Cisco Networking Academy

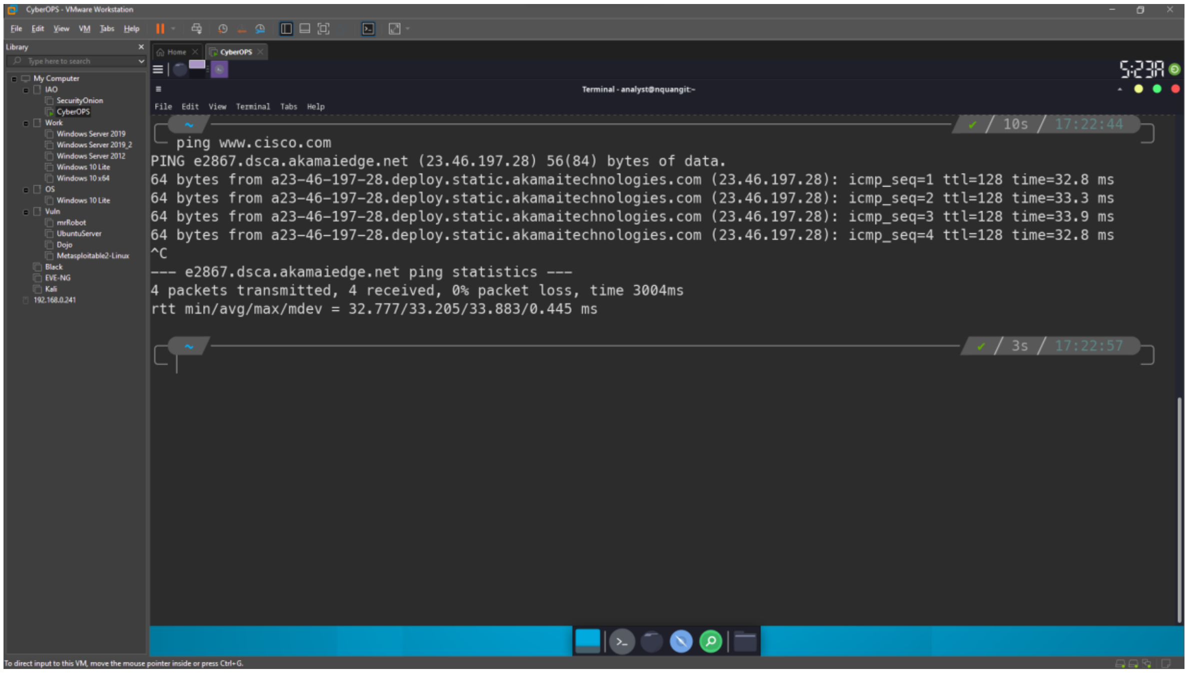
Lab - Tracing a Route

Instructions

Verifying Network Connectivity Using Ping

a. Start the CyberOps Workstation VM. Log into the VM with the following credentials:

b. Open a terminal window in the VM to ping a remote server, such as www.cisco.com.



```
~                                                          ✓ / 10s / 17:22:44
 ping www.cisco.com
PING e2867.dsca.akamaiedge.net (23.46.197.28) 56(84) bytes of data.
64 bytes from a23-46-197-28.deploy.static.akamaitechnologies.com (23.46.197.28): icmp_seq=1 ttl=128 time=32.8 ms
64 bytes from a23-46-197-28.deploy.static.akamaitechnologies.com (23.46.197.28): icmp_seq=2 ttl=128 time=33.3 ms
64 bytes from a23-46-197-28.deploy.static.akamaitechnologies.com (23.46.197.28): icmp_seq=3 ttl=128 time=33.9 ms
64 bytes from a23-46-197-28.deploy.static.akamaitechnologies.com (23.46.197.28): icmp_seq=4 ttl=128 time=32.8 ms
^C
--- e2867.dsca.akamaiedge.net ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 32.777/33.205/33.883/0.445 ms

~                                                          ✓ / 3s / 17:22:57
```

c. The first output line displays the Fully Qualified Domain Name (FQDN) e2867.dsca.akamaiedge.net. This is followed by the IP address 184.24.123.103. Cisco hosts the same web content on different servers throughout the world (known as mirrors). Therefore, depending upon where you are geographically, the FQDN and the IP address will be different.

