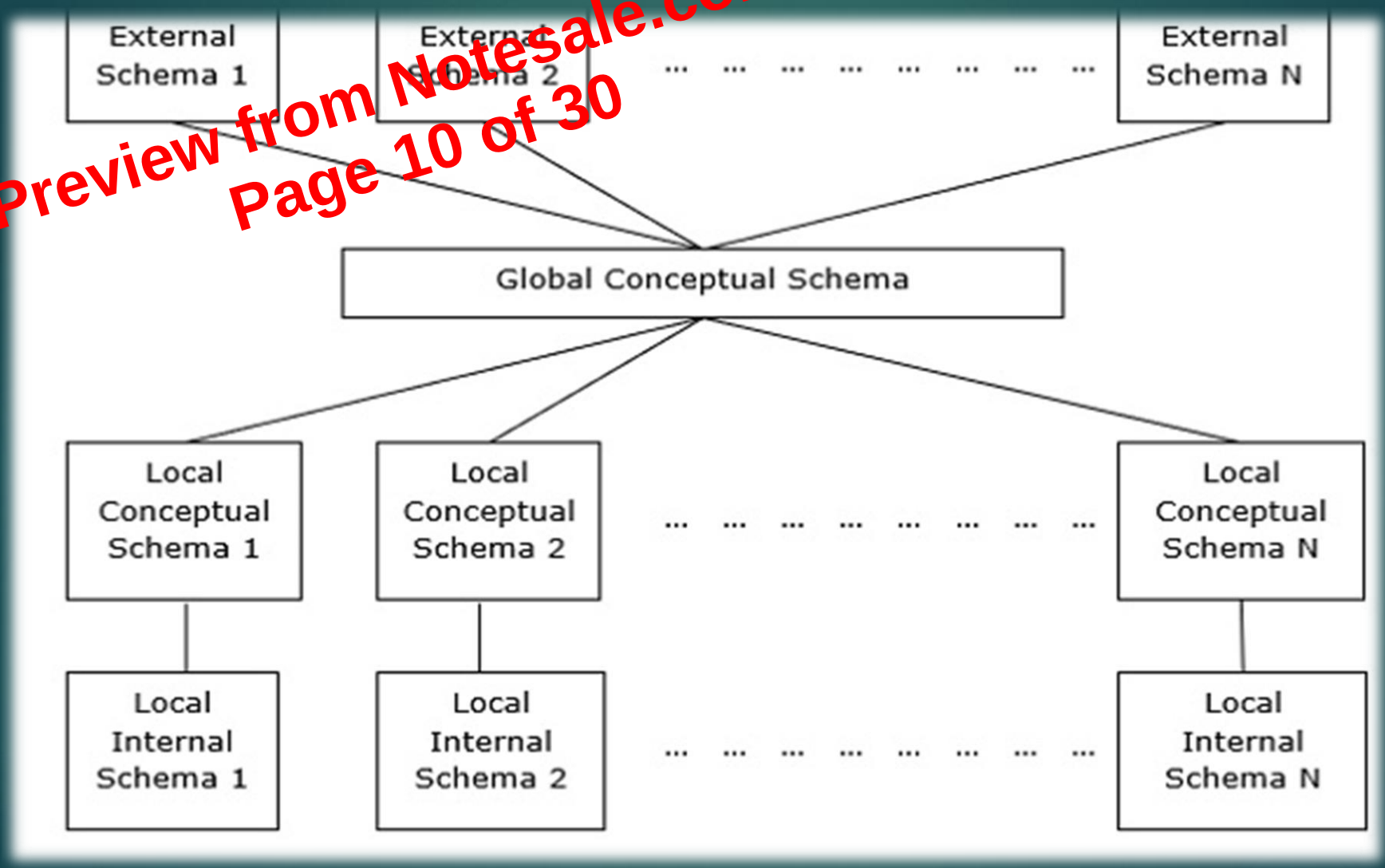
5.1Introduction

1)Distributed Database System vs. Centralized Database System

Centralized Database	Distributed Database
a)It is a database that is stored, located as well as maintained at a single location only.	a)It is a database that consists of multiple databases which are connected with each other and are spread across different physical locations.
b)The data access time in the case of multiple users is more in a centralized database.	b) The data access time in the case of multiple users is less in a distributed database.
c) This database provides a uniform and complete view to the user.	c) Since it is spread across different locations thus it is difficult to provide a uniform view to the user.
d) A centralized database is less costly.	d) This database is very expensive
e) The users cannot access the database in case of database failure occurs.	e) In a distributed database, if one database fails users have access to other databases.
f) A desktop or server CPU, A mainframe computer.	f) Apache Ignite, Apache Cassandra, Apache HBase.

