Network Tools

Vijay Vasudevan
Overview

- Network simulation through ns-2
- Network tools:
  - ping
  - traceroute
  - whois
  - dig
- Scripting!
ns-2

- Creatively named “The Network Simulator”
- To a different presentation file we go!
Ping?  Pong!

- ping - send a ICMP ping message to a remote destination, which returns information about the RTT, ttl.

- $ ping www.google.com

PING www.l.google.com (64.233.169.147): 56 data bytes
64 bytes from 64.233.169.147: icmp_seq=0 ttl=245 time=15.505 ms
64 bytes from 64.233.169.147: icmp_seq=1 ttl=245 time=15.586 ms
64 bytes from 64.233.169.147: icmp_seq=2 ttl=245 time=16.204 ms
64 bytes from 64.233.169.147: icmp_seq=3 ttl=245 time=15.585 ms
64 bytes from 64.233.169.147: icmp_seq=4 ttl=245 time=15.559 ms
Traceroute

- Traceroute: trace the IP path to a destination
- `$ traceroute www.google.com`

traceroute: Warning: **www.google.com** has multiple addresses; using 64.233.169.147
traceroute to **www.l.google.com** (64.233.169.147), 64 hops max, 40 byte packets
  1 128.237.224.2 (128.237.224.2) 1.803 ms 1.608 ms 6.027 ms
  2 CORE0-VL914.GW.CMU.NET (128.2.0.155) 152.642 ms 217.223 ms 2.105 ms
  3 POD-I-CYH-VL986.GW.CMU.NET (128.2.0.250) 1.456 ms 1.165 ms 1.346 ms
  4 bar-cmu-ge-4-0-0-2.3rox.net (192.88.115.185) 118.413 ms 82.660 ms 107.321 ms
  5 minithan-bar-transitrail-10ge-0-1-0-0-203.3rox.net (192.88.115.26) 2.160 ms 2.430 ms 3.622 ms
  6 te2-1--577.tr01-asbnva01.transitrail.net (137.164.131.193) 8.133 ms 7.933 ms 7.924 ms
  7 google-peer.asbnva01.transitrail.net (137.164.130.154) 7.906 ms 7.692 ms 7.712 ms
  8 216.239.48.110 (216.239.48.110) 15.832 ms 216.239.48.108 (216.239.48.108) 15.421 ms
     216.239.48.110 (216.239.48.110) 15.402 ms
  9 64.233.175.109 (64.233.175.109) 15.817 ms 64.233.175.169 (64.233.175.169) 16.976 ms 15.335 ms
 11 yo-in-fl47.google.com (64.233.169.147) 17.773 ms 15.590 ms 15.639 ms
whois

- Domain name/AS number directory service
- whois -a 64.233.169.147
  OrgName: Google Inc.
  OrgID: GOGL (they do nothing!)
  Address: 1600 Amphitheatre Parkway
  City: Mountain View
  StateProv: CA
  ...

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• DNS Lookup, Reverse DNS Lookup

• dig www.google.com

;; QUESTION SECTION:
;www.google.com. IN A

;; ANSWER SECTION:
www.l.google.com. 54 IN A 64.233.169.104
www.l.google.com. 54 IN A 64.233.169.99
www.l.google.com. 54 IN A 64.233.169.147
www.l.google.com. 54 IN A 64.233.169.103

• dig -x 64.233.169.147

;; QUESTION SECTION:
;147.169.233.64.in-addr.arpa. IN PTR

;; ANSWER SECTION:
147.169.233.64.in-addr.arpa. 84783 IN PTR yo-in-f147.google.com.
Sleuthing on the Internets

- Sometimes an IP can tell a lot
- The story of the edited CMCL wiki
- Sometimes it can’t
- Tor (what is it good for? anonymizing sources! (say it again))
- Lesson?
- If you’re going to do something bad, anonymize your traffic
  - Or launch it remotely
Scripting

• Choices! Perl, Python, Ruby, Shell scripting

• I <3 Ruby, but you can use any of them. *

• Take the time to write a script for your experiments. It **will** pay off in the long run.

• ... ns example

* - you’ll be using Ruby in a later hw :).
Scriptroute

- System for performing network measurements
- Runs on PlanetLab: distributed measurements!
- Uses . . . Ruby! *gasp*
- Provides an easy-to-use software interface to send out measurements and obtain statistics and data
- More on Scriptroute later (Tools HW 2).
Network tools and simulators are useful.
The heart of network measurement!
Useful not only for this class but in real life (because they are logically separate).