hardware and software failures and restores the data if required.

Multiple user interface: It provides different types of user interfaces like graphical user interfaces, application program interfaces

Disadvantages of DBMS

Cost of Hardware and Software: It requires a high speed of data processor and large memory size to run DBMS software.

Size: It occupies a large space of disks and large memory to run them efficiently.

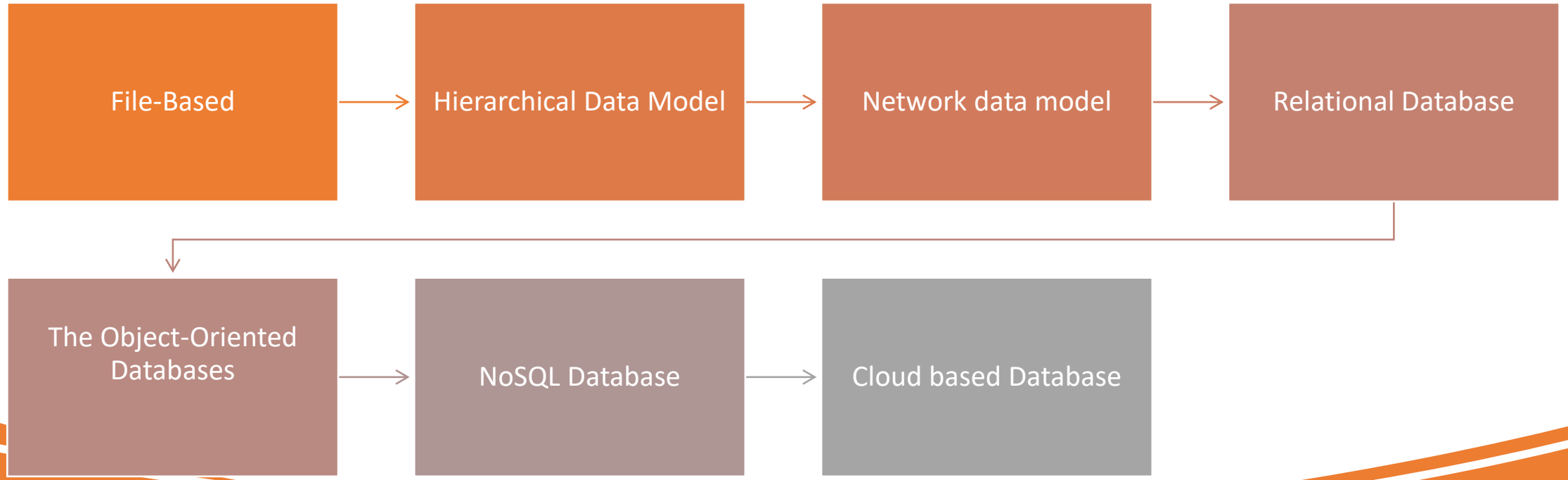
Complexity: Database system creates additional complexity and requirements.

Higher impact of failure: Failure is highly impacted the database because in most of the organization, all the data stored in a single database and if the database is damaged due to electric failure or database corruption then the data may be lost forever.

DBMS vs. Flat File

DBMS	Flat File Management System
Multi-user access	It does not support multi-user access
Design to fulfil the need for small and large businesses	It is only limited to smaller DBMS system.
Remove redundancy and Integrity	Redundancy and Integrity issues
Expensive. But in the long term Total Cost of Ownership is cheap	It's cheaper
Easy to implement complicated transactions	No support for complicated transactions

Evolution of Databases



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Thank you