iGNITE Technologies

Nmap for Pentester

Timing & Performance

WWW.HACKINGARTICLES.IN

Contents

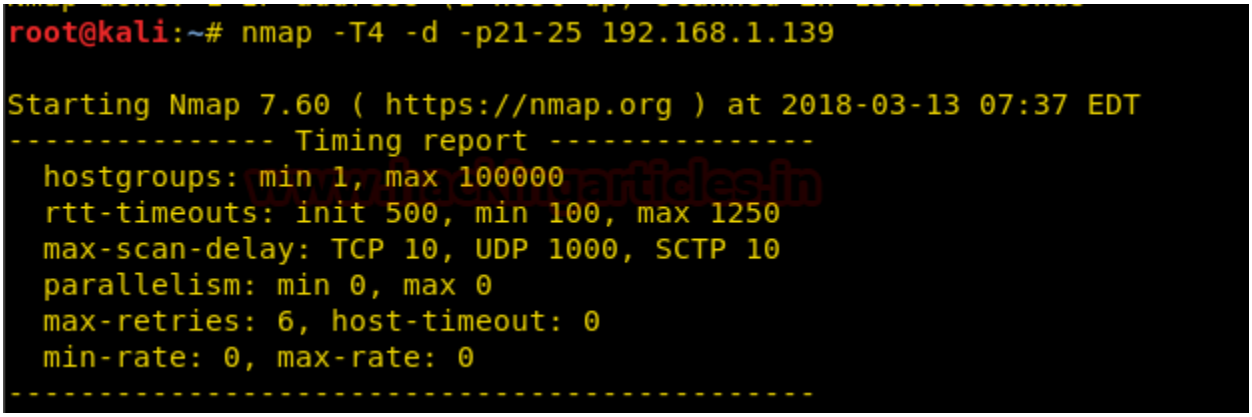
Nmap Timing Template

As we have seen, Nmap has multiple timing templates that can be used differently according to the requirements. Click here to check the timing scan article. Let's see what's inside the timing template. To get the description of the timing template, we'll use the -d attribute.

nmap -T4 -d -p21-25 192.168.1.139

Here we have multiple arguments that collectively make a timing template. Let's have a look at them one by one.

- Host-groups
- Rtt-timeouts
- Scan-delay
- Max-retires
- Min-rates
- Parallelism



Maximum Retries (–max-retries)

-max-retries specifies the number of times a packet is to be resent on a port to check if it is open or closed. If -max-retries is set to 0, the packets will be sent only once on a port and no retries will be made.

nmap -p21-25 192.168.1.139 --max-retries 0

```
root@kali:~# nmap -p21-25 192.168.1.139 --max-retries 0

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:40 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00053s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.26 seconds
```

Here in Wireshark, we can see that 1-1 TCP SYN packet sent to each port from **source:** 192.168.1.126 to **destination:** 192.168.1.139 are not sent again.

.	Time	Source	Destination	Protocol	Length	Info
…	14.630333528	192.168.1.126	192.168.1.139	TCP	58	40101 → 21 [SYN] Seq=0
…	14.630502138	192.168.1.126	192.168.1.139	TCP	58	40101 → 22 [SYN] Seq=0
…	14.630632889	192.168.1.126	192.168.1.139	TCP	58	40101 → 25 [SYN] Seq=0
…	14.630754074	192.168.1.126	192.168.1.139	TCP	58	40101 → 23 [SYN] Seq=0
…	14.630861979	192.168.1.139	192.168.1.126	TCP	60	21 → 40101 [SYN, ACK] S
…	14.630895140	192.168.1.126	192.168.1.139	TCP	54	40101 → 21 [RST] Seq=1
…	14.630998982	192.168.1.139	192.168.1.126	TCP	60	22 → 40101 [SYN, ACK] S
…	14.631018799	192.168.1.126	192.168.1.139	TCP	54	40101 → 22 [RST] Seq=1
…	14.631088195	192.168.1.139	192.168.1.126	TCP	60	25 → 40101 [SYN, ACK] S
…	14.631104983	192.168.1.126	192.168.1.139	TCP	54	40101 → 25 [RST] Seq=1
…	14.631183660	192.168.1.139	192.168.1.126	TCP	60	23 → 40101 [SYN, ACK] S
…	14.631203172	192.168.1.126	192.168.1.139	TCP	54	40101 → 23 [RST] Seq=1
…	14.631332434	192.168.1.126	192.168.1.139	TCP	58	40101 → 24 [SYN] Seq=0
…	14.631694887	192.168.1.139	192.168.1.126	TCP	60	24 → 40101 [SYN, ACK] S
…	14.631727933	192.168.1.126	192.168.1.139	TCP	54	40101 → 24 [RST] Seq=1

Now we will apply a small firewall rule on the target machine so that the packets get blocked if they come at a faster rate.

sudo iptables -I INPUT -p tcp -m state --state NEW -m recent --set
sudo iptables -I INPUT -p tcp -m state --state NEW -m recent --update --seconds 1 --hitcount 1 -j DROP

```
xander@ubuntu:~$ sudo iptables -I INPUT -p tcp -m state --state NEW -m recent --
set
xander@ubuntu:~$ sudo iptables -I INPUT -p tcp -m state --state NEW -m recent --
update --seconds 1 --hitcount 1 -j DROP
xander@ubuntu:~$
```

Now, the normal scan will not show any results with max-retries.

nmap -p21-25 192.168.1.139 --max-retries 0

```
root@kali:~# nmap -p21-25 192.168.1.139 --max-retries 0

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:45 EDT
Warning: 192.168.1.139 giving up on port because retransmission cap hit (0).
Nmap scan report for 192.168.1.139
Host is up (0.00030s latency).

PORT   STATE    SERVICE
21/tcp filtered ftp
22/tcp filtered ssh
23/tcp open     telnet
24/tcp filtered priv-mail
25/tcp filtered smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.37 seconds
```

As we can see that the ports whose packets got dropped are not sent again so their status is not determined.

.	Time	Source	Destination	Protocol	Length	Info
162	8.820434671	192.168.1.126	192.168.1.139	TCP	58	46184 → 23 [SYN] Seq=0
163	8.820728339	192.168.1.126	192.168.1.139	TCP	58	46184 → 22 [SYN] Seq=0
164	8.820884704	192.168.1.126	192.168.1.139	TCP	58	46184 → 21 [SYN] Seq=0
165	8.820999986	192.168.1.126	192.168.1.139	TCP	58	46184 → 25 [SYN] Seq=0
166	8.820996631	192.168.1.139	192.168.1.126	TCP	60	23 → 46184 [SYN, ACK]
167	8.821086895	192.168.1.126	192.168.1.139	TCP	54	46184 → 23 [RST] Seq=1
168	8.821219665	192.168.1.126	192.168.1.139	TCP	58	46184 → 24 [SYN] Seq=0

Here we can increase the max-retries value, which will bypass the specified firewall filter so that we can get the exact port status.

nmap -p21-25 192.168.1.139 --max-retries 5

```
root@kali:~# nmap -p21-25 192.168.1.139 --max-retries 5

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:47 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00060s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 17.72 seconds
```

Here we can see that TCP SYN packets sent to one port from **source:** 192.168.1.126 to **destination:** 192.168.1.139 are **sent again and again** until the packets return a specified reply or the maximum retry value (here 5) is reached.

