

Architecture Model of Distributed database Management System (DDBMS)

DDBMS architectures are generally developed developing on three parameters

- (1) Distribution:- It states the physical distribution of data across the different sites.
- (2) Autonomy:- It indicates the distribution of control of the database system and the degree to which each constituent DBMS can operate independently.
- (3) Heterogeneity:- It refers to the uniformity or dissimilarity of the data models system components and databases.

Architectural Models.

Some of the common Architectural models are:

- (1) client - server architecture for DDBMS
- (2) Peer to peer Architecture for DDBMS
- (3) Multi DBMS Architecture.

(1) Client - Server architecture for DDBMS:-

This is a two level architecture where the functionality is divided into servers and clients. The server functions primarily encompass data management, query processing, optimization, and transaction management.

Client functions include mainly user interface. However they have some functions like consistency checking and transaction Management.

The two different client-server architecture are.

(1) Single server multiple client

Single server accessed by multiple clients.

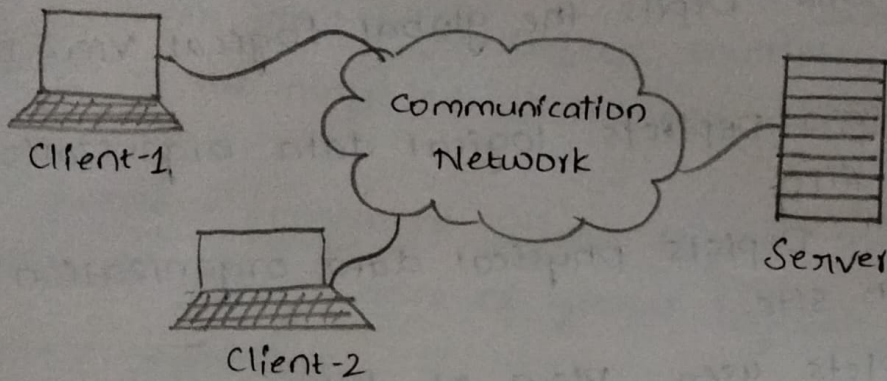


Figure 1:- Single Server multiple client.

