Yeti Many Master Verifier

Shane Kerr / BII Labs / shane@biigroup.cn

2016-11-12 / Seoul · 서울 / Yeti Workshop
Yeti Needs Traffic

- Yeti is a production testbed
- In order to fulfill this goal, Yeti needs lots of real traffic
- DNS caching makes it very difficult to get large amounts of traffic
  - Even a very, very busy cluster of servers produces a trickle of queries
  - Google servers each send <50 queries/second to IANA root servers\(^1\)

\(^1\) [http://recs.conf.meetecho.com/Playout/wa...pter_1](http://recs.conf.meetecho.com/Playout/wa...pter_1) (starting around 20:20)
Sources of Traffic

• Real resolvers configured for Yeti
  – The ”gold standard” for traffic
  – May harm users, since Yeti is experimental!

• Synthetic traffic
  – Easy to generate
  – Can stress network and servers

• Mirrored production traffic
  – Real traffic, good for Yeti load & patterns
  – Problems in Yeti not detected
ymmv

- Another way to generate Yeti traffic
- Mirrored production traffic++
  - IANA answers compared with Yeti answers
ymmv: Design Goals

• Easy
  – Simple for administrators to install & run
  – Flexible, works with existing environments

• Informative
  – For administrators
  – For Yeti operators

• Safe
  – Does not affect production service
  – Privacy-maintaining
ymmv: Design Choices

- Go language for implementation
  - Relatively fast, good concurrency support
  - Great DNS library
  - Compiles to static binaries
  - Dependencies are painless
- Input handled via separate component
  - Allows migrating to alternate format later
- Simple command-line application
ymmv: Components
ymmv: Components

- pcap as input
  - dnstap or CBOR might be better eventually
  - tcpdump, tshark, dnscap, ...
  - Can be live or replayed (live probably better)
- Pcap2ymmv
  - Convert pcap to custom format
  - Looks for traffic to IANA root servers
  - Matches queries & answers
- ymmv
  - Does actual queries & comparisons
ymmv: Features

- Detect IANA vs. Yeti differences
- Compare IANA vs. Yeti performance
- Server selection: RTT, round-robin, random, all
- Default to unusual EDNS buffer size (4093)
- Obfuscate query names (by default)
  - example ➔ example
  - foo.example ➔ ymmv.845a838696ae1e5a.example
- Send daily reports (opt-in) via SMTP or Sendmail
ymmv: Usage [1 of 3]

$ nohup capture.sh eth0 &>/dev/null &
$ nohup capture.sh he-ipv6 &>/dev/null &
$ ps axo args | grep tcpdump | grep -v grep
tcpdump -i eth1 -w- -U -q udp port 53
tcpdump -i he-ipv6 -w- -U -q udp port 53
$ ps axo args | grep ymmv | grep -v grep
./../pcap2ymmv/pcap2ymmv
./../ymmv/ymmv -v 1 -p /tmp/ymmv-eth1-perf -d /tmp/ymmv-eth1-diff -r -sendmail
./../pcap2ymmv/pcap2ymmv
./../ymmv/ymmv -v 1 -p /tmp/ymmv-he-ipv6-perf -d /tmp/ymmv-he-ipv6-diff -r -sendmail -mail-to=shane@blij.tk
### ymmv: Usage [3 of 3]

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-v 1</td>
<td>Increase verbosity of logging. By default, logs are placed in uniquely-named files in <code>/tmp</code> by the Go logging library.</td>
</tr>
<tr>
<td>-p <code>file_name_base</code></td>
<td>File name to log performance to, as a CSV file. Gets date appended.</td>
</tr>
<tr>
<td>-d <code>file_name_base</code></td>
<td>File name to log differences to. Gets date appended.</td>
</tr>
<tr>
<td>-r</td>
<td>Send daily reports of performance &amp; differences via e-mail</td>
</tr>
<tr>
<td>-sendmail</td>
<td>Use local sendmail for e-mail (the other option is SMTP)</td>
</tr>
<tr>
<td>-mail-to <code>email_address</code></td>
<td>The e-mail address to send to</td>
</tr>
</tbody>
</table>
Some Differences Discovered

- TTL problem with TISF server [fixed]
- Query with ‘%’ broke PowerDNS [fixed]
- Query for DS records returns additional section from Bundy server [open]
IANA RTT (IPv4) vs. Yeti RTT (IPv6)

Yeti 40 millisecond slower on average, a 105% difference.
IANA RTT (IPv6) vs. Yeti RTT (IPv6)

Yeti 24 millisecond slower on average, a 50% difference.
RTT Comparison Analysis

- Yeti than IANA is slower in Amsterdam
  - IPv6 vs. IPv6 comparison most interesting
- Not surprising... there are at least 4 IANA root servers at AMS-IX
- Server selection algorithm has huge impact
- Ability for any operator to perform similar RTT comparison may be interesting
- Getting such comparison from more locations may be interesting.
Summary

- ymmv should be easy to run
- ymmv can provide us traffic
- ymmv can give us insight into Yeti
- Please use it! 😊

- http://dnsv6lab.net/2016/10/13/ymmv/