



Lab 2

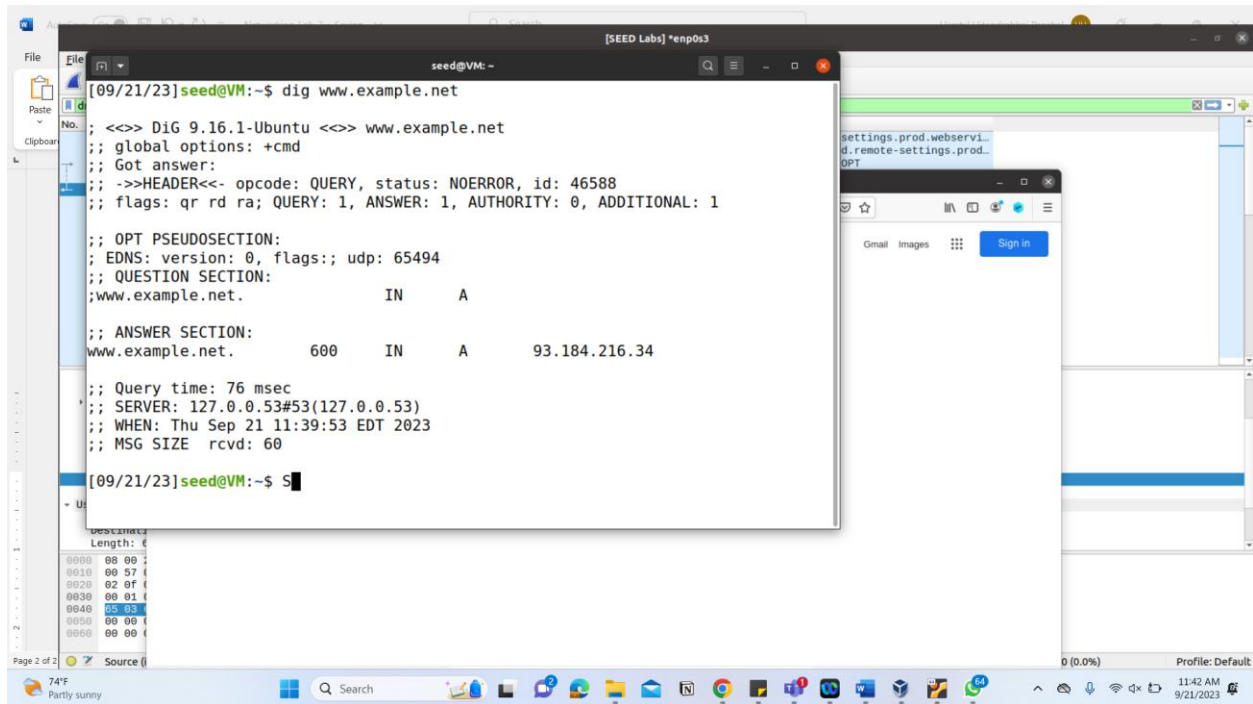
Course: Networking and Data Security COMP8677-1-R-2023F

Professor: Dr. Shaoquan Jiang

Prepared by

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1.a. Try \$ dig www.example.net to find out its ip address.



The screenshot shows a terminal window titled 'seed@VM: ~' with the command '[09/21/23]seed@VM:~\$ dig www.example.net' entered. The output is as follows:

```
>>> DiG 9.16.1-Ubuntu <>> www.example.net
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 46588
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;www.example.net.                IN      A
;; ANSWER SECTION:
www.example.net.                600     IN      A      93.184.216.34
;; Query time: 76 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Thu Sep 21 11:39:53 EDT 2023
;; MSG SIZE rcvd: 60

[09/21/23]seed@VM:~$ S
```

The terminal window is part of a desktop environment. In the background, a web browser window is visible with a 'Sign in' button. The taskbar at the bottom shows various application icons and the system clock indicating 11:42 AM on 9/21/2023.

1.b. run Wireshark on your VM, then \$ dig www.example.net and stop wireshark. Look at the DNS request packet (using filter DNS to find it easily), confirm that the transport layer protocol is UDP. What are the values of this UDP header (you need to first check the header fields learned in class)?

- Used www.google.com instead of www.example.net

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Activities Wireshark Sep 21 12:19 [SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

dns

No.	Time	Source	Destination	Protocol	Length	Info
3	2023-09-21 12:11	10.0.2.15	172.20.10.1	DNS	85	Standard query 0x7683 A www.google.com OPT
6	2023-09-21 12:11	172.20.10.1	10.0.2.15	DNS	181	Standard query response 0x7683 A www.google.com A 172.217.1.4...

