CS305-2022Spring Lab2 Report

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Lab Time：Thursday 10:20 a.m. to 12:10 p.m.

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Practice 1

- **Problem: Find Narcissistic Numbers**
- **Source Code**

```
def narcissistic(value: int) -> bool:
    length = len(str(value))
    subs = [int(single) ** length for single in str(value)]
    sum3 = sum(subs)
    del subs
    return sum3 == value


def find_narcissistic_number(start: int, end: int) -> list:
    result = []
    for number in range(start, end + 1, 1):
        if narcissistic(number):
            result.append(number)
    return result


print(' '.join([str(i) for i in find_narcissistic_number(1, 1000000)]))
```

This program can display all the narcissistic numbers from 1 to 1,000,000(including).

- **Commands and Screenshots**

Type this in the command line:

```
python3 narcissistic_number.py
```

And this is the screenshot of the python source code.

```
D:\PycharmProjects\CS305\venv\Scripts\python.exe D:/PycharmProjects/CS305/narcissistic_number.py
1 2 3 4 5 6 7 8 9 153 370 371 407 1634 8208 9474 54748 92727 93084 548834

Process finished with exit code 0
```

Practice 2

- **Problem: Wireshark**

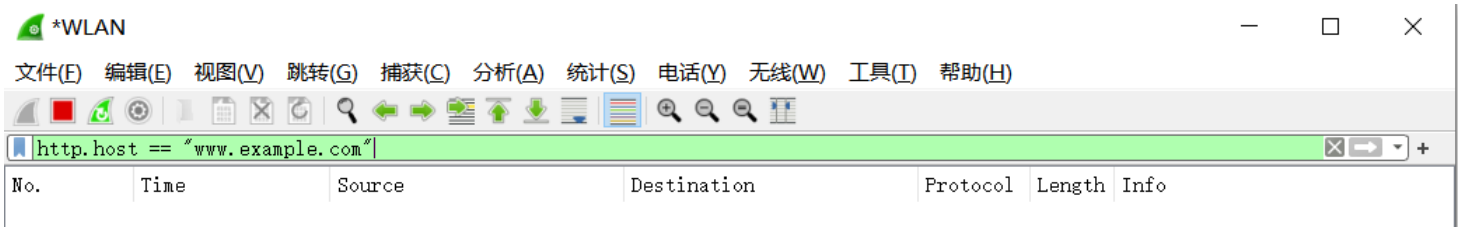
Problem 2-1

Q1

Filter: Capture Filter. Since capture filter can select those packets satisfying the requirements.

Q2

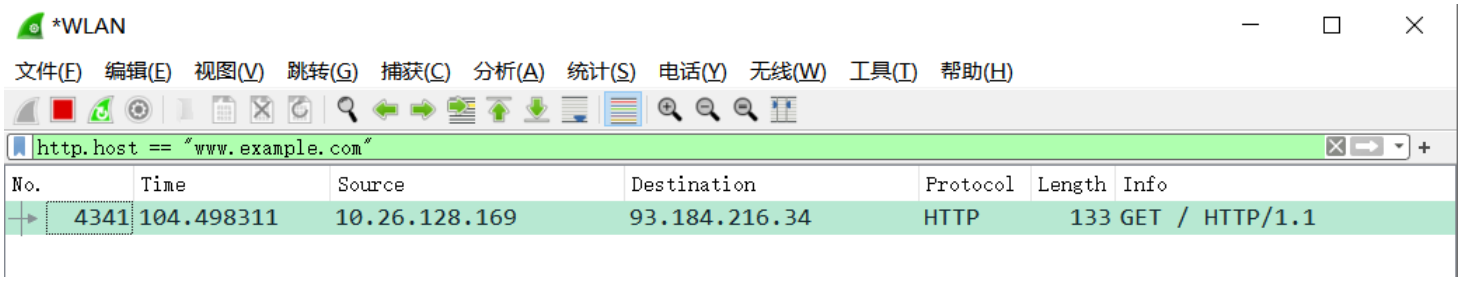
Step 1: Use display filter to find out the ip address of www.example.com. But unfortunately, we cannot find any packets since we haven't built connection with the destination address.



Step 2: Type the following in the command line, so that curl can send request via ipv4.

```
curl --ipv4 www.example.com
```

Then it can be seen that the ip address of www.example.com is 93.184.216.34, and localhost is 10.26.128.169.



