# 实验报告

【实验题目】**二层交换机实验**

【实验目的】掌握二层交换机的基本配置和使用方法。

【预备知识】

✧ **ping 命令可以用来测试网络的连通性。**

每次 ping 都将发出 4 个 echo 请求包给目的主机，目的主机每收到一个 echo 请求包(echo request)之后都将发回 echo 响应包(echo reply)。因此，ping 可以用来检测网络的双向连通性。

✧ **ping 命令：**

C:\>ping 目的主机的 IP 地址 ！发出 4 个请求包，例如，C:\>ping 192.168.1.2

C:\>ping -t 目的主机的 IP 地址 ！持续发出请求包，例如，C:\>ping -t 192.168.1.2

【注意事项】

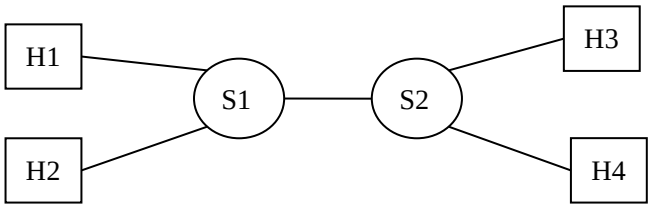
1、查看主机的校园网网卡的 IP 地址和子网掩码。四台主机的 IP 地址为 172.16.X.2~172.16.X.5，子网掩码都是 255.255.0.0,默认网关为 172.16.0.1，其中，X 为组号。如果没有设置好要设置一下。

2、每次做实验前先用#reload 重启设备,否则，可能会遗留前面配置的内容。

3、主机上禁用 Windows 防火墙（控制面板/系统和安全），否则防火墙可能会禁用 ping。

【实验内容】

(1)在两个交换机之间连接一条网线，每台交换机连两台主机。




四台主机配置 IPv4 地址：192.168.1.1，192.168.1.2 ，192.168.1.3 和 192.168.1.4,子网掩码均为 255.255.255.0。

**1A、用 ipconfig 命令查出四台主机的 MAC 地址(注意：查实验网接口，不是校园网接口)：**

**(1) IP 地址：192.168.1.1 MAC 地址：44-33-4C-0E-B6-AD**

**(2) IP 地址：192.168.1.2 MAC 地址：44-33-4C-0E-AE-20**

**(3) IP 地址：192.168.1.3 MAC 地址：00-88-99-00-01-41**

**(4) IP 地址：192.168.1.4 MAC 地址：F4-8E-38-F2-28-C9**

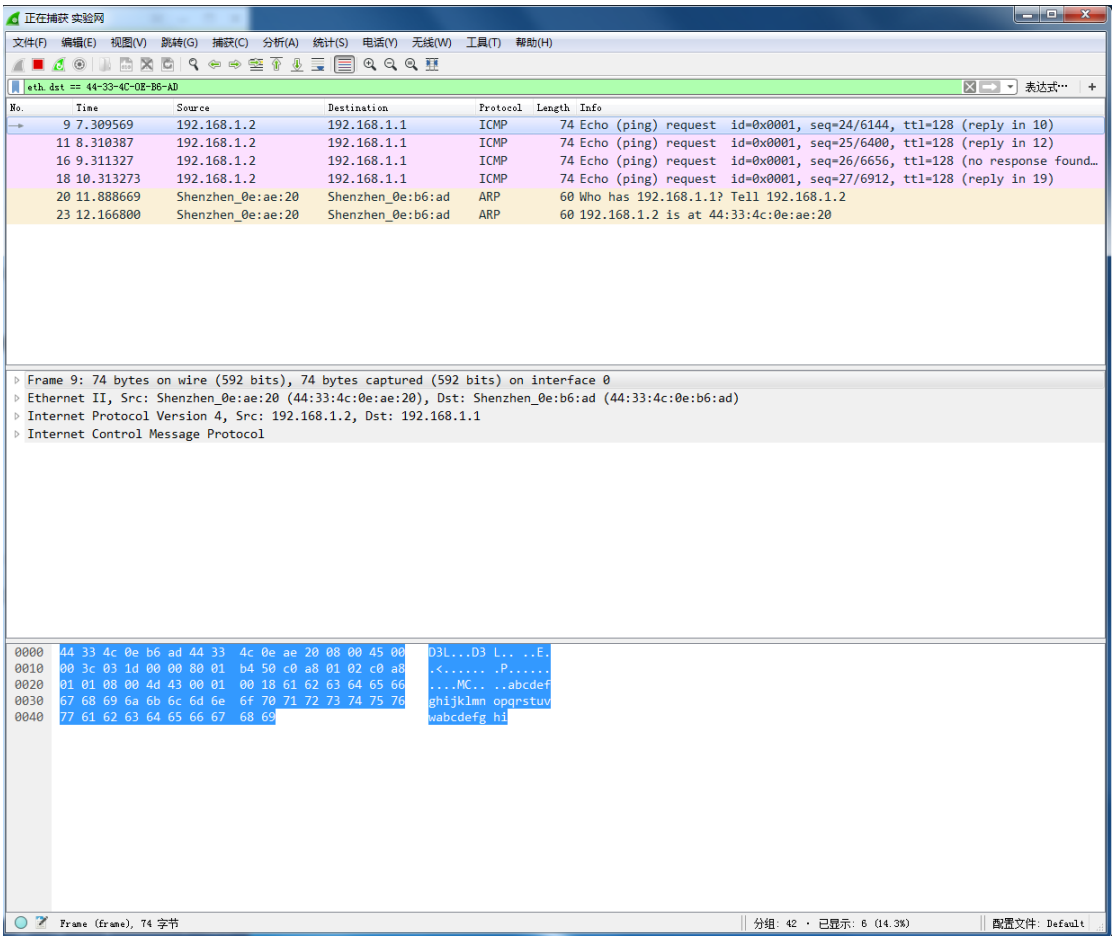
**1B、Wireshark 以太网帧（DIXv2）截屏：**

每台主机用 Wireshark 检测出一个其它主机发给自己的以太网帧并截屏（用 anysend 或者用 ping IP 地址产生包）。Wireshark Filter：eth.dst == 84-A6-C8-C0-BB-CF(主机的实验网网卡地址)进行过滤。

