جامعة طرابلس

كلية تقنية المعلومات

قواعد البيانات النقالة والغير متجانسة

Heterogeneous and Mobile Databases

ITMC322

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المحاضرة الثانية

Review of topics

-Peer-to-Peer Topology
-Distributed Databases
-Multidatabases
-Mobile Computing

Database Systems classification

Peer-to-Peer Topology

- Shared Resources
  Each peer is a shares its resources with others, acting as both a client and server.
- Decentralization and Self-organization
  Peers coordinate their activities with other peers rather than with a centralized server.
- Autonomy
  Peers are free to come and go at will.

Database Systems classification

Peer-to-Peer Topology

This is the direct evolution of the client-server topology. Note that in a Client-server topology functionality is split into user processes and data processes.

User processes handle interaction with the user and data processes handle interaction with data.

In a Peer-to-Peer topology, one should expect to find both class of processes placed on every machines.

Database Systems classification

Peer-to-Peer Topology

From a data logical perspective, Client-server topology and Peer-to-Peer topology provide the same view of data ─ data distribution transparency. The distinction lies in the architectural paradigm that is used to realize this level of transparency.

Database Systems classification

Distributed Databases

Distributed databases are based on data distribution. It brings the advantages of distributed computing to the database management domain.
A distributed system is a collection of processors, not necessarily homogeneous, interconnected by a computer network. Data distribution is an effort to improve performance by reducing communication costs and to improve quality of service in case of network failure.

Database Systems classification

Distributed Databases

Based on our taxonomy, a distributed database system has the following characteristics: data is distributed (possibly replicated and/or fragmented) stored in locations close to the application domain(s) that uses it (e.g. increased availability), processors do not share resources (i.e., disks and memory) and processes are more distinct, and the underlying platform is possibly parallel.

Database Systems classification

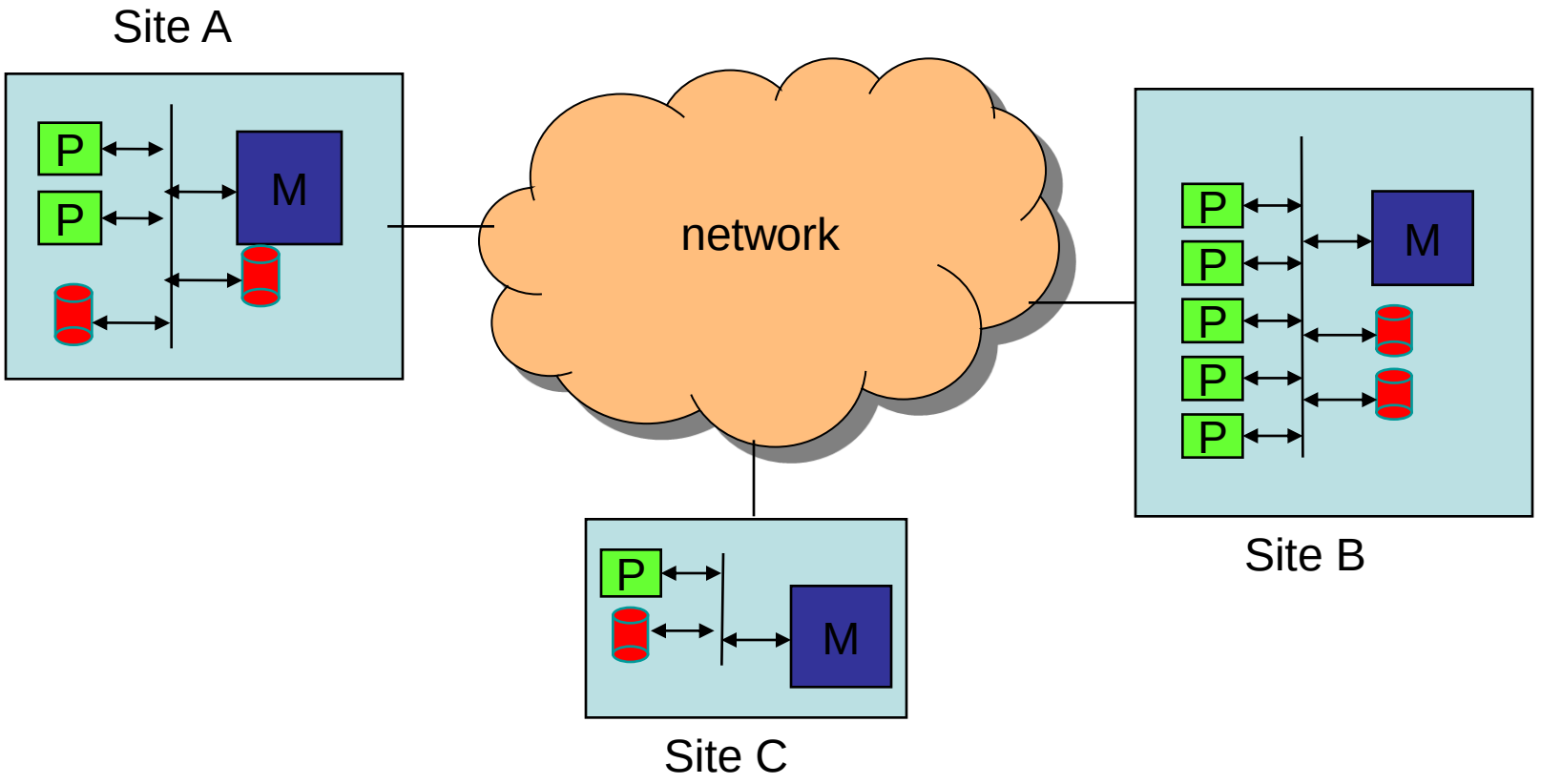
Distributed Databases

In comparison to parallel systems in which processors are tightly coupled and constitute a single database system, a distributed data base system is a collection of loosely coupled systems that share no physical components.

