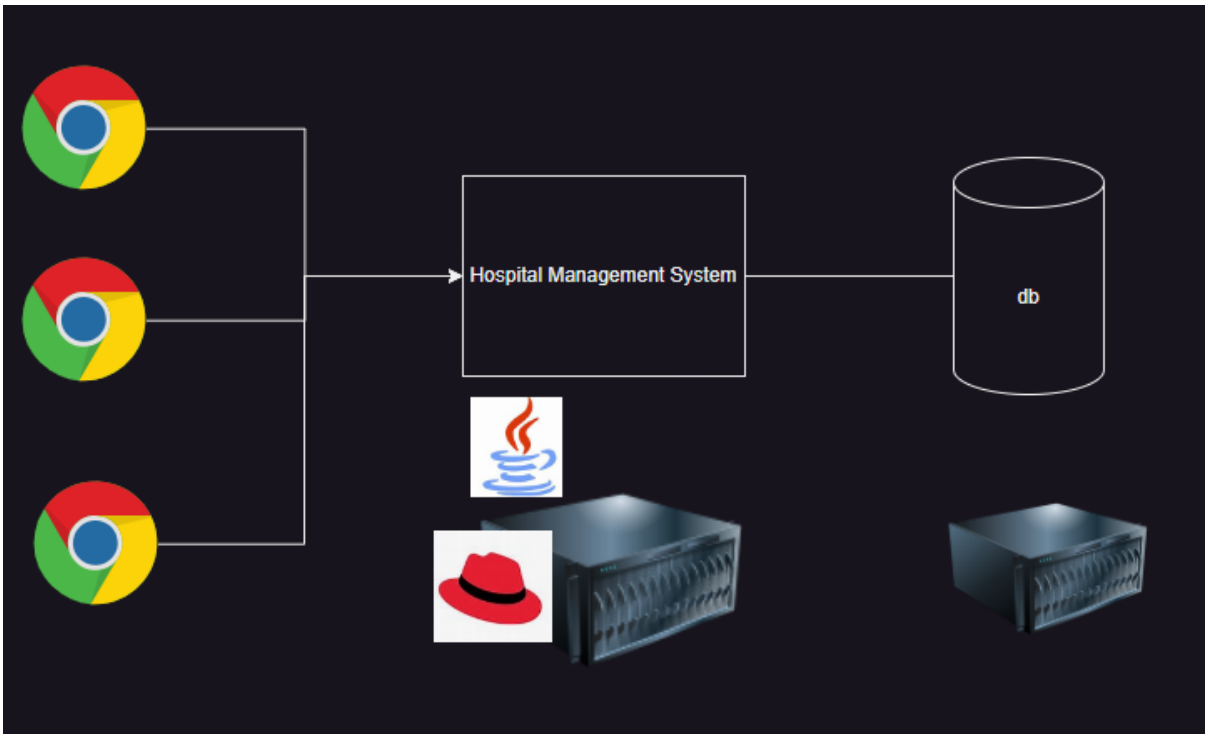
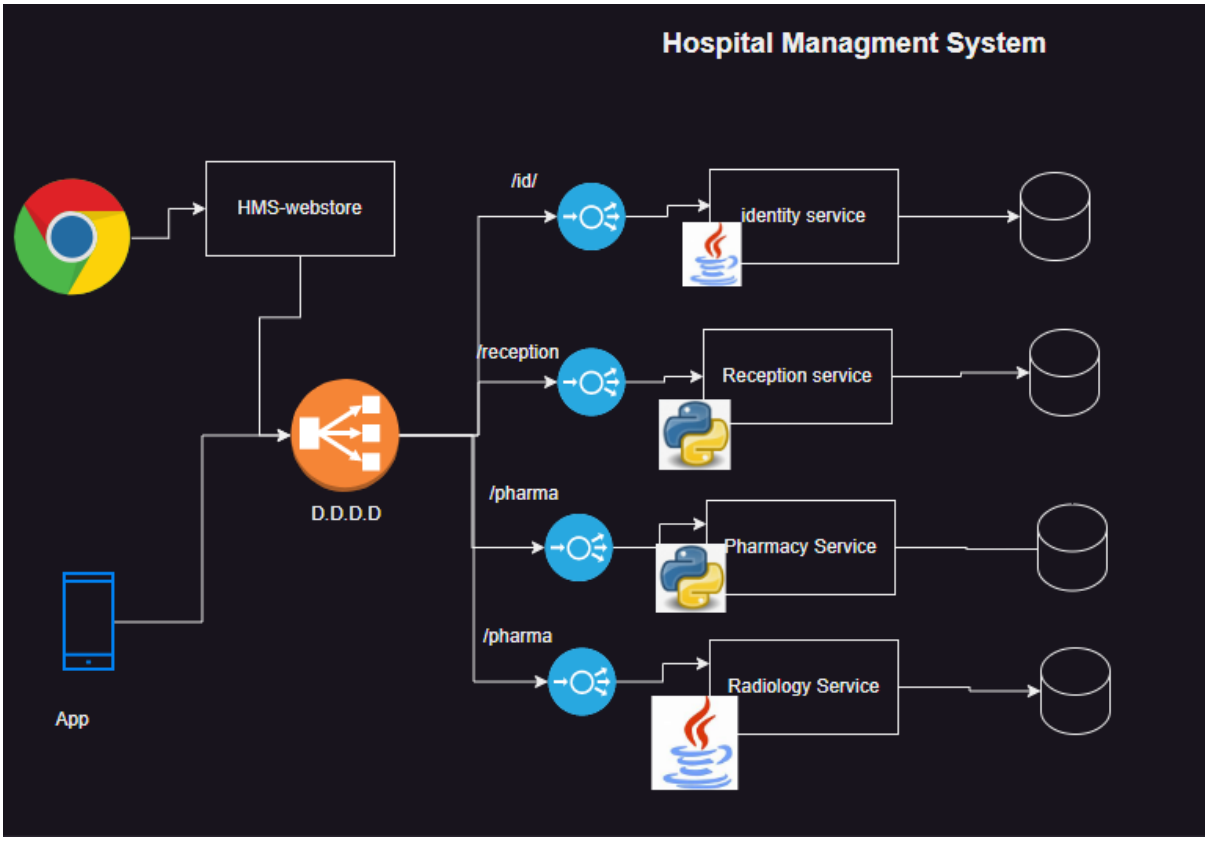
Application Architectures

