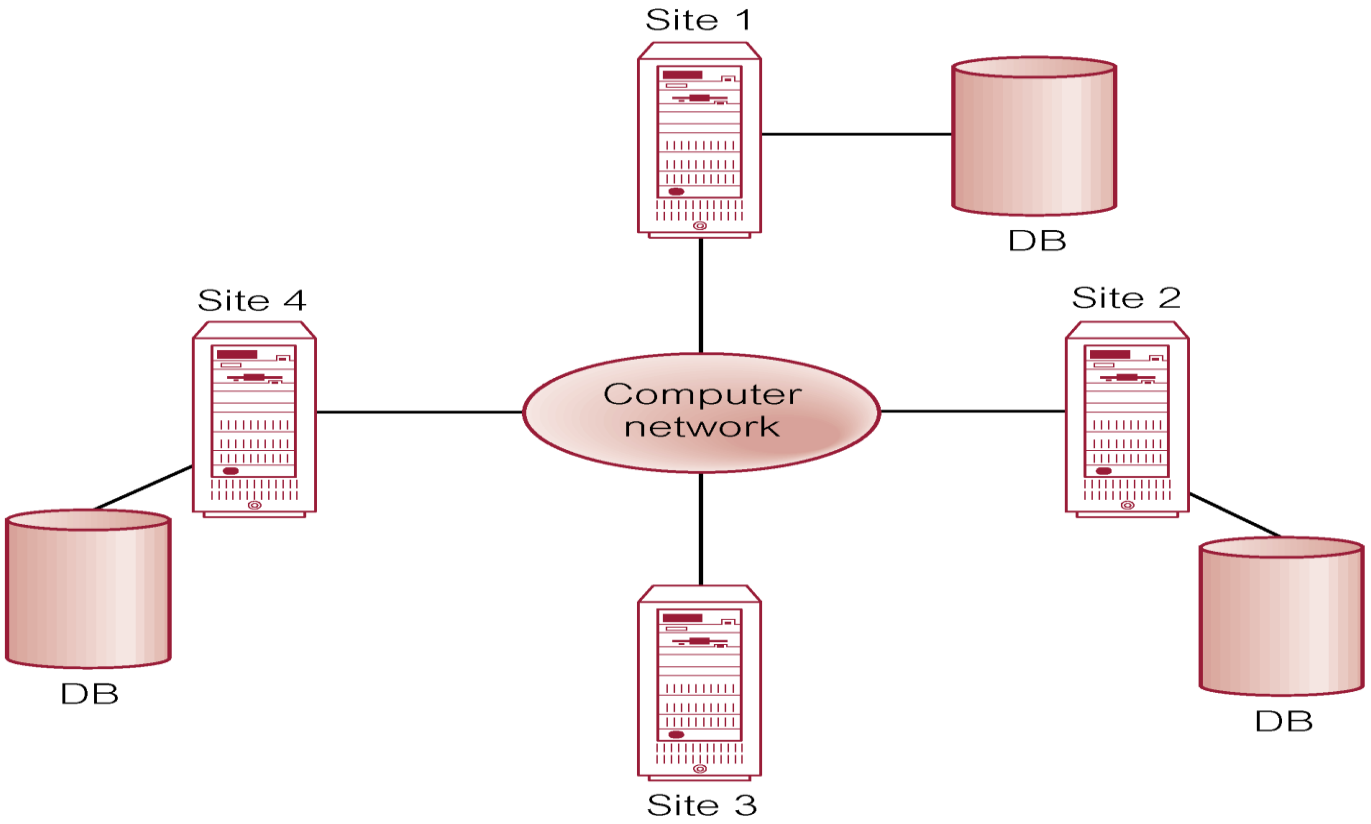
Oracle's Distributed Database

Definition

A Distributed Database is a set of databases stored on multiple computers at different locations and it appears to the user as a single database.

The locations of the distributed database may be spread over a large area around the world, or over a small area such as one building.

Distributed DBMS



Why A Distributed Database?

- Reflects organizational structure
- Improved shareability and local autonomy
- Improved availability
- Improved reliability
- Improved performance
- Economics
- Modular growth

Why Not A Distributed Database?

