CS-224

(Computer Networks)

Assignment-3

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IIT BOMBAY

Solution 1:

a)

```
sravan@DESKTOP-QQSR5LJ:~$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.29.13.127  netmask 255.255.240.0  broadcast 172.29.15.255
        inet6 fe80::215:5dff:fe33:3d00  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:33:3d:00  txqueuelen 1000  (Ethernet)
        RX packets 778  bytes 827912 (827.9 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 318  bytes 68540 (68.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

sravan@DESKTOP-QQSR5LJ:~$
```

Report

IPv4 address: 172.29.13.127 (32 bits)

IPv6 address: fe80::215:5dff:fe33:3d00 (128 bits)

MAC address: 00:15:5d:33:3d:00 (48 bits)

MTU (Maximum Transmission Unit): 1500 bytes

Transmit Queue Length: 1000 packets

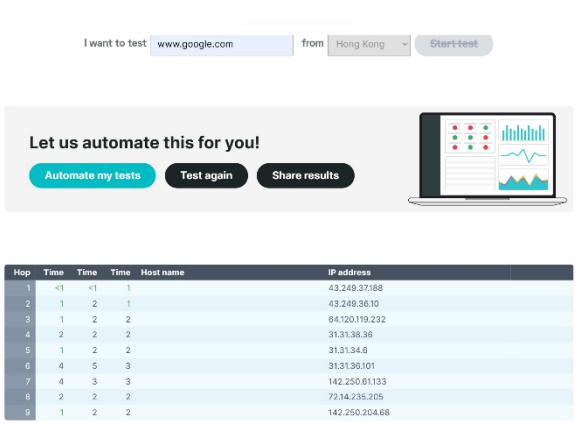
b)

Destination address: www.google.com

Traceroute from My machine

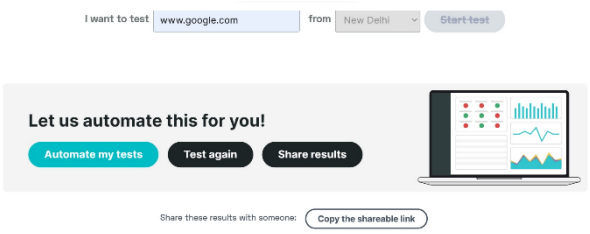
```
sravan@DESKTOP-QQSR5LJ:~$ traceroute www.google.com
traceroute to www.google.com (142.250.192.36), 30 hops max, 60 byte packets
 1  DESKTOP-QQSR5LJ.mshome.net (172.29.0.1)  0.238 ms  0.271 ms  0.219 ms
 2  192.168.1.1 (192.168.1.1)  1.130 ms  0.955 ms *
 3  10.3.200.250 (10.3.200.250)  1.109 ms  1.287 ms  1.280 ms
 4  10.250.3.1 (10.250.3.1)  1.760 ms * *
 5  * * 172.16.6.2 (172.16.6.2)  1.717 ms
 6  * 172.16.5.1 (172.16.5.1)  1.016 ms  1.009 ms
 7  10.250.201.2 (10.250.201.2)  1.023 ms  0.717 ms  0.902 ms
 8  ifwb-201.iitb.ac.in (10.201.250.200)  0.691 ms  0.684 ms  0.679 ms
```

Traceroute from Hong Kong



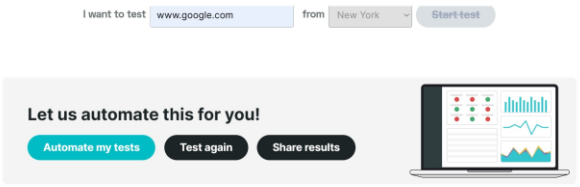
Hop	Time	Time	Time	Host name	IP address
1	<1	<1	1		43.249.37.188
2	1	2	1		43.249.36.10
3	1	2	2		64.120.119.232
4	2	2	2		31.31.38.36
5	1	2	2		31.31.34.6
6	4	5	3		31.31.36.101
7	4	3	3		142.250.61.133
8	2	2	2		72.14.235.205
9	1	2	2		142.250.204.68

Traceroute from New Delhi



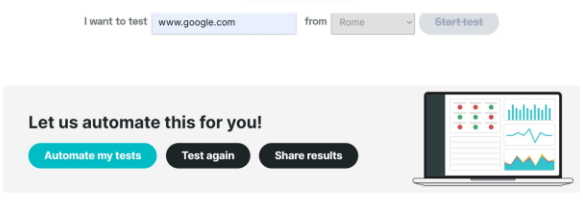
Hop	Time	Time	Time	Host name	IP address
1	2746	15	4		164.52.192.1
2	1	<1	1		180.179.210.65
3	1	1	1		180.179.197.213
4	2	2885	2		219.65.44.177
5	4	3	3		115.112.197.90
6	5	5	4		142.251.78.139
7	4	4	4		142.251.76.203
8	4	3	3		142.250.206.164

Traceroute from New York



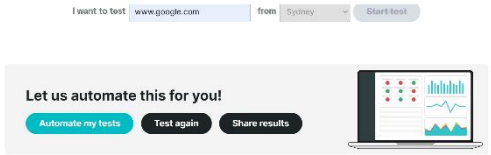
Hop	Time	Time	Time	Host name	IP address
1	11	<1	<1		172.96.165.73
2	1	<1	1		31.217.251.4
3	1	1	<1		206.148.25.74
4	1	1	3		198.32.118.39
5	2	4	2		108.170.248.97
6	1	1	3		142.251.65.103
7	1	1	3		142.250.80.68

