EL5373

INTERNET ARCHITECTURE AND PROTOCOLS

48/50

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Workstation: APAH Othello_I

MAC: f8:0f:41:c4:7f:aa

Lab Report 4

Due Oct 14, 2014

Exercise 1

Configure the IP addresses of my workstations and the router as following

Router 3	eth0 (123.238.63.3)	eth1 (128.238.64.3)
Host	Yachi(Me) (128.238.63.103)	Fenchi (Partner) (128.238.64.103)

When a packet was sent to a workstation in the other subnet, explain how the source and destination Ethernet addresses were changed.

1). when the packet was sent from transmitter to the router, source Ethernet address is transmitter address, destination Ethernet address is router Ethernet interface address connected to the transmitter subnet.
2.) When the packet go through the router to the receiver, source Ethernet address is router Ethernet interface address connected to the receiver subnet, destination address is receiver address.

What are the source and destination addresses in the IP and Ethernet headers of a packet that went from your machine to the router?

Ethernet Header Source: f8:0f:41:c4:7f:aa (My workstation MAC)
Destination: 00:05:9b:bf:45:a0 (Router 3 eth0 MAC)

IP Header Source: 128.238.63.103
Destination: 128.238.64.103

What are the source and destination addresses in the IP and Ethernet headers of a packet that went from the router to your partner's machine?

Ethernet Header Source: 00:05:9b:bf:45:a1 (Router 3 eth1 MAC)
Destination: f8:0f:41:c4:7f:a8 (Partner MAC)

IP Header Source: 128.238.63.103
Destination: 128.238.64.103

What are the source and destination addresses in the IP and Ethernet headers of a packet that went from your partner's workstation to the router?

Ethernet Header Source: f8:0f:41:c4:7f:a8 (Partner MAC)
Destination: 00:05:9b:bf:45:a1 (Router 3 eth1 MAC)

IP Header Source: 128.238.64.103
Destination: 128.238.63.103

What are the source and destination addresses in the IP and Ethernet headers

of a packet that went from the router to your machine?
Ethernet Header Source: 00:05:9b:bf:45:a0 (Router 3 eth0 MAC)
Destination: f8:0f:41:c4:7f:aa (My workstation MAC)

IP Header Source: 128.238.64.103
Destination: 128.238.63.103

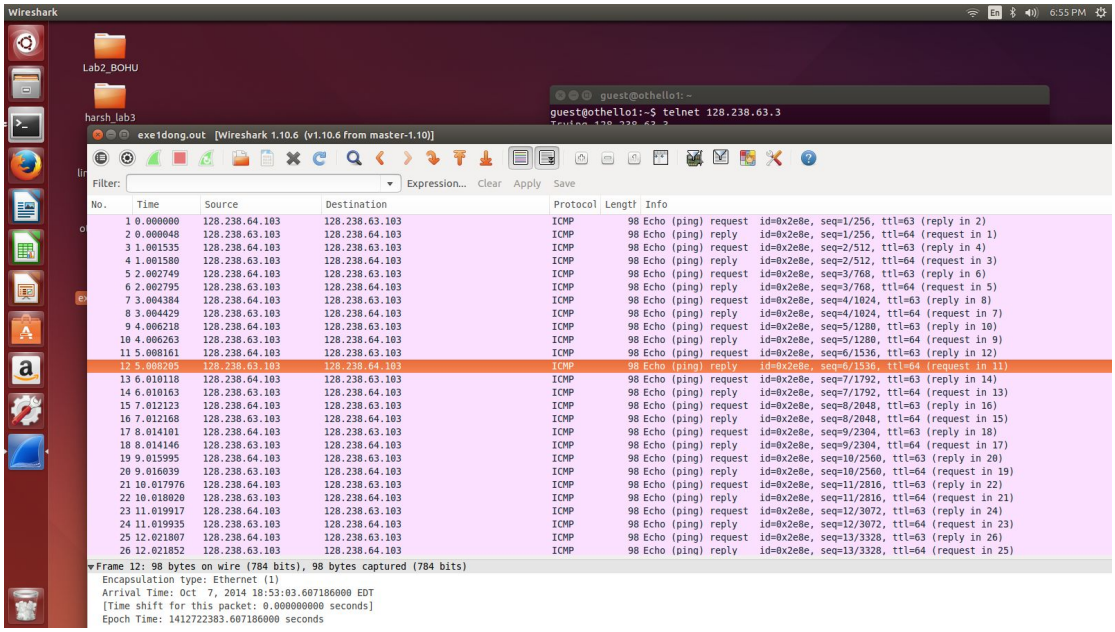
calculate the average delay that a packet experienced in the router.