	Time	Source	Destination	Protocol	Length	Info
288	15.040965464	192.168.1.126	192.168.1.139	TCP	58	52227 → 23 [SYN] Seq=0
289	15.041154766	192.168.1.126	192.168.1.139	TCP	58	52227 → 25 [SYN] Seq=0
290	15.041280718	192.168.1.126	192.168.1.139	TCP	58	52227 → 22 [SYN] Seq=0
291	15.041389638	192.168.1.139	192.168.1.126	TCP	60	23 → 52227 [SYN, ACK]
292	15.041422649	192.168.1.126	192.168.1.139	TCP	54	52227 → 23 [RST] Seq=1
293	15.041553830	192.168.1.126	192.168.1.139	TCP	58	52227 → 21 [SYN] Seq=0
294	15.041673430	192.168.1.126	192.168.1.139	TCP	58	52227 → 24 [SYN] Seq=0
315	16.143226373	192.168.1.126	192.168.1.139	TCP	58	52228 → 24 [SYN] Seq=0
316	16.143406963	192.168.1.126	192.168.1.139	TCP	58	52228 → 21 [SYN] Seq=0
317	16.143501663	192.168.1.126	192.168.1.139	TCP	58	52228 → 22 [SYN] Seq=0
318	16.143630235	192.168.1.126	192.168.1.139	TCP	58	52228 → 25 [SYN] Seq=0
319	16.143747646	192.168.1.139	192.168.1.126	TCP	60	24 → 52228 [SYN, ACK]
320	16.143782287	192.168.1.126	192.168.1.139	TCP	54	52228 → 24 [RST] Seq=1
341	17.245774996	192.168.1.126	192.168.1.139	TCP	58	52229 → 25 [SYN] Seq=0
342	17.245951233	192.168.1.126	192.168.1.139	TCP	58	52229 → 22 [SYN] Seq=0
343	17.246495358	192.168.1.139	192.168.1.126	TCP	60	25 → 52229 [SYN, ACK]
344	17.246544048	192.168.1.126	192.168.1.139	TCP	54	52229 → 25 [RST] Seq=1
345	17.249780225	192.168.1.126	192.168.1.139	TCP	58	52229 → 21 [SYN] Seq=0
365	18.348029402	192.168.1.126	192.168.1.139	TCP	58	52230 → 21 [SYN] Seq=0
366	18.348204450	192.168.1.126	192.168.1.139	TCP	58	52230 → 22 [SYN] Seq=0
367	18.348806210	192.168.1.139	192.168.1.126	TCP	60	21 → 52230 [SYN, ACK]
368	18.348853260	192.168.1.126	192.168.1.139	TCP	54	52230 → 21 [RST] Seq=1
394	19.451211514	192.168.1.126	192.168.1.139	TCP	58	52231 → 22 [SYN] Seq=0
395	19.452501730	192.168.1.139	192.168.1.126	TCP	60	22 → 52231 [SYN, ACK]
396	19.452625958	192.168.1.126	192.168.1.139	TCP	54	52231 → 22 [RST] Seq=1

Host-timeout

The **--host-timeout** is an attribute that specifies the scan to give up on a host after the specified time. The less the time specified, the greater the chances of inaccuracy in scan results.

We can specify the time in milliseconds **(ms),** seconds **(s),** or minutes **(m).**

nmap -p21-25 192.168.1.139 --host-timeout 10ms

```
root@kali:~# nmap -p21-25 192.168.1.139 --host-timeout 10ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:50 EDT
Note: Host seems down. If it is really up, but blocking our ping probes
Nmap done: 1 IP address (0 hosts up) scanned in 0.16 seconds
```

Now we will try to get the result by increasing the timeout value

nmap -p21-25 192.168.1.139 --host-timeout 100ms

```
root@kali:~# nmap -p21-25 192.168.1.139 --host-timeout 100ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:51 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00047s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.26 seconds
```

We can use **--host-timeout** in other scenarios also like when we need to check if the host system is live or not. Here we have shown how the host-timeout can affect the results of a ping scan.

nmap -sP 192.168.1.139 --host-timeout 10ms

The output from the above command had given **0 hosts is up**.

nmap -sP 192.168.1.139 --host-timeout 100ms

The output from the above command had given **1 host is up**.

```
root@kali:~# nmap -sP 192.168.1.139 --host-timeout 10ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:53 EDT
Note: Host seems down. If it is really up, but blocking our ping probes
Nmap done: 1 IP address (0 hosts up) scanned in 0.09 seconds
root@kali:~# nmap -sP 192.168.1.139 --host-timeout 100ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:53 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00039s latency).
MAC Address: 00:0C:29:EB:27:7A (VMware)
Nmap done: 1 IP address (1 host up) scanned in 13.13 seconds
```

Hostgroup

The hostgroup attribute is specified to scan a specified number of hosts in the network at a time. You need to specify the minimum number of hosts, maximum number of hosts, or both, to be scanned at a time.

nmap -sP 192.168.1.1/24 --min-hostgroup 3 --max-hostgroup 3

From the given below image, you can observe that it has shown only 3 live hosts from inside the complete subnet mask, saving your time from scanning the entire network.

```
root@kali:~# nmap -sP 192.168.1.1/24 --min-hostgroup 3 --max-hostgroup 3

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:55 EDT
Nmap scan report for 192.168.1.1
Host is up (0.0013s latency).
MAC Address: 60:E3:27:CB:B6:2A (Tp-link Technologies)
Nmap scan report for 192.168.1.105
Host is up (0.049s latency).
MAC Address: E0:2A:82:FC:CB:27 (Universal Global Scientific Industrial)
Nmap scan report for 192.168.1.106
Host is up (0.00035s latency).
MAC Address: 14:2D:27:E8:C1:07 (Hon Hai Precision Ind.)
```

Scan delay

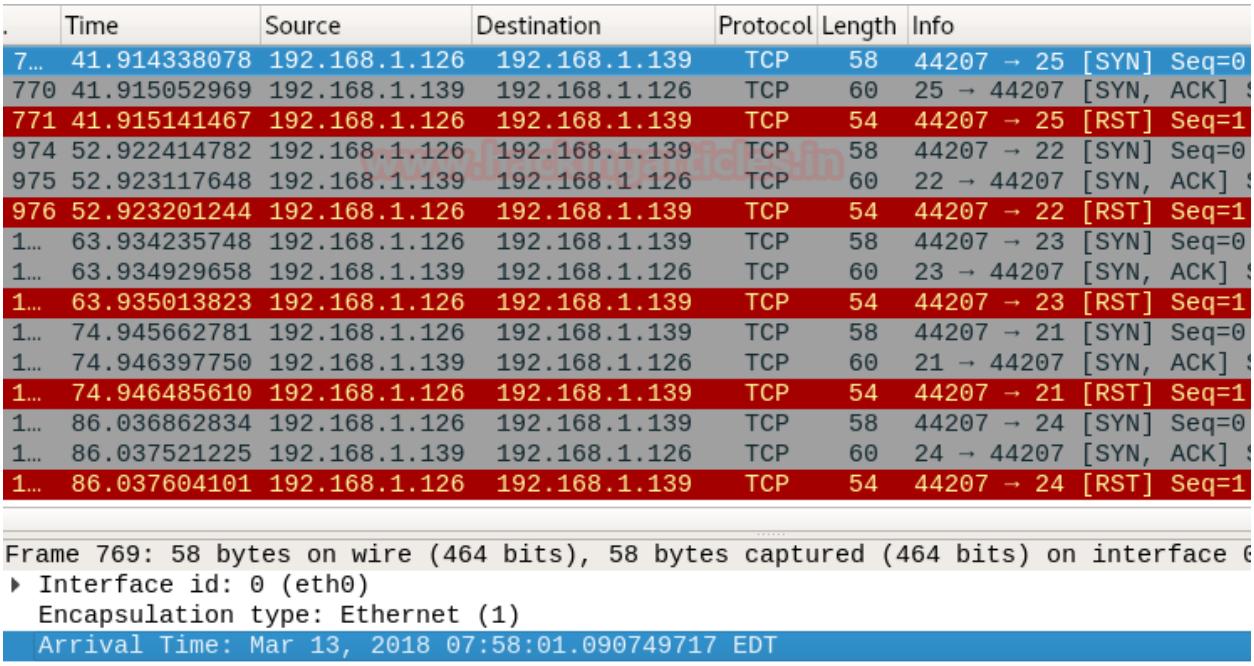
A scan delay is used to delay the packet until the specified time. It is very useful for evading time-based firewalls.