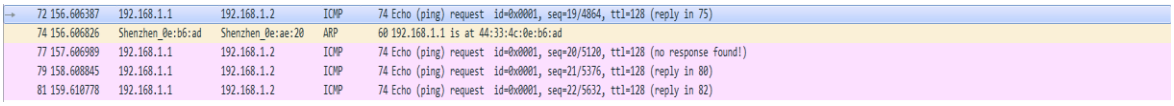
【192.168.1.1 和 192.168.1.2 互发帧；192.168.1.3 和 192.168.1.4 互发帧】

(1)

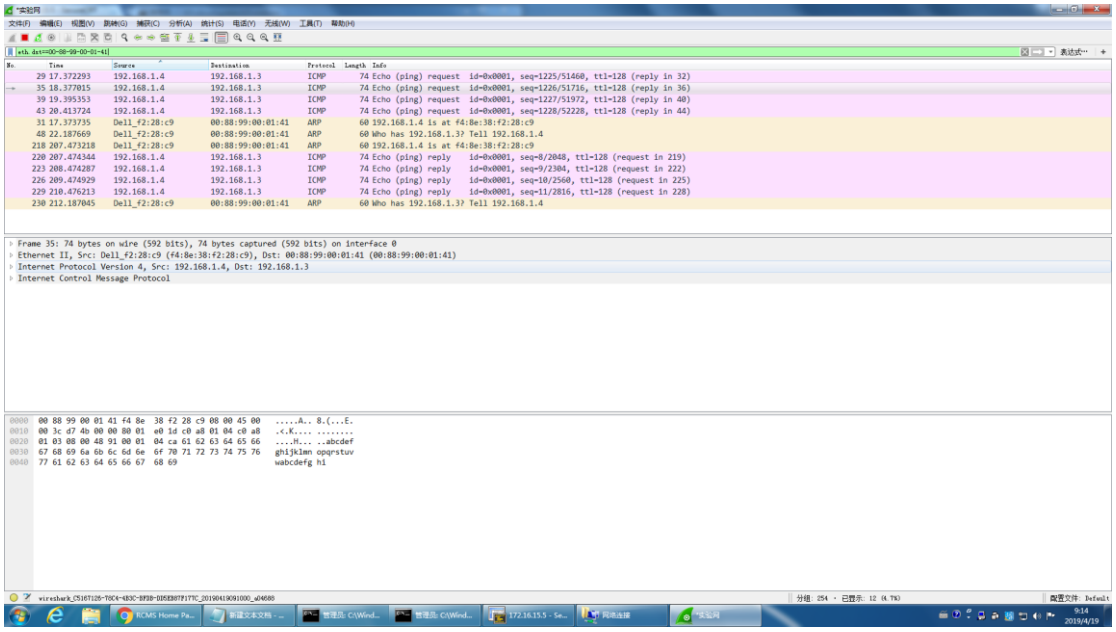
# 实验报告


正在捕获 实验网
文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(Y) 无线(W) 工具(T) 帮助(H)
eth.dst == 44-33-4C-0E-B6-AD
No. Time Source Destination Protocol Length Info
9 7.309569 192.168.1.2 192.168.1.1 ICMP 74 Echo (ping) request id=0x0001, seq=24/6144, ttl=128 (reply in 10)
11 8.310387 192.168.1.2 192.168.1.1 ICMP 74 Echo (ping) request id=0x0001, seq=25/6400, ttl=128 (reply in 12)
16 9.311327 192.168.1.2 192.168.1.1 ICMP 74 Echo (ping) request id=0x0001, seq=26/6656, ttl=128 (no response found…
18 10.313273 192.168.1.2 192.168.1.1 ICMP 74 Echo (ping) request id=0x0001, seq=27/6912, ttl=128 (reply in 19)
20 11.888669 Shenzhen_0e:ae:20 Shenzhen_0e:b6:ad ARP 60 Who has 192.168.1.1? Tell 192.168.1.2
23 12.166800 Shenzhen_0e:ae:20 Shenzhen_0e:b6:ad ARP 60 192.168.1.2 is at 44:33:4c:0e:ae:20
Frame 9: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
Ethernet II, Src: Shenzhen_0e:ae:20 (44:33:4c:0e:ae:20), Dst: Shenzhen_0e:b6:ad (44:33:4c:0e:b6:ad)
Internet Protocol Version 4, Src: 192.168.1.2, Dst: 192.168.1.1
Internet Control Message Protocol
0000 44 33 4c 0e b6 ad 44 33 4c 0e ae 20 08 00 45 00 D3L...D3 L.. ..E.
0010 00 3c 03 1d 00 00 80 01 b4 50 c0 a8 01 02 c0 a8 .<..... .P.....
0020 01 01 08 00 4d 43 00 01 00 18 61 62 63 64 65 66 ....MC.. ..abcdef
0030 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76 ghijklmn opqrstuv
0040 77 61 62 63 64 65 66 67 68 69 wabcdefg hi
Frame (frame), 74 字节
分组: 42 · 已显示: 6 (14.3%)
配置文件: Default

(2)