> **“Database is stored on several computers and computers communicate with each other through various communication media.**
> **Computers do not share resources – disks, memory, processor, …”**

Database Systems classification

Distributed Systems



Database Systems classification

Distributed Systems

In general distributed databases can be classified as:

Homogeneous databases
Heterogeneous databases

Database Systems classification

Distributed Database Systems

There are several reasons for building distributed database systems:

- Sharing data
- Autonomy
- Increased reliability and availability
- Improved performance
- Ease of expansion

Database Systems classification

Distributed Database Systems

Data distribution is an effort to improve performance:

- To reduce communication costs and hence to reduce response time,
- To maintain more control and enforce better security,
- To improve quality of service in case of network failure.

Database Systems classification

Distributed Database Systems

Data distribution is an effort to improve performance:

- To reduce communication costs and hence to reduce response time,
- To maintain more control and enforce better security,
- To improve quality of service in case of network failure.

In a distributed database system, data is physically stored across several sites and each site is typically managed by a database management system capable of running independent of the other sites.

Data distribution is motivated by:

Increased availability, and

Distributed access to data – locality in access patterns

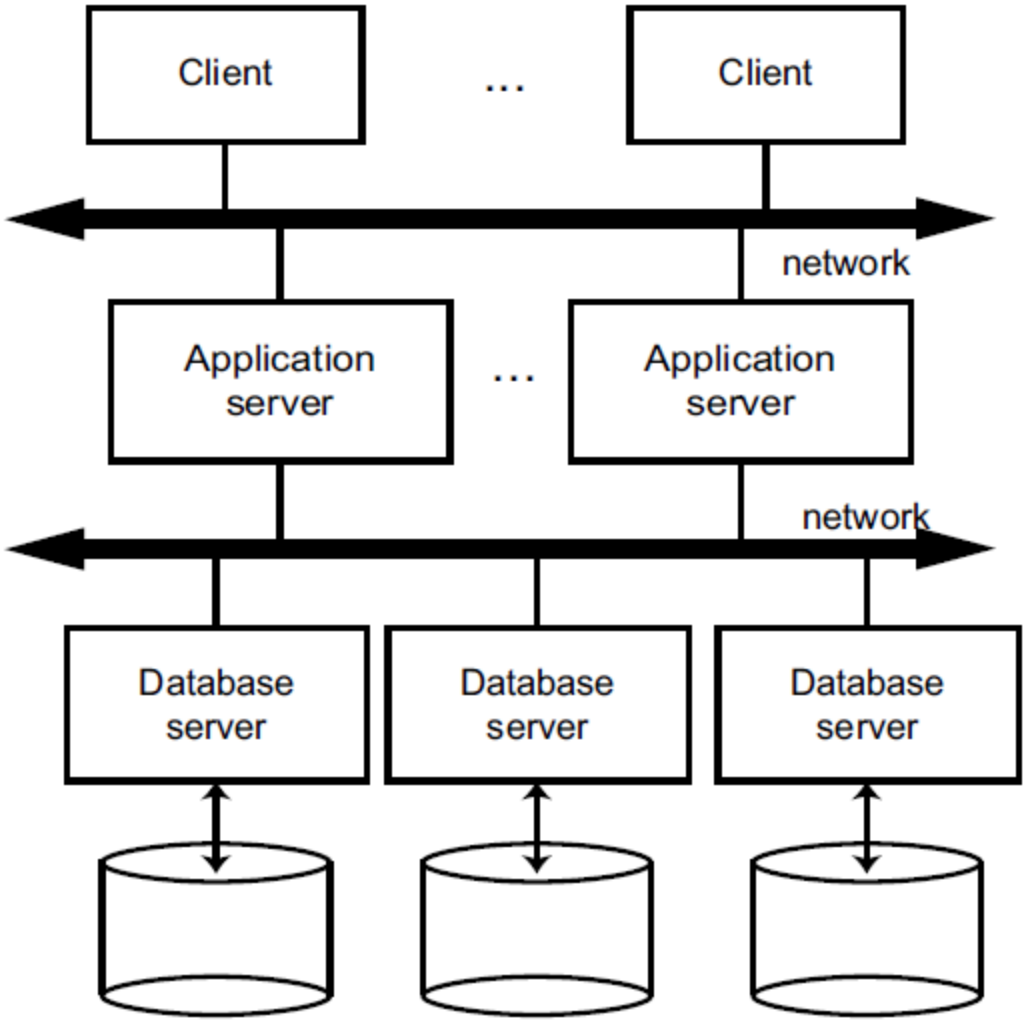
Database Systems classification

Distributed Database System :

- Increased reliability and availability – reliability means probability that a system is running at a certain time point, availability means probability that a system is continuously available during a time interval.
- Improved performance, and
- Ease of expansion.

Database System Architecture

Distributed Database System :



Distributed Database Servers

Database Systems classification

Multidatabases

Adding control distribution to the definition of distributed databases as discussed in previews section results in an environment with the following characteristics:

- Data is distributed and stored in several locations,
- Processes are more distinguished,
- Underlying platforms could be parallel, and
- Processing nodes are autonomous.

The End

Thanks for listening ..

Any questions ?