Traceroute from Rome



Hop	Time	Time	Time	Host name	IP address
1	3	5	11		82.102.26.33
2	*	*	*	Request timed out	
3	3	5	25		146.70.1.186
4	5	8	25		217.29.66.96
5	2	5	19		108.170.245.65
6	36	28	29		142.251.235.177
7	3	4	21		142.251.209.36

Traceroute from Sydney



Hop	Time	Time	Time	Host name	IP address
1	4	3	<1		43.245.161.97
2	8	16	12		103.76.165.42
3	<1	<1	4		103.76.165.70
4	1	2	2		45.127.172.2
5	1	2	2		45.127.172.73
6	2	2	2		108.170.247.49
7	2	2	2		216.239.56.69
8	1	2	2		172.217.24.36

REPORT

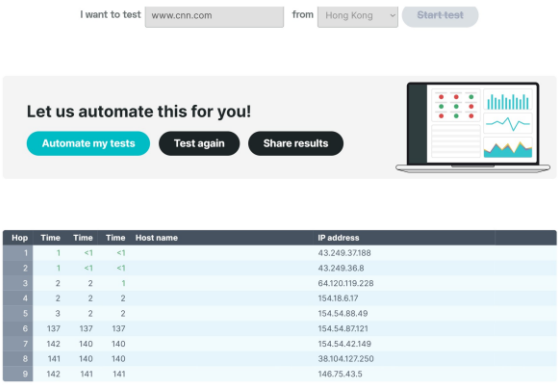
	Own Machine	Hong Kong	New Delhi	New York	Rome	Sydney
No. of Hops	8	9	8	7	7	8
RTT (avg) in µs	1027	2074	3409	2000	13167	3292
DST IP	**Different**					

Destination address: www.cnn.com

Traceroute from My machine

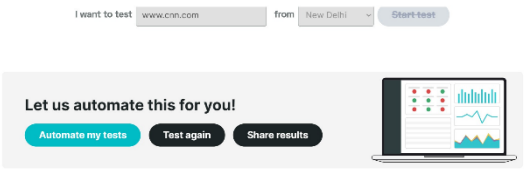
```
sravan@DESKTOP-QQSR5LJ:~$ traceroute www.cnn.com
traceroute to www.cnn.com (151.101.155.5), 30 hops max, 60 byte packets
 1  DESKTOP-QQSR5LJ.mshome.net (172.29.0.1)  0.570 ms  0.515 ms  0.506 ms
 2  192.168.1.1 (192.168.1.1)  1.196 ms  0.948 ms  0.941 ms
 3  10.3.200.250 (10.3.200.250)  1.464 ms  1.458 ms  1.453 ms
 4  10.250.3.1 (10.250.3.1)  2.004 ms  2.082 ms  1.989 ms
 5  172.16.6.2 (172.16.6.2)  2.113 ms  2.284 ms  2.508 ms
 6  172.16.5.1 (172.16.5.1)  1.363 ms  0.587 ms  0.581 ms
 7  10.250.201.2 (10.250.201.2)  0.763 ms  1.244 ms  1.217 ms
 8  ifwb-201.iitb.ac.in (10.201.250.200)  1.037 ms  1.030 ms  1.023 ms
```

Traceroute from Hong Kong



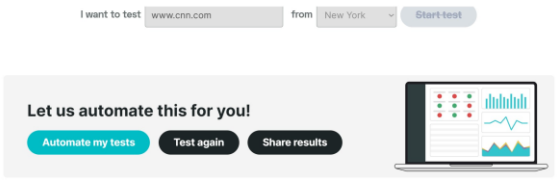
Hop	Time	Time	Time	Host name	IP address
1	1	<1	<1		43.249.37.188
2	1	<1	<1		43.249.36.8
3	2	2	1		64.120.119.228
4	2	2	2		154.18.6.17
5	3	2	2		154.54.88.49
6	137	137	137		154.54.87.121
7	142	140	140		154.54.42.149
8	141	140	140		38.104.127.250
9	142	141	141		146.75.43.5

Traceroute from New Delhi



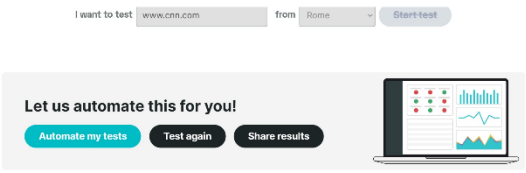
Hop	Time	Time	Time	Host name	IP address
1	*	*	*	Request timed out	
2	1	2	1		180.179.210.65
3	2	2	2		180.179.197.209
4	1	2	1		180.179.197.70
5	3	7	2		125.19.53.93
6	4	7	4		116.119.112.17
7	4	6	4		167.82.128.62
8	5	6	5		199.232.255.5

Traceroute from New York



Hop	Time	Time	Time	Host name	IP address
1	1	2	2		172.96.165.73
2	1	2	2		31.217.251.4
3	1	2	2		206.148.25.74
4	1	4	1		38.32.103.97
5	7	2	2		154.54.47.121
6	5	2	2		154.54.0.142
7	1	3	1		38.140.107.34
8	3	2	2		151.101.131.5

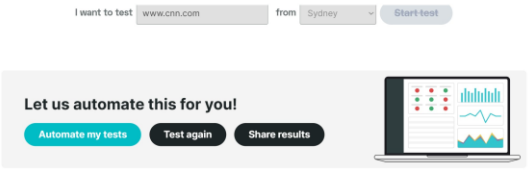
Traceroute from Rome



Hop	Time	Time	Time	Host name	IP address
1	1	<1	1		82.102.26.33
2	*	*	*	Request timed out	
3	3	2	1		146.70.1.186
4	*	*	*	Request timed out	
5	2	1	1		151.101.3.5

