厦門大學

信息学院软件工程系

《计算机网络》实验报告

题　　目 实验四　观察 TCP 报文段并监听分析 FTP 协议

班　　级 软件工程 2018 级 3 班

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实验时间 2020 年 3 月 23 日

2020 年 4 月 7 日

1 实验目的

先用 Omnipeek 或 Wireshark 侦听并观察 TCP 报文段。观察其建立和撤除连接的过程，观察其报文段 ID、窗口机制和拥塞控制机制等。将其过程截图在报告中。

用 Omnipeek 或 Wireshark 侦听并观察 FTP 数据，分析其用户名密码所在报文的上下文特征，再总结出提取用户名密码的有效方法。基于 WinPCAP 工具包制作程序，实现监听网络上的 FTP 数据流，解析协议内容，并作记录与统计。对用户登录行为进行记录。

最终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、登录名、口令、成功与否
2015-03-14 13:05:16,60-36-DD-7D-D5-21,192.168.33.1,60-36-

DD-7D-D5-72,192.168.33.2,student,software,SUCCEED

2015-03-14 13:05:16,60-36-DD-7D-D5-21,192.168.33.1,60-36-

DD-7D-D5-72,192.168.33.2,student,software1,FAILED

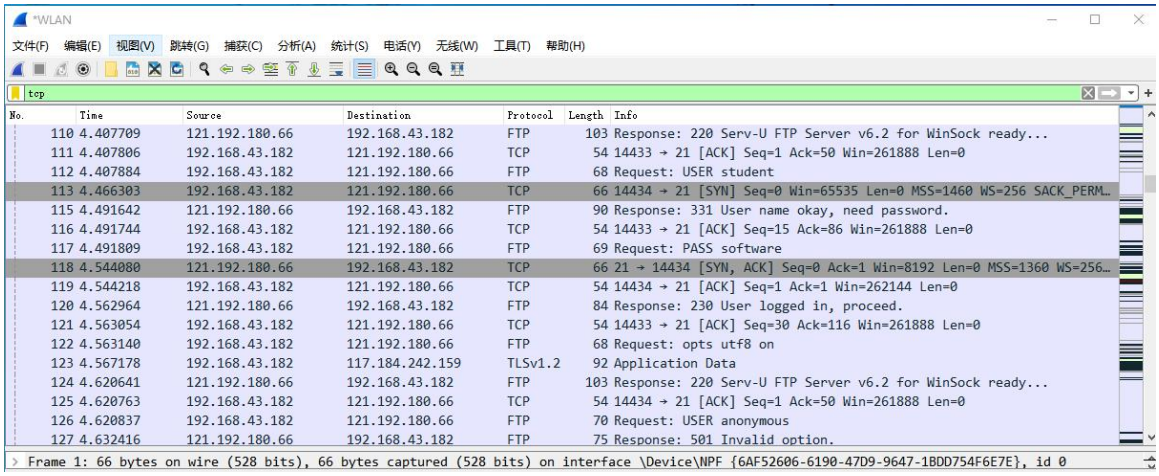
2 实验环境

操作环境：Visual Studio 2019、WpdPack、Wireshark

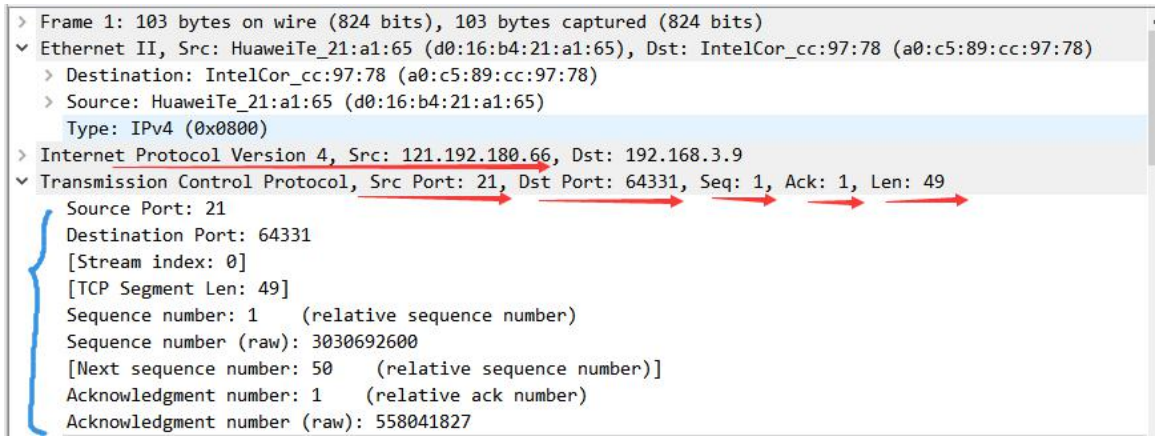
编程语言：C 语言

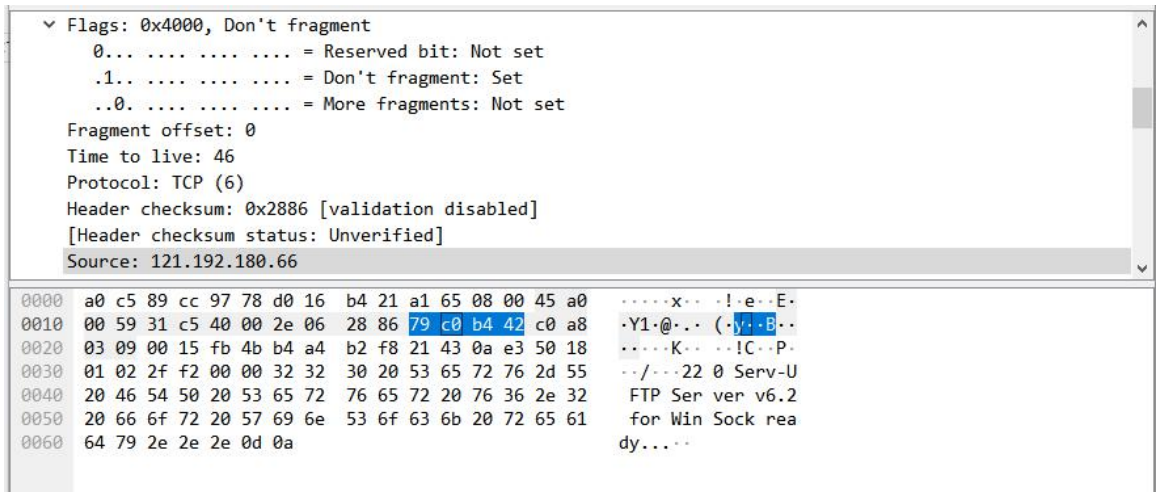
3 实验结果

1、观察 TCP 数据段，观察 Wireshark 对数据的分组形式，观察建立及撤除连接的过程。具体截图如下：



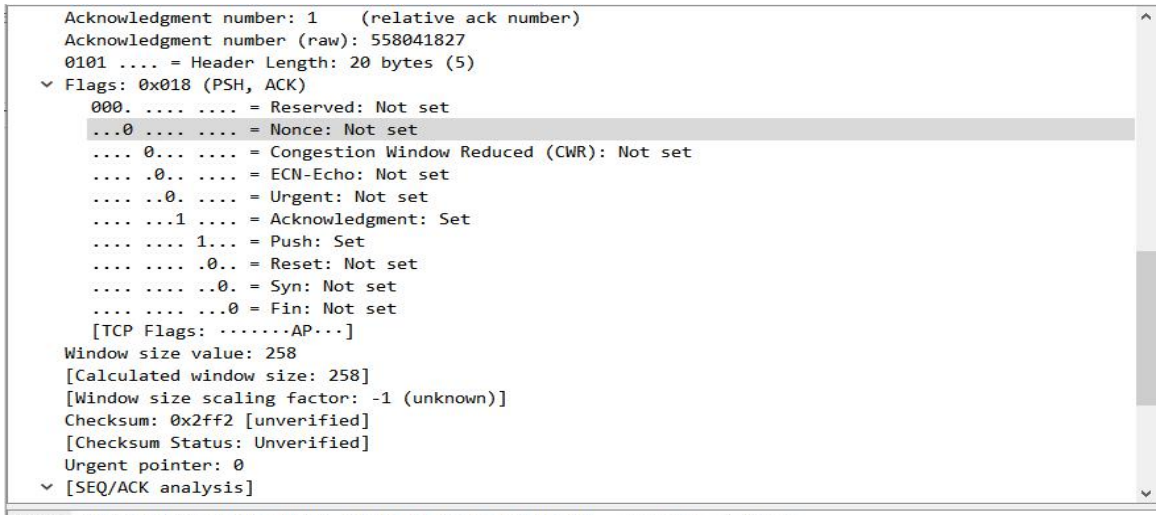
2.观察端口参数，了解 TCP 握手与挥手过程





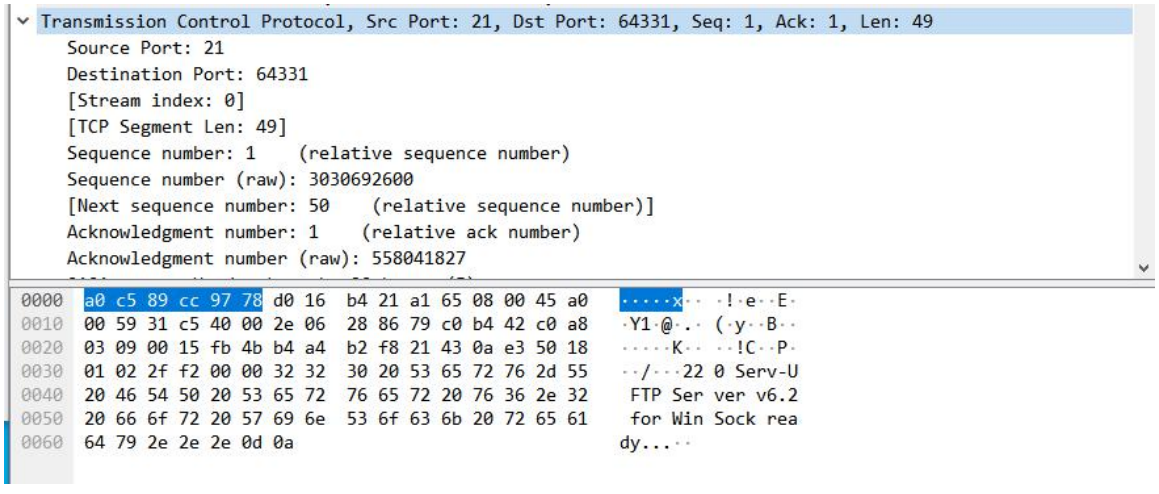
```
▾ Flags: 0x4000, Don't fragment
    0... .... .... .... = Reserved bit: Not set
    .1.. .... .... .... = Don't fragment: Set
    ..0. .... .... .... = More fragments: Not set
  Fragment offset: 0
  Time to live: 46
  Protocol: TCP (6)
  Header checksum: 0x2886 [validation disabled]
  [Header checksum status: Unverified]
  Source: 121.192.180.66