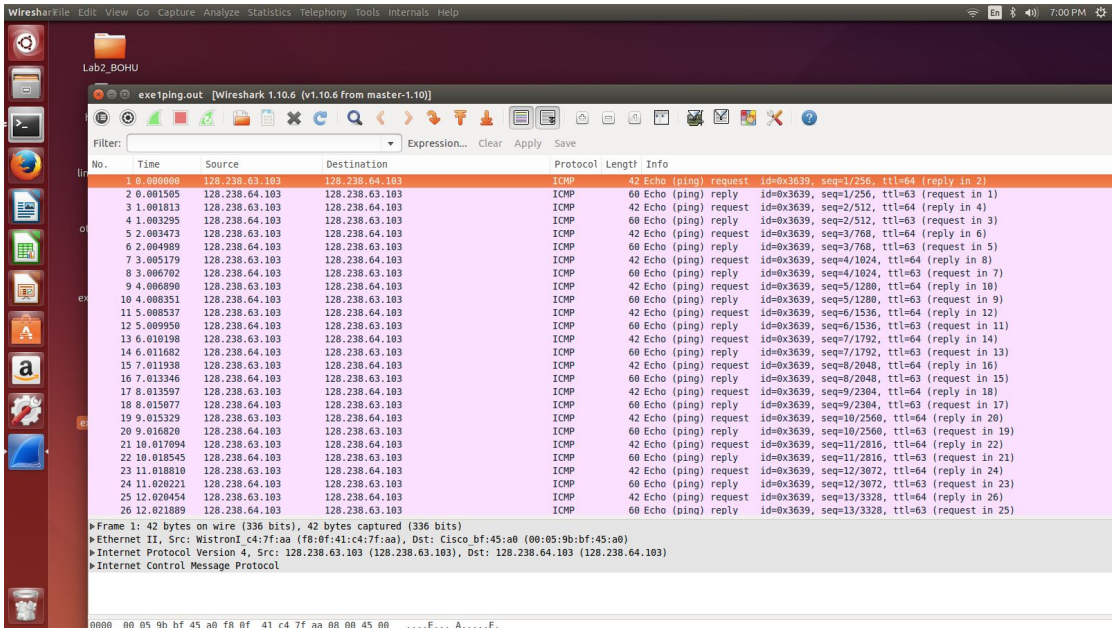
When I ping my partner, an ICMP message is sent from my workstation and I can find the send time of this ICMP request (1.001813) in my tcpdump output. From my partner tcpdump output, he can also find the send time of this same request (1.001827). So the subtraction of these two time is the delay of the packet through the router.

(1.001827, 1.001813) (2.003419, 2.003473) (3.005179, 3.005167) (4.006926, 4.006890)

-2

The average delay is 0.000028 s and Router is faster than bridge





Exercise 2

Explain why you can only get two different RIP messages in your subnet. Was a RIP packet forwarded by the routers? Why?

RIP response packets are only received by directly connected routers and are not forwarded. Each router only speaks to its neighbors. Networks are learned only from neighbors, not necessarily from the router that is directly connected to the network. Each route sent in response packets includes the network address and the metric associated with the network address.

