Yeti DNS Project Status

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2016-11-12 / Seoul / Yeti DNS Workshop

Outline

- Yeti DNS Project Review

- Yeti DNS Findings

  - Experiment findings

  - Operational issues

  - Preliminary result from Yeti data

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What Is Yeti?

- The Yeti DNS Project is a live root DNS server system testbed for advanced root services and some trials on IPv6-only operation, DNSSEC key rollover, renumbering issues, scalability issue, and so on.

- The goal of this parallel root system is to discover the limits of DNS root name services and **deliver useful technical output**.

https://yeti-dns.org/

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Why: Problem Space of Yeti(1)

Conflict between DNS Centralization Vs. Network Autonomy

- **External Dependency**
  - Local services rely on external root services
  - Require external management and support

- **Surveillance risk**
  - Information leakage cause by the DNS Root lookup
  - RFC7626: DNS Privacy Considerations, by S. Bortzmeyer

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Why: Problem Space of Yeti(1)

Co...

• E

• S

Why: Problem Space of Yeti(2)

- **Can IPv6-only DNS survive?**
  - Some DNS servers which support both A & AAAA (IPv4 & IPv6) records still do not respond to IPv6 queries
  - IPv6 introduces larger MTU (1280 bytes) , but a different fragmentation model
- **Is it ready for KSK Rollover, or not?**
  - Not all resolver is compliant to RFC5011
  - Larger packets will introduce risks during ksk/zsk rollover
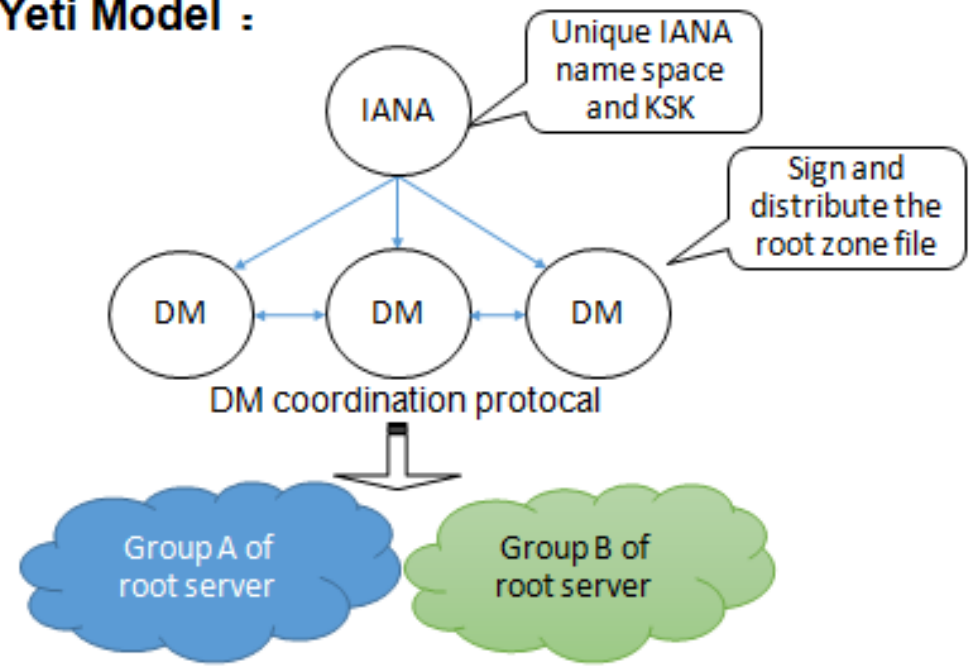- **And, Renumbering issue**

