

# Programming of We Information Syst

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# Interconnected Databases

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# Database

- A collection of related data stored in a manner that enables information to be retrieved as needed.

## Database Management System (DBMS)

- The software system used to create, maintain, and access databases.

## Database engine

- Database engine is the part of the program that actually stores, accesses and retrieves data.

# Database Types and Classification

## Single-User Database System

- Located on a single computer
- Designed to be accessed by one user
- Widely used for personal applications and very small businesses

## Multiuser Database System

- Designed to be accessed by multiple users
- most business databases today

# Database Types and Classification

## Client/Server Database System

- Client-Server database systems have both clients (Front End) and at least one database server (Backend)

## N-Tier Database System

- Has more than two tiers
- Additional tiers typically contain software referred to as middleware
- Allows program code to be separate from the database
- Code can be divided into any number of logical components

# Database Types and Classification

## Centralized Database System

- Database is located on a single server, such as a server or mainframe

## Distributed Database System

- Data is physically divided among several computers connected by a network, but the database logically looks like it is a single database

# Database Types and Classification

## Disk-based Database System

- Data is stored on hard drives

## In-memory Database System

- Data is stored in main memory
- Dramatically faster than disk-based databases
- Good backup procedures are essential
- Used both in high-end systems where performance is crucial and in small-footprint, embedded applications.



# Database Types and Classification

## Multi-Dimensional Databases

- Designed to be used with data warehousing
- Often used in conjunction with Online Analytical Processing (OLAP).
- **MOLAP (Multidimensional OLAP)**
  - Data is stored in single structures called data cubes
- **ROLAP (Relational OLAP)**
  - Data is stored in an existing relational database using tables to store the summary information
- **HOLAP (Hybrid OLAP)**
  - Combination of MOLAP and ROLAP technologies

# Database Types and Classification

## Cloud Databases

- Typically hosted on a cloud database provider's servers that is accessible to users
- Cloud databases allow Web pages to be dynamic Web pages.
  - Use growing rapidly
  - Typically built using a cloud provider (Windows Azure, Amazon SimpleDB, or Google Cloud SQL)
  - Requires less in-house hardware and maintenance
  - Individuals can create via Microsoft Access web apps.

# How Cloud Databases Work?

1. Visitor makes request by
  - Filling out a Web page form
  - Selecting an option from a menu displayed on a Web page form
2. Web server converts the request into a database query, passes it onto the database server, and then sends the results back to the visitor.

# Database Types and Classification

## NoSQL Databases

- Refers to any non-relational database
- Used for large sets of distributed data
- Very efficient in analyzing large size unstructured data

# Types of NoSQL Databases

## Document databases

- Store data in documents
- Example: MongoDB

## Key-Value databases

- Type of database where each item contains keys and values.
- Examples: Redis and DynanoDB

## Wide Column databases

- Store data in tables, rows, and dynamic columns.
- Examples: Cassandra and Hbase

## Graph databases

- Store data in nodes and edges
- Examples: Neo4j and JanusGraph

# Middleware

- Software used to connect two otherwise separate applications, such as a Web server and a database management system
- A set of drivers, APIs, or other software that improves connectivity between a client application and a server
- Commonly written as scripts
- Common languages include
  - JavaScript
  - VBScript
  - CGI Scripts
  - Active Server Pages (ASPs)
  - PHP Scripts

# Thank You!

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