**Database Selection and Analysis Report for 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 (Criterion1)

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
   1. Microsoft SQL Server (MSSQL)

Microsoft SQL Server has many advantages and disadvantages. Its advantages include high-speed query processing, ease of use, portability, data integrity, security, and a standardized language for interacting with databases. However, it also has some disadvantages, such as expensive pricing, complexity of optimizing and maintaining complex queries and database designs, lack of real-time processing, limited scalability, and potential vendor lock-in. Additionally, the Express version of SQL Server has some limitations in terms of database size, CPU usage, RAM usage, and lack of SQL Agent.

* 1. Oracle

Oracle Database offers many advantages, including high performance, portability, backup and recovery capabilities, support for multiple databases, and strong security features. It is highly scalable and provides extensive support for data consistency, concurrency, and data access control. However, Oracle Database is characterized by complexity, high cost, installation and maintenance. Oracle products have high pricing and complex licensing processes. In addition, Oracle Database may not be suitable for small and medium-sized enterprises that require small and medium-sized databases.

* 1. SQLite

SQLite has several advantages, including free and open source, lightweight, high-performance, no installation required, reliable, portable, easy to access and cost-effective. However, SQLite also has some limitations, such as primitive syntax and format, insufficient support for certain features, and limited scalability compared to other databases such as PostgreSQL. Despite these limitations, SQLite remains a popular choice for small projects and applications that require a simple, stand-alone database engine.

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

* 1. MySQL (or MariaDB)

The advantages of MariaDB include being completely open source and compatible with MySQL's protocol. At the same time, it is better than MySQL in terms of scalability and query speed, and is suitable for managing large-scale data. The difference is that it is powered by MariaDB and developed by the original core MySQL team, focusing on user flexibility and freedom, and providing more features that MySQL does not have. MySQL and MariaDB are each suitable for different use cases. MySQL is widely adopted and provides strong transaction support, while MariaDB is more suitable for processing large-scale data and has faster query speed. Choosing the right database depends on specific needs and preferences.

<https://mariadb.org/>

* 1. PostgreSQL

As an open source object-relational database management system, PostgreSQL has many advantages, including open source and scalability, ACID compatibility and strong security, compatibility and support, as well as scalability and performance. However, it also has some disadvantages, such as complexity and performance issues, adoption and resource constraints, database structure and maintenance challenges, and the potential need for specialized hardware or software.

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

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

* 1. Microsoft Access

Microsoft Access has several advantages and disadvantages. Some of the benefits include ease of learning and use, rapid development and prototyping, integration with Microsoft Office, data security and rights management, and customizable user interface. Additionally, it's also fast and easy to build something usable, making it ideal for proof-of-concept development. However, Microsoft Access also has some limitations, such as limited scalability and performance, relational database constraints, concurrent user limits, lack of version control and collaboration features, and compatibility and portability issues.

* 1. LibreOffice Base

LibreOffice Base, as the database component of the LibreOffice suite, has the advantages of open source and free, strong compatibility, community support and multi-platform availability. However, some users may be dissatisfied with its unrefined user interface, compatibility challenges, and lack of professional support and advanced features. To sum up, LibreOffice Base is a free and open source database management tool suitable for different operating systems, but it may have some limitations compared with commercial office suites in some aspects.

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

1. Analysis of Databases

Based on the requirements to analysis each database.

1. Evaluation of Databases

Draw the table to give each database points.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |  |  |  |  |  |  |  |
| Minimal Setup |  |  |  |  |  |  |  |
| No Special H/S required |  |  |  |  |  |  |  |
| Cross-platform |  |  |  |  |  |  |  |
| No special network access |  |  |  |  |  |  |  |
| Easy backup |  |  |  |  |  |  |  |
| Low-Cost |  |  |  |  |  |  |  |
| Easy Transfer |  |  |  |  |  |  |  |
| Python compatible |  |  |  |  |  |  |  |

1. Conclusion