Programming of We Information Syst

Instructor: Najib Ullah Sadaat

Email: najeeb.szu@gmail.com

Contacts: 0706 24 90 24 | 0766 24 90 24 | 0786 24 90 24

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-Diamensional 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!