Using a Load Balancer in the CORE Emulator

PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIA DA COMPUTAÇÃO

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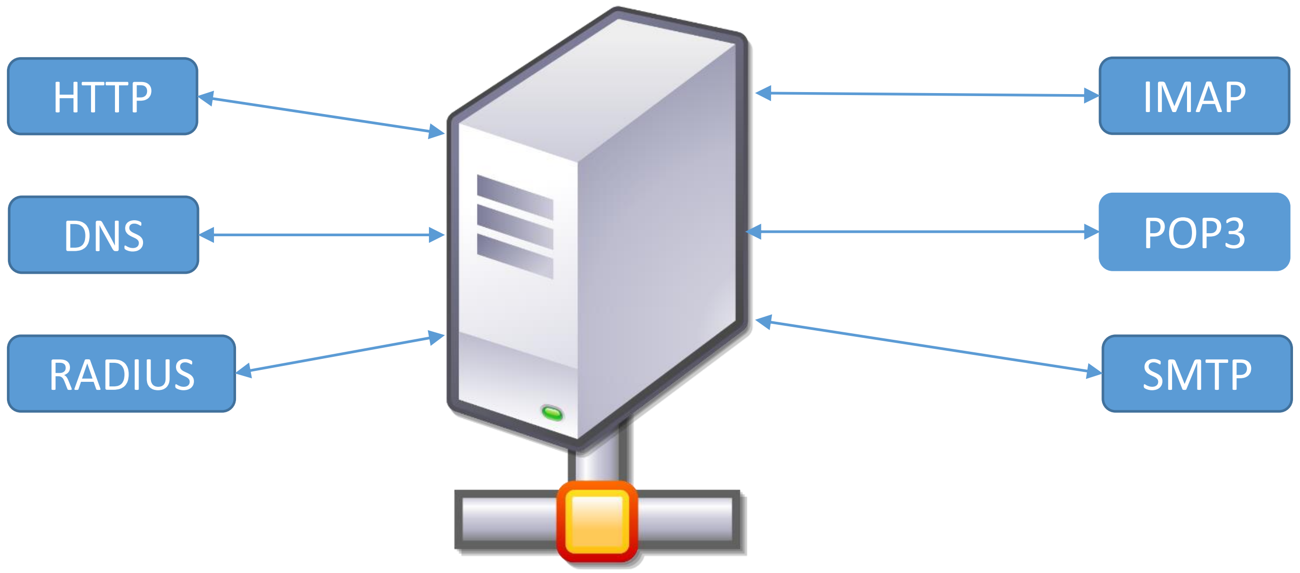
Some historical perspective

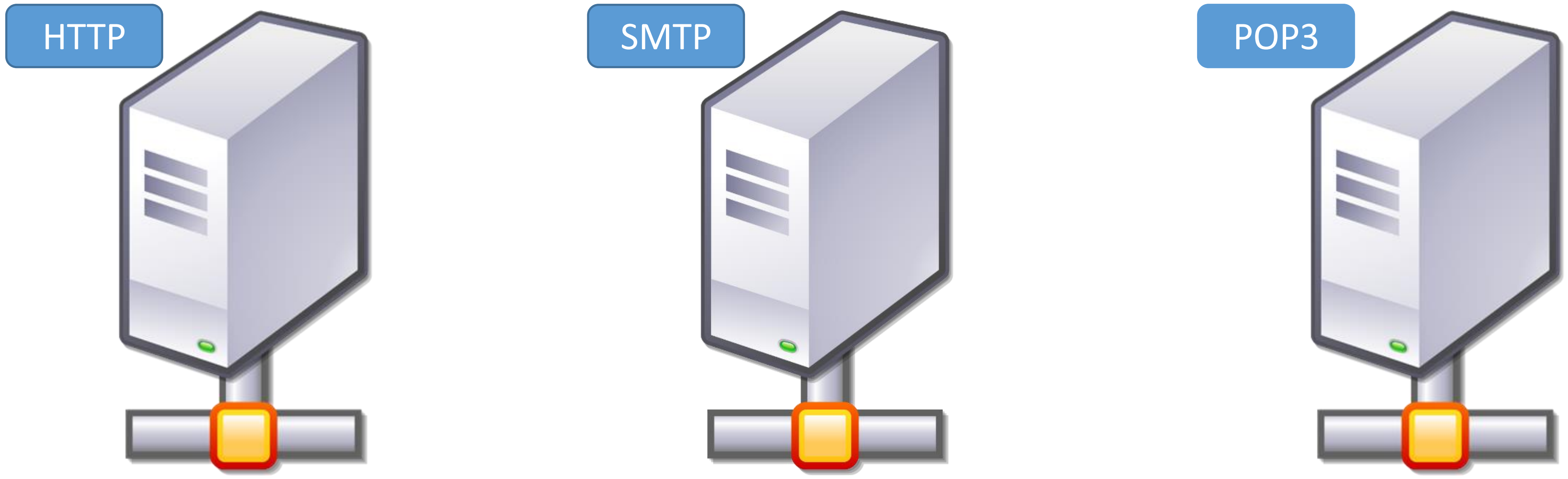
- Commercial Internet started in Brazil in 1995.
- First ISPs (Internet Service Providers) UOL, BOL, NutecNet/ZAZ/Terra.
- Mostly everybody follow the model "**one server to rule them all**".



Fortunately the business grew up ☺.

- To scale services, upgrade the (only one) server.
- Switch to a new server after couple of months (not very good ☹).

