
Institutionalizing the IANA Functions To Deliver A Stable and Accessible Global Internet for Mission Critical Business Traffic and Transactions

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Outline

- ◆ in the beginning
- ◆ current IANA functions
- ◆ future IANA structure and role
- ◆ open issues
- ◆ conclusion

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Background - Protocol Values

- ◆ many values are used in network protocols
 - both numbers & strings
- ◆ to identify nodes
 - e.g., IP Addresses & domain names
- ◆ to differentiate applications
 - e.g., IP ports (telnet vs. web)
- ◆ to define options within an application
 - e.g., TELNET line vs. character mode
- ◆ data types
 - e.g., MIME email media types

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Background, contd.

- ◆ assignments must be unique and consistent
 - both ends have to know "port 25" means email
- ◆ therefore must have an assigning authority and a repository of values
 - multiple categories of values
 - e.g. telnet options
 - with rules to create additional instances in category
 - new categories come from new applications

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Assigning Internet Values

- ◆ Internet value assignment & recording mechanism predates the Internet
- ◆ started at the beginning of the ARPANET
- ◆ continuity of responsibility for more than 25 years
- ◆ documented in RFCs (IETF publication series)

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RFC History

- ◆ many RFCs include value assignments
 - 1st RFC (7 Apr 1969) *Host Software*
specified use of values
 - RFC 204 (5 Aug 1971) *Sockets in use*
 - RFC 717 (1 Jul 1976) *Assigned network numbers*
updated regularly ever since
- ◆ now on-line
 - <http://www.iana.org/iana/assignments.html>

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Other Things to Assign

- ◆ IP Addresses
- ◆ Top Level Domain Names

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IP Addresses

- ◆ Internet Protocol defined in 1981
 - RFC 791 (1 Sep 1981) *Internet Protocol*
 - uses 32-bit IP Address as interface ID and locator
 - 44 Class A IP Addresses assigned in RFC 790

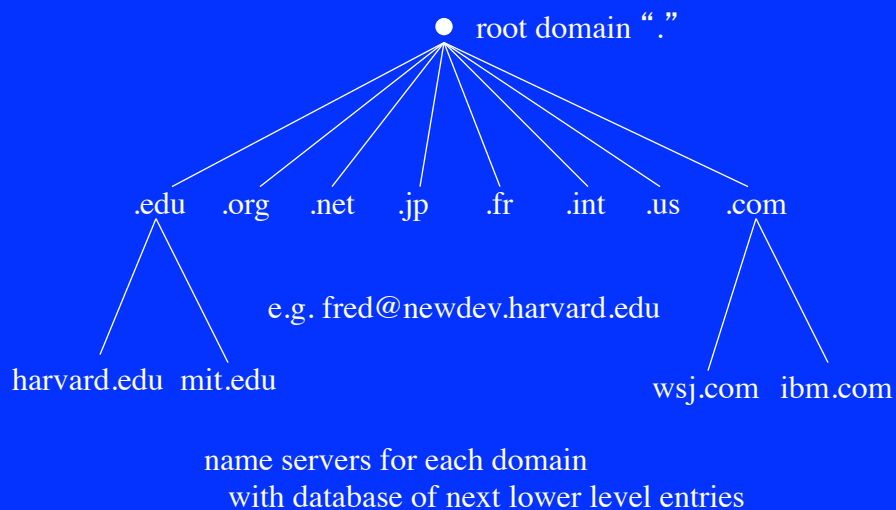
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Top Level Domains

- ◆ domain names - user-friendly host reference
 - initially conversion to IP Address used table lookup
 - now distributed databases on DNS servers
 - multi part and hierarchical - right most part is TLD
 - RFC 819 (8 Feb 1982) *Computer mail meeting notes*
 - assigned 1st top level domain (TLD) - .ARPA
 - RFC 920 (1 Oct 1984) *Domain requirements*
 - added .GOV, .EDU, .COM, .MIL, .ORG
 - and 2 letter country code TLDs

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Domain Names



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Assignment Authority History

- ◆ initially an ad-hoc function
adjunct to RFC Editor
- ◆ performed initially by Jon Postel then by the IANA
1969 - 1973 - UCLA
1973 - 1974 - Mitre Corporation & Keydata
1974 - 1977 - SRI International
1977 - 1998 - USC / ISI
- ◆ under ARPA (DARPA) funding
- ◆ Internet Assigned Numbers Authority (IANA)
name established in 1989

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Current IANA Responsibilities

- ◆ IP Addresses
- ◆ Domain Names
- ◆ Root Domain
- ◆ Protocol Parameters

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IP Addresses

- ◆ actual assignments performed by regional registries
 - non-profit geographically based organizations
 - ARIN, RIPE, APNIC
 - additional registries expected
- ◆ IANA
 - cooperates in establishing allocation guidelines
 - e.g. RFC 2050 (Nov 1996) *INTERNET REGISTRY IP ALLOCATION GUIDELINES*
 - reviews complaints about registries
 - allocates blocks of addresses to registries

