

1. Groups
 2. Holds return value of last executed command
 3. find
 4. uname -vn
 5. "." = the current directory. ".." = one directory above the current directory. "~" = start or home directory. "/" = root or highest level directory.
 6. ps
 7. "wc -l" to print the number of lines in the file. To display the contents of use "cat"
 8. They are different ways to gain root privileges. "sudo" runs a single command with root privileges. "Su" switches you to the root of the user's account and asks for the root accounts credentials.
 9. crontab file, a program used to manage cron allowing you to run a script or program on an interval or schedule
 10. Use the "scp" command
 11. Use the ">>" command
 12. For www.google.com
 - a. First time average: 8.024
First time Standard deviation: 0.006027
Second time average: 8.167
Second time standard deviation: 0.3086
Third time average: 8.270
Third time standard deviation: 0.3608
 - b. Each time was around 18-20 or so routers that it took to get to the destination, each time the destination of the path changed and the later half of the path changed as a result. The start of each path seemed to mimic each other.
 - c. Maybe 4-5 ISPs. the largest delays seemed to occur within the middle of the path
- For www.harenet.ad.jp
- a. First time average: 132.124
First time Standard deviation: 2.64860
Second time average: 135.816
Second time standard deviation: 1.87158
Third time average: 133.32
Third time standard deviation: 2.4137
 - b. This one the paths seemed to remain the same each time, potentially because the destination remained the same and the distance was so far
 - c. Here there were probably way more ISP likely around 10-15
 - d. The intercontinental and outer continental varied drastically, the intercontinental destination changed on each iteration as well as the path that was taken. Not to mention the time it took was much shorter. The outer continental path was the same, took way longer and didn't even successfully reach the destination.

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-bash-4.2$ date
Sun Oct  3 20:51:58 PDT 2021
-bash-4.2$ traceroute www.google.com
traceroute to www.google.com (142.250.189.4), 30 hops max, 60 byte packets
 1 dc2-g-v864.ucsc.edu (128.114.104.124)  0.354 ms dc1-g-v864.ucsc.edu (128.114.104.123)  0.444 ms dc2-g-v864.ucsc.edu (128.114.104.124)  0.354 ms
 2 core-north-g-te6-2.ucsc.edu (128.114.101.202)  0.263 ms core-north-g-te2-6.ucsc.edu (128.114.101.130)  0.296 ms core-north-g-te6-2.ucsc.edu (128.114.101.202)  0.340 ms
 3 border-north-g-te0-0-0-3.ucsc.edu (128.114.1.190)  1.738 ms border-south-g-te0-0-1-0.ucsc.edu (128.114.0.42)  2.128 ms border-north-g-te0-0-0-3.ucsc.edu (128.114.1.190)  1.754 ms
 4 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182)  8.061 ms border-north-g-te0-0-1-1.ucsc.edu (128.114.1.72)  3.355 ms dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182)  8.070 ms
 5 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182)  8.047 ms  8.011 ms 74.125.49.165 (74.125.49.165)  7.985 ms
 6 108.170.247.129 (108.170.247.129)  9.635 ms * 74.125.49.165 (74.125.49.165)  7.899 ms
 7 * 108.170.247.129 (108.170.247.129)  9.427 ms *
 8 142.251.60.133 (142.251.60.133)  7.973 ms 142.251.60.131 (142.251.60.131)  8.006 ms 108.170.247.193 (108.170.247.193)  8.943 ms
 9 lax31s16-in-f4.1e100.net (142.250.189.4)  8.030 ms  8.018 ms  8.025 ms
-bash-4.2$

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-bash-4.2$ date
Sun Oct  3 15:56:19 PDT 2021
-bash-4.2$ traceroute www.google.com
traceroute to www.google.com (142.250.188.228), 30 hops max, 60 byte packets
 1 dc2-g-v864.ucsc.edu (128.114.104.124)  0.367 ms dc1-g-v864.ucsc.edu (128.114.104.123)  0.355 ms 0.418 ms
 2 core-north-g-te2-6.ucsc.edu (128.114.101.130)  0.234 ms  0.242 ms core-south-g-te2-6.ucsc.edu (128.114.101.118)  0.263 ms
 3 border-north-g-te0-0-1-0.ucsc.edu (128.114.1.64)  0.737 ms border-north-g-te0-0-0-3.ucsc.edu (128.114.1.190)  0.842 ms border-north-g-te0-0-1-0.ucsc.edu (128.114.1.64)  0.850 ms
 4 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182)  8.044 ms  8.058 ms  8.065 ms
 5 72.14.222.56 (72.14.222.56)  7.957 ms 74.125.49.165 (74.125.49.165)  8.028 ms 72.14.222.56 (72.14.222.56)  7.914 ms
 6 108.170.247.161 (108.170.247.161)  8.119 ms  8.030 ms *
 7 216.239.41.44 (216.239.41.44)  8.045 ms 142.251.60.129 (142.251.60.129)  8.050 ms 142.251.60.127 (142.251.60.127)  7.999 ms
 8 lax31s15-in-f4.1e100.net (142.250.188.228)  8.009 ms 108.170.247.211 (108.170.247.211)  8.523 ms lax31s15-in-f4.1e100.net (142.250.188.228)  7.970 ms
-bash-4.2$