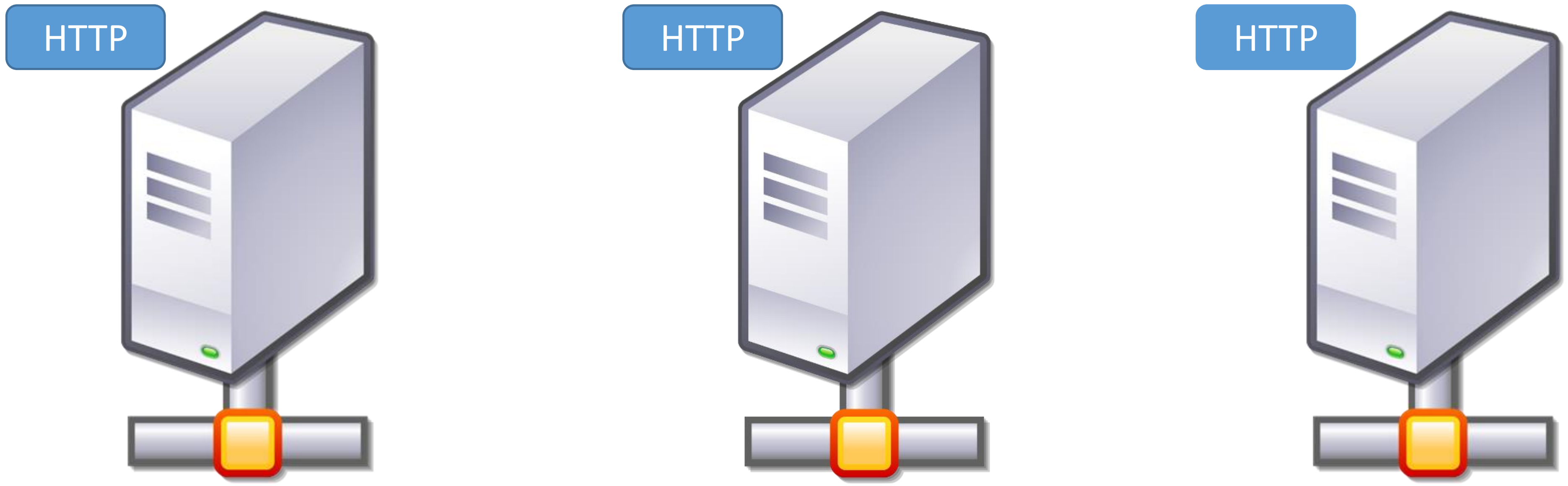
Big idea, split the services between servers!



Fortunately the business kept growing ☺☺

- To scale services, upgrade the (only one) server.
- Switch to a new server after couple of months (not very good ☹☹).
- This sounds familiar…

Big idea, split the same service between many servers!



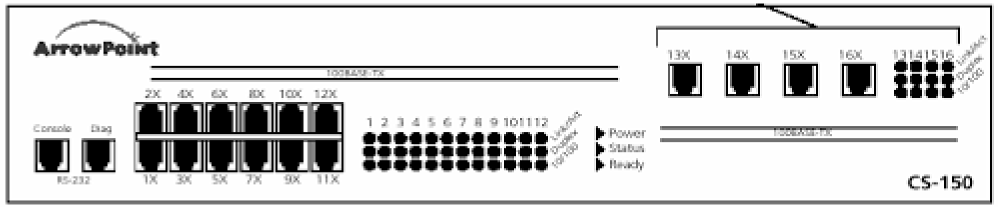
Sounds great, but how to do that ?

- Let’s use a load balancer. Problem, they don’t exist yet.
- **DNS Round-robin**! We can have multiple IP serving same service.

DNS Round-robin – drawbacks (few of them)

- Just does load distribution (and not very well).
- DNS caches (client side) can affect load distribution.
- If one server fail, users keep reaching the server.
- There is no persistence (we can’t have sessions).

Load balancers 1st generation (ArrowPoint)



Load balancers 1st gen, features

- Just L4 TCP (no UDP).
- All servers must be physically connected to them.
- Not exactly the most stable platform (strange things happened in the LAN).

Load balancers 2st generation (Alteon)

Load balancers 2st gen, much better

- Now we have L7 and it works!
- We still have a few issues, but much more stable.

So what for load balancers are used to ?

- Horizontal escalability.

- High availability.

Today we have software based load balancers.

- HAProxy (L7)

- Linux Virtual Server (L4)

Why L7 it is relevant ?

- Pros
  - The content can be modified.
  - We can have rewrite rules.
  - Clients and servers are not required to use the same protocol (for example IPv4 vs IPv6, clear vs SSL).
- Cons
  - Much more cpu intensive.
  - There is no DRS (direct server response).

Load balancing – algorithms and estrategies

- Round-robin (for short connections, pick each server in turn).
- Leastconn (pick the least recently used of the servers with the lowest connection count).
- Least Response Time.
- Source (directly depends on the client's source address)
- Algorithms must support per-server weights so that it is possible to accommodate from different server sizes/generations in same farm.

Hashing and persistence

- Consistent hashing protects server farms against massive users redistribution when adding or removing servers in a farm.
- Hashing can apply to various elements such as client's source address, URL components, header field values, cookie.
- That's very important in large cache farms and it allows slow-start to be used to refill cold caches.

Referências

- HAProxy Documentation http://cbonte.github.io/haproxy-dconv/1.9/intro.html