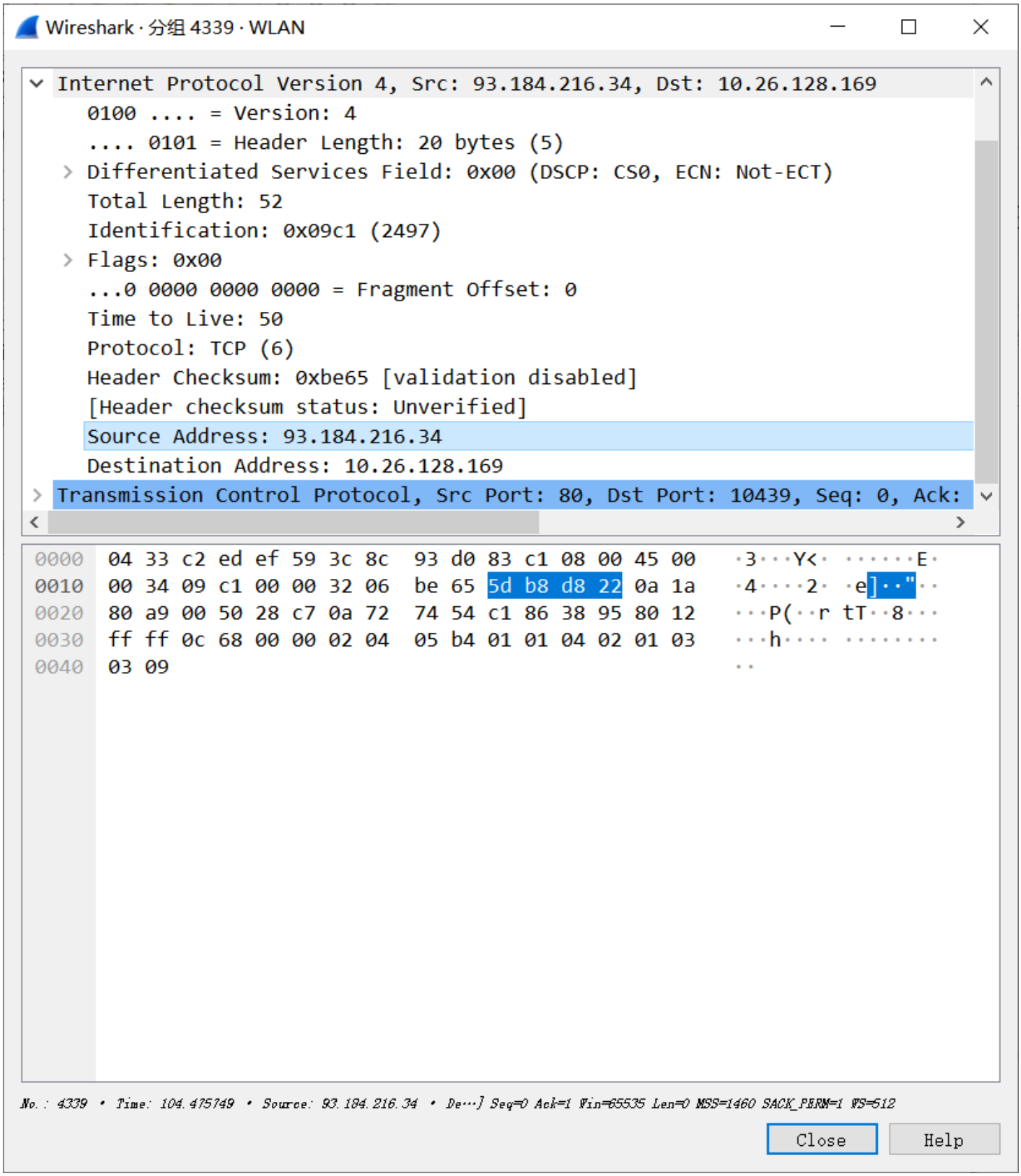
Step 3: Add the new capture filter.