REPORT

Traceroute from Sydney



Hop	Time	Time	Time	Host name	IP address
1	2	1	2		43.245.161.97
2	15	22	22		103.76.165.42
3	<1	<1	<1		103.76.165.70
4	1	1	<1		45.127.172.2
5	*	*	*	Request timed out	
6	1	1	1		151.101.3.5

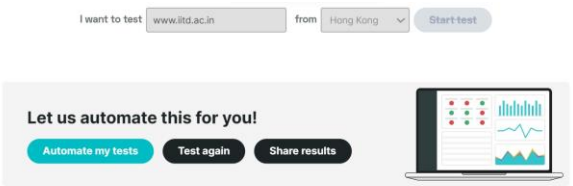
	Own Machine	Hong Kong	New Delhi	New York	Rome	Sydney
No. of Hops	8	9	8	8	5	6
RTT (avg) in µs	1220	63037	3381	2208	1444	4867
DST IP	**Different**					

Destination address: www.iitd.ac.in

Traceroute from My machine

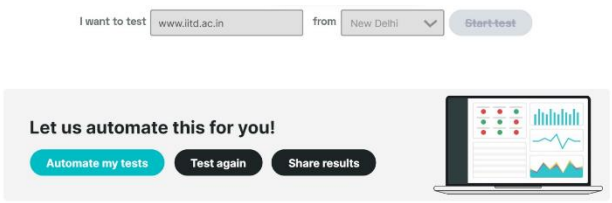
```
sravan@DESKTOP-QQSR5LJ:~$ traceroute www.iitd.ac.in
traceroute to www.iitd.ac.in (103.27.9.24), 30 hops max, 60 byte packets
 1  DESKTOP-QQSR5LJ.mshome.net (172.29.0.1)  0.312 ms  0.267 ms  0.259 ms
 2  192.168.1.1 (192.168.1.1)  0.922 ms  0.913 ms  0.904 ms
 3  * * 10.3.200.250 (10.3.200.250)  1.331 ms
 4  * 10.250.3.1 (10.250.3.1)  1.623 ms *
 5  * 172.16.6.2 (172.16.6.2)  2.216 ms *
 6  172.16.5.1 (172.16.5.1)  1.021 ms  0.766 ms  0.756 ms
 7  10.250.201.2 (10.250.201.2)  0.708 ms  0.818 ms  0.792 ms
 8  ifwb-201.iitb.ac.in (10.201.250.200)  0.788 ms  0.781 ms  0.773 ms
```

Traceroute from Hong Kong



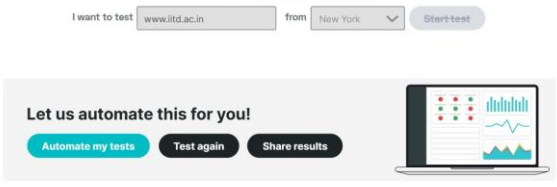
Hop	Time	Time	Time	Host name	IP address
1	<1	<1	<1		43.249.37.189
2	<1	<1	<1		43.249.36.14
3	1	1	1		64.120.119.228
4	1	1	1		31.31.38.34
5	34	34	34		31.31.34.9
6	33	139	33		27.111.228.124
7	65	65	66		103.198.140.206
8	67	67	67		103.198.140.185
9	*	*	*	Request timed out	
10	*	*	*	Request timed out	
11	101	101	101		136.232.148.178
12	*	*	*	Request timed out	
13	*	*	*	Request timed out	
14	*	*	*	Request timed out	
15	*	*	*	Request timed out	
16	104	104	104		103.27.9.24
17	104	104	105		103.27.9.24
18	104	104	104		103.27.9.24

Traceroute from New Delhi



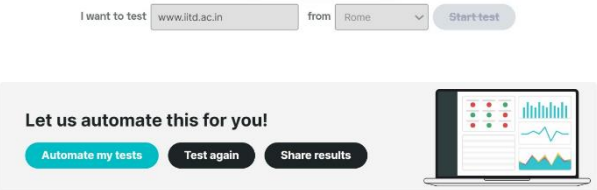
Hop	Time	Time	Time	Host name	IP address
1	7	7	4		164.52.192.1
2	3	2	2		180.179.210.65
3	4	2	1		180.179.197.209
4	4	2	3		219.65.112.81
5	*	*	*	Request timed out	
6	3	3	3		115.110.210.38
7	3	3	3		115.244.136.18
8	4	3	3		115.244.136.22
9	*	*	*	Request timed out	
10	*	*	*	Request timed out	
11	*	*	*	Request timed out	
12	*	*	*	Request timed out	
13	*	*	*	Request timed out	
14	*	*	*	Request timed out	
15	*	*	*	Request timed out	
16	6	6	6		103.27.9.24
17	7	6	6		103.27.9.24
18	7	6	6		103.27.9.24

