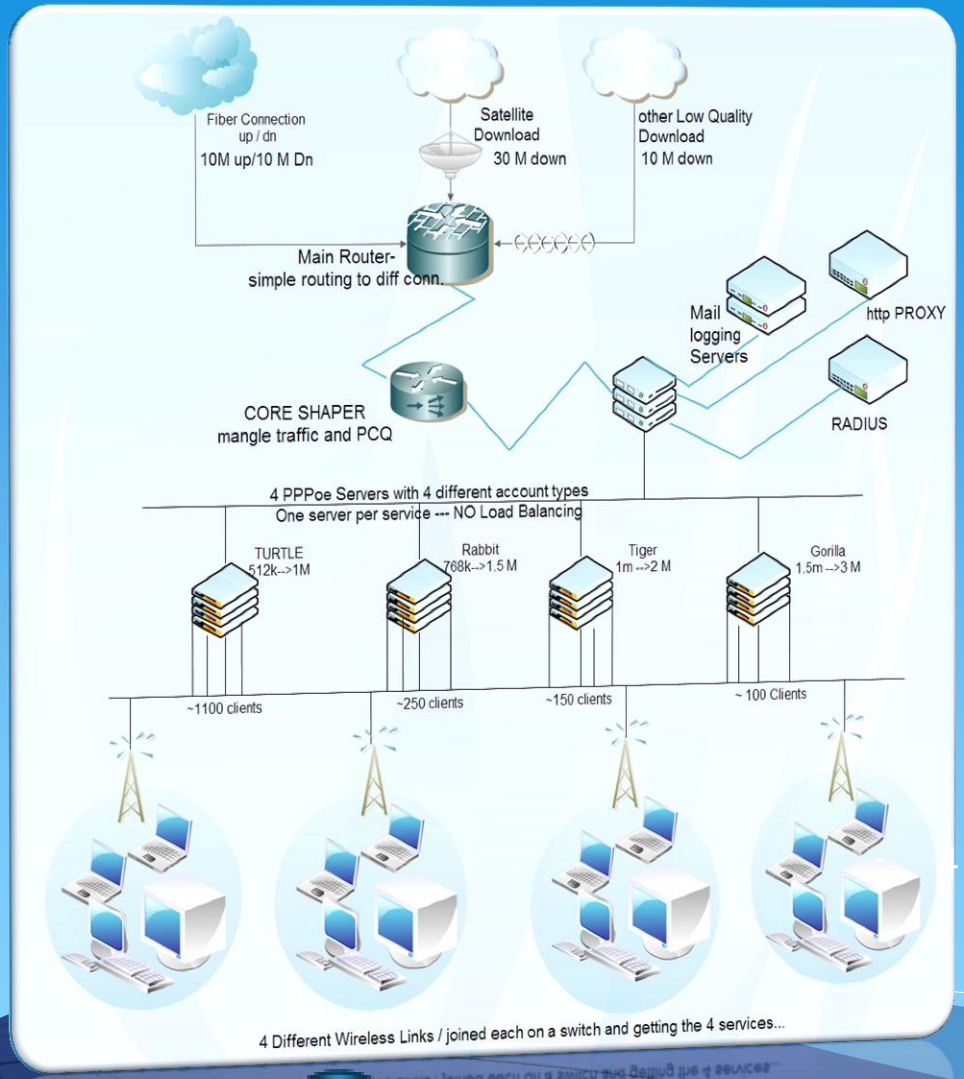
Users Equal Distribution on Multi-PPPoe Servers

Using RouterBoard and RouterOS

Charbel Matta – Fast2serv , Lebanon.

MuM Dubai – Aug 2012 .

Current Scenario – Case Study:



- **Wisp had the following:**
- **Approx ~1500+ users (10% monthly growth)**
- **4 Different wireless Links**
- **4 PPPoe servers**
- **4 account types and Service**

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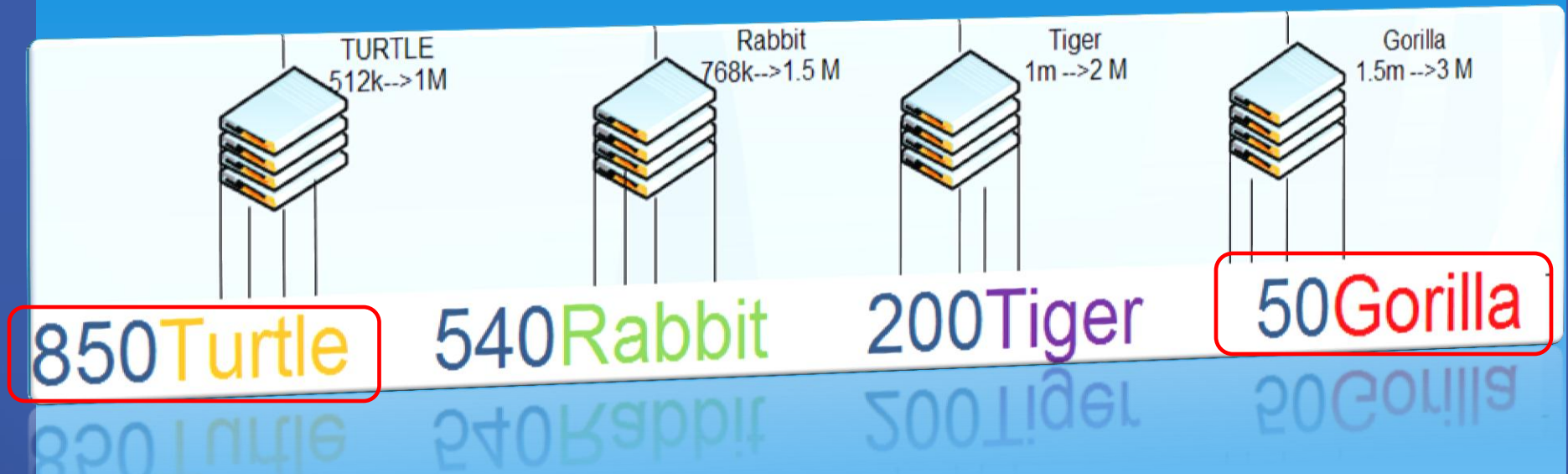
Case Study : ppp distribution

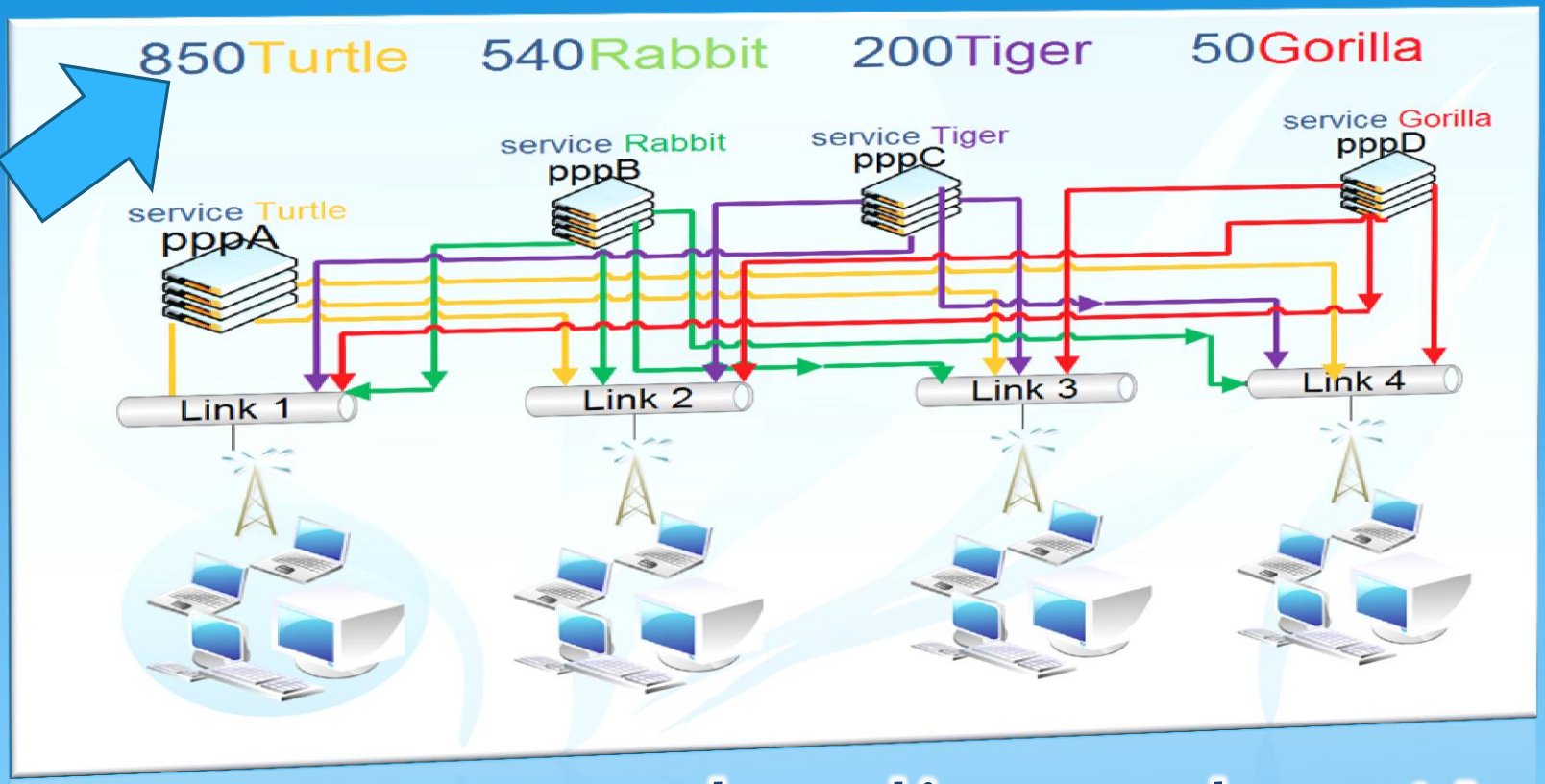


- 4 Services are offered with different prices

-This is giving unbalanced distribution as pppoe clients per one concentrator

- ex: gorilla have ~50 clients turtle have ~850

Current Scenario – Closer Look:



as demand is more on low cost Account

Normaly pppA(turtle) is congested ~ 900Users

NO Load Balancing

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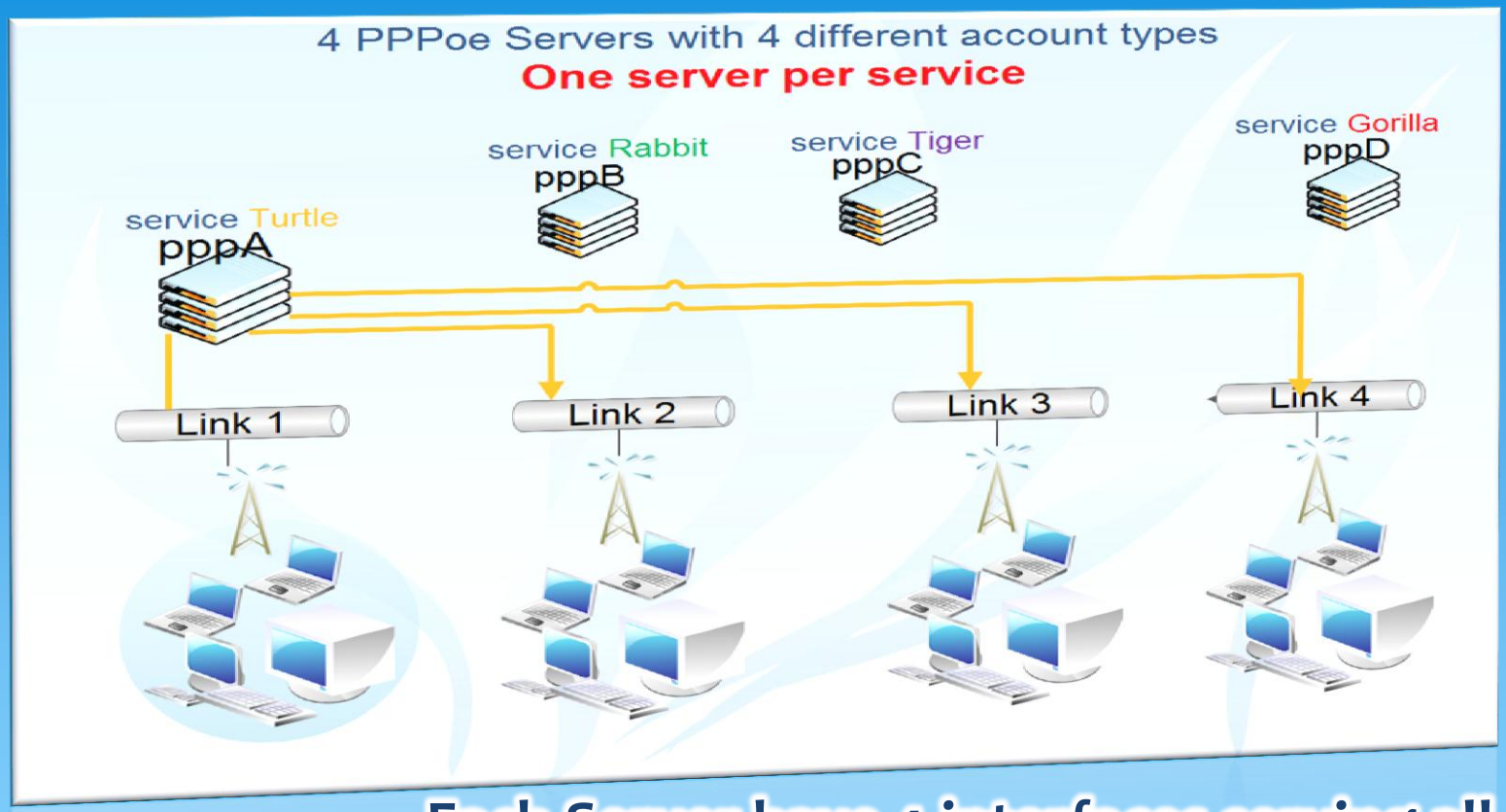
Current Scenario – Closer Look:



Each Server have 4 interfaces serving all 4 Links
one interface for every link

One Server per Service

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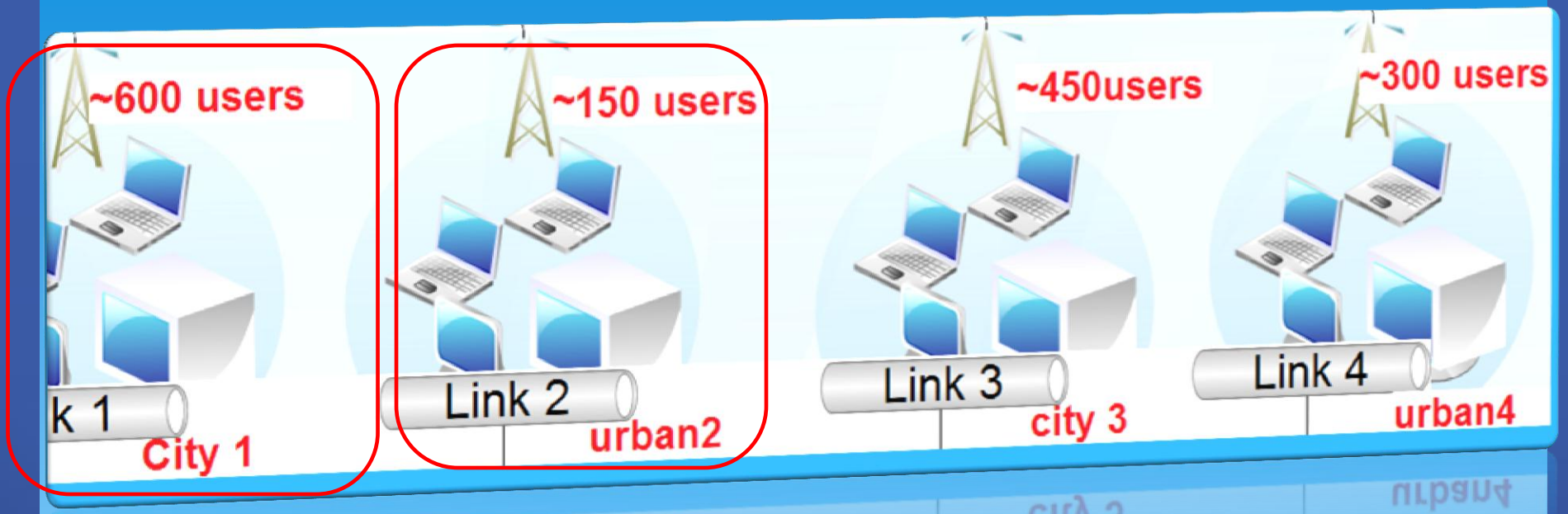
Case Study: wireless Links



-All 4 links serves different areas (city and suburbs)

thus it is not possible to have one server per link

ex: link 1 have total of ~600 clients and link2 d have only ~150

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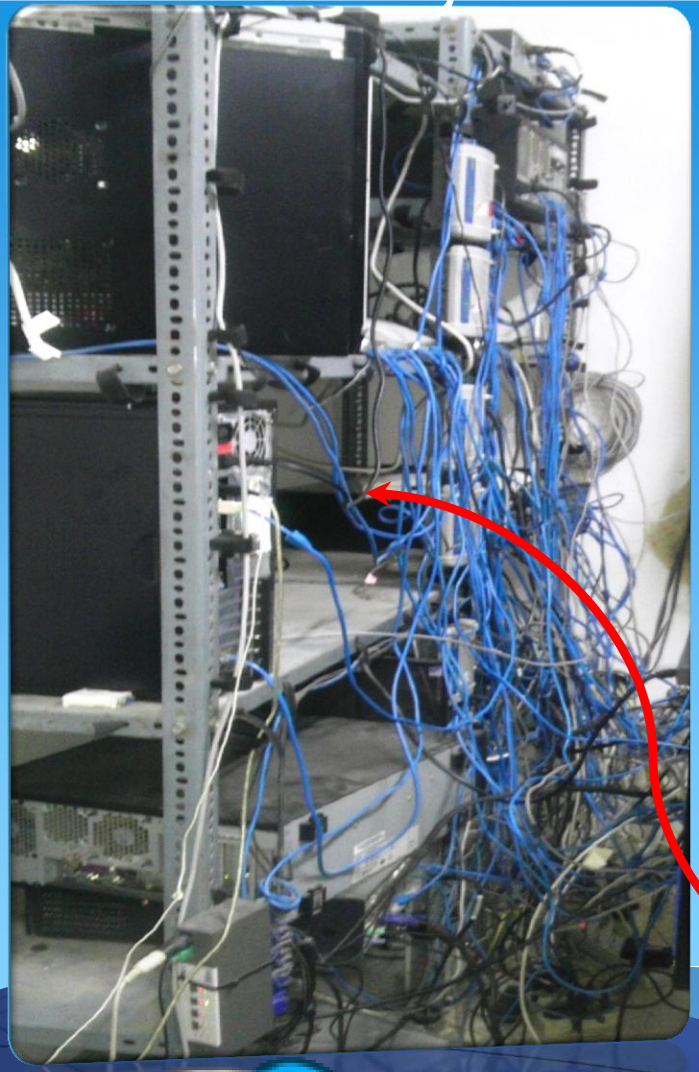
Case Study: old servers



Old Servers are all x86 running routerOS with low resources .

No Organisation –Chaos

the clients are divided into 4 different wireless links then joined with basic switches along with one interface from each concentrator.

Where is pppA ????
True Cable Jungle

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Case Study: Requirements

- Chaos needs reorganization and New Topology…

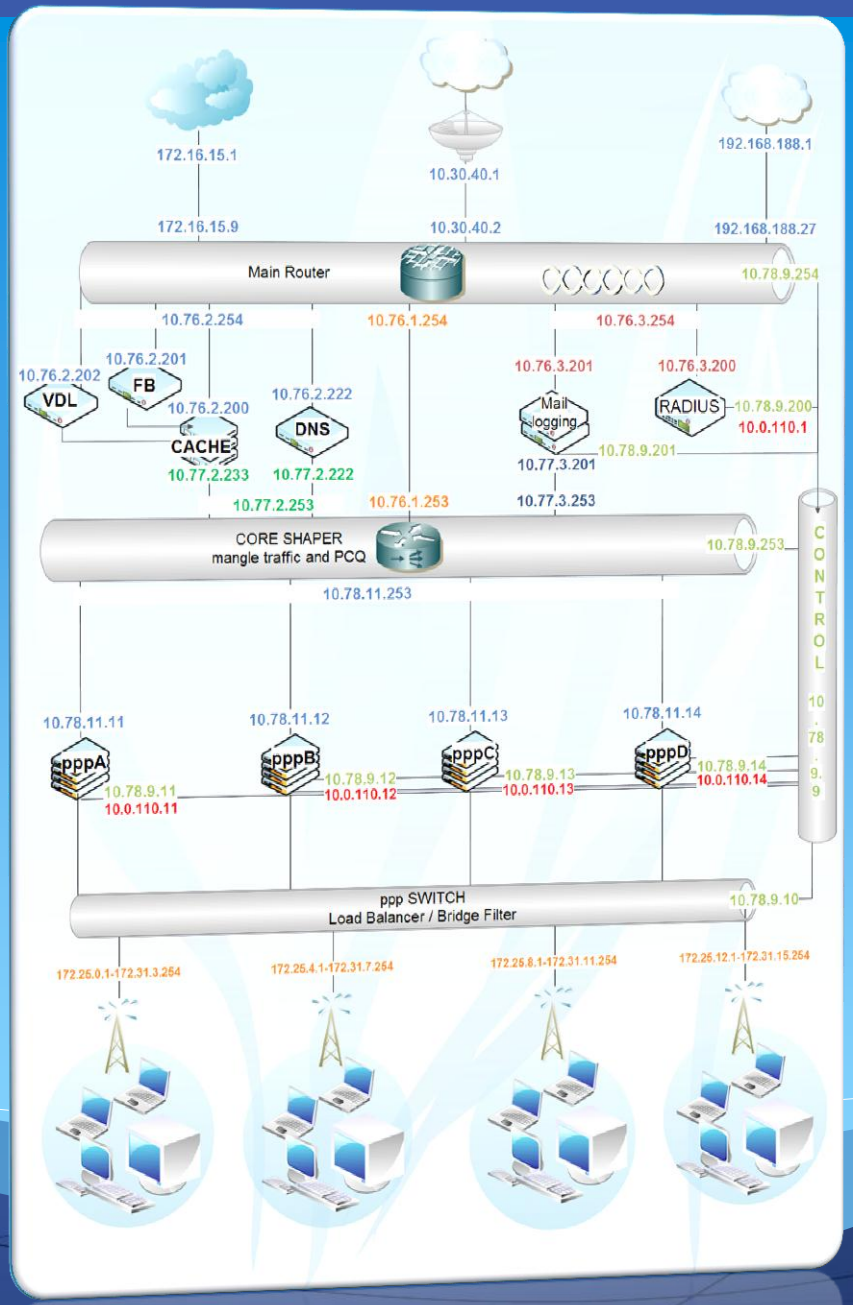
- Old Servers Systems Needs to be replaced…
- All 4 links must be joined in one network somehow…
- Need load balance pppoe on all 4 servers.
- Need System scalability

