

MSc Group C

John Doe

May 30, 2025

Contents

1 Introduction	1
2 System perspective	1
2.1 Database (PostgreSQL)	1
3 Process perspective	2
Bibliography	2

1 Introduction

2 System perspective

2.1 Database (PostgreSQL)

Our setup includes two PostgreSQL databases: one for production and one for testing. Each runs on a separate, containerized droplet, with access restricted via a firewall to ensure security and isolation between environments (see Figure 1).

PostgreSQL was to replace the SQLite setup, due to strong SQL standards compliance [1], high community adoption [2], advanced features (e.g., JSON, HStore, Security) [3], [4].

2.1.1 Choice of Technology - Database

To replace our current SQLite setup, we compared leading relational databases based on the Stack Overflow 2024 Developer Survey [2]. Only open-source, self-hosted RDBMSs were considered—excluding NoSQL and cloud services.

Database	SQLite	PostgreSQL	MySQL	Oracle	SQL Server	MariaDB
Popularity	33.1% [2]	49.7% [2]	40.3% [2]	10.1% [2]	25.3% [2]	17.2% [2]
License	Public-Domain [5]	Open-Source [6]	Open-Source & Proprietary [7]	Proprietary	Proprietary [8]	Open-Source [9]
Standards Compliance [10]	Low [1]	Compliant [1]	Limited [1]	<i>Unknown</i>	<i>Unknown</i>	Fork of MySQL; Assumed limited
Max Connections	1	500,000+ [4]	100,000+ [4]	<i>Unknown</i>	<i>Unknown</i>	200,000+ [4]

Database	SQLite	PostgreSQL	MySQL	Oracle	SQL Server	MariaDB
Horizontal Scaling	No	Yes [4]	Yes [4]	<i>Unknown</i>	<i>Unknown</i>	Yes [4]
Concurrency Handling	None	Excellent [4]	Moderate [4]	<i>Unknown</i>	<i>Unknown</i>	Strong [4]

Note: Performance benchmarks are excluded due to license restrictions placed on benchmarking by licensing of proprietary DBMSs [11].

MySQL was ruled out due to licensing issues and development concerns post-Oracle acquisition [12], [1].

3 Process perspective

Bibliography

- [1] Mark Drake and ostezer, “SQLite vs MySQL vs PostgreSQL: A comparison of relational database management systems.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.digitalocean.com/community/tutorials/sqlite-vs-mysql-vs-postgresql-a-comparison-of-relational-database-management-systems>
- [2] Stack Overflow, “Stack Overflow developer survey 2024.” Accessed: Mar. 20, 2025. [Online]. Available: <https://survey.stackoverflow.co/2024/>
- [3] A. Regu, “MariaDB vs PostgreSQL: Detailed comparison for developers.” Accessed: Mar. 20, 2025. [Online]. Available: <https://blog.tooljet.ai/mariadb-vs-postgresql-a-detailed-comparison-for-developers/>
- [4] P. Abedinpour, “MariaDB vs MySQL vs PostgreSQL vs SQLite: A comprehensive comparison for web applications.” Accessed: Mar. 20, 2025. [Online]. Available: <https://medium.com/@peymaan.abedinpour/mariadb-vs-mysql-vs-postgresql-vs-sqlite-a-comprehensive-comparison-for-web-applications-0523cc3bc9d8#:~:text=PostgreSQL%20tends%20to%20perform%20better,applications%20with%20stringent%20data%20requirements.>
- [5] SQLite, “SQLite is public domain.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.sqlite.org/copyright.html>
- [6] The PostgreSQL Global Development Group, “PostgreSQL license.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.postgresql.org/about/licence/>
- [7] Oracle, “MySQL - commercial license.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.mysql.com/about/legal/licensing/oem/>
- [8] Microsoft, “Microsoft SQL server - commercial license.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.microsoft.com/en-us/licensing/product-licensing/sql-server>
- [9] MariaDB, “MariaDB - license.” Accessed: Mar. 20, 2025. [Online]. Available: <https://mariadb.com/kb/en/mariadb-licenses/>
- [10] B. Kelechava, “The SQL standard – ISO/IEC 9075:2023 (ANSI X3.135).” Accessed: Mar. 20, 2025. [Online]. Available: <https://blog.ansi.org/sql-standard-iso-iec-9075-2023-ansi-x3-135/>
- [11] Oracle, “Oracle technology network license agreement.” Accessed: Mar. 20, 2025. [Online]. Available: <https://www.oracle.com/downloads/licenses/standard-license.html>
- [12] The Fedora Project, “Issue: Replace MySQL with MariaDB.” Accessed: Mar. 20, 2025. [Online]. Available: <https://fedoraproject.org/wiki/Features/ReplaceMySQLwithMariaDB>