Traceroute from New York



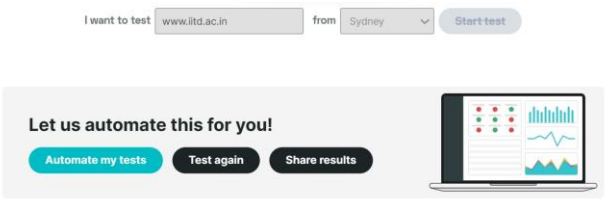
Hop	Time	Time	Time	Host name	IP address
1	8	<1	<1		172.96.165.73
2	8	1	<1		31.217.251.4
3	8	<1	<1		206.148.25.74
4	8	<1	<1		206.148.25.45
5	67	66	67		206.148.26.6
6	67	66	67		206.148.26.9
7	68	67	68		195.66.226.133
8	184	184	184		103.198.140.212
9	188	187	187		103.198.140.42
10	184	184	184		103.198.140.212
11	184	184	201		103.198.140.175
12	*	*	*	Request timed out	
13	*	*	*	Request timed out	
14	213	212	213		136.232.148.178
15	*	*	*	Request timed out	
16	*	*	*	Request timed out	
17	*	*	*	Request timed out	
18	*	*	*	Request timed out	
19	218	218	218		103.27.9.24
20	218	218	218		103.27.9.24
21	217	218	218		103.27.9.24

Traceroute from Rome



Hop	Time	Time	Time	Host name	IP address
1	1	<1	1		82.102.26.33
2	*	*	*	Request timed out	
3	1	<1	<1		146.70.1.186
4	1	<1	1		62.115.166.252
5	9	7	8		62.115.124.72
6	9	8	8		62.115.155.139
7	107	107	107		103.198.140.55
8	106	107	106		103.198.140.177
9	*	*	*	Request timed out	
10	*	*	*	Request timed out	
11	147	147	147		136.232.148.178
12	*	*	*	Request timed out	
13	*	*	*	Request timed out	
14	*	*	*	Request timed out	
15	*	*	*	Request timed out	
16	138	139	138		103.27.9.24
17	138	139	138		103.27.9.24
18	137	138	137		103.27.9.24

Traceroute from Sydney



Hop	Time	Time	Time	Host name	IP address
1	2	2	2		43.245.161.97
2	15	21	22		103.76.165.42
3	<1	<1	<1		103.76.165.70
4	93	92	101		45.112.246.143
5	92	92	92		45.112.247.3
6	*	*	*	Request timed out	
7	124	124	124		103.198.140.16
8	*	*	*	Request timed out	
9	*	*	*	Request timed out	
10	*	*	*	Request timed out	
11	157	157	157		136.232.148.178
12	*	*	*	Request timed out	
13	*	*	*	Request timed out	
14	*	*	*	Request timed out	
15	*	*	*	Request timed out	
16	162	162	162		103.27.9.24
17	161	161	162		103.27.9.24
18	161	161	162		103.27.9.24

REPORT

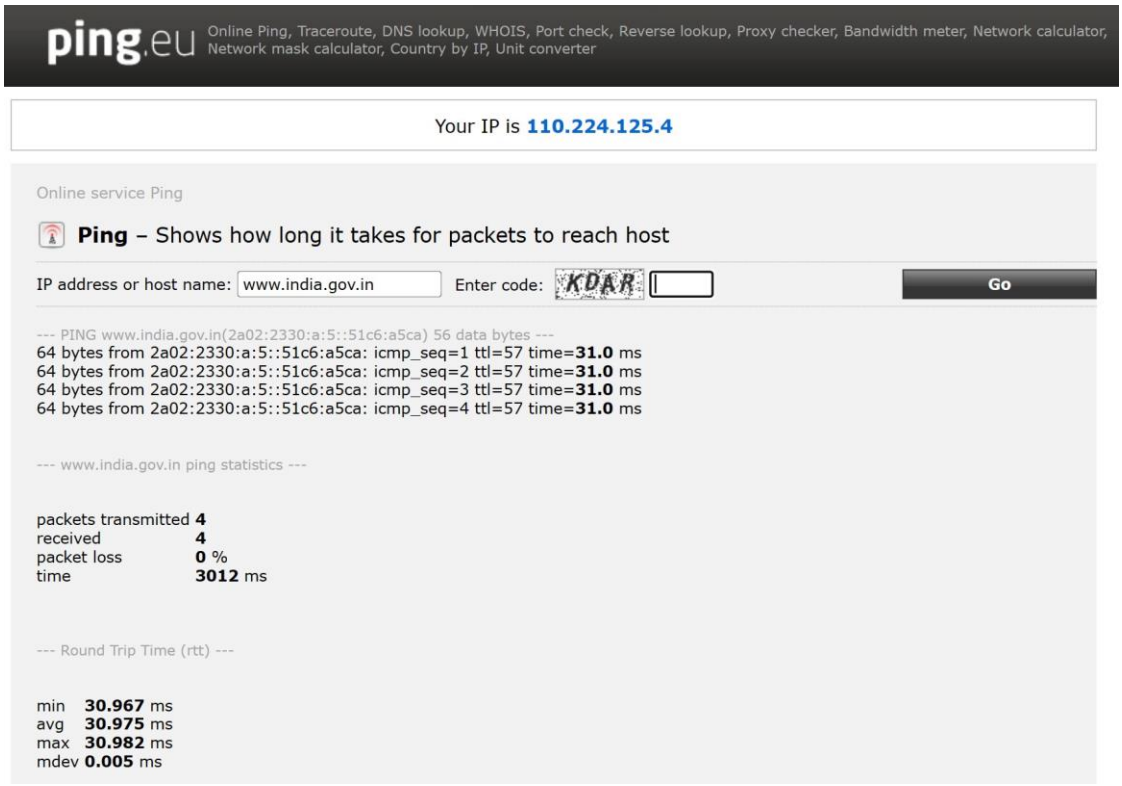
	Own Machine	Hong Kong	New Delhi	New York	Rome	Sydney
No. of Hops	8	18	18	21	18	18
RTT (avg) in μs	886	54333	4167	107178	77606	67533
DST IP	SAME					