  (as growth is ~150+ users/month)

Solution: topology

- **Chaos needs reorganization and New Topology, how?**

Design New Topology



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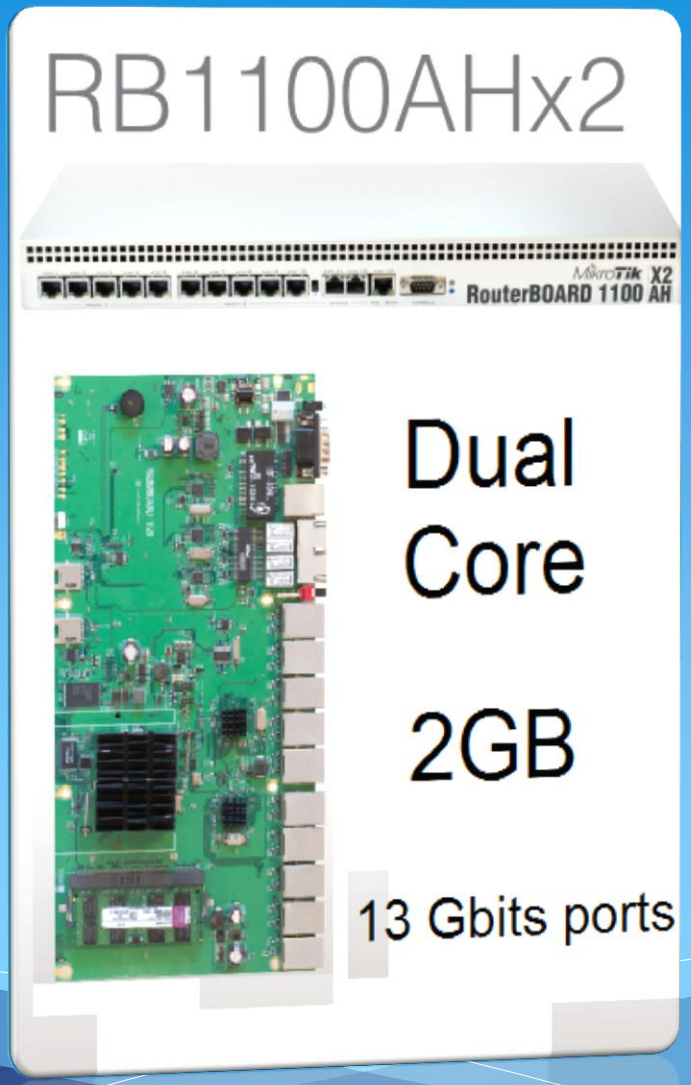
Solution: Hardware

- **Old Servers Needs to be replaced**

What To Choose ???



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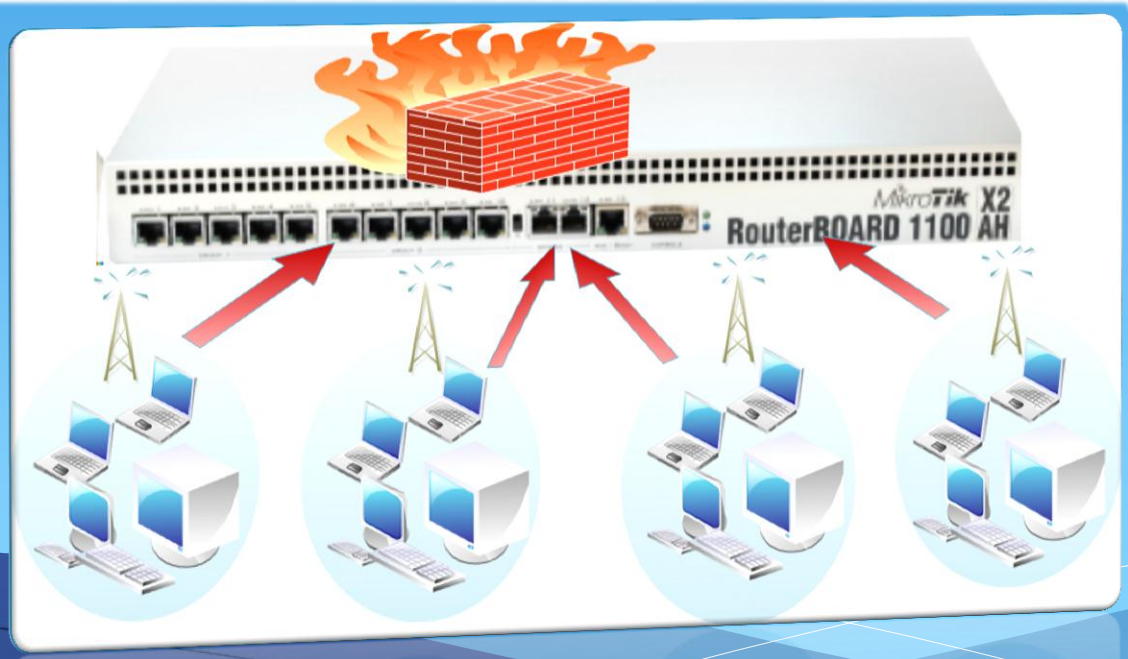
Solution: Bridge

- **Wireless Links Needs to Be Joined together, How?**

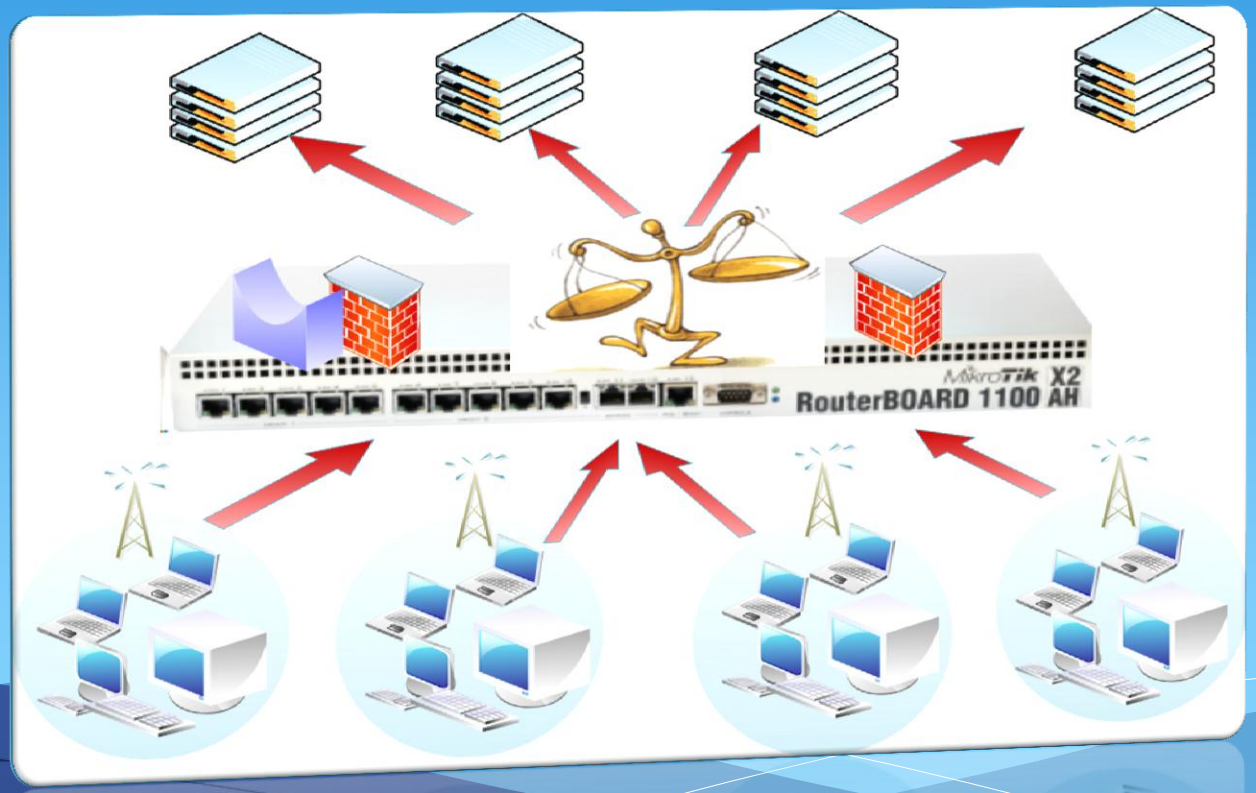
Bridge ALL Links and use routerOS Firewall Bridge