2)Peer-to-Peer Architecture :



5.5 Distributed Data Storage Technique:

5.5.1 Fragmentation : Horizontal , Vertical , Hybrid

- Fragmented

  In this design, a table is divided into two or more pieces referred to as fragments or partitions, and each fragment can be stored at different sites. This considers the fact that it seldom happens that all data stored in a table is required at a given site. Moreover, fragmentation increases parallelism and provides better disaster recovery. Here, there is only one copy of each fragment in the system, i.e. no redundant data.

- The three fragmentation techniques are −

  I. Vertical fragmentation
  II. Horizontal fragmentation
  III. Hybrid fragmentation

II. Horizontal Fragmentation :

a) Horizontal fragmentation refers to the process of dividing a table horizontally by assigning each row or (a group of rows) of relation to one or more fragments.

b) These fragments are then be assigned to different sides in the distributed system. Some of the rows or tuples of the table are placed in one system and the rest are placed in other systems.

c) The rows that belong to the horizontal fragments are specified by a condition on one or more attributes of the relation.

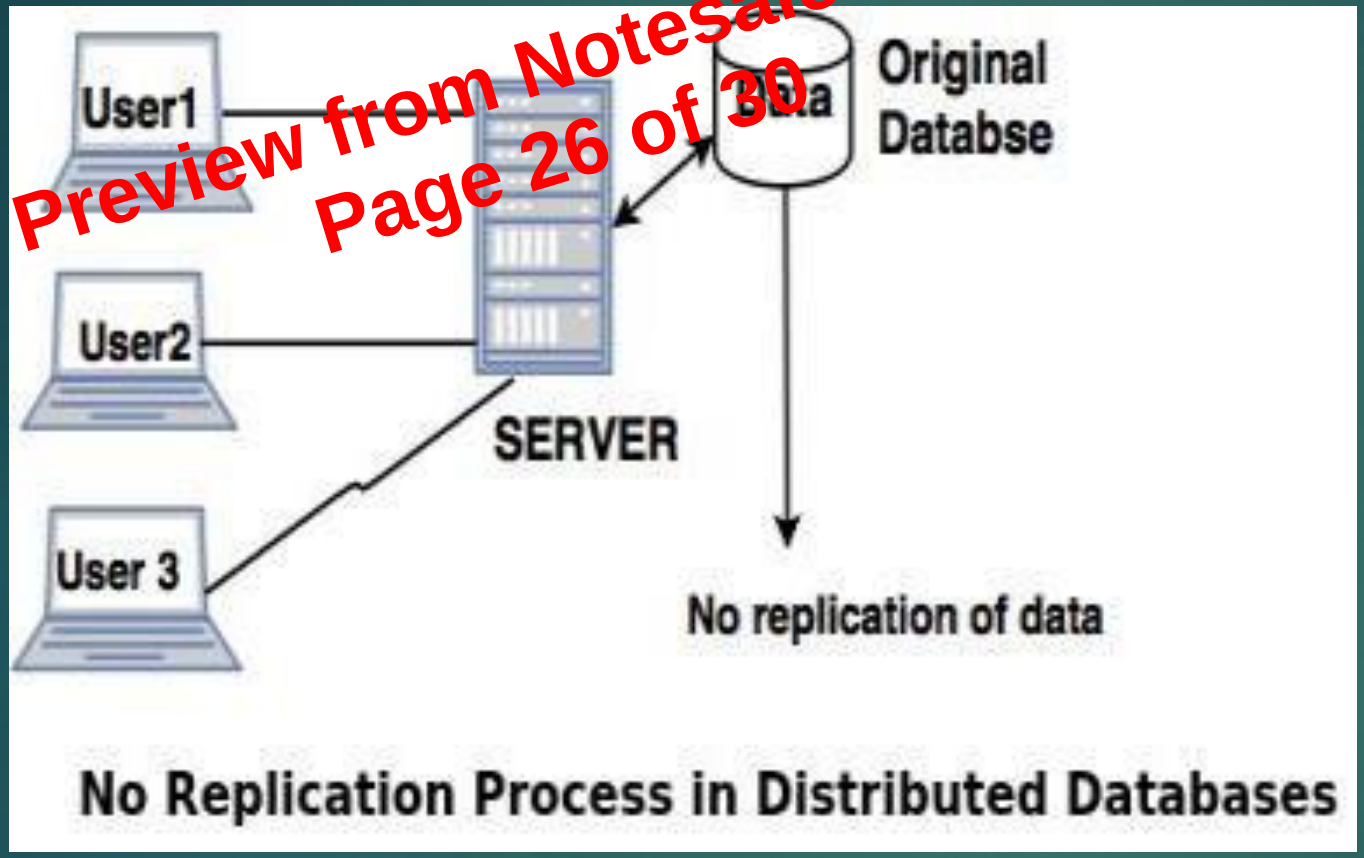
d) In relational algebra horizontal fragmentation on table T, can be represented as follows:

$\sigma p(T)$

where, σ is relational algebra operator for selection

p is the condition satisfied by a horizontal fragment

- No Replication :
  No replication means, each fragment is stored exactly at one location.



No Replication Process in Distributed Databases