*RIP Packet from 128.238.63.3, (63.100/ yach)i

IP header

IP Version 4.0	Hdr Len 20 bytes	0xc0(DSCP 0x30, ECN 0x00)	Total Len 72 bytes
0x0000		0x00	0
2	UDP(17)	0xf7f4	
128.238.63.3			
255.255.255.255			
options			
data			

UDP header

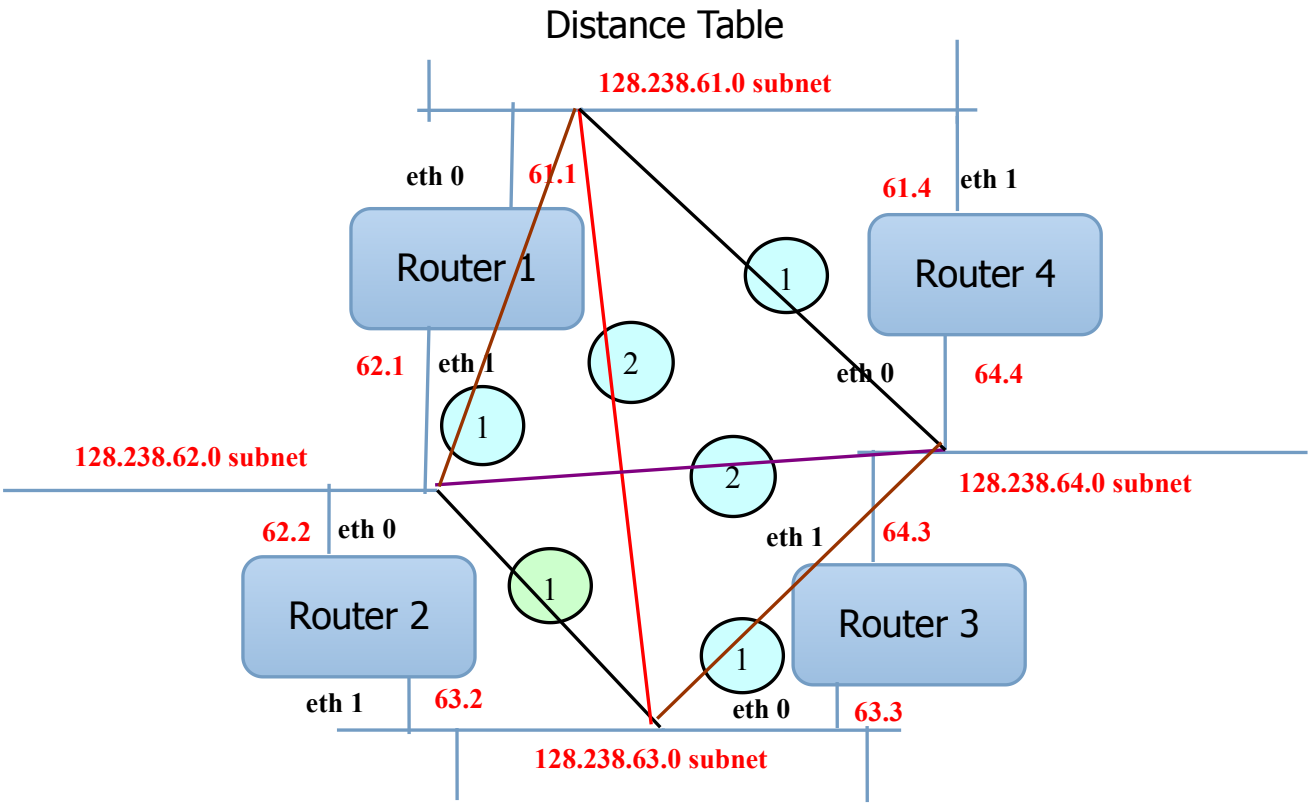
520	520
Len 52 bytes	0xba9f

RIP message

Command (2)	Version (1)	0
Address Family IP (2)	0	
128.238.61.0		
0		
0		
Metric (2)		
Address Family IP (2)	0	
128.238.64.0		
0		
0		
Metric (1)		

