# Using Splunk To Monitor Network Connectivity and Quality

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Twitter: @dmuth

None of the things I am about to say should be considered as speaking for Splunk, and definitely not for my employer.

You interrupted my tachyon detection grid

for THIS?

# How My Obsession Started

```
root@9472fb8370bd:/# ping -c 10 google.com
PING google.com (172.217.6.206) 56(84) bytes of data.
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=1 ttl=37 time=20.9 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=2 ttl=37 time=13.2 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=3 ttl=37 time=13.9 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=4 ttl=37 time=13.7 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=5 ttl=37 time=294 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=6 ttl=37 time=14.0 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=7 ttl=37 time=13.7 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=8 ttl=37 time=13.6 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=9 ttl=37 time=13.8 ms
64 bytes from lga25s54-in-f206.1e100.net (172.217.6.206): icmp_seq=10 ttl=37 time=12.9 ms

--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9015ms
rtt min/avg/max/mdev = 12.925/42.447/294.451/84.030 ms
```

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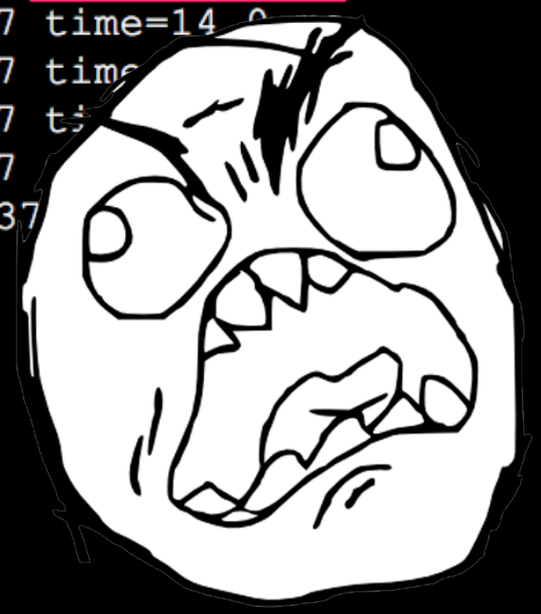

# Let's Do This A Little Longer

```
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=289 ttl=37 time=15.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=290 ttl=37 time=13.4 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=291 ttl=37 time=13.8 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=292 ttl=37 time=13.0 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=293 ttl=37 time=13.1 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=294 ttl=37 time=12.5 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=295 ttl=37 time=13.3 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=296 ttl=37 time=12.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=297 ttl=37 time=12.6 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=298 ttl=37 time=18.2 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=299 ttl=37 time=12.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=300 ttl=37 time=13.3 ms

--- google.com ping statistics ---
300 packets transmitted, 297 received, 1% packet loss, time 299638ms
rtt min/avg/max/mdev = 12.145/13.656/28.737/2.012 ms
```

# Let's Do This A Little Longer

```
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): icmp_seq=289 ttl=37 time=15.9 ms
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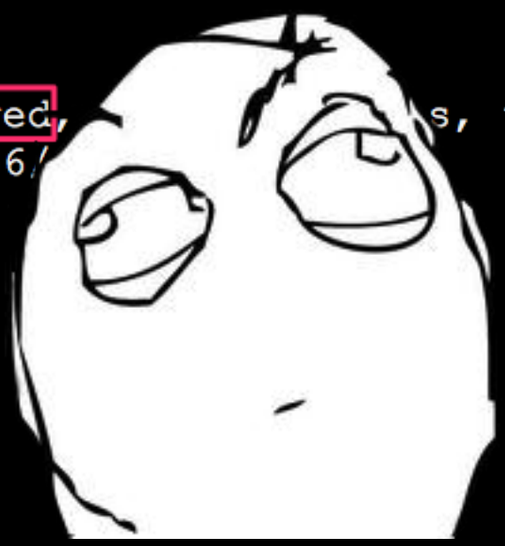
```