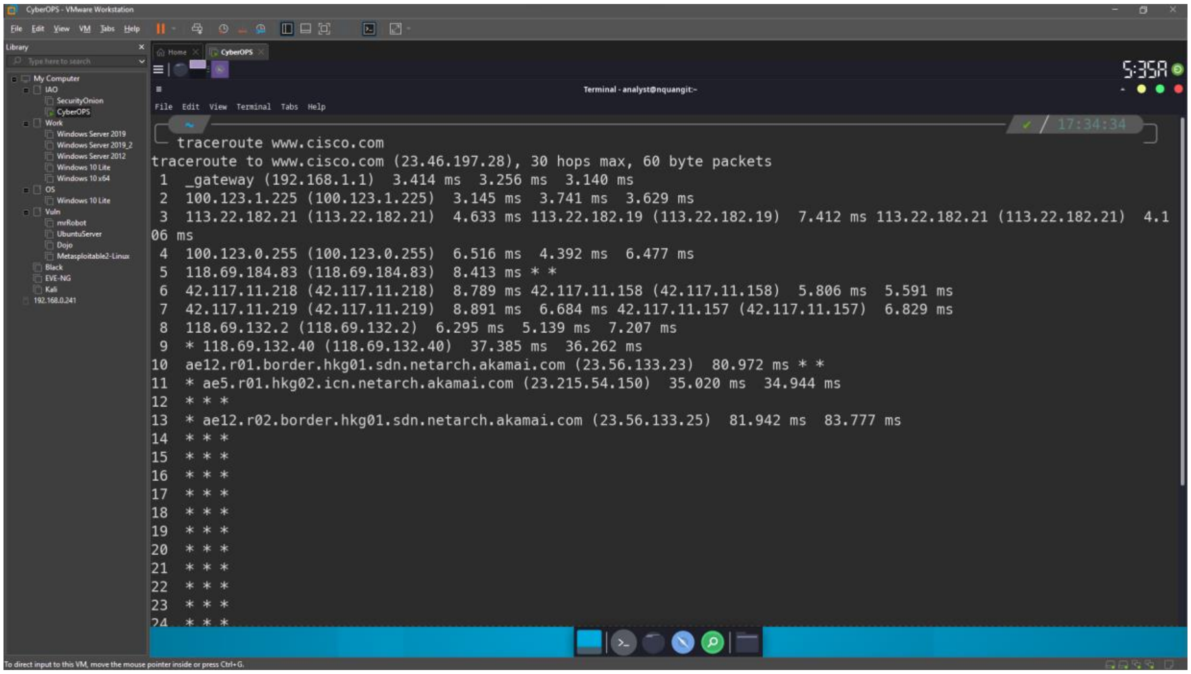
e2867.dsca.akamaiedge.net

4 packets transmitted, 4 received, 0% packet loss, time 3004ms

rtt min/avg/max/mdev = 32.777/33.205/33.883/0.445 ms

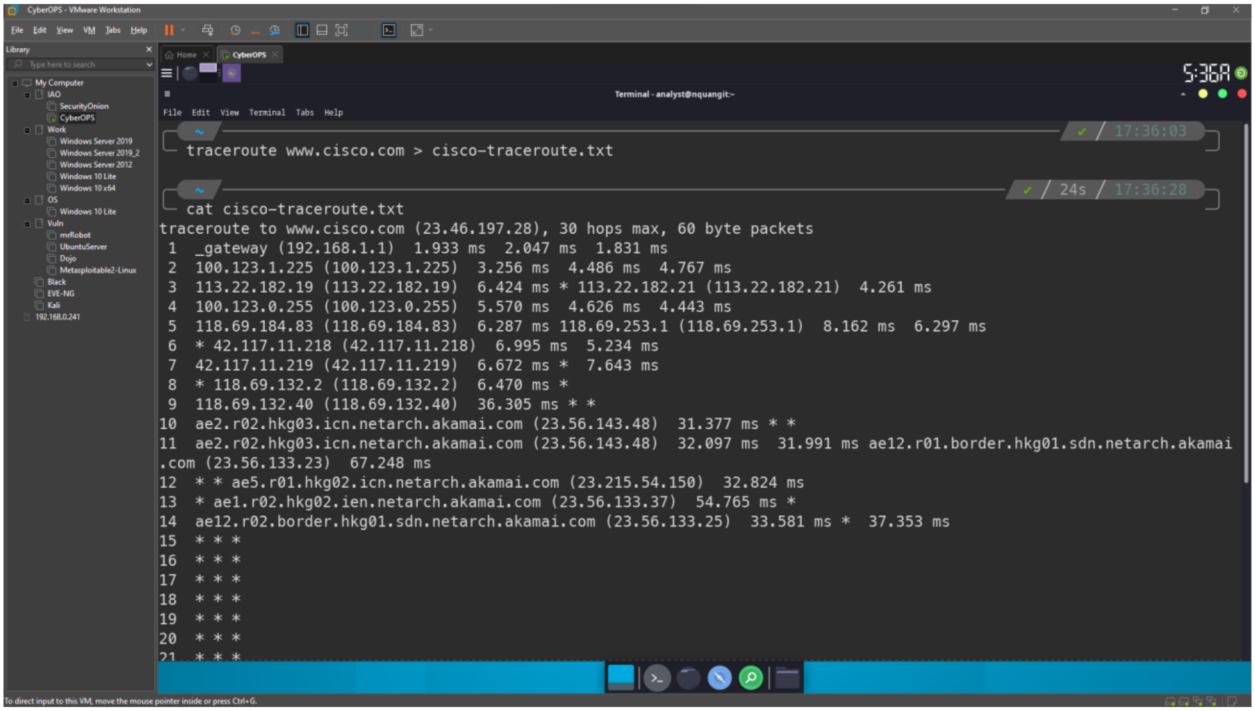
Tracing a Route to a Remote Server Using Traceroute

a. At the terminal prompt, type **traceroute www.cisco.com**.