Observations:

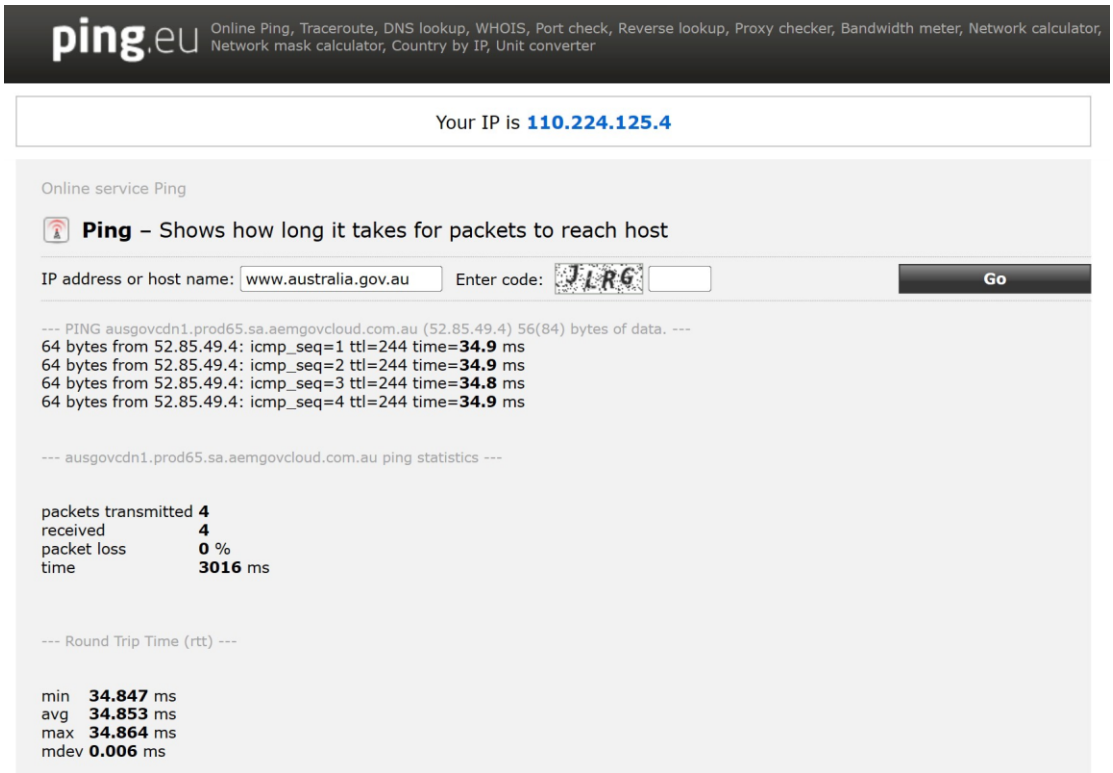
Different destination IP was observed for www.google.com and www.cnn.com as they have multiple servers at different continents whereas for www.iitd.ac.in, the destination IP was same from all locations $(103.27.9.24)$ as it has only one server.

c)