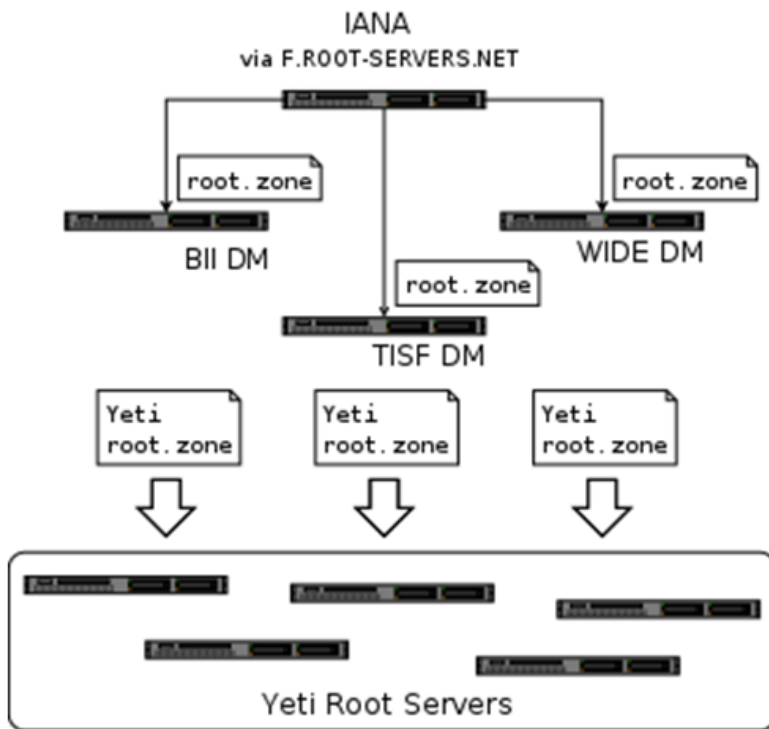 https://github.com/BII-Lab/Yeti-Project/blob/master/doc/Yeti_PS.md

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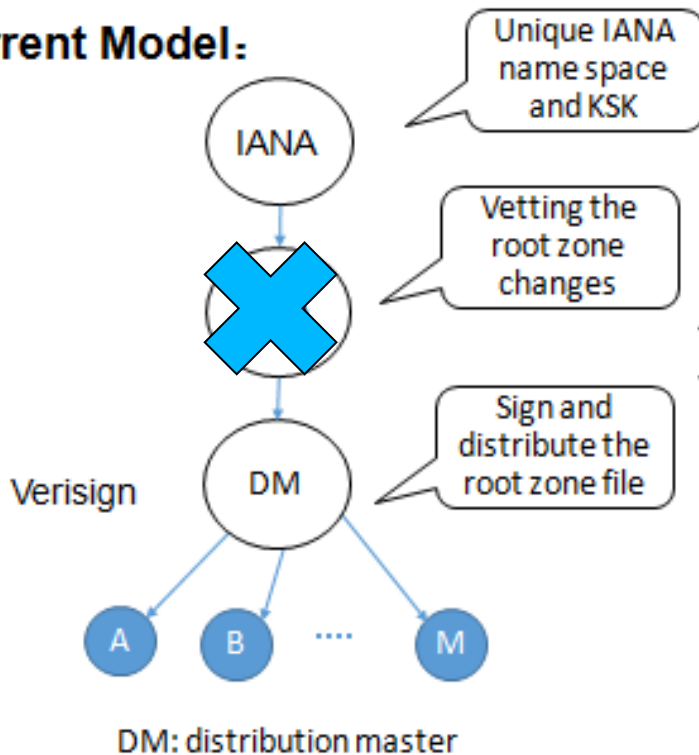
Source : 2015-11-15 Yeti DNS Workshop @ Yokohama presented by Davey Song

Three DMs setup and coordination

Timing setting

Time of Fetching the zone

DM	Time
BII	*hour* + 00
WIDE	*hour* + 20
TISF	*hour* + 40

Synchronizing
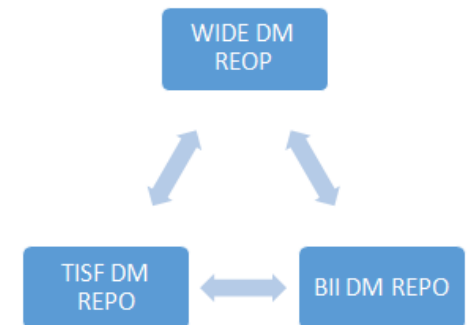
KSK, ZSK, server list,
IANA serial number

https://github.com/BII-Lab/Yeti-Project/blob/master/doc/Yeti-DM-Setup.md
https://github.com/BII-Lab/Yeti-Project/blob/master/doc/Yeti-DM-Sync.md