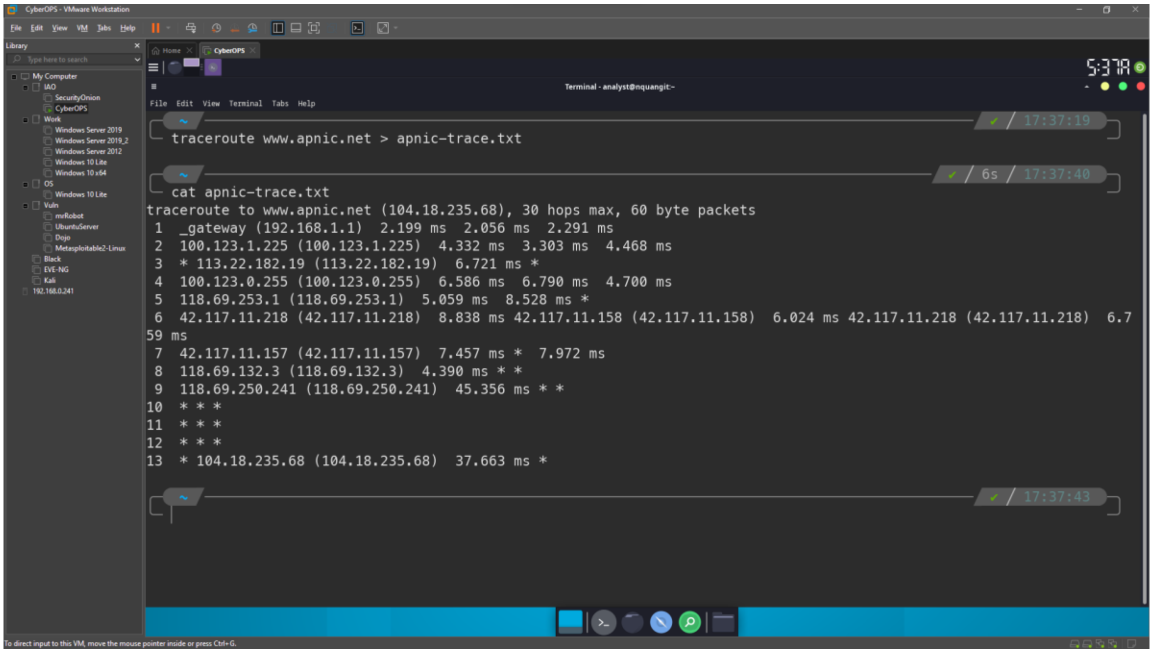
```
~                                                                    ✓ / 17:34:34
 traceroute www.cisco.com
traceroute to www.cisco.com (23.46.197.28), 30 hops max, 60 byte packets
 1  _gateway (192.168.1.1)  3.414 ms  3.256 ms  3.140 ms
 2  100.123.1.225 (100.123.1.225)  3.145 ms  3.741 ms  3.629 ms
 3  113.22.182.21 (113.22.182.21)  4.633 ms 113.22.182.19 (113.22.182.19)  7.412 ms 113.22.182.21 (113.22.182.21)  4.1
06 ms
 4  100.123.0.255 (100.123.0.255)  6.516 ms  4.392 ms  6.477 ms
 5  118.69.184.83 (118.69.184.83)  8.413 ms * *
 6  42.117.11.218 (42.117.11.218)  8.789 ms 42.117.11.158 (42.117.11.158)  5.806 ms  5.591 ms
 7  42.117.11.219 (42.117.11.219)  8.891 ms  6.684 ms 42.117.11.157 (42.117.11.157)  6.829 ms
 8  118.69.132.2 (118.69.132.2)  6.295 ms  5.139 ms  7.207 ms
 9  * 118.69.132.40 (118.69.132.40)  37.385 ms  36.262 ms
10  ae12.r01.border.hkg01.sdn.netarch.akamai.com (23.56.133.23)  80.972 ms * *
11  * ae5.r01.hkg02.icn.netarch.akamai.com (23.215.54.150)  35.020 ms  34.944 ms
12  * * *
13  * ae12.r02.border.hkg01.sdn.netarch.akamai.com (23.56.133.25)  81.942 ms  83.777 ms
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
```

b. If you would like to save the traceroute output to a text file for later review, use the right carat (>) and the desired filename to save the output in the present directory. In this example, the traceroute output is saved in the /home/analyst/cisco-traceroute.txt file.



