Identifier Technology Innovation Panel

Jan 2014

Formal Charter

1. Develop a technology roadmap for DNS and other identifiers

2. Develop best practice recommendations and reference systems

3. Provide technology guidance to ICANN operations, security, policy, and technical functions

4. Engage with ICANN community and public on technology matters

Who follows up after the panel?

1. Someone other than ICANN "develops" or "provides"
2. ICANN develops, provides & engages

   That is, we want good things to happen, but they will probably only happen at ICANN if "close" to the root or other ICANN key capability.

   ICANN does separately and jointly sponsor things.

Strategy

- Look for:
  - Forcing Trends
  - Opportunities
  - Burning needs

- Avoid well-ploughed fields (e.g. DNSSEC, existing strategies for collisions)

Deliverables

- Given short timeframe,
  - Document all issues looked at
  - Work on some interesting subset
  - Create a roadmap we predict over 10 year horizon; especially ICANN relevant
  - Make some actionable recommendations

People

- Panelists:
  - Jari Arkko
  - Rick Boivie
  - Anne-Marie Eklund Löwinder
  - Geoff Huston
  - Paul Mockapetris, Chair
  - James Seng
  - Paul Vixie
  - Lixia Zhang

ICANN's current identifiers

- Domain names
- Autonomous system numbers
- ipv4 internet numbers
- ipv6 internet numbers
- Multicast addresses
- Port numbers
- Protocol numbers

Today's Topics

- Drivers for the roadmap

- New Identifiers

- Hardening the Root

- DNS Fundamentals

Darwin Drivers (for DNS)

Expansion

- Organic Growth / Legacy Base / Universality

- New TLDs

- New Capabilities

- New Data

Contraction

- UI accent on commerce, multimedia, portability

- Protocol & Process ossification

- Rise of commercial identifiers

- Rise of new systems from research

Research Drivers

- Names are hot: Name Based Networking, Content based networking, Information Based Networking

- Common Themes: access by name, opportunistic caching

- Common ingredients:
  - Self certifying/flat names
  - PKI
  - User friendly Names

The roadmap question for ICANN

- ICANN serves the Internet community by administering part of the DNS. The DNS is one of the most important building blocks of the present Internet and future open innovation.

- The present DNS is limited by:
  - operational (e.g. packet size, flawed DNS software in access points)
  - protocol (e.g. difficulty in defining new formats)
  - process (e.g. DNSOPS WG does "mechanisms" not "protocol" to avoid process, diverse WGs)

- Should ICANN try to preserve & enhance the DNS asset? How?
  - Breakthroughs for bottlenecks? Aka De-ossification
  - DNS2?
  - Evolution to research direction
  - New features, e.g. privacy, confidentiality

New Data

- ## What about LISP?
  - Technical
    - LISP maps from Locators to addresses
    - What software?
  - Political
    - Address mappings "owned" by RIRs, what about RFID tags?

- ## Should ICANN publish in DNS?
  - Reserved labels et al
  - Domain birthdays, activity levels

Hardening the Root

- Major opportunities:
  - Generating the root file
    - Use of more robust/secure components
    - Globalization via Shared Zone Control

  - Distributing the root file
    - Basic idea is to distribute copies of the root zone to any server that wants one, not just root servers
      - Vixie version: 2 anycast addresses, variants
      - Perhaps others, some fine points on delegation verification

Shared Zone Control (SZC)

- Can we imagine a workflow language that allows multiple parties different rights for the same zone?

- For the root, can we make it possible to split control to avoid the whole single authority issue?

- For other zones:
  - Coordinate glue, DNSSEC stuff, fwd & reverse

- Some limited history here e.g. N/M, 2 DNSOPs proposals

SZC of Root - Today

- CCTLDs, new GTLDs & old GTLDs request updates at ICANN
- ICANN vets via business logic and humans
- ICANN asks DOC for OK
- ICANN sends certified request to Verisign
- Verisign vets, makes root, signs root, fans it out

SZC of Tomorrow (one version)

- CCTLD creates a request for change in a journal

- Other CCTLDs either vote yes or no

- If 51% of CCTLDs assent, change takes effect 2 hours after original request.

- If no protests, change happens 24 hours after request regardless.

SZC implications

- Distributed generation of Root Zone truth
- What keys to use?
  - Single? Multiple?
- What protocols to use? DNS? EPP?
- What primitives?
  - Vote?
  - Delay / Hysteresis
  - How is workflow defined?

DNS Fundamentals

- Which parts need thought?
  - Abstract database (i.e. name & RR structure, matching rules, zone rules)
    - E.g. why not define RR structure definitions in DNS
  - Query & other operations
    - Asynchronous DNS work (Hoffman, Verisign, ?)
  - Replication
    - Copies of root vs. root servers
- How to make the effort worth doing?

Recommendations under consideration

- ICANN to publish more signed data for reserved labels, etc.

- A study to define a vision for DNS in 2020

- Prototype open root publication

- Prototype shared zone control

- Perform collision "fire drills"