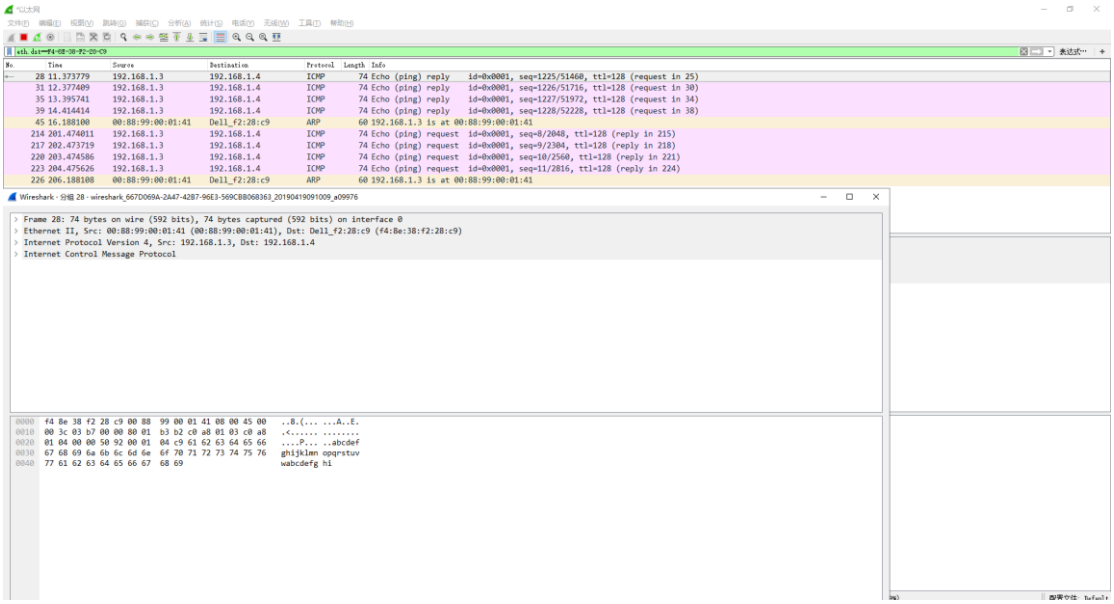

72 156.606387 192.168.1.1 192.168.1.2 ICMP 74 Echo (ping) request id=0x0001, seq=19/4864, ttl=128 (reply in 75)
74 156.606826 Shenzhen_0e:b6:ad Shenzhen_0e:ae:20 ARP 60 192.168.1.1 is at 44:33:4c:0e:b6:ad
77 157.606989 192.168.1.1 192.168.1.2 ICMP 74 Echo (ping) request id=0x0001, seq=20/5120, ttl=128 (no response found!)
79 158.608845 192.168.1.1 192.168.1.2 ICMP 74 Echo (ping) request id=0x0001, seq=21/5376, ttl=128 (reply in 80)
81 159.610778 192.168.1.1 192.168.1.2 ICMP 74 Echo (ping) request id=0x0001, seq=22/5632, ttl=128 (reply in 82)

(3)


29 17.372293 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) request id=0x0001, seq=1225/51460, ttl=128 (reply in 32)
35 18.377015 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) request id=0x0001, seq=1226/51716, ttl=128 (reply in 36)
39 19.395353 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) request id=0x0001, seq=1227/51972, ttl=128 (reply in 40)
43 20.413724 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) request id=0x0001, seq=1228/52228, ttl=128 (reply in 44)
31 17.373735 Dell_f2:28:c9 00:88:99:00:01:41 ARP 60 192.168.1.4 is at f4:8e:38:f2:28:c9
48 22.187669 Dell_f2:28:c9 00:88:99:00:01:41 ARP 60 Who has 192.168.1.3? Tell 192.168.1.4
218 207.473218 Dell_f2:28:c9 00:88:99:00:01:41 ARP 60 192.168.1.4 is at f4:8e:38:f2:28:c9
220 207.474344 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) reply id=0x0001, seq=8/2048, ttl=128 (request in 219)
223 208.474287 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) reply id=0x0001, seq=9/2304, ttl=128 (request in 222)
226 209.474929 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) reply id=0x0001, seq=10/2560, ttl=128 (request in 225)
229 210.476213 192.168.1.4 192.168.1.3 ICMP 74 Echo (ping) reply id=0x0001, seq=11/2816, ttl=128 (request in 228)
230 212.187045 Dell_f2:28:c9 00:88:99:00:01:41 ARP 60 Who has 192.168.1.3? Tell 192.168.1.4
Frame 35: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
Ethernet II, Src: Dell_f2:28:c9 (f4:8e:38:f2:28:c9), Dst: 00:88:99:00:01:41 (00:88:99:00:01:41)
Internet Protocol Version 4, Src: 192.168.1.4, Dst: 192.168.1.3
Internet Control Message Protocol
0000 00 88 99 00 01 41 f4 8e 38 f2 28 c9 08 00 45 00 .....A.. 8.(...E.
0010 00 3c d7 4b 00 00 80 01 a0 1d c0 a8 01 04 c0 a8 .<K.... ........
0020 01 03 08 00 48 91 00 01 04 ca 61 62 63 64 65 66 ....H... ..abcdef
0030 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76 ghijklmn opqrstuv
0040 77 61 62 63 64 65 66 67 68 69 wabcdefg hi

(4)

# 实验报告



(2)直接用 anysend 发送一个广播帧，或者用一台主机（例如，192.168.1.1）ping 一个子网中不存在的 IP 地址(例如，192.168.1.50)来产生广播帧(ARP 包)。在所有主机上用 Wireshark 检测这个以太网广播帧（源 MAC 地址为该主机的地址，目的 MAC 地址为广播地址）并截屏。Wireshark Filter：eth.src == 84-A6-C8-C0-BB-CF and eth.dst == FF-FF-FF-FF-FF-FF。

