

ALX Web infrastructure design

TASK 1-distributed_web_infrastructure

Infrastructure Design:

1. **Server 1 (Primary Web Server):**
 - Web Server: Nginx
 - Application Server
 - Application Files (Codebase)
2. **Server 2 (Secondary Web Server):**
 - Web Server: Nginx
 - Application Server
 - Application Files (Codebase)
3. **Server 3 (Database Server):**
 - Database: MySQL
4. **Load Balancer (HAProxy):**
 - Distributes incoming web traffic to the two web servers.
5. **User's Computer**
 - Initiates requests to www.foobar.com.

Specifics and Explanations:

- **Additional Elements:**
 - We added a secondary web server for redundancy and load distribution. The load balancer distributes traffic between the primary and secondary web servers.
 - HAProxy load balancer manages incoming requests to achieve high availability and even distribution.
- **Distribution Algorithm:**
 - The load balancer is configured with a Round Robin distribution algorithm, which cycles through each server in a circular order. This ensures an even distribution of requests among the web servers.
- **Active-Active Setup:**
 - The setup is Active-Active. Both web servers are actively handling incoming requests. This increases availability and balances the load. If one web server fails, the load balancer directs traffic to the other.
- **Database Primary-Replica Cluster:**
 - The database server is set up as a Primary-Replica (Master-Slave) cluster.
 - The Primary node handles write operations (INSERT, UPDATE, DELETE), while the Replica node replicates data from the Primary node and serves read operations (SELECT).
 - This setup improves data redundancy, fault tolerance, and read scalability.
- **Difference between Primary and Replica:**
 - In terms of the application, the Primary node is responsible for handling write operations, ensuring data consistency. It is where changes to the database occur.

- The Replica node is used for read operations, reducing the read load on the Primary node. This improves query performance and ensures data is available even if the Primary node fails.

Issues with the Infrastructure:

1. Single Points of Failure (SPOF):

- The load balancer can become a single point of failure. To address this, you can introduce a secondary load balancer for redundancy.

2. Security Issues:

- There is no mention of a firewall, which can leave the infrastructure vulnerable to unauthorized access. A firewall should be added to control incoming and outgoing traffic.
- There is no mention of HTTPS, which leaves data transmission unsecured. To improve security, you should implement SSL/TLS certificates for HTTPS.

3. No Monitoring:

- The infrastructure lacks monitoring and logging systems, making it challenging to detect and troubleshoot issues. Implementing monitoring tools and practices is essential for maintaining the health and performance of the system.