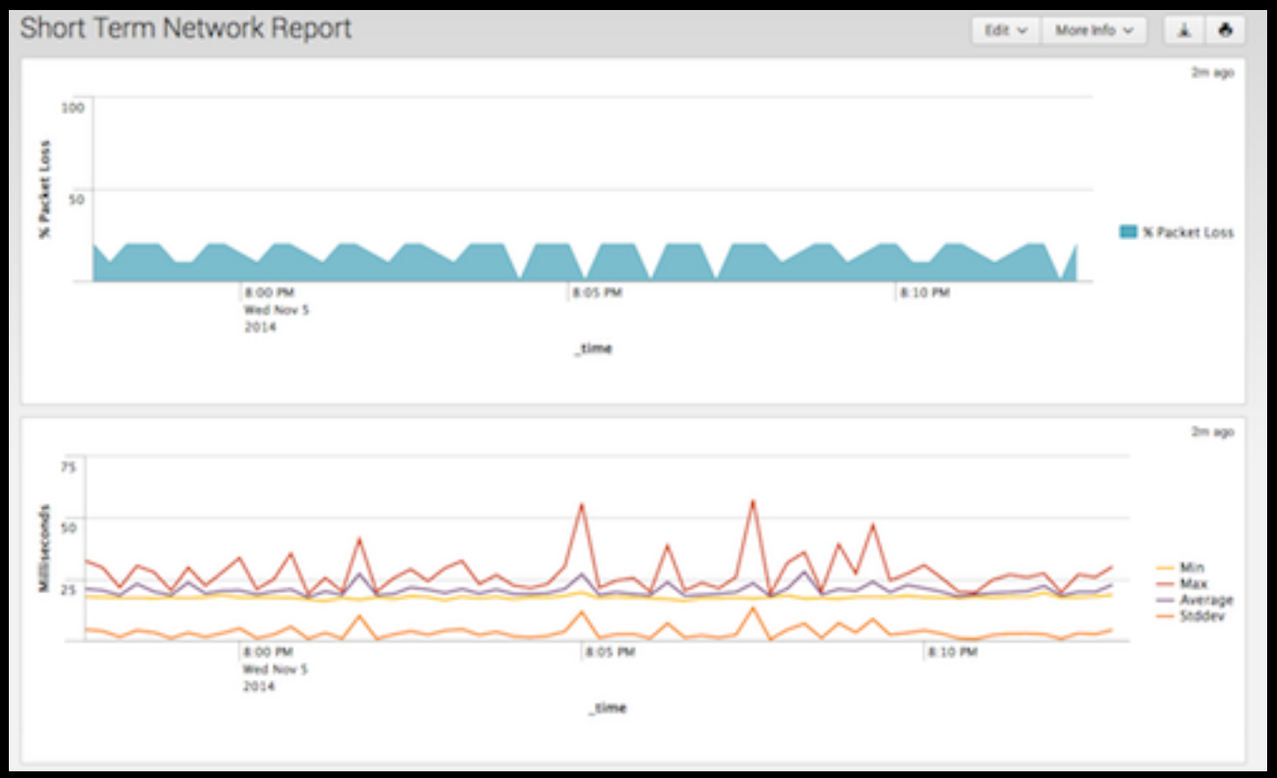


# How About MTR?

```
Sat Oct 20 13:55:18 EDT 2018
Running 'mtr  -4  --report --report-cycles 10 google.com'...
Start: Sat Oct 20 13:55:18 2018
HOST: CheetahCollector.localdomai Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- ubnt                        0.0%    10    0.6   0.5   0.4   0.6   0.0
  2.|-- 10.0.0.1                    0.0%    10    0.7   1.0   0.7   1.4   0.0
  3.|-- 96.120.76.109               0.0%    10    8.6   8.6   7.3  11.0   0.9
  4.|-- xe-10-2-0-32767-sur01.bal   0.0%    10   11.6   8.6   7.7  11.6   1.1
  5.|-- be-8-ar03.newcastle.de.pa   0.0%    10    9.5  10.0   9.2  11.6   0.5
  6.|-- be-202-ar03.ivyland.pa.pa   0.0%    10    9.6  10.0   9.1  12.2   0.8
  7.|-- 69.241.64.98                0.0%    10   11.4  12.3  11.3  13.7   0.5
  8.|-- ???                       100.0    10    0.0   0.0   0.0   0.0   0.0
  9.|-- 108.170.227.210             0.0%    10   12.1  12.9  11.9  17.2   1.5
 10.|-- 108.170.248.99              0.0%    10   12.2  13.5  11.7  20.7   2.6
 11.|-- 209.85.255.52               0.0%    10   13.3  13.4  12.8  14.5   0.3
 12.|-- 209.85.254.138              0.0%    10   12.8  14.7  12.6  20.9   2.8
 13.|-- 108.170.248.1               0.0%    10   14.1  14.3  13.3  14.9   0.3
 14.|-- 72.14.234.65                0.0%    10   14.8  13.6  12.4  14.8   0.5
 15.|-- lga25s61-in-f14.1e100.net   0.0%    10   13.4  12.9  12.3  13.6   0.0
```