Solution: Load Balance

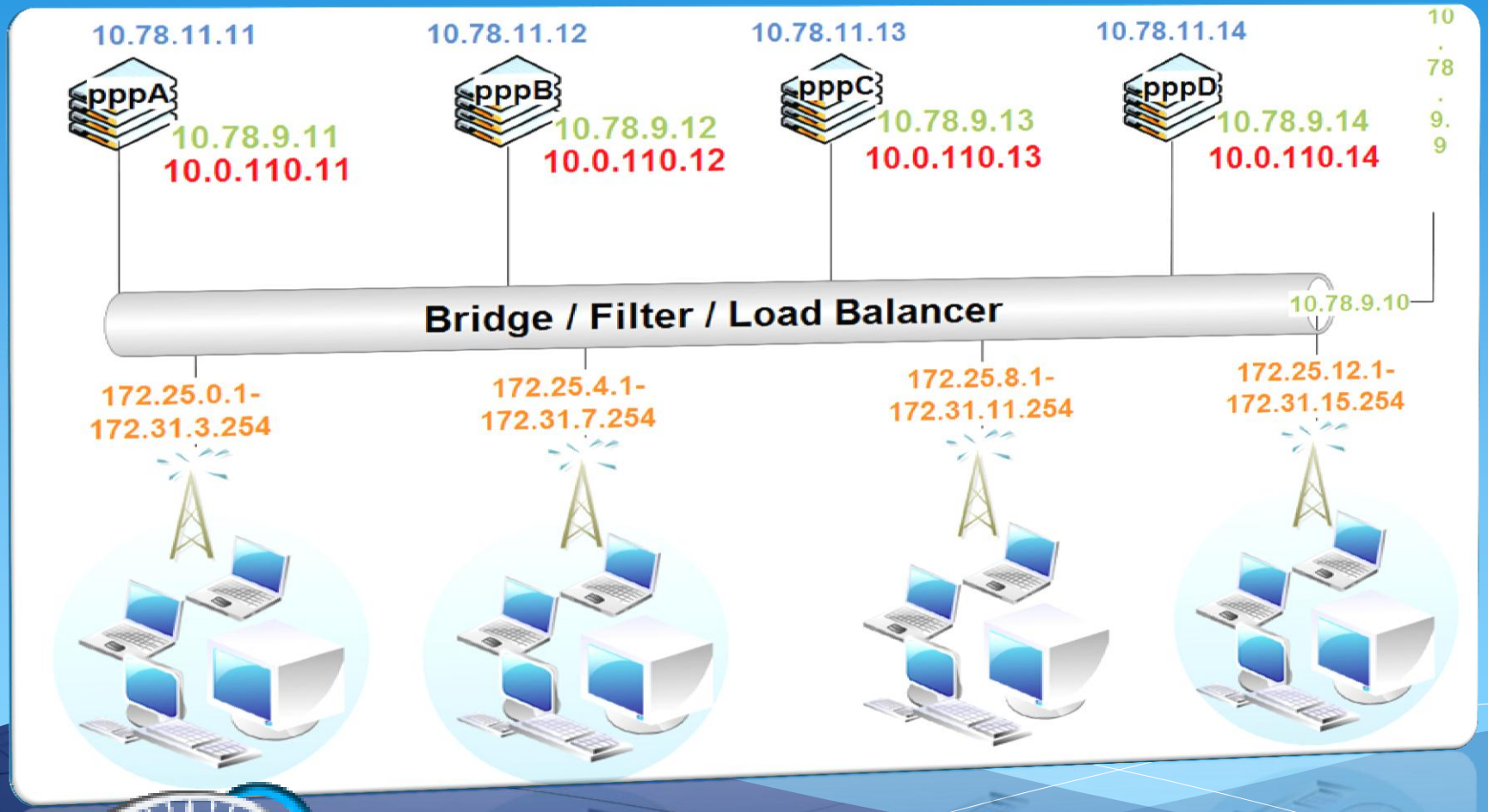
- **Load Balance pppoe Connections**

Tune the previous bridge to act as load balancer



Solution: Load Balancer

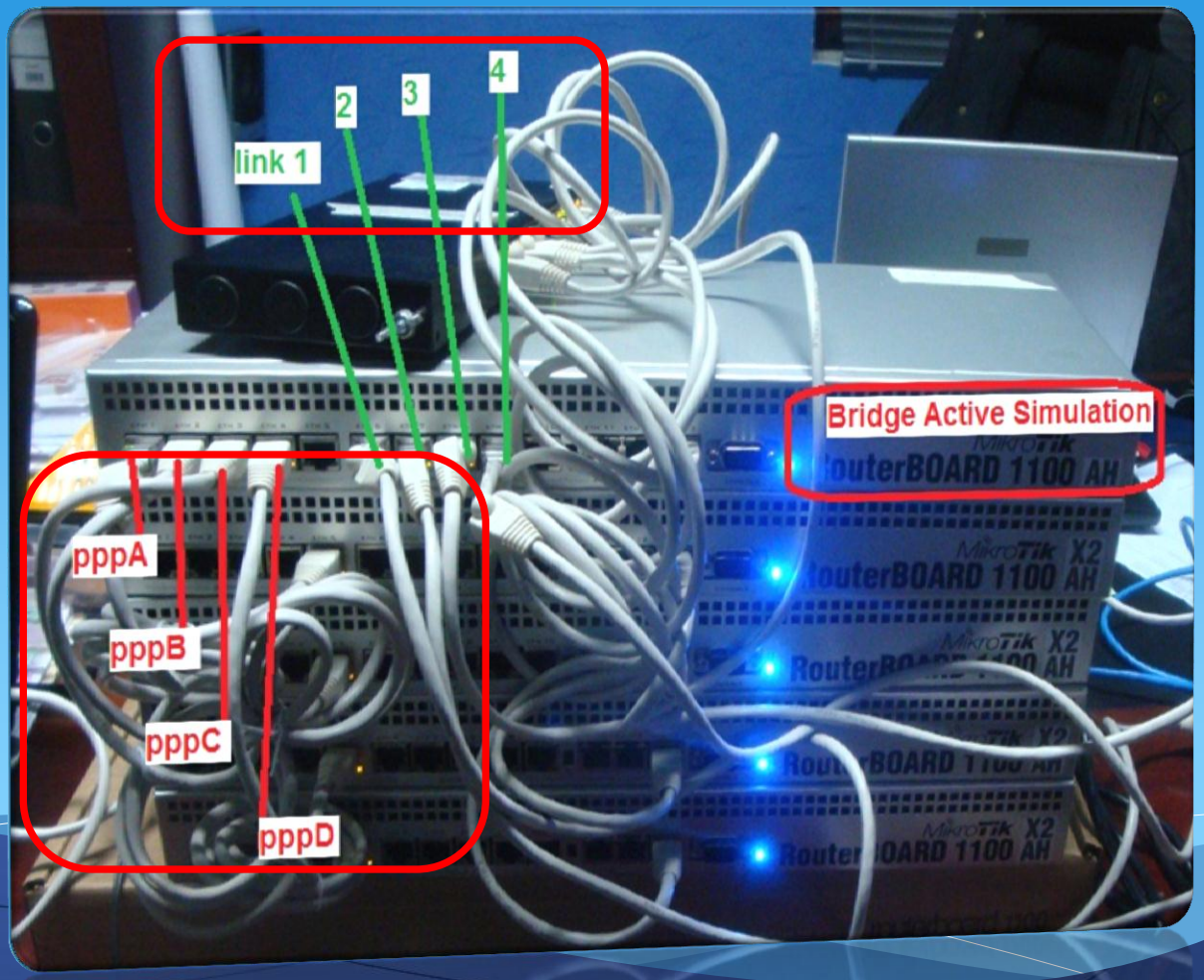
Closer look to configuration:



Solution: Load Balancer

load balance LAB:

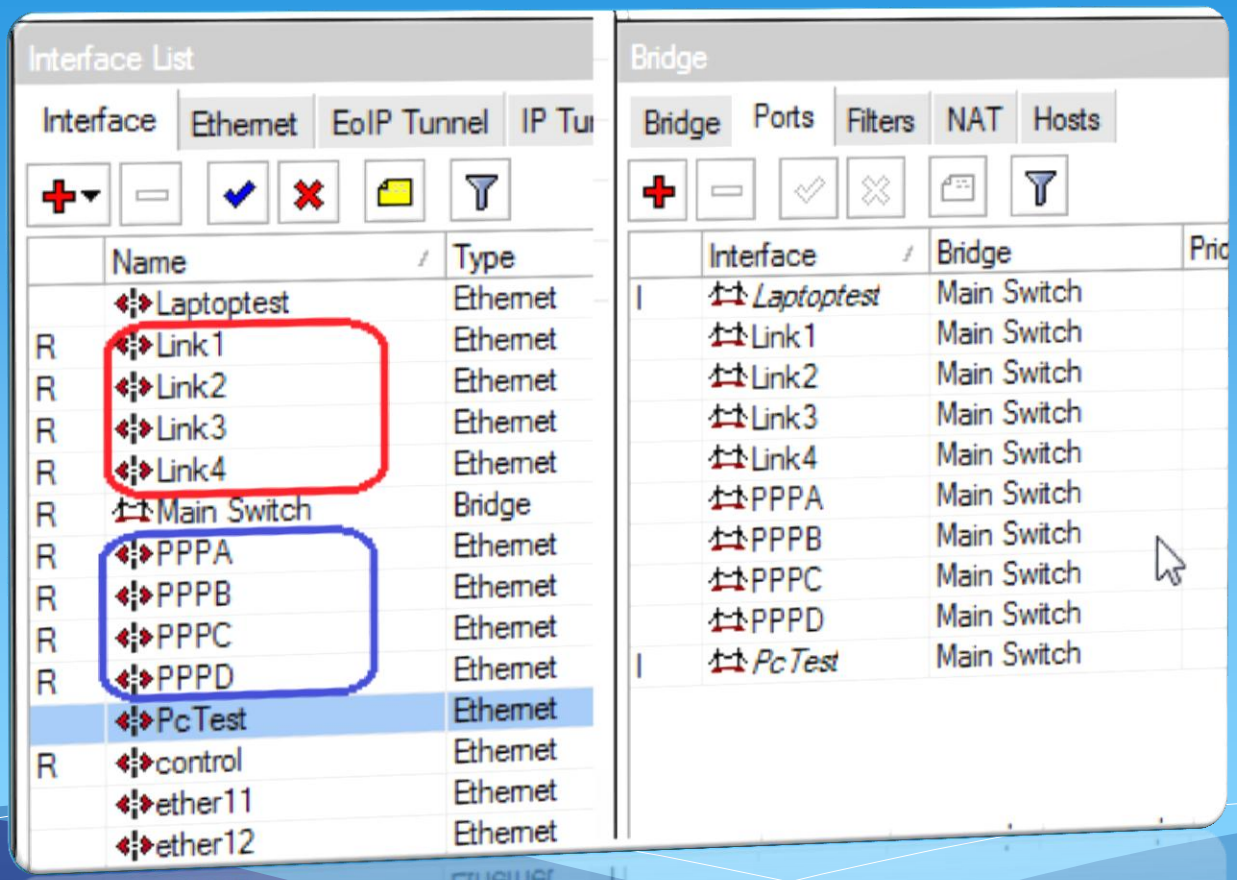
- 4* 1100AHx2 as pppoe servers
- 1 * 1100AH as Bridge/firewall



Solution: Bridge

Bridge ALL Links and pppoes

- **Create Bridge with ALL links and pppoe servers as ports**



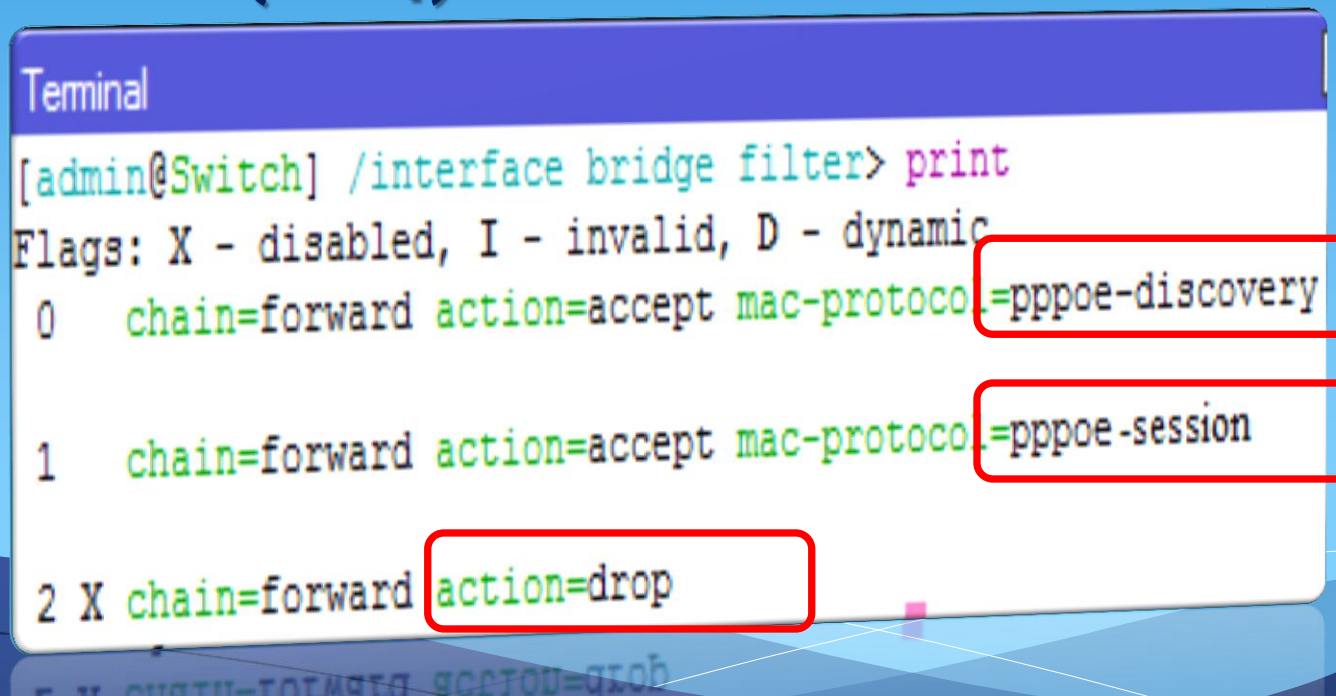
Solution: Bridge Firewall

After bridge we will use routerOS Firewall Facility

- Bridge Filter Drop ALL except:

pppoe –discovery (8863)

pppoe Sessions (8864)