```

```
0000  a0 c5 89 cc 97 78 d0 16  b4 21 a1 65 08 00 45 a0   ·····x·· ·!·e··E·
0010  00 59 31 c5 40 00 2e 06  28 86 79 c0 b4 42 c0 a8   ·Y1·@··· (·y··B··
0020  03 09 00 15 fb 4b b4 a4  b2 f8 21 43 0a e3 50 18   ·····K·· ··!C··P·
0030  01 02 2f f2 00 00 32 32  30 20 53 65 72 76 2d 55   ··/···22 0 Serv-U
0040  20 46 54 50 20 53 65 72  76 65 72 20 76 36 2e 32    FTP Ser ver v6.2
0050  20 66 6f 72 20 57 69 6e  53 6f 63 6b 20 72 65 61    for Win Sock rea
0060  64 79 2e 2e 2e 0d 0a                              dy...··
```



```
  Acknowledgment number: 1    (relative ack number)
  Acknowledgment number (raw): 558041827
  0101 .... = Header Length: 20 bytes (5)
▾ Flags: 0x018 (PSH, ACK)
    000. .... .... = Reserved: Not set
    ...0 .... .... = Nonce: Not set
    .... 0... .... = Congestion Window Reduced (CWR): Not set
    .... .0.. .... = ECN-Echo: Not set
    .... ..0. .... = Urgent: Not set
    .... ...1 .... = Acknowledgment: Set
    .... .... 1... = Push: Set
    .... .... .0.. = Reset: Not set
    .... .... ..0. = Syn: Not set
    .... .... ...0 = Fin: Not set
    [TCP Flags: ·····AP···]
  Window size value: 258
  [Calculated window size: 258]
  [Window size scaling factor: -1 (unknown)]
  Checksum: 0x2ff2 [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
▾ [SEQ/ACK analysis]
```

```
0000  a0 c5 89 cc 97 78 d0 16  b4 21 a1 65 08 00 45 a0   ·····x·· ·!·e··E·