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Domain Names

- ◆ IANA only deals with top level domains
 - e.g. .edu, .jp
- ◆ two types
 - country code Top Level Domains - ccTLDs
 - generic Top Level Domains - gTLDs

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ccTLDs

- ◆ based on ISO 2 letter country codes
 - e.g., .fr, .jp, .us, .gn
 - note: IANA does not create countries
- ◆ IANA records a registrar for each ccTLD
- ◆ may have to help resolve disputes between competing organizations
 - generally “settle it yourselves”
 - but governments seem to carry big sticks

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gTLDs

- ◆ current gTLDs:
 - .com, .net, .org, - general use
 - .edu - 4 year colleges and universities
 - .int - international treaty orgs and Internet databases
 - .gov, .mil - US government & US military
 - .arpa - reverse lookup of IP Addresses
- ◆ most managed by Network Solutions Inc.
 - under cooperative agreement with US National Science Foundation
- ◆ many suggestions for more gTLDs

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Root Domain

- ◆ IANA is responsible for the contents of the database that points to TLD registries
 - i.e. defines what TLDs are globally reachable
- ◆ currently includes 230 ccTLDs and 7 gTLDs
 - (.arpa is infrastructure function run by IANA)
- ◆ also list of root nameservers used to configure local nameservers
 - `ftp://ftp.rs.internic.net/domain/named.root`

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IANA Past & Future

- ◆ past - US government funded
 - much confusion over management of gTLDs
- ◆ future - self-sustaining non-profit corporation

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IANA, Inc.

- ◆ under active development
- ◆ organizational structure in flux
- ◆ today' s fuzzy snapshot

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Why an IANA

- ◆ historical continuity
 - prevent perception of a power vacuum
- ◆ outside review of infrastructure policies
 - help ensure fair procedures
- ◆ default home for new infrastructure functions
 - many new ones on the horizon
- ◆ prevent proliferation of infrastructure organizations
 - minimize the number of organizations that must be supported

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IANA Board of Directors

- ◆ hire executive director
 - oversee budget
 - apportion IANA costs
 - manage DNS root domain
- ◆ oversee policy setting process
- ◆ provide for legal review of policies in development
- ◆ accept (or reject) proposed policies
- ◆ review appeals of alleged process violations

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Advice Committees

- ◆ provide advice to IANA board
- ◆ focus of policy & procedure development
- ◆ Address Committee
- ◆ Names Committee
- ◆ Protocol Committee
- ◆ Industry and User Committee

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Address Committee

- ◆ representatives of the IP Address registries
 - 3 from each registry
 - additional registries expected
 - others may be added by Executive Director
- ◆ develops IP Address policy guidelines
 - policies must support and promote industry self governance and permit entry of new ISPs

Name Committee

- ◆ representatives of domain name management groups - who is still an open issue
 - POC / CORE
 - country code TLDs
 - whatever happens to .com
 - others may be added by Executive Director
- ◆ develops domain name policies
 - policies for new TLDs
 - policies for assigning registrars for ccTLDs

Protocol Committee

- ◆ IETF function
- ◆ Protocol Committee may be IAB (for the IETF)
- ◆ controls protocol parameter assignments

Industry and User Committee

- ◆ representatives of industries that use the Internet
not just ISPs
- ◆ representatives of the users of the Internet
e.g. consumer advocacy groups
- ◆ fee - based membership

IANA Board Membership

- ◆ 9 members
 - 3 year terms - limit 6 years
- ◆ selected by independent support groups providing funding for IANA
 - 2 by IP Address Organization
 - 2 by Name Organization
 - 2 by Protocol Organization (IAB)
 - 3 by Industry and User Organization

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Support Organizations

- ◆ addresses
 - GAR?
- ◆ names
 - TLD managers
- ◆ industry
 - new group or ISOC
- ◆ protocol
 - IETF - \$ from ISOC

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Open Issues

- ◆ what is a legit name organization?
 - get to create gTLDs
- ◆ rules for new IP Address registries
 - note exclusive territories
 - management of a scarce resource
 - RFC 2050 policies have extended life of IPv4 address space

Base Questions

- ◆ what authority would IANA, Inc. have?
 - e.g. who says what new gTLDs
- ◆ how is IANA authority established?
 - very long history
 - very successful history
 - but no “legal basis”
 - but what does legal mean for / in / on the Internet?
 - what government blessing is needed?
 - which government(s)?
 - what does government blessing mean in the Internet?

Conclusion

- ◆ 1st pass at answering the 2 basic Internet governance questions

Who says who makes the rules?

Who pays for what?