Source : 2015-11-15 Yeti DNS Workshop @ Yokohama presented by Davey Song

Major Events and Activities in Yeti Testbed

Yeti experiments
New Root servers

yeti.aquaray.com

dahu2.yeti.eu.org

yeti.mind-dns.nl

yeti-ns.switch.ch

First Yeti
KSK rollover
June 30, 2015

yeti-ns.datev.net.

yeti.mind-dns.nl

Yeti DNS Project
founded with 3
DM/Root servers

May 8, 2015

yeti-ns.conit.co

yeti-ns.lab.nic.cl

yeti-dns02.dnsworkshop.org
A Windows Server

yeti-ns.ix.ru

yeti-dns01.dnsworkshop.org

MZSK experiment
February 17, 2016

Second Yeti
KSK rollover
July 12, 2016

dahu1.yeti.eu.org

yeti.ipv6.ernet.in

Add 8 additional server

yeti-ns.as59715.net

yeti.bofh.priv.at

yeti1.ipv6.ernet.in
मूल. येती. भारत

ns-yeti.bondis.org

BZSK experiment
2048 bit ZSK
May, 8,, 2016

May 2015   Jun 2015   Jul 2015   Aug 2015   Oct 2015   Nov 2015   Feb 2016   April 2016   May 2016   Jun 2016   Jul 2016   Sep 2016

Yeti Root Operators

Current Need: Traffic

- DNS caching is really efficient

- <100 queries/second

- Please help!

  - Set up a Yeti resolver
    http://yeti-dns.org/join.html

  - Use dnsdist with a Yeti resolver
    http://yeti-dns.org/.../Mirroring-traffic-using-dnsdist.html

  - Try the ymmv query mirror (alpha code)
    https://github.com/shane-kerr/ymmv

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Experiments and findings

- Yeti is for research!

Yeti Operation Issues

- ## Yeti Root naming

  - Like bii.dns-lab.net, yeti-ns.wide.ad.jp, yeti-ns.tisf.net

- ## Root Glue issues (**Resolved!**)

  - Current root servers answer for the `root-servers.net` zone, but Yeti root server dose not (independent domain),Without this setup, BIND 9 does not include glue in answers to priming queries.

  - Resolved! With a patch for BIND9

Yeti Operation Issues

- ## A Bug in Knot 2.0 (**Resolved!)**

  - Knot 2 compress even the root. It is useless since it is a zero-length label, only one byte. Knot 1.6 used for K-root do not do that

  - https://gitlab.labs.nic.cz/labs/knot/issues/398

Yeti Operation Issues

- Dnscap process crashed
  - Dnscap bug dropping some IPv6 packets
  - Disk is full(logs, pcaps) , Resolved!

- Zone transfer failed
  - Multiple IPv6 address (EUI-64 address)
  - zone transfer delayed (Bundy)
  - IPv6 fragment lost