0010  00 59 31 c5 40 00 2e 06  28 86 79 c0 b4 42 c0 a8   ·Y1·@··· (·y··B··
0020  03 09 00 15 fb 4b b4 a4  b2 f8 21 43 0a e3 50 18   ·····K·· ··!C··P·
0030  01 02 2f f2 00 00 32 32  30 20 53 65 72 76 2d 55   ··/···22 0 Serv-U
0040  20 46 54 50 20 53 65 72  76 65 72 20 76 36 2e 32    FTP Ser ver v6.2
0050  20 66 6f 72 20 57 69 6e  53 6f 63 6b 20 72 65 61    for Win Sock rea
0060  64 79 2e 2e 2e 0d 0a                              dy...··
```



```
▾ Transmission Control Protocol, Src Port: 21, Dst Port: 64331, Seq: 1, Ack: 1, Len: 49
    Source Port: 21
    Destination Port: 64331
    [Stream index: 0]
    [TCP Segment Len: 49]
    Sequence number: 1    (relative sequence number)
    Sequence number (raw): 3030692600
    [Next sequence number: 50    (relative sequence number)]
    Acknowledgment number: 1    (relative ack number)
    Acknowledgment number (raw): 558041827
```

```
0000  a0 c5 89 cc 97 78 d0 16  b4 21 a1 65 08 00 45 a0   ·····x·· ·!·e··E·
0010  00 59 31 c5 40 00 2e 06  28 86 79 c0 b4 42 c0 a8   ·Y1·@··· (·y··B··
0020  03 09 00 15 fb 4b b4 a4  b2 f8 21 43 0a e3 50 18   ·····K·· ··!C··P·
0030  01 02 2f f2 00 00 32 32  30 20 53 65 72 76 2d 55   ··/···22 0 Serv-U
0040  20 46 54 50 20 53 65 72  76 65 72 20 76 36 2e 32    FTP Ser ver v6.2
0050  20 66 6f 72 20 57 69 6e  53 6f 63 6b 20 72 65 61    for Win Sock rea
0060  64 79 2e 2e 2e 0d 0a                              dy...··
```