Frame 3: 85 bytes on wire (680 bits), 85 bytes captured (680 bits) on interface enp0s3, id 0
Ethernet II, Src: PcsCompu_6a:94:2c (08:00:27:6a:94:2c), Dst: RealtekU_12:35:02 (52:54:00:12:35:02)
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 172.20.10.1
0100 = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 71
Identification: 0x2f28 (12672)
Flags: 0x4000, Don't fragment
Fragment offset: 0
Time to live: 64
Protocol: UDP (17)
Header checksum: 0x495a [validation disabled]
0000 52 54 00 12 35 02 08 00 27 6a 94 2c 08 00 45 00 RT: 5... 'j',--E-
0010 00 47 2f 28 40 00 40 11 49 5a 0a 00 02 0f ac 14 -G/((@ @: IZ:-----
0020 0a 01 bd 54 00 35 00 33 c2 08 76 03 01 00 00 01 ...T:5:3 :hv:-----
0030 00 00 00 00 00 01 03 77 77 77 06 67 6f 6f 67 6cw ww googl
0040 65 03 63 6f 6d 00 00 01 00 01 00 00 29 02 00 00 e com (.....)
0050 00 00 00 00 00

Protocol (ip.proto), 1 byte

Packets: 197 · Displayed: 2 (1.0%) · Dropped: 0 (0.0%)

78°F Mostly sunny 12:19 PM 9/21/2023

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Activities Wireshark Sep 21 12:20 [SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

dns

No.	Time	Source	Destination	Protocol	Length	Info
3	2023-09-21 12:11	10.0.2.15	172.20.10.1	DNS	85	Standard query 0x7683 A www.google.com OPT
6	2023-09-21 12:11	172.20.10.1	10.0.2.15	DNS	181	Standard query response 0x7683 A www.google.com A 172.217.1.4...

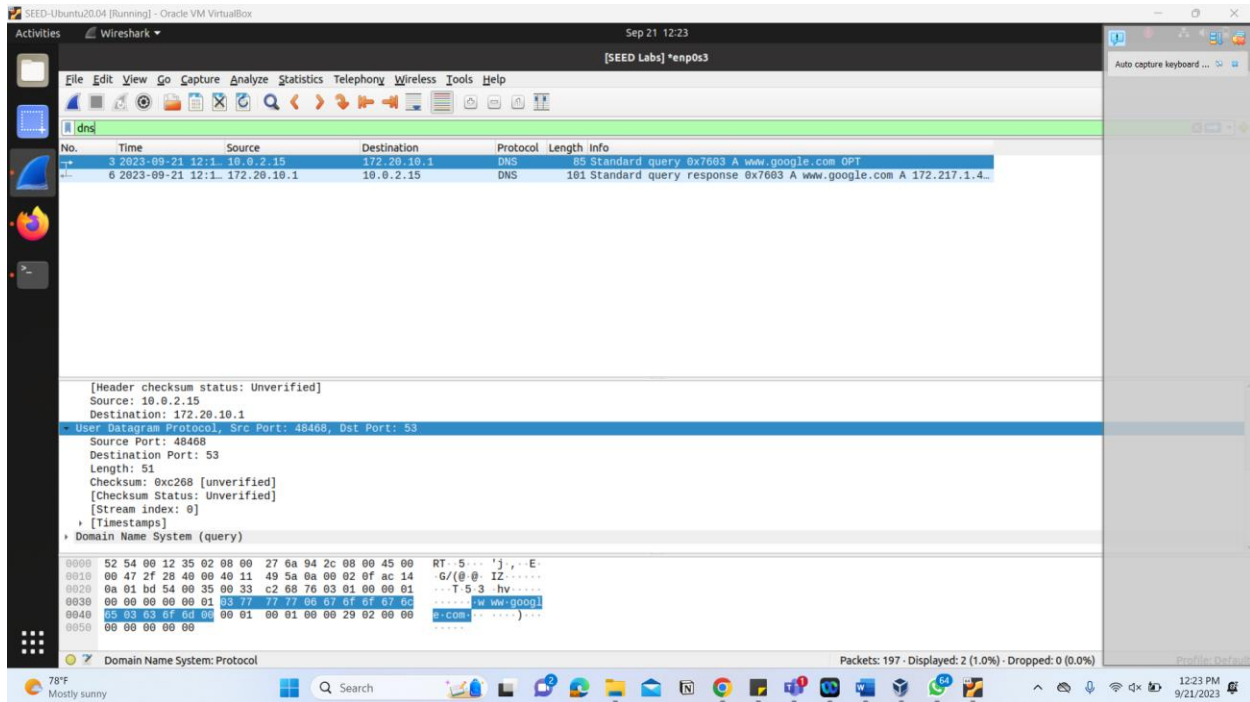
[Header checksum status: Unverified]
Source: 10.0.2.15
Destination: 172.20.10.1
User Datagram Protocol, Src Port: 48468, Dst Port: 53
Source Port: 48468
Destination Port: 53
Length: 51
Checksum: 0xc268 [unverified]
[Checksum Status: Unverified]
[Stream index: 0]
[Timestamps]
Domain Name System (query)
0000 52 54 00 12 35 02 08 00 27 6a 94 2c 08 00 45 00 RT: 5... 'j',--E-
0010 00 47 2f 28 40 00 40 11 49 5a 0a 00 02 0f ac 14 -G/((@ @: IZ:-----
0020 0a 01 bd 54 00 35 00 33 c2 08 76 03 01 00 00 01 ...T:5:3 :hv:-----
0030 00 00 00 00 00 01 03 77 77 77 06 67 6f 6f 67 6cw ww googl
0040 65 03 63 6f 6d 00 00 01 00 01 00 00 29 02 00 00 e com (.....)
0050 00 00 00 00 00

