

# What we did last OARC

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**DNS-OARC**

**RIPE77 DNS WG**

**Amsterdam, Oct 2018**

# OARC's Mission Statement

*The Domain Name System Operations Analysis and Research Center (DNS-OARC) is a non-profit, membership organization that seeks to improve the security, stability, and understanding of the Internet's DNS infrastructure.*

*DNS-OARC's mission is to:*

- promote and conduct research with operational relevance through data collection and analysis*
- offer useful services and tools*
- build relationships among its community of members*
- facilitate an environment where information can be shared responsibly*
- enable knowledge transfer by organizing open workshops*
- increase public awareness of the DNS's significance*

# OARC Governance

- Independent legal entity
- Diverse member base (77)
- Financially self-supporting
- Self-governing, neutral
- Elected Board reflecting member interests
- Contracted ~4FTE Executive Staff
- Volunteer workshop Programme Committee
- 501(c)3 non-profit public benefit corporation



# 2018 OARC Achievements

- Verisign funding of RSSAC DNSCAP anonymisation
- *drool* DNS Replay Tool (funded by Comcast)
- Engaged new Systems Engineer
- Record >10TB DITL 2018 data gathering completed
- Added 125TB storage capacity and 2 new servers
- First workshop in Caribbean region
- Major upgrade to Indico conference platform

# 2017-9 OARC Board

- Jacques Latour, Treasurer
- David Lawrence, Director
- George Michaelson, Director
- Ondřej Surý, Director
- Jaromír Talíř, Director
- Duane Wessels, Chairman

# 2018 OARC AGM

- 2017/8 AGM Resolutions mean all OARC Directors now elected in individual, not organisational, capacity
- Anti-capture measures amendment to Bylaws
- Ratified Conduct Policy
  - <https://www.dns-oarc.net/oarc/policies/conduct>
- Seeking nominations for 2019 Programme Committee



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# OARC Workshops

- Sharing of latest operational and research knowledge, experiences, data analysis, best practices & insights
  - like RIPE, but with global scope and tight DNS focus
- 2 open workshops per year, 1½-2 days long
- Rotating co-location with RIPE / NANOG / ICANN / IETF
- OARC 29 held here jointly with CENTR-Tech 39, October 13/14<sup>th</sup>
  - <https://indico.dns-oarc.net/event/29/>
  - biggest yet, 192 registered attendees



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# OARC 29 Hot Topics

- Successful Root DNSSEC KSK rollover on 11<sup>th</sup> 😊
- Abuse Prevention, Detection, Mitigation
- The DNS Zoo
- DNS Privacy
- Measurement and Analysis Tools
- OARC DNS software tools



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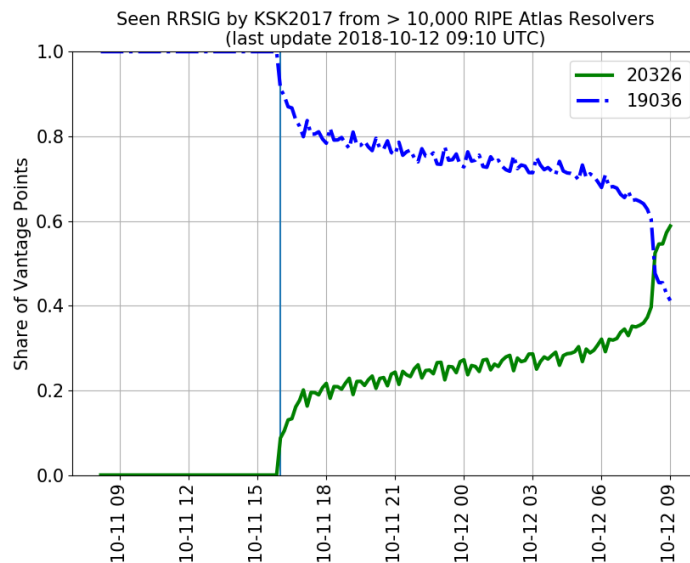
# 2018 Root KSK Rollover

- The DNSSEC zone-signing key (ZSK) for the root had never been rolled since the root was signed in 2010
- After a years' delay, measurement, outreach, and careful planning, ICANN & Verisign did this on October 11<sup>th</sup>
- Appears to have been almost entirely successful, with measurements and reports suggesting minimal disruption
- OARC Co-ordinated DITL data collection from Root-Ops and resolver operations over rollover 82-hour window
- Open discussion at OARC 29 from key players