```
~                                                                    ✓ / 17:36:03
 traceroute www.cisco.com > cisco-traceroute.txt

~                                                              ✓ / 24s / 17:36:28
 cat cisco-traceroute.txt
traceroute to www.cisco.com (23.46.197.28), 30 hops max, 60 byte packets
 1  _gateway (192.168.1.1)  1.933 ms  2.047 ms  1.831 ms
 2  100.123.1.225 (100.123.1.225)  3.256 ms  4.486 ms  4.767 ms
 3  113.22.182.19 (113.22.182.19)  6.424 ms * 113.22.182.21 (113.22.182.21)  4.261 ms
 4  100.123.0.255 (100.123.0.255)  5.570 ms  4.626 ms  4.443 ms
 5  118.69.184.83 (118.69.184.83)  6.287 ms 118.69.253.1 (118.69.253.1)  8.162 ms  6.297 ms
 6  * 42.117.11.218 (42.117.11.218)  6.995 ms  5.234 ms
 7  42.117.11.219 (42.117.11.219)  6.672 ms *  7.643 ms
 8  * 118.69.132.2 (118.69.132.2)  6.470 ms *
 9  118.69.132.40 (118.69.132.40)  36.305 ms * *
10  ae2.r02.hkg03.icn.netarch.akamai.com (23.56.143.48)  31.377 ms * *
11  ae2.r02.hkg03.icn.netarch.akamai.com (23.56.143.48)  32.097 ms  31.991 ms ae12.r01.border.hkg01.sdn.netarch.akamai
.com (23.56.133.23)  67.248 ms
12  * * ae5.r01.hkg02.icn.netarch.akamai.com (23.215.54.150)  32.824 ms
13  * ae1.r02.hkg02.ien.netarch.akamai.com (23.56.133.37)  54.765 ms *
14  ae12.r02.border.hkg01.sdn.netarch.akamai.com (23.56.133.25)  33.581 ms *  37.353 ms
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
```