- Monolith:
  - All of the application components run on a server



- Microservices:
  - Application is developed as collection of services
  - Each service is created based on functionality
  - Each Service generally has its own database.
  - Each Service can be implemented in the best technology
  - Each service can be individually deployed.

- Zero downtime deployements are expected.



- Cloud Native:
  - These architectures are designed to work for cloud by taking the advantages of new options such as serverless.

Scaling

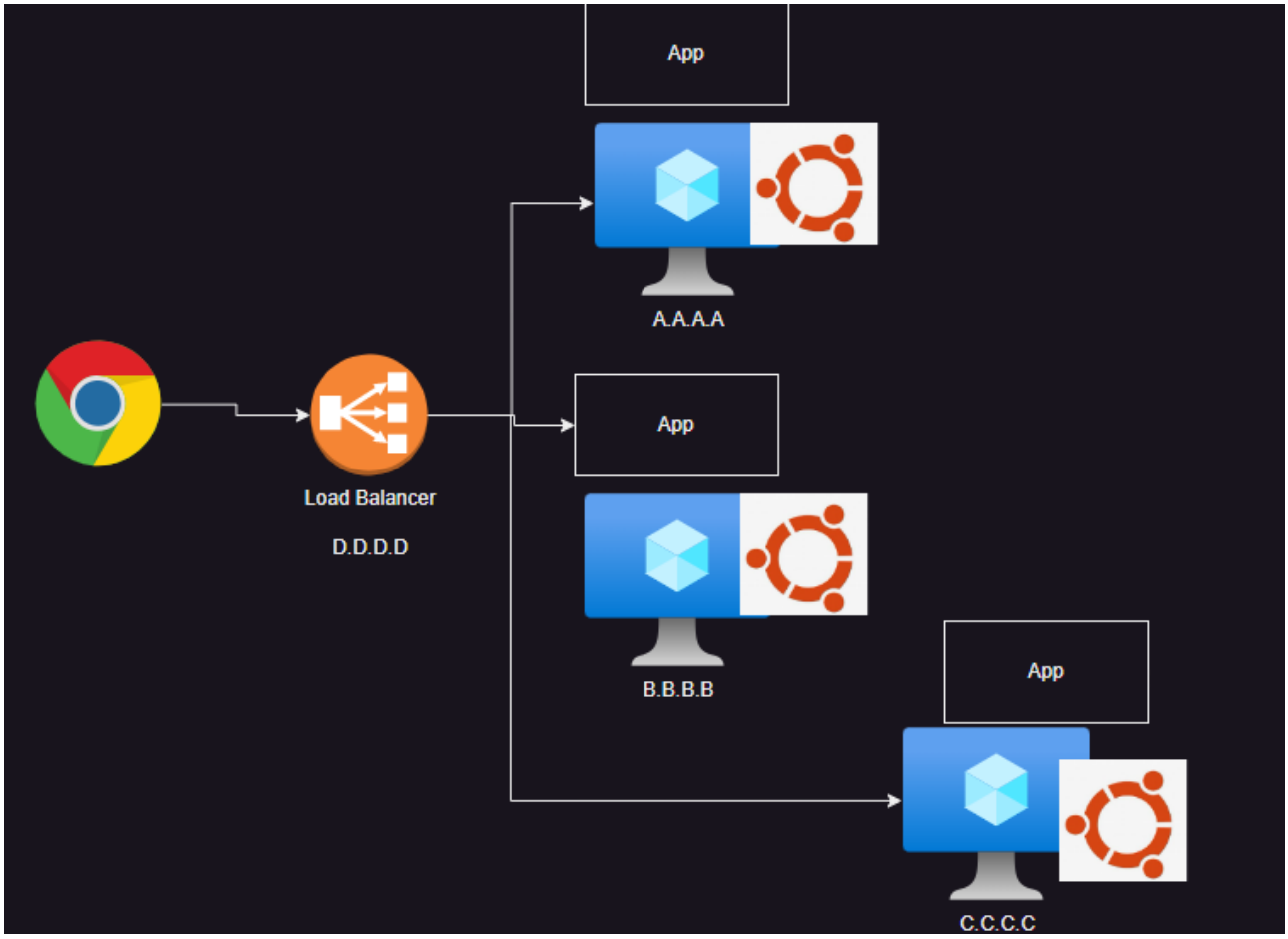
- Vertical Scaling: Increasing the size of the server (cpu, RAM, ...)
- Horizontal Scaling: Increasing number of servers

Elasticity

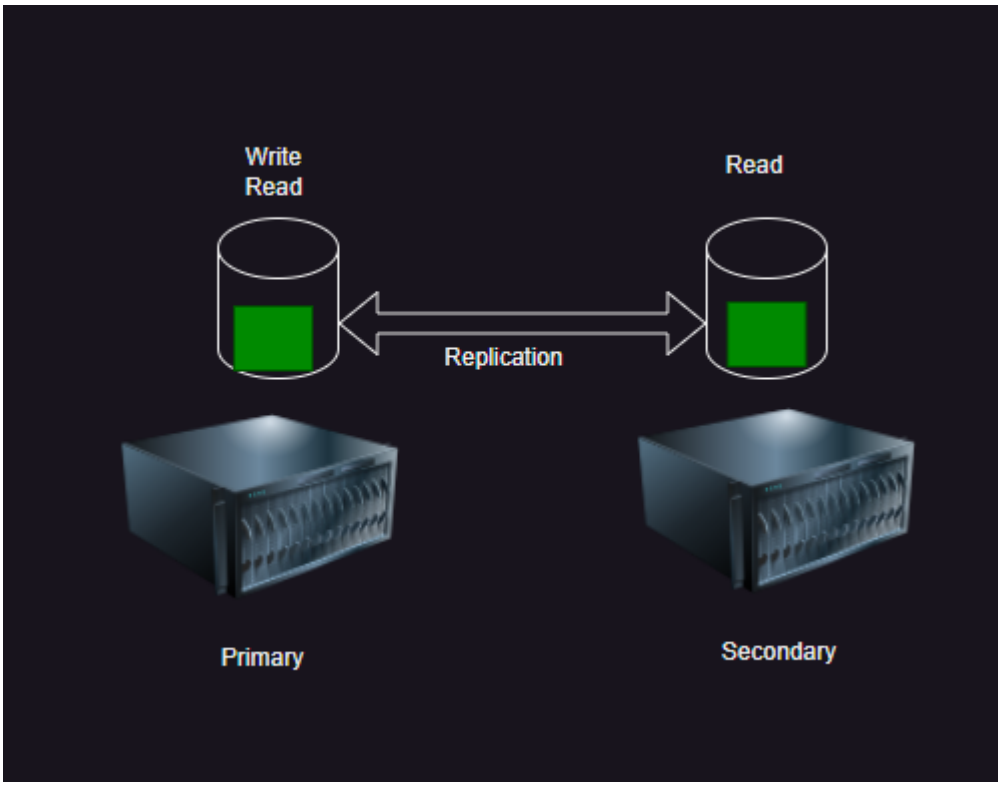
- Elasticity is equavalent to scaling, we can
  - scale up or down (vertical scaling)
  - scale in or out (horizontal scaling)

