



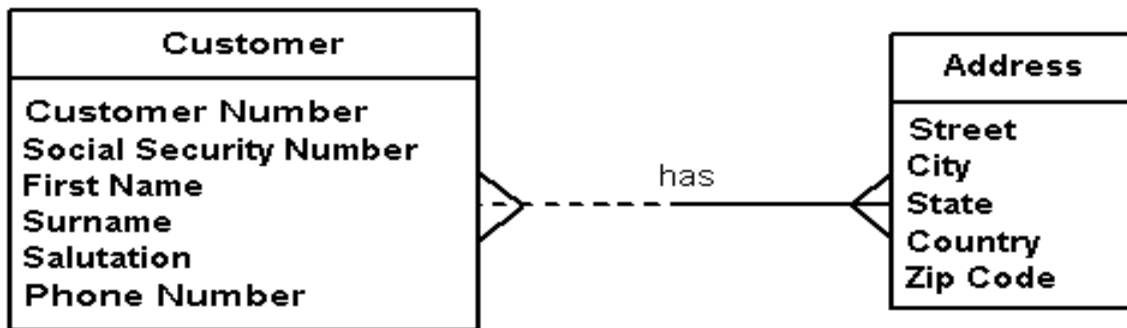


CSE3103 : Database FALL 2020

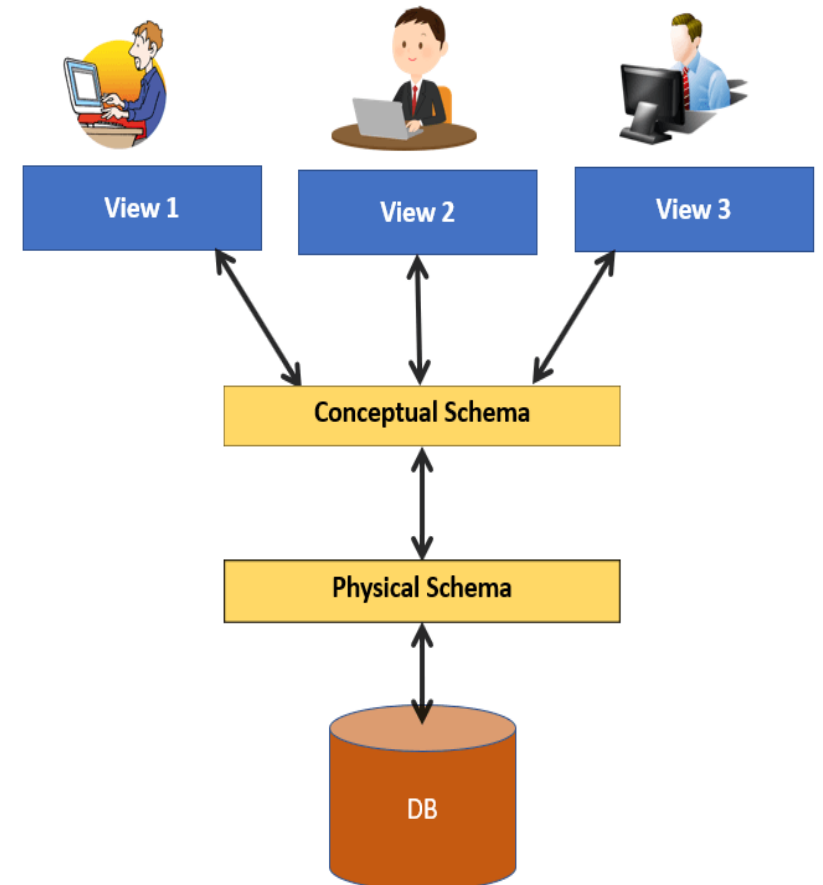
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Instances and Schemas

- **Schema**– describe the overall design of the database.
- **Physical schema**– Overall physical structure of the database.
- **Logical Schema** – Overall logical structure of the database
 - Example: The database consists of information about a set of customers and address and the relationship between them.
- **Sub Schema**– Describe the different views of the database.



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Instances and Schemas

- **Instance** – the actual Database Applications content of the database at a particular point in time.
 - Analogous to the value of a variable.

