Introduction to DNS-OARC

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DNS-OARC
Domain Name System Operations Analysis and Research Center

What is DNS-OARC ?

- The Internet's Domain Name System (DNS) provides distributed resolution of Internet names to IP addresses

    e.g "www.ntia.doc.gov" to "170.110.225.155"

- The DNS Operational, Analysis and Research Center (OARC) is a neutral membership organization of the many parties that play a role in operating the DNS globally

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DNS-OARC's Mission

- We seek to improve security, stability and understanding of the Internet's DNS Infrastructure

- Our Mission:
  - build trust among members
  - information sharing in confidence
  - enable knowledge transfer
  - semiannual workshops
  - promote research
  - data collection, analysis, and simulation
  - increase awareness with publicly available tools and services

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DNS-OARC Motivation

- DNS infrastructure makes everything work as expected
- DNS outage of any network service provider or large content provider affects everyone using the Internet
- The DNS is frequently involved:
  - as abuse victim
  - as abuse vector
  - for abuse detection and mitigation

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DNS-OARC Motivation

- Attacks against the DNS have increased over time
- DNS implicated in and compromised by Botnet activity
- DNS traffic increasingly subjected to interference by vested commercial and nation-state interests
- A lot of unwanted traffic on the Internet is a result of DNS misconfiguration
- New DNS technology challenges
  - DNSSEC, IDN, ENUM, IPv6, gTLD growth

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DNS-OARC History

- Established in 2004 by Internet Systems Consortium and funded by an NSF grant in collaboration with CAIDA (UCSD)
- Became separate 501(c)3 nonprofit corporation in 2008
- 6 seat member-elected board provides oversight

- Funded by member subscriptions and grants

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DNS-OARC Members

over 60 members, wide industry support

Root and Top-Level Domain (TLD) operators, government agencies, registries, registrars, hosting providers, hardware vendors, software vendors, security companies, universities, service providers
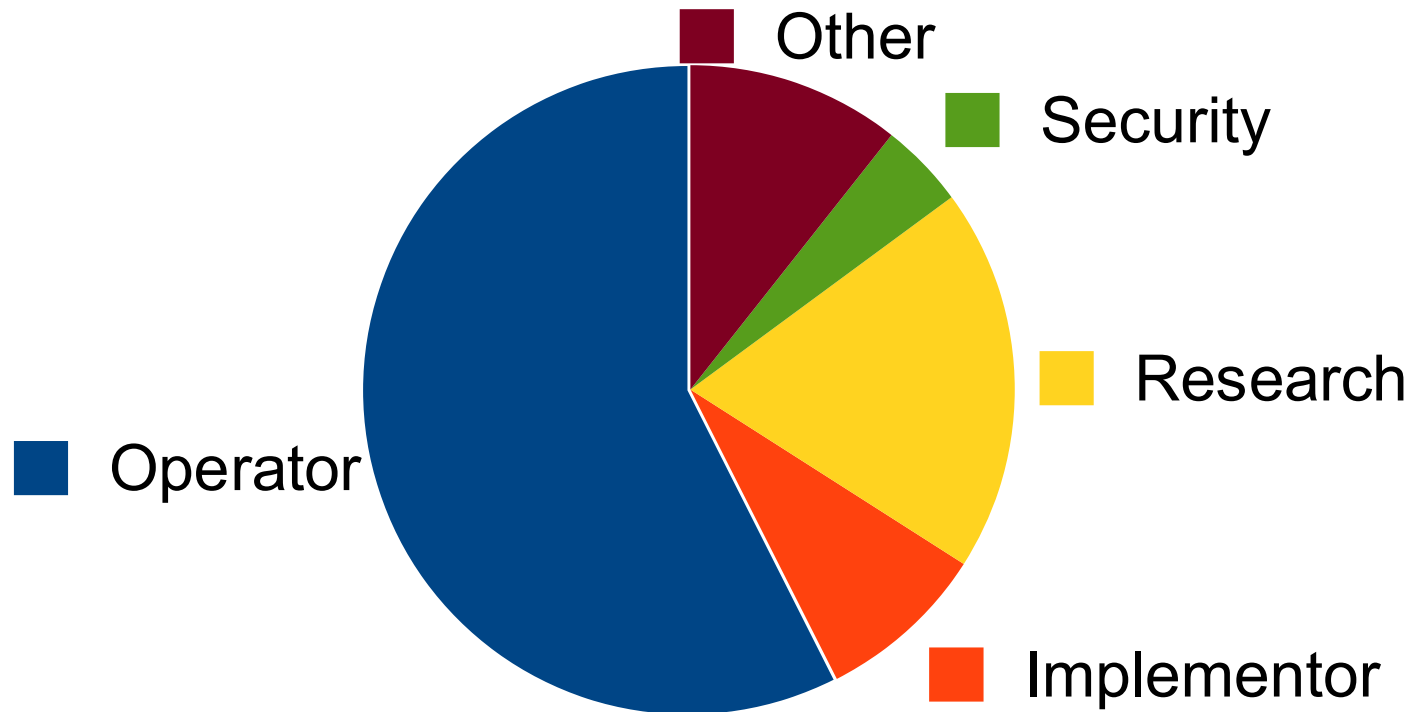
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DNS-OARC Members

