

kathara lab

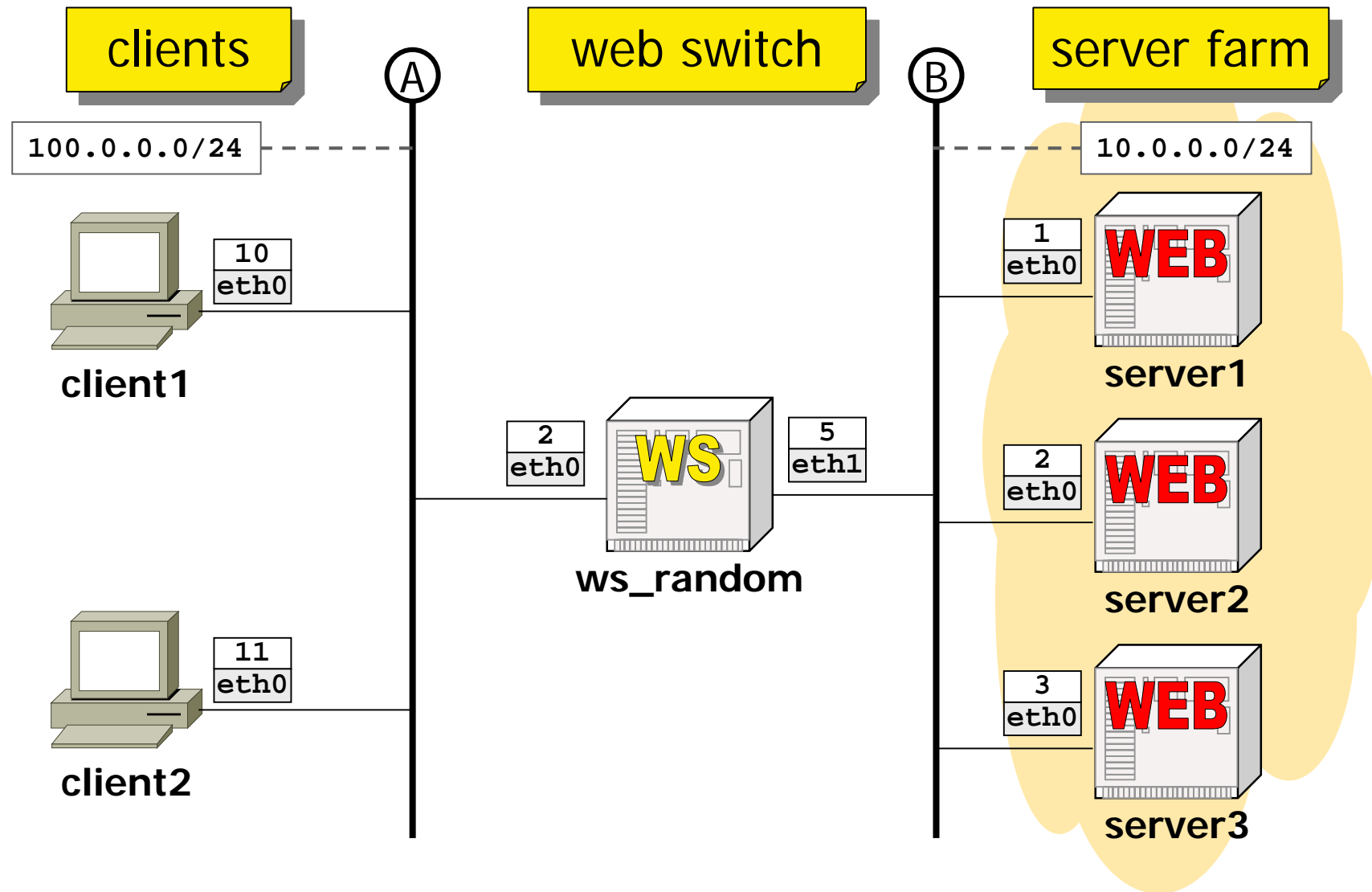
load balancer – web switch – random

Version	1.1
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Description	A lab showing the operation of a web switch based on iptables – kathara version of a netkit lab

