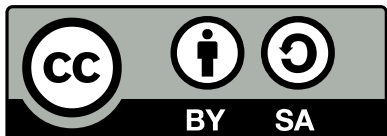


# Yeti DNS

ICANN 53 Tech Day

Shane Kerr / Bii Lab  
2015-10-19 / Dublin, Ireland

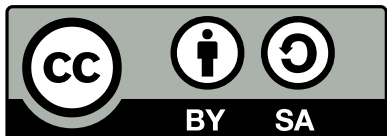


# Origin Story



Once upon a time at WIDE Camp, Davey Song and Paul Vixie were wondering if there was a way to research the DNS root server system without process or political issues.

”If only there was a way to look at technical questions in a scientific way... a way to strictly research... if only...”

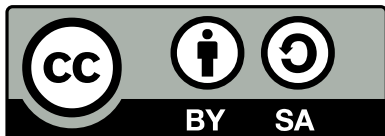




# DNS Root Server System

- 12 root server operators
- More than 475 anycast nodes

Hostname	IP Addresses	Manager
a.root-servers.net	198.41.0.4, 2001:503:ba3e::2:30	VeriSign, Inc.
b.root-servers.net	192.228.79.201, 2001:500:84::b	University of Southern California (ISI)
c.root-servers.net	192.33.4.12, 2001:500:2::c	Cogent Communications
d.root-servers.net	199.7.91.13, 2001:500:2d::d	University of Maryland
e.root-servers.net	192.203.230.10	NASA (Ames Research Center)
f.root-servers.net	192.5.5.241, 2001:500:2f::f	Internet Systems Consortium, Inc.
g.root-servers.net	192.112.36.4	US Department of Defence (NIC)
h.root-servers.net	128.63.2.53, 2001:500:1::803f:235	US Army (Research Lab)
i.root-servers.net	192.36.148.17, 2001:7fe::53	Netnod
j.root-servers.net	192.58.128.30, 2001:503:c27::2:30	VeriSign, Inc.
k.root-servers.net	193.0.14.129, 2001:7fd::1	RIPE NCC
l.root-servers.net	199.7.83.42, 2001:500:3::42	ICANN
m.root-servers.net	202.12.27.33, 2001:dc3::35	WIDE Project



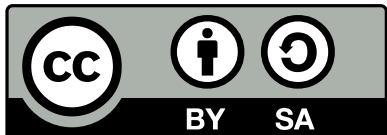
<https://www.iana.org/domains/root/servers>



# Politics



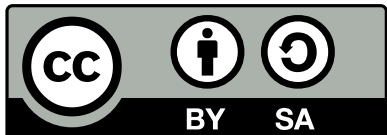
- Root server system does not evolve
  - Roughly identical to 15 years ago
  - Stopped changing when Jon Postel died
- Presence & "ownership" of root servers
  - Countries perceive as crucial infrastructure
  - US dominance of root servers a concern
- Feelings not grounded in technical issues
  - But still real!



# Yeti DNS: An DNS Root Server Testbed



- Many things to test about the DNS root
  - DNSSEC parameters & operations
  - Root server renumbering
  - Adding/removing root servers
  - Scaling Limitations
  - IPv6-only operation!
- Cannot use production root servers
  - Large-Scale testbed (Yeti) vs. lab testing

