

CS3530

Computer Networks-1

Illustration of Internet topology

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Network Topology:

The arrangement of the elements (links, nodes, and so on) of a communication network is known as network topology. Various forms of telecommunication networks, such as command and control radio networks, industrial fieldbuses, and computer networks, can be defined or described using network topology.

Network topology is the physical or logical representation of a network's topological structure. It is a graph theory application in which communicative devices are represented as nodes and the connections between them are represented as links or lines connecting the nodes.

The Internet is a global network of routers that allows computers and servers from all over the world to interact with one another. Each router communicates with one another to guide or route data packets to their destination.

Traceroute –

Traceroute utility is just a tool that is used to find out the exact path of a data packet is taken from sender to the destination.

Using traceroute you can find different problems like bottlenecks.

Now we will see the route of our computer to google.com that is (source – our device and destination – google.com using 30 hops (number of packets))

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C:\Users\naiti>tracert -h 30 www.google.com

Tracing route to www.google.com [142.250.183.228]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms    dir-806in.home [192.168.0.1]
  2     *        *        *        Request timed out.
  3     1 ms     2 ms     <1 ms    192.168.41.1
  4     1 ms     <1 ms     <1 ms    192.168.8.19
  5    <1 ms     <1 ms     1 ms    103.232.241.2
  6     1 ms     1 ms     1 ms    10.119.254.121
  7     *        *        *        Request timed out.
  8     *        *        *        Request timed out.
  9    20 ms    18 ms    18 ms    10.119.73.122
 10    19 ms    19 ms    20 ms    72.14.195.128
 11    19 ms    19 ms    19 ms    74.125.242.145
 12    25 ms    18 ms    18 ms    209.85.247.251
 13    19 ms    18 ms    19 ms    maa05s23-in-f4.1e100.net [142.250.183.228]

Trace complete.

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Here first column is index of router, 2-4 column is explanation of turn around time taken by router and last column is AS number of routers.

Here Request timed out is occurring when life span of packet is less than turn around time of router then we can not receive signal from that router, but it passes packets to next routers.

WHOIS –

It is a query and response protocol that is widely used for querying databases that store the registered users or assignees of an Internet resource, such as a domain name, an IP address block, or an autonomous system.

Below are the few sources and 10 destinations. We have formed a table of trace route path in between source and destination. We have also listed the AS numbers, IP range and name of organization.

1. Source: Dubai (216.218.252.182)

Destination: playstation.com (209.200.152.198)

IP	Name	Range
216.218.252.182	Hurricane Electric LLC	216.218.128.0 - 216.218.255.255
184.105.64.197	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.105.222.101	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.104.197.90	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
123.255.91.26	The Hong Kong Internet Exchange Limited	123.255.88.0 - 123.255.95.255
72.52.2.184	Akamai Technologies, Inc.	72.52.0.0 - 72.52.63.255
72.52.1.139	Akamai Technologies, Inc.	72.52.0.0 - 72.52.63.255
72.52.2.189	Akamai Technologies, Inc.	72.52.0.0 - 72.52.63.255
209.200.152.198	Akamai Technologies, Inc.	209.200.128.0 - 209.200.191.255

2. Source: Rio De Janeiro (216.218.252.83)

Destination: nintendo.com (199.227.51.53)

IP	Name	Range
216.218.252.83	Hurricane Electric LLC	216.218.128.0 - 216.218.255.255
184.104.194.153	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
72.52.92.49	Hurricane Electric LLC	72.52.64.0 - 72.52.127.255
216.66.39.142	Hurricane Electric LLC	216.66.0.0 - 216.66.95.255
4.69.214.113	Level 3 Parent, LLC	4.0.0.0 - 4.127.255.255
4.35.38.118	Level 3 Parent, LLC	4.0.0.0 - 4.127.255.255
199.227.51.53	Xspedius Communications Co.	199.227.0.0 - 199.227.255.255

3. Source: Singapore (216.218.252.182)

Destination: protonmail.com (185.70.42.12)

IP	Name	Range
216.218.252.182	Hurricane Electric LLC	216.218.128.0 - 216.218.255.255
184.105.64.197	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
103.41.12.16	MegaPort Singapore Pte Limited	103.41.12.0 - 103.41.15.255
68.142.82.41	Limelight Networks, Inc.	68.142.64.0 - 68.142.127.255

156.154.216.0	NeuStar, Inc.	156.154.0.0 - 156.154.255.255
185.70.42.12	Proton Technologies AG	185.70.40.0 - 185.70.43.255

4. Source 216.218.252.236

Destination: 149.6.126.132

IP	Name	Range
216.218.252.236	Hurricane Electric LLC	216.218.128.0 - 216.218.255.255
184.104.197.94	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.104.192.113	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.104.195.110	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
62.115.175.189	Telia Company AB	62.115.160.0 - 62.115.191.255
62.115.120.238	Telia Company AB	62.115.112.0 - 62.115.127.255
62.115.122.181	Telia Company AB	62.115.112.0 - 62.115.127.255
154.54.57.153	PSINet, Inc.	154.54.0.0 - 154.54.255.255
154.54.39.98	PSINet, Inc.	154.54.0.0 - 154.54.255.255
154.25.4.170	PSINet, Inc.	154.25.0.0 - 154.25.255.255
149.6.126.132	PSINet, Inc.	149.6.0.0 - 149.6.255.255