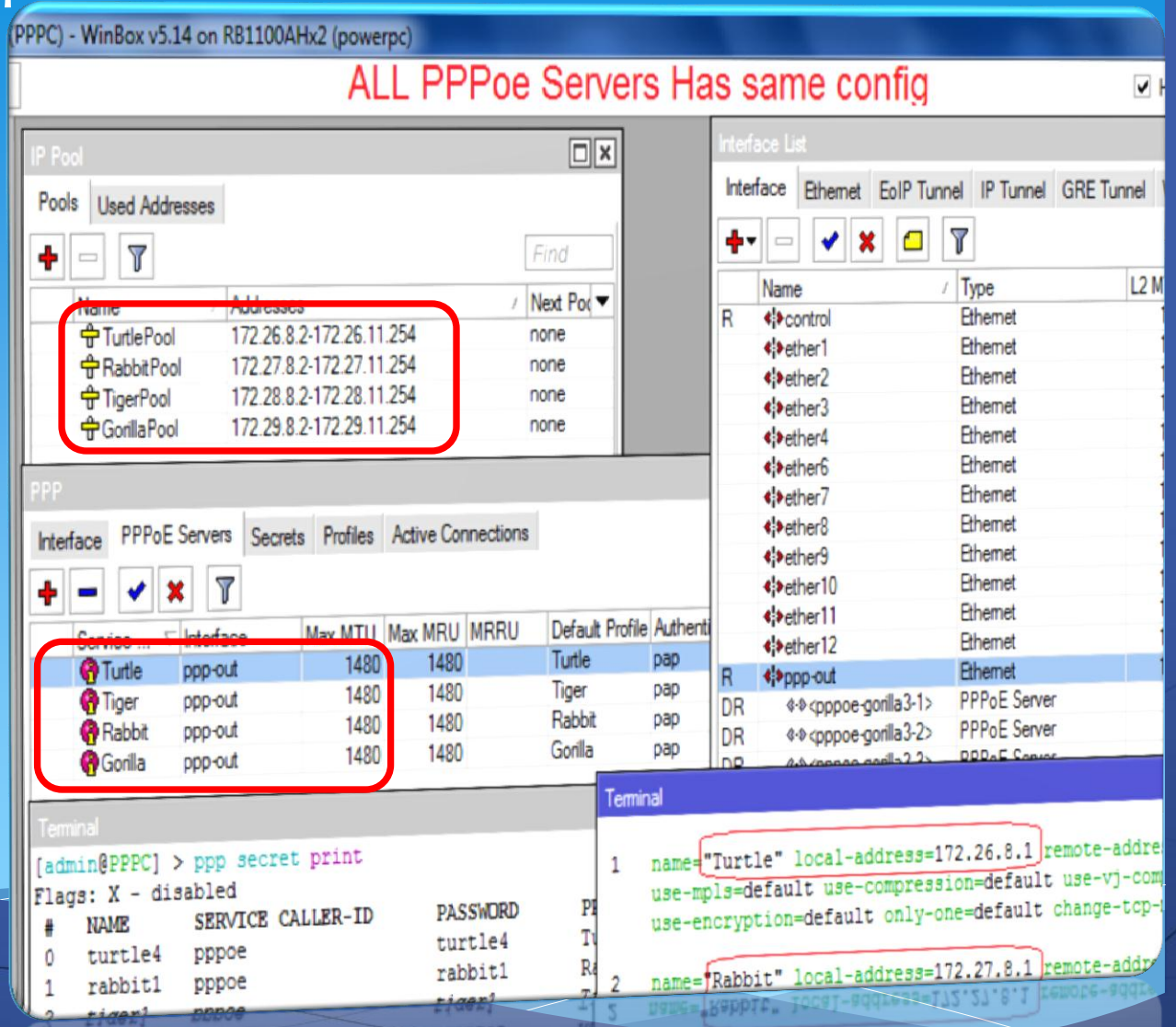
Solution: pppoe servers

after firewall we create all PPPoe servers

4 pppoe servers

4 Service names

4 ip pools



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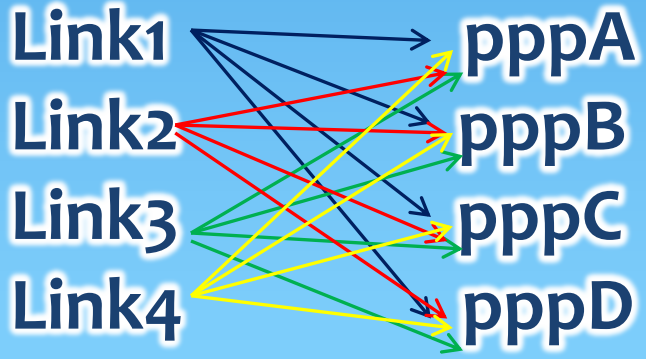
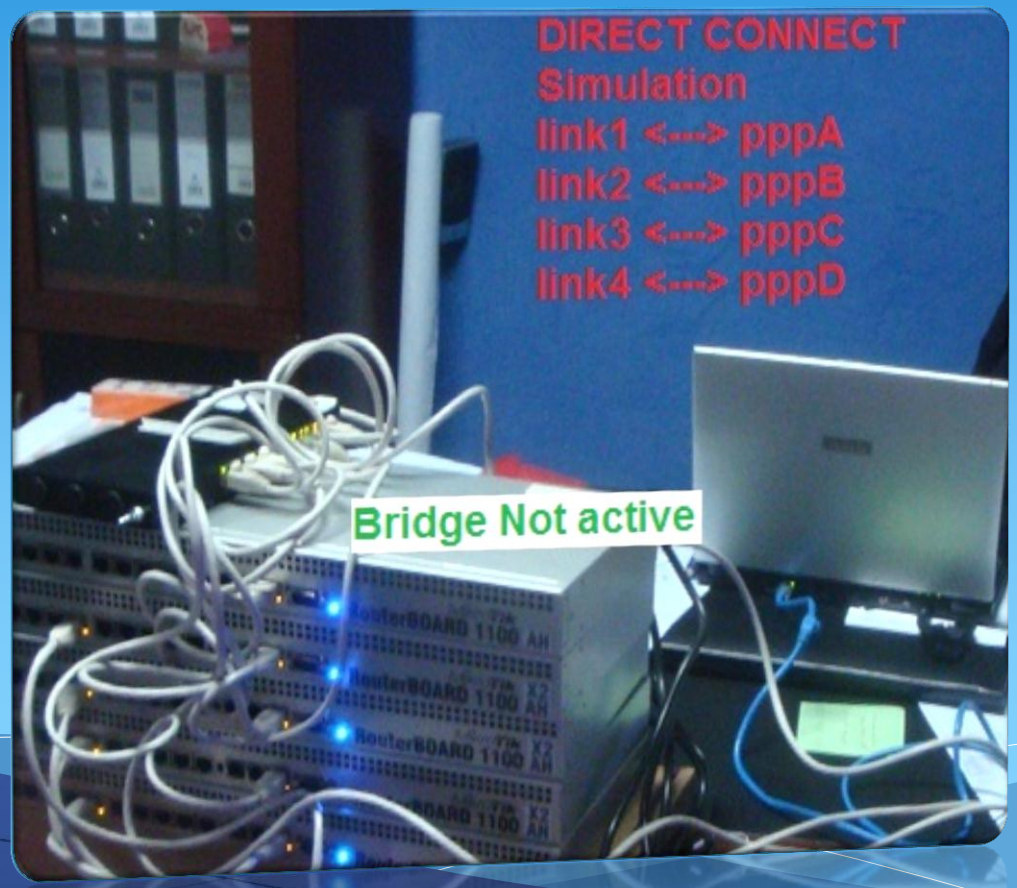
Solution: Simulator

- Using RB433 connected to all 4 link ports we created script to simulate ~500 real clients connections .

Direct connect Simulation





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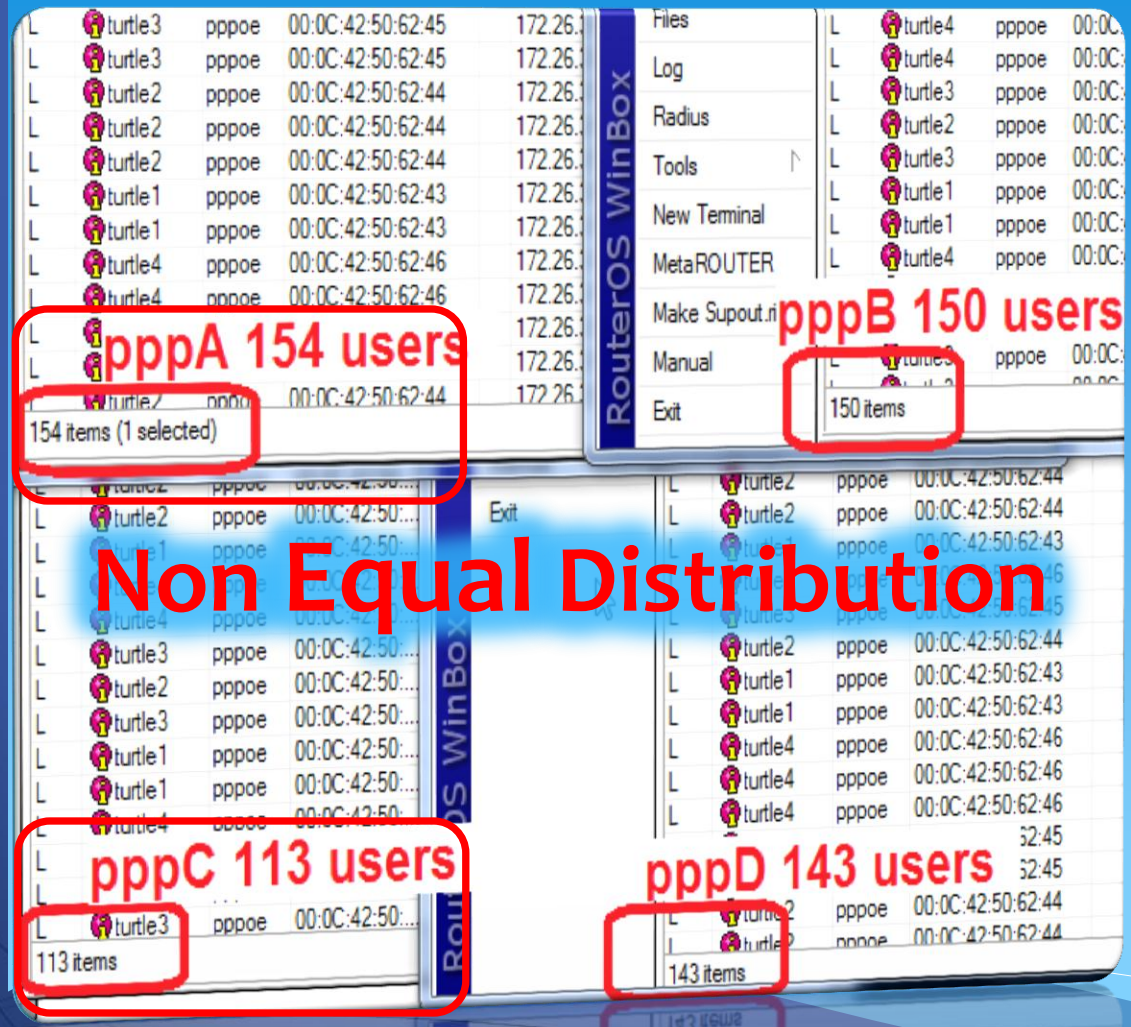
Solution: Simulator result



