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 major single point of failure in this infrastructure is

having only one load balancer.

B. Security issues (no firewall, no HTTPS); Major security issues involve having the

application communicate over HTTP protocol that is not secure and can allow an attacker

(who may be in the middle) to view sensitive information (since HTTP transfers plain

texts) like passwords. Also since the application doesn’t have a firewall, This can allow

an attacker to perform a denial of service attack(DOS or DDOS) that may cause a major

downtime in the system, or allow a malicious attacker to breach the system exploiting

unknown 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 problem. It will also improve productivity and

possibly save some costs on IT support. As well as improve user experience in general.

References

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https://www.toptal.com/mysql/mysql-master-slave-replication-tutorial

https://www.purestorage.com/au/knowledge/what-is-active-active.html