This is the filter requirement:

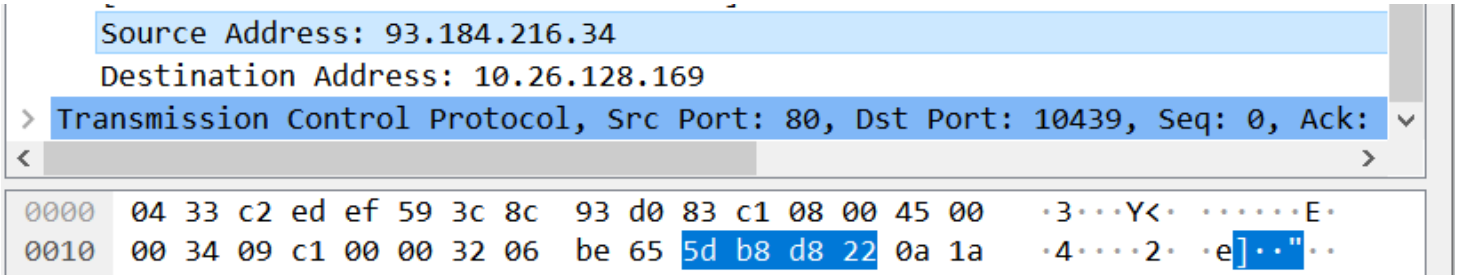
```
src host 93.184.216.34 and dst host 10.26.128.169
```

Step 4: Select a packet we need.

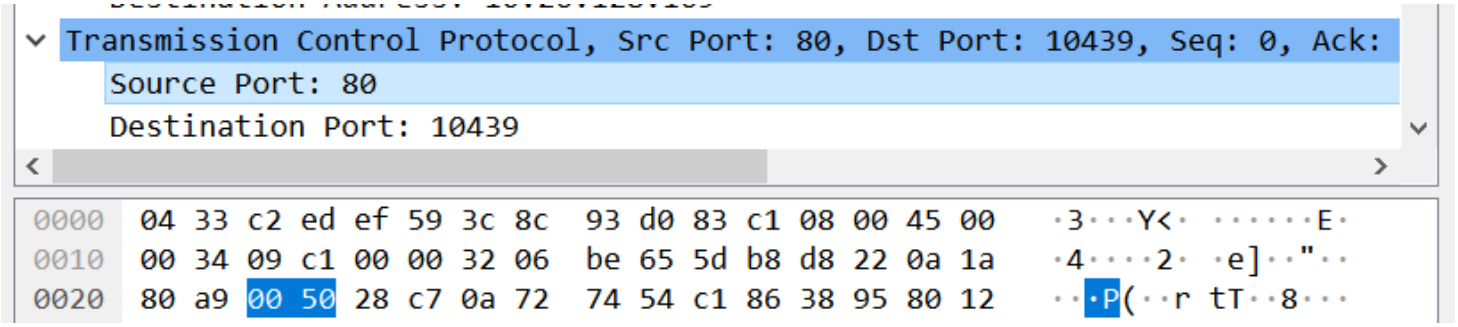
- Packet we select:



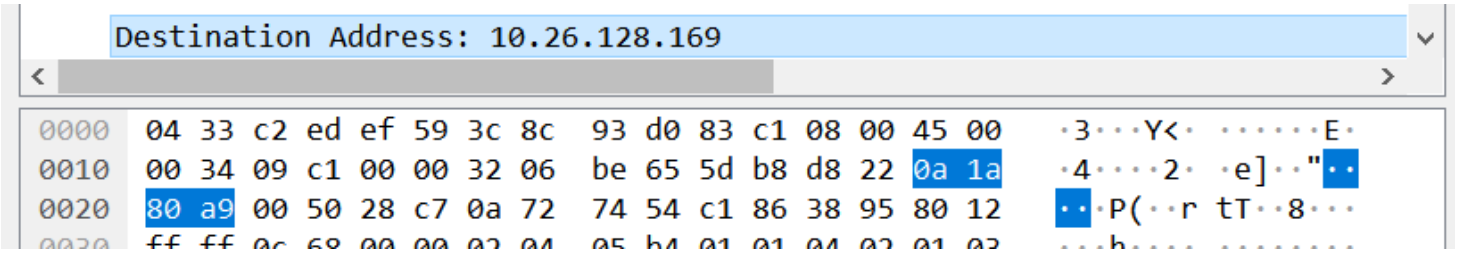
- Source Address



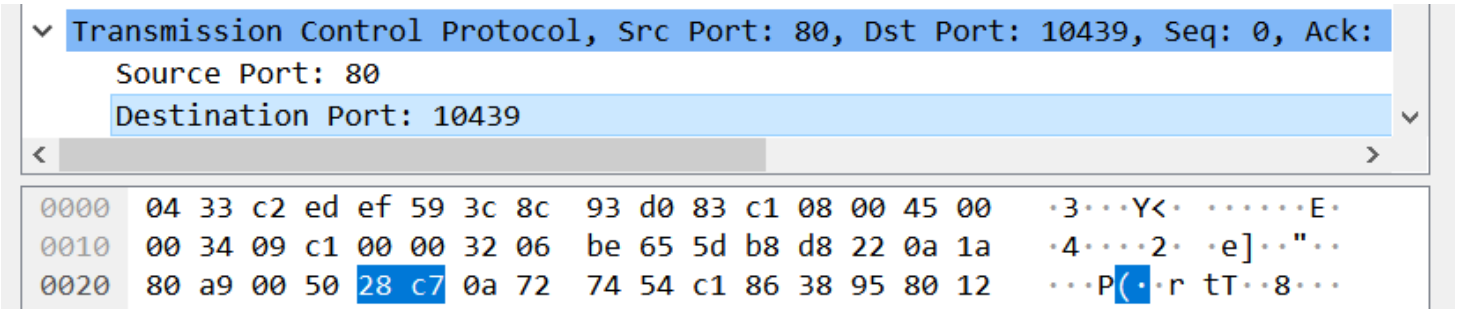
- Source Port



- Destination Address



- Destination Port



We can find these information:

```
Source Address: 93.184.216.34(5d.b8.d8.22 in hexadecimal)
Source Port: 80(0050 in hexadecimal)
Destination Address: 10.26.128.169(0a.1a.80.a9 in hexadecimal)
Destination Port: 10439(28c7 in hexadecimal)
```

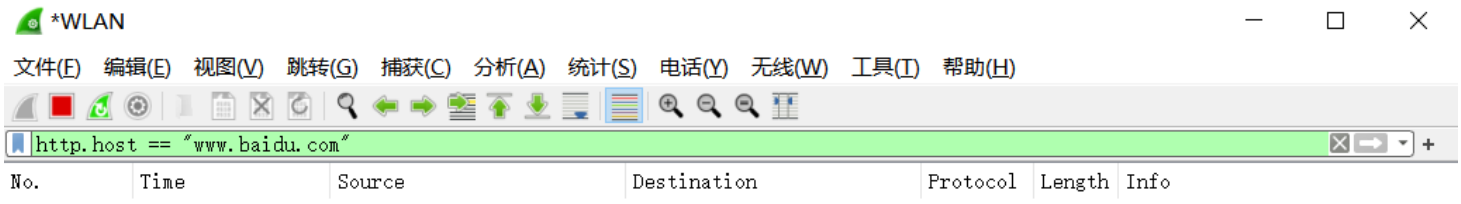
Problem 2-2

Q1

The process of this part is as same as Q2 in Problem 2-1.

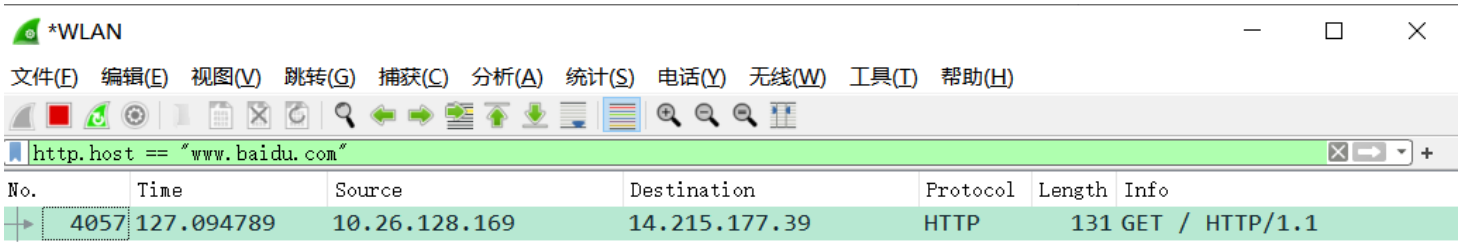
So only screenshots and commands will be displayed.

