

MSc Group C

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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 [do_dbcomparison], high community adoption [stackoverflow_survey_2024], advanced features (e.g., JSON, HStore, Security) [tooljet_mariavspostgres], [Medium_Peymaan_DB_Comparison].

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 [stackoverflow_survey_2024]. Only open-source, self-hosted RDBMSs were considered—excluding NoSQL and cloud services.

Database	SQLite	PostgreSQL	MySQL	Oracle	SQL Server	MariaDB
Popularity	33.1% [stackoverflow_survey_2024]	49.7% [stackoverflow_survey_2024]	40.3% [stackoverflow_survey_2024]	10.1% [stackoverflow_survey_2024]	25.3% [stackoverflow_survey_2024]	17.2% [stackoverflow_survey_2024]
License	Public-Domain [sqlite_license]	Open-Source [postgresql_license]	Open-Source & Proprietary [mysql_license]	Proprietary	Proprietary [microsoft_sqlserver_license]	Open-Source [mariadb_license]

Database	SQLite	PostgreSQL	MySQL	Oracle	SQL Server	MariaDB
Standards Compliance	Low [@do_dbcomparison]	Compliant [@do_dbcomparison]	Limited [@do_dbcomparison]	<i>Unknown</i>	<i>Unknown</i>	Fork of MySQL; Assumed limited
Max Connections	1	500,000+ [@Medium_Peymaan_DB_Comparison]	100,000+ [@Medium_Peymaan_DB_Comparison]	<i>Unknown</i>	<i>Unknown</i>	200,000+ [@Medium_Peymaan_DB_Comparison]
Horizontal Scaling	No	Yes [@Medium_Peymaan_DB_Comparison]	Yes [@Medium_Peymaan_DB_Comparison]	<i>Unknown</i>	<i>Unknown</i>	Yes [@Medium_Peymaan_DB_Comparison]
Concurrency Handling	None	Excellent [@Medium_Peymaan_DB_Comparison]	Moderate [@Medium_Peymaan_DB_Comparison]	<i>Unknown</i>	<i>Unknown</i>	Strong [@Medium_Peymaan_DB_Comparison]

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

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

3 Process perspective

4 Bibliography