ALX Project
Web infrastructure design

Task 1
Definitions and Explanations

1. **For every additional element, why are you adding it;** The purpose of adding a new server is for the load balancer to manage the incoming traffic and to eliminate the single point of failure which could occur by having just one server present
2. **What distribution algorithm is your load balancer configured with and how it works;** The load balancer uses the Round Robin algorithm, which passes each new connection to the next available server, thus evenly distributing each new one amongst until it reaches the last one and restarts the process all over again. This algorithm is used when the servers have the same equal specifications and when there isn't that many persistent connections
3. **Is your load-balancer enabling an Active-Active or Active-Passive setup, explain the difference between both;** The load balancer has an Active-Active setup where both servers are running the same service concurrently. In a Active-Passive setup not all the nodes are active and instead one of them is on "stand-by". What separates these two architectures from each other is performance. Active-Active allows access to all the servers during normal operation. In an Active-Passive setup the backup server starts up during failover.
4. **How a database Primary-Replica (Master-Slave) cluster works**; The master-slave replication allows data from one database to be copied to one or more database servers (slaves). The master logs the updates which are then applied to the slaves. The changes are said to be synchronous when both the master and slave are updated at the same time. If the updates are scheduled for later then they are asynchronous. It is mostly used to distribute read access across multiple servers for scalability, although they can also be used for other purposes such as failover or analyzing data on the slave so as 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 that is used as a backup in event of a hardware failure, and increases capacity to serve read requests like searching or retrieval of a document.

Issues

A. **SPOF (Single Point of Failure)**The single point of failure for this infrastructure is the availability of one load-balancer.
B. **Security issues(no firewall or https)**; Major security concerns involving application communication over HTTP that is not secured and could potentially enable an attacker to view sensitive information(because HTTP transfers plain text) like passwords. Additionally since the application does not have a firewall, it could enable the attacker to perform a denial

of service attack(DOS or DDOS) that my cause the a major downtime in the system, or allow a malicious attack to breach the system, exploiting unknown open ports and perform data exfiltration.

C. **No monitoring**; Monitoring the server, website or application in general would enable the owner to identify any problems, downtime or security threats and resolve them quickly before they turn into serious problems. It also improves productivity and possibly saves some costs on IT support, it also improves user experience as a whole.