Step 1



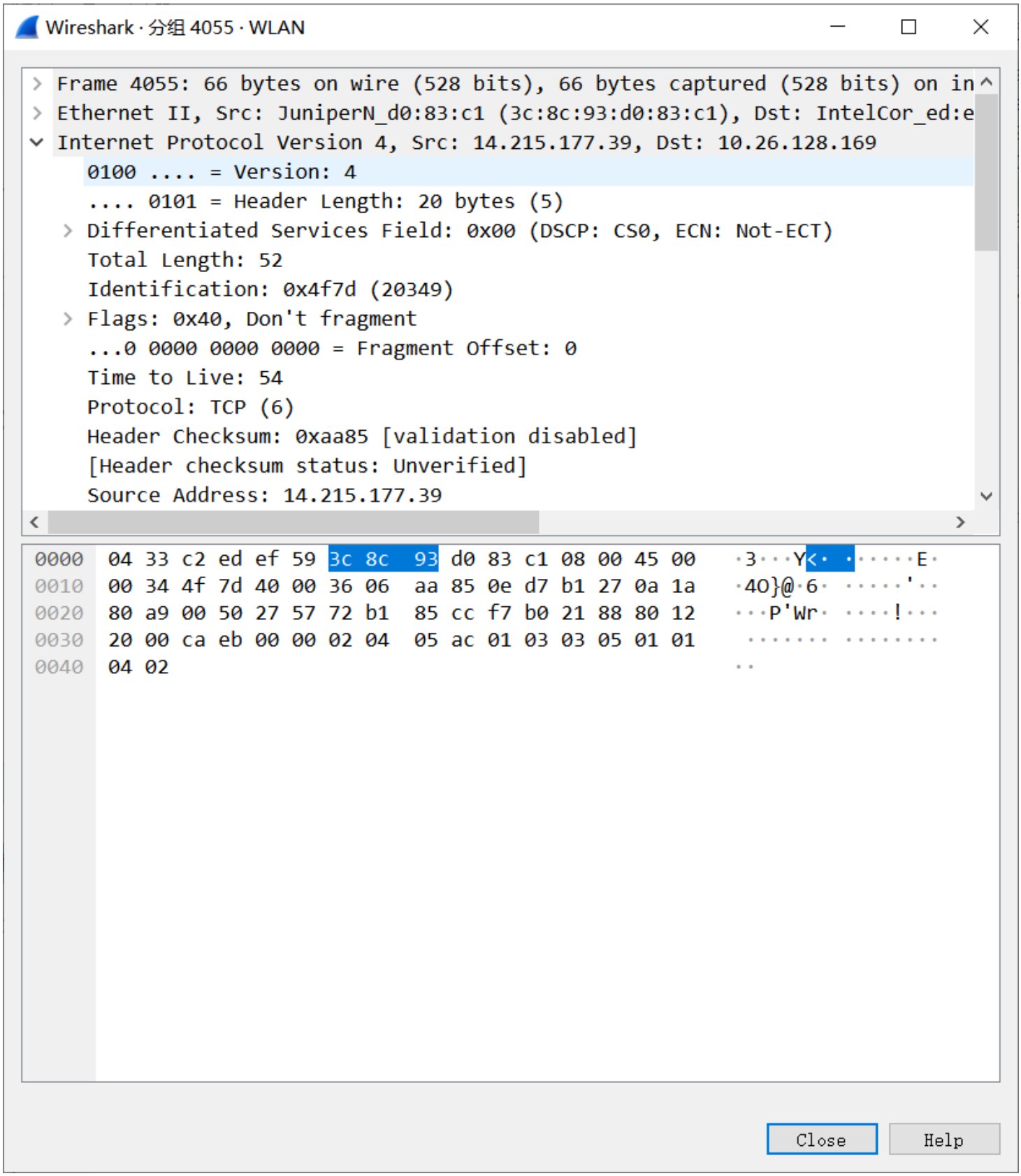
Step 2

```
curl --ipv4 www.baidu.com
```



Step 3

- Packet we select:



- Source Address:

```
    Source Address: 14.215.177.39
    Destination Address: 10.26.128.169
Transmission Control Protocol, Src Port: 80, Dst Port: 10071, Seq: 0, Ack:
    Source Port: 80
```

```
0000  04 33 c2 ed ef 59 3c 8c  93 d0 83 c1 08 00 45 00   ·3···Y<· ·····E·
0010  00 34 4f 7d 40 00 36 06  aa 85 0e d7 b1 27 0a 1a   ·4O}@·6· ·····'··
0020  80 a9 00 50 27 57 72 b1  85 cc f7 b0 21 88 80 12   ···P'Wr· ····!···
0030  20 00 ca eb 00 00 02 04  05 ac 01 03 03 05 01 01    ······ ········
0040  04 02                                             ··
```

- Source Port:

```
Transmission Control Protocol, Src Port: 80, Dst Port: 10071, Seq: 0, Ack:
    Source Port: 80
```

