

## **1. Distributed web infrastructure**

**Explaining some specifics about this infrastructure:**

**For every additional element, The Reason for adding it:**

**Two Servers:**

Two extra servers were added for high availability, and load distribution, to improve scalability, redundancy and fault tolerance.

**Load Balancer (HAproxy):**

The load balancer was added to ensure that incoming requests are evenly distributed, improving scalability and fault tolerance.

**What distribution algorithm the Load balancer is configured with and how it works:**

For the Load balancer, the algorithm it was configured with is the round-robin algorithm which distributes traffic sequentially to the active servers, ensuring fairness.

**The Load balancer setup is Active-Active.**

**The Difference between Active-Active and Active-Passive setup:**

In Active-Active setup, all servers are actively serving requests simultaneously.

In an Active-Passive setup, one server is actively serving traffic, while others are on standby for failover.

**How a database Primary-Replica (Master-Slave) cluster works:**

In the Primary-Replica (Master-Slave) cluster, the Primary node handles the write operations (INSERT, UPDATE, DELETE)

The Replica node replicates the data from the Primary node and handles the read operations(SELECT).

**What is the difference between the Primary node and the Replica node in regard to the application:**

The Primary node handles write operations, ensuring data consistency and integrity.

The Replica node replicates the data from the Primary node and handles read operations, ensuring high availability and reducing the load on the primary.

## **ISSUES WITH THE INFRASTRUCTURE:**

**Single Point of Failure (SPOF):**

The Load Balancer can be SPOF. If it fails, incoming traffic won't be distributed.

The Primary database server can still be an SPOF. If the primary node fails, all write operations will be affected until failover to a replica occurs.

**Security Issues:** There is no mention of a firewall or HTTPS, the Data transferred is not secured and encrypted and so can suffer malicious attacks.

**No Monitoring:** Lack of monitoring tools means that issues with the infrastructure may not be promptly detected and resolved.