0x09. Web infrastructure design

Overview

a simple one-server web infrastructure using the LAMP stack to host the website reachable via "www.foobar.com". I will break down the components and explain their roles

What is a server ?

- A server is a computer or a machine that hosts and serves web content. It responds to requests from clients (such as browsers) by providing the requested data.
- In our case, we have a single server that will handle all the necessary components.

What is the role of the domain name ?

- Domain names serve to identify Internet resources, such as computers, networks, and services, with a text-based label that is easier to memorize than the numerical addresses used in the Internet protocols.
- A domain name may represent entire collections of such resources or individual instances.

What DNS type record is `www in` [`www.foobar.com`](www.foobar.com) ?

- www is a CNAME (Canonical Name) DNS record-type in www.foobar.com since it also points to the same IP address as foobar.com and if the IP address changes we can only record changes in the DNS A record of foobar.com

What is the role of the web server ?

- The primary role of a web server is to store, process, and deliver requested information or webpages to end users.
- It uses: Physical Storage: All website data is stored on a physical web server to ensure its safety.

What is the role of the application server ?

- The application server is responsible for the following tasks:
  - user authentication and security
  - processing and serving HTML files.
  - processing and compiling JSP files with help from its servlet/JSP engine
  - then serving the entire response generated back to the browser.

What is the role of the database ?

- The primary purpose of a database is to store, retrieve, and update information
- A database can be used to store data related to any aspect of business operations
- Databases can be very large, containing millions of records, or very small, containing just a few records or even a single record.

What is the server using to communicate with the computer of the user requesting the website ?

- The communication between a web server or browser and the end user takes place using Hypertext Transfer Protocol (HTTP)
- The primary role of a web server is to store, process, and deliver requested information or webpages to end users.

Single Point of Failure (SPOF) :

- **Since we have only one server, any failure (hardware, software, or network) would cause downtime for the entire website.**
- **To mitigate this, consider adding redundancy (multiple servers) and load balancing.**

Downtime during Maintenance :

- When deploying new code or performing maintenance, the web server (Nginx) needs to be restarted.
- During this restart, the website may be temporarily unavailable.
- Implement rolling deployments or use a load balancer to minimize downtime.

Scalability :

- With a single server, scaling to handle high traffic becomes challenging.
- To handle increased traffic, consider adding more servers, load balancing, and optimizing database queries.