

CSN 110: Fall 2011

Assignment on Computer Networks

Traceroute is a program to trace the path of routers that a packet traverses, ie. if the tool is launched from a source S to a destination D, it will report the list of routers from S to D. A sample output is given below:

```
aseth@glenstorm:~$ traceroute www.google.com

traceroute to www.google.com (74.125.236.50), 30 hops max, 60 byte packets
 1 10.22.1.1 (10.22.1.1) 0.344 ms 0.364 ms 0.395 ms
 2 ras2.iitd.ac.in (202.54.26.81) 0.947 ms 1.431 ms 1.671 ms
 3 124.124.245.50 (124.124.245.50) 1.514 ms 1.552 ms 1.591 ms
 4 115.255.235.17 (115.255.235.17) 24.593 ms 25.401 ms 25.816 ms
 5 115.255.239.53 (115.255.239.53) 49.647 ms 63.170 ms 67.770 ms
 6 72.14.223.25 (72.14.223.25) 81.575 ms 82.870 ms 82.840 ms
 7 209.85.241.52 (209.85.241.52) 70.957 ms 70.931 ms 70.946 ms
 8 209.85.251.95 (209.85.251.95) 84.075 ms 70.767 ms 84.053 ms
 9 209.85.241.33 (209.85.241.33) 70.745 ms 70.891 ms 70.910 ms
10 74.125.236.50 (74.125.236.50) 70.377 ms 70.374 ms 70.364 ms
```

Each output line of traceroute reports the following:

- Router number [1, 2, 3...]
- IP address of hostname of router
- Three latency measurements from the source to the router (in ms)

You have to do the following:

1. A list of several sources from where you can launch traceroute is given at the end of this document. As you can see, these sources are from India, US, Canada, Africa, etc.
2. Launch traceroute from these sources to www.google.com. Use 74.125.236.50 as the IP address of www.google.com
3. Make a table containing the following entries for each source
 - a. Number of router hops from the source to 74.125.236.50
 - b. Latency reported to the final destination (last line of traceroute)
 - c. Launch whois queries at <http://whois.domaintools.com> on the IP addresses of the routers along the way. Whois tells you the owner of the IP address, so you can know the ISP to which the IP address belongs. Record the number of ISPs traversed by the packet
 - d. You will find that Google is reported as the final ISP for a lot of routers. Record the fraction of routers along the path which belong to Google

4. Do you notice any patterns in how soon a packet gets into Google's network, with respect to traceroutes launched from different countries? Do you notice any significant difference in latencies reported to reach Google from different countries? Can you conclude anything from this study about the state of Internet access in developed and developing countries?

Suggestion

You can divide yourself into groups to do traceroutes from different sources, so you don't have to individually run experiments from all sources yourself.

Additional

You can also try installing gtrace, which gives a visualization on the world map of how your data is being routed: <http://www.caida.org/tools/visualization/gtrace/>

References

[1] ATLAS Internet Observatory 2009 Annual Report,

http://www.nanog.org/meetings/nanog47/presentations/Monday/Labovitz_ObserveReport_N47_Mon.pdf

Open Traceroute servers

<http://adl-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

<http://bne-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

<http://cbr-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

<http://mel-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

<http://per-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

<http://syd-a-ext1.aarnet.net.au/cgi-bin/traceroute.pl?choice=yes>

Ramallah, West Bank, Palestine. <http://pinger.alquds.edu/cgi-bin/traceroute.pl?choice=yes>

Florida International University, Miami, <http://davinci.ampath.net/cgi-bin/traceroute.pl?choice=yes>

Ottawa, Canada. <http://traceroute.physics.carleton.ca/cgi-bin/traceroute.pl?choice=yes>

<http://pinger.cdacmumbai.in/cgi-bin/traceroute.pl?choice=yes>

<http://netops.cdac.in/cgi-bin/traceroute.pl?choice=yes>

Geneva, Switzerland. <http://pinger.cern.ch/cgi-bin/traceroute.pl?choice=yes>

Warrington, England. <http://icfamon.dl.ac.uk/cgi-bin/traceroute.pl?choice=yes>

Chicago. <http://pinger.fnal.gov/cgi-pub/traceroute.pl?choice=yes>

Atlanta <http://www.rnoc.gatech.edu/cgi-bin/traceroute.pl?choice=yes>

Italy. <http://pinger.ictp.it/cgi-bin/traceroute.pl?choice=yes>

Beijing, China. <http://v-www.ihep.ac.cn/cgi-bin/traceroute.pl?choice=yes>

Israel <http://noc.ilan.net.il/LG/>

High Energy Research Lab near Tokyo, Japan. <http://yumj2.kek.jp/cgi-bin/traceroute.pl?choice=yes>

Sri Lanka. <http://namunu.learn.ac.lk/cgi-bin/traceroute.pl?choice=yes>

Mountain View, California <http://www.nren.nasa.gov/traceroute2.pl>

Islamabad, Pakistan. <http://pinger-ncp.ncp.edu.pk/cgi-bin/traceroute.pl?choice=yes>

Dallas, Texas, US. <http://network-tools.com/default.asp?prog=trace>

<http://monitor.niit.edu.pk/cgi-bin/traceroute.pl?choice=yes>

<http://maggie1.niit.edu.pk/cgi-bin/traceroute.pl?choice=yes>

<http://maggie2.niit.edu.pk/cgi-bin/traceroute.pl?choice=yes>

Oak Ridge, TN <http://www.csm.ornl.gov/~dunigan/cgi-bin/traceroute.cgi?choice=yes>

Ottawa, Canada. <http://www.ottix.net/cgi-bin/traceroute.pl?choice=yes>

Islamabad, Pakistan <http://pinger.pern.edu.pk/cgi-bin/traceroute.pl?choice=yes>

<http://icfamon.rl.ac.uk/cgi-bin/traceroute.pl?choice=yes>

Prague, Czech Republic. <http://www.pstruh.cz/util/trace.asp>

San Diego, CA <http://www.sdsc.edu/~hutton/cgi-bin/tracert.cgi>

<http://www-wanmon.slac.stanford.edu/cgi-bin/nph-traceroute.pl?choice=yes>

<http://pinger.stanford.edu/cgi-bin/traceroute.pl?choice=yes>

Cape Town, South Africa <http://brunsvigia.tenet.ac.za/cgi-bin/traceroute.pl?choice=yes>

Germany. <http://www.tracert-traceroute.de/>

Vancouver, Canada <http://andrew.triumf.ca/cgi-bin/traceroute.pl?choice=yes>

Sao Paulo, Brazil. <http://ping.unesp.br/cgi-bin/traceroute.pl?choice=yes>

University of Maryland <http://www.physics.umd.edu/cgi-script/hep/traceroute.sh?choice=yes>

Cochabamba, Bolivia. <http://www.umss.edu.bo/cgi-bin/traceroute.pl?choice=yes>

Burkina Faso. <http://www.univ-ouaga.bf/cgi-bin/traceroute.pl?choice=yes>

Mumbai, India <http://sfsmds2.vsnl.net/cgi-bin/traceroute.pl?choice=yes>

Argentina <http://www.telvvg.coop/cgi-bin/trace.cgi?estoydeacuerdo=si>