Checkpoint
Introduction To DATABASES

Rayhana Saula

Some definitions before starting:

A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access, and process data stored in a computer database, you need a database management system

A relational database stores data in separate tables rather than putting all the data in one big storeroom.

The database structures are organized into physical files optimized for speed.

The logical model, with objects such as databases, tables, views, rows, and columns, offers a flexible programming environment.

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation.

- *MySQL is a database management system.*

- *MySQL databases are relational.*

  - The SQL part of "MySQL" stands for "Structured Query Language".

  - It is the most common standardized language used to access databases.

  - SQL is defined by the ANSI/ISO SQL Standard.

- *MySQL software is Open Source.*

  - The MySQL software uses the GPL (GNU General Public License),

Fun fact:
The official way to pronounce "MySQL" is "My Ess Que Ell" (not "my sequel")

•*The MySQL Database Server is very fast, reliable, scalable, and easy to use.*
  •MySQL Server can run comfortably on a desktop or laptop, alongside your other applications, web servers, and so on, requiring little or no attention. MySQL can also scale up to clusters of machines, networked together.
  •Its connectivity, speed, and security make MySQL Server highly suited for accessing databases on the Internet.

•*MySQL Server works in client/server or embedded systems.*
  •The MySQL Database Software is a client/server system that consists of a multithreaded SQL server that supports different back ends, several different client programs and libraries, administrative tools, and a wide range of application programming interfaces (APIs).

•*A large amount of contributed MySQL software is available.*

https://dev.mysql.com/doc/refman/8.0/en/what-is-mysql.html

PostgreSQL is an object-relational database management system (ORDBMS), developed at the University of California at Berkeley Computer Science Department.

- **PostgreSQL supports a large part of the SQL standard and offers many modern features:**
  - complex queries
  - foreign keys
  - triggers
  - updatable views
  - transactional integrity
  - multiversion concurrency control

- **Also, it can be extended by the user in many ways**, for example by adding new data types/ Functions/ Operators/aggregate functions/ index methods/ and procedural languages

- And because of the liberal license, **PostgreSQL can be used, modified, and distributed by anyone free of charge for any purpose, be it private, commercial, or academic.**
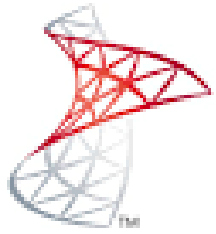
SQL Server is a relational database management system, or RDBMS, developed and marketed by Microsoft. It is built on top of SQL, a standard programming language for interacting with the relational databases.

Platform of choice

SQL Server 2017

Support for **Windows and Linux** operating systems and **Docker** containers

Any cloud, any platform including **OpenShift, Red Hat OpenStack,** and **Kubernetes**

**License Mobility** enables on-premises licenses to be used in the cloud

Enhanced performance without tuning

Before — After
Query — Adaptive Query Processing — Memory grant — Run query

Speed query performance without tuning using **Adaptive Query Processing** and **Automatic Plan Correction**

Faster transactions with **In-Memory OLTP** and up to 100x faster analytics with **In-Memory ColumnStore**

Real-time operational analytics when you combine in-memory technologies

Protect data at rest, in motion and in use

Always Encrypted — Client side — Server side — Query — SQL
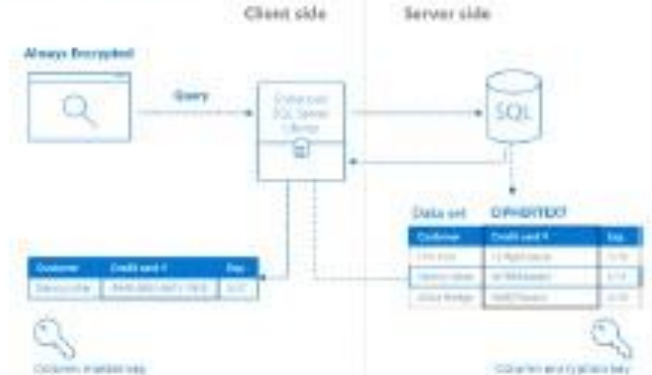
Fewest NIST vulnerabilities[1] over last 7 years

Encrypt data at rest and in use with **Always Encrypted** and **Transparent Data Encryption (TDE)**

Dynamic Data Masking conceals sensitive data

Control access to database rows with **Row-Level Security**
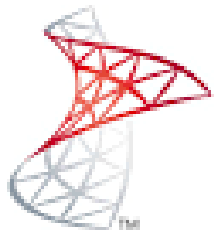
Microsoft® SQL Server®

Advanced Analytics at up to 1M predictions/second

Bring scalable, high performance and parallelized R and **Python-based analytics** to where your data lives

Native scoring in T-SQL for analytics in near real time

Advanced **Machine Learning algorithms** with GPUs

Gain new insights with support for diverse data

Store and analyze highly interconnected data and relationships with **graph data support**

PolyBase enables easy querying across SQL Server and data stored in Hadoop

Hadoop combined with **SQL Server** provides value and insight from data lakes

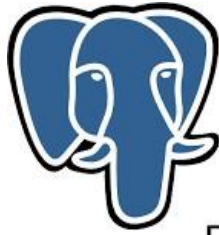**Rich, interactive reports on any device**

Rich visualizations using enhanced Reporting Services

Mobile Reporting on iOS, Windows and Android mobile devices

Get the updated **Report Viewer** as a free developer component
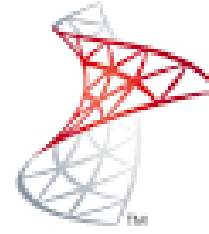
General information for MySQL, PostgreSQL and SQL Server

	MySQL	PostgreSQL	SQL Server
Maturity	Initial release was in 1995	Initial release was in 1989	MSMS SQL Server for OS/2 was released in 1989 (together with Sybase) SQL Server 6.0 was released in 1995 marking the end of collaboration with Sybase.
Language	Written in C, has a few C++ modules	Written in C	Mostly C++ with a few exceptions
Cost	Open source / Owned by Oracle and has several paid editions	Completely free / Open source	SQL Server Express is a free edition, but it is limited to using 1 processor, 1 GB memory and 10 GB database files.

Resources

Comparison between the three RDBMS:
https://www.mssqltips.com/sqlservertip/5745/compare-sql-server-mysql-and-postgresql-features/

MySQL:
https://www.mysql.com/fr/

PostgreSQL:
https://www.postgresql.org/

Microsoft SQL Server:
https://www.microsoft.com/fr-fr/sql-server/sql-server-downloads