- NoN equal Distribution between the pppoes
- pppoe sessions are distributed arbitrary on all 4 servers….
- Pppoe Discovery have 16 service
- (4 Gorilla 4tiger 4Rabbit 4Turtle)

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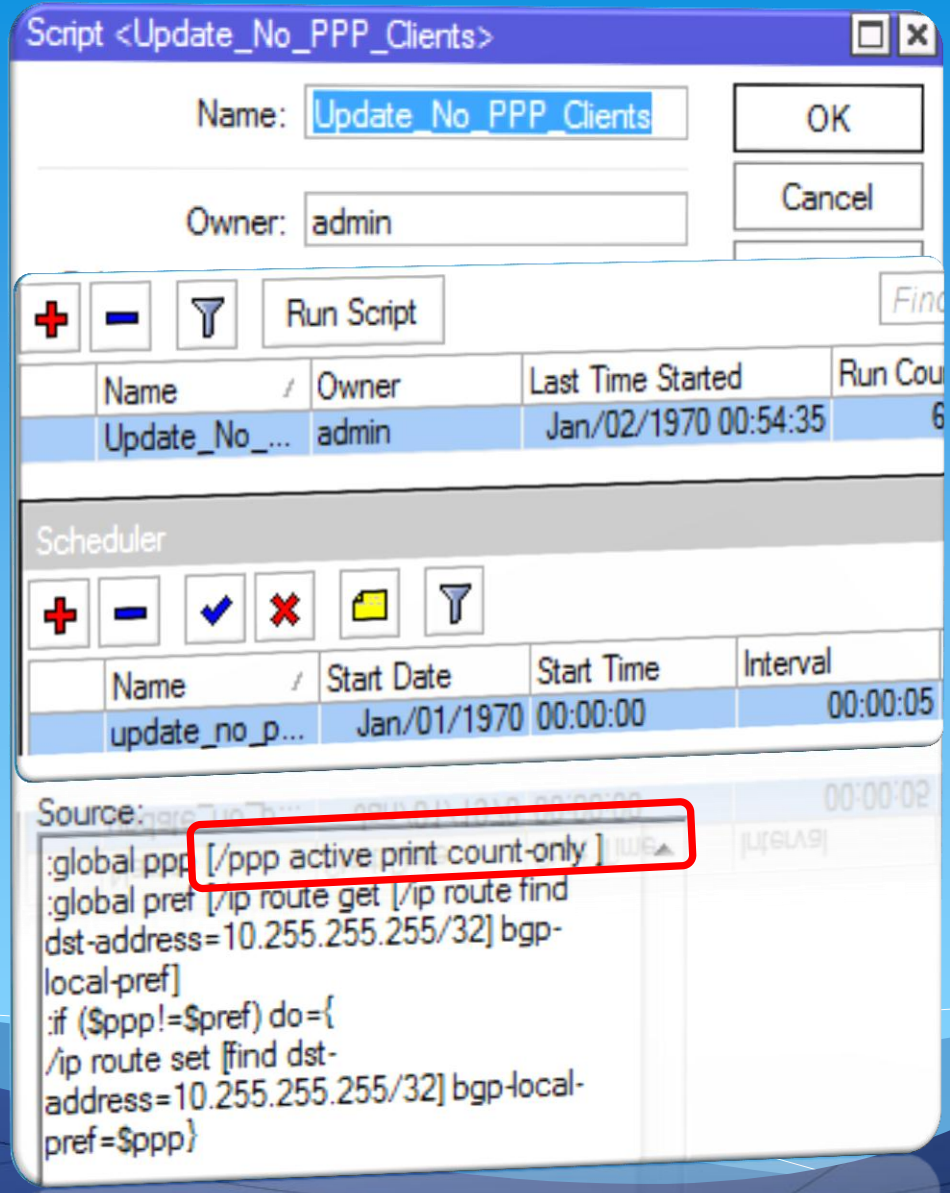
Solution: #connected

- **In Order to load balance we need to know at anytime how many users are connected to each pppoe server**

  create and Schedule every 5s script to update the NO' of connected users

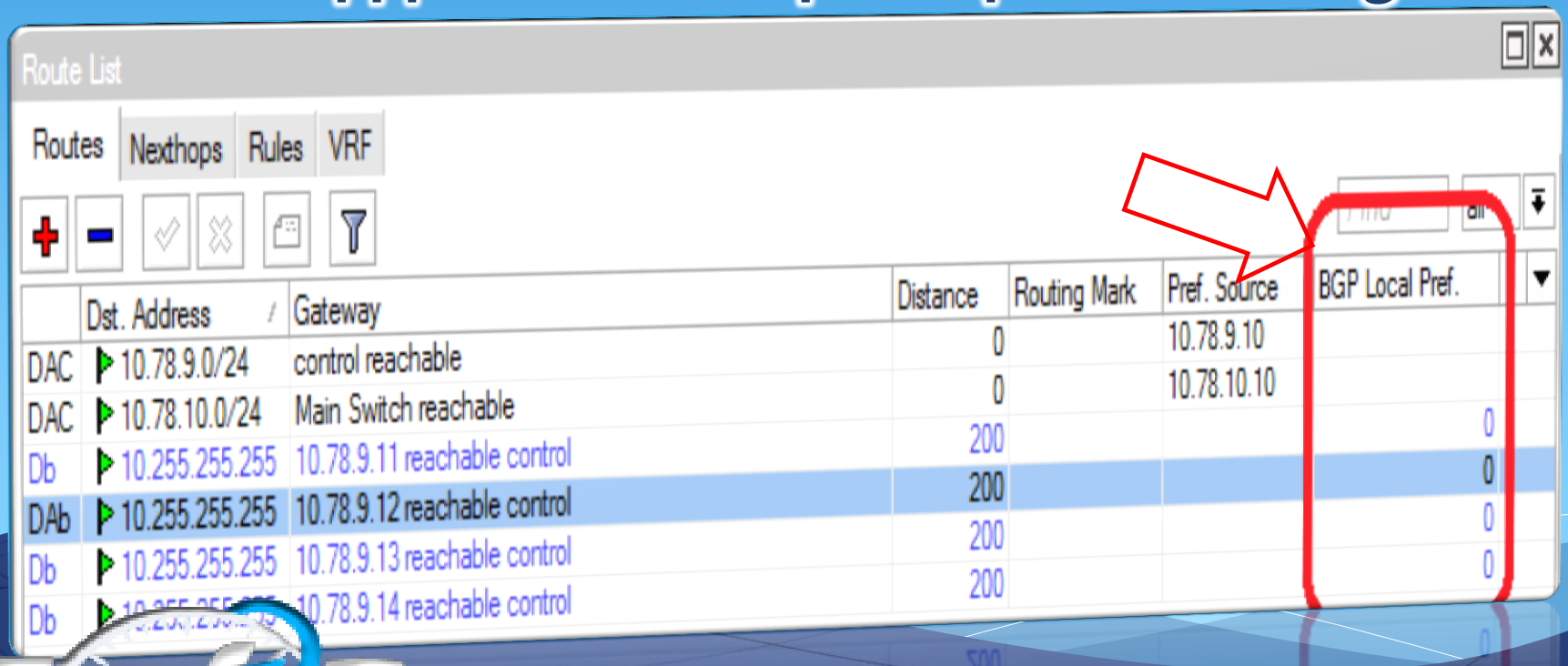
/ppp active print count-only



Solution: Load Balancer

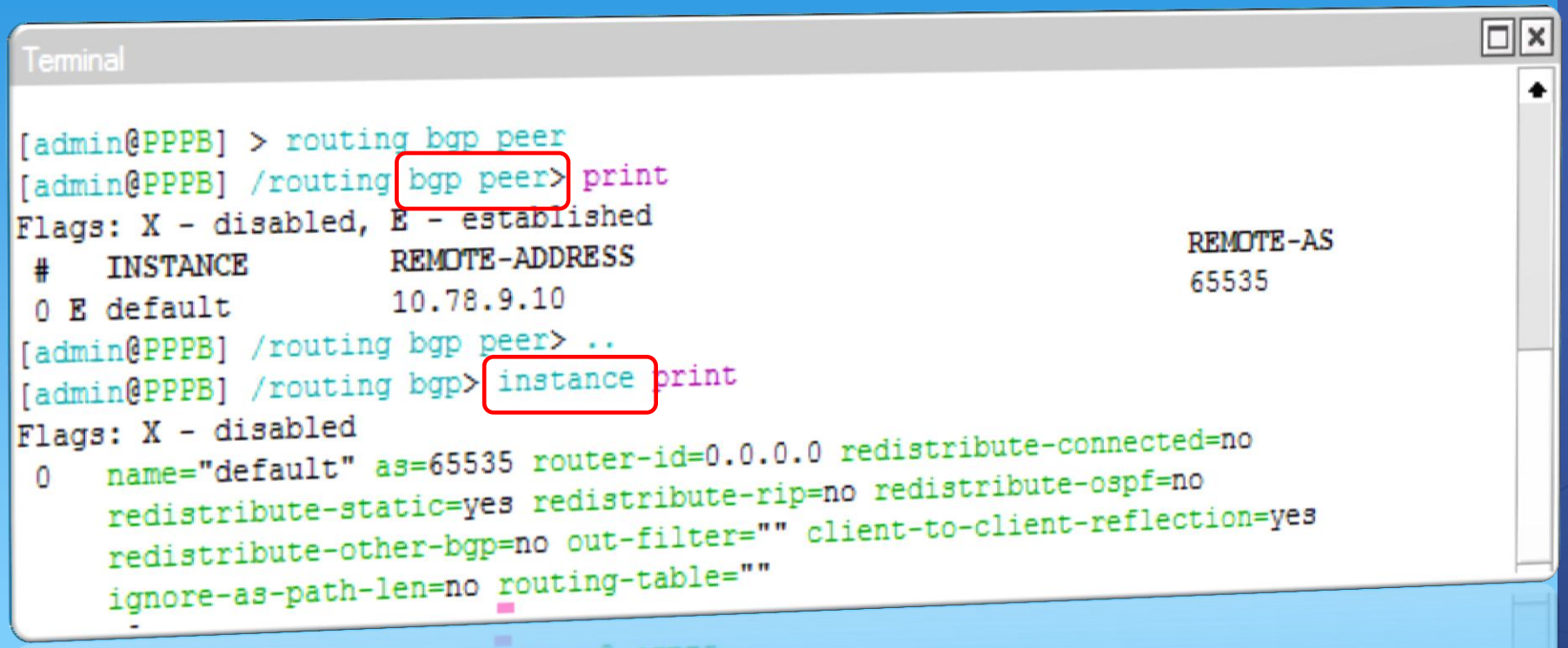
-Now that the Number of active ppp is know on each server,How to pass it to Bridge ????