nmap -p21-25 192.168.1.139 --scan-delay 11s

```
root@kali:~# nmap -p21-25 192.168.1.139 --scan-delay 11s

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 07:57 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00076s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 79.36 seconds
```

here we can see the time difference in between the packets

packet 1: TCP SYN packet on port 25 at **07:58:01** from 192.168.1.126 to 192.168.1.139

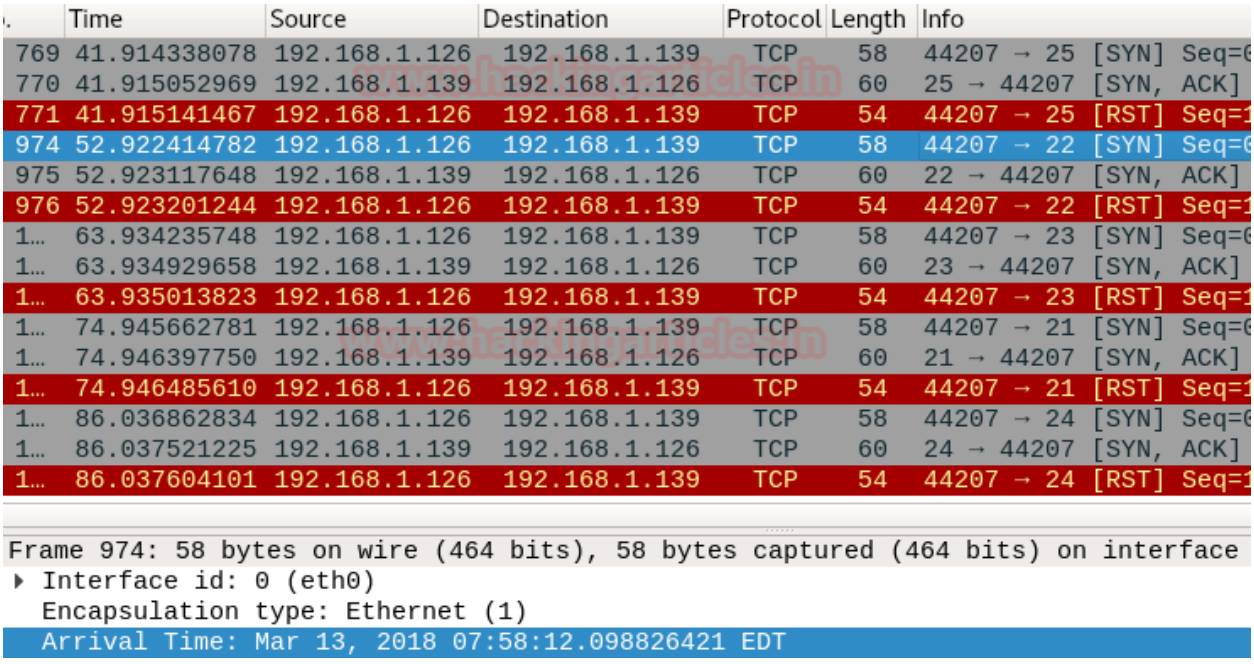


	Time	Source	Destination	Protocol	Length	Info
7…	41.914338078	192.168.1.126	192.168.1.139	TCP	58	44207 → 25 [SYN] Seq=0
770	41.915052969	192.168.1.139	192.168.1.126	TCP	60	25 → 44207 [SYN, ACK]
771	41.915141467	192.168.1.126	192.168.1.139	TCP	54	44207 → 25 [RST] Seq=1
974	52.922414782	192.168.1.126	192.168.1.139	TCP	58	44207 → 22 [SYN] Seq=0
975	52.923117648	192.168.1.139	192.168.1.126	TCP	60	22 → 44207 [SYN, ACK]
976	52.923201244	192.168.1.126	192.168.1.139	TCP	54	44207 → 22 [RST] Seq=1
1…	63.934235748	192.168.1.126	192.168.1.139	TCP	58	44207 → 23 [SYN] Seq=0
1…	63.934929658	192.168.1.139	192.168.1.126	TCP	60	23 → 44207 [SYN, ACK]
1…	63.935013823	192.168.1.126	192.168.1.139	TCP	54	44207 → 23 [RST] Seq=1
1…	74.945662781	192.168.1.126	192.168.1.139	TCP	58	44207 → 21 [SYN] Seq=0
1…	74.946397750	192.168.1.139	192.168.1.126	TCP	60	21 → 44207 [SYN, ACK]
1…	74.946485610	192.168.1.126	192.168.1.139	TCP	54	44207 → 21 [RST] Seq=1
1…	86.036862834	192.168.1.126	192.168.1.139	TCP	58	44207 → 24 [SYN] Seq=0
1…	86.037521225	192.168.1.139	192.168.1.126	TCP	60	24 → 44207 [SYN, ACK]
1…	86.037604101	192.168.1.126	192.168.1.139	TCP	54	44207 → 24 [RST] Seq=1

```
Frame 769: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface 0
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 07:58:01.090749717 EDT
```

packet 2: TCP SYN packet on port 22 at **07:58:12** from 192.168.1.126 to 192.168.1.139

Now if you count the time difference between these packets, you get an 11-second time lap between these two packets.



	Time	Source	Destination	Protocol	Length	Info
769	41.914338078	192.168.1.126	192.168.1.139	TCP	58	44207 → 25 [SYN] Seq=0
770	41.915052969	192.168.1.139	192.168.1.126	TCP	60	25 → 44207 [SYN, ACK]
771	41.915141467	192.168.1.126	192.168.1.139	TCP	54	44207 → 25 [RST] Seq=1
974	52.922414782	192.168.1.126	192.168.1.139	TCP	58	44207 → 22 [SYN] Seq=0
975	52.923117648	192.168.1.139	192.168.1.126	TCP	60	22 → 44207 [SYN, ACK]
976	52.923201244	192.168.1.126	192.168.1.139	TCP	54	44207 → 22 [RST] Seq=1
1…	63.934235748	192.168.1.126	192.168.1.139	TCP	58	44207 → 23 [SYN] Seq=0
1…	63.934929658	192.168.1.139	192.168.1.126	TCP	60	23 → 44207 [SYN, ACK]
1…	63.935013823	192.168.1.126	192.168.1.139	TCP	54	44207 → 23 [RST] Seq=1
1…	74.945662781	192.168.1.126	192.168.1.139	TCP	58	44207 → 21 [SYN] Seq=0
1…	74.946397750	192.168.1.139	192.168.1.126	TCP	60	21 → 44207 [SYN, ACK]
1…	74.946485610	192.168.1.126	192.168.1.139	TCP	54	44207 → 21 [RST] Seq=1
1…	86.036862834	192.168.1.126	192.168.1.139	TCP	58	44207 → 24 [SYN] Seq=0
1…	86.037521225	192.168.1.139	192.168.1.126	TCP	60	24 → 44207 [SYN, ACK]
1…	86.037604101	192.168.1.126	192.168.1.139	TCP	54	44207 → 24 [RST] Seq=1

```
Frame 974: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 07:58:12.098826421 EDT
```

Maximum rate (max-rate)

Rate is an attribute that specifies at what rate the packets are to be sent, in other words, the number of packets to be sent at a time. Max-rate specifies the maximum number of packets to be sent at once.

nmap -p21-25 192.168.1.139 --max-rate 2

```
root@kali:~# nmap -p21-25 192.168.1.139 --max-rate 2

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-15 03:17 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00045s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 15.27 seconds
```

wireshark shows that the packets sending rate are less than 2, means the number of packets sent at a time is less than or equal to 2

packet 1: TCP SYN packet on port 21 at **03:17:20** from 192.168.1.126 to 192.168.1.139