(2) Multiple Server Multiple clients :-

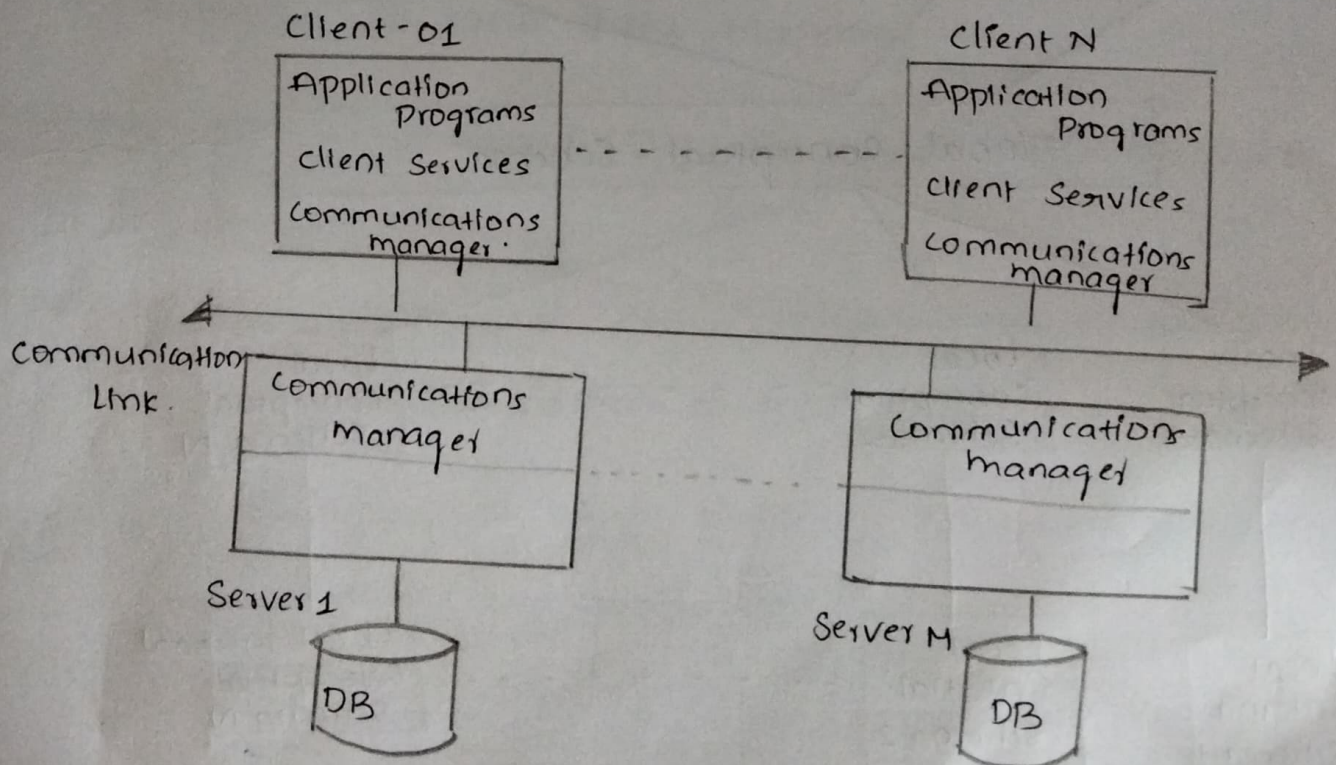


Figure 2:- Multiple server Multiple clients.

(2) Peer to Peer Architecture for DDBMS:-

In these systems each peer acts both as a client and a server for imparting database services the peers share their resource with other peers and co-ordinate their activities.

This architecture generally has Four Levels of Schemas.

Global conceptual Schema: Depicts the global Logical view of data

Local conceptual Schema: Depicts logical data organization at each site.

Local Internal Schema: Depicts physical data organization at each site.

External Schema: Depicts user view of data.