Create local BGP between ALL ppps and bridge, where we Store the # of ppp in BGP Local pref & pass it to bridge…



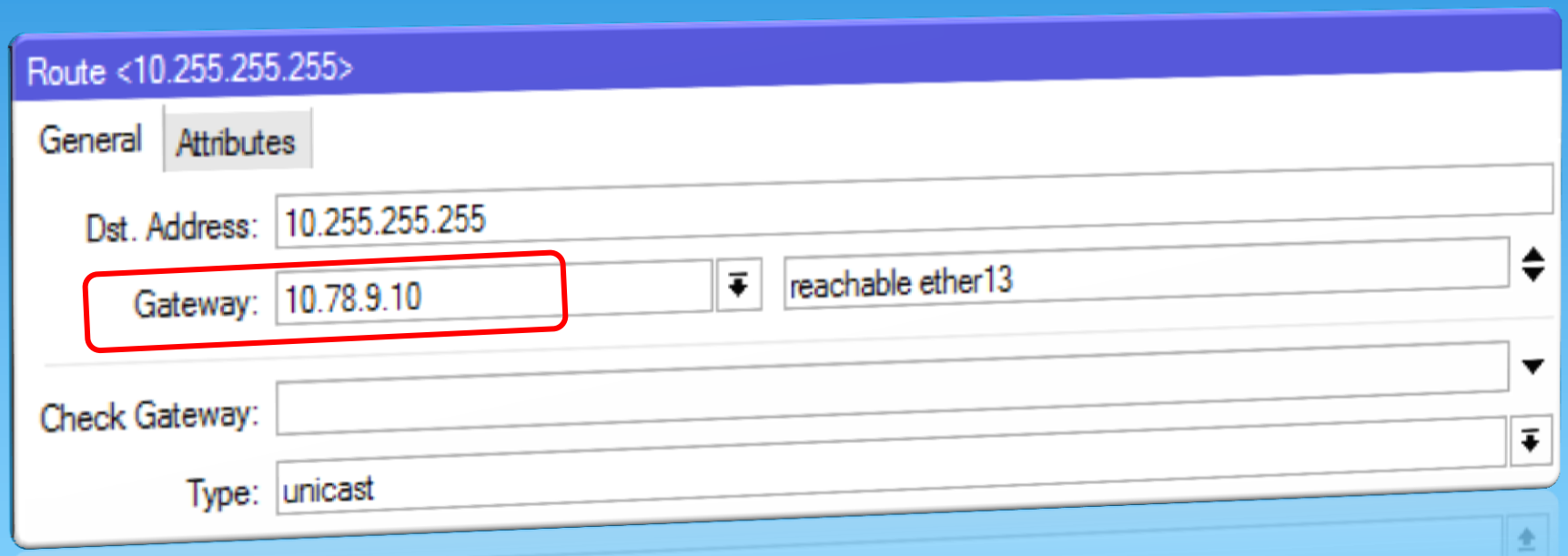
Solution: Load Balancer

- **Create a local BGP peers and set instance:**



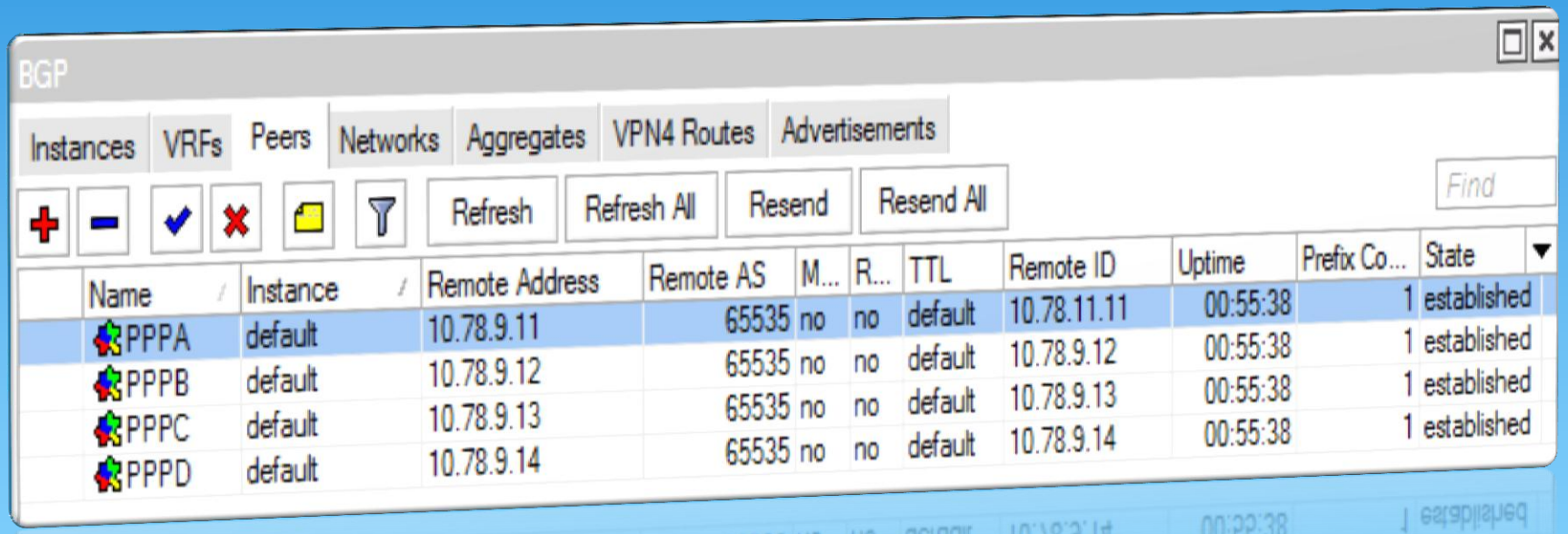
Solution: Load Balancer

- **Create a Route on all ppps with gateway to the main bridge to pass all the route info**



Solution: Load Balancer

- **After BGP creation**
- **BGP peer list in main bridge will look as follows:**



Solution: Load Balancer

Script is running on all ppps every 5 seconds & returning the number of active connections

Modify script to store The # of ppp in BGP pref

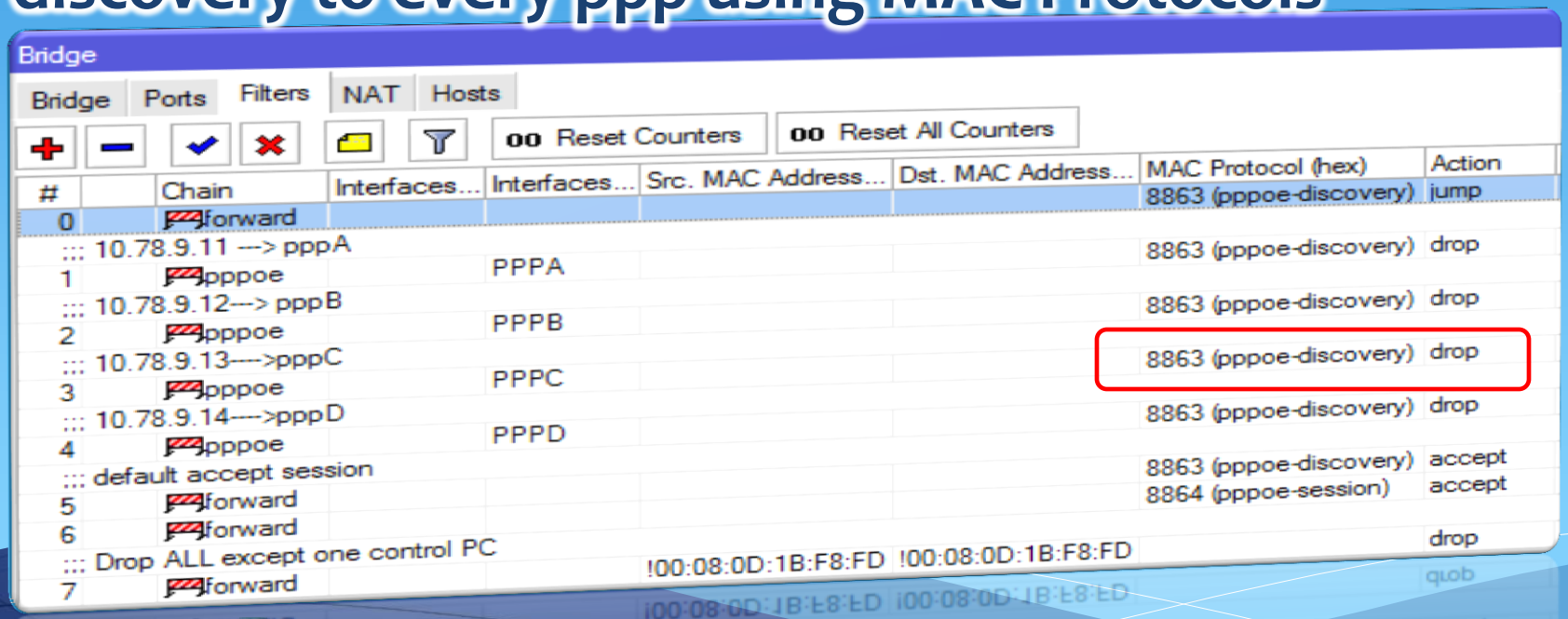
Source:

```
:global ppp [/ppp active print count-only ]
:global pref [/ip route get [/ip route find
dst-address=10.255.255.255/32] bgp-
local-pref]
:if ($ppp!=$pref) do={
/ip route set [find dst-
address=10.255.255.255/32] bgp-local-
pref=$ppp}
```

Solution: Load Balancer

Now after active user # on each ppp is in bgp local pref how to priotirize one ppp over other?

Configure the firewall to be ready to enable/disable discovery to every ppp using MAC Protocols



Solution: Load Balancer

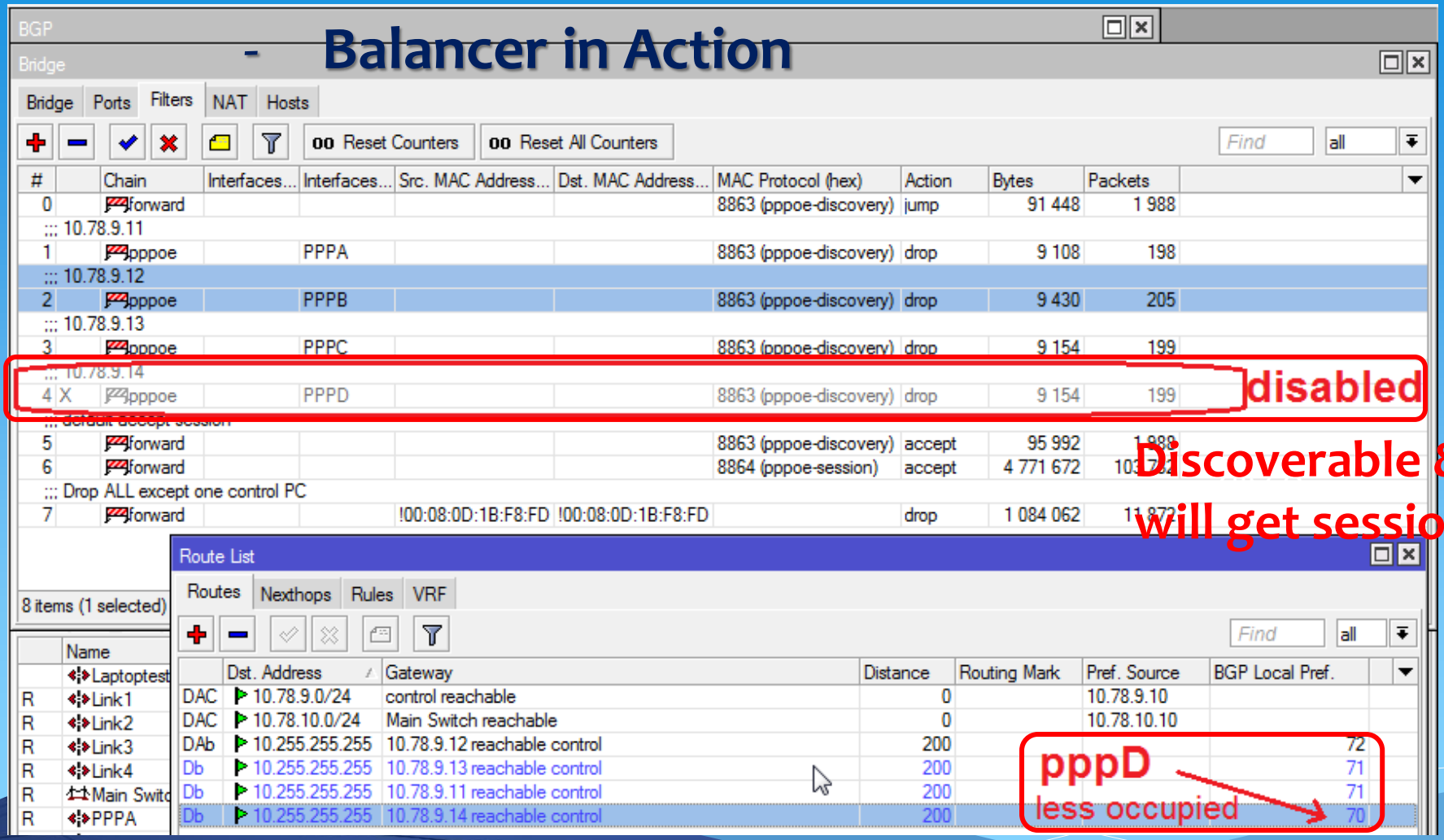
How to give advantage to the lowest occupied PPP and pass connections to it ??

