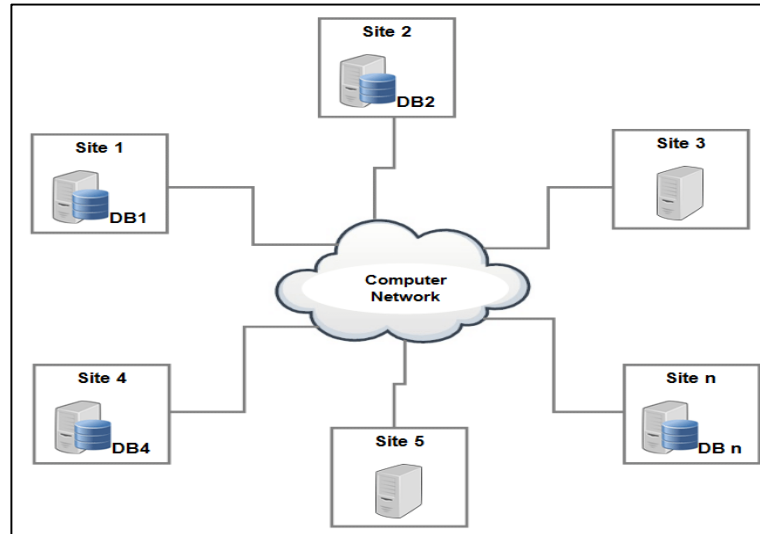# Database Management System (BCSC – 1003)

Topic: Distributed Database

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Topics to be covered

- Distributed DBMS

- Types of Distributed Databases

- Data Replication & Fragmentation

Distributed DBMS

- A distributed database is a set of interconnected databases that is distributed over the computer network or internet.

- A Distributed Database Management System (DDBMS) manages the distributed database and provides mechanisms so as to make the databases transparent to the users.

- In these systems, data is intentionally distributed among multiple nodes so that all computing resources of the organization can be optimally used.
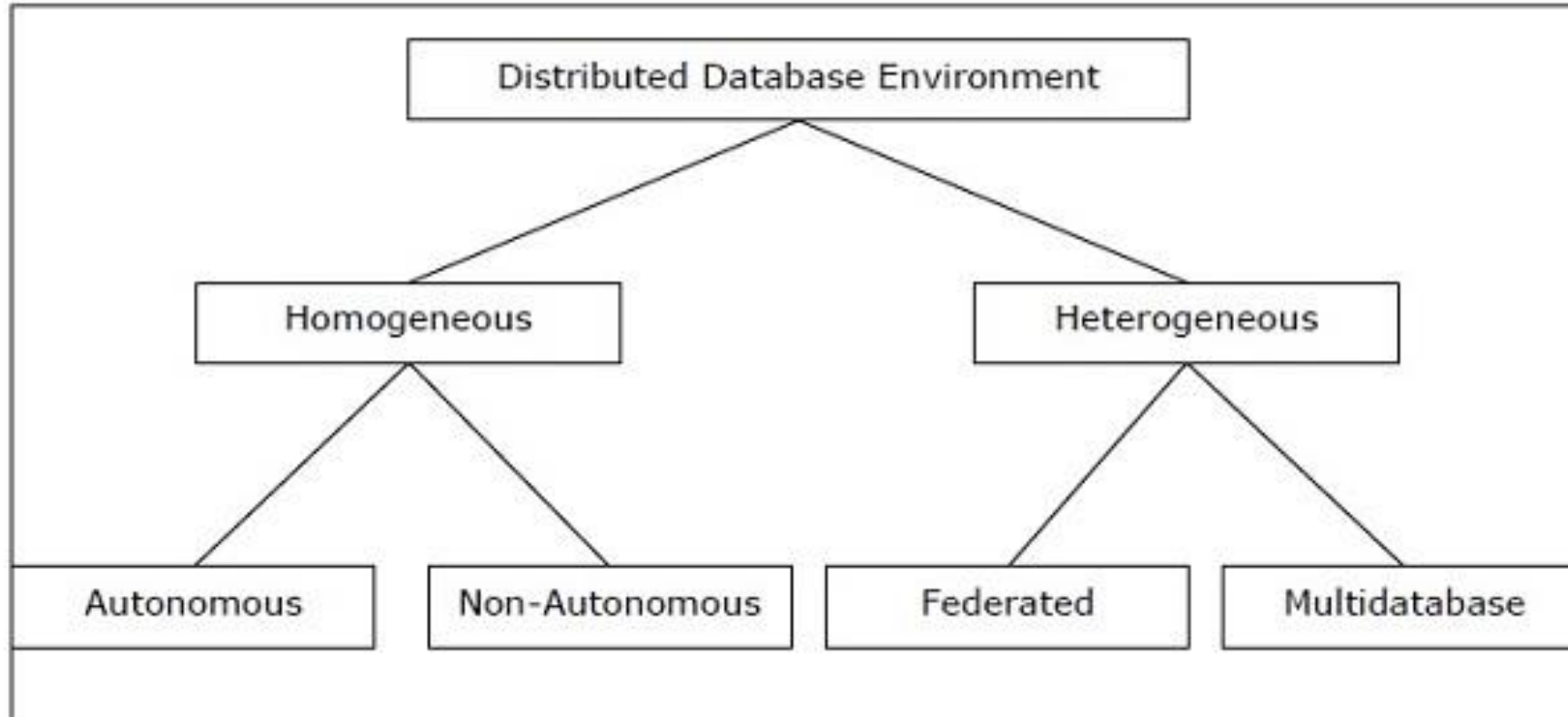
Distributed DBMS

The following factors encourage moving over to DDBMS −

- Distributed Nature of Organizational Units
- Need for Sharing of Data
- Support for Both OLTP and OLAP
- Database Recovery
- Support for Multiple Application Software

Types of Distributed Database

Distributed databases can be broadly classified into homogeneous and heterogeneous distributed database environments.

Types of Distributed Database

Homogeneous Distributed Databases

In a homogeneous distributed database, all the sites use identical DBMS and operating systems.

Types of Homogeneous Distributed Database

There are two types of homogeneous distributed database −

Autonomous: Each database is independent that functions on its own. They are integrated by a controlling application and use message passing to share data updates.

Non-autonomous: Data is distributed across the homogeneous nodes and a central or master DBMS co-ordinates data updates across the sites.

Types of Distributed Database

Heterogeneous Distributed Databases

In a heterogeneous distributed database, different sites have different operating systems.

Types of Heterogeneous Distributed Databases

There are two types of heterogeneous distributed database −

Federated: The heterogeneous database systems are independent in nature and integrated together so that they function as a single database system.

Un-federated (Multidatabases): The database systems employ a central coordinating module through which the databases are accessed.

Data Replication & Fragmentation

Data Replication

- Data replication is the process of storing separate copies of the database at two or more sites. It is a popular fault tolerance technique of distributed databases.

Fragmentation

- Fragmentation is the task of dividing a table into a set of smaller tables. The subsets of the table are called fragments. Fragmentation can be of three types: horizontal, vertical, and hybrid (combination of horizontal and vertical).

- Fragmentation should be done in a way so that the original table can be reconstructed from the fragments. This is needed so that the original table can be reconstructed from the fragments whenever required.

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Thank you