



JUS5680: Internet Governance: The DNS and ICANN

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Overview

- Basic explanation of the Domain Name System (DNS)
- Prehistory of ICANN
- ICANN:
 - Status
 - Structure
 - Mandate



DNS (1)

- Linked to (but formally distinct from) IP number/address system
- Under IPv4, an IP address is 32 bit string of 1s and 0s
 - The string is represented by 4 numbers from 0 to 255 separated by dots/periods e.g. 239.3.45.88
- Domain names are essentially translations of IP numbers/addresses into more semantic form. Thus, IP number 153.110.179.30 tells most people little or nothing; whereas <telenor.no> is much more easily remembered and catchy.
- IPv6



DNS (2)

- Main reason for domain names is mnemonics.
- Domain names are not essential to movement of data packets.
- Each DN must be unique, but need not be associated with just one single or consistent IP number. It must simply map onto particular IP number or set of numbers which will satisfy result desired by DN registrant.
- Three main parts to DN arranged hierarchically (from right to left) as:
 - i. Top-level domain (TLD)
 - ii. Second-level domain (SLD)
 - iii. Third level-domains

DNS (3)



- Different TLDs:
 - gTLDs (generic):
 - .com, .net, .org, .gov, .edu, .mil, .int, .biz, .jobs, .pro, .museum, .mobi
 - Cf. Special status of .arpa
 - NB Some gTLDs are “sponsored” (e.g. .jobs, .pro, .museum) and/or reserved (e.g. .gov, .mil, .pro)
 - Opening of new gTLDs:
 - In June 2008, ICANN announces radical liberalization of its policy on recognizing new TLDs. Application window from 12 January 2012 – 12 April 2012: 1930 new applications
 - ccTLDs (country-code): .no, .de, .it, .ru, .us, ... etc. For complete list, see <<http://www.iana.org/domains/root/db/>>
 - Examples of fairly new TLDs:
 - .eu
 - .cat
 - .mobi
- IDNs: Internationalized domain names



DNS (4)

- DNS = system for mapping, allocating and registering DNSs.
- Most fundamental design goal is to provide same answers to same queries issued from any place on the Internet.
DNS ensures:
 - That no two computers have the same DN
 - That all parts of the Internet know how to convert DNSs into numerical IP addresses, so that packets of data can be sent to right destination.



DNS (5)

- At heart of DNS is distributed database holding information over which DNS map onto which IP numbers. Data files with this information = “roots” and servers with these files = “root servers” or “root nameservers”.
- Servers arranged hierarchically. At top are set of root servers which hold master file of registrations in each TLD and which provide information about which other computers are authoritative re the TLDs in the naming structure.
 - For extensive description of DNS, see K.L. Manheim & L.B. Solum “An Economic Analysis of Domain Name Policy”, *Hastings Communications and Entertainment Law Journal*, 2004, vol. 25, p. 317ff; also available at < http://papers.ssrn.com/sol3/papers.cfm?abstract_id=515183>



DNS (6)

- Two main points of conflict and politics:
 - Allocation of DNs to persons/organisations: Basic principle here has been “first come, first served”.
 - Which TLDs (and, more generally, DNs) are permitted.
- Another relatively minor point of conflict concerns issue of accessibility of WHOIS database.
- Control over root servers is also contentious.
- Points of conflict arise in part due to changing function of DNS:
 - Easily remembered address identifiers → signifiers of broader identity and value (e.g. trademarks; signifiers of cultural and ethnic origin).
 - Indeed, DNs are even on way to being seen as property, viz. *Kremen v. Cohen & Network Solutions*, 25.7.2003, US Ct. Of App (9th Cir.).



Prehistory of ICANN

- Postel/IANA → US Dept of Commerce (DOC) → ICANN
 - Work on establishing and co-ordinating DNS originally carried out by Jon Postel at Information Sciences Institute of University of Southern California, under grants first from US Dept of Defense, later from US National Science Foundation. Postel and ISI colleagues established TLD system and categories.
- US DOC took over govt. responsibility for DN management in late 1990s. Dept issued White Paper in June 1998 in which it called for creation of private body (“NewCo”) to take over management of root. In response, a group of various persons in Internet community formed ICANN.
 - For critical accounts of this process, see Froomkin, “Wrong Turn in Cyberspace: Using ICANN to Route Around the APA and the Constitution”, *Duke Law Journal*, 2000, vol. 50, p. 17 *et seq*; Jonathan Weinberg, “ICANN and the Problem of Legitimacy”, 2000, *Duke Law Journal*, p. 187 *et seq*; Mueller, *Ruling the Root*, chapters 5-9.