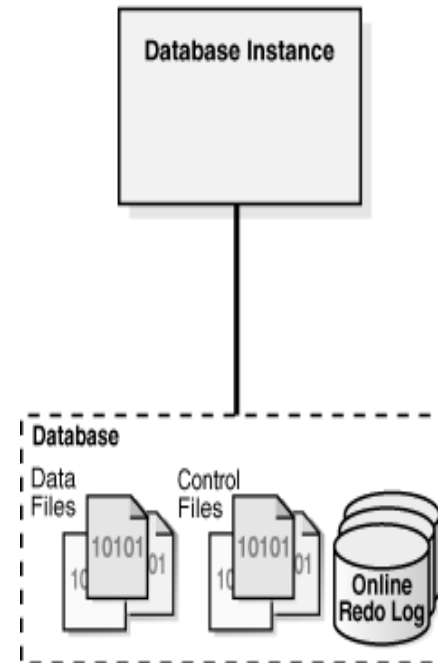
Database schema (names of columns + the types associated with them)

Name	DOB	Address	Job	Scale
<i>String</i>	<i>Date</i>	<i>String</i>	<i>String</i>	<i>Int</i>

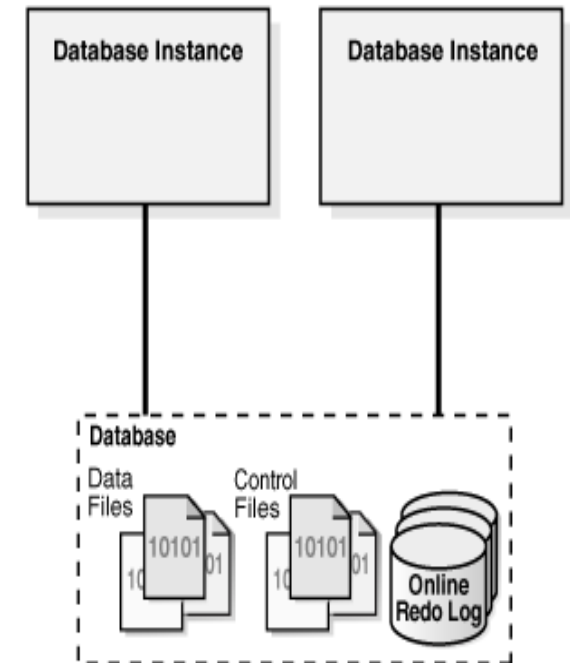
A database instance

Name	DOB	Address	Job	Scale
A. Johnson	2/04/1960	London	Programmer	12
B. Holiday	3/10/1947	Leeds	Analyst	14
C. Clark	12/08/1971	York	Programmer	10