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-bash-4.2$ date
Sun Oct  3 22:08:33 PDT 2021
-bash-4.2$ traceroute www.google.com
traceroute to www.google.com (142.250.68.4), 30 hops max, 60 byte packets
 1 dc1-g-v864.ucsc.edu (128.114.104.123)  0.399 ms dc2-g-v864.ucsc.edu (128.114.104.124)  0.287 ms  0.384 ms
 2 core-south-g-te5-6.ucsc.edu (128.114.101.126)  0.362 ms core-south-g-te2-6.ucsc.edu (128.114.101.118)  0.347 ms  0.377 ms
 3 border-south-g-te0-0-1-0.ucsc.edu (128.114.0.42)  0.945 ms  1.048 ms border-south-g-te0-0-0-0.ucsc.edu (128.114.0.81)  1.085 ms
 4 border-north-g-te0-1-1-1.ucsc.edu (128.114.1.74)  0.805 ms border-north-g-te0-0-1-1.ucsc.edu (128.114.1.72)  2.180 ms  2.168 ms
 5 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182)  8.240 ms  8.209 ms  8.189 ms
 6 72.14.222.56 (72.14.222.56)  8.012 ms 74.125.49.165 (74.125.49.165)  7.952 ms 72.14.222.56 (72.14.222.56)  7.987 ms
 7 108.170.247.225 (108.170.247.225)  8.178 ms * 8.138 ms
 8 142.250.226.113 (142.250.226.113)  9.096 ms 142.250.226.108 (142.250.226.108)  8.074 ms 108.170.247.129 (108.170.247.129)  9.071 ms
 9 142.250.226.115 (142.250.226.115)  8.687 ms lax17s44-in-f4.1e100.net (142.250.68.4)  8.056 ms  8.068 ms
-bash-4.2$

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-bash-4.2$ date
Sun Oct 3 21:00:05 PDT 2021
-bash-4.2$ traceroute www.harenet.ad.jp
traceroute to www.harenet.ad.jp (211.125.120.152), 30 hops max, 60 byte packets
 1 dc1-g-v864.ucsc.edu (128.114.104.123) 0.486 ms dc2-g-v864.ucsc.edu (128.114.104.124) 0.336 ms dc1-g-
v864.ucsc.edu (128.114.104.123) 0.538 ms
 2 core-south-g-te2-6.ucsc.edu (128.114.101.118) 0.282 ms core-north-g-te2-6.ucsc.edu (128.114.101.130)
0.250 ms core-south-g-te5-6.ucsc.edu (128.114.101.126) 0.280 ms
 3 border-north-g-te0-1-0-3.ucsc.edu (128.114.1.192) 0.831 ms border-north-g-te0-1-1-0.ucsc.edu (128.114
.1.166) 0.731 ms border-north-g-te0-1-0-3.ucsc.edu (128.114.1.192) 0.845 ms
 4 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182) 7.995 ms 8.033 ms 8.075 ms
 5 * * *
 6 lacGCS002.int-gw.kddi.ne.jp (203.181.106.153) 8.087 ms lacGCS002.int-gw.kddi.ne.jp (203.181.106.149)
8.101 ms lacGCS001.int-gw.kddi.ne.jp (203.181.106.117) 8.140 ms
 7 106.187.12.37 (106.187.12.37) 109.817 ms 106.187.12.1 (106.187.12.1) 110.687 ms 110.671 ms
 8 27.85.128.38 (27.85.128.38) 109.808 ms 27.85.128.34 (27.85.128.34) 110.031 ms 27.85.231.2 (27.85.231
.2) 114.365 ms
 9 118.159.224.50 (118.159.224.50) 114.839 ms 111.858 ms 114.840 ms
10 42.net061211190.t-com.ne.jp (61.211.190.42) 110.858 ms 158.net061211190.t-com.ne.jp (61.211.190.158)
115.283 ms 115.101 ms
11 p106.net219124151.tnc.ne.jp (219.124.151.106) 117.853 ms 117.624 ms 117.581 ms
12 * * *
13 r106.tr9.kct.ne.jp (211.125.119.106) 128.943 ms 133.352 ms 133.318 ms
14 103-14-13-3.c2.ptr.chiroro.ne.jp (103.14.13.3) 134.929 ms 129.666 ms 131.777 ms
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-bash-4.2$