- MTR was a nice idea, but ultimately didn't pan out

# My First Attempt With Splunk




- You had to install Splunk manually
- Reproducible builds were a challenge

# Docker to the Rescue!

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- ```
  docker run -p 8000:8000 \
      -v $(pwd)/splunk-data:/opt/splunk/var/lib/splunk/defaultdb \
      dmuth1/splunk-network-health-check
  ```
  ```

# Let's Monitor Multiple Hosts

- Ping had issues
- Could only ping one host at a time
- Pinging multiple hosts created spikes in load every 10 seconds when the process exited and was restarted.
- ...and that's no good. This is meant to be run on laptops!

# Maybe fping is a good idea?

```
[CheetahCollector:~ ] $ fping -c 4 1.1.1.1 8.8.8.8 google.com cnn.com
1.1.1.1    : [0], 84 bytes, 12.7 ms (12.7 avg, 0% loss)
8.8.8.8    : [0], 84 bytes, 12.5 ms (12.5 avg, 0% loss)
google.com : [0], 84 bytes, 12.4 ms (12.4 avg, 0% loss)
cnn.com    : [0], 84 bytes, 11.8 ms (11.8 avg, 0% loss)
1.1.1.1    : [1], 84 bytes, 12.1 ms (12.4 avg, 0% loss)
8.8.8.8    : [1], 84 bytes, 11.6 ms (12.1 avg, 0% loss)
google.com : [1], 84 bytes, 12.2 ms (12.3 avg, 0% loss)
cnn.com    : [1], 84 bytes, 11.6 ms (11.7 avg, 0% loss)
1.1.1.1    : [2], 84 bytes, 12.1 ms (12.3 avg, 0% loss)
8.8.8.8    : [2], 84 bytes, 12.8 ms (12.3 avg, 0% loss)
google.com : [2], 84 bytes, 11.9 ms (12.2 avg, 0% loss)
cnn.com    : [2], 84 bytes, 11.6 ms (11.7 avg, 0% loss)
1.1.1.1    : [3], 84 bytes, 12.2 ms (12.2 avg, 0% loss)
8.8.8.8    : [3], 84 bytes, 12.1 ms (12.3 avg, 0% loss)
google.com : [3], 84 bytes, 19.9 ms (14.1 avg, 0% loss)
cnn.com    : [3], 84 bytes, 11.7 ms (11.7 avg, 0% loss)

1.1.1.1    : xmt/rcv/%loss = 4/4/0%, min/avg/max = 12.1/12.2/12.7
8.8.8.8    : xmt/rcv/%loss = 4/4/0%, min/avg/max = 11.6/12.3/12.8
google.com : xmt/rcv/%loss = 4/4/0%, min/avg/max = 11.9/14.1/19.9
cnn.com    : xmt/rcv/%loss = 4/4/0%, min/avg/max = 11.6/11.7/11.8
```

# Maybe fping is a good idea?


- ...if you like time travel!


