

New Opportunities for Research and Experiments in Internet Naming and Identification

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Needs for New Naming and Identity

- DNS is critical infrastructure
- DNS integrity and privacy
- Identity
- **Your ideas here...**

Evolution of the DNS Ecosystem

- 1985: DNS starts in academia
- 1995: Internet commercialization
- 1998: ICANN
- 2004: new TLDs
- 2014: NTIA transition plans



commercialization has been great (growth in users and names. stability.)

what about innovation? (growth in uses? protocol evolution?)

Needs for New Naming and Identity

- DNS is critical infrastructure
 - how can hardware and software evolve, safely?
 - how to cope with growth?
 - many more names: 1000s of new TLDs
 - new applications: repurposing DNS for anti-spam, IP reputation
- DNS integrity and privacy
 - does DNSSEC trust and DANE extend to ...X?
 - improving DNS privacy?
- Identity
 - how identity in an Internet of Things?
 - does the mature DNS and DNSSEC infrastructure help?
- **Your ideas here...**

Changing Roles

- 1985: academic: applied research
- 1995: transition to “make it real”
- 2005: academia lacks perspective to contribute



can we benefit from complementary roles?

Needs for New Naming and Identity

- DNS is critical infrastructure
 - how can hardware and software evolve, safely? => new research infrastructure
 - how to cope with growth? => new research infrastructure
 - many more names: 1000s of new TLDs
 - new applications: repurposing DNS for anti-spam, IP reputation
- DNS integrity and privacy
 - does DNSSEC trust and DANE extend to ...X?
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- Identity
 - how identity in an Internet of Things? => new research directions?
 - does the mature DNS and DNSSEC infrastructure help?
- **Your ideas...**

New Infrastructure: A Research Root

Research Root Infrastructure

B-Root Operations

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Strong, Research-Friendly Operations

- working with B-root operators
 - (initially, but interested in broader collaboration!)
- B's operational differentiators
 - a few, relatively powerful sites
 - tolerant to changes via monitoring with rapid fallback
- research partnership
 - complete, privacy-sensitive data collection
 - involve experimental efforts

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Safe Experimentation

goals:

- experiments in real conditions
- validation for correctness
- path to deployment

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Community and Research Building

- community building
 - outreach to broader research community
 - growing academic engagement
 - working with operational community
- helping broaden the research agenda
 - looking for input and feedback!
- new open-source software
 - may be picked up by other operators

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Instrumentation and Measurement

goals:

- queries and performance
- long-term and immediate data
- usable by multiple researchers (concurrently)
- privacy sensitivity (peap to text w/opt. anonymization)

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Other Activities

- DNS-OARC
 - very successful data sharing
 - no experimental capabilities
 - supports external research (no internal research)
- large operators (Verisign, ISC, Dyn, etc.)
 - most have internal labs or advanced development
 - often shorter-term focused
 - commercial perspective makes collaboration more difficult
- individual researcher data and modeling
 - (a researcher's own DNS, or artificial models)
 - not seen as representative

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Overall Benefits

- rekindle and grow academic involvement
- accelerate innovation
 - new uses
 - more rapid evolution
- collaboration of academia, industry, gov't and NGOs

Current Status

- operations in place
- measurement infrastructure in place
- working on experimental support

- all are continuing to evolve

Next Steps

- basic components coming into place
 - <https://ant.isi.edu/researchroot>
- **looking for feedback**
 - what about the capability?
 - *what new questions are now possible?*
- workshop in LA 2016-11-17 (day after IMC)
 - <https://ant.isi.edu/events/dns2016/>