User Datagram Protocol (udp), 8 bytes

Packets: 197 · Displayed: 2 (1.0%) · Dropped: 0 (0.0%)

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1.C. In the DNS request packet in step b, the destination IP is your local DNS server's IP. What is this value? As said, DNS is serviced by UDP and has no connection setup before sending DNS request. You can confirm this by checking that there is no any packet in Wireshark exchanged between your VM and local DNS server, prior to the DNS request packet (show the screen shot of the window of Wireshark for the list of packets).



In the above Screenshot, you can see that there are only 2 DNS packet exchanged.

2.

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Sep 21 12:28

[SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr == 93.184.216.34

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39038 → 80 [SYN] Seq=2961200459 Win=64240 Len=0 MSS=1460 SACK...
2	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39040 → 80 [SYN] Seq=3454521070 Win=64240 Len=0 MSS=1460 SACK...
3	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [SYN, ACK] Seq=312768001 Ack=3454521071 Win=65535...
4	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521071 Ack=312768002 Win=64240 Len=0...
5	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [SYN, ACK] Seq=312832001 Ack=2961200460 Win=65535...
6	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200460 Ack=312832002 Win=64240 Len=0...
7	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [FIN, ACK] Seq=3454521071 Ack=312768002 Win=64240...
8	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [ACK] Seq=312768002 Ack=3454521072 Win=65535 Len=0...
9	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [FIN, ACK] Seq=2961200460 Ack=312832002 Win=64240...
10	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [ACK] Seq=312832002 Ack=2961200461 Win=65535 Len=0...
11	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [FIN, ACK] Seq=312768002 Ack=3454521072 Win=65535...
12	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521072 Ack=312768003 Win=64240 Len=0...
13	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [FIN, ACK] Seq=312832002 Ack=2961200461 Win=65535...
14	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200461 Ack=312832003 Win=64240 Len=0...

0100 = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 44
Identification: 0x3073 (12403)
Flags: 0x0000
Fragment offset: 0
Time to live: 64
Protocol: TCP (6)
Header checksum: 0x0870 [validation disabled]
[Header checksum status: Unverified]

Source: 93.184.216.34
Destination: 10.0.2.15

0000 00 00 27 6a 94 2c 52 54 00 12 35 02 08 00 45 00 ...j,RT..S...E..
0010 00 2c 30 73 00 00 40 06 08 70 5d b8 d8 22 0a 00 ...0s..@..p].....
0020 02 0f 00 50 98 08 12 a4 76 01 cd e7 ce ef 60 12 ...P....V.....
0030 ff ff 97 df 00 08 02 04 05 b4 00 00 00 00 00 00

Source (ip.src), 4 bytes

Packets: 45 - Displayed: 14 (31.1%) - Dropped: 0 (0.0%)

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Search

12:28 PM 9/21/2023

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Sep 21 12:29

[SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr == 93.184.216.34

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39038 → 80 [SYN] Seq=2961200459 Win=64240 Len=0 MSS=1460 SACK...
2	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39040 → 80 [SYN] Seq=3454521070 Win=64240 Len=0 MSS=1460 SACK...
3	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [SYN, ACK] Seq=312768001 Ack=3454521071 Win=65535...
4	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521071 Ack=312768002 Win=64240 Len=0...
5	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [SYN, ACK] Seq=312832001 Ack=2961200460 Win=65535...
6	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200460 Ack=312832002 Win=64240 Len=0...
7	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [FIN, ACK] Seq=3454521071 Ack=312768002 Win=64240...
8	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [ACK] Seq=312768002 Ack=3454521072 Win=65535 Len=0...
9	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [FIN, ACK] Seq=2961200460 Ack=312832002 Win=64240...
10	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [ACK] Seq=312832002 Ack=2961200461 Win=65535 Len=0...
11	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [FIN, ACK] Seq=312768002 Ack=3454521072 Win=65535...
12	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521072 Ack=312768003 Win=64240 Len=0...
13	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [FIN, ACK] Seq=312832002 Ack=2961200461 Win=65535...
14	2023-09-21 12:2:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200461 Ack=312832003 Win=64240 Len=0...