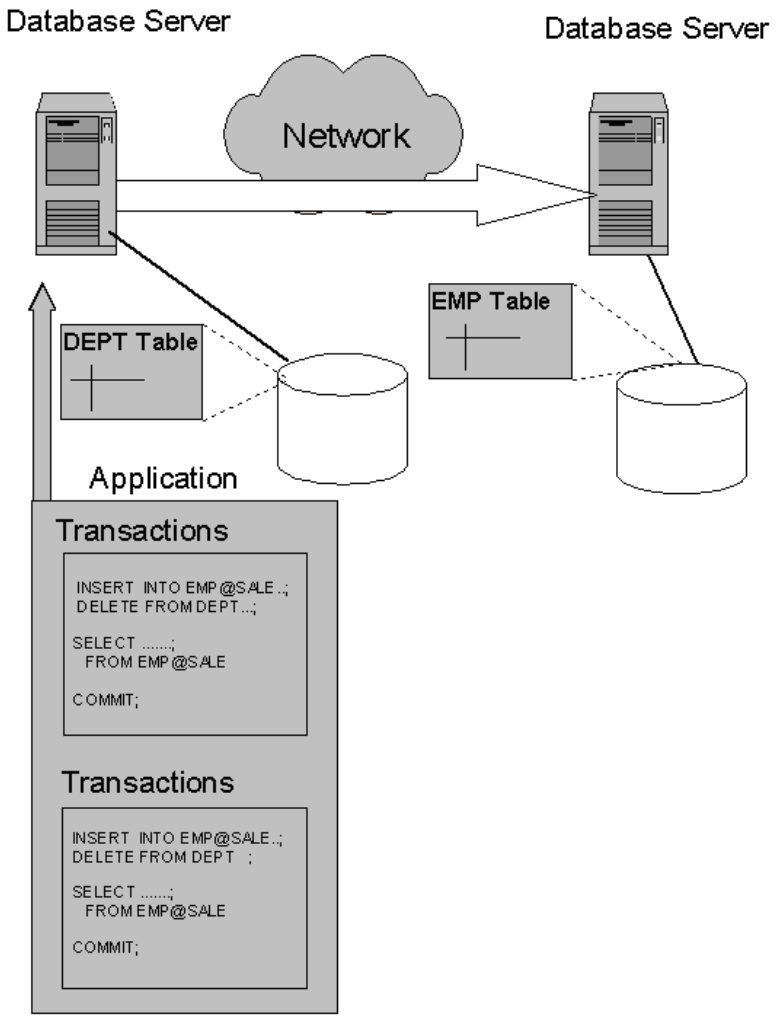
- Complexity
- Cost
- Security
- Integrity control more difficult
- Lack of standards
- Lack of experience
- Database design more complex

Oracle Client/Server Concept

The software that manages the database is called the **database server**

An application that requests information from that server is the **client or a node**

A client can connect to the database server either directly or indirectly



The Network Connection

Net8 is an Oracle's network software that provides the inter-database communications across the network.

Net8 performs all its operations independent of the network operating system (NOS).

Database Replication

It is the process of storing a copy of the database at each location of the distributed database system.

advantages:

- Reliability: If one site containing the database fails, a copy can always be accessed at another site.
- Fast response time: Each site has a local copy of the database, so queries can be executed faster.
- Node decoupling: Transaction may proceed without coordination across the network.
- Improve performance by minimizing the network traffic at prime time

disadvantages

- Storage requirements: Each site must storage capacity to store copy of the database.
- Complexity and cost of updating: When updating the database, all sites must be updated.

Heterogeneous Distributed Database

One of the database systems may not be an oracle database system called heterogeneous distributed database system

and services are handled by an Oracle software called Oracle Gateway.

Transparency in a Distributed Database System

Location transparency which allows application developers and administrators to hide the physical location of the database

Location Transparency

It has two major advantages:

- Access to remote database objects will be very simple.
- Database objects can be moved with no impact on the user's applications.

Administration of an Oracle Distributed Database System

Local Autonomy each server in a distributed database system is administered independently from all other databases

benefit of local autonomy

- Administrator's responsibility is smaller and their database is more manageable.
- Failure of an independent system has no effect on other nodes.
- Recovery from isolated failures also has no effect on other nodes.
- Each local database has its own data dictionary.
- Upgrades can be done independently for each database.