c. Perform and save the traceroute results for one of the following websites. These are the Regional Internet Registry (RIR) websites located in different parts of the world:


CyberOPS - VMware Workstation
Terminal - analyst@nquangit:~
File Edit View Terminal Tabs Help
5:37A

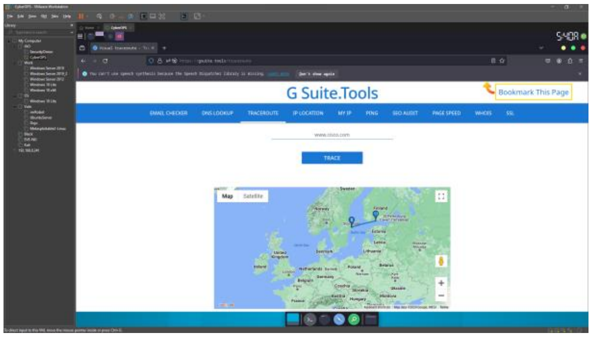
```
traceroute www.apnic.net > apnic-trace.txt                                ✓ / 17:37:19

cat apnic-trace.txt                                                       ✓ / 6s / 17:37:40
traceroute to www.apnic.net (104.18.235.68), 30 hops max, 60 byte packets
 1  _gateway (192.168.1.1)  2.199 ms  2.056 ms  2.291 ms
 2  100.123.1.225 (100.123.1.225)  4.332 ms  3.303 ms  4.468 ms
 3  * 113.22.182.19 (113.22.182.19)  6.721 ms *
 4  100.123.0.255 (100.123.0.255)  6.586 ms  6.790 ms  4.700 ms
 5  118.69.253.1 (118.69.253.1)  5.059 ms  8.528 ms *
 6  42.117.11.218 (42.117.11.218)  8.838 ms 42.117.11.158 (42.117.11.158)  6.024 ms 42.117.11.218 (42.117.11.218)  6.7
59 ms
 7  42.117.11.157 (42.117.11.157)  7.457 ms *  7.972 ms
 8  118.69.132.3 (118.69.132.3)  4.390 ms * *
 9  118.69.250.241 (118.69.250.241)  45.356 ms * *
10  * * *
11  * * *
12  * * *
13  * 104.18.235.68 (104.18.235.68)  37.663 ms *

                                                                          ✓ / 17:37:43
```

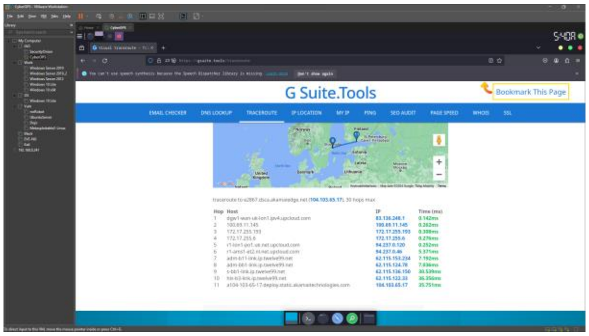
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

Trace a Route to a Remote Server Using Web-Based Traceroute Tool

a. Open a web browser in the VM and search for a visual traceroute tool that you can use in the web browser. Try going to the following website: https://gsuite.tools/traceroute