# Other Operation Issues

- DNS software problem
  - process crashed
  - process hang
- DNS configure issue
  - wrong DM address
- Hardware problem
  - power failure
  - server down
- network problem
  - IPv6 networking unreachable
  - firewall rules
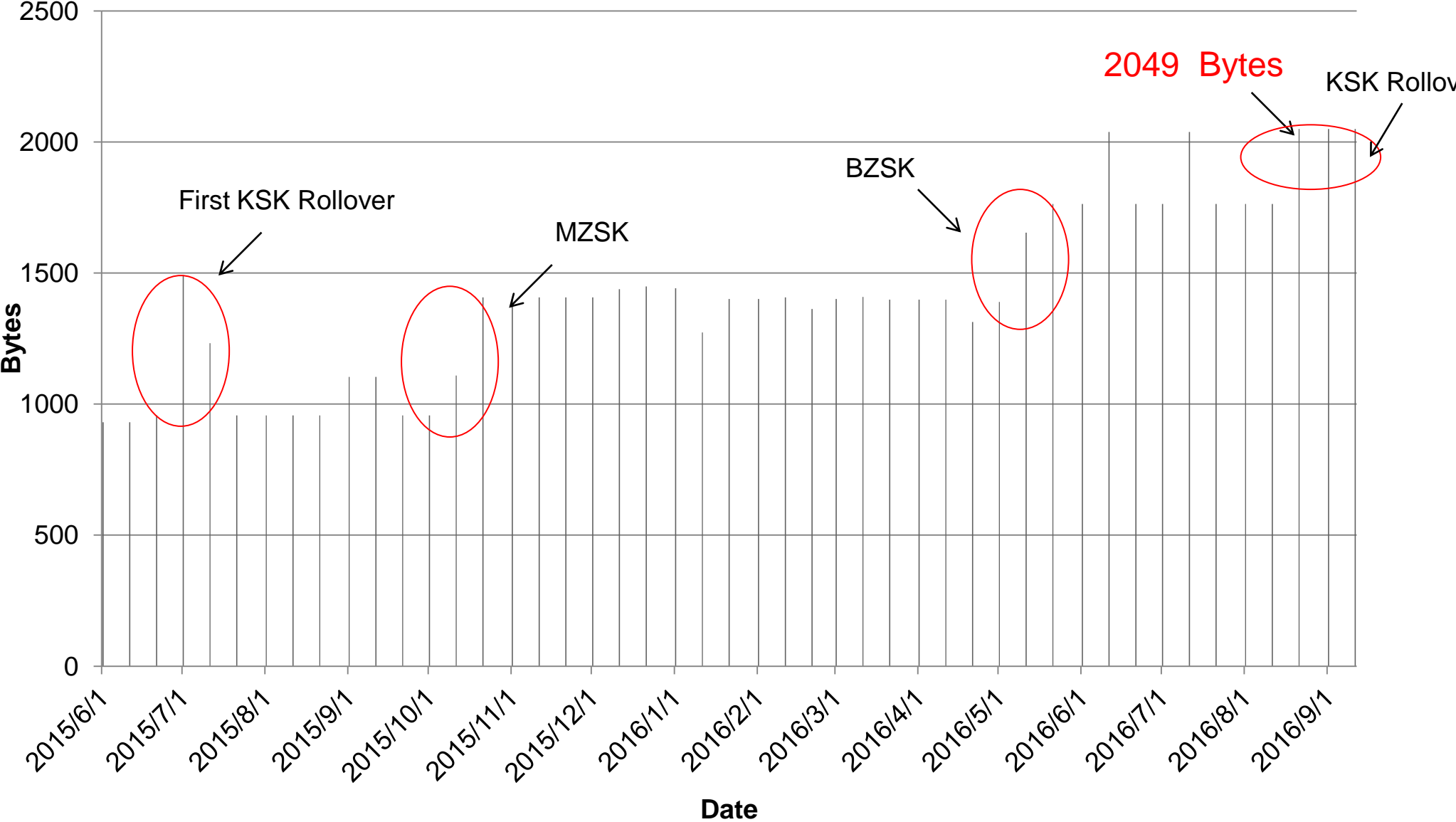
Preliminary analysis of Yeti data

- Use Entrada to analysis Yeti traffic data
  - ✓ http://entrada.sidnlabs.nl/

- Prelimilary findings
  - ✓ The packet size and impact
  - ✓ Information about Resolvers