3、最终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、登录名、口令、成功与否

	A	B	C	D	E	F	G	H
1	2020/4/7 19:47	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	anonymous	IEUser@	FAILED
2	2020/4/7 19:47	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	anonymous	IEUser@	FAILED
3	2020/4/7 19:47	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	anonymous	IEUser@	FAILED
4	2020/4/7 19:47	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	student	software	SUCCEED
5	2020/4/7 19:57	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	anonymous	IEUser@	FAILED
6	2020/4/7 19:57	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	student	software	SUCCEED
7	2020/4/7 19:57	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	anonymous	IEUser@	FAILED
8	2020/4/7 19:57	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	student	IEUser@	FAILED
9	2020/4/7 19:57	00-E1-8C-BF-44-47	192.168.0.102	74-C3-30-B5-1E-0C	121.192.180.66	student	software	SUCCEED
10								

表格输出到硬盘的形式如下：

	A	B	C	D	E
1	FTP:121.192.180.66	USR:anonymous	PAS:IEUser@	STA:FAILED	
2	FTP:121.192.180.66	USR:anonymous	PAS:IEUser@	STA:FAILED	
3	FTP:121.192.180.66	USR:anonymous	PAS:IEUser@	STA:FAILED	
4	FTP:121.192.180.66	USR:student	PAS:software	STA:OK	
5	FTP:121.192.180.66	USR:anonymous	PAS:IEUser@	STA:FAILED	
6	FTP:121.192.180.66	USR:student	PAS:software	STA:OK	
7	FTP:121.192.180.66	USR:anonymous	PAS:IEUser@	STA:FAILED	
8	FTP:121.192.180.66	USR:student	PAS:IEUser@	STA:FAILED	
9	FTP:121.192.180.66	USR:student	PAS:software	STA:OK	
10					

4 实验总结

用 Wireshark 软件对 FTP 通信时的网络分组进行了侦听操作，观察了解 TCP 握手和挥手的过程。对 FTP 的通信协议的过程有了更为深入的理解，且在此基础编程能力得到提升。