ALX WEB INFRASTRUCTURE DESIGN PROJECT

TASK 1

1-Distributed_Web_Infrastructure

- **For every additional element, why you are adding it: -** additional web servers and application servers were added to facilitate High Availability Cluster thereby increasing the redundancy of the infrastructure and decreasing downtime while maintaining high traffic influx, this also helps to increase the QPS
- **What distribution algorithm your load balancer is configured with and how it works: -** The HAProxy Load Balancer is configured with Round Robin Algorithm which distributes work evenly among all available resources. This ensures that no single resource is overworked, which can lead to errors and other issues down the line.
- **Is your load-balancer enabling an Active-Active or Active-Passive setup, explain the difference between both: -** The load-balancer is enables an Active-Active setup. In an active-passive configuration, the server load balancer recognizes a failed node and redirects traffic to the next available node while in an active-active configuration the load balancer spreads out the workload's traffic among multiple available nodes.
- **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 to the slaves. The slave outputs a message stating that it has received the update successfully, thus allowing the sending of subsequent updates. Master-slave replication can be either synchronous or asynchronous. The difference is simply the timing of propagation of changes. 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. The master-slave design has been instrumental in alleviating system failures and performance issues. It has helped in the optimization of multiple databases.
- **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

- **SPOF**: - The single load-balancer is the only single-point of failure in this infrastructure
- **Security issues: -** The security issues with this infrastructure are the absence of Firewalls and using HTTP instead of the secured version, HTTPS
- **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 problem. It will also improve productivity and possibly save some costs on IT support. As well as improve user experience in general.