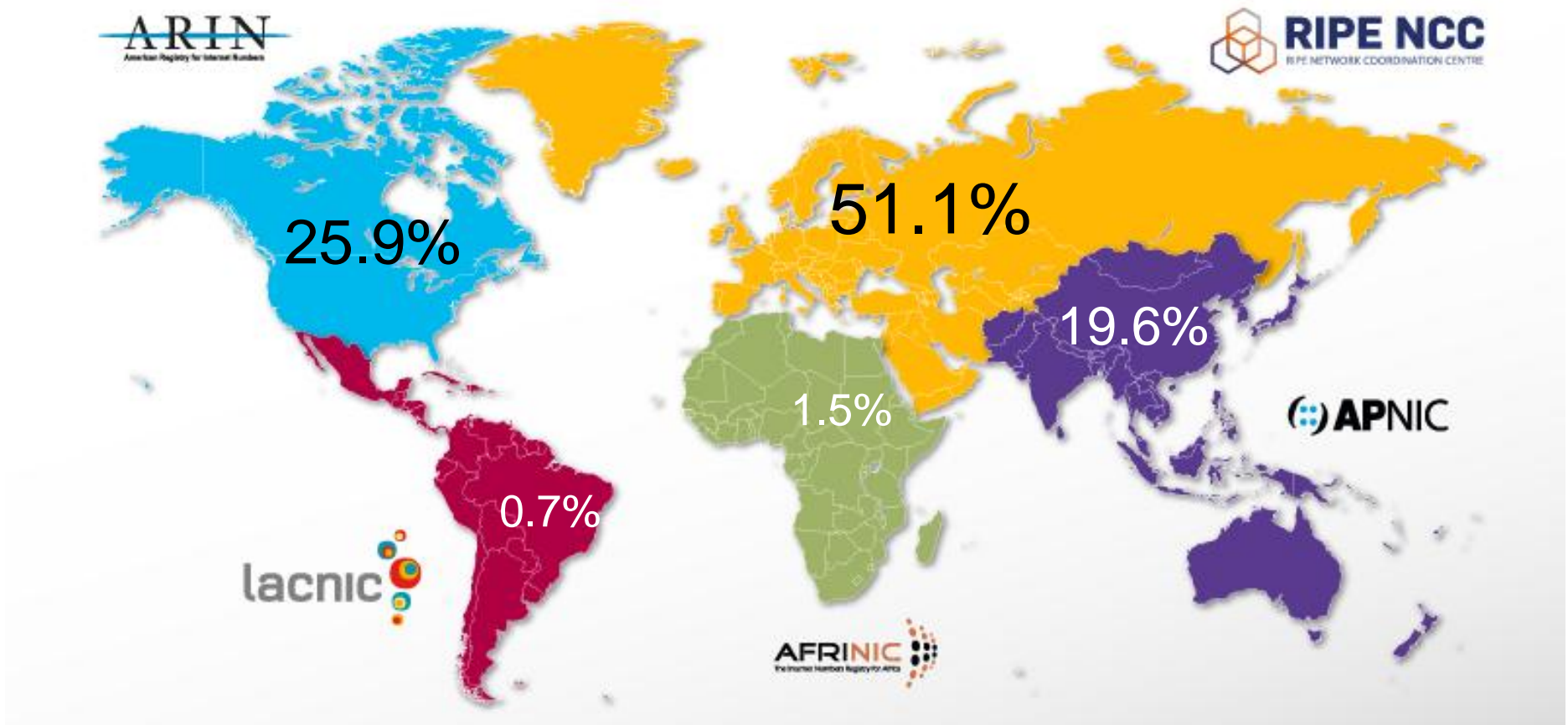# Length of Priming Response

Response length of NS query
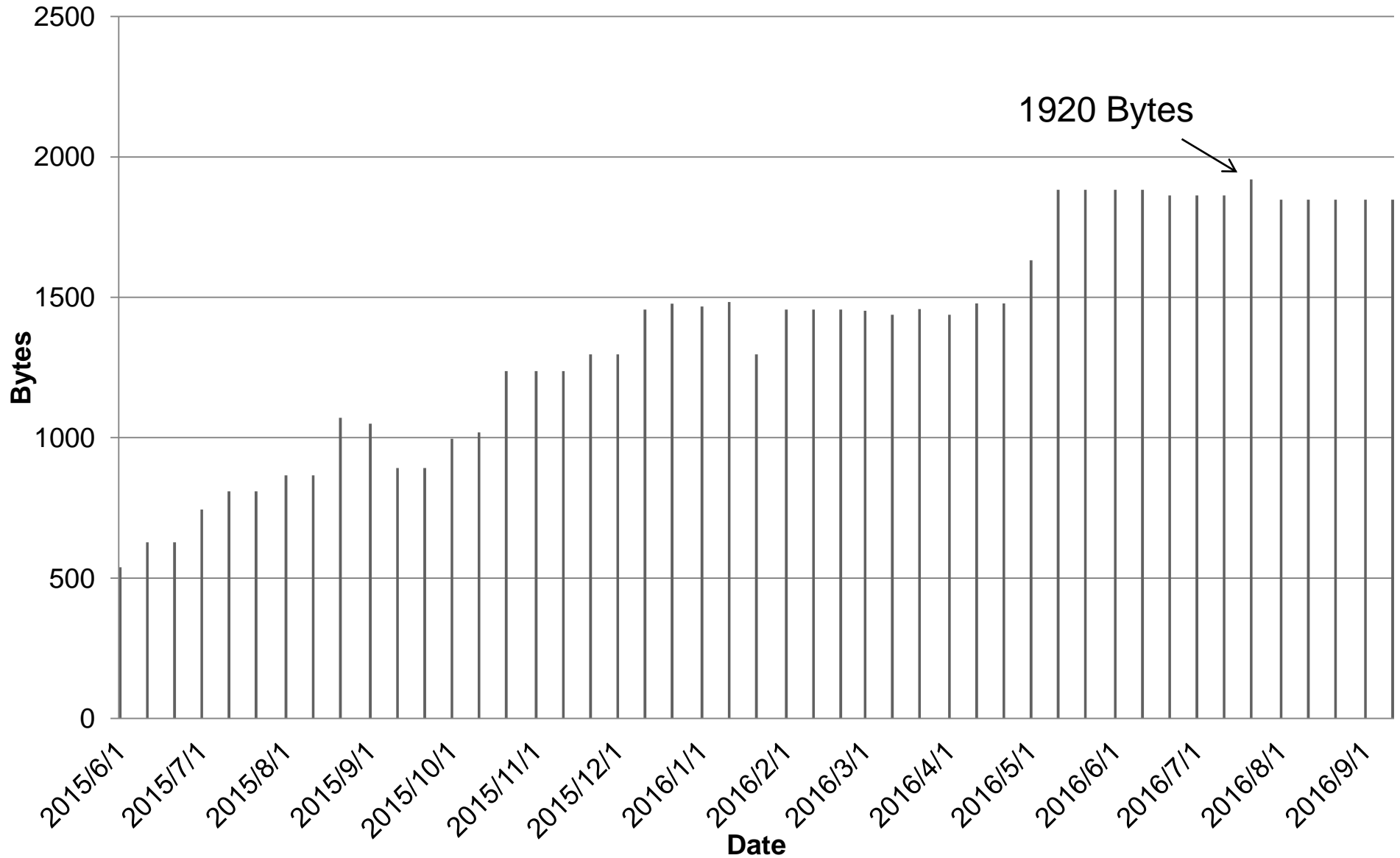
Length of DNSKEY response

Yeti Resolvers

Prefix	Number
::/128	2391
::/64	1509
::/32	716

The Active IPv6 Prefix

240c::/28	BII	CN
2001:6d0:6d06::/48	MSK-IX	RU
2001:1488::/32	CZ.NIC	CZ
2001:620::/32	SWITCH	CH
2001:470::/32	Hurricane Electric, Inc.	US
2001:0DA8:0202::/48	BUPT6-CERNET2	CN
2001:19f0:6c00::/38	Choopa, LLC	US
2001:da8:205::/48	BJTU6-CERNET2	CN
2001:62a::/31	Vienna University Computer Center	AT
2a02:2478::/32	Profitbricks GmbH	DE
2001:1398:4::/48	NIC Chile	CL
2001:4490:dc4c::/46	NIB (National Internet Backbone)	IN
2a02:aa8:0:2000::/52	T-Systems-Eltec	ES
2a01:cb04::/30	Orange S.A.	FR
2a03:b240::/32	Netskin GmbH	CH
2801:1a0::/42	Universidad de Ibague	CO
2a00:1cc8::/40	ICT Valle Umbra s.r.l.	IT
2a02:cdc0::/29	ORG-CdSB1-RIPE	IT
2001:620::/32	SWITCH	CH

Preliminary Observation

- Packet size grows steadily

- Retry and TCP-fallback observed

- No IPv4 and IPv6 data comparison

- Some Data is corrupted and messy

- More than half of resolvers come from Europe

- Our Root server operator contribute most traffic

Conclusion

- Results are finally appearing

- Don't forget to send us queries!

More information

Yeti DNS project : www.yeti-dns.org