No.	Time	Source	Destination	Protocol	Length	Info
14	13.085464118	192.168.1.126	192.168.1.139	TCP	58	41591 → 21 [SYN] Seq=0
15	13.086123851	192.168.1.139	192.168.1.126	TCP	60	21 → 41591 [SYN, ACK]
16	13.086272575	192.168.1.126	192.168.1.139	TCP	54	41591 → 21 [RST] Seq=1
17	13.553070699	192.168.1.126	192.168.1.139	TCP	58	41591 → 23 [SYN] Seq=0
18	13.553315324	192.168.1.139	192.168.1.126	TCP	60	23 → 41591 [SYN, ACK]
19	13.553336412	192.168.1.126	192.168.1.139	TCP	54	41591 → 23 [RST] Seq=1
20	14.052887939	192.168.1.126	192.168.1.139	TCP	58	41591 → 25 [SYN] Seq=0
21	14.053571128	192.168.1.139	192.168.1.126	TCP	60	25 → 41591 [SYN, ACK]
22	14.053619708	192.168.1.126	192.168.1.139	TCP	54	41591 → 25 [RST] Seq=1
24	14.552443786	192.168.1.126	192.168.1.139	TCP	58	41591 → 22 [SYN] Seq=0
25	14.552743062	192.168.1.139	192.168.1.126	TCP	60	22 → 41591 [SYN, ACK]
26	14.552774165	192.168.1.126	192.168.1.139	TCP	54	41591 → 22 [RST] Seq=1
27	15.052648773	192.168.1.126	192.168.1.139	TCP	58	41591 → 24 [SYN] Seq=0
28	15.053377802	192.168.1.139	192.168.1.126	TCP	60	24 → 41591 [SYN, ACK]
29	15.053466696	192.168.1.126	192.168.1.139	TCP	54	41591 → 24 [RST] Seq=1

```
Frame 14: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 15, 2018 03:17:20.807234072 EDT
```

packet 2: TCP SYN packet on port 23 at **03:17:21** from 192.168.1.126 to 192.168.1.139

Now if you count the time difference between these packets, you get a 1 sec time-lapse between these two packets, indicating that these two packets were not sent together.

No.	Time	Source	Destination	Protocol	Length	Info
14	13.085464118	192.168.1.126	192.168.1.139	TCP	58	41591 → 21 [SYN] Seq=0
15	13.086123851	192.168.1.139	192.168.1.126	TCP	60	21 → 41591 [SYN, ACK]
16	13.086272575	192.168.1.126	192.168.1.139	TCP	54	41591 → 21 [RST] Seq=1
17	13.553070699	192.168.1.126	192.168.1.139	TCP	58	41591 → 23 [SYN] Seq=0
18	13.553315324	192.168.1.139	192.168.1.126	TCP	60	23 → 41591 [SYN, ACK]
19	13.553336412	192.168.1.126	192.168.1.139	TCP	54	41591 → 23 [RST] Seq=1
20	14.052887939	192.168.1.126	192.168.1.139	TCP	58	41591 → 25 [SYN] Seq=0
21	14.053571128	192.168.1.139	192.168.1.126	TCP	60	25 → 41591 [SYN, ACK]
22	14.053619708	192.168.1.126	192.168.1.139	TCP	54	41591 → 25 [RST] Seq=1
24	14.552443786	192.168.1.126	192.168.1.139	TCP	58	41591 → 22 [SYN] Seq=0
25	14.552743062	192.168.1.139	192.168.1.126	TCP	60	22 → 41591 [SYN, ACK]
26	14.552774165	192.168.1.126	192.168.1.139	TCP	54	41591 → 22 [RST] Seq=1
27	15.052648773	192.168.1.126	192.168.1.139	TCP	58	41591 → 24 [SYN] Seq=0
28	15.053377802	192.168.1.139	192.168.1.126	TCP	60	24 → 41591 [SYN, ACK]
29	15.053466696	192.168.1.126	192.168.1.139	TCP	54	41591 → 24 [RST] Seq=1

```
Frame 17: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 15, 2018 03:17:21.274840653 EDT
```

Minimum rate (min-rate)

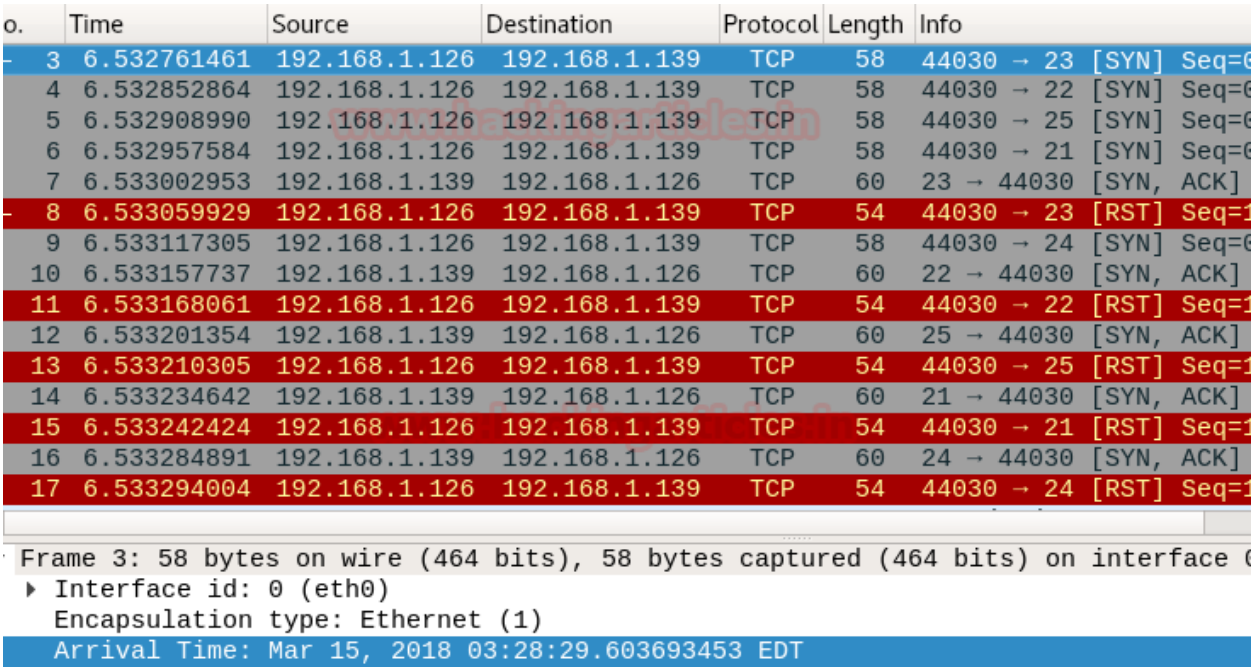
The Min-rate specifies the maximum number of packets to be sent at once. Here, if we want at least 2 packets to be sent on the target's network at the same time, not less than that, then we need to execute the below command.

nmap -p21-25 192.168.1.139 --min-rate 2

```
root@kali:~# nmap -p21-25 192.168.1.139 --min-rate 2

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-15 03:28 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00043s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.27 seconds
```

wireshark shows that the packets sending rate are greater than 2, means the number of packets sent at a time is equal to or greater than 2

packet 1: TCP SYN packet on port 23 at **03:28:29** from 192.168.1.126 to 192.168.1.139