ICANN: Status (1)

- ICANN is a non-profit corporation registered in California
- Operated with blessing of DOC. Relationship with DOC formerly formalized in 3 separate agreements:
 - MoU (terminated at end September 2006) by which ICANN was to prove it can do its job efficiently and sustainably;
 - Contract for performance of IANA functions
 - Cooperative Research and Development Agreement (CRADA): gave DOC power to terminate if control of ICANN transferred to foreign company or government.
- October 2006, new Joint Project Agreement signed between DOC and ICANN:
 - JPA expired on 30 September 2009.



ICANN: Status (2)

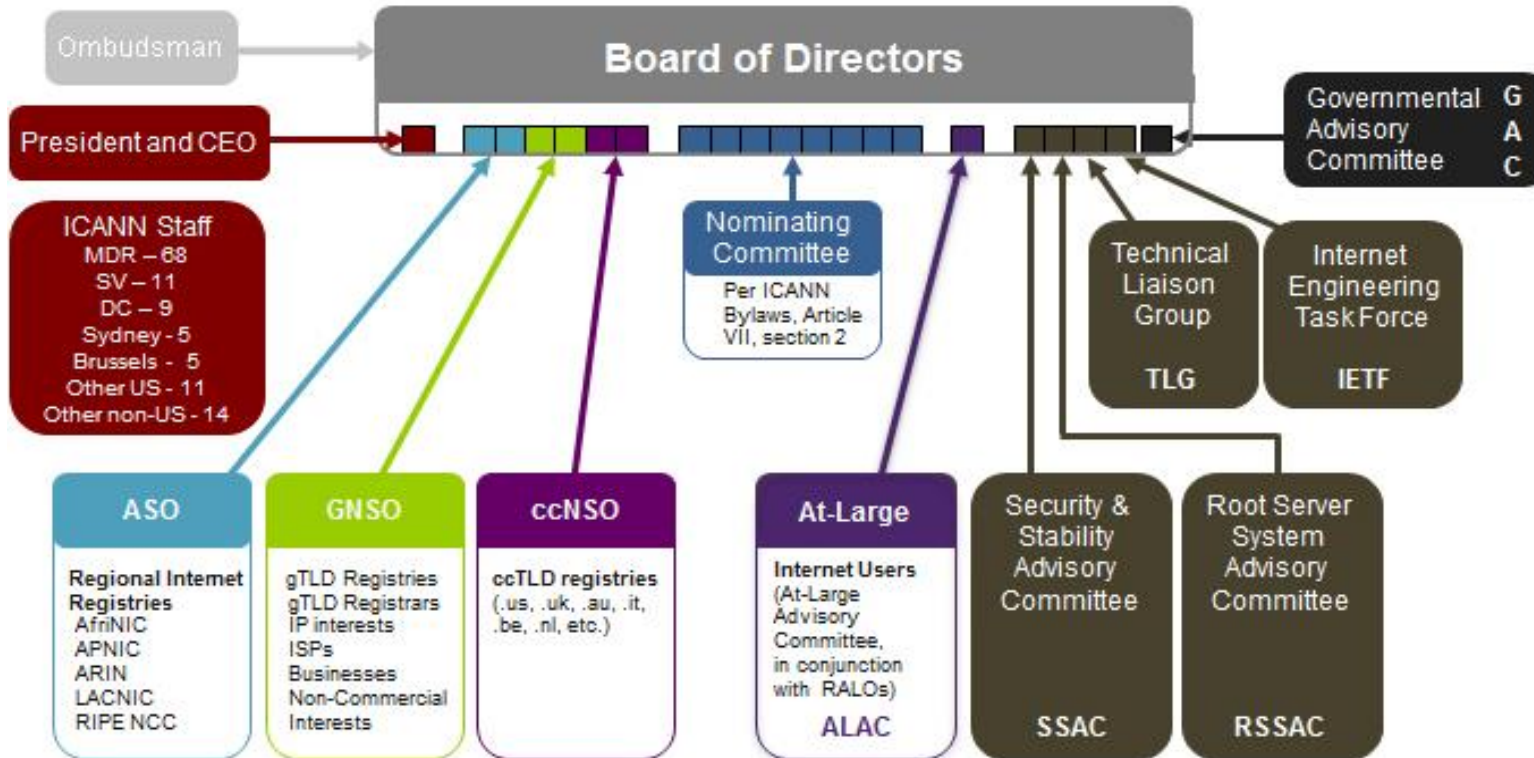
- 30 September 2009: DOC and ICANN make joint “Affirmation of Commitments” (AOC), effective 1 October 2009.
 - Text at <http://www.icann.org/en/affirmation/>
 - Legal status of this is far from self-evident. Essentially seeks to maintain status quo and principles underlying that status quo, especially with respect to upholding security, stability and resiliency of DNS, but DOC’s formal oversight powers have been reduced. Unclear, though what would happen if ICANN breached its commitments.
 - Latest renewal of IANA contract by DOC
- Note old allegations that US government’s approval and sponsorship of ICANN is in breach of US Constitution:
 - see Fromkin, “Wrong Turn in Cyberspace: Using ICANN to Route Around the APA and the Constitution”, *Duke Law Journal*, 2000, vol. 50, p. 17 *et seq*