...so I had to hack ping

# How ping behaves now

```
root@9472fb8370bd:/mnt/splunk-app/bin# /iputils/ping google.com
PING google.com (172.217.11.46) 56(84) bytes of data.
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=1 ttl=37 time=12.7 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=2 ttl=37 time=12.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=3 ttl=37 time=13.1 ms
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64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=6 ttl=37 time=12.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=7 ttl=37 time=12.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=8 ttl=37 time=14.6 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=9 ttl=37 time=12.10 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=10 ttl=37 time=12.8 ms
target=google.com transmitted=10 received=10
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=11 ttl=37 time=12.8 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=12 ttl=37 time=13.5 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=13 ttl=37 time=13.6 ms
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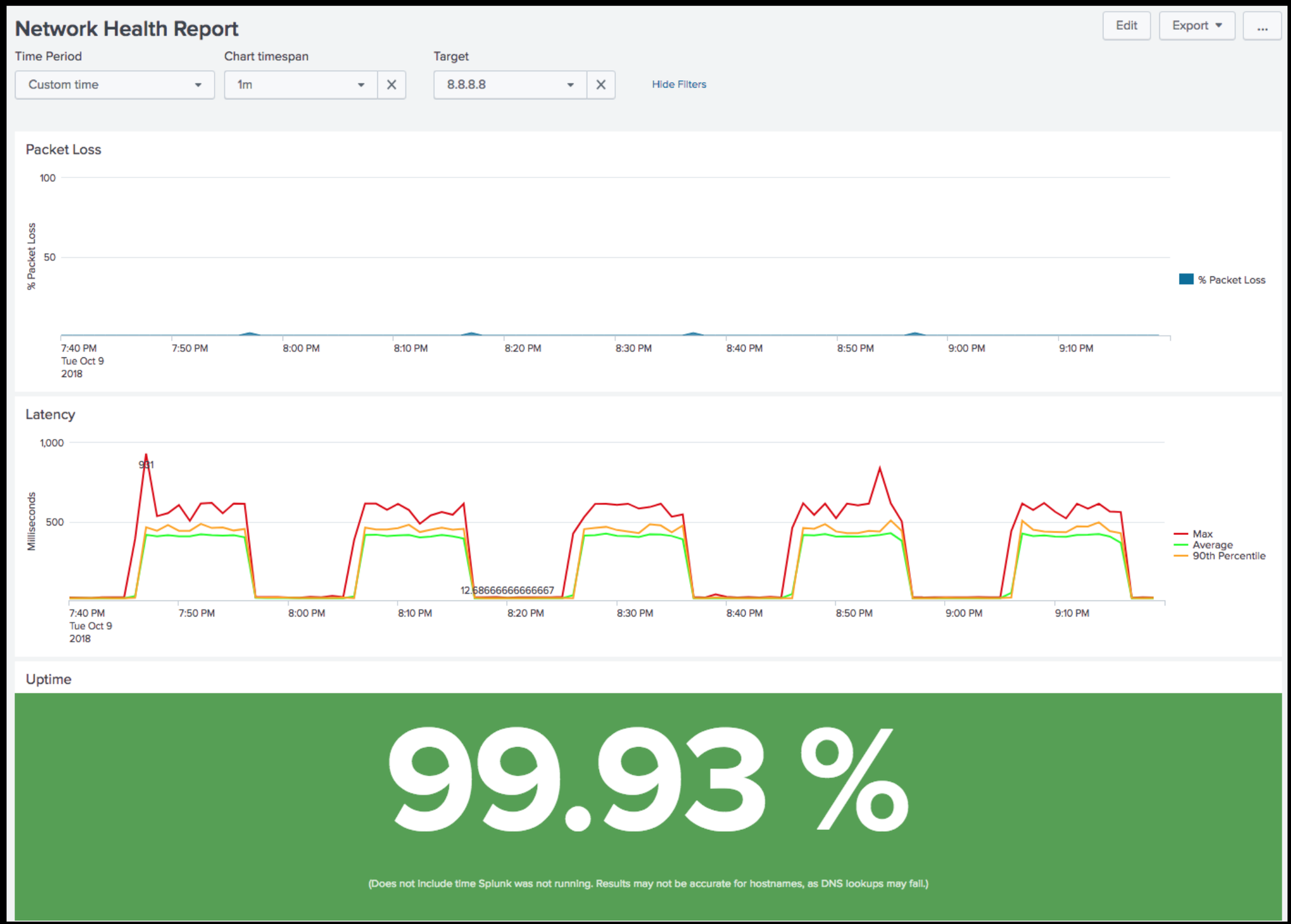
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=15 ttl=37 time=20.9 ms
64 bytes from lga25s61-in-f14.1e100.net (172.217.11.46): target=google.com icmp_seq=16 ttl=37 time=12.2 ms
```

