Introduction to Databases

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What is a RDBMS ?

- RDBMS (Relational DataBase Management System)

- RDBMS is a collection of programs and capabilities that enable IT teams and others to create, update, administer and otherwise interact with a relational database.

- RDBMSes store data in the form of tables, with most commercial relational database management systems using Strucured Query Language (SQL) to access the database

Now we'll see the 3 well known relational RDBMS

- MySQL
- PostgreSQL
- SQL Server

MySQL

- MySQL is an open-source relational database management system (RDBMS).
- It was created by a Swedish company in 1994.
- MySQL is used to manage the data of web applications, websites, and even mobile applications by sorting it into tables; because of this, it is called a relational database.

PostgreSQL

- PostgreSQL is a powerful, open source object-relational database system that uses and extends the SQL language combined with many features that safely store and scale the most complicated data workloads.

- The origins of PostgreSQL date back to 1986 as part of the POSTGRES project at the University of California at Berkeley

- PostgreSQL is used as the primary data store or data warehouse for many web, mobile, geospatial, and analytics applications. The latest major version is PostgreSQL 12.

SQL Server

- SQL Server is a elational database management system developed by Microsoft
- The history of Microsoft SQL Server begins in 1989 and extends to the current day.
- As a databse server, it is a software product with the primary function of storing and retrieving data as requested by other software applications.

Comparison between the 3 RDBMS

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.

Comparison between the 3 RDBMS

Data changes for MySQL, PostgreSQL and SQL Server

	MySQL	PostgreSQL	SQL Server
Row Updates	Updates happen in place, changed data is copied to the rollback segment. This makes vacuuming and index compaction very efficient. MySQL is slower for reads, but writes are atomic and if columns in a secondary index change, this does not require changes to all indexes.	Updates are being implemented as inserts + mark as delete for vacuum. All indexes have a link to the physical id of the row. This has an update amplifying effect because when the column gets updated, new row with new physical id gets created and all indexes require updates, even those which are not referring to the changed column to get a pointer to the new row physical id.	Row-Store database engine: In-Memory database engine: updates implemented as insert + mark for delete. Garbage collector is not non-blocking and parallel Columnstore database engine: in-place updates
Vacuum / Defragmentation	Vacuuming and index compaction are very efficient.	Vacuum performs full tables scans to find the deleted rows and quite heavy process/might impact users' workload.	In-memory garbage collector might add max ~15% overhead, usually much less.

Thank you