Pinging server of India

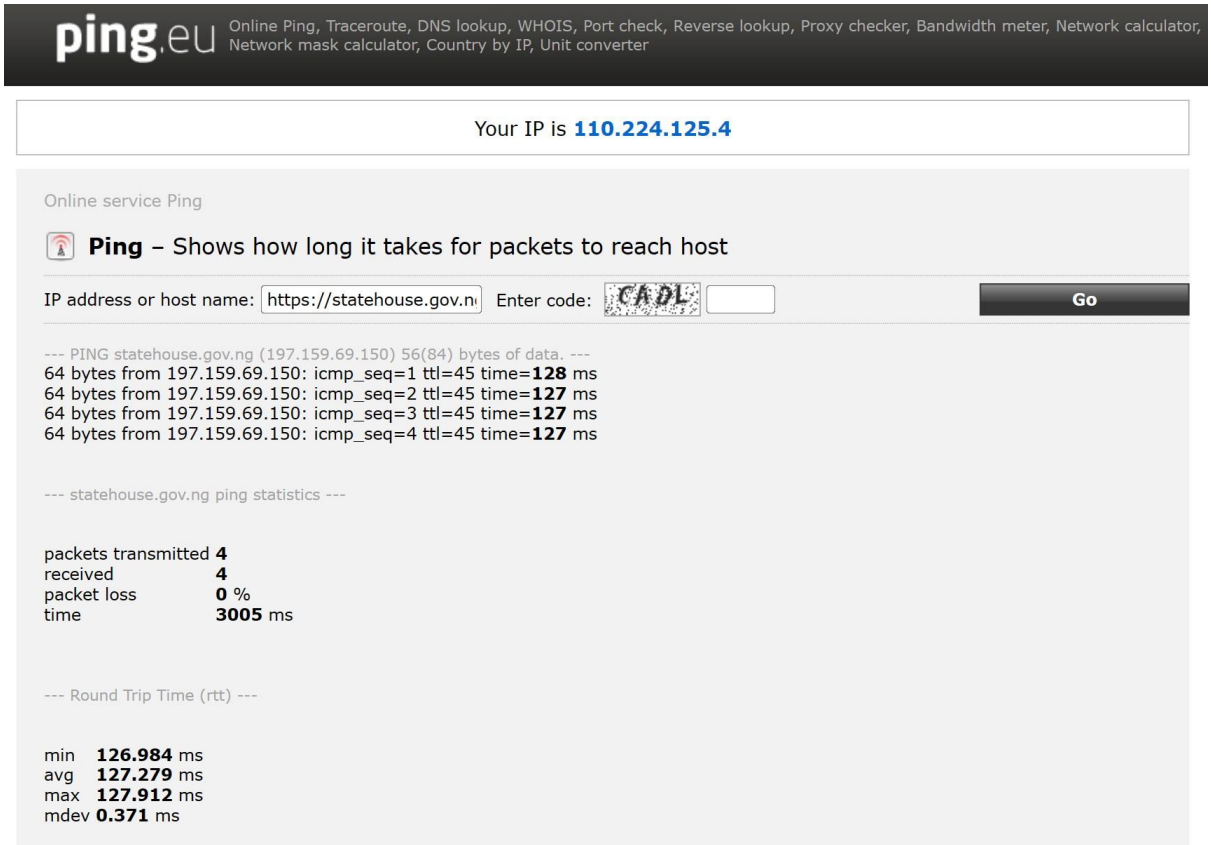


Pinging server of Australia



Pinging server of Italy

Pinging server of Nigeria



Pinging server of USA

Report

Location	India	Australia	Italy	Nigeria	USA
RTT (avg) in ms	30.975	34.853	29.717	127.279	34.761

Conclusion

As farther the server geographically is, the greater is the observed Ping to the server.

Solution 2:

a)

a) Routing Tree (R_1 to all other routers within AS$_1$) using Dijkstra's Algorithm

STEPS

1] R_1

2] $R_1 \xrightarrow{2} R_5$

3] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6$

4] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6 \xrightarrow{2} R_2$

5] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6$, $R_6 \xrightarrow{2} R_2$, $R_6 \xrightarrow{2} R_7$

6] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6$, $R_6 \xrightarrow{2} R_2$, $R_6 \xrightarrow{2} R_7$, $R_5 \xrightarrow{4} R_8$

7] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6$, $R_6 \xrightarrow{2} R_2$, $R_6 \xrightarrow{2} R_7$, $R_7 \xrightarrow{2} R_3$, $R_5 \xrightarrow{4} R_8$

8] $R_1 \xrightarrow{2} R_5 \xrightarrow{1} R_6$, $R_6 \xrightarrow{2} R_2$, $R_6 \xrightarrow{2} R_7$, $R_7 \xrightarrow{2} R_3$, $R_5 \xrightarrow{4} R_8 \xrightarrow{2} R_4$

EXPLANATION

START

* R_5 being the only neighbouring router.

* $R_1 - R_5 - R_6 : (2+1) = 3 \leq R_1 - R_5 - R_8 : (2+4) = 6$

* $R_6 \rightarrow R_2$ is 2, $R_6 \rightarrow R_7$ also 2 ∴ choosing R_2. ∴ $R_1 - R_5 - R_6 - R_2 = 5$, $R_1 - R_5 - R_6 - R_7 = 5$

* No more routers after R_2, ∴ tracing back to R_6 and proceeding to R_7 (next neighbour)

* For R_8, we had a better path remembered at STEP 3, distance being $6 (R_1 - R_5 - R_8) < (R_1 - R_5 - R_6 - R_7 - R_8) = 7$

* Only way to reach R_3 is via R_7. ∴ $R_1 - R_5 - R_6 - R_7 - R_3 = 7$

* Similarly, only way to reach to router R_4 is via R_8. Therefore, $R_1 - R_5 - R_8 - R_4 = 8$.

All eight nodes covered.

END.

Name of Router	Shortest distance from R_1	Path
R_2	$2+1+2 = 5$	$R_1 - R_5 - R_6 - R_2$
R_3	$2+1+2+2 = 7$	$R_1 - R_5 - R_6 - R_7 - R_3$
R_4	$2+4+2 = 8$	$R_1 - R_5 - R_8 - R_4$
R_5	2	$R_1 - R_5$
R_6	$2+1 = 3$	$R_1 - R_5 - R_6$
R_7	$2+1+2 = 5$	$R_1 - R_5 - R_6 - R_7$
R_8	$2+4 = 6$	$R_1 - R_5 - R_8$

Routing Tree (R_2 to all other routers within AS_1) using Dijkstra's Algorithm

STEPS

1] R_2

2] $R_2 \overset{2}{—} R_6$

3] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5$

4] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5$, $R_6 \overset{2}{—} R_7$

5] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5 \overset{2}{—} R_1$, $R_6 \overset{2}{—} R_7$

6] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5 \overset{2}{—} R_1$, $R_6 \overset{2}{—} R_7 \overset{2}{—} R_3$

7] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5 \overset{2}{—} R_1$, $R_6 \overset{2}{—} R_7 \overset{2}{—} R_8$, $R_7 \overset{2}{—} R_3$

8] $R_2 \overset{2}{—} R_6 \overset{1}{—} R_5 \overset{2}{—} R_1$, $R_6 \overset{2}{—} R_7 \overset{2}{—} R_8 \overset{2}{—} R_4$, $R_7 \overset{2}{—} R_3$

START

EXPLANATION

★ R_6 being the only neighbouring router.