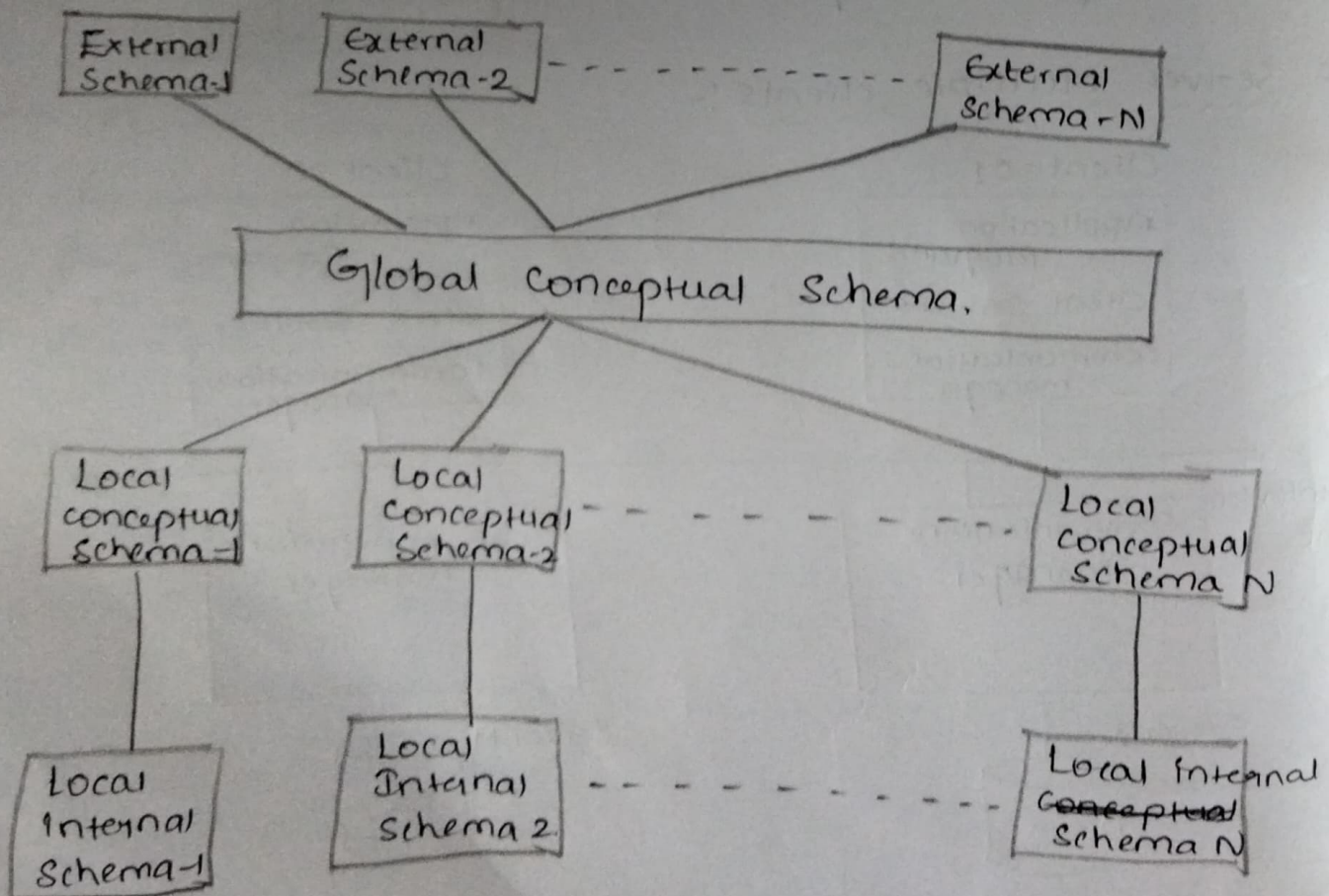


Figure: Framework

Multi-DBMS Architecture

This is an integrated database system formed by a collection of two or more autonomous database systems.

Multi-DBMS can be expressed through six levels of schemas.

Multi-database View Level of Schemas:-

Multi-database View Level: Depicts multiple user views comprising of subset of the integrated distributed database.

Multi-database conceptual Level:- Depicts integrated multi-database that comprises of global logical multi-database structure definitions.

Multi-database internal Level:-

Depicts the data distribution across different sites and multi-database to local data mapping.

Local database View Level: Depicts public view of local data.

Local database conceptual Level:- Depicts local data organization at each site.

Local database internal Level. Depicts physical data organization at each site.

