ALX System Engineering And Devops - Web infrastructure design

Task 1.

1. For every additional element, why are adding it;
    - Adding additional servers allows us to handle more requests and to avoid the SPOF.
    - The HAProxy load balancer is a load balancing software mainly used for TCP and HTTP-based applications. Adding a load balancer allows us to distribute the load to each server accordingly.

2. What distribution algorithm your load balancer is configured with and how it Works; The load balancer uses the **Least Connections** algorithm**.** With this algorithm, the server with the lowest number of connections receives the connection. This type of load balancing is recommended when very long sessions are expected, such as LDAP, SQL, TSE. It's not, however, well-suited for protocols using short sessions such as HTTP.

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

6. SPOF (Single Point Of Failure); The major single point of failure in this infrastructure is having only one load balancer.

7. Security issues (no firewall, no HTTPS); Security issues may result if an HTTP connection is used to access the application which may allow attackers to intercept the data. The lack of firewall rules means we cannot dictate which network traffic is allowed to enter and exit our

network. Hence our system may be vulnerable to network attacks such as DDoS (Distributed Denial of Service).
7. No monitoring; Monitoring the server, website, or application allows the owner to identify any problems, downtime, or security threats and resolve them quickly before they turn into a serious problem.