★ $R_2—R_6—R_5 : (2+1) = 3 < R_2—R_6—R_7 := (2+2) = 4$

★ Observing that $R_2—R_6—R_5—R_8—R_7 : (2+1+4+2) = 9 > 4$ remembered at step 3, $\therefore R_2—R_6—R_7 : 4$ ($R_2—R_5—R_7$)

★ Only way to reach R_1 is via R_5.

$\therefore R_2—R_6—R_5—R_1 : (2+1+2) = 5$.

★ Only way to reach R_3 is via R_7.

$\therefore R_2—R_6—R_7—R_3 : (2+2+2) = 6$.

★ $R_2—R_6—R_7—R_8 : (2+2+2) = 6 <$
$R_2—R_6—R_5—8 : (2+1+4) = 7$.

$\therefore R_2—R_6—R_7—R_8$ ✓.

★ Only way to reach R_4 is via R_8.

$\therefore R_2—R_6—R_7—R_8—R_4 : (2+2+2+2) = 8$.

All eight NODES covered.

END.

Name of Router	Shortest distance from R_2	Path
R_1	$2+1+2 = 5$	$R_2—R_6—R_5—R_1$
R_3	$2+2+2 = 6$	$R_2—R_6—R_7—R_3$
R_4	$2+2+2+2 = 8$	$R_2—R_8—R_7—R_8—R_4$
R_5	$2+1 = 3$	$R_2—R_6—R_5$
R_6	2	$R_2—R_6$
R_7	$2+2 = 4$	$R_2—R_6—R_7$
R_8	$2+2+2 = 6$	$R_2—R_6—R_7—R_8$

b)

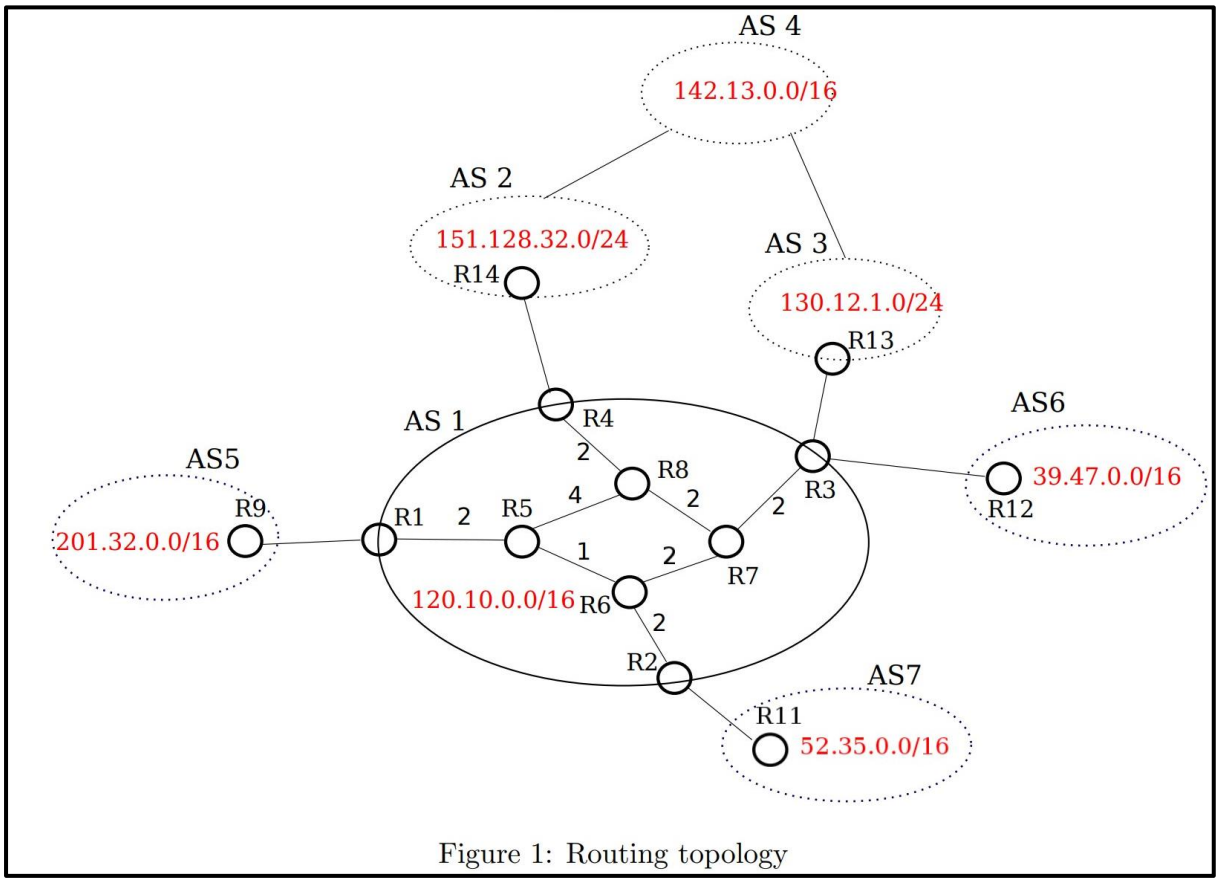


Figure 1: Routing topology

i] There are 2 NEXT_HOP routers advertising their paths to AS2 for all BGP routers in AS1 to send to the destination prefix: 151.128.32.0/24 (AS2):

R13 - [151.128.32.0/24 AS2]

R14 - [151.128.32.0/24 AS3-AS4-AS2]

Since the administrator of AS1 has set LOCAL_PREF to the same value for all BGP routes, therefore we check which one has the shortest path:

- No. of AS for R13 is **3** (AS3-AS4-AS2)
- No. of AS for R14 is **1** (AS2)

