

# ALX Project

## Web infrastructure design

### Task 1.

#### Definitions and Explanations.

1. **For every additional element, why are adding it;** Adding a new server allows us to add a load balancer to handle excessive incoming traffic while also eliminating a single point of failure that could occur with only one server.
2. **What distribution algorithm your load balancer is configured with and how it works;** Until a server is offline, our load balancer connects in order using the Round Robin method. The server responds to requests in order, one after another. It restarts at the first server after sending the request to the last server. When servers have similar specifications and there aren't many persistent connections, this technique is utilized.
3. **Is your load-balancer enabling an Active-Active or Active-Passive setup, explain the difference between both;** Both nodes (servers) in an Active-Active configuration are actively running the same service at the same time thanks to the load balancer. Some nodes won't be active in an Active-Passive configuration. If there are two nodes, the second node must be passive or in standby mode if the first node is currently operational. Performance is the primary distinction between these two architectures. You have access to all of your servers' resources while using active-active clusters. The backup server in an active-passive cluster only functions during failover.
4. **How a database Primary-Replica (Master-Slave) cluster works;** Data from one database server (the master) can be duplicated to one or more other database servers using master-slave replication (the slaves). The updates are logged by the master, which propagates them to the slaves. Synchronous changes are those that are made to the master and slave simultaneously. It is asynchronous if changes are queued up and written later. Although it can also be used for other things like failover or data analysis on the slave to avoid overburdening the master, it is typically used to scale read access across numerous servers.
5. **What is the difference between the Primary node and the Replica node in regard to the application;** A replica node is a duplicate of the main node; it offers redundant copies of the application codebase to guard against hardware failure and expands capacity to handle read requests like searching for or retrieving documents.

#### Issues

- A. **SPOF (Single Point Of Failure);** The major single point of failure in this infrastructure is having only one load balancer.
- B. **Security issues (no firewall, no HTTPS);** A major vulnerability is the application's use of the insecure HTTP protocol, which transports passwords in plain text and makes it possible for an attacker (perhaps in the middle) to read sensitive data. Additionally, because the application lacks a firewall, an attacker

may be able to launch a denial of service (DOS or DDOS) attack, which could result in significant system downtime, or a malicious attacker may be able to infiltrate the system by exploiting unidentified open ports and perform data exfiltration.

C. **No monitoring;** “You cannot fix or improve what you cannot measure” is a famous saying in the tech industry. Monitoring the server, website, or application in general, would allow the owner to identify any problems, downtime, or security threats and resolve them quickly before they turn into a serious problems. It will also improve productivity and possibly save some costs on IT support. As well as improve user experience in general.