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
...0 = Push: Not set
...0 = Reset: Not set
...1 = Syn: Set
...0 = Fin: Not set
[TCP Flags:A..S..]
Window size value: 65535

0000 00 00 27 6a 94 2c 52 54 00 12 35 02 08 00 45 00 ...j,RT..S...E..
0010 00 2c 30 73 00 00 40 06 08 70 5d b8 d8 22 0a 00 ...0s..@..p].....
0020 02 0f 00 50 98 08 12 a4 76 01 cd e7 ce ef 60 12 ...P....V.....
0030 ff ff 97 df 00 08 02 04 05 b4 00 00 00 00 00 00

The window size value from the TCP header (tcp.window_size_value), 2 bytes

Packets: 45 - Displayed: 14 (31.1%) - Dropped: 0 (0.0%)

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Search

12:29 PM 9/21/2023

3.a.

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Sep 21 12:35

[SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr == 93.184.216.34

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	74	39038 → 80 [SYN] Seq=2961200459 Win=64240 Len=0 MSS=1460 SACK_...
2	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	74	39040 → 80 [SYN] Seq=3454521070 Win=64240 Len=0 MSS=1460 SACK_...
3	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [SYN, ACK] Seq=312768001 Ack=3454521071 Win=65535 ...
4	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [ACK] Seq=3454521071 Ack=312768002 Win=64240 Len=0 ...
5	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [SYN, ACK] Seq=312832001 Ack=2961200460 Win=65535 ...
6	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [ACK] Seq=2961200460 Ack=312832002 Win=64240 Len=0 ...
7	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [FIN, ACK] Seq=3454521071 Ack=312768002 Win=64240 ...
8	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [ACK] Seq=312768002 Ack=3454521072 Win=65535 Len=0 ...
9	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [FIN, ACK] Seq=2961200460 Ack=312832002 Win=64240 ...
10	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [ACK] Seq=312832002 Ack=2961200461 Win=65535 Len=0 ...
11	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [FIN, ACK] Seq=312768002 Ack=3454521072 Win=65535 ...
12	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [ACK] Seq=3454521072 Ack=312768003 Win=64240 Len=0 ...
13	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [FIN, ACK] Seq=312832002 Ack=2961200461 Win=65535 ...
14	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [ACK] Seq=2961200461 Ack=312832003 Win=64240 Len=0 ...

Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 0]
Sequence number: 2961200459
[Next sequence number: 2961200460]
Acknowledgment number: 0
Acknowledgment number (raw): 0
1010 = Header Length: 40 bytes (10)
* Flags: 0x002 (SYN)
0000 = Reserved: Not set
...0 = Nonce: Not set
....0 = Congestion Window Reduced (CWR): Not set
.....0 = ECN-Echo: Not set
0000 52 54 00 12 35 02 08 00 27 0a 94 2c 08 00 45 00 RT: 5 ... E-
0010 00 3c ac 59 40 00 40 00 4c 79 0a 00 02 0f 5d b8 < YB 0 Ly ...]
0020 d8 22 98 7e 00 50 b0 80 55 4b 00 00 00 a0 02 ... P ... UK ...
0030 fa f0 42 18 00 00 02 04 05 b4 04 02 08 0a 7a ee ... B ... Z ...
0040 b9 4f 00 00 00 00 01 03 03 07 ... 0 ...

wireshark_enp0s3_20230921122604_tr8Hpl.pcapng

Packets: 45 · Displayed: 14 (31.1%) · Dropped: 0 (0.0%) Profile: Default

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3.b.

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Sep 21 12:37

[SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr == 93.184.216.34

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	74	39038 → 80 [SYN] Seq=2961200459 Win=64240 Len=0 MSS=1460 SACK_...
2	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	74	39040 → 80 [SYN] Seq=3454521070 Win=64240 Len=0 MSS=1460 SACK_...
3	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [SYN, ACK] Seq=312768001 Ack=3454521071 Win=65535 ...
4	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [ACK] Seq=3454521071 Ack=312768002 Win=64240 Len=0 ...
5	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [SYN, ACK] Seq=312832001 Ack=2961200460 Win=65535 ...
6	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [ACK] Seq=2961200460 Ack=312832002 Win=64240 Len=0 ...
7	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [FIN, ACK] Seq=3454521071 Ack=312768002 Win=64240 ...
8	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [ACK] Seq=312768002 Ack=3454521072 Win=65535 Len=0 ...
9	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [FIN, ACK] Seq=2961200460 Ack=312832002 Win=64240 ...
10	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [ACK] Seq=312832002 Ack=2961200461 Win=65535 Len=0 ...
11	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39040 [FIN, ACK] Seq=312768002 Ack=3454521072 Win=65535 ...
12	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39040 → 80 [ACK] Seq=3454521072 Ack=312768003 Win=64240 Len=0 ...
13	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	60	80 → 39038 [FIN, ACK] Seq=312832002 Ack=2961200461 Win=65535 ...
14	2023-09-21 12:12:10.0215	192.168.1.10	192.168.1.100	TCP	54	39038 → 80 [ACK] Seq=2961200461 Ack=312832003 Win=64240 Len=0 ...