Clearly, the path via R14 is the shortest path. Hence, all the BGP routers in AS1 choose R14 as their NEXT_HOP router to send their packets to the destination prefix:
151.128.32.0/24 (AS2).

ii] There are 2 NEXT_HOP routers advertising their paths to AS3 for all BGP routers in AS1 to send to the destination prefix:
130.12.1.0/24 (AS3):

R13 – [130.12.1.0/24 AS2-AS4-AS3]

R14 – [130.12.1.0/24 AS3]

Since the administrator of AS1 has set LOCAL_PREF to the same value for all BGP routes, therefore we check which one has the shortest path:

- No. of AS for R13 is **1** (AS3)
- No. of AS for R14 is **3** (AS2-AS4-AS3)

Clearly, the path via R14 is the shortest path. Hence, all the BGP routers in AS1 choose R13 as their NEXT_HOP router to send their packets to the destination prefix:
130.12.1.0/24 (AS3).

iii] There are 2 NEXT_HOP routers advertising their paths to AS4 for all BGP routers in AS1 to send to the destination prefix:
142.13.0.0/16 (AS4):

R13 – [142.13.0.0/24 AS2-AS4]

R14 – [142.13.0.0/24 AS3-AS4]

Since the administrator of AS1 has set LOCAL_PREF to the same value for all BGP routes, therefore we check which one has the shortest path:

- No. of AS for R13 is **2** (AS2-AS4)
- No. of AS for R14 is **2** (AS3-AS4)

Now that the paths are also of same distance and no MED value is assigned to either of them, we try applying the rule 'eBGP path over iBGP path':

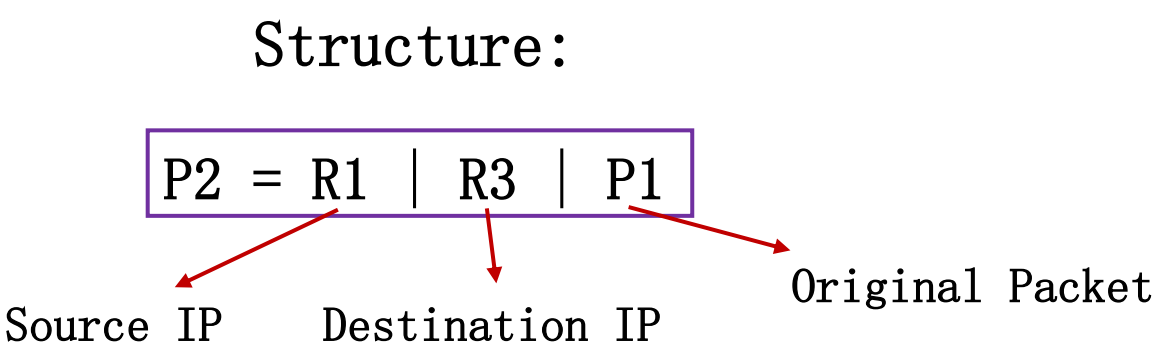
- For R3, R13 is eBGP and R14 is iBGP. Therefore, R3 uses R13 as NEXT_HOP router.
- For R4, R14 is eBGP and R13 is iBGP. Therefore, R4 uses R14 as NEXT_HOP router.
- For R1 and R2, R13 and R14 both are iBGP, therefore we go for Hot-Potato Routing. So, the cost for R1 via R13 is (2+1+2+2) = 7 whereas via R14 is (2+4+2) = 8. Hence, R1 uses R13 as its NEXT_HOP router. Similarly, the cost for R2 via R13 is (2+2+2) = 6 whereas via R14 is (2+1+4+2) = 9. Hence, R2 also uses R13 as its NEXT_HOP router.

iv] The administrator has to simply set the LOCAL_PREF of R14 to be higher than that of R13, since the one with higher LOCAL_PREF value will be always chosen irrespective of the other parameters. Therefore, we set the LOCAL_PREF value for R14 to be higher than the LOCAL_PREF value of R13 and thereafter, R14 will always be chosen as the NEXT_HOP from AS1.

c)

i]

Since R1 receives the packet, it is the one who encapsulates the packet P1. As predicted in part b) iii], since R1 had chosen R13 as its NEXT_HOP router to send its packets to AS4, it will forward the encapsulated packet to R3. Since R3 would be now sending the packet to AS4, it will decapsulate the packet. Thus, P2 will have destination address as the IP address of R3.



ii]

The routers R5, R6 and R7 are in between R1 and R3. But as R5, R6 and R7 are NOT BGP speakers, they have IGP tables.

- Now, first the router R1 looks up the BGP table to identify the NEXT_HOP.
- It then checks the IGP table to know the router nearest to the NEXT_HOP (R3).
- After encapsulation of the packet by R1, the routers R5, R6 and R7 each look up the IGP table to find next routers on the path to R3.
- When the encapsulated packet reaches at the router R3, it decapsulates P2 and reads the destination and therefore searches the BGP table where it finds the next router to be R13.

All Forwarding Tables used

R1 --> BGP Table

IP Prefix	Exit
142.13/16	R3

R1 --> IGP Table

DST. IP	NEXT_HOP
R3	R5

R5 --> IGP Table

DST. IP	NEXT_HOP
R3	R6

R6 --> IGP Table

DST. IP	NEXT_HOP
R3	R7

R7 --> IGP Table

DST. IP	NEXT_HOP
R3	R3

R3 --> BGP Table

IP Prefix	NEXT_HOP
142.13/16	R13