ICANN Structure (1)

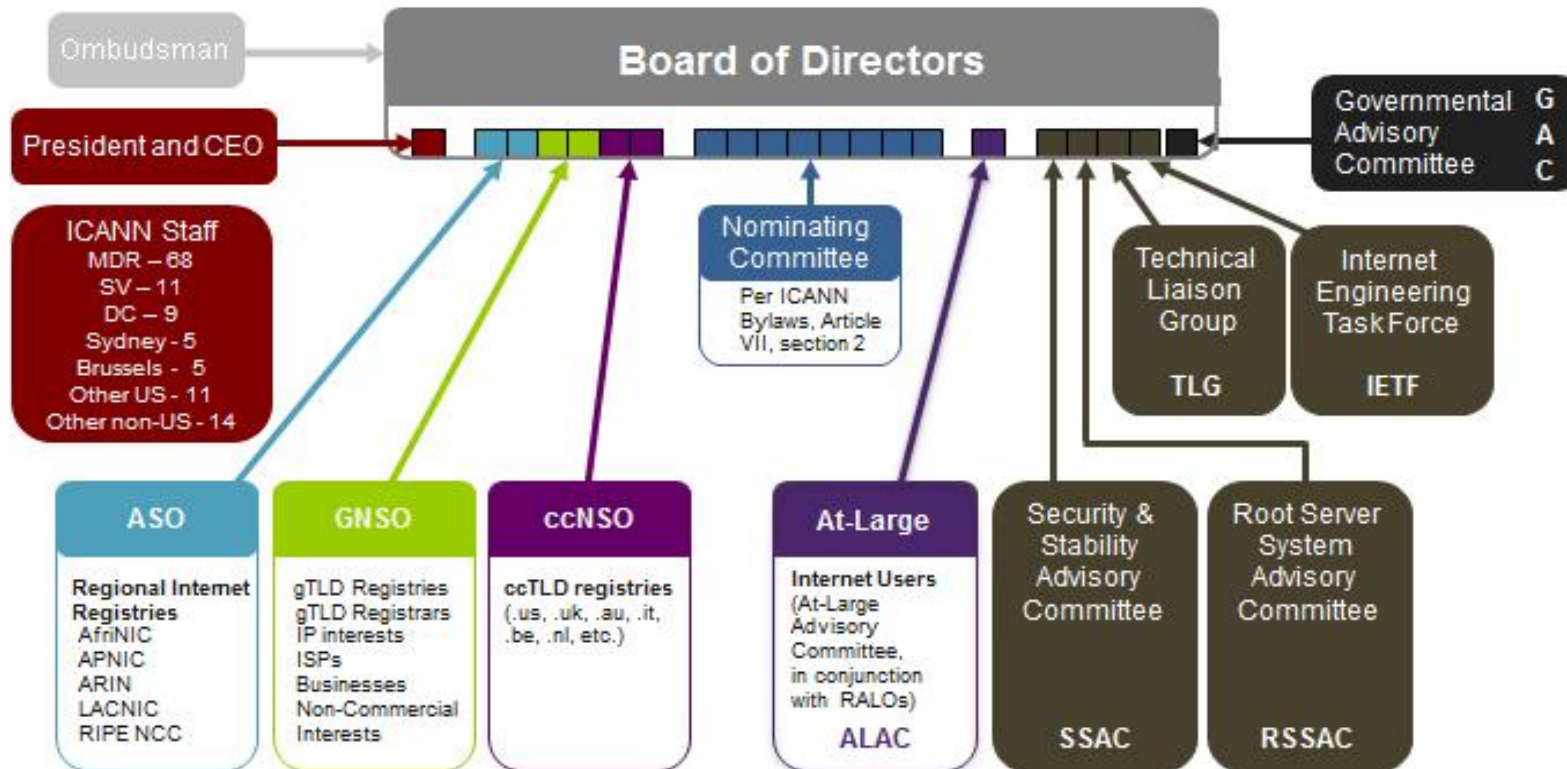
- ICANN run by President and Board of Directors with assistance of several “Supporting Organizations” and several Advisory Committees, most powerful of which is Governmental Advisory Committee (GAC).
- ICANN *per se* has no members; participation is through the committees and Supporting Organizations.
- Board made up of 16 voting members; election is extremely complicated process.