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lab topology



lab description

- servers
 - offer a simple HTML default page
 - each physical server hosts a different page, so that they can be easily distinguished
- web switch
 - web switch implements a policy for directing requests to the servers
 - **ws_random**: sends each request to a random server
- clients
 - host a simple web browser (**links**)

lab description – servers

- each server has a different IP address in the subnet **10.0.0.0/24**
- no special configuration, just a simple HTML default page in **/var/www/index.html**

lab description – web switch

- each web switch has two interfaces
 - one facing the internal network, with an IP address in the same subnet as the servers
 - one facing the external network, exposing a single **virtual IP address (VIP)** to the clients
- clients only see VIPs of the web switch: they do not know how many servers are in the farm

lab description – web switch

- web switch is implemented using the Linux firewall iptables
 - random

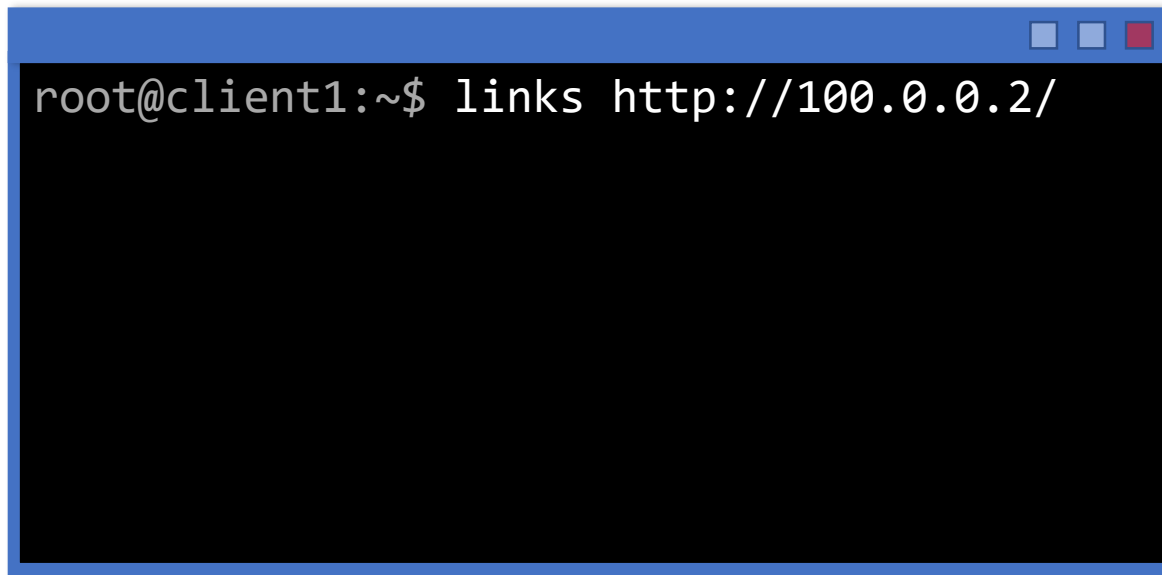
```
iptables --table nat --append PREROUTING --destination 100.0.0.2 -p tcp --dport 80 --match  
statistic --mode random --probability 0.33 --jump DNAT --to-destination 10.0.0.1:80  
iptables --table nat --append PREROUTING --destination 100.0.0.2 -p tcp --dport 80 --match  
statistic --mode random --probability 0.5 --jump DNAT --to-destination 10.0.0.2:80  
iptables --table nat --append PREROUTING --destination 100.0.0.2 -p tcp --dport 80 --jump  
DNAT --to-destination 10.0.0.3:80
```

```
iptables --table nat --append PREROUTING --destination 100.0.0.2  
-p tcp --dport 80 --match statistic --mode random --probability  
0.33 --jump DNAT --to-destination 10.0.0.1:80
```

the rule applies
with a certain
probability

experiments

- to experiment load balancing, pick one of the clients, start **links**, and direct it to the VIP exposed by web switch:

A terminal window with a blue title bar and a black background. The prompt is 'root@client1:~\$' and the command entered is 'links http://100.0.0.2/'.

```
root@client1:~$ links http://100.0.0.2/
```

to experiment random
balancing

experiments

- once you have accessed one of the VIPs, you get a page stating which is the physical server that has served it
- load balancing can be checked by reloading the page (**ctrl+R**), but...



experiments

- once you have accessed one of the VIPs, you get a page stating which is the physical server that has served it
- load balancing can be checked by reloading the page (**ctrl+R**), but...
 - ...by default all HTTP requests use the same connection (HTTP 1.1)!
 - since iptables tracks TCP connections, all HTTP requests within the same connection are directed to the same physical server
 - to really appreciate load balancing you need to close and re-open links