Other seven RIP messages

123.238.63.2 IP address 128.238.61.0 Metric 2 IP address 128.238.62.0 Metric 1	
123.238.62.2 IP address 128.238.63.0 Metric 1 IP address 128.238.64.0 Metric 2	123.238.62.1 IP address 128.238.61.0 Metric 1 IP address 128.238.64.0 Metric 2
123.238.61.4 IP address 128.238.63.0 Metric 2 IP address 128.238.64.0 Metric 1	123.238.61.1 IP address 128.238.62.0 Metric 1 IP address 128.238.63.0 Metric 2
123.238.64.4 IP address 128.238.61.0 Metric 1 IP address 128.238.62.0 Metric 2	123.238.64.3 IP address 128.238.62.0 Metric 2 IP address 128.238.63.0 Metric 1



For example, A routing table can be formed at 128.238.62.0 subnet

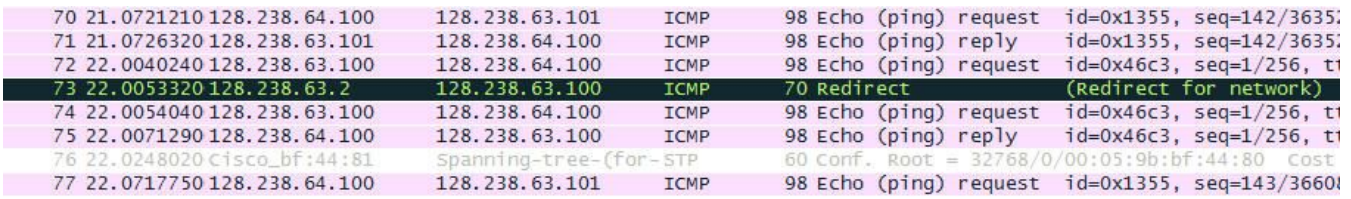
Destination	Next hop	Cost
128.238.61.0	Router 1	1
128.238.63.0	Router 2	1
128.238.64.0	Router 1	2

Exercise 4

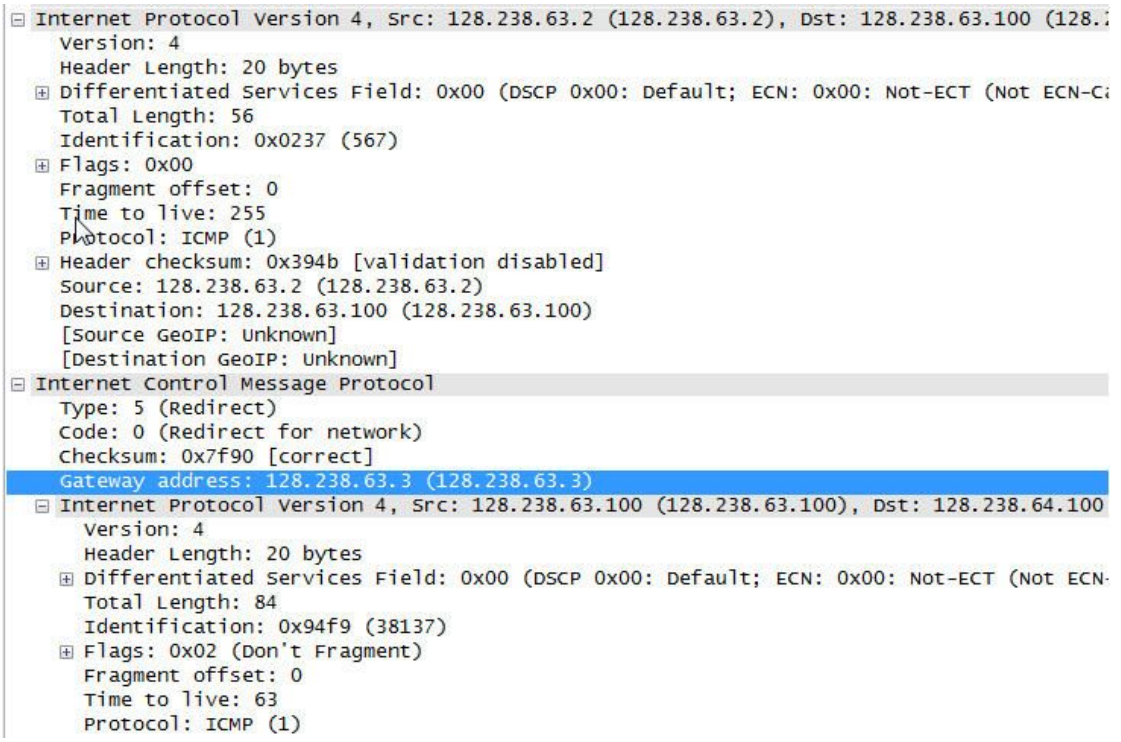
When I (128.238.63.100) ping 128.238.64.100, which is three hops away from my host.