Destination Port: 80
[Stream index: 0]
[TCP Segment Len: 0]
Sequence number: 2961200459
[Next sequence number: 2961200460]
Acknowledgment number: 0
Acknowledgment number (raw): 0
1010 = Header Length: 40 bytes (10)
* Flags: 0x002 (SYN)
0000 = Reserved: Not set
...0 = Nonce: Not set
....0 = Congestion Window Reduced (CWR): Not set
.....0 = ECN-Echo: Not set
0000 52 54 00 12 35 02 08 00 27 0a 94 2c 08 00 45 00 RT: 5 ... E-
0010 00 3c ac 59 40 00 40 00 4c 79 0a 00 02 0f 5d b8 < YB 0 Ly ...]
0020 d8 22 98 7e 00 50 b0 80 55 4b 00 00 00 a0 02 ... P ... UK ...
0030 fa f0 42 18 00 00 02 04 05 b4 04 02 08 0a 7a ee ... B ... Z ...
0040 b9 4f 00 00 00 00 01 03 03 07 ... 0 ...

Show Applications

Sequence number (tcp.seq), 4 bytes

Packets: 45 · Displayed: 14 (31.1%) · Dropped: 0 (0.0%) Profile: Default

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3.c.

The image shows a Wireshark capture of a network traffic stream. The top pane displays a list of 14 packets. The second pane shows the details of the selected packet (No. 1), which is a TCP SYN packet. The third pane shows the raw packet data in hexadecimal and ASCII. The status bar at the bottom indicates that 45 packets were displayed, with 14 (31.1%) shown and 0 (0.0%) dropped.

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39038 → 80 [SYN] Seq=2961200459 Win=64240 Len=0 MSS=1460 SACK
2	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39040 → 80 [SYN] Seq=3454521070 Win=64240 Len=0 MSS=1460 SACK
3	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [SYN, ACK] Seq=312768001 Ack=3454521071 Win=65535
4	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521071 Ack=312768002 Win=64240 Len=0
5	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [SYN, ACK] Seq=312832001 Ack=2961200460 Win=65535
6	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200460 Ack=312832002 Win=64240 Len=0
7	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [FIN, ACK] Seq=3454521071 Ack=312768002 Win=64240
8	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [ACK] Seq=312768002 Ack=3454521072 Win=65535 Len=0
9	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [FIN, ACK] Seq=2961200460 Ack=312832002 Win=64240
10	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [ACK] Seq=312832002 Ack=2961200461 Win=65535 Len=0
11	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39040 [FIN, ACK] Seq=312768002 Ack=3454521072 Win=65535
12	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39040 → 80 [ACK] Seq=3454521072 Ack=312768003 Win=64240 Len=0
13	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39038 [FIN, ACK] Seq=312832002 Ack=2961200461 Win=65535
14	2023-09-21 12:12:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39038 → 80 [ACK] Seq=2961200461 Ack=312832003 Win=64240 Len=0