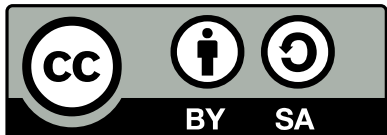


<https://yeti-dns.org>

# Yeti DNS: NOT a Alternate Namespace



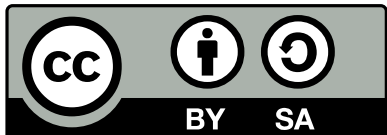
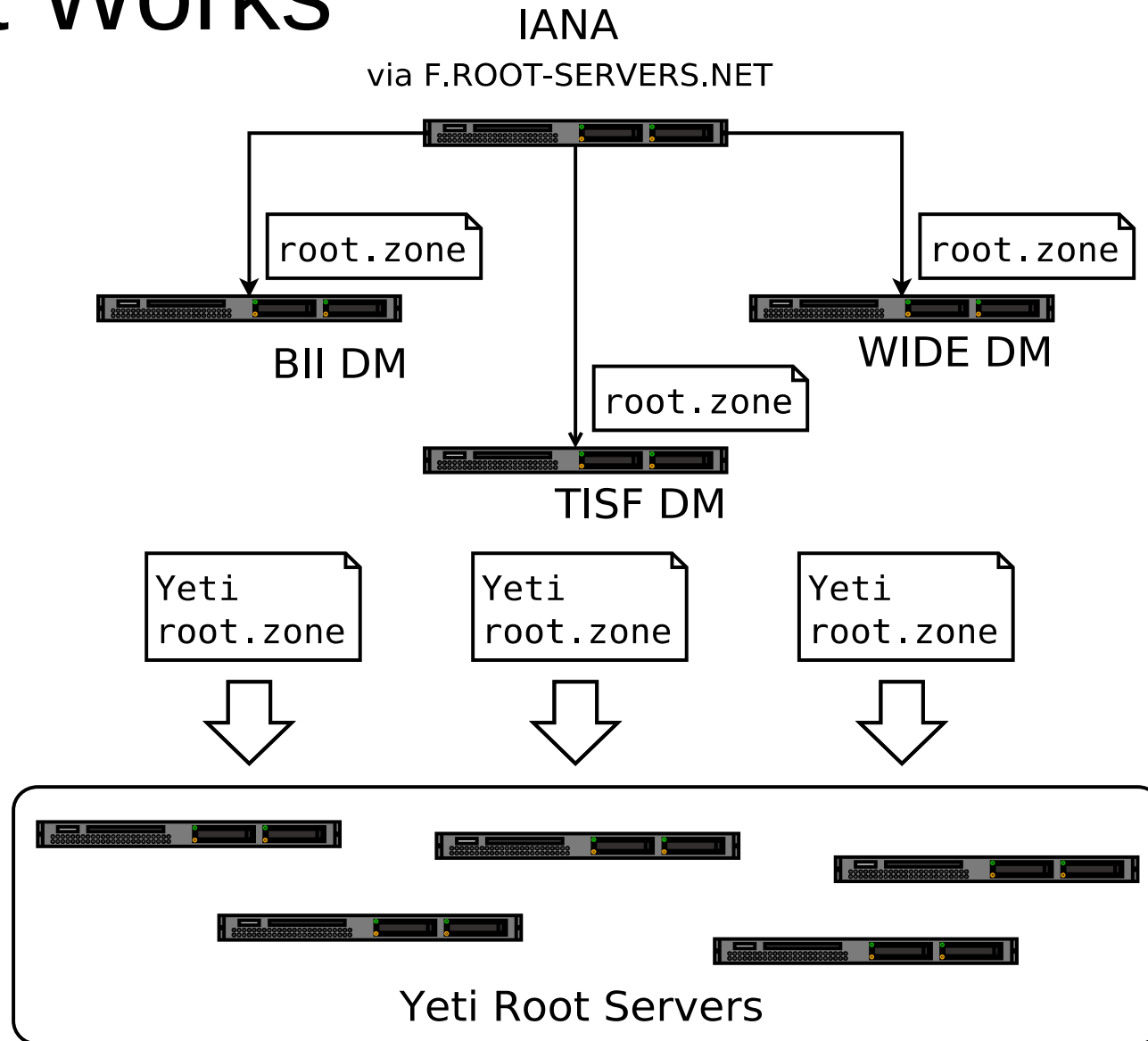
- The Yeti DNS project uses the ICANN root zone.
- The Yeti DNS project is not intended to research the *contents* of the root zone.
- The Yeti DNS project is not about policy or political subjects.