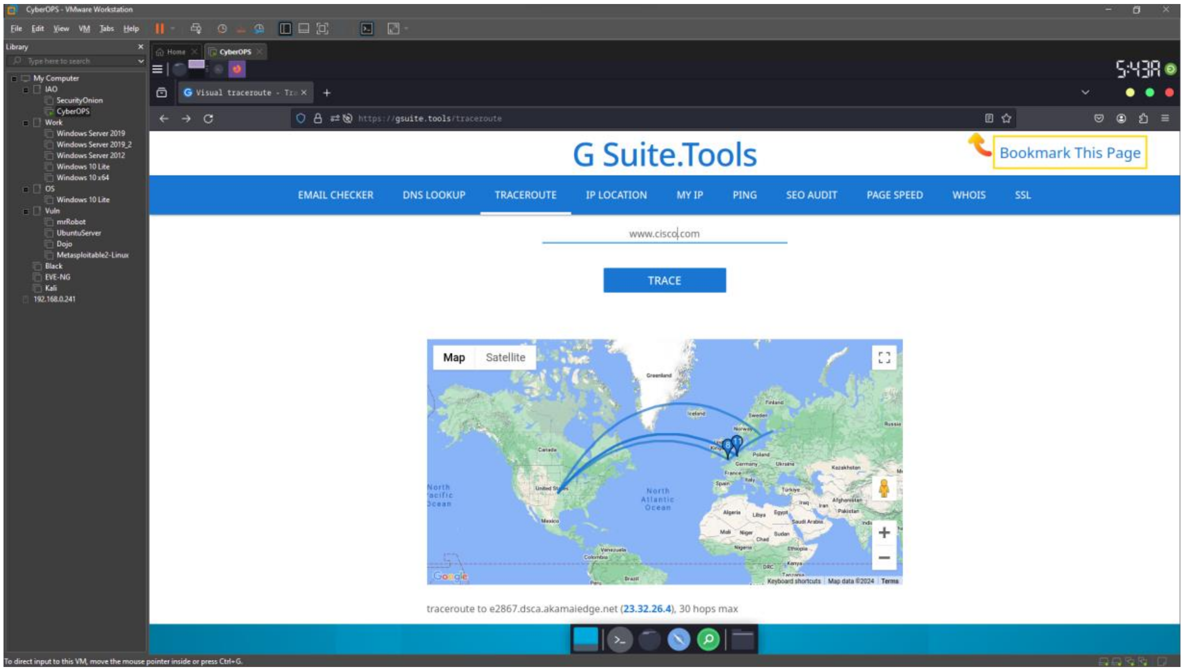
b. Enter any website you wish. **Example: www.cisco.com** and press **Trace**.





traceroute to e2867.dsca.akamaiedge.net (104.103.65.17), 30 hops max

Hop	Host	IP	Time (ms)
1	dgw1-wan-uk-lon1.ipv4.upcloud.com	83.136.248.1	0.142ms
2	100.69.11.145	100.69.11.145	0.262ms
3	172.17.255.193	172.17.255.193	0.308ms
4	172.17.255.6	172.17.255.6	0.279ms
5	r1-lon1-po1.uk.net.upcloud.com	94.237.0.120	0.252ms
6	r1-ams1-et2.nl.net.upcloud.com	94.237.0.46	5.371ms
7	adm-b11-link.ip.twelve99.net	62.115.153.234	7.192ms
8	adm-bb1-link.ip.twelve99.net	62.115.124.78	7.836ms
9	s-bb1-link.ip.twelve99.net	62.115.136.150	30.539ms
10	hls-b3-link.ip.twelve99.net	62.115.133.33	36.356ms
11	a104-103-65-17.deploy.static.akamaitechnologies.com	104.103.65.17	35.751ms



www.cisco.com

traceroute to e2867.dsca.akamaiedge.net (23.32.26.4), 30 hops max

Review the geographical locations of the responding hops. What did you observe regarding the path?

It doesn't always follow the shortest path from source to destination.

Reflection Question

How is the traceroute different when going to www.cisco.com or other websites from the terminal (see Part 2) rather than from the online website? (Your results may vary depending upon where you are located geographically, and which ISP is providing connectivity to your school.)

The traceroute from the terminal is different than the one from the website. Domain names can be hosted on multiple mirrors worldwide. This is done so that access time to the website will be quick from anywhere in the world.