DNS-OARC Board

- 4 Member-elected Directors

- 2 Appointed Directors

- Board members:
  - Suzanne Woolf (ISC) – President (Secretariat)
  - Matt Larson (VeriSign) – Chairman (Root Operators)
  - Peter Koch (DENIC)
  - Matt Pounsett (Afilias)
  - Stephane Bortzmeyer (AFNIC)
  - Roy Arends (Nominet)

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DNS-OARC Capabilities

- Mediation of trust and introductions between participants

- Data gathering, storage & analysis infrastructure

- Accumulated >40Tb dataset over 6+ years

- > 6Tb data from the most recent DITL

- Tools for verifying, scanning & probing vulnerabilities and major changes in the DNS

- Secure communication resources for co-ordinating response to attacks and incidents

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DNS-OARC Capabilities

- Regular stand-alone and co-operative open and closed meetings

- Liaison with other DNS co-ordination bodies:

  - ICANN, CENTR, RISG, SSR, ccNSO, APTLD

- Outreach and facilities for researchers to analyze and characterize incidents and long-term trends

- Legal confidentiality framework for secure data sharing

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DNS-OARC Services

- http://www.dns-oarc.net website
    and private member-only portal

- Twice-yearly open meetings

- Open <dns-operations@lists.oarci.net> mailing list

- Continuous, annual & incident-based Data Gathering

- Data Analysis

- Private DNS mailing lists

- Encrypted jabber/XMPP chat server

- Openly available tools

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DNS-OARC Services

- Domain Statistics Collector
- "Day in the Life of the Internet"
- Open DNSSEC Validating Resolvers
- Top-level Domain Monitor
- "No-Probe" Database
- Validation and vulnerabilty testing tools

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DNS-OARC Tools

- UDP source port randomization test (Kaminsky)

- DNS reply size tester (DNSSEC)

- DNSSEC Lookaside-Validation (DLV) test zones

- DNS data traffic capturing and decoding tools

- Quality and conformance testing tools

- DNS server fingerprinting tool

- Usage of the above tools generates additional datasets

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DNS-OARC Data Sets

- 6+ years of continuous DSC summary statistics gathering from root and major TLD servers

- 5+ years of annual 48-hour snapshots of all traffic to key servers (DITL)

- Lists of IP address ranges not to be probed by researchers

- Lists of DNS Open Recursive Resolvers

- TLD zonefile repository

- 10+ years of root zone archive

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OARC and DNSSEC

- The roll-out of DNSSEC is considered vital to long-term Internet infrastructure integrity