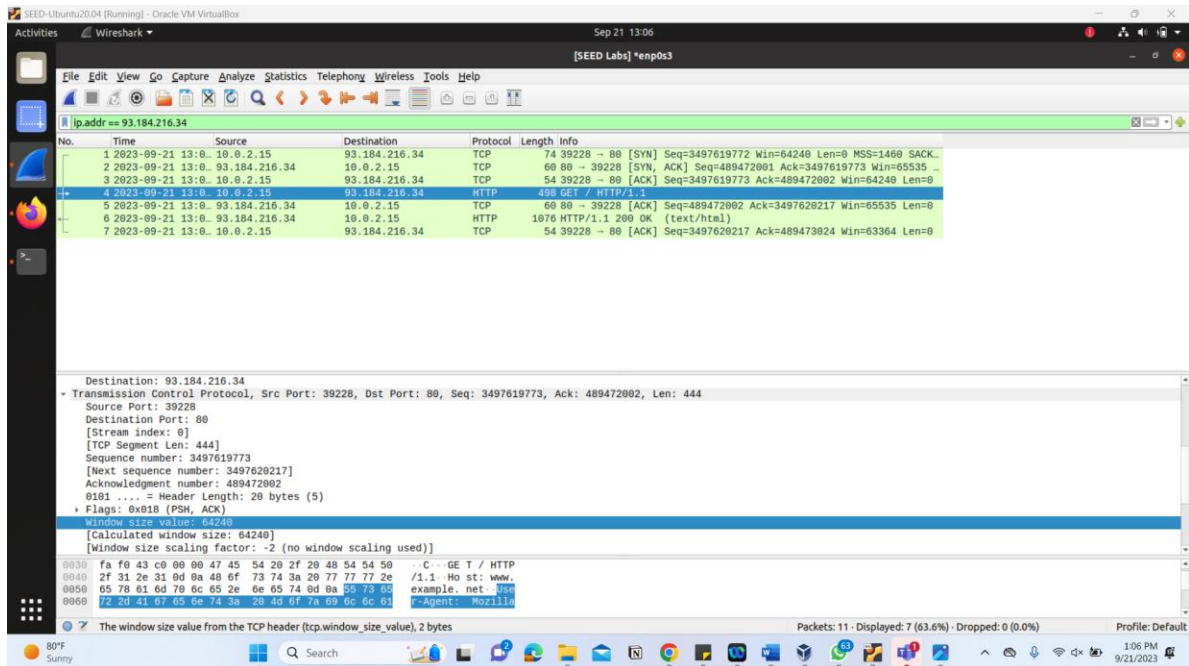
1010 = Header Length: 40 bytes (10)
Flags: 0x002 (SYN)
0000 = Reserved: Not set
...0 = Nonce: Not set
....0 = Congestion Window Reduced (CWR): Not set
....0 = ECN-Echo: Not set
....0 = Urgent: Not set
....0 = Acknowledgment: Not set
....0 = Push: Not set
....0 = Reset: Not set
....0 = SYN: Set
....0 = FIN: Not set
[TCP Flags:S.]
0000 52 54 00 12 35 02 08 00 27 6a 94 2c 08 00 45 00 RT: 5... 'j',...E-
0010 00 3c a3 21 40 00 40 06 55 b1 0a 00 02 0f 5d b8 ...< 1@: U...]
0020 08 22 98 08 00 50 c0 e7 ce ee 00 00 00 a0 02 ...P...
0030 fa f6 42 18 00 00 02 04 05 b4 04 02 08 0a 7a ee ...B...-Z-
0040 b9 60 00 00 00 00 03 03 07

3.d.

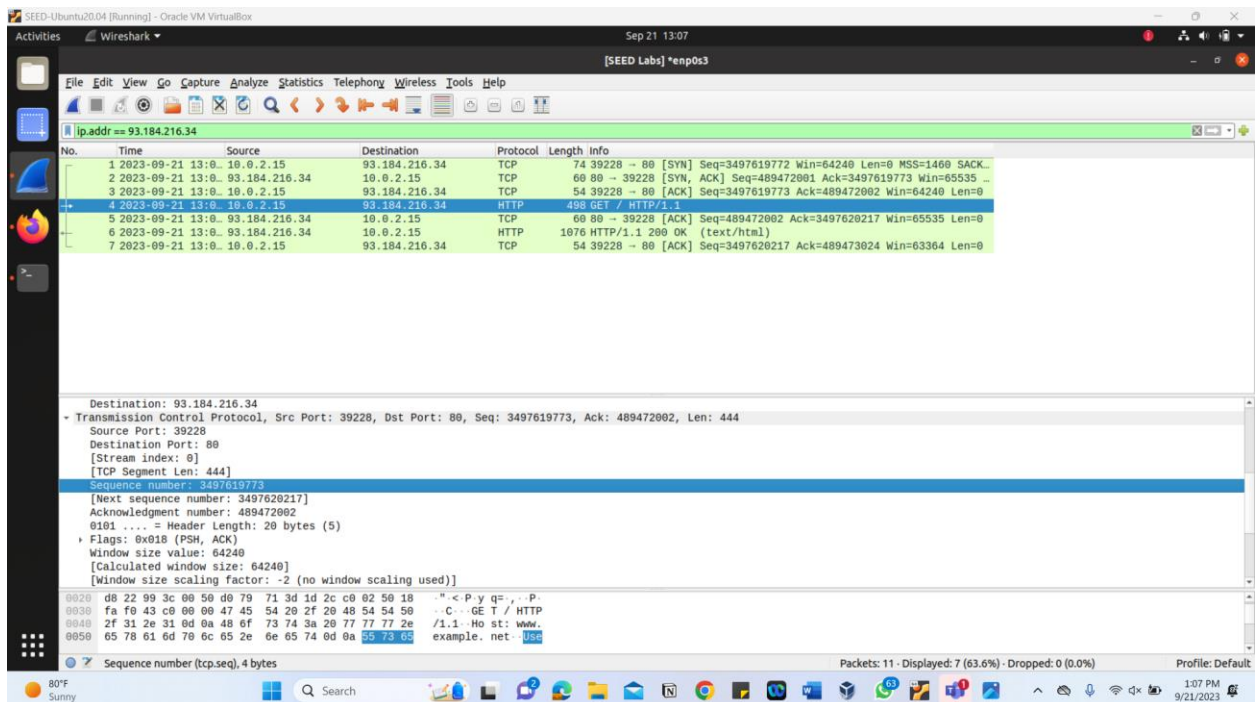
The image shows a Wireshark capture of a network traffic stream. The top pane displays a list of 7 packets. The second pane shows the details of the selected packet (No. 2), which is a TCP ACK packet. The third pane shows the raw packet data in hexadecimal and ASCII. The status bar at the bottom indicates that 11 packets were displayed, with 7 (63.6%) shown and 0 (0.0%) dropped.