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[-bash-4.2$ date
Sun Oct 3 22:07:35 PDT 2021
[-bash-4.2$ traceroute www.harenet.ad.jp
traceroute to www.harenet.ad.jp (211.125.120.152), 30 hops max, 60 byte packets
 1 dc1-g-v864.ucsc.edu (128.114.104.123) 0.487 ms dc2-g-v864.ucsc.edu (128.114.104.124) 0.249 ms 0.344 ms
 2 core-south-g-te2-6.ucsc.edu (128.114.101.118) 0.326 ms core-south-g-te5-6.ucsc.edu (128.114.101.126) 0.363 ms core-south-g-t
e2-6.ucsc.edu (128.114.101.118) 0.342 ms
 3 border-north-g-te0-1-1-0.ucsc.edu (128.114.1.66) 0.711 ms border-north-g-te0-1-0-3.ucsc.edu (128.114.1.192) 2.316 ms border-
north-g-te0-1-1-0.ucsc.edu (128.114.1.66) 2.231 ms
 4 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182) 8.143 ms 8.183 ms 8.153 ms
 5 * * *
 6 lacGCS002.int-gw.kddi.ne.jp (203.181.106.141) 8.056 ms 203.181.106.213 (203.181.106.213) 8.064 ms lacGCS001.int-gw.kddi.ne.j
p (203.181.106.113) 8.079 ms
 7 106.187.12.45 (106.187.12.45) 116.497 ms 106.187.12.49 (106.187.12.49) 111.124 ms 106.187.12.33 (106.187.12.33) 110.769 ms
 8 27.85.128.38 (27.85.128.38) 105.659 ms 27.85.128.34 (27.85.128.34) 107.059 ms 27.85.128.26 (27.85.128.26) 137.342 ms
 9 118.159.224.50 (118.159.224.50) 110.603 ms 111.818 ms 114.807 ms
10 42.net061211190.t-com.ne.jp (61.211.190.42) 110.978 ms 158.net061211190.t-com.ne.jp (61.211.190.158) 114.893 ms 42.net061211
190.t-com.ne.jp (61.211.190.42) 111.126 ms
11 p106.net219124151.tnc.ne.jp (219.124.151.106) 117.611 ms 117.718 ms 118.224 ms
12 * * *
13 r106.tr9.kct.ne.jp (211.125.119.106) 133.532 ms 129.186 ms 133.582 ms
14 103-14-13-3.c2.ptr.chiroro.ne.jp (103.14.13.3) 137.846 ms 135.159 ms 135.443 ms
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-bash-4.2$

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-bash-4.2$ date
Sun Oct 3 23:08:24 PDT 2021
-bash-4.2$ traceroute www.harenet.ad.jp
traceroute to www.harenet.ad.jp (211.125.120.152), 30 hops max, 60 byte packets
 1 dc1-g-v864.ucsc.edu (128.114.104.123) 0.367 ms dc2-g-v864.ucsc.edu (128.114.104.124) 0.316 ms dc1-g-v864.ucsc.edu (128.114.104.123) 0.412 ms
 2 core-south-g-te5-6.ucsc.edu (128.114.101.126) 0.273 ms core-north-g-te2-6.ucsc.edu (128.114.101.130) 9.719 ms 9.763 ms
 3 border-north-g-te0-1-1-0.ucsc.edu (128.114.1.66) 0.826 ms border-north-g-te0-1-0-3.ucsc.edu (128.114.1.192) 1.006 ms border-north-g-te0-1-1-0.ucsc.edu (128.114.1.66) 0.920 ms
 4 dc--lax-agg10--ucsc--100g.cenic.net (137.164.23.182) 11.736 ms 11.706 ms 11.697 ms
 5 * * *
 6 lacGCS001.int-gw.kddi.ne.jp (203.181.106.117) 8.082 ms lacGCS002.int-gw.kddi.ne.jp (203.181.106.153) 8.098 ms 203.181.106.201 (203.181.106.201) 8.121 ms
 7 106.187.12.49 (106.187.12.49) 112.114 ms 106.187.12.1 (106.187.12.1) 111.055 ms 106.187.12.37 (106.187.12.37) 107.679 ms
 8 27.85.128.46 (27.85.128.46) 109.816 ms 114.020 ms 27.85.128.30 (27.85.128.30) 109.997 ms
 9 118.159.224.50 (118.159.224.50) 110.492 ms 114.791 ms 115.003 ms
10 158.net061211190.t-com.ne.jp (61.211.190.158) 112.310 ms 111.362 ms 111.457 ms
11 p106.net219124151.tnc.ne.jp (219.124.151.106) 117.618 ms 122.064 ms 117.778 ms
12 * * *
13 r106.tr9.kct.ne.jp (211.125.119.106) 129.217 ms 129.166 ms 129.135 ms
14 103-14-13-3.c2.ptr.chiroro.ne.jp (103.14.13.3) 133.802 ms 135.469 ms 130.712 ms
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-bash-4.2$
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