

Web infrastructure design Project

Task 1: 1-distributed_web_infrastructure

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1. For every additional element, why are adding it: We're incorporating a new server to facilitate the addition of a load balancer, which will manage an influx of incoming traffic. Additionally, this setup safeguards against a single point of failure that might occur with just a single server.

2. What distribution algorithm your load balancer is configured with and how it works: Our load balancer employs the Round Robin algorithm, connecting sequentially unless a server is unavailable. It serves requests in sequence to servers. Once the last server is reached, the cycle reinitiates from the first server. This algorithm suits situations where servers have similar specifications and few persistent connections.

3. Is your load-balancer enabling an Active-Active or Active-Passive setup, explain the difference between both: The load balancer facilitates an Active-Active setup where both nodes (servers) actively provide the same service simultaneously. Conversely, in an Active-Passive setup, not all nodes remain active. In a two-node scenario, if the first node is active, the second must be passive or on standby. The main difference lies in performance. Active-active clusters grant continuous access to server resources during normal operation. In an active-passive cluster, the backup server only becomes active during failover.

4. How a database Primary-Replica (Master-Slave) cluster works:? Master-slave replication involves copying data from a database server (the master) to one or more additional database servers (the slaves). The master logs updates, which are then propagated to the slaves. Simultaneous changes on both master and slave are synchronous, while queued changes written later are asynchronous. This setup is commonly used to distribute read access across multiple servers for scalability. It can also serve other purposes like failover or data analysis on the slave to prevent overloading the master.

5. What is the difference between the Primary node and the Replica node in regard to the application: A replica node replicates the primary node, offering redundant copies of the application codebase. This redundancy provides protection against hardware failures and enhances the capacity to handle read requests, such as searching or retrieving documents.

Issues

1. Single Point of Failure (SPOF) Concern: The primary vulnerability in this infrastructure stems from relying solely on a single load balancer.

2. Security Vulnerabilities (Absence of Firewall, Lack of HTTPS): Notable security concerns arise due to the application's utilization of the unsecured HTTP protocol, which exposes sensitive information to potential attackers intercepting the communication. This vulnerability includes passwords since HTTP transmits data in plain text. Furthermore, the absence of a firewall opens the door for attackers to launch debilitating denial-of-service (DoS or DDoS) assaults, resulting in significant system downtime. Additionally, the lack of a firewall allows malicious actors to exploit undisclosed open ports, potentially leading to data breaches.

3. Absence of Monitoring: The adage "You can't enhance what you can't measure" holds profound significance in the tech realm. Failing to monitor the server, website, or application leaves the owner blind to problems, downtime, and security risks, which can escalate into severe issues. Implementing robust monitoring not only facilitates rapid issue identification and resolution but also enhances overall productivity. This practice has the potential to reduce IT support costs and elevate the overall user experience.

1-distributed_web_infrastructure image