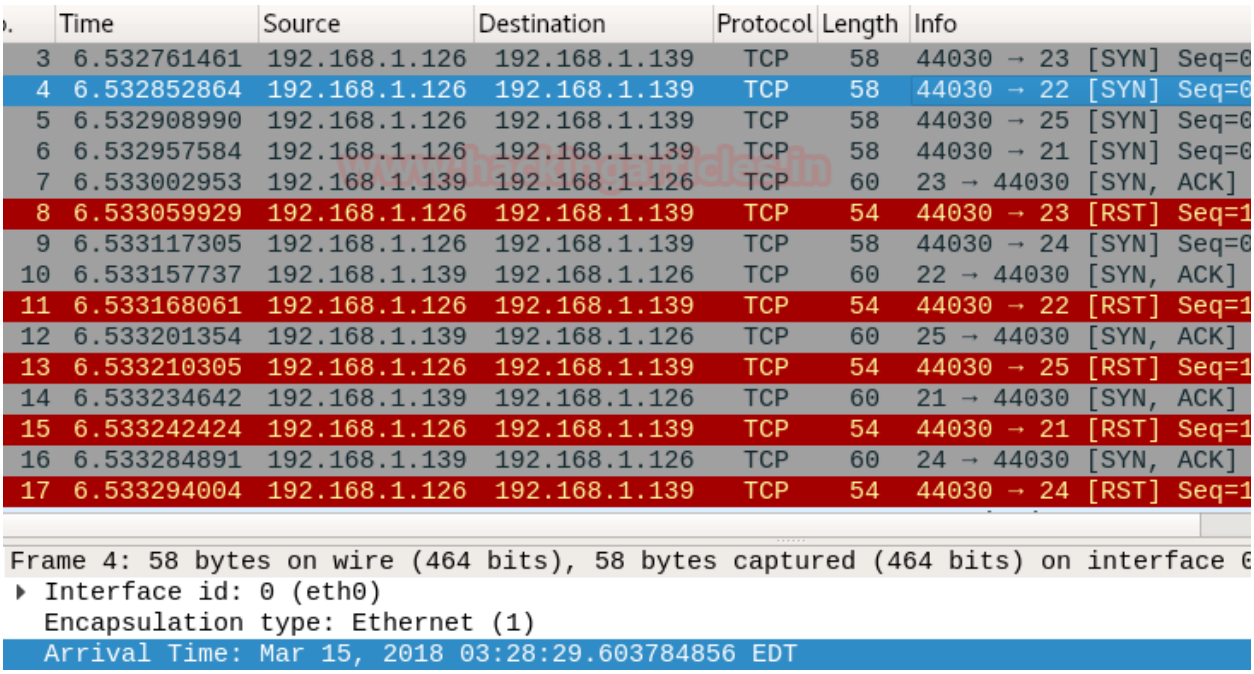


o.	Time	Source	Destination	Protocol	Length	Info
3	6.532761461	192.168.1.126	192.168.1.139	TCP	58	44030 → 23 [SYN] Seq=0
4	6.532852864	192.168.1.126	192.168.1.139	TCP	58	44030 → 22 [SYN] Seq=0
5	6.532908990	192.168.1.126	192.168.1.139	TCP	58	44030 → 25 [SYN] Seq=0
6	6.532957584	192.168.1.126	192.168.1.139	TCP	58	44030 → 21 [SYN] Seq=0
7	6.533002953	192.168.1.139	192.168.1.126	TCP	60	23 → 44030 [SYN, ACK]
8	6.533059929	192.168.1.126	192.168.1.139	TCP	54	44030 → 23 [RST] Seq=1
9	6.533117305	192.168.1.126	192.168.1.139	TCP	58	44030 → 24 [SYN] Seq=0
10	6.533157737	192.168.1.139	192.168.1.126	TCP	60	22 → 44030 [SYN, ACK]
11	6.533168061	192.168.1.126	192.168.1.139	TCP	54	44030 → 22 [RST] Seq=1
12	6.533201354	192.168.1.139	192.168.1.126	TCP	60	25 → 44030 [SYN, ACK]
13	6.533210305	192.168.1.126	192.168.1.139	TCP	54	44030 → 25 [RST] Seq=1
14	6.533234642	192.168.1.139	192.168.1.126	TCP	60	21 → 44030 [SYN, ACK]
15	6.533242424	192.168.1.126	192.168.1.139	TCP	54	44030 → 21 [RST] Seq=1
16	6.533284891	192.168.1.139	192.168.1.126	TCP	60	24 → 44030 [SYN, ACK]
17	6.533294004	192.168.1.126	192.168.1.139	TCP	54	44030 → 24 [RST] Seq=1

```
Frame 3: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface 0
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 15, 2018 03:28:29.603693453 EDT
```

packet 2: TCP SYN packet on port 22 at **03:28:29** from 192.168.1.126 to 192.168.1.139

Now if you will count the time difference between these packets you get only a fraction of second as time laps between these two packets indicating that these two packets were sent together.



).	Time	Source	Destination	Protocol	Length	Info
3	6.532761461	192.168.1.126	192.168.1.139	TCP	58	44030 → 23 [SYN] Seq=0
4	6.532852864	192.168.1.126	192.168.1.139	TCP	58	44030 → 22 [SYN] Seq=0
5	6.532908990	192.168.1.126	192.168.1.139	TCP	58	44030 → 25 [SYN] Seq=0
6	6.532957584	192.168.1.126	192.168.1.139	TCP	58	44030 → 21 [SYN] Seq=0
7	6.533002953	192.168.1.139	192.168.1.126	TCP	60	23 → 44030 [SYN, ACK]
8	6.533059929	192.168.1.126	192.168.1.139	TCP	54	44030 → 23 [RST] Seq=1
9	6.533117305	192.168.1.126	192.168.1.139	TCP	58	44030 → 24 [SYN] Seq=0
10	6.533157737	192.168.1.139	192.168.1.126	TCP	60	22 → 44030 [SYN, ACK]
11	6.533168061	192.168.1.126	192.168.1.139	TCP	54	44030 → 22 [RST] Seq=1
12	6.533201354	192.168.1.139	192.168.1.126	TCP	60	25 → 44030 [SYN, ACK]
13	6.533210305	192.168.1.126	192.168.1.139	TCP	54	44030 → 25 [RST] Seq=1
14	6.533234642	192.168.1.139	192.168.1.126	TCP	60	21 → 44030 [SYN, ACK]
15	6.533242424	192.168.1.126	192.168.1.139	TCP	54	44030 → 21 [RST] Seq=1
16	6.533284891	192.168.1.139	192.168.1.126	TCP	60	24 → 44030 [SYN, ACK]
17	6.533294004	192.168.1.126	192.168.1.139	TCP	54	44030 → 24 [RST] Seq=1

```
Frame 4: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface 0
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 15, 2018 03:28:29.603784856 EDT
```

Parallelism

The parallelism attribute is used to send multiple packets in parallel, min-parallelism means that the number of packets to be sent in parallel is to be greater than the value specified, and max-parallelism means that the number of packets to be sent in parallel is to be less than or equal to the value specified.

nmap -p21-25 192.168.1.139 --min-parallelism 2 --max-parallelism 2

```
root@kali:~# nmap -p21-25 192.168.1.139 --min-parallelism 2 --max-parallelism 2

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 08:08 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00044s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.29 seconds
```

In Wireshark we can see a couple of TCP-SYN packets sent in parallel from 192.168.1.126, which is neither less nor greater than 2.

.	Time	Source	Destination	Protocol	Length	Info
2…	15.113820456	192.168.1.126	192.168.1.139	TCP	58	33157 → 25 [SYN] Seq=0
298	15.114028125	192.168.1.126	192.168.1.139	TCP	58	33157 → 21 [SYN] Seq=0
299	15.114511298	192.168.1.139	192.168.1.126	TCP	60	25 → 33157 [SYN, ACK]
300	15.114602850	192.168.1.126	192.168.1.139	TCP	54	33157 → 25 [RST] Seq=1
301	15.114686525	192.168.1.139	192.168.1.126	TCP	60	21 → 33157 [SYN, ACK]
302	15.114711125	192.168.1.126	192.168.1.139	TCP	54	33157 → 21 [RST] Seq=1
303	15.114815205	192.168.1.126	192.168.1.139	TCP	58	33157 → 23 [SYN] Seq=0
304	15.115161257	192.168.1.126	192.168.1.139	TCP	58	33157 → 22 [SYN] Seq=0
305	15.115338186	192.168.1.139	192.168.1.126	TCP	60	23 → 33157 [SYN, ACK]
306	15.115430772	192.168.1.126	192.168.1.139	TCP	54	33157 → 23 [RST] Seq=1
307	15.115621623	192.168.1.139	192.168.1.126	TCP	60	22 → 33157 [SYN, ACK]
308	15.115697971	192.168.1.126	192.168.1.139	TCP	54	33157 → 22 [RST] Seq=1
309	15.115871751	192.168.1.126	192.168.1.139	TCP	58	33157 → 24 [SYN] Seq=0
310	15.116269932	192.168.1.139	192.168.1.126	TCP	60	24 → 33157 [SYN, ACK]
311	15.116341992	192.168.1.126	192.168.1.139	TCP	54	33157 → 24 [RST] Seq=1

