ALX Project

Web infrastructure design

Task 1.

Definitions and Explanations

1. **For every additional element, why are adding it;** Adding a new server so that we can be able to add a load balancer to handle too much incoming traffic and also enable us to eliminate a single point of failure which could occur by having just one server.

2. **What distribution algorithm your load balancer is configured with and how it works;** Our load balancer uses the Round Robin algorithm which connects in order unless a server is down. Requests are served by the server sequentially one after another. After sending the request to the last server, it starts from the first server again. This algorithm is used when servers are of equal specification and there are not many persistent connections.

3. **Is your load-balancer enabling an Active-Active or Active-Passive setup, explain the difference between both;** The load balancer enables an Active-Active setup where both nodes (servers) are actively running the same kind of service simultaneously. While in an Active-Passive setup, not all nodes are going to be active. In the case of two nodes, if the first node is already active, the second node must be passive or on standby.
The key difference between these two architectures is performance. Active-active clusters give you access to the resources of all your servers during normal operation. In an active-passive cluster, the backup server only sees action during failover.

4. **How a database Primary-Replica (Master-Slave) cluster works;** master-slave replication enables data from one database server (the master) to be replicated to one or more other database servers (the slaves). The master logs the updates, which then ripple through the slaves. If the changes are made to the master and slave at the same time, it is synchronous. If changes are queued up and written later, it is asynchronous. It is usually used to spread read access on multiple servers for scalability, although it can also be used for other purposes such as for failover, or analyzing data on the slave in order not to overload the master.

5. **What is the difference between the Primary node and the Replica node in regard to the application;** A replica node is a copy of the primary node, they provide redundant copies of the application codebase to protect against hardware failure and increase capacity to serve read requests like searching or retrieving a document.

Issues

A. **SPOF (Single Point Of Failure);** The load balancer and the database can still be potential single points of failure. If any of them fail, it could disrupt the availability of the website.

B. **Security Issues;** There are no mentioned security measures, such as a firewall or HTTPS, which could leave the infrastructure vulnerable to attacks or unauthorized access.

C. **No monitoring;** Without monitoring tools in place, it would be challenging to identify and address issues promptly, impacting performance and user experience.

This three-server web infrastructure is an improvement over the single-server setup, providing load balancing, database replication, and redundancy. However, additional measures are needed to address the identified issues and enhance security, availability, and monitoring.