Single-Instance Database



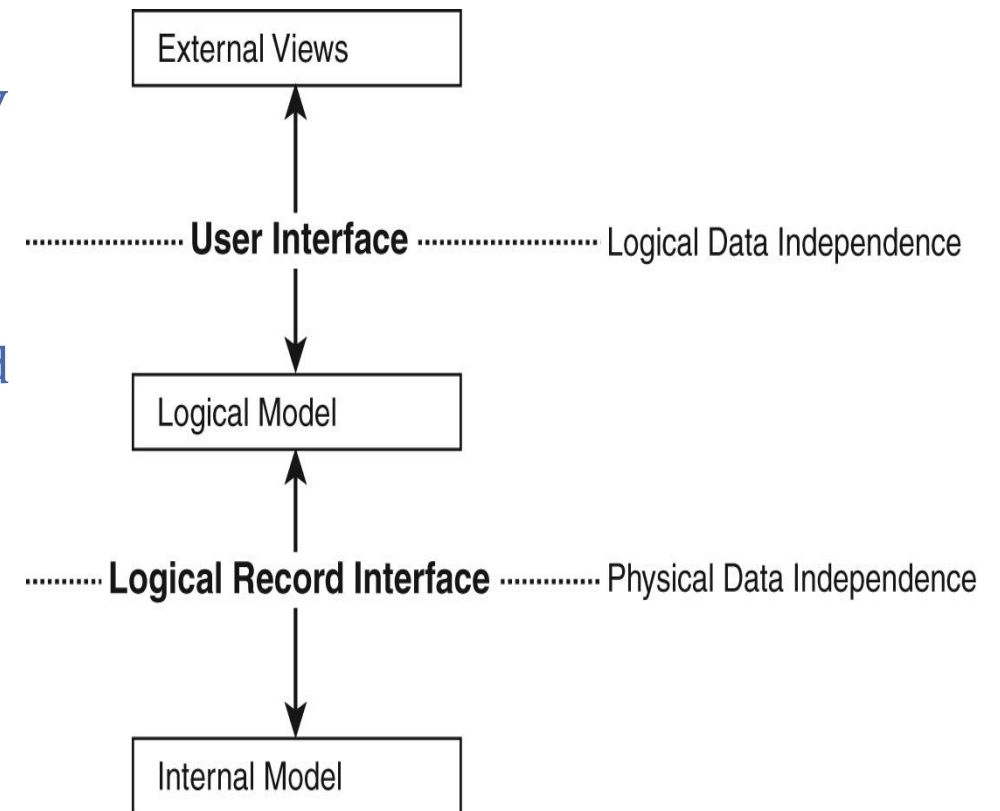
Oracle RAC Database



Instances and Schemas

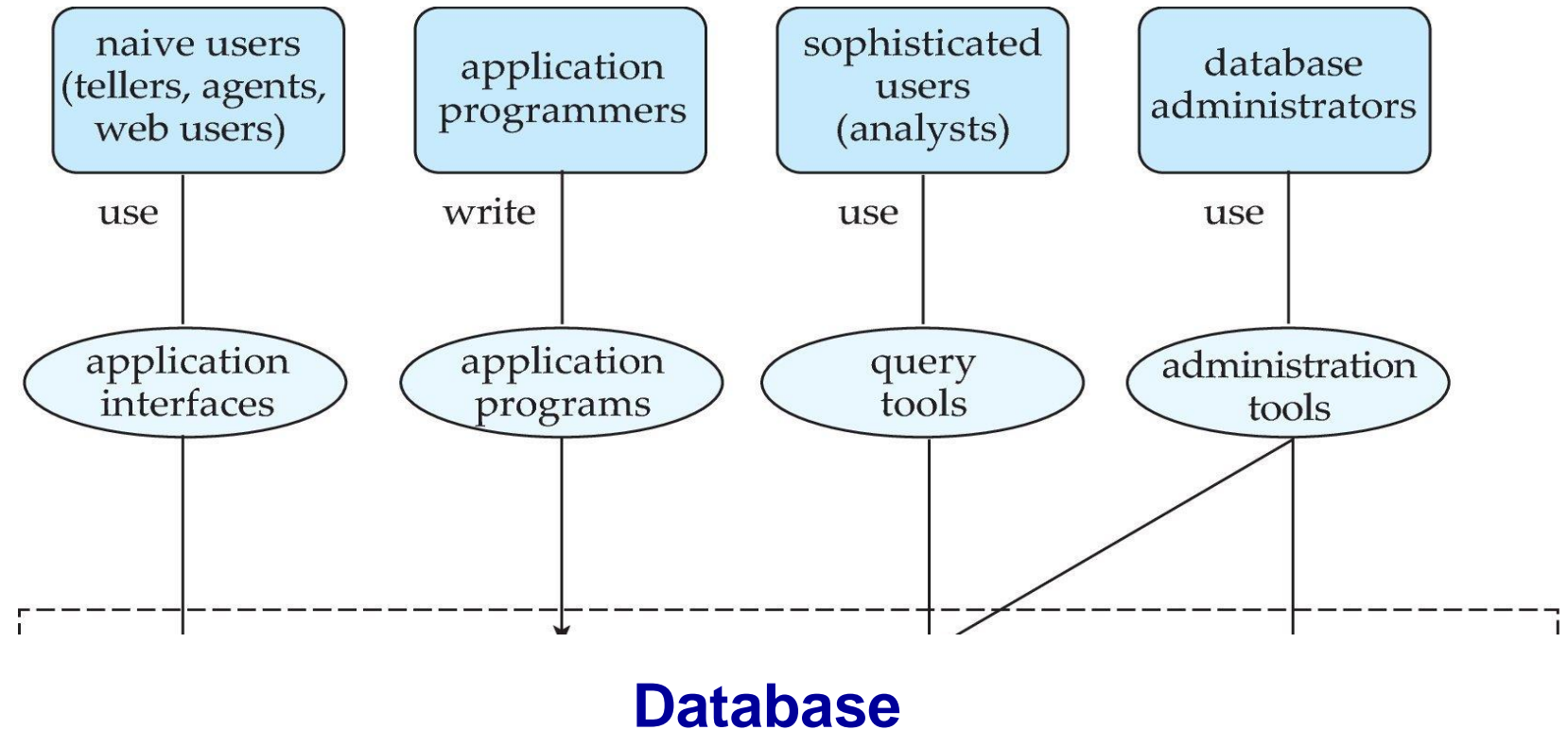
Data Independence – Application that ensures the protection of data or structure is stored.

