# EL5373 INTERNET ARCHITECTURE AND PROTOCOLS

Runze Dong

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N10264442

rd1711@nyu.edu

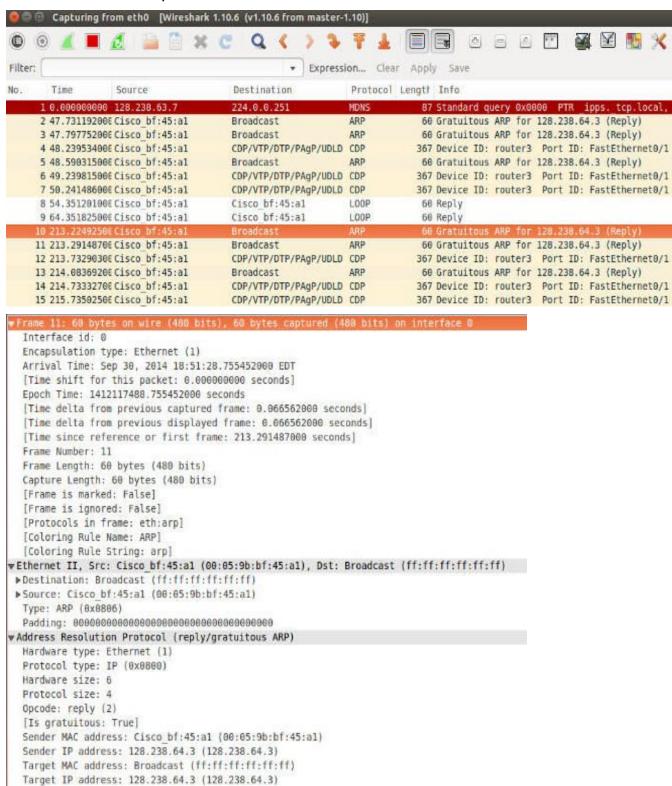
Workstation: APAH Othello\_I

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

Lab Report 3

Due Oct 7, 2014

The default IP address of the router interface is <u>128.238.64.3</u> Gratuitous ARP sent by the router.



Change the IP address of my workstation to be the same subnet as the router 3 and telnet the router 3 (default ip address 128.238.63.4).

## **Show Version**

## Version 12.3(20) Release Software (fc2)

```
🌘 🖨 🖯 guest@othello1: ~
% Invalid input detected at '^' marker.
router3>show version
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-I-M), Version 12.3(20), RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2006 by cisco Systems, Inc.
Compiled Tue 08-Aug-06 20:50 by kesnyder
Image text-base: 0x80008098, data-base: 0x80CE7FC4
ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
ROM: C2600 Software (C2600-I-M), Version 12.3(20), RELEASE SOFTWARE (fc2)
router3 uptime is 23 minutes
System returned to ROM by power-on
System image file is "flash:c2600-i-mz.123-20.bin"
cisco Z651 (MPC860P) processor (revision 0x200) with 61440K/4096K bytes of memor
Processor board ID JAB05240AQ8 (2969173941)
M860 processor: part number 5, mask 2
Bridging software.
X.25 software, Version 3.0.0.
2 FastEthernet/IEEE 802.3 interface(s)
```

## Exercise 3

In order to finish this part, we change router interface IP address as Figure 3.7.

Router 3	eth0 (123.238.63.3)	eth1 (128.238.63.4)			
Host	Partner(eth0) (128.238.63.100)	Me(eth1) (128.238.63.115)			

What are the IP and MAC addresses of a packet that went from your machine to the bridge?

# IP 128.238.63.100 MAC f8:0f:41:c4:7f:a8

What are the IP and MAC addresses of a packet that went from the router to your partner's machine?

## IP 128.238.63.100 MAC f8:0f:41:c4:7f:a8

What are the IP and MAC addresses of a packet that went from partner's machine to the bridge?

# IP 128.238.63.115 MAC f8:0f:41:c4:7f:aa

What are the IP and MAC addresses of a packet that went from the router to your machine?

## IP 128.238.63.115 MAC f8:0f:41:c4:7f:aa

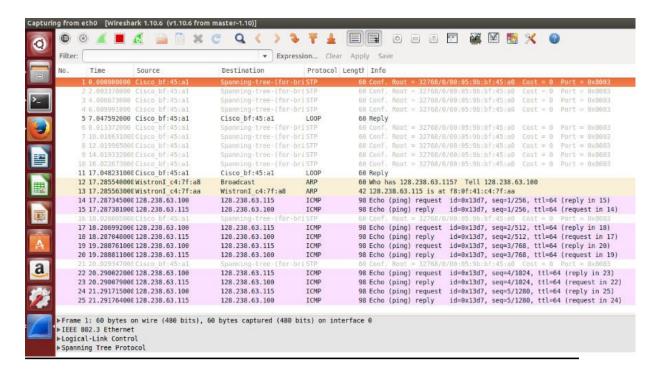
Using the tcpdump outputs from both machines, calculate the average delay that a packet experienced in the bridge.