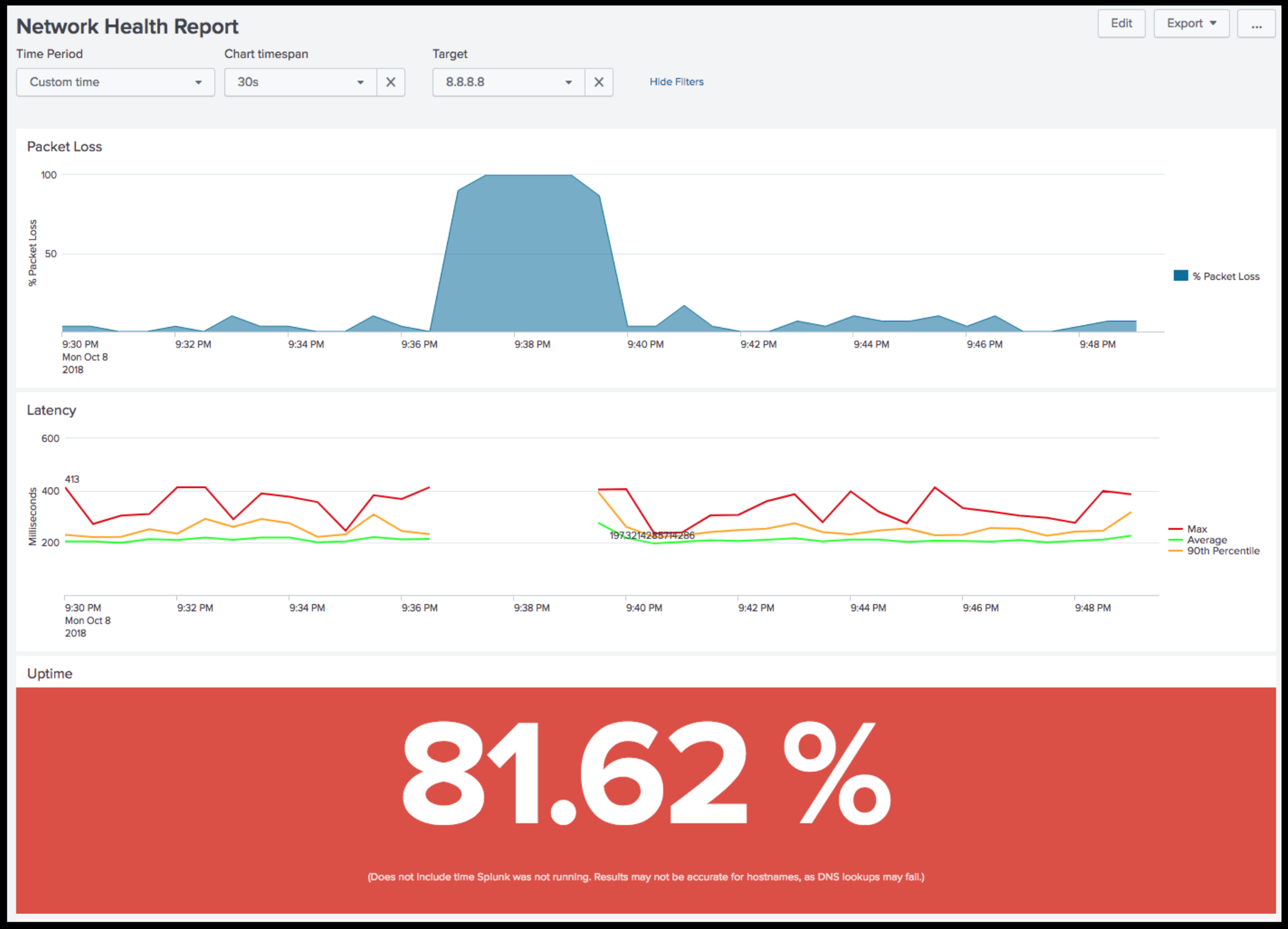
- Runs normally, but prints a checkpoint every 10 s
- Also lets me track individual packets, get percentiles, etc.