- **Physical Data Independence** – the ability to modify the physical schema without changing the logical schema
 - Applications depend on the logical schema
 - In general, the interfaces between the various levels and components should be well defined so that changes in some parts do not seriously influence others.
- **Logical Data Independence** – the ability to modify the logical schema without changing the View Level.



Database Users & DBA Activities

- **Application Programmer**
- **Sophisticated User**
- **Specialized User**
- **Naïve User**



Data Definition Language (DDL)

- Specification notation for defining the database schema

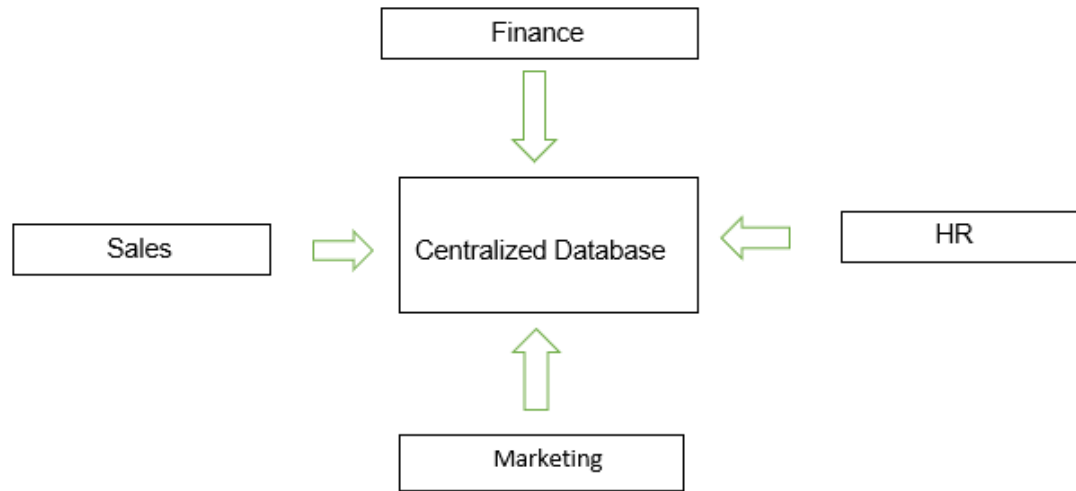
Example: **create table** *instructor* (
 ID **char**(5),
 name **varchar**(20),
 dept_name **varchar**(20),
 salary **numeric**(8,2))

- DDL compiler generates a set of table templates stored in a ***data dictionary***
- Data dictionary contains metadata (i.e., data about data)
 - Database schema
 - Integrity constraints
 - Primary key (ID uniquely identifies instructors)
 - Authorization
 - Who can access what

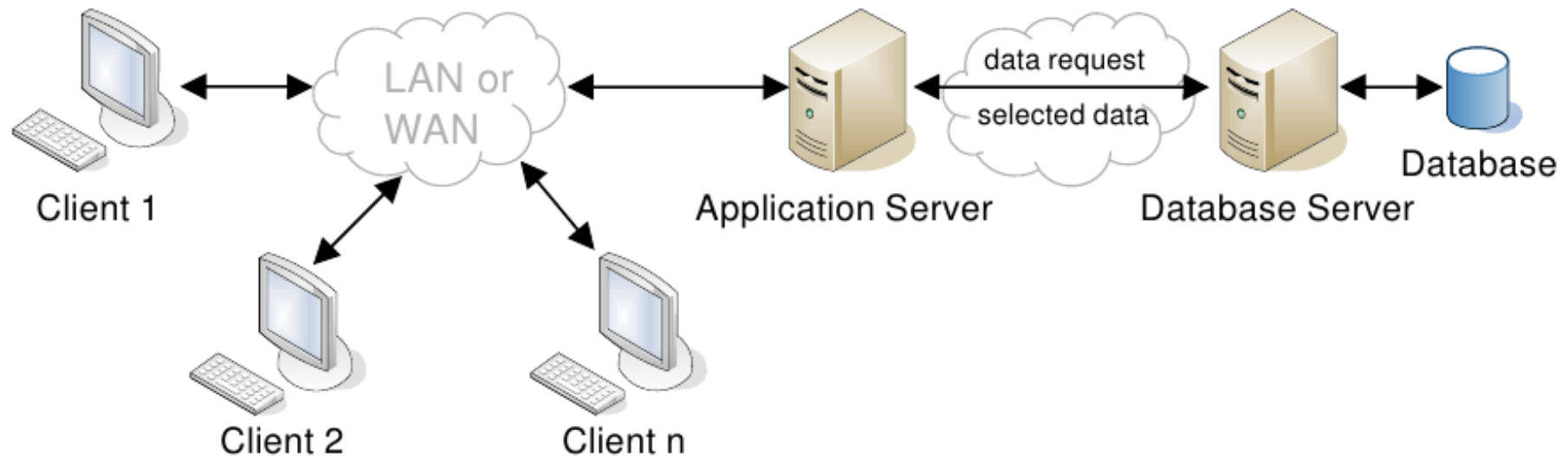
Data Manipulation Language (DML)