<https://yeti-dns.org>

**Bii**  
天地互连

# Yeti DNS: How It Works



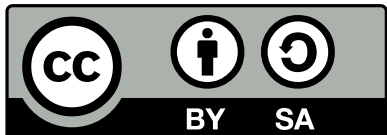
<https://github.com/BII-Lab/Yeti-Project/.../doc/Yeti-DM-Setup.md>

**Bii**  
天地互连

# Yeti DNS: Components



- Yeti Distribution Masters (DM)
  - Produce the Yeti root zone
- Yeti root servers
  - AXFR Yeti root zone from Yeti DM
  - Serve as DNS root servers
  - Capture traffic information
- Yeti resolvers
  - Use Yeti root servers
  - May capture traffic information

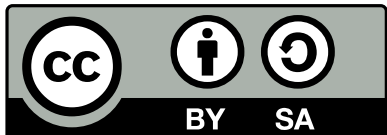




# Yeti DNS: Who Does What



- Coordinators initiated & administer Yeti
- Yeti root operators run Yeti root servers
  - 12 root operators (will add more)
  - 1 in USA, 1 in Columbia, 7 in Europe, 3 in Asia
- Resolver operators send queries
- Experimenters propose & conduct experiments

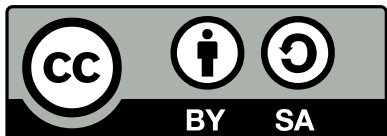


<https://yeti-dns.org/operators.html>

# Planned Experiments & Other Investigations



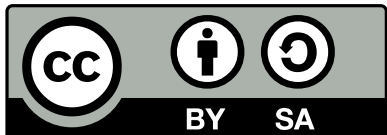
- Impacts of IPv6-only DNS
  - Bigger minimum packet size
  - Different IP-fragmentation model
- Changes in DNSSEC
  - KSK rollover, KSK/ZSK rollover frequency, algorithm, signature size
- Changes to root servers
  - Lots/few of root servers, churn in root server set
- And many more...



# Example: Multiple-ZSK



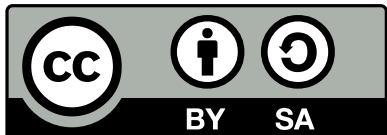
- Try separate ZSK - 1 per DM operator
- Lab experiments first
  - Insure behavior is as expected in software
- Design & propose experiment to Yeti
  - Must document plan, outcome, and so on
- Run on Yeti platform
- Document results



# Challenges



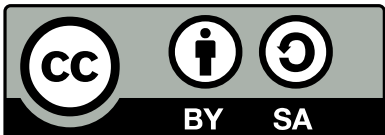
- Getting more root operators
  - Maybe you can help?
- Getting enough query traffic
  - University resolvers (BUPT as a model)
  - Mirroring real-world traffic
  - Measurement networks (RIPE Atlas)



# Testbed or Prototype?



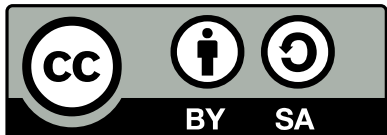
- Testbed:
  - A place to run experiments
  - Can break
  - Temporary
- Prototype:
  - Place to get ready for the production version
- Today Yeti is a testbed
- In the future perhaps a prototype



# Status & Next Steps



- Platform Stable
  - Infrastructure, processes, and so on
- Have enough root servers to begin
  - More is always better
- Ready for experiments to start!



# Yeti Coordinators

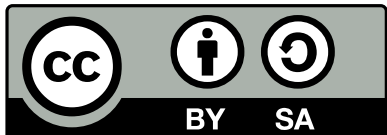


Bii Group — the parent company of Bii (Beijing Internet Institute), a public interest company serving as Bii's Engineering Research Center.



WIDE — Widely Integrated Distributed Environment.

TISF — a collaborative engineering and security project by Paul Vixie.



<https://yeti-dns.org>