Round trip timeout

Rtt timeout is the time specified for a packet to return a reply, min-rtt-timeout specifies the minimum value of time that is to be taken by a packet to return a reply

nmap -p21-25 192.168.1.139 --min-rtt-timeout 5ms

```
root@kali:~# nmap -p21-25 192.168.1.139 --min-rtt-timeout 5ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 08:10 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00067s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.32 seconds
```

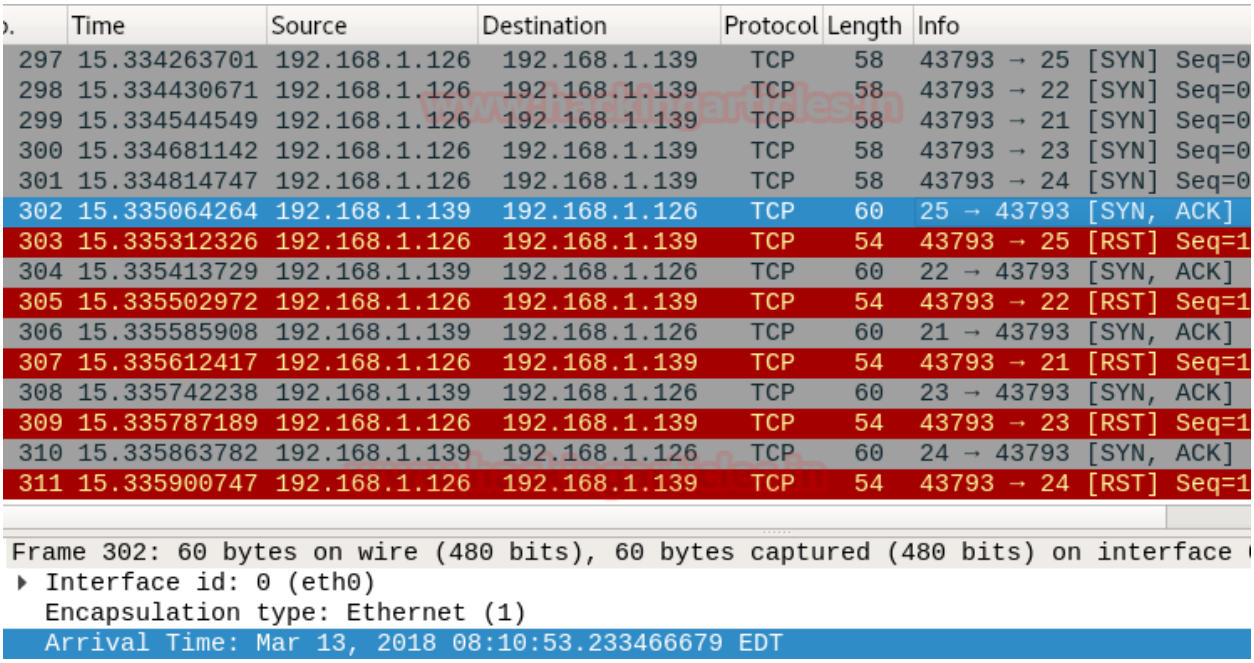
Wireshark shows that the packet and its reply take more time than the min-rtt-timeout specified.

).	Time	Source	Destination	Protocol	Length	Info
297	15.334263701	192.168.1.126	192.168.1.139	TCP	58	43793 → 25 [SYN] Seq=0
298	15.334430671	192.168.1.126	192.168.1.139	TCP	58	43793 → 22 [SYN] Seq=0
299	15.334544549	192.168.1.126	192.168.1.139	TCP	58	43793 → 21 [SYN] Seq=0
300	15.334681142	192.168.1.126	192.168.1.139	TCP	58	43793 → 23 [SYN] Seq=0
301	15.334814747	192.168.1.126	192.168.1.139	TCP	58	43793 → 24 [SYN] Seq=0
302	15.335064264	192.168.1.139	192.168.1.126	TCP	60	25 → 43793 [SYN, ACK]
303	15.335312326	192.168.1.126	192.168.1.139	TCP	54	43793 → 25 [RST] Seq=1
304	15.335413729	192.168.1.139	192.168.1.126	TCP	60	22 → 43793 [SYN, ACK]
305	15.335502972	192.168.1.126	192.168.1.139	TCP	54	43793 → 22 [RST] Seq=1
306	15.335585908	192.168.1.139	192.168.1.126	TCP	60	21 → 43793 [SYN, ACK]
307	15.335612417	192.168.1.126	192.168.1.139	TCP	54	43793 → 21 [RST] Seq=1
308	15.335742238	192.168.1.139	192.168.1.126	TCP	60	23 → 43793 [SYN, ACK]
309	15.335787189	192.168.1.126	192.168.1.139	TCP	54	43793 → 23 [RST] Seq=1
310	15.335863782	192.168.1.139	192.168.1.126	TCP	60	24 → 43793 [SYN, ACK]
311	15.335900747	192.168.1.126	192.168.1.139	TCP	54	43793 → 24 [RST] Seq=1

```
Frame 297: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface (
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 08:10:53.232666116 EDT
```

packet 1: TCP SYN packet on port 25 at **08:10:53.232666116** from 192.168.1.126 to 192.168.1.139

packet 2: SYN-ACK packet from port 25 at **08:10:53.233466679** from 192.168.1.139 to 192.168.1.126



Max-rtt-timeout

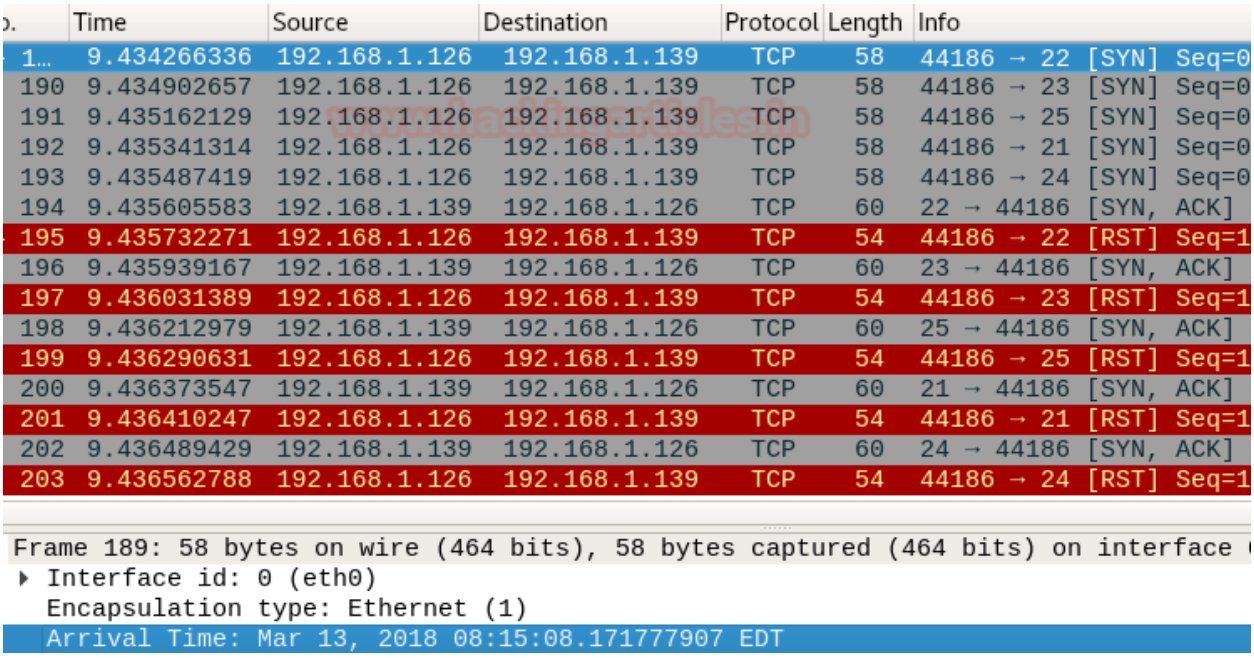
A max-rtt-timeout specifies the maximum value of time that is to be taken by a packet to return a reply.

