

### Reverse proxy

Distribute incoming traffic across multiple backend servers

Ensures that no single server becomes overwhelmed with requests

handles routing traffic to the available servers, making it simple to scale horizontally

Can easily scale application by adding or removing backend servers as needed

Compress responses before sending them to clients, reducing the amount of data transmitted

Offloading SSL termination to the reverse proxy alleviates the resource-intensive task of encryption/decryption from backend servers

### Load Balancer

Distributes incoming traffic

Ensures optimal resource utilization, fault tolerance, and scalability as the application grows

#### Types:

##### Hardware Load Balance

Supports L4\* and L7\*

Higher cost

Limited flexibility and agility compared

##### Software Load Balancer

Supports only L7\*

Lower cost compared to HLB

Greater flexibility and agility in deployment and management.

*L4 - Transport Layer of the OSI includes UDP, TCP, SCTP*

*L7 - Application Layer of the OSI which is highest layer includes HTTP, HTTPS, SFTP etc*

### DNS as load balancer

Involves leveraging DNS to distribute incoming client requests across multiple backend servers or resources.

Returns single IP in round robin fashion

can be configured along with health checks

DNS records can be updated dynamically based on server availability and load conditions.

it's essential to consider the limitations and potential latency issues associated with DNS caching and propagation

#### Drawback

Indefinite caching

Low or zero TTLs

Very high load on DNS

### SAGA Pattern

SAGA breaks down complex transactions into smaller, loosely coupled units of work called "sagas."

In a microservices architecture each microservice can represent a step in the saga, allowing them to be scaled independently based on demand

Asynchronous nature can be leveraged to improve scalability by decoupling services and allowing them to scale independently

the SAGA pattern's transaction decomposition, asynchronous communication, and distributed coordination can aid in constructing scalable distributed systems.

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