

# **IT 775**

# **Database Technology**

## **Data Stores**

## **Cloud Computing**

# CLOUD COMPUTING

## **Infrastructure as a Service (IaaS)**

Computer hardware provided as standardized services over the network

## **Platform as a Service (PaaS)**

Resources required for building applications provided as standardized services over a network

## **Software as a Service (SaaS)**

Computer applications offered as a service on demand

## **Database as a Service (DaaS)**

Specialized version of SaaS developed for database management in clouds

# Database As A Service (DaaS)

## Cloud Database

- A database service built and accessed through a cloud platform. It serves many of the same functions as a traditional database with the added flexibility of cloud computing.
- Software is installed on a cloud infrastructure to implement the database. Using the Internet to deliver data storage and processing services hosted by a service provider

# Database As A Service (DaaS)

## Features:

- Enables enterprise users to host databases without buying dedicated hardware
- Can be managed by the user or offered as a service and managed by a provider
- Can support relational databases (including MySQL and PostgreSQL) and NoSQL databases (including MongoDB and Apache CouchDB)
- Accessed through a web interface or vendor-provided API

# Database As A Service (DaaS)

## Benefits:

- **Cost savings:** Creating infrastructure for database management is expensive; scaling it as needed is costly and often wasteful. With DaaS, you pay a predictable periodic charge based on the resources you consume - No need to purchase additional capacity for potential future needs.
- **Scalability:** DaaS can quickly and easily provision additional capacity (at run time if needed), and can scale down the database cluster during non-peak usage to save cost.

# Database As A Service (DaaS)

## Benefits:

- **Simpler, less costly management:** To manage and maintain a database on-premises, you need an in-house DBA team. The DaaS provider manages everything (some aspects can be self-managed, if desired). It reduces the administrative burden on existing IT staff.
- **Rapid development and faster time-to-market:** DaaS developers can spin up and configure a database, ready to integrate with their application in minutes. On-premises usage typically needs IT assistance to obtain.

# Database As A Service (DaaS)

## Benefits:

- Data and Application security: DaaS providers typically offer enterprise grade security, including features like default encryption of data at rest and in-transit and integrated identity and access management controls. Some also meet specific regulatory compliance standards.
- Reduced risk: Offerings typically include a SLA guaranteeing uptime. In the unlikely event that the DaaS doesn't meet the SLA, compensation is available for any downtime experienced.

# Database As A Service (DaaS)

## Benefits:

- Software quality: The major cloud providers offer a wide variety of highly configurable DaaS options - each preselected for their environment. The provider worries about updates, performance, security, and viability. Typically multiple styles of data stores are available (Relational, NoSQL, etc.). This eases the issues in data store selection.



# Database As A Service (DaaS)

## Primary Data Stores:

- Stores offering flexible data models, including relational and document-based storage.
- Typically support general-purpose query (such as the various implementations of SQL) and data modeling tools.
- Most are designed with emphasis on maintaining data integrity. They're flexible and are a solid choice for use with the majority of applications.
- Examples of primary data stores include MySQL, MongoDB, and PostgreSQL.

# Database As A Service (DaaS)

## Auxiliary Data Stores:

- Stores to perform a few specialized tasks well, but aren't strong general-purpose tools.
- They may offer restricted data models or limited querying capabilities, but they will have best-in-class performance in one particular area. If this type perfectly fits your application's requirements, you can obtain excellent results by using an auxiliary data store (otherwise, stick with a primary data store).
- Examples of this type include Redis, etcd, Elasticsearch, and JanusGraph.

# Database As A Service (DaaS)

## Offerings:

- Google - Cloud Bigtable
  - SQL - SQL Server, MySQL, PostgreSQL; NoSQL - MongoDB
- Amazon – RDS
  - SQL - MySQL, PostgreSQL; NoSQL - MongoDB, Redis
- Microsoft Azure - MongoDB Atlas
  - SQL - SQL Server; NoSQL - MongoDB

# Database As A Service (DaaS)

## Offerings:

- IBM – Cloudant
  - SQL - IBM Db2, Cloudant, PostgreSQL; NoSQL – MongoDB, Elasticsearch, etcd, Redis, RabbitMQ-a
- MongoDB - MongoDB Atlas
  - Runs on AWS, Microsoft Azure, and Google Cloud.
  - SQL - Azure SQL Server, MySQL, MariaDB; NoSQL - CouchDB, MongoDB