5. Source: 216.218.252.22

Destination: 23.57.97.245

IP	Name	Range
216.218.252.22	Hurricane Electric LLC	216.218.128.0 - 216.218.255.255
184.104.195.218	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.105.64.49	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
184.104.196.149	Hurricane Electric LLC	184.104.0.0 - 184.105.255.255
198.32.160.74	TELEHOUSE International Corp. of America	198.32.160.0 - 198.32.161.255
23.57.97.245	Akamai Technologies, Inc.	23.32.0.0 - 23.67.255.255

6. Source: US-San Francisco (66.250.250.145)

Destination: google.com (142.250.217.78)

IP	Name	Range
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66.250.250.145	Cogent Communications, Washington DC	66.250.0.0 - 66.250.255.255
154.54.30.221	PSINet, Inc., Washington DC	154.54.0.0 - 154.54.255.255
154.54.43.14	PSINet, Inc., Washington DC	154.54.0.0 - 154.54.255.255
154.54.12.142	PSINet, Inc., Washington DC	154.54.0.0 - 154.54.255.255
209.85.173.2	Google LLC, Mountain View	209.85.128.0 - 209.85.255.255
108.170.242.94	Google LLC, Mountain View	108.170.192.0 - 108.170.255.255
72.14.237.147	Google LLC, Mountain View	72.14.192.0 - 72.14.255.255
108.170.225.198	Google LLC, Mountain View	108.170.192.0 - 108.170.255.255
216.239.57.195	Google LLC, Mountain View	216.239.32.0 - 216.239.63.255
108.170.245.113	Google LLC, Mountain View	108.170.192.0 - 108.170.255.255
142.251.55.197	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
142.250.217.78	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255

7. Source: US-San Francisco(66.250.250.145)

Destination: gmail.com (142.251.33.69)

IP	Name	Range
66.250.250.145	Cogent Communications	66.250.0.0 - 66.250.255.255
154.54.27.57	PSINet, Inc.	154.54.0.0 - 154.54.255.255
154.54.43.14	PSINet, Inc.	154.54.0.0 - 154.54.255.255
154.54.12.142	PSINet, Inc.	154.54.0.0 - 154.54.255.255
209.85.173.2	Google LLC, Mountain View	209.85.128.0 - 209.85.255.255
108.170.242.238	Google LLC, Mountain View	108.170.192.0 - 108.170.255.255
142.250.234.139	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
142.250.56.34	Google LLC, Mountain View	142.250.0.0 - 142.251.255.256
216.239.43.89	Google LLC, Mountain View	216.239.32.0 - 216.239.63.255
108.170.245.97	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
142.251.50.243	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
142.251.33.69	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255

8. Source: Tokyo (184.105.213.117)

Destination: facebook.com (157.240.3.35)

IP	Name	Range
184.105.213.117	Hurricane Electric LLC, Fremont	184.104.0.0 - 184.105.255.255
206.81.80.211	Seattle Internet Exchange, Seattle	206.81.80.0 - 206.81.83.255
157.240.48.57	Facebook, Inc., Menlo Park	157.240.0.0 - 157.240.255.255
157.240.38.247	Facebook, Inc., Menlo Park	157.240.0.0 - 157.240.255.255

157.240.3.35	Facebook, Inc., Menlo Park	157.240.0.0 - 157.240.255.255
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9. Source: Singapore (103.41.12.7)

Destination: youtube.com (216.58.206.238)

IP	Name	Range
103.41.12.7	MegaPort Singapore Pte Limited, Singapore	103.41.12.0 - 103.41.15.255
74.125.242.34	Google LLC, Mountain View	74.125.0.0 - 74.125.255.255
72.14.234.96	Google LLC, Mountain View	72.14.192.0 - 72.14.255.255
209.85.247.135	Google LLC, Mountain View	209.85.128.0 - 209.85.255.255
142.251.224.212	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
142.251.226.161	Google LLC, Mountain View	142.250.0.0 - 142.251.255.255
209.85.250.9	Google LLC, Mountain View	209.85.128.0 - 209.85.255.255
209.85.250.201	Google LLC, Mountain View	209.85.128.0 - 209.85.255.255
72.14.238.62	Google LLC, Mountain View	72.14.192.0 - 72.14.255.255
108.170.244.161	Google LLC, Mountain View	108.170.192.0 - 108.170.255.255
216.239.48.147	Google LLC, Mountain View	216.239.32.0 - 216.239.63.255
216.58.206.238	Google LLC, Mountain View	216.58.192.0 - 216.58.223.255

10. Source: London (129.250.4.246)

Destination: yahoo.com (98.136.144.138)

IP	Name	Range
129.250.4.246	NTT America, Inc., Greenwood Village	129.250.0.0 - 129.250.255.255
129.250.3.215	NTT America, Inc., Greenwood Village	129.250.0.0 - 129.250.255.255
129.250.9.254	NTT America, Inc., Greenwood Village	129.250.0.0 - 129.250.255.255
4.16.168.186	Level 3 Parent, LLC, Monroe	4.0.0.0 - 4.127.255.255
209.191.65.51	Oath Holdings Inc., New York	209.191.64.0 - 209.191.127.255
66.196.67.97	Oath Holdings Inc., New York	66.196.64.0 - 66.196.127.255
98.136.158.211	Oath Holdings Inc., New York	98.136.0.0 - 98.139.255.255
98.136.159.244	Oath Holdings Inc., New York	98.136.0.0 - 98.139.255.255
67.195.34.66	Oath Holdings Inc., New York	67.195.0.0 - 67.195.255.255
98.136.144.138	Oath Holdings Inc., New York	98.136.0.0 - 98.139.255.255