MSc_group_c

ITU MiniTwit Report Skeleton

May 2024

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

Database	License	Popularity[6]	SQL Compliance[7]	Max Connections[8]	Scaling[9]	Concurrency[10]	Notes
SQLite	Public Domain[11]	33.1%	Low	1	No	None	File-based, lightweight

[1] DigitalOcean - RDBMS Comparison
[2] Stack Overflow 2024 Developer Survey
[3] Medium - RDBMS Comparison
[4] Tooljet - MariaDB vs PostgreSQL
[5] Stack Overflow 2024 Developer Survey
[11] SQLite Licensing

Database	License	Popularity	SQL Compliance[6][7]	Max Connections[8]	Scaling[9]	Concurrency	Notes[10]
PostgreSQL	Open-Source[12]	48.7%	High	500,000+	Yes (Citus, Postgres-XL)	Excellent	Strong standards, JSON/XML support
MariaDB	Open-Source[13]	17.2%	Moderate (MySQL fork)	200,000+	Yes (Galera Cluster)	Strong	MySQL-compatible, stable
MySQL	Dual-License[14]	40.3%	Limited	100,000+	Yes (native sharding/replica)	Moderate	Dropped by Fedora[15], dev slowdown[16]
Oracle DB	Proprietary[17]	10.1%	*Unknown*	*Unknown*	*Unknown*	*Unknown*	-
SQL Server	Proprietary[18]	25.3%	*Unknown*	*Unknown*	*Unknown*	*Unknown*	-

Note: Performance benchmarks are excluded due to license restrictions placed on benchmarking by licensing of proprietary DBMSs[19].

While MariaDB is stable and compatible with MySQL, its advantages rely on prior MySQL knowledge, which our team lacks. MySQL was ruled out due to licensing issues and development concerns post-Oracle acquisition[20][21].

[12] PostgreSQL License
[13] MariaDB License
[14] MySQL License
[15] Fedora Drops MySQL
[16] DigitalOcean - RDBMS Comparison
[17] Oracle Licensing
[18] SQL Server Licensing
[6] Stack Overflow 2024 Developer Survey
[7] ISO/IEC 9075 SQL Standard
[8] AWS - MariaDB vs PostgreSQL
[9] AWS - MariaDB vs PostgreSQL
[10] AWS - MariaDB vs PostgreSQL
[19] Oracle Standard License
[20] DigitalOcean - RDBMS Comparison
[21] Fedora Drops MySQL

2.2 References

3 Process perspective