- DNSSEC allows for cryptographic verification of DNS reply data

- OARC is facilitating many aspects of DNSSEC deployment
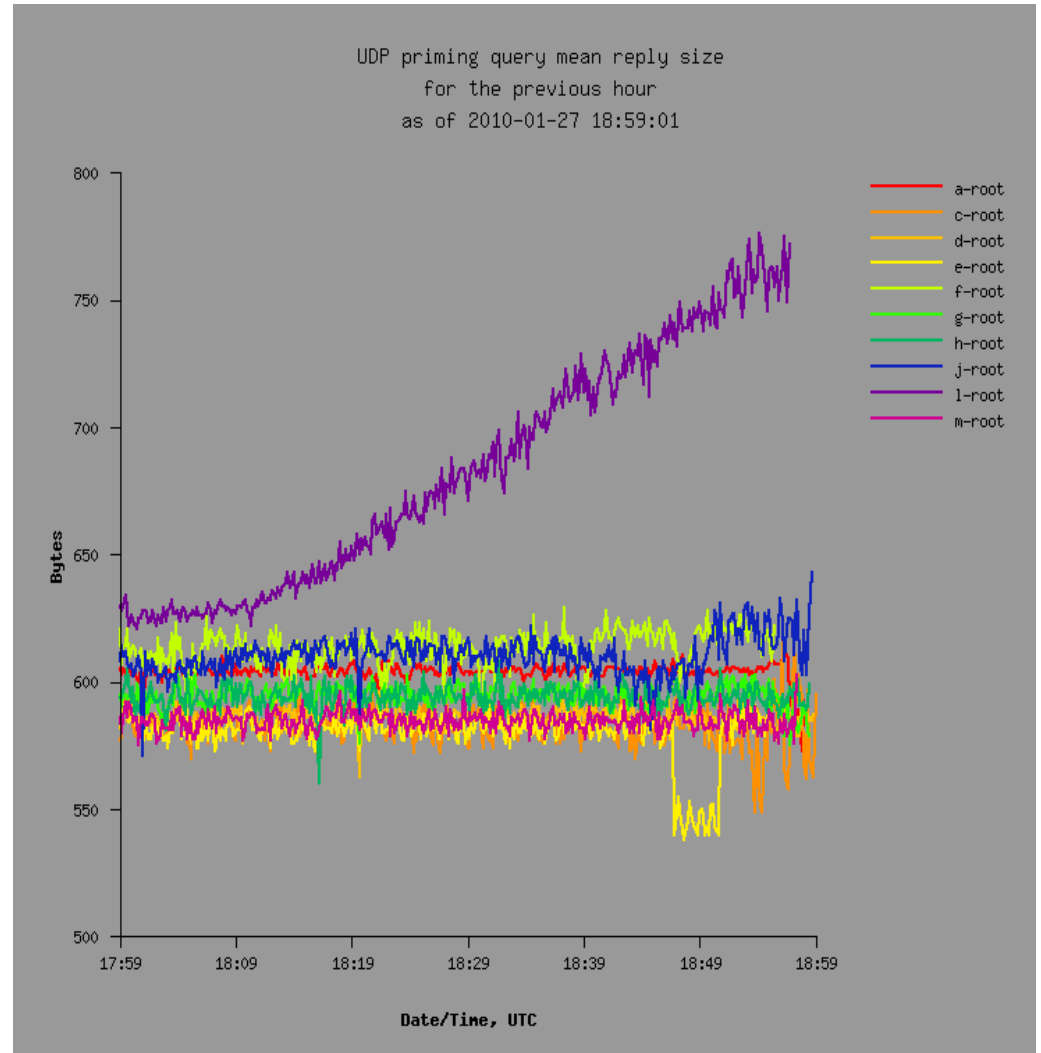
  - tools, data gathering, outreach

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OARC and DNSSEC

- Ongoing funding by ICANN to model and measure impact of DNSSEC signing of root zone

- https://www.dns-oarc.net/ node/240

UDP priming query mean reply size
for the previous hour
as of 2010-01-27 18:59:01

Legend:
- a-root
- c-root
- d-root
- e-root
- f-root
- g-root
- h-root
- j-root
- l-root
- m-root

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DNS-OARC Resourcing

- Executive Director:
  - Wayne MacLaurin
- Secretariat functions outsourced to ISC:
  - Director: President/Secretary/Treasurer
  - Administration and Finance
  - Infrastructure hosting
- Contract Engineer
- Annual revenue ~$250k

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DNS-OARC Future Activities

- Publish analysis when root zone signing study completed

- Enhance data storage and archiving infrastructure

- Seek funding to expand full-time staff to ~4

- Outreach to registrars, new gTLD operators, and developing ccTLDs

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Contact Us

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