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Problem 1.1

List of messages exchanged in the order they would be exchanged.

1. Eth: from <Alice's MAC> to <BCast> -- Who has Linus's IP?
2. Eth: from <Router's MAC> to <Alice's MAC> -- Router answers to Alice
3. ICMP: Request, from <Alice's IP> to <Linus's IP> -- ICMP packet goes to Router
4. ICMP: Redirect, from <Router's IP> to <Linus's IP> -- ICMP packet forwarded
5. ICMP: Reply, from <Linus's IP> to <Router's IP> -- Linus answers to Router
6. ICMP: Reply, from <Router's IP> to <Alice's IP> -- Alice get's ICMP reply

Ping completes after step 6.

Problem 1.2

a. Routing vs Forwarding

Forwarding
- Move packet from input link to the appropriate output link
- Purely local computation
- Must go be very fast (executed for every packet)

Routing
- Make sure that the next hop actually leads to the destination
- Global decisions; distributed computation and communication
- Can go slower (only important when topology changes)

Source : [1]

b. Examples

Link state:
1. Open Shortest Path First (OSPF)
2. Intermediate System-to-Intermediate System (IS-IS)

Distance Vector:
1. Routing Information Protocol (RIP)
2. Enhanced Interior Gateway Routing Protocol (EIGRP) [2]

c. Link state vs Distance vector

In Distance Vector routing information is only exchanged between directly connected neighbors. Each Router has a limited visibility of the whole network. Link-state routing, in contrast, requires that all routers know about the paths reachable by all other routers in the network. [3]

d. Border Gateway Protocol (BGP) [4]

e. Round 3 & 4

Round 3 & Round 4 are identical since the system reaches a steady state by the end Round 3.

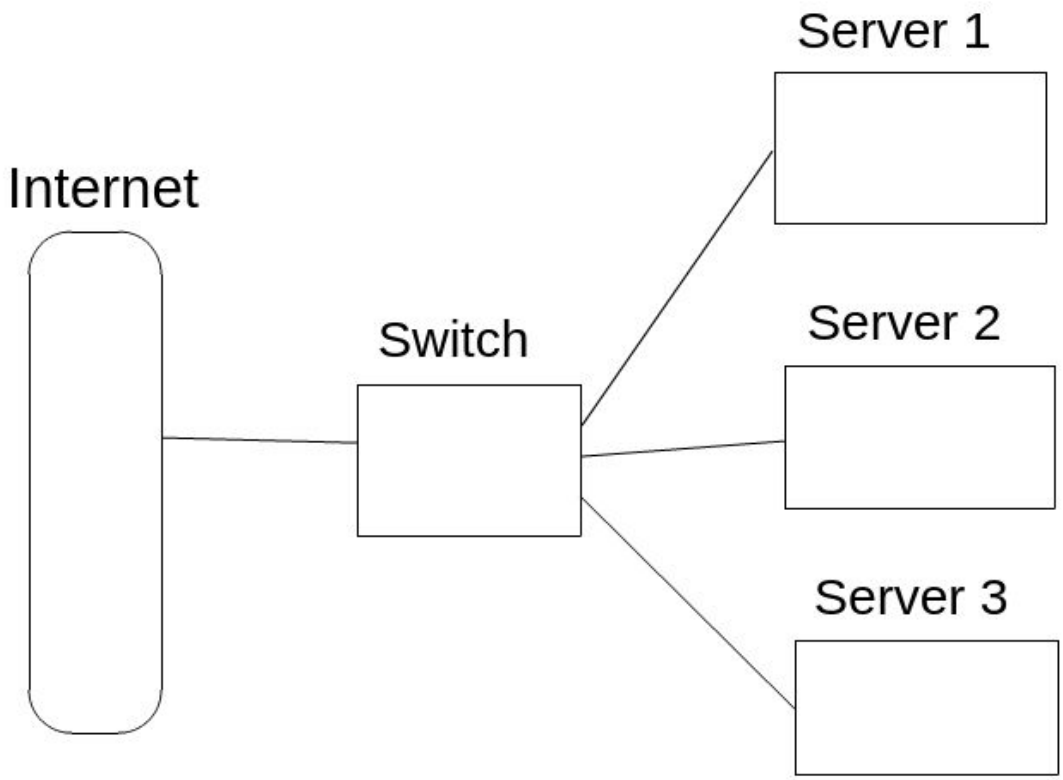
Node F		
Destination	Distance	Next node
G	2	G
H	N.E.	-

Node G		
Destination	Distance	Next node
G	2	F
H	N.E.	-

Node H		
Destination	Distance	Next node
G	N.E.	-
H	N.E.	-

Problem 1.3

The final setup of the system would look like this.



All the internet traffic arrives at the switch which then redirects the requests to one the servers depending on their current load and other factors.

SDN rule to redirect traffic to one of the servers

Switch Port	MAC src	MAC dst	Eth type	VLAN ID	IP Src	IP Dst	IP Prot	TCP sport	TCP dport	Action
*	*	*	*	*	*	5.6.7.8	*	*	*	port6

References:

[1]: https://cseweb.ucsd.edu/classes/fa10/cse123/lectures/123-fa10-l12.pdf
[2]: https://en.wikipedia.org/wiki/Enhanced_Interior_Gateway_Routing_Protocol
[3]: http://packetlife.net/blog/2008/oct/2/distance-vector-versus-link-state/
[4]: http://www.tcpipguide.com/free/t_TCPIPExteriorGatewayRouting.htm