**Database Selection and Analysis**

**Report for Back-end Project 6D**

1. Intro to the project

As requested by the boss in the meeting, research databases on the market for business new back-end project.

1. Database requirements for the project

Several needs are summarized based on the meeting.

* 1. Quick and easy solution
  2. Minimal setup
  3. No special hardware/software required
  4. Cross-platform
  5. No special network accesses
  6. Single-user access
  7. Easy backup to USB flash drive
  8. Low cost
  9. Can transfer to other databases easily later
  10. Python compatible

1. Main Database Analysis Options
   1. Microsoft SQL Server (MSSQL)

Microsoft SQL is a robust, enterprise grade database, it designed for very high performance and scalable data management. It supports multiply users and workloads, it can integrate seamlessly with another Microsoft ecosystem software. Offering advanced security. However, it’s very expensive and license limitations. What’s more, it difficult to study for beginner, for small group it’s hard to study and complexity to setting. It runs primarily on the Windows platform, so not good for cross-platform, or difficult to deploy in non-Windows environments.

<https://www.microsoft.com/en-us/sql-server>

* 1. Oracle

Installation and configuration are a complex that may need require more time and effort. No special hardware and software required, it can run on different system platform. Oracle database support a wide range of platforms to meet the cross-platform needs. It can run in local mode without network connection, and it supports single-user mode too. What’s more, it supports data backup to external storage devices, including USB flash drives. The commercial licenses are expensive for individual users and small projects. And Oracle provides data export tools to help people migrate data to another database system. Lastly, Oracle supports python language, so can deploy database using python.

<https://www.oracle.com/ca-en/database/>

* 1. SQLite

SQLite is a powerful, open source database, it’s good for single user non-concurrent access, and it’s works on local hard drive, so it’s not over the network. It’s very lightweight but high-performance, cross-platform can work on Linux, Windows, Mac, Android, and Window Mobile. No installation required, reliable, portable, easy to access and cost-effective, what’s more it built with python.

<https://sqlite.org/whentouse.html>

* 1. MySQL (or MariaDB)

The MariaDB is an open sources software, making it a very cost-effective choice, but it owned by Oracle now, so there is a licensing fees, but commercial support is available. It is easy to set up, simple install and configuration, especially compared to other enterprise database. Due to its small and simple dependencies, MariaDB requires minimal hardware and software to function. It can work on basic PC without any specialized requirements. What’s more, it supports on different systems, which made it cross-platform. And there it can run on a local machine, so no special network accesses. Also, it can be single user access, easy backup to USB flash drive. MariaDB works very well with python, with available connectors for intergration.

<https://mariadb.org/>

* 1. PostgreSQL

PostgreSQL is a quick and easy solution with minimal setup, single user access. It provides cross-platform flexibility, also can transfer to other databases very easily later. This makes migrations to other standards databases easy. It provides powerful features like full text search, and JSON support. PostgreSQL is open source and free to use. And it’s works with python very good.

<https://www.postgresql.org/>

<https://www.postgresql.org/about/>

* 1. Microsoft Access

Microsoft Access is user friendly interface and quick and easy solution, it need minimal setup, install can be done very quick. it can run on Windows system without specific setting. It’s single user access with GUI, making it approachable for non-technical users. Backing up is easy for USB flash drive, it is low cost if you already have a MS suite, python compatible and easy transfer to other databases.

<https://www.microsoft.com/en-ca/microsoft-365/access>

* 1. LibreOffice Base

LibreOffice Base is a standard lone end user software like Microsoft Access, quick and easy set up with minimal set up. No special hardware and software required, it is cross platform software which can works on different system. Also good for databases for individual use, easy backup to USB flash drive. With open source it eliminating licensing fees. It can transfer to other databases easily later. Python integration with LibreOffice Base, but may not be as robust or good support as with another database system.

<https://www.libreoffice.org/>

1. Analysis of Databases

Based on the requirements to analysis each database.

1. Evaluation of Databases Options (Criterion3 – database rated 0 to 5)

Draw the table to give each database for comparison.

**Features: 1 is not important, 5 is very important**

**Criteria: 0 means doesn’t meet the criteria at all, 5 meets extremely well**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Features  Rank 1-5 | MSSQL  Rank 0-5 | Oracle  Rank 0-5 | SQLite  Rank 0-5 | MySQL  Rank 0-5 | PostgreSQL  Rank 0-5 | Microsoft Access  Rank 0-5 | LibreOffice Base  Rank 0-5 |
| Quick and Easy solution (4) | 5\*4 | 1\*4 | 5\*4 | 5\*4 | 5\*4 | 5\*4 | 4\*4 |
| Minimal Setup (4) | 5\*4 | 1\*4 | 5\*4 | 5\*4 | 5\*4 | 5\*4 | 5\*4 |
| No Special H/S required (5) | 4\*5 | 4\*5 | 5\*5 | 5\*5 | 5\*5 | 3\*5 | 5\*5 |
| Cross-platform (4) | 5\*4 | 5\*4 | 5\*4 | 5\*4 | 5\*4 | 0\*4 | 5\*4 |
| No special network access (1) | 5\*1 | 5\*1 | 5\*1 | 5\*1 | 5\*1 | 3\*1 | 5\*1 |
| Single user access (4) | 5\*1 | 0\*1 | 5\*1 | 4\*1 | 4\*1 | 5\*1 | 5\*1 |
| Easy backup (3) | 5\*3 | 0\*3 | 5\*3 | 2\*3 | 3\*3 | 5\*3 | 3\*3 |
| Low-Cost (5) | 4\*5 | 0\*5 | 5\*5 | 4\*5 | 5\*5 | 2\*5 | 5\*5 |
| Easy Transfer (3) | 4\*3 | 2\*3 | 3\*3 | 3\*3 | 2\*3 | 2\*3 | 2\*3 |
| Python compatible (5) | 5\*5 | 5\*5 | 5\*5 | 5\*5 | 5\*5 | 4\*5 | 5\*5 |
| Performance (1) | 4\*1 | 4\*1 | 4\*2 | 4\*2 | 5\*2 | 3\*2 | 2\*2 |
| Total -> | 166 | 88 | 177 | 137 | 169 | 110 | 160 |

1. Recommendation

After researching the main popular databases and combining with the Boss requirements of the project, and comparing other databases, I recommend SQLite as our back-end project database for the first phrase. As shown in the table above, SQLite perform best among the databases and does meet each project requirement very well.

1. Reason for recommend SQLite
   1. Quick and easy solution, simple and fast
   2. Minimal setup
   3. No special hardware or software required
   4. Cross-platform
   5. Single-user access
   6. Easy backup to USB stick
   7. Free to use
   8. Easy transfer to other databases later
   9. Python compatible

In conclusion, SQLite meet projects needs very well, and free to use.