**2A、在四台主机上捕捉发给自己的广播帧并截屏：**

**我们用 IP 地址：192.168.1.4、MAC 地址：F4-8E-38-F2-28-C9 的主机 Ping 192.168.1.50**

**实验过程中出现 IP 地址：192.168.1.4 的主机自动发送 ping 192.168.1.144 的情况，经询问老师，觉得可能是该主机是 PC 机，可能系统自带的一些软件会自动发帧。**

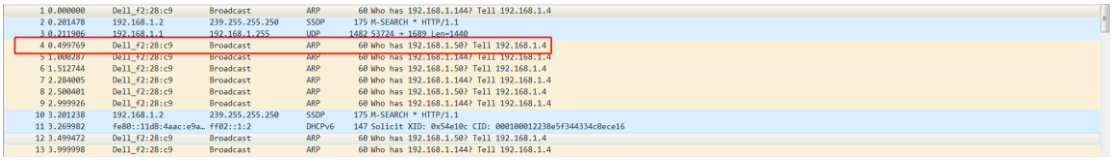
**【部分截图只体现收到了广播帧，但没体现广播帧的来源，但可以在其他截图中看到】**

(1)

eth.dst == FF-FF-FF-FF-FF-FF

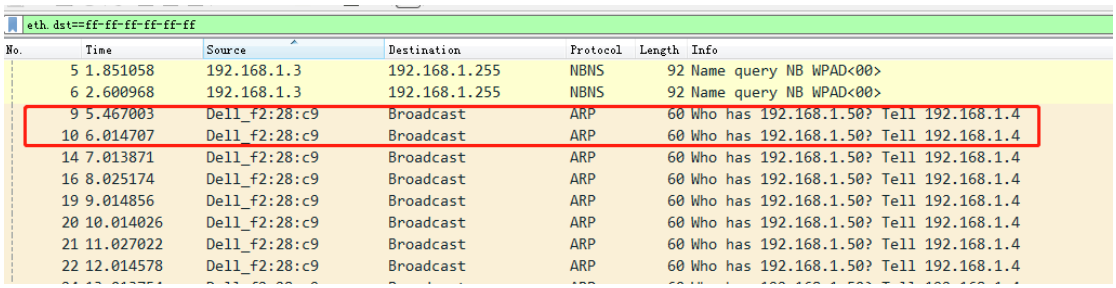
| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 3 | 1.720182 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 7 | 2.719297 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 9 | 3.730765 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 12 | 4.720234 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 13 | 5.719183 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 14 | 6.732367 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 15 | 7.719861 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 17 | 8.719218 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 19 | 9.731643 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 20 | 10.719967 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |
| 21 | 11.718972 | Dell_f2:28:c9 | Broadcast | ARP | 60 | Who has 192.168.1.50? Tell 192.168.1.4 |

(2)

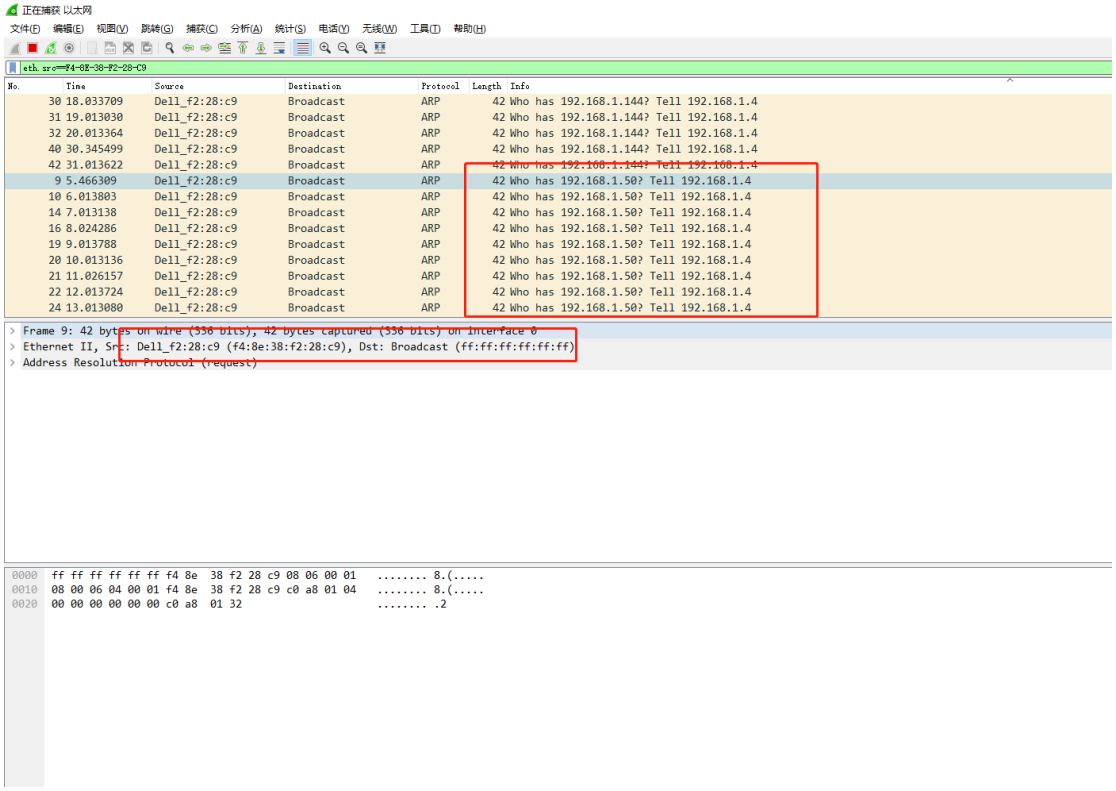



(3)