- Language for accessing and manipulating the data organized by the appropriate data model
 - DML also known as query language (**Procedural & Declarative**)
- Two classes of languages
 - **Pure** – used for proving properties about computational power and for optimization
 - Relational Algebra
 - Tuple relational calculus
 - Domain relational calculus
 - **Commercial** – used in commercial systems
 - SQL is the most widely used commercial language

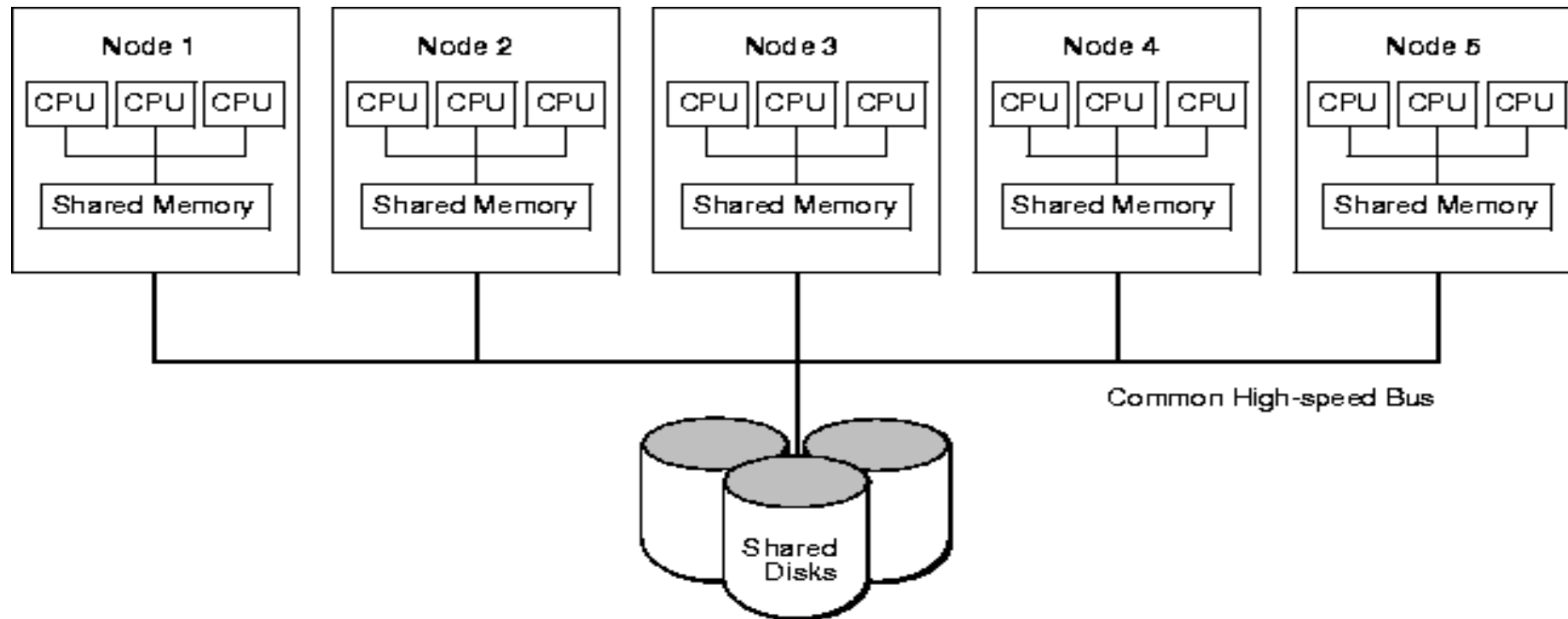
Database Architecture: Centralized Database



Database Architecture: Client Server Database



Database Architecture: Parallel Database



Database Architecture: Distributed Database