The first IP datagram to host 64.100 is forwarded through router 2 gateway 128.238.63.2.

And then I receive ICMP redirect from 63.2

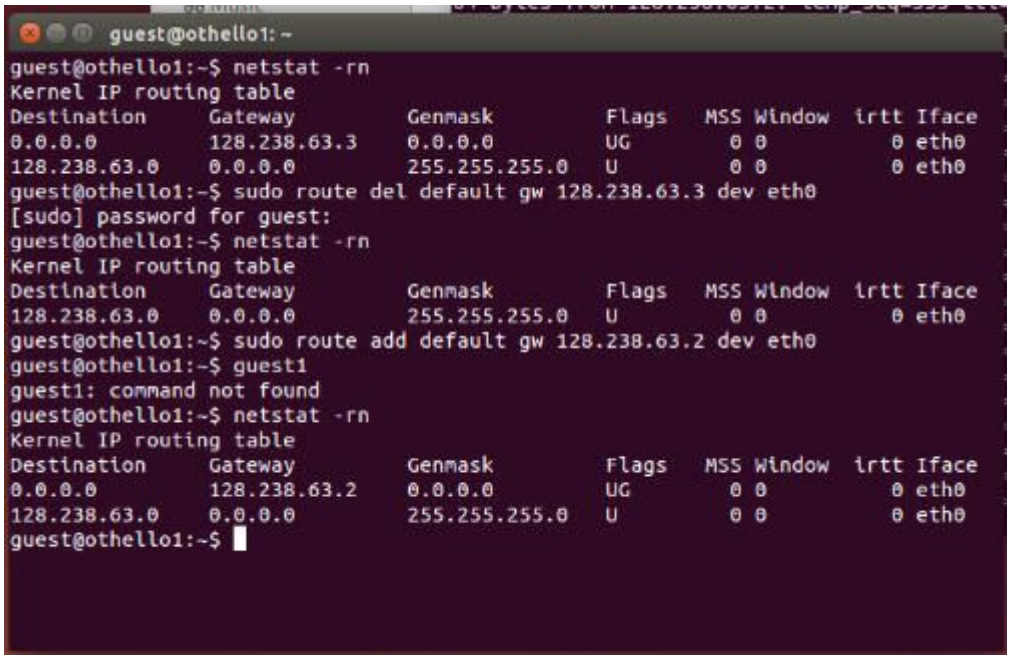


It adds a new entry which is directed to host 64.100 through router 3 gateway 128.238.63.3



From the experiment, the routing table haven't changed actually.
But from textbook, we find Routing table Flags index meaning as following:
There are five flags which can be used for a given route.

U. The route is up.
G. The route is to a router (gateway).
H. The route is to a host.
D. The route was created by a redirect (see Section 4.2.3).
M. The route was modified by a redirect.


guest@othello1: ~
guest@othello1:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 128.238.63.3 0.0.0.0 UG 0 0 0 eth0
128.238.63.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
guest@othello1:~$ sudo route del default gw 128.238.63.3 dev eth0
[sudo] password for guest:
guest@othello1:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
128.238.63.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
guest@othello1:~$ sudo route add default gw 128.238.63.2 dev eth0
guest@othello1:~$ guest1
guest1: command not found
guest@othello1:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 128.238.63.2 0.0.0.0 UG 0 0 0 eth0
128.238.63.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
guest@othello1:~$