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	TCP	74	39228 → 80 [SYN] Seq=3497619772 Win=64240 Len=0 MSS=1460 SACK
2	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39228 [SYN, ACK] Seq=489472001 Ack=3497619773 Win=65535
3	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39228 → 80 [ACK] Seq=3497619773 Ack=489472002 Win=64240 Len=0
4	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	HTTP	498	GET / HTTP/1.1
5	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	TCP	60	80 → 39228 [ACK] Seq=489472002 Ack=3497620217 Win=65535 Len=0
6	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	HTTP	1076	HTTP/1.1 200 OK (text/html)
7	2023-09-21 13:00:10.0.2.15	93.184.216.34	10.0.2.15	TCP	54	39228 → 80 [ACK] Seq=3497620217 Ack=489473024 Win=63364 Len=0

Acknowledgment number: 3497619773
0110 = Header Length: 24 bytes (6)
Flags: 0x0012 (SYN, ACK)
Window size value: 65535
[Calculated window size: 65535]
Checksum: 0x9dbb [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
Options: (4 bytes), Maximum segment size
[SEQ/ACK analysis]
[This is an ACK to the segment in frame: 1]
[The RTT to ACK the segment was: 0.051515799 seconds]
[RTT: 0.051552289 seconds]
[Timestamps]
0000 08 00 27 6a 94 2c 52 54 00 12 35 02 08 00 45 00 ...j',RT: 5...E-
0010 00 2c 33 ff 00 00 40 06 04 e4 5d b8 d8 22 0a 00 ...3...@: ...]
0020 02 ff 00 50 99 3c 1d 2c c0 01 00 79 71 3d 00 12 ...p<...yq=
0030 ff ff 0d bb 00 02 04 05 b4 00 00 00 00 00 00 ...



3.e.



3.f.

Wireshark capture showing a successful HTTP GET request and response. The packet list shows a GET request (No. 5) and a 200 OK response (No. 6). The packet details for the response show the status code 200 and the content type text/html.

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	74	39228 → 80 [SYN] Seq=3497619772 Win=64240 Len=0 MSS=1460 SACK...
2	2023-09-21 13:0...	93.184.216.34	10.0.2.15	TCP	60	80 → 39228 [SYN, ACK] Seq=489472001 Ack=3497619773 Win=65535 ...
3	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	54	39228 → 80 [ACK] Seq=3497619773 Ack=489472002 Win=64240 Len=0
4	2023-09-21 13:0...	93.184.216.34	10.0.2.15	HTTP	498	GET / HTTP/1.1
5	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	60	80 → 39228 [ACK] Seq=489472002 Ack=3497620217 Win=65535 Len=0
6	2023-09-21 13:0...	93.184.216.34	10.0.2.15	HTTP	1076	HTTP/1.1 200 OK (text/html)
7	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	54	39228 → 80 [ACK] Seq=3497620217 Ack=489473024 Win=63364 Len=0

Destination: 10.0.2.15
Transmission Control Protocol, Src Port: 80, Dst Port: 39228, Seq: 489472002, Ack: 3497620217, Len: 0
Source Port: 80
Destination Port: 39228
[Stream index: 0]
[TCP Segment Len: 0]
Sequence number: 489472002
[Next sequence number: 489472002]
Acknowledgment number: 3497620217
0101 = Header Length: 20 bytes (5)
Flags: 0x018 (ACK)
Window size value: 65535
[Calculated window size: 65535]
[Window size scaling factor: -2 (no window scaling used)]
0000 08 00 27 6a 94 2c 52 54 00 12 35 02 08 00 45 00 ...J,RT...5...E-
0010 00 28 34 00 00 00 40 06 04 e7 5d b8 d8 22 0a 00 ...4...@...]-...-
0020 02 0f 00 50 99 3c 1d 2c c0 02 d0 79 72 f9 50 18 ...P<...yrP-
0030 ff ff 20 4f 4b 0d 6a 43 0f 6e 74 65 6e 74 2d 45 ...HT TP/1.1.2
0040 00 OK - Content-E

3.g.

Wireshark capture showing a failed HTTP GET request. The packet list shows a GET request (No. 5) and a TCP RST response (No. 7). The packet details for the RST show the reset flag set.