create a Scheduled script that discover the lowest occupied ppp &Enable its discovery in firewall, wich make it discoverable to pass sessions to it ….

```
:global min 10000000
:global clients
:global newActive
:global concentrator
:foreach c=server in=[/ip route find dst-address=10.255.255.255/32] do={
   :set clients [/ip route get $server bgp-local-pref]
   :set concentrator [/ip route get $server gateway]

   if ($clients<$min) do={
      :set min $clients
      :set newActive $concentrator
   }
}



:foreach c=rules in=[/interface bridge filter find] do={
   :if ([/interface bridge filter get $rules comment]=$newActive) do={
      /int br filter disable $rules;
   } else={
      /int bridge filter enable $rules;
   }

}
```

Solution: Load Balancer TEST

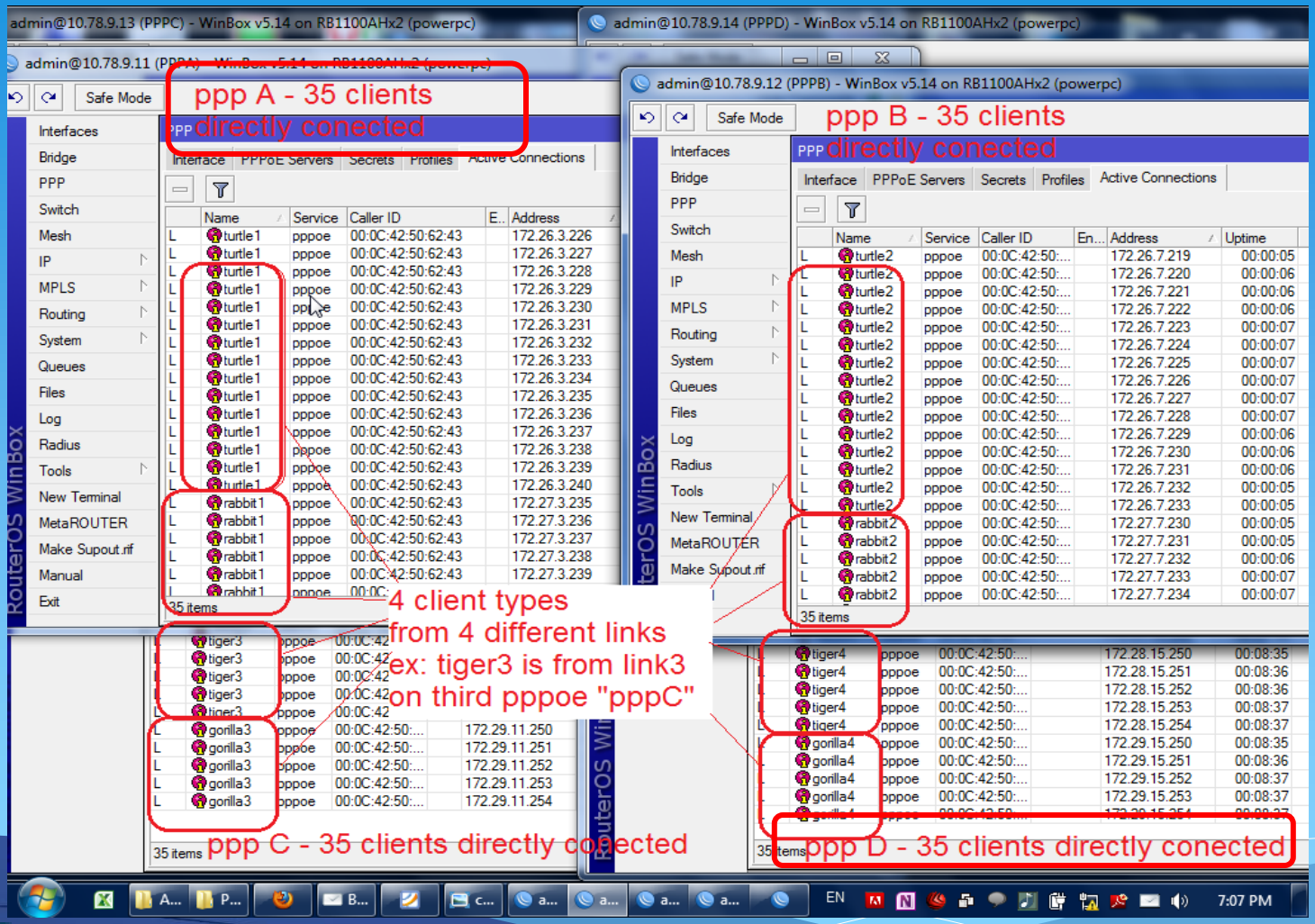
- Balancer in Action



Solution: Load Balancer TEST

Test with simulator:

35 Clients on each



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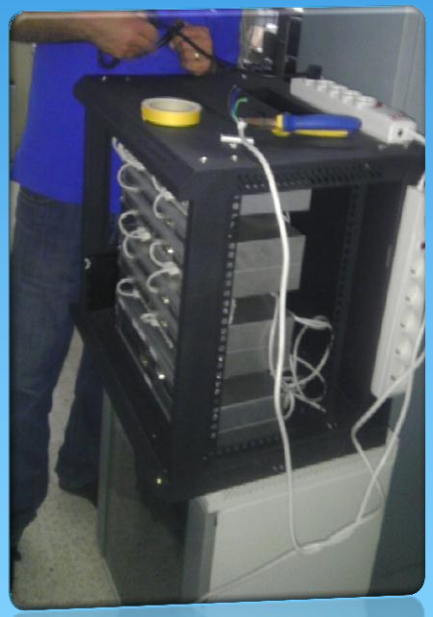
Solution: Reorganize

- **Bridge / Firewall / Load balancer OK**

Time to Reorganize, lets Implement



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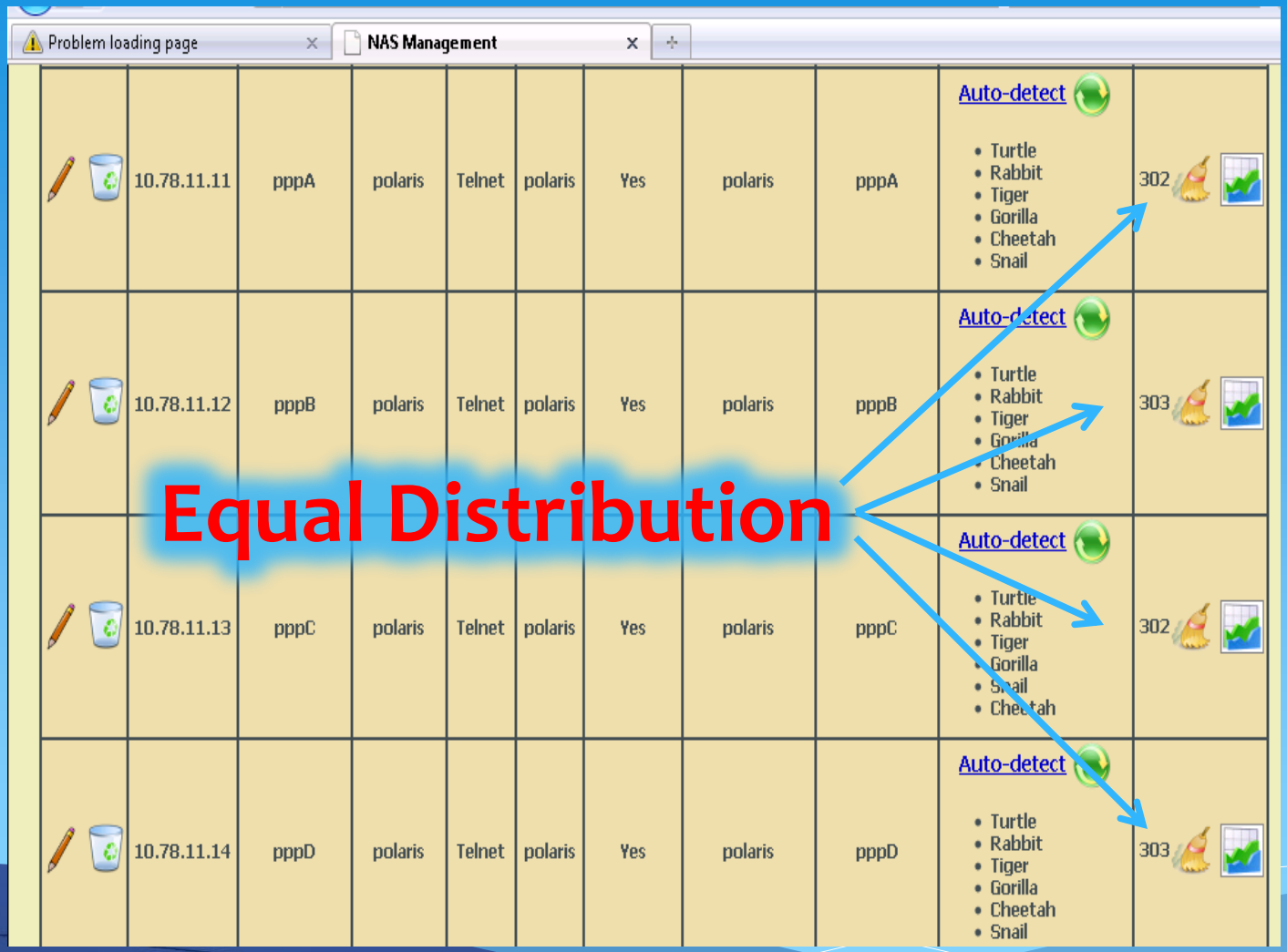
Solution: Load Balancer TEST

Test on real network After implement

303 Clients on each



Thank You for your Attention

Questions ????

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MuM Dubai – Aug 2012 .

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