Analyzing SPOFs

We analyze the SPOF (Single point of failure) that occurs when we have a part of the system that, if it fails, will cause the entire system to stop working. The idea is to strengthen the systems by adding redundancy in all potential SPOFs and that is why the following actions were taken in the system in general:

- 2 Load Balancers (HAproxy) were added instead of 1, these load balancers are configured as a cluster with one another, which means that both load balancers are combined to function as a single entity and their behavior is similar to a active-passive state, since if a load balancer fails immediately the other takes its place, thereby increasing the redundancy of the system in general at a key point.
- we have servers that are separated from each other and thanks to this we manage to avoid the SPOF in the servers (web server, application server and database).

Load Balancers

As we can see, the load balancer communicates with servers 1, 2 and 3, distributing the requests through the Round Robin algorithm which sends the requests to each server in turn in a loop every time it finishes with all of them the servers in the list and according to the idle capacity of each server.

Also to avoid data theft between the load balancer and the server, we have decided to decrypt data only at the server level

High Availability

A concept that we apply when designing this web infrastructure is the concept of High Availability, which refers to the ability of users to access a system without loss of service. To solve the problem of high availability the most important mechanism is redundancy. For this we use a combination of solutions between active-active and active-passive which mean:

- Active- Active, that 2 or more active instances of the system can be implemented and this can improve scalability and provide high availability.
- Active — Passive, which is basically about implementing an active instance of the system that handles the requests and a passive instance that is waiting. In addition, between these two instances or servers there is a cluster software that is responsible for monitoring and automatically fail-over between the cluster nodes.

It was decided to use an active-active system on server 1 and 2 and a passive on server 3, thus achieving a system that has high availability, redundancy and achieve resource efficiency since the useful life of the system that is in passive mode will be greater due to its considerably lower use of its components, waiting for the failure of server 1 or server 2 to start up and be able to ensure the availability of the service without interruptions .

Firewall

We add a Firewall on arrival at each server that has an internet connection, which is a security system that monitors and controls incoming and outgoing traffic, without a firewall we could be attacked from the internet and we could be vulnerable to loss of information. Also to protect the load balancer we add one more Firewall at it's level.

Monitoring Clients

In addition, Monitoring Clients were placed in all servers (Web server, Application server), databases level. It was decided to place in the following points already which are important points to monitor:

- In each server where the web servers, application servers, Database server and codebase are located.
- In addition, also in the server where the 2 Load Balancers are located, it is important to monitor them due to their relevance in the system and that always configure a SPOF, so it is important to have data on its status.