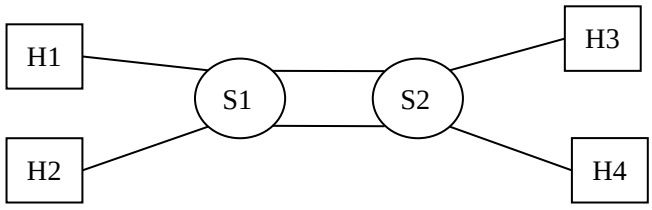
# 实验报告




(4)




(3)在两个交换机之间再连接一条网线。




用步骤(2)的方法产生广播帧，并用 Wireshark 检测广播风暴（capture/interfaces），得到实验网接口收发包的速度(packets/s)，截屏该画面。注意：当发现广播风暴时要**及时断开**其中一条网线以避免死机。

**在四台主机上捕捉广播风暴并截屏收发包的速度： 7400packets/s**

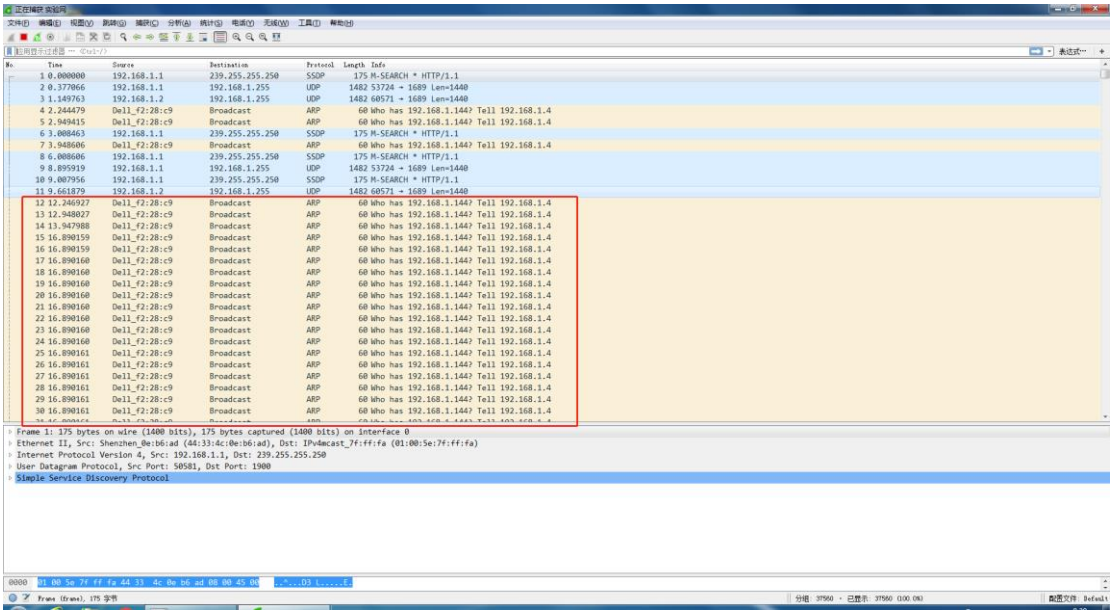
**上面提到实验过程中出现 IP 地址：192.168.1.4 的主机自动发送 ping 192.168.1.144 的情况，所以我们利用这一点检查广播风暴。**

(1)

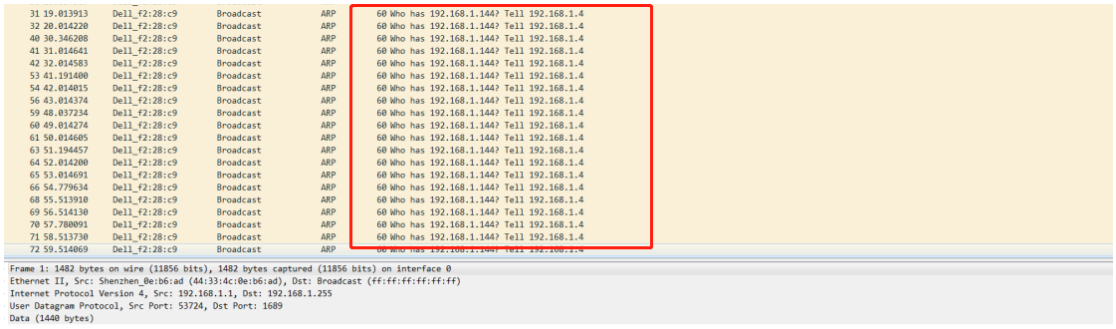
# 实验报告


24 14.719106 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
25 15.719062 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
33 26.050863 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
34 26.719288 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
35 27.719314 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
46 36.895825 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
47 37.718204 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
49 38.718581 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
52 43.741299 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
53 44.718321 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
54 45.718561 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
56 46.898496 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
57 47.718021 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
58 48.718622 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
59 50.483522 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
61 51.217535 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
62 52.217799 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
63 53.483780 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
64 54.217318 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
65 55.217832 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
Ethernet II, Src: Dell_f2:28:c9 (f4:8e:38:f2:28:c9), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Address Resolution Protocol (request)

(2)

