

Network Tools

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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
10 72.14.232.21 (72.14.232.21) 18.666 ms 18.350 ms 72.14.232.25 (72.14.232.25) 18.310 ms
11 yo-in-f147.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
...

dig

- DNS Lookup, Reverse DNS Lookup

- `dig www.google.com`
;; QUESTION SECTION:
;www.google.com. IN A

;;ANSWER SECTION:

```
www.google.com. 140939 IN CNAME www.l.google.com.  
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 Intarnets

- 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).



Conch-collusion



- 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).