# In The Real World

# When Firewalls Go Bad



# Train Tunnels



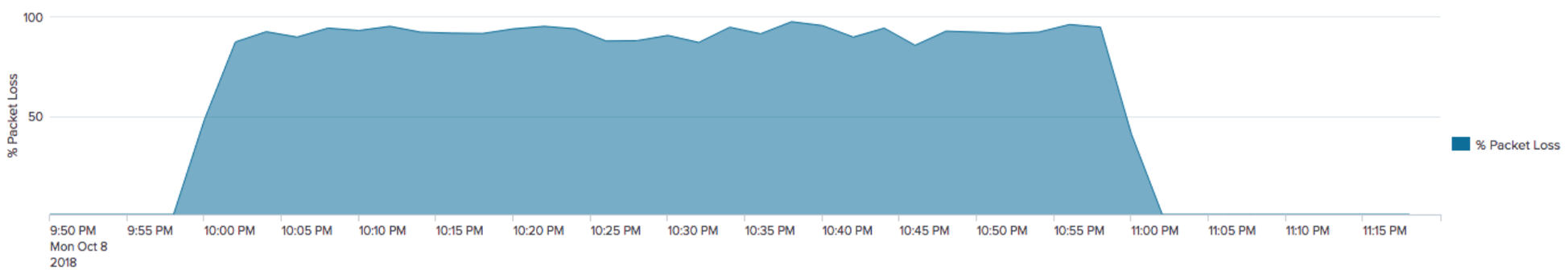
# Internet Outages

## Network Health Report

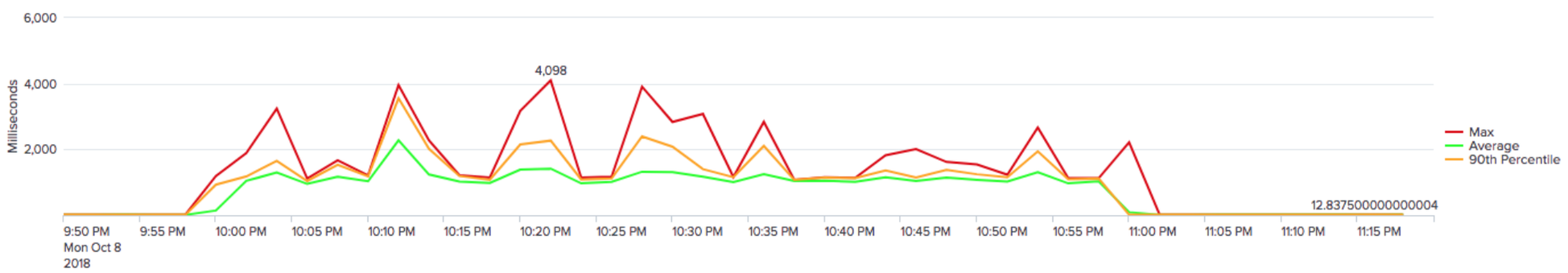
Edit | Export | ...

Time Period: Custom time | Chart timespan: 2m | Target: 8.8.8.8 | Hide Filters

### Packet Loss




### Latency




### Uptime

**38.47 %**

(Does not include time Splunk was not running. Results may not be accurate for hostnames, as DNS lookups may fail.)

# Live Demo

# Additional Resources

- github.com/dmuth/splunk-network-health-check
- github.com/dmuth/splunk-lab
- github.com/dmuth/presentations
- docker.com
- Twitter: @dmuth

# Questions?