ICANN Multi-Stakeholder Model



(Source: <http://icann.org/en/structure/>)

ICANN Multi-Stakeholder Model



“commitment to a multi-stakeholder, private sector led, bottom-up policy development model for DNS technical coordination that acts for the benefit of global Internet users”, AoC §4

(source: ICANN)



ICANN Structure (2)

- ccNSO composed of ccTLD managers:
 - Advises Board on public policy matters related to ccTLDs
 - Relationship between ccTLD managers and ICANN has often been strained and troublesome, cf. IG book, section 5.1.3
- gNSO advises Board on policy related to gTLDs
 - In effect, it prepares proposals (PDP) that are submitted for adoption by the Board
 - Recent liberalization of policy on permitting new gTLDs emanated from gNSO.
- ASO advises Board on policy issues relating to operation, assignment and management of Internet addresses.



ICANN Structure (3)

- SSAC advises Board on policy issues relating to operation, assignment and management of Internet addresses.
- RSSAC advises Board on operation of DNS root name servers.
- ALAC represents individual net users.



ICANN's mandate

- ICANN's central functionality is DN management and IP address allocation.
- Complex contractual web has been spun around the exercise of this functionality.
- Three main categories of agreement:
 - i. Agreements between ICANN and DOC
 - ii. Agreements between NSI (later VeriSign) and DOC
 - iii. Agreements between ICANN and other bodies that are directly engaged in DNS operations (mainly domain name registries and registrars).
 - See overview in section 5.1.3 of IG book.
 - ICANN accredits DN registrars for broad range of TLDs (e.g. .aero, .biz, .com, .coop, .info, .jobs, .mobi, .museum, .name, .net, .org, .pro, .travel)



Three categories of agreements (1)

- (1) Documents related to the structure and functioning of ICANN:
 - Between ICANN and US Dept of Commerce (DOC): since Sep. 30, 2009 an Affirmation of Commitments (AOC) between DOC and ICANN –
 - Preceded by a Joint Project Agreement which replaced a series of MOUs
 - A nonprofit public-benefit corporation in California
 - ICANN's Articles of incorporation; Bylaws
 - CRADA Agreement: Cooperative Research and Development Agreement bw ICANN and DOC (re security and robustness of DNS root server) - lapsed
 - Between ICANN and DOC, for the performance of the so-called IANA function
- (2) Cooperative agreement between Verisign (previously Network Solutions, Inc.) and DOC, amended several times:
 - Amendment 19: NSI agreed to be subject to ICANN registry and registrar agreements



Three categories of agreements (2)

- (3) Agreements between ICANN and other bodies that are directly engaged in DNS operations:
 - Complex regulatory framework:
 - Re gTLD: Extensive use of contracts
 - Re ccTLDs: more informal framework, some use of contracts, though some of the regimes for management of ccTLDs also have a legislative footing



Contractual web (1)

- Re gTLDs:
 - ICANN – Registry Agreements:
 - Contract between ICANN and each respective gTLD, usually contains a number of other contracts as an Appendix:<
 - E.g. Registry Data Escrow Agreement between ICANN, Registry and Escrow Agent; Service Level Agreement; Registry-Registrar agreement which Registry is bound to use with its Registrars; standard Zone File Access Agreement between Registry and third party
 - Registry - Registrar:
 - Two-party agreement – standard contract attached to ICANN – Registry agreement
 - ICANN- Registrar:
 - Registrar Accreditation Agreement
 - Registrar – Registrant Agreement:
 - Contractