Commercial Databases

by Sophia

WHAT'S COVERED

This lesson explores some of the most common databases, in six parts. Specifically, this lesson will cover:

1. Introduction

A database management system (DBMS) is software that helps organize and manage data in a structured way. It provides tools for storing, retrieving, and manipulating data, making it easier to store, access, and update information in a database. The DBMSs described in this lesson include SQLite, Oracle, SQL Server, PostgreSQL, MySQL, and MariaDB. They represent a mixture of commercial and open-source products; some of them are open source but have commercial (paid) options available that include additional support and tools.

2. SQLite

SQLite is a self-contained database that is file-based and completely open source. It is known for its portability, reliability, and performance, even in low-memory environments. All the transactions are ACID-compliant (atomicity, consistency, integrity, durability), even in cases where there's a system crash or power outage.

It is unique in that it is a serverless database. Most other databases require a server process that programs connect to when performing database requests. SQLite, however, accesses the database and reads from and writes to the database disk file directly. Consequently, there is no need to configure a server or to configure

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programs to connect to the database. If programs can access the disk that SQLite is on, they can access it directly.

One of its limitations is its limited **concurrency**. Although multiple processes can read and query simultaneously, only one process can make changes to the database at a time. There is also no way to specify permissions for different users with SQLite. As long as the underlying operating system permits users to access the disk file, the user can access the database.

TERM TO KNOW

Concurrency

The ability for multiple users or processes to access and change a file simultaneously.

3. SQL Server

SQL Server is a robust Microsoft product with a variety of editions, from its smaller-scale Express to an Enterprise edition that has high-end data center capabilities. SQL Server isn't only a database engine; it has many other business intelligence tools. SQL Server uses its version of SQL with Transact SQL. It is a tool that is highly supported, but it also comes at a high price. For example, an Enterprise edition license can cost upwards of $14,000 per core. Unlike Microsoft Access (Microsoft's consumer-level database application), it can run on Linux as well as in the cloud environment.

4. Oracle

Oracle has established itself as one of the top database systems used in enterprise solutions. It is owned by Oracle Corporation. Similar to SQL Server, many different variants of Oracle are available, so there is one to meet any organization's needs.

Oracle has no open-source version of its DBMS product. However, the XE or Express edition, which is the basic edition, is free if used for training purposes. Oracle charges for it only for enterprise use. Oracle is one of the most expensive DBMSs, and determining the end cost can be quite complex because of all the many optional tools and features available.

Oracle also offers PL/SQL, a procedural language that provides developers with powerful tools for grouping procedures and functions together into packages. Even with Oracle's high cost, many organizations prefer it because it is fast, highly reliable, and easy to support.

5. MySQL and MariaDB

MySQL (now owned by Oracle) and MariaDB are some of the most popular open-source databases. MySQL, which is designed for speed and reliability, powers many of the largest databases, including Twitter, YouTube,

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Airbnb, Facebook, and Netflix. Once MySQL was taken over by Oracle, the original MySQL developers split off to create MariaDB as a fork of the MySQL code, as they worried that Oracle had planned to kill MySQL. MySQL now exists both in an open-source version and as a commercial offering, known as MySQL Enterprise Edition. While MariaDB remains open source, MariaDB Corporation, the company behind MariaDB, offers MariaDB Enterprise as a commercial service. Its subscribers are not paying for MariaDB itself, but for services, support, and extra features.

Like most other DBMSs, MySQL must be installed on a server. Many third-party tools are available for use with MySQL/MariaDB, including phpMyAdmin.

6. PostgreSQL

PostgreSQL is one of the most advanced open-source relational databases. It was created to be standard-compliant and highly extensible. Standard compliance is a significant element of PostgreSQL that differentiates it from other databases. It is an object/relational database, meaning that although it is primarily a relational database, it offers functionality like table inheritance implemented in object databases. PostgreSQL has no corporate owner; it is maintained by a global network of volunteers. However, some companies sell support services and tools for PostgreSQL as a commercial product.

PostgreSQL isn't as widely used as MySQL due to a lack of additional third-party tools. However, PostgreSQL is compatible with many programming languages and platforms, making it much easier to migrate the database from one operating system to another or integrate it within a given tool. You will work with PostgreSQL later in this course.

SUMMARY

In this lesson you learned in the **introduction** that popular database management systems available today include **SQLite**, **SQL Server**, **PostgreSQL**, **MySQL**, **MariaDB**, and **Oracle**. Depending on the requirements and characteristics of the application or project at hand, the most appropriate database depends on features, performance, scalability, and cost. This section focused on the primary relational databases you will find in companies or other organizations. There are many smaller databases that can be found, but they are generally not used to run companies or use data from the internet.

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TERMS TO KNOW

Concurrency

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