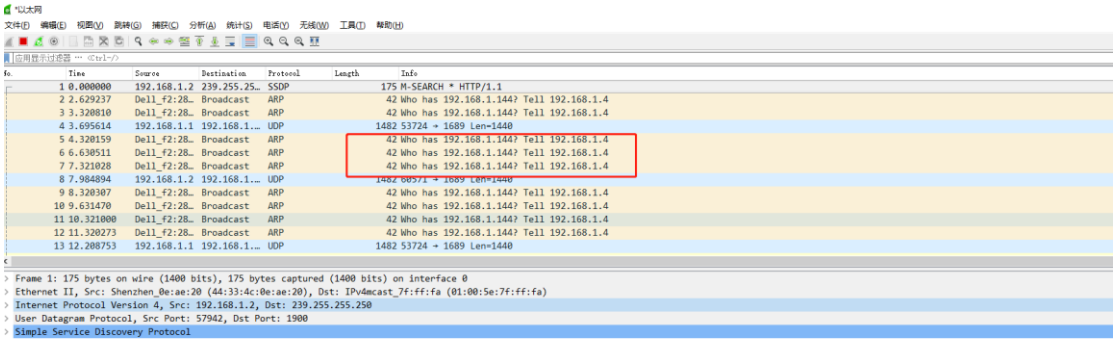

1 0.000000 192.168.1.1 239.255.255.250 SSDP 175 M-SEARCH * HTTP/1.1
2 0.377066 192.168.1.1 192.168.1.255 UDP 1482 53724 → 1689 Len=1440
3 1.149763 192.168.1.2 192.168.1.255 UDP 1482 60571 → 1689 Len=1440
4 2.244479 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
5 2.949415 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
6 3.008463 192.168.1.1 239.255.255.250 SSDP 175 M-SEARCH * HTTP/1.1
7 3.948606 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
8 6.008606 192.168.1.1 239.255.255.250 SSDP 175 M-SEARCH * HTTP/1.1
9 8.895919 192.168.1.1 192.168.1.255 UDP 1482 53724 → 1689 Len=1440
10 9.007956 192.168.1.1 239.255.255.250 SSDP 175 M-SEARCH * HTTP/1.1
11 9.661879 192.168.1.2 192.168.1.255 UDP 1482 60571 → 1689 Len=1440
12 12.246927 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
13 12.948027 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
14 13.947988 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
15 16.890159 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
16 16.890159 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
17 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
18 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
19 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
20 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
21 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
22 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
23 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
24 16.890160 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
25 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
26 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
27 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
28 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
29 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
30 16.890161 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
Frame 1: 175 bytes on wire (1400 bits), 175 bytes captured (1400 bits) on interface 0
Ethernet II, Src: Shenzhen_0e:b6:ad (44:33:4c:0e:b6:ad), Dst: IPv4mcast_7f:ff:fa (01:00:5e:7f:ff:fa)
Internet Protocol Version 4, Src: 192.168.1.1, Dst: 239.255.255.250
User Datagram Protocol, Src Port: 50581, Dst Port: 1900
Simple Service Discovery Protocol

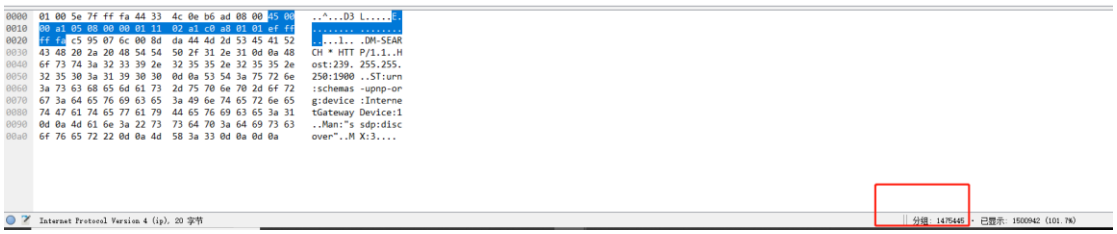
(3)


31 19.013913 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
32 20.014220 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
40 30.346208 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
41 31.014641 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
42 32.014583 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
53 41.191400 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
54 42.014015 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
56 43.014374 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
59 48.037234 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
60 49.014274 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
61 50.014605 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
63 51.194457 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
64 52.014200 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
65 53.014691 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
66 54.779634 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
68 55.513910 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
69 56.514130 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
70 57.780091 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
71 58.513730 Dell_f2:28:c9 Broadcast ARP 60 Who has 192.168.1.144? Tell 192.168.1.4
72 59.514069 Dell_f2:28:c9 Broadcast ARP
Frame 1: 1482 bytes on wire (11856 bits), 1482 bytes captured (11856 bits) on interface 0
Ethernet II, Src: Shenzhen_0e:b6:ad (44:33:4c:0e:b6:ad), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Internet Protocol Version 4, Src: 192.168.1.1, Dst: 192.168.1.255
User Datagram Protocol, Src Port: 53724, Dst Port: 1689
Data (1440 bytes)

(4)