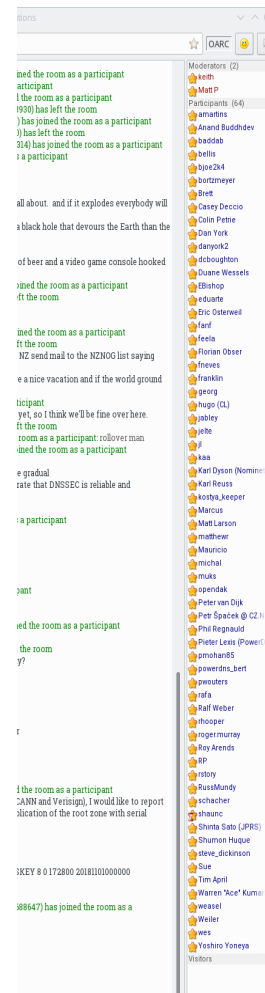
# Riding the Rollover



DNS ROOT KSK ROLLOVER (live-ish)



Graph from NLnet Labs/SIDN



# KSK Rollover First Look

- ICANN: “very pleasant non-event”
- SIDN rootcanary.org used 10,000 RIPE ATLAS probes to query RRSIG for . via their resolvers
- Some minor issues with DNSSEC-aware browsers, and cryptocurrency app with old KSK hard-coded in
- Next up deeper dive into resolver and DITL data
- Also NIC.CZ story of first rollover to ECDSA in TLD space



# Abuse Prevention, Detection, Mitigation

- Real-time Detection of Internationalized Domain Name-Based Brand Abuse
- Dissecting DNS Defenses During DDoS
- Collaborative Security Challenges
  - (OARC members only)



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# I wanted a Pony but got a Camel

- Understanding DNS standards gives many people the hump
- <http://powerdns.org/hello-dns>
  - Entry-point resource for problem solvers
- <https://powerdns.org/dns-camel/>
  - RFC viewer
- TDNS
  - teachable sample server implementation in clean, readable C++ code



# DNS Privacy

- Operational experiences for DoH and DoT
  - launch of 1.1.1.1 privacy resolver in April
  - comparison of the 2 protocols
  - performance analysis
- Where will encrypted DNS transports push DNS operators ?
  - DNS community waiting for decision from browser vendors which will have major impact on DNS infrastructure !



# Measurement and Analysis Tools

- <https://dnsthought.nlnetlabs.nl>
  - Everything you ever wanted to about caching resolvers but were afraid to ask
  - Work from RIPE 2017 DNS hackathon to measure resolver capabilities using ATLAS probes & other sources
- Resolver detection using machine learning



# New Technologies

- C-DNS
  - Highly efficient binary serial format for DNS data
  - draft-ietf-dnsop-dns-capture-format
  - <https://github.com/dns-stats/compactor>
- CNAME at apex experiments
- DNS usage in LoRaWAN



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# OARC Software Tools

- OARC's disparate set of DNS measurement, collection and testing tools had undergone major transformation over past 2+ years
- See <https://www.dns-oarc.net/oarc/software>
- Tool developments of note:
  - *dnsjit* – an engine for capturing, parsing and replaying DNS traffic
  - *drool* - DNS replay tool, based on *dnsjit*, with response comparison
  - New *dsc* and *dnscap* features
- Open-source hosted at <https://github.com/DNS-OARC> with automated buildbot integration and test environment

# Other Topics

- DNS Flag Day
  - <https://dnsflagday.net/>
  - Test and compliance tools
- Upcoming changes to operation of .net and .com
- Message digest for DNS Zones
- OARC Systems update
- PGP keysigning HowTo



# Lightning Talks

- DNS-over-TLS and DNS-over-HTTPS at Cambridge University
- DNS UDP replies using MAC address
- TTLs in RFC8918 NSEC Aggressive Use



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# Until Next Time...

- OARC 29 Presentations Video
  - <https://www.youtube.com/playlist?list=PLCAxS3rufJ1cOBd1D4K4QJFmLcSypixh3>
  - most of OARC team are at RIPE77 ☺
- OARC 30 will be hosted by ICANN, and co-located with IDS/RoW/GDD in Bangkok TH, May 13-14<sup>th</sup> 2019
- OARC 31 will be co-located with NANOG77 in Austin TX, October 26-27<sup>th</sup> 2019
- Thank you CENTR for sharing the workshop with us !
- Thank you RIPE NCC team for all your co-location help !

**Questions ?**



# Why Become an OARC Member ?

- Access to and participation in the world's premier community of DNS technical experts
- Influence development of open tools and services to support your infrastructure operations
- Ability to share and analyze a unique dataset perspective into global DNS operations
- Use of community co-ordination resources to respond to incidents and threats
- Support a trusted neutral party free of vested interests in the DNS space



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