Security Issues

As with a non-distributed database, all security features are supported in a distributed database system.

User Accounts and Roles

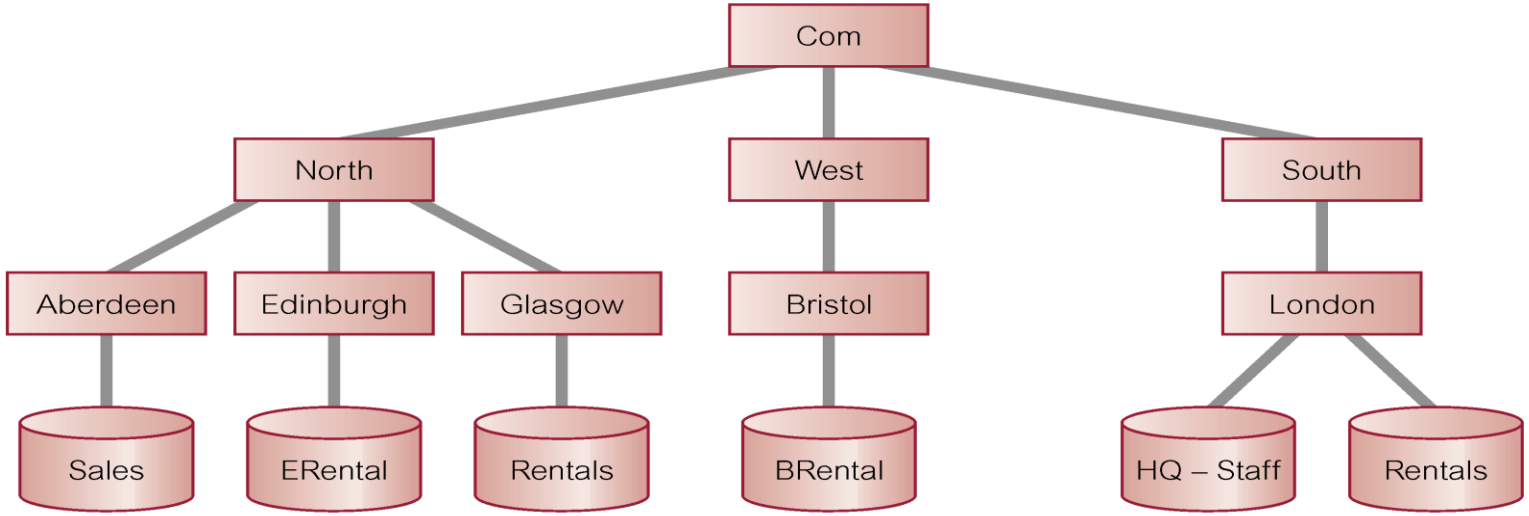
- User accounts and roles must be available in all databases of the distributed database system
- the Net8 Advanced Networking Option protects the data from an unauthorized viewing and ensures that data has not been modified, updated, or deleted during transmission

Administration tools for an Oracle Distributed Database System

- **Oracle Enterprise Manager**: A GUI version and a command mode version are available.
- **Third-party administration tools**: More than 60 products from different companies are available to manage Oracle distributed database.
- **SNMP (Simple Network Management Protocol)**: Beside its network management tasks, it can be used to locate and query and Oracle server.

Global Database Names

Each distributed database is given a global database name, distinct from all databases in system. Name formed by prefixing database's network domain name with local database name. Domain name must follow standard Internet conventions.



Database Links (*Cont.*)

- DDBs in Oracle are built on database links, which define communication path from one Oracle database to another.
- Purpose of database links is to make remote data available for queries and updates, essentially acting as a type of stored login to the remote database.
- For example:

```
CREATE PUBLIC DATABASE LINK
   RENTALS.GLASGOW.NORTH.COM;
```

Database Links

- Once database link has been created, it can be used to refer to tables and views on the remote database by appending *@databaselink* to table or view name.
- For example:

```
SELECT *
FROM Staff@RENTALS.GLASGOW.NORTH.COM;
```

Thanks