

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

Database	SQLite	PostgreSQL	MySQL	Oracle	SQL Server	MariaDB
<b>Horizontal Scaling</b>	No	Yes [4]	Yes [4]	<i>Unknown</i>	<i>Unknown</i>	Yes [4]
<b>Concurrency Handling</b>	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

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