nmap -p21-25 192.168.1.139 --max-rtt-timeout 50ms

```
root@kali:~# nmap -p21-25 192.168.1.139 --max-rtt-timeout 50ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 08:14 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00090s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.37 seconds
```

Wireshark shows that the packet and its reply take less time lesser than the max-rtt-timeout

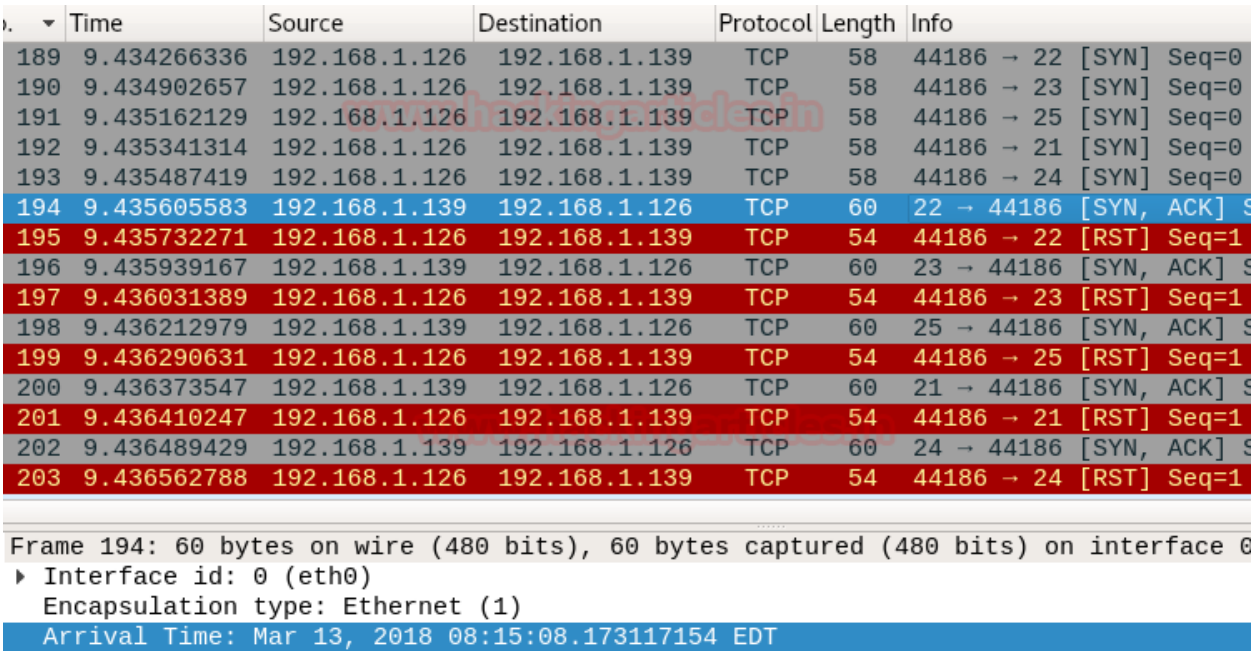
packet 1: TCP SYN packet on port 22 at **08:15:08.171777907** from 192.168.1.126 to 192.168.1.139



No.	Time	Source	Destination	Protocol	Length	Info
1…	9.434266336	192.168.1.126	192.168.1.139	TCP	58	44186 → 22 [SYN] Seq=0
190	9.434902657	192.168.1.126	192.168.1.139	TCP	58	44186 → 23 [SYN] Seq=0
191	9.435162129	192.168.1.126	192.168.1.139	TCP	58	44186 → 25 [SYN] Seq=0
192	9.435341314	192.168.1.126	192.168.1.139	TCP	58	44186 → 21 [SYN] Seq=0
193	9.435487419	192.168.1.126	192.168.1.139	TCP	58	44186 → 24 [SYN] Seq=0
194	9.435605583	192.168.1.139	192.168.1.126	TCP	60	22 → 44186 [SYN, ACK]
195	9.435732271	192.168.1.126	192.168.1.139	TCP	54	44186 → 22 [RST] Seq=1
196	9.435939167	192.168.1.139	192.168.1.126	TCP	60	23 → 44186 [SYN, ACK]
197	9.436031389	192.168.1.126	192.168.1.139	TCP	54	44186 → 23 [RST] Seq=1
198	9.436212979	192.168.1.139	192.168.1.126	TCP	60	25 → 44186 [SYN, ACK]
199	9.436290631	192.168.1.126	192.168.1.139	TCP	54	44186 → 25 [RST] Seq=1
200	9.436373547	192.168.1.139	192.168.1.126	TCP	60	21 → 44186 [SYN, ACK]
201	9.436410247	192.168.1.126	192.168.1.139	TCP	54	44186 → 21 [RST] Seq=1
202	9.436489429	192.168.1.139	192.168.1.126	TCP	60	24 → 44186 [SYN, ACK]
203	9.436562788	192.168.1.126	192.168.1.139	TCP	54	44186 → 24 [RST] Seq=1

```
Frame 189: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 08:15:08.171777907 EDT
```

packet 2: SYN-ACK packet from port 22 at **08:15:08.173117154** from 192.168.1.139 to 192.168.1.126



No.	Time	Source	Destination	Protocol	Length	Info
189	9.434266336	192.168.1.126	192.168.1.139	TCP	58	44186 → 22 [SYN] Seq=0
190	9.434902657	192.168.1.126	192.168.1.139	TCP	58	44186 → 23 [SYN] Seq=0
191	9.435162129	192.168.1.126	192.168.1.139	TCP	58	44186 → 25 [SYN] Seq=0
192	9.435341314	192.168.1.126	192.168.1.139	TCP	58	44186 → 21 [SYN] Seq=0
193	9.435487419	192.168.1.126	192.168.1.139	TCP	58	44186 → 24 [SYN] Seq=0
194	9.435605583	192.168.1.139	192.168.1.126	TCP	60	22 → 44186 [SYN, ACK]
195	9.435732271	192.168.1.126	192.168.1.139	TCP	54	44186 → 22 [RST] Seq=1
196	9.435939167	192.168.1.139	192.168.1.126	TCP	60	23 → 44186 [SYN, ACK]
197	9.436031389	192.168.1.126	192.168.1.139	TCP	54	44186 → 23 [RST] Seq=1
198	9.436212979	192.168.1.139	192.168.1.126	TCP	60	25 → 44186 [SYN, ACK]
199	9.436290631	192.168.1.126	192.168.1.139	TCP	54	44186 → 25 [RST] Seq=1
200	9.436373547	192.168.1.139	192.168.1.126	TCP	60	21 → 44186 [SYN, ACK]
201	9.436410247	192.168.1.126	192.168.1.139	TCP	54	44186 → 21 [RST] Seq=1
202	9.436489429	192.168.1.139	192.168.1.126	TCP	60	24 → 44186 [SYN, ACK]
203	9.436562788	192.168.1.126	192.168.1.139	TCP	54	44186 → 24 [RST] Seq=1

```
Frame 194: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 08:15:08.173117154 EDT
```

Initial Round trip timeout

Initial-rtt-timeout specifies the initial value of time to be taken by a packet to return a reply. The return time can be greater or less than the initial-rtt-timeout because of the max-rtt-timeout and min-rtt-timeout specifications, but the packet attempts to return a reply at the time specified in initial-rtt-timeout.

nmap -p21-25 192.168.1.139 --initial-rtt-timeout 50ms

```
root@kali:~# nmap -p21-25 192.168.1.139 --initial-rtt-timeout 50ms

Starting Nmap 7.60 ( https://nmap.org ) at 2018-03-13 08:18 EDT
Nmap scan report for 192.168.1.139
Host is up (0.00042s latency).

PORT   STATE SERVICE
21/tcp open  ftp
22/tcp open  ssh
23/tcp open  telnet
24/tcp open  priv-mail
25/tcp open  smtp
MAC Address: 00:0C:29:EB:27:7A (VMware)

Nmap done: 1 IP address (1 host up) scanned in 13.28 seconds
```