Model with Multi-database Conceptual Level

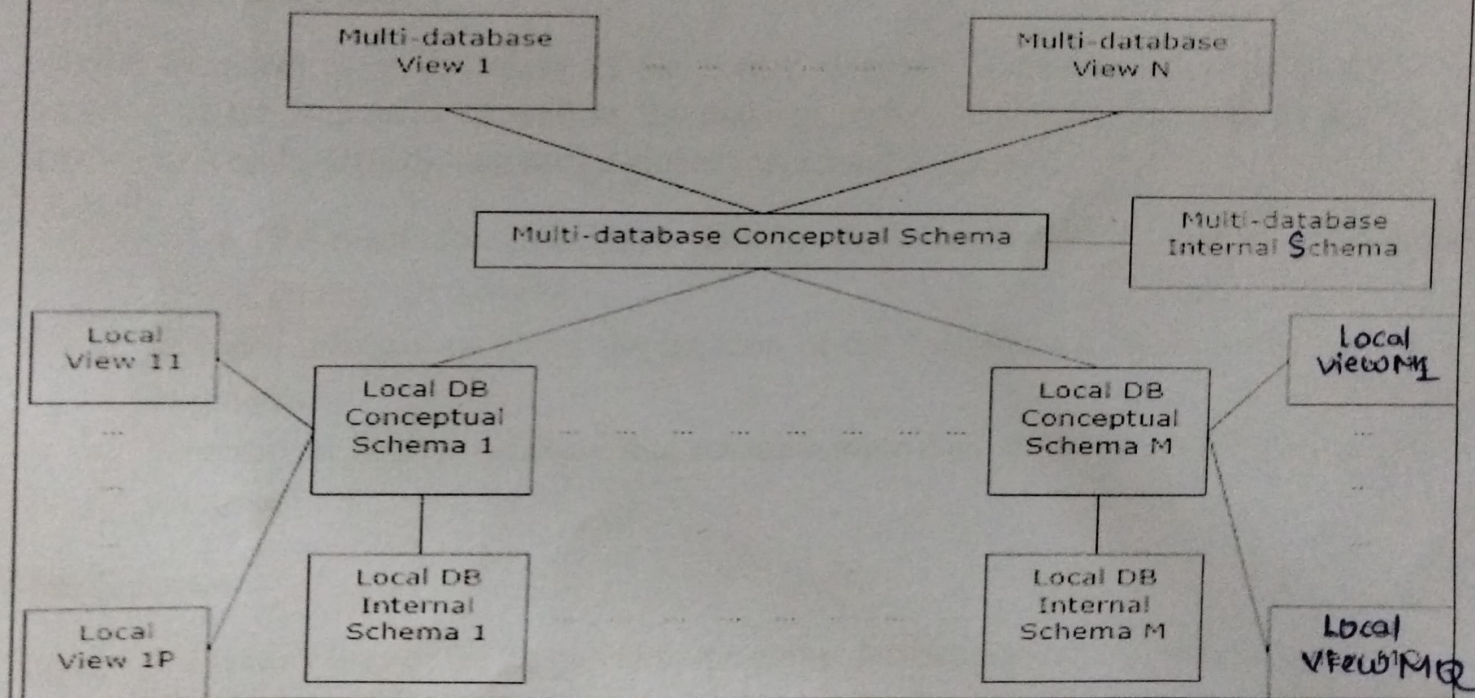


Figure 1.11 Models Using a Global Conceptual Schema

Types of Distributed Databases

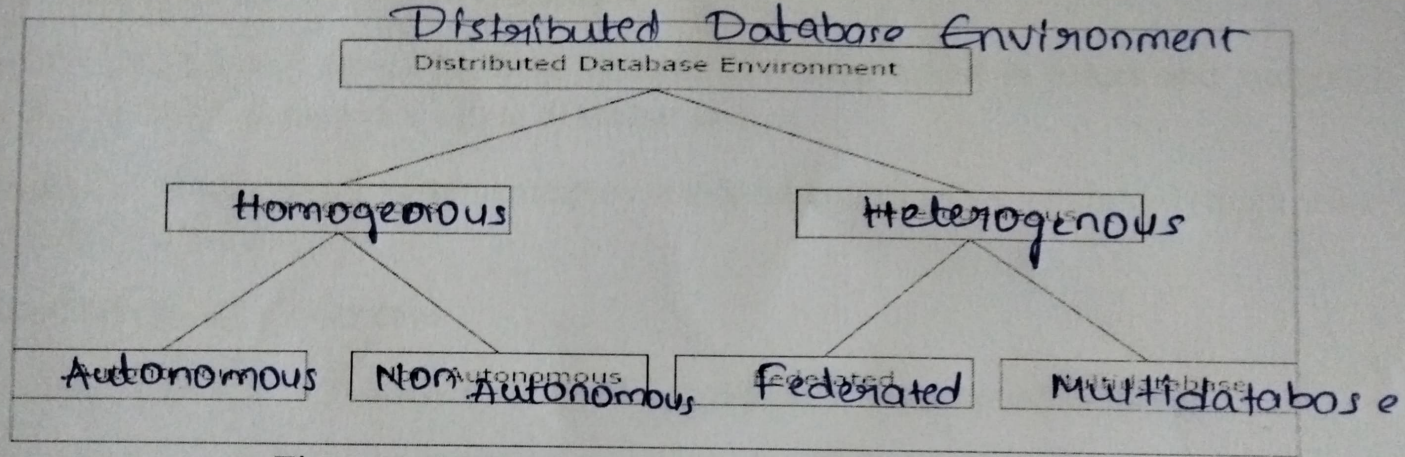


Figure 1.7 Types of Distributed Databases

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

Homogeneous Distributed Databases

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

- The sites use very similar software.
- The sites use identical DBMS or DBMS from the same vendor.
- Each site is aware of all other sites and cooperates with other sites to process user requests.
- The database is accessed through a single interface as if it is a single database.

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.

Heterogeneous Distributed Databases

In a heterogeneous distributed database, different sites have different operating systems, DBMS products and data models. Its properties are –

- Different sites use dissimilar schemas and software.
- The system may be composed of a variety of DBMSs like relational, network, hierarchical or object oriented.
- Query processing is complex due to dissimilar schemas. Transaction processing is complex due to dissimilar software.
- A site may not be aware of other sites and so there is limited co-operation in processing user requests.

Types of Heterogeneous Distributed Databases

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

Un-federated – The database systems employ a central coordinating module through which the databases are accessed.