# 实验报告



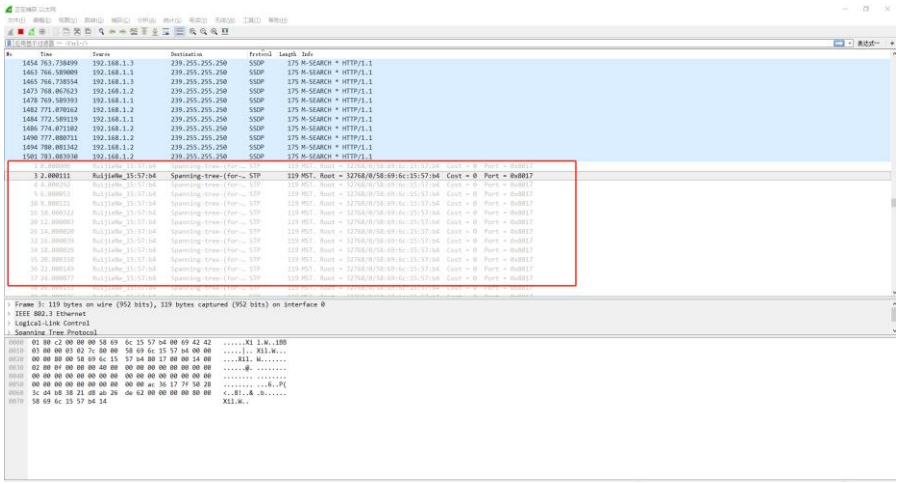


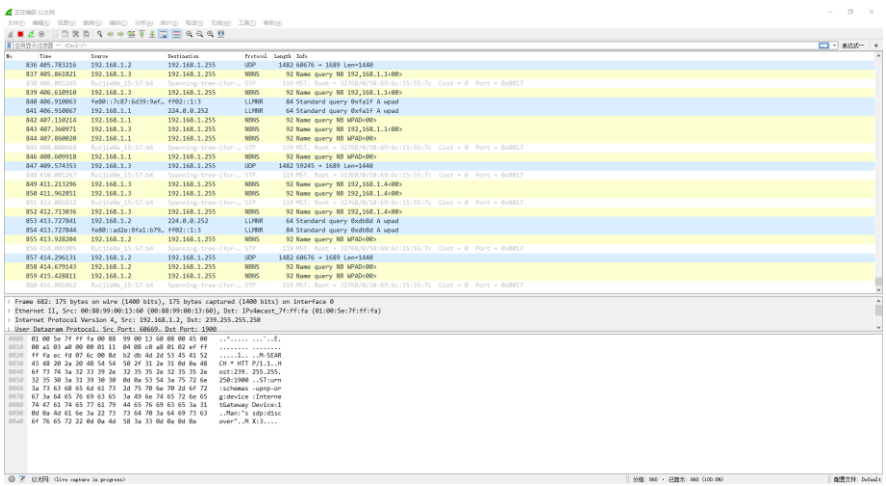
(4) 先在两台交换机上启动生成树算法，然后在它们之间重新连接两条网线，检测是否会出现广播风暴，截屏 Wireshark。启动生成树算法的命令：(config)#spanning-tree

4A. 是否存在广播风暴？ 没有

4B. 经过 2 分钟截屏 Wireshark（capture/interfaces）：

由截图可以看到生成树算法成功启动可以看到根网桥的 MAC 地址





4C. 在两台交换机上执行显示生成树参数的命令并截屏：

(config)#show spanning-tree

```
13-S5750-2(config)#show spanning-tree
StpVersion : MSTP
SysStpStatus : ENABLED
MaxAge : 20
HelloTime : 2
ForwardDelay : 15
BridgeMaxAge : 20
BridgeHelloTime : 2
BridgeForwardDelay : 15
MaxHops: 20
TxHoldCount : 3
PathCostMethod : Long
BPDUGuard : Disabled
BPDUFilter : Disabled
LoopGuardDef  : Disabled

###### mst 0 vlans map : ALL
BridgeAddr : 5869.6c15.57b4
Priority: 32768
TimeSinceTopologyChange : 0d:0h:5m:57s
TopologyChanges : 1
DesignatedRoot : 32768.5869.6c15.557c
RootCost : 0
RootPort : GigabitEthernet 0/7
CistRegionRoot : 32768.5869.6c15.557c
```

另一台主机

```
01-S3750-1#show spanning-tree
StpVersion : MSTP
SysStpStatus : ENABLED
MaxAge : 20
HelloTime : 2
ForwardDelay : 15
BridgeMaxAge : 20
BridgeHelloTime : 2
BridgeForwardDelay : 15
MaxHops: 20
TxHoldCount : 3
PathCostMethod : Long
BPDUGuard : Disabled
BPDUFilter : Disabled
LoopGuardDef  : Disabled

###### mst 0 vlans map : ALL
BridgeAddr : 5869.6c15.557c
Priority: 32768
TimeSinceTopologyChange : 0d:0h:0m:12s
TopologyChanges : 4
DesignatedRoot : 4096.5869.6c15.57b4
RootCost : 0
RootPort : GigabitEthernet 0/9
CistRegionRoot : 4096.5869.6c15.57b4
CistPathCost : 20000
```

4D. 在两台交换机上执行显示接口 f0/1 和 f0/2 的生成树参数的命令并截屏：

(config)#show spanning-tree interface *G0/7* 或 G0/9 或 G0/13

由于我们两台交换机之间连接的接口分别是 G0/7 接 G0/9，G0/13 接 G0/13，所以我们查看并截图了一台交换机中的 G0/7 和 G0/13 接口和另一台交换机的 G0/9 和 G0/13 接口。

```
13-S5750-2(config)#show spanning-tree interface g0/7

PortAdminPortFast : Disabled
PortOperPortFast : Disabled
PortAdminAutoEdge : Enabled
PortOperAutoEdge : Disabled
PortAdminLinkType : auto
PortOperLinkType : point-to-point
PortBPDUGuard : Disabled
PortBPDUFilter : Disabled
PortGuardmode  : None

###### MST 0 vlans mapped :ALL
PortState : forwarding
PortPriority : 128
PortDesignatedRoot : 32768.5869.6c15.557c
PortDesignatedCost : 0
PortDesignatedBridge :32768.5869.6c15.557c
PortDesignatedPortPriority : 128
PortDesignatedPort : 9
PortForwardTransitions : 1
PortAdminPathCost : 20000
PortOperPathCost : 20000
Inconsistent states : normal
PortRole : rootPort
```

```
13-S5750-2(config)#show spanning-tree interface g0/13

PortAdminPortFast : Disabled
PortOperPortFast : Disabled
PortAdminAutoEdge : Enabled
PortOperAutoEdge : Disabled
PortAdminLinkType : auto
PortOperLinkType : point-to-point
PortBPDUGuard : Disabled
PortBPDUFilter : Disabled
PortGuardmode  : None

###### MST 0 vlans mapped :ALL
PortState : discarding
PortPriority : 128
PortDesignatedRoot : 32768.5869.6c15.557c
PortDesignatedCost : 0
PortDesignatedBridge :32768.5869.6c15.557c
PortDesignatedPortPriority : 128
PortDesignatedPort : 13
PortForwardTransitions : 1
PortAdminPathCost : 20000
PortOperPathCost : 20000
Inconsistent states : normal
PortRole : alternatePort
```