No.	Time	Source	Destination	Protocol	Length	Info
1	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	74	39228 → 80 [SYN] Seq=3497619772 Win=64240 Len=0 MSS=1460 SACK...
2	2023-09-21 13:0...	93.184.216.34	10.0.2.15	TCP	60	80 → 39228 [SYN, ACK] Seq=489472001 Ack=3497619773 Win=65535 ...
3	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	54	39228 → 80 [ACK] Seq=3497619773 Ack=489472002 Win=64240 Len=0
4	2023-09-21 13:0...	93.184.216.34	10.0.2.15	HTTP	498	GET / HTTP/1.1
5	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	60	80 → 39228 [ACK] Seq=489472002 Ack=3497620217 Win=65535 Len=0
6	2023-09-21 13:0...	93.184.216.34	10.0.2.15	HTTP	1076	HTTP/1.1 200 OK (text/html)
7	2023-09-21 13:0...	10.0.2.15	93.184.216.34	TCP	54	39228 → 80 [RST] Seq=3497620217 Ack=489473024 Win=0 Len=0

Acknowledgment number: 3497620217
0101 = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
0000 = 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...]
0020 02 0f 00 50 99 3c 1d 2c c0 02 d0 79 72 f9 50 18 ...P<...yrP-
0030 ff ff 92 27 00 00 48 54 54 50 2f 31 2e 31 20 32 ...HT TP/1.1.2
0040 00 OK - Content-E

3.h.

SEED-Ubuntu20.04 [Running] - Oracle VM VirtualBox

Sep 21 13:22

[SEED Labs] *enp0s3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr == 93.184.216.34

No.	Time	Source	Destination	Protocol	Length	Info
58	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	74	39358 → 80 [SYN] Seq=311286012 Win=64240 Len=0 MSS=1460 SACK...
59	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	74	39360 → 80 [SYN] Seq=210510944 Win=64240 Len=0 MSS=1460 SACK...
60	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	60	80 → 39358 [SYN, ACK] Seq=625088001 Ack=311286013 Win=65535 L...
61	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	54	39358 → 80 [RST] Seq=311286013 Win=0 Len=0
62	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	60	80 → 39360 [SYN, ACK] Seq=625088001 Ack=210510945 Win=65535 L...
63	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	54	39360 → 80 [ACK] Seq=210510945 Ack=625088002 Win=64240 Len=0
64	2023-09-21 13:2...	10.0.2.15	93.184.216.34	HTTP	343	GET /favicon.ico HTTP/1.1
65	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	60	80 → 39360 [ACK] Seq=625088002 Ack=210511234 Win=65535 Len=0
66	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	54	39360 → 80 [FIN, ACK] Seq=210511234 Ack=625088002 Win=64240 L...
67	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	60	80 → 39360 [ACK] Seq=625088002 Ack=210511235 Win=65535 Len=0
68	2023-09-21 13:2...	10.0.2.15	93.184.216.34	HTTP	1067	HTTP/1.1 404 Not Found (text/html)
69	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	54	39360 → 80 [RST] Seq=210511235 Win=0 Len=0
70	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	60	80 → 39360 [FIN, ACK] Seq=625088015 Ack=210511235 Win=65535 L...
71	2023-09-21 13:2...	93.184.216.34	10.0.2.15	TCP	54	39360 → 80 [RST] Seq=210511235 Win=0 Len=0
72	2023-09-21 13:2...	10.0.2.15	93.184.216.34	TCP	60	80 → 39360 [RST, ACK] Seq=0 Ack=210511235 Win=0 Len=0

[Next sequence number: 210511235]
Acknowledgment number: 0
Acknowledgment number (raw): 0
0101 = Header Length: 20 bytes (5)
Flags: 0x004 (RST)
000. = Reserved: Not set
...0 = Nonce: Not set
....0 = Congestion Window Reduced (CWR): Not set
....0 = ECN-Echo: Not set
....0 = Urgent: Not set
....0 = Acknowledgment: Not set
....0 = Push: Not set
....1 = Reset: Set
....0 = Syn: Not set

0000 52 54 00 12 35 02 08 00 27 0a 94 2c 08 00 45 00 RT: 5... 'j',...E-
0010 00 28 00 00 40 00 40 06 f8 e6 0a 00 02 0f 5d b8 .{..@.. ..-..
0020 08 22 99 c0 00 50 0c 8c 25 83 00 00 00 00 50 04 .P...P...%...P..
0030 00 00 a1 d7 00 00

ECN concealment protection (RFC 3540) (tcp.flags.ns), 1 byte

Packets: 76 - Displayed: 15 (19.7%) - Dropped: 0 (0.0%) Profile: Default

80°F Sunny

Search

1:22 PM 9/21/2023