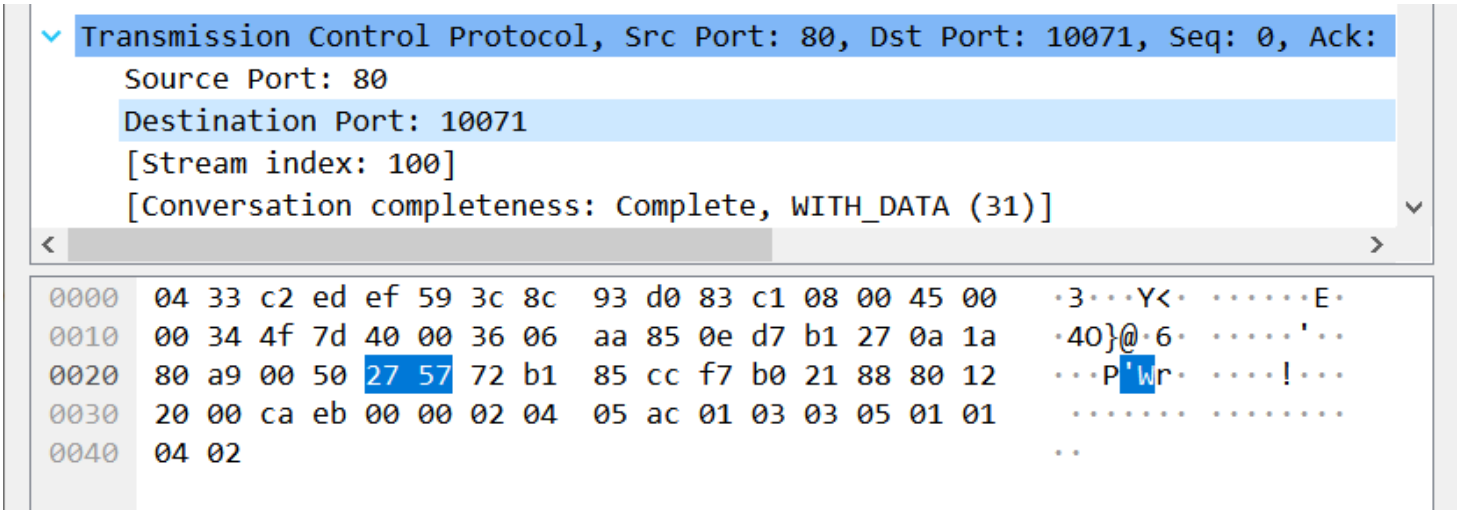
```
0000  04 33 c2 ed ef 59 3c 8c  93 d0 83 c1 08 00 45 00   ·3···Y<· ·····E·
0010  00 34 4f 7d 40 00 36 06  aa 85 0e d7 b1 27 0a 1a   ·4O}@·6· ·····'··
0020  80 a9 00 50 27 57 72 b1  85 cc f7 b0 21 88 80 12   ···P'Wr· ····!···
0030  20 00 ca eb 00 00 02 04  05 ac 01 03 03 05 01 01    ······ ········
0040  04 02                                             ··
```

- Destination Address:

```
    Destination Address: 10.26.128.169
Transmission Control Protocol, Src Port: 80, Dst Port: 10071, Seq: 0, Ack:
    Source Port: 80
```

```
0000  04 33 c2 ed ef 59 3c 8c  93 d0 83 c1 08 00 45 00   ·3···Y<· ·····E·
0010  00 34 4f 7d 40 00 36 06  aa 85 0e d7 b1 27 0a 1a   ·4O}@·6· ·····'··
0020  80 a9 00 50 27 57 72 b1  85 cc f7 b0 21 88 80 12   ···P'Wr· ····!···
0030  20 00 ca eb 00 00 02 04  05 ac 01 03 03 05 01 01    ······ ········
0040  04 02                                             ··
```

- Destination Port:



Source Address: 14.215.177.39(0e.d7.b1.27 in hexadecimal)
Source Port: 80(0050 in hexadecimal)
Destination Address: 10.26.128.169(0a.1a.80.a9 in hexadecimal)
Destination Port: 10071(2757 in hexadecimal)

Q2

Comparing the result in Q2 of Problem 2-1 and Q2 of Problem 2-2:

	www.example.com	www.baidu.com
Source Address	93.184.216.34	14.215.177.39
Source Port	80	80
Destination Address	10.126.128.169	10.126.128.169
Destination Port	10439	10071

And we can find that the source port and destination address are identical in the two cases.