For this question, we can capture some completed ICMP request/reply to calculate the delay. When I ping my partner, my machine sends ICMP request, and then partner's machine receive the request, send ICMP reply to my machine. So we can calculate round trip delay from tcpdump output.

368 511.07312400 128.238.63.115	128.238.63.100	ICMP	42 Echo (ping) request id=0x1be7, seg=2/512, ttl=64 (reply in 369)
		401,040	
369 511.07435406 128.238.63.100	128.238.63.115	ICMP	60 Echo (ping) reply id=0x1be7, seq=2/512, ttl=64 (request in 368)
370 512.0744630€ 128.238.63.115	128.238.63.100	ICMP	42 Echo (ping) request id=0xlbe7, seq=3/768, ttl=64 (reply in 371)
371 512.0757070€ 128.238.63.100	128.238.63.115	ICMP	60 Echo (ping) reply id=0x1be7, seq=3/768, ttl=64 (request in 370)
372 512.57492586 Cisco bf:45:a1	Spanning-tree-(for-	-briSTP	60 Conf. Root = 32768/0/60:05:9b:bf:45:a0
373 512.9689690@Cisco_bf:45:a1	CDP/VTP/DTP/PAgP/UI	OLD CDP	376 Device ID: router3 Port ID: FastEthernet0/1
374 513.07587906 128.238.63.115	128.238.63.100	ICMP	42 Echo (ping) request id=0x1be7, seq=4/1024, ttl=64 (reply in 375)
375 513.07719506 128.238.63.100	128.238.63.115	ICMP	60 Echo (ping) reply id=0x1be7, seq=4/1024, ttl=64 (request in 374
376 514.07668306 128.238.63.115	128.238.63.100	ICMP	42 Echo (ping) request id=0x1be7, seq=5/1280, ttl=64
377 514.07792306 128.238.63.100	128.238.63.115	ICMP	60 Echo (ping) reply id=0x1be7, seq=5/1280, ttl=64 (request in 370

When I ping my partner, from these 4 complete ICMP process, we have 4 round trip delay time, <u>0.001316</u>, <u>0.00123</u>, <u>0.00124</u>, <u>0.00124 seconds</u>.

So the average transmission delay in bridge is half round trip delay, <u>0.000628</u> (6.28E-4) seconds.



A bridge sends its BPDUs every 2 seconds.

\*Priority level always :32768

Othello_1	Desdemona_1
Root ID: 00:05:9b:bf:45:a0	Root ID: 00:05:9b:bf:45:a0
Root path cost: 0	Root path cost: 0
Bridge ID: 00:05:9b:bf:45:a0	Bridge ID: 00:05:9b:bf:45:a0
Port ID: 0x8003	Port ID: 0x8002
Katherina_1	Petruchio_1
Root ID: 00:05:9b:bf:4a:80	Root ID: 00:05:9b:bf:4a:80
Root path cost: 0	Root path cost: 0
Bridge ID: 00:05:9b:bf:4a:80	Bridge ID: 00:05:9b:bf:4a:80
Port ID: 0x8003	Port ID: 0x8004
Romeo_1	Juliet_1
Root ID: 00:09:e8:d9:93:60	Root ID: 00:09:e8:d9:93:60
Root path cost: 0	Root path cost: 0
Bridge ID: 00:09:e8:d9:93:60	Bridge ID: 00:09:e8:d9:93:60
Port ID: 0x8004	Port ID: 0x8003
Ophelia_1	Hamlet_1
Root ID: 00:05:9b:bf:44:80	Root ID: 00:05:9b:bf:44:80
Root path cost: 0	Root path cost: 0
Bridge ID: 00:05:9b:bf:44:80	Bridge ID: 00:05:9b:bf:44:80

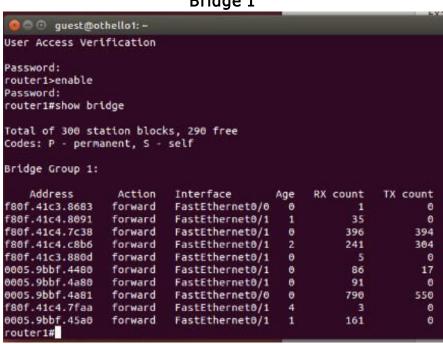
Port ID: 0x8003	Port ID: 0x8004

Form show bridge

Bridge 4 eth1 is blocked.

<u>Bridge 3 eth0</u> and <u>Bridge 1 eth1</u> are in forwarding state to each bridge.