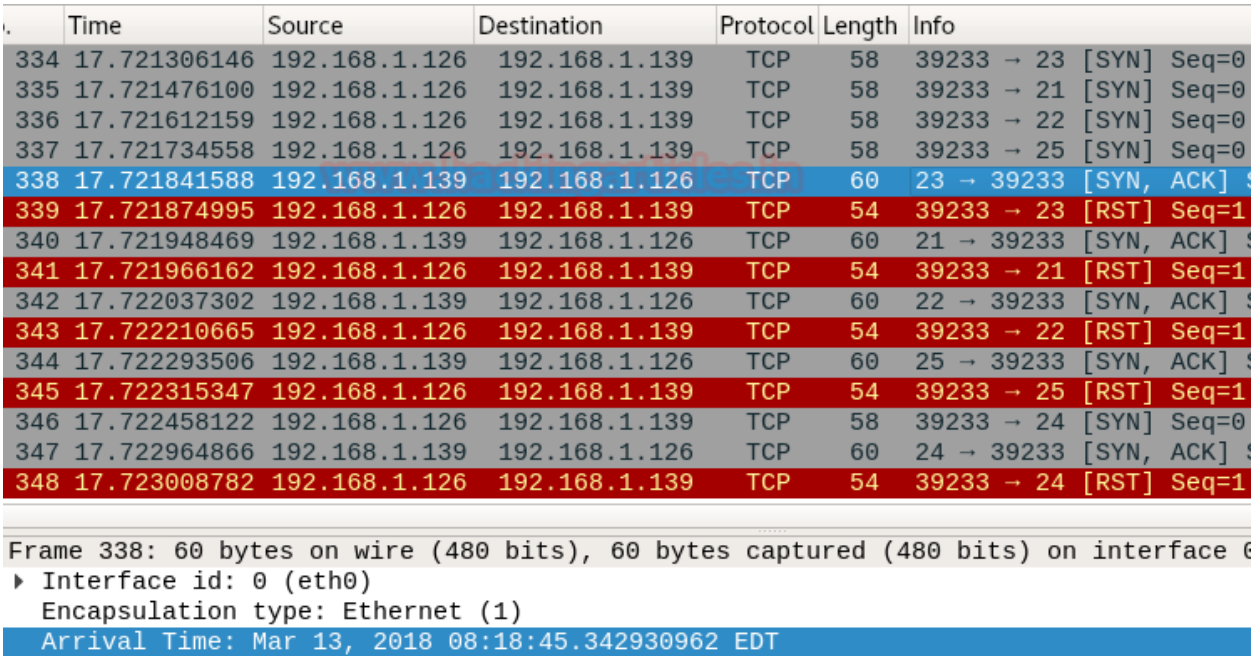
Wireshark shows that the time taken by the packet to return reply is around the same time as specified in initial-rtt-timeout

packet 1: TCP SYN packet on port 23 at **08:18:45.342395520** from 192.168.1.126 to 192.168.1.139

.	Time	Source	Destination	Protocol	Length	Info
3…	17.721306146	192.168.1.126	192.168.1.139	TCP	58	39233 → 23 [SYN] Seq=0
335	17.721476100	192.168.1.126	192.168.1.139	TCP	58	39233 → 21 [SYN] Seq=0
336	17.721612159	192.168.1.126	192.168.1.139	TCP	58	39233 → 22 [SYN] Seq=0
337	17.721734558	192.168.1.126	192.168.1.139	TCP	58	39233 → 25 [SYN] Seq=0
338	17.721841588	192.168.1.139	192.168.1.126	TCP	60	23 → 39233 [SYN, ACK]
339	17.721874995	192.168.1.126	192.168.1.139	TCP	54	39233 → 23 [RST] Seq=1
340	17.721948469	192.168.1.139	192.168.1.126	TCP	60	21 → 39233 [SYN, ACK]
341	17.721966162	192.168.1.126	192.168.1.139	TCP	54	39233 → 21 [RST] Seq=1
342	17.722037302	192.168.1.139	192.168.1.126	TCP	60	22 → 39233 [SYN, ACK]
343	17.722210665	192.168.1.126	192.168.1.139	TCP	54	39233 → 22 [RST] Seq=1
344	17.722293506	192.168.1.139	192.168.1.126	TCP	60	25 → 39233 [SYN, ACK]
345	17.722315347	192.168.1.126	192.168.1.139	TCP	54	39233 → 25 [RST] Seq=1
346	17.722458122	192.168.1.126	192.168.1.139	TCP	58	39233 → 24 [SYN] Seq=0
347	17.722964866	192.168.1.139	192.168.1.126	TCP	60	24 → 39233 [SYN, ACK]
348	17.723008782	192.168.1.126	192.168.1.139	TCP	54	39233 → 24 [RST] Seq=1

```
Frame 334: 58 bytes on wire (464 bits), 58 bytes captured (464 bits) on interface
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 08:18:45.342395520 EDT
```

packet 2: SYN-ACK packet from port 23 at **08:18:45.342930962** from 192.168.1.139 to 192.168.1.126



.	Time	Source	Destination	Protocol	Length	Info
334	17.721306146	192.168.1.126	192.168.1.139	TCP	58	39233 → 23 [SYN] Seq=0
335	17.721476100	192.168.1.126	192.168.1.139	TCP	58	39233 → 21 [SYN] Seq=0
336	17.721612159	192.168.1.126	192.168.1.139	TCP	58	39233 → 22 [SYN] Seq=0
337	17.721734558	192.168.1.126	192.168.1.139	TCP	58	39233 → 25 [SYN] Seq=0
338	17.721841588	192.168.1.139	192.168.1.126	TCP	60	23 → 39233 [SYN, ACK]
339	17.721874995	192.168.1.126	192.168.1.139	TCP	54	39233 → 23 [RST] Seq=1
340	17.721948469	192.168.1.139	192.168.1.126	TCP	60	21 → 39233 [SYN, ACK]
341	17.721966162	192.168.1.126	192.168.1.139	TCP	54	39233 → 21 [RST] Seq=1
342	17.722037302	192.168.1.139	192.168.1.126	TCP	60	22 → 39233 [SYN, ACK]
343	17.722210665	192.168.1.126	192.168.1.139	TCP	54	39233 → 22 [RST] Seq=1
344	17.722293506	192.168.1.139	192.168.1.126	TCP	60	25 → 39233 [SYN, ACK]
345	17.722315347	192.168.1.126	192.168.1.139	TCP	54	39233 → 25 [RST] Seq=1
346	17.722458122	192.168.1.126	192.168.1.139	TCP	58	39233 → 24 [SYN] Seq=0
347	17.722964866	192.168.1.139	192.168.1.126	TCP	60	24 → 39233 [SYN, ACK]
348	17.723008782	192.168.1.126	192.168.1.139	TCP	54	39233 → 24 [RST] Seq=1

```
Frame 338: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
▸ Interface id: 0 (eth0)
  Encapsulation type: Ethernet (1)
  Arrival Time: Mar 13, 2018 08:18:45.342930962 EDT
```

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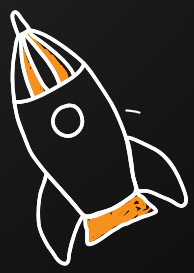

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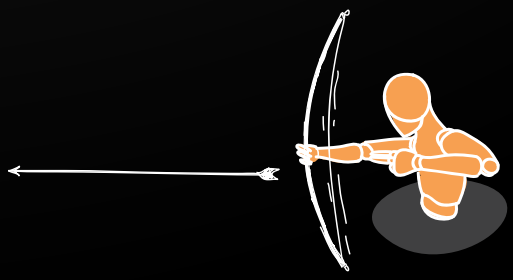

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