3. Scale up

1. Design of Infrastructure:

Server 1: Load Balancer (HAProxy)

Server 2: Web Server (Nginx)

Server 3: Application Server

Server 4: Database Server (MySQL)

2. Explanation:

Load Balancer (HAProxy):

Added to distribute incoming traffic across multiple servers, improving performance and reliability.

HAProxy is configured as a cluster to ensure high availability and redundancy. If one HAProxy instance fails, the other one can handle the traffic seamlessly.

Web Server (Nginx):

The web server handles HTTP requests from clients and serves static content or routes requests to the application server.

Separating the web server from the application server allows for better resource management and scalability.

Application Server:

The application server executes the application logic, processes dynamic content, and interacts with the database server.

Separating the application logic from the web server enhances modularity and maintainability of the system.

Database Server (MySQL):

The database server stores and manages the website's data.

By isolating the database on its own server, we ensure data integrity, security, and scalability.

3. Specifics about the Infrastructure:

Load Balancer Cluster: HAProxy is configured in a cluster to distribute incoming traffic evenly across multiple servers, improving performance and fault tolerance.

Split Components: Each component (web server, application server, database server) is deployed on its own server to isolate functionalities, improve scalability, and enhance security.

Splitting components offers several benefits:

- **Scalability**: Scale individual components independently by adding resources to specific VMs when needed.
- **Security**: Isolates components, mitigating the impact of vulnerabilities in one area from affecting others.
- **Resource Management**: More effectively allocate resources based on each component's specific needs.

High Availability: The load balancer and other components are deployed redundantly to ensure high availability and fault tolerance. If one server fails, the system can continue to operate without significant disruption.

This design provides a scalable, reliable, and efficient infrastructure for hosting www.foobar.com. It allows for easy scaling of individual components and ensures high availability of the website.