另一台交换机：

```
01-S3750-1#show spanning-tree interface g0/13

PortAdminPortFast : Disabled
PortOperPortFast : Disabled
PortAdminAutoEdge : Enabled
PortOperAutoEdge : Disabled
PortAdminLinkType : auto
PortOperLinkType : point-to-point
PortBPDUGuard : Disabled
PortBPDUFilter : Disabled
PortGuardmode  : None

###### MST 0 vlans mapped :ALL
PortState : forwarding
PortPriority : 128
PortDesignatedRoot : 32768.5869.6c15.557c
PortDesignatedCost : 0
PortDesignatedBridge :32768.5869.6c15.557c
PortDesignatedPortPriority : 128
PortDesignatedPort : 13
PortForwardTransitions : 1
PortAdminPathCost : 20000
PortOperPathCost : 20000
Inconsistent states : normal
PortRole : designatedPort
01-S3750-1#show spanning-tree interface g0/9

PortAdminPortFast : Disabled
PortOperPortFast : Disabled
PortAdminAutoEdge : Enabled
PortOperAutoEdge : Disabled
PortAdminLinkType : auto
PortOperLinkType : point-to-point
PortBPDUGuard : Disabled
PortBPDUFilter : Disabled
PortGuardmode  : None

###### MST 0 vlans mapped :ALL
PortState : forwarding
PortPriority : 128
PortDesignatedRoot : 32768.5869.6c15.557c
PortDesignatedCost : 0
PortDesignatedBridge :32768.5869.6c15.557c
PortDesignatedPortPriority : 128
PortDesignatedPort : 9
PortForwardTransitions : 1
PortAdminPathCost : 20000
PortOperPathCost : 20000
Inconsistent states : normal
PortRole : designatedPort
01-S3750-1#
```

4E. 根据上面结果填表

# 实验报告

| | 网桥优先权（priority） | 网桥 MAC 地址 (BridgeAddr) | 根网桥 ID (DesignatedRoot) | 到根的距离 (RootCost) | 根端口 (RootPort) | 指定端口 (Designated) |
|---|---|---|---|---|---|---|
| Switch1 | 32768 | 5869.6c15.557c | 32768.5869.6c15.557c | 0 | 0 | G0/9、G0/13 G0/21、G0/23 |
| Switch2 | 32768 | 5869.6c15.57b4 | 32768.5869.6c15.557c | 0 | G 0/7 | G0/21、G0/23 |

其中 G0/21 和 G0/23 是交换机和主机相连的端口。

4F. 显示两台交换机的 MAC 地址表，通过 ping 让每个 MAC 地址表包含全部主机的 MAC 地址，然后截屏：

命令：**#show mac-address-table**

**Switch1 的 MAC 地址表截屏：**

```
01-S3750-1#show mac-address-table
Vlan        MAC Address          Type      Interface
----------  -------------------- --------- --------------------
   1        0088.9900.12f3       DYNAMIC   GigabitEthernet 0/21
   1        0088.9900.1360       DYNAMIC   GigabitEthernet 0/23
   1        4433.4c0e.be1a       DYNAMIC   GigabitEthernet 0/9
   1        5869.6c15.57b4       DYNAMIC   GigabitEthernet 0/9
   1        f48e.38f2.28c9       DYNAMIC   GigabitEthernet 0/9
01-S3750-1#
```

**Switch2 的 MAC 地址表截屏：**

```
13-S5750-2(config)#show mac-address-table
Vlan        MAC Address          Type      Interface
----------  -------------------- --------- --------------------
   1        0088.9900.12f3       DYNAMIC   GigabitEthernet 0/7
   1        0088.9900.1360       DYNAMIC   GigabitEthernet 0/7
   1        4433.4c0e.be1a       DYNAMIC   GigabitEthernet 0/21
   1        484d.7e9b.1727       STATIC    GigabitEthernet 0/9
   1        5869.6c15.557c       DYNAMIC   GigabitEthernet 0/7
   1        f48e.38f2.28c9       DYNAMIC   GigabitEthernet 0/23
```

(5) 在(4)的基础上，修改优先权令另一台交换机成为根网桥，ping 通后查看生成树信息并填表：

(config)#spanning-tree priority *4096*　　!设置交换机优先权为 4096。默认优先权为 32768

| | 网桥优先权 | 网桥 MAC 地址 | 根网桥 ID | 到根的距离 | 根端口 | 指定端口 |
|---|---|---|---|---|---|---|
| Switch1 | 32768 | 5869.6c15.557c | 32768.5869.6c15.557c | 0 | G 0/9 | G0/21、G0/23 |
| Switch2 | 4096 | 5869.6c15.57b4 | 4096.5869.6c15.57b4 | 0 | 0 | G0/7、G 0/13 G0/21、G0/23 |

【实验体会】

写出实验过程中的问题、思考及解决方法，并简述实验体会（如果有的话）。每个小组成员分别写，并在前面署名。

[张三]

体会

[李四]

# 实验报告

体会

…

【交实验报告】

**上传地址**：http://172.18.187.9/netdisk/default.aspx?vm=17net

**实验上交/配置实验/01、二层交换机实验**

**截止日期（不迟于）**：2019 年 4 月 28 日（周日）

**实验报告**：每个小组 3-4 人，统一交一份实验报告，打分是统一的。

**上传文件**：最小学号_二层交换机实验.doc