Bridge 1



Bridge 2

```
🔘 📵 guest@othello1: ~
User Access Verification
Password:
router2>enable
Password:
router2#show bridge
Total of 300 station blocks, 290 free
Codes: P - permanent, S - self
Bridge Group 1:
    Address
                   Action
                             Interface
                                              Age
                                                     RX count
                                                                 TX count
f80f,41c4,8091
                  forward
                             FastEthernet0/0
f80f.41c4.7c38
                  forward
                             FastEthernet0/1
                                                          400
                                                                       389
f80f.41c4.c8b6
f80f.41c3.880d
                                                          245
                  forward
                             FastEthernet0/1
                                                                       304
                  forward
                             FastEthernet0/0
                                                          115
                                                                        0
0005.9bbf.4a80
                  forward
                            FastEthernet0/1
                                                          116
                                                                        0
0005.9bbf.4a81
                             FastEthernet0/0
                                                                      550
                  forward
                                               0
                                                          785
f80f.41c4.7faa
                  forward
                             FastEthernet0/1
                                                           33
                                                                        0
f80f.41c4.7fa8
                             FastEthernet0/1
                  forward
                                                           60
                                                                       28
0005.9bbf.45a0
0009.e8d<u>9</u>.9361
                             FastEthernet0/1
                  forward
                                               a
                                                          267
                                                                        0
                                                                       32
                  forward
                             FastEthernet0/0
                                                            34
router2#
```

# Bridge 3

```
😑 🖯 guest@othello1: ~
0005.9bbf.4a80
                  forward
                            FastEthernet0/1
                                                         121
0005.9bbf.4a81
                  forward
                            FastEthernet0/0
                                                         494
                                                                     550
                                               0
f80f.41c4.7faa
                  forward
                            FastEthernet0/0
                                               0
                                                          57
                                                                      0
f80f.41c4.7fa8
                  forward
                            FastEthernet0/0
                                                          56
                                                                      20
8869.9361
                 forward
                            FastEthernet0/0
router3#show bridge
Total of 300 station blocks, 290 free
Codes: P - permanent, S - self
Bridge Group 1:
    Address
                  Action
                            Interface
                                                    RX count
                                                                TX count
                                             Age
f80f.41c4.8091
                  forward
                            FastEthernet0/0
                                               0
                                                         37
f80f.41c4.7c38
                            FastEthernet0/1
                  forward
                                                         488
                                                                     214
                                               8
f80f.41c4.c8b6
                  forward
                            FastEthernet0/1
                                                         273
                                                                     204
f80f.41c3.880d
                  forward
                            FastEthernet0/0
                                                         113
                                                                      Θ
                            FastEthernet0/0
0005.9bbf.4481
                  forward
                                                                      0
                                               0
                                                          86
0005.9bbf.4a80
0005.9bbf.4a81
                                                         122
                  forward
                            FastEthernet0/1
                                               0
                                                                      20
                  forward
                            FastEthernet0/0
                                               0
                                                         495
                                                                     550
f80f.41c4.7faa
                  forward
                            FastEthernet0/0
                                                          57
                                               0
                                                                      0
f80f.41c4.7fa8
                  forward
                            FastEthernet0/0
                                               0
                                                          56
                                                                      20
0009.e8d9.9361
router3#
                  forward
                            FastEthernet0/0
                                                                       0
```

## Bridge 4

```
🏿 🖨 🗇 guest@othello1: ~
Trying 128.238.61.40...
Connected to 128.238.61.48.
Escape character is '^]'.
User Access Verification
Password:
router4>enable
Password:
router4#show bridge
Total of 300 station blocks, 295 free
Codes: P - permanent, S - self
Bridge Group 1:
    Address
                   Action
                             Interface
                                                     RX count
                                                                TX count
                                              Age
f80f.41c4.8091
                  forward
                             FastEthernet0/0
                                              0
                                                                        0
f80f.41c4.7c38
                  forward
                             FastEthernet0/0
                                               0
                                                            1
                                                                        0
f80f.41c4.c8b6
f80f.41c3.880d
                             FastEthernet0/0
                  forward
                                                                        0
                                               0
                  forward
                             FastEthernet0/0
                                               0
                                                                        0
0005.9bbf.4a81
                  forward
                             FastEthernet0/0
                                               a
                                                           28
                                                                        0
router4#
```

# Final BPDU Messages collected

\*Priority level always :32768

Bridge 1 Bridge 2 Root ID: 00:05:9b:bf:44:80 Root ID: 00:05:9b:bf:44:80 Root path cost: 100 Root path cost: 0 Bridge ID: 00:09:e8:d9:93:60 Bridge ID: 00:05:9b:bf:44:80 Port ID: 0x8003 Port ID: 0x8003 Bridge 3 Bridge 4 Root ID: 00:05:9b:bf:44:80 Root ID: 00:05:9b:bf:44:80 Root path cost: 100 Root path cost: 200 Bridge ID: 00:05:9b:bf:45:a0 Bridge ID: 00:05:9b:Bf:4a:80 Port ID: 0x8003 Port ID: 0x8003