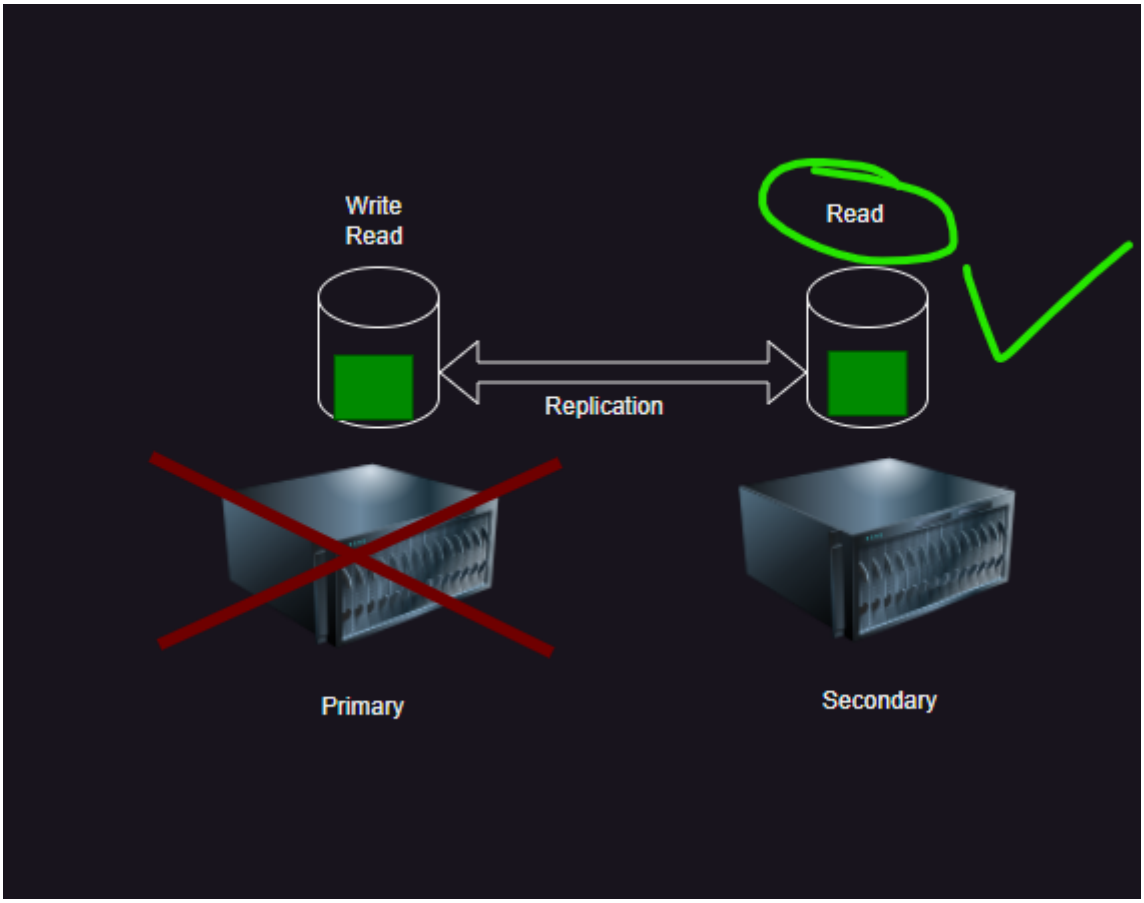
Load Balancing

- Overview

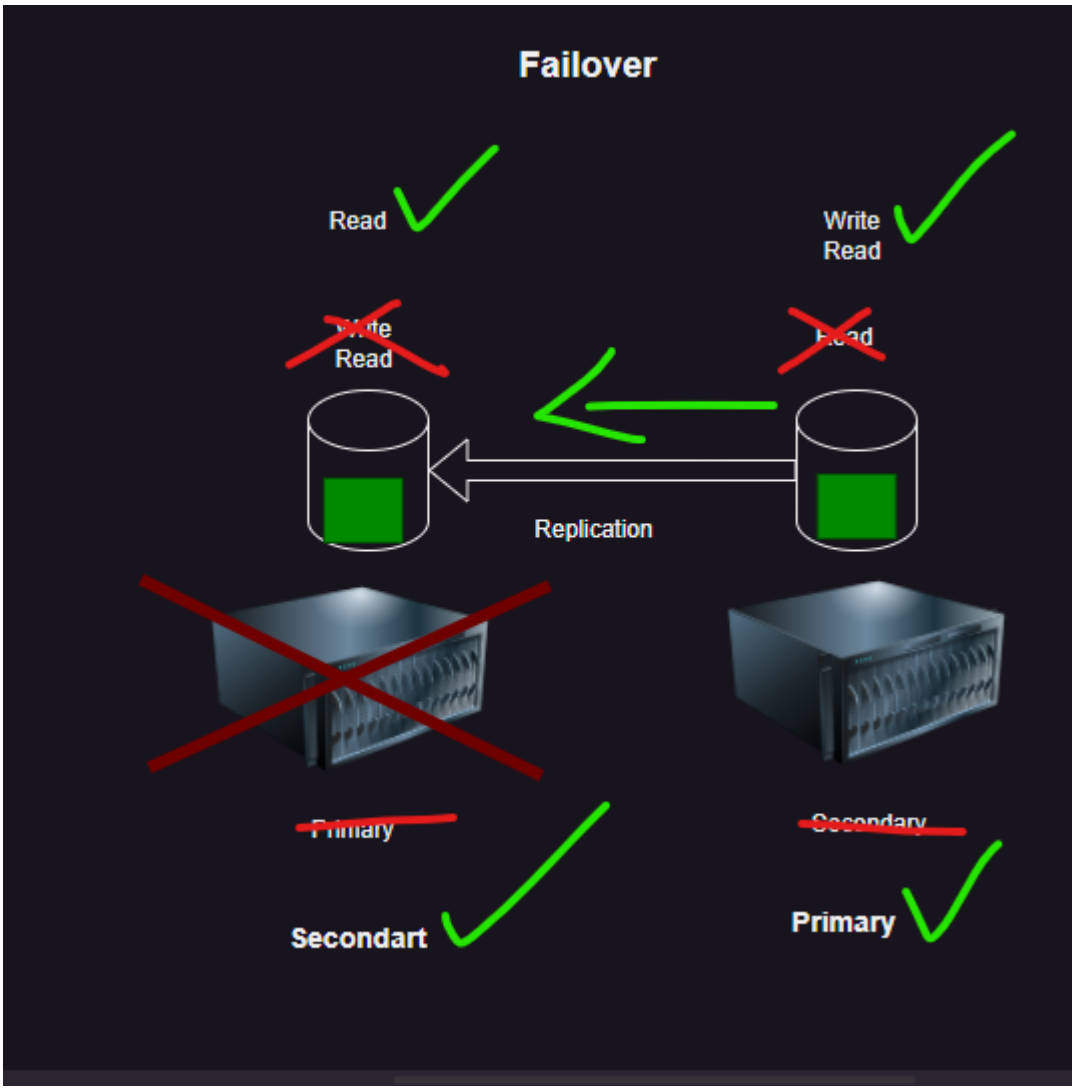


Replication (Databases)





Failover (Databases)



Structured data vs Unstructured data

- Structured data can be queried.
- Unstructured data is generally in the form of documents in text, audio and video.

Databases

- Relational Databases:
  - Data is stored in tabular format
  - Tables can have relations between them
  - To query this data, SQL (Structured Query Language) is used.
  - Strict Schema is enforced
  - Examples:
    - SQL Server
    - Oracle
    - mysql
    - Postgres
    - DB2
- NoSQL Databases:
  - To query the data there is no formal language, databases might give cli, client libraries
  - NoSQL Databases donot enforce strict schema.

- Examples:
  - Mongo DB
  - Cassandra
  - Redis
  - Etcd
  - Gremlin