

廈門大學



信息学院软件工程系

《计算机网络》实验报告

题 目 实验三 侦听以太网帧和 IP 报文

班 级 软件工程 2018 级 2 班

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实验时间 2020 年 3 月 12 日

2020 年 3 月 20 日

1 实验目的

1.捕获并分析以太网的帧，获取目标与源网卡的 MAC 地址

2.获取本机地址

——IPCONFIG.EXE

——通过 WinSock 的 GetAddress 命令

3.获取远端 MAC 地址

——ARP

——WinPCAP

2 实验环境

Windows10, cpp

3 实验结果

```
D:\1学习笔记\资料\大二下\计算机网络\实验\实验三\test\Ethernet_frames-and-IP_packets\Debug\x86\Ethernet_frames-and-IP_packets.exe
1. \Device\NPF_{2CF84233-A608-4BE5-8319-A74BB5F8E958} (Realtek Gaming GbE Family Controller)
2. \Device\NPF_{C5FF31C2-3E52-4B04-AE97-ASDE731FBF19} (Microsoft)
3. \Device\NPF_{6CCAE7D1-48D9-43BE-8E34-AB459EC3DF73} (Microsoft)
4. \Device\NPF_{7F586FBE-5AF1-4ABA-AE64-E0A4F3BBBE18} (TAP-Windows Adapter V9)
5. \Device\NPF_{A9310318-6561-43BA-82C7-F4EABD118270} (Oracle)
Enter the interface number (1-5):1

Listening on Realtek Gaming GbE Family Controller...
2020-03-23 11:09:59, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:00, B4-DE-DF-D0-12-28, 120.204.17.14, 3C_52_82_DC_47_FD, 192.168.1.4, 129
```

```

D:\1学习笔记\资料\大二下\计算机网络实验\实验三\test\Ethernet_frames-and-IP_packets\Debug\x86\Ethernet_frames-and-IP_packets.exe
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Listening on Realtek Gaming GbE Family Controller...
2020-03-23 11:09:59, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:00, B4-DE-DF-D0-12-28, 120.204.17.14, 3C 52 82 DC 47 FD, 192.168.1.4, 129
2020-03-23 11:10:00, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:01, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:02, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:03, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:04, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:05, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:06, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:07, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:08, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:09, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:10, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:11, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:12, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:13, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:14, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:15, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:16, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305

```

选择网卡

程序在文件上输出形如下列 CSV 格式的日志：

时间、源 MAC、源 IP、目标 MAC、目标 IP、帧长度（以逗号间隔）

```

D:\1学习笔记\资料\大二下\计算机网络实验\实验三\test\Ethernet_frames-and-IP_packets\Debug\x86\Ethernet_frames-and-IP_packets.exe
2020-03-23 11:10:42, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:43, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:44, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:45, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:46, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:47, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:48, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:49, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:50, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:51, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:52, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:53, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:54, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:55, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:56, 3C-52-82-DC-47-FD, 192.168.1.4, B4 DE DF D0 12 28, 183, 232, 98, 208, 108
2020-03-23 11:10:56, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:57, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:58, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
2020-03-23 11:10:59, 3C-52-82-DC-47-FD, 192.168.1.4, FF FF FF FF FF FF, 192.168.1.255, 305
indata:
3C-52-82-DC-47-FD, 192.168.001.004 receive len: 18794
B4-DE-DF-D0-12-28, 120.204.017.014 receive len: 863

outdata:
FF FF FF FF FF FF, 192.168.001.255 send len: 18605
3C 52 82 DC 47 FD, 192.168.001.004 send len: 863
B4 DE DF D0 12 28, 120.204.017.014 send len: 81
B4 DE DF D0 12 28, 183.232.098.208 send len: 108

请按任意键继续. . .

```

每隔 60s，程序统计来自不同 MAC 和 IP 地址的通信数据长度，统计发至不同 MAC 和 IP 地址的通信数据长度。并根据是否大于 1MB 给出警告

test.pcap

文件(E) 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)

应用显示过滤器 ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.4	114.114.114.114	DNS	78	Standard query 0:
2	0.013851	114.114.114.114	192.168.1.4	DNS	78	Standard query r

< >

> Frame 1: 78 bytes on wire (624 bits), 78 bytes captured (624 bits)

> Ethernet II, Src: HewlettP_dc:47:fd (3c:52:82:dc:47:fd), Dst: zte_d0:12:28 (b4:de:df:d0:12:28)

> Internet Protocol Version 4, Src: 192.168.1.4, Dst: 114.114.114.114

> User Datagram Protocol, Src Port: 64734, Dst Port: 53

> Domain Name System (query)

< >

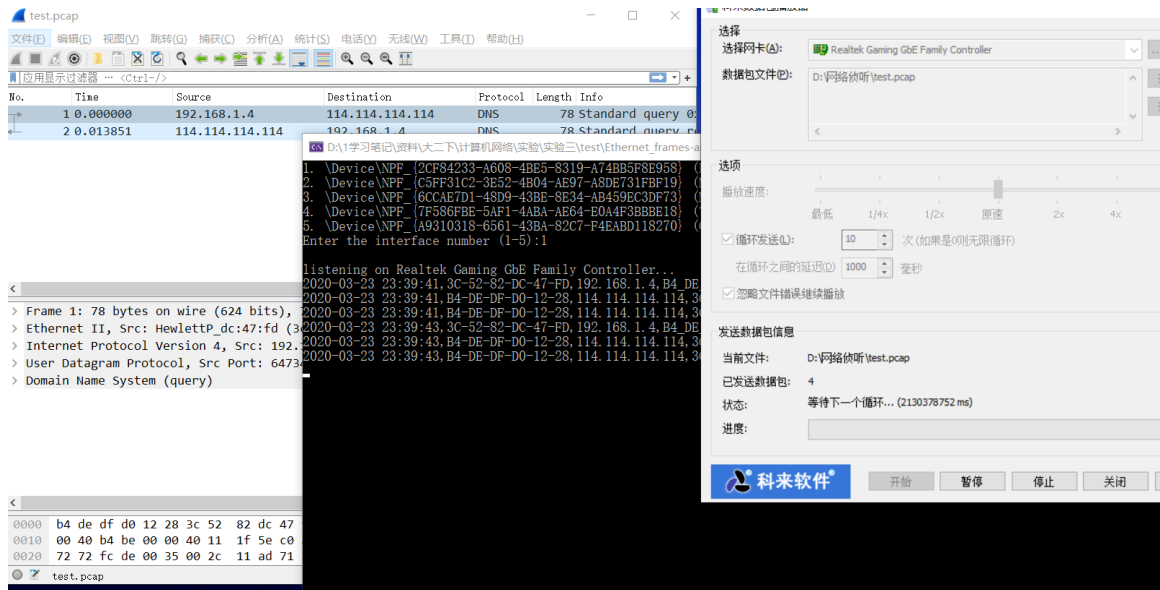
0000	b4 de df d0 12 28 3c 52	82 dc 47 fd 08 00 45 00(<R ..G...E..
0010	00 40 b4 be 00 00 40 11	1f 5e c0 a8 01 04 72 72	..@....@..^....rr
0020	72 72 fc de 00 35 00 2c	11 ad 71 32 01 00 00 01	rr...5.,..q2....

test.pcap

分组: 2 · 已显示: 2 (100.0%)

配置: Default

使用 wireshark 获得特定组



断网后用科来数据播放器模拟

```
indata:
3C-52-82-DC-47-FD, 192.168.001.004 receive len: 858
B4-DE-DF-D0-12-28, 114.114.114.114 receive len: 1560
7C-03-5E-F8-C3-82, 192.168.001.003 receive len: 597
B4-DE-DF-D0-12-28, 192.168.001.001 receive len: 506

outdata:
B4_DE_DF_D0_12_28, 114.114.114.114 send len: 858
3C_52_82_DC_47_FD, 192.168.001.004 send len: 1560
01_00_5E_00_00_FB, 224.000.000.251 send len: 597
FF_FF_FF_FF_FF_FF, 192.168.001.255 send len: 506

请按任意键继续. . .
```

统计的数据量

4 实验总结

- 1.学会了时间戳的格式设置
- 2.学会了代码注释的更正确方式
- 3.学会了动态库，包含目录，库目录，预处理定义，链接器的附加依赖项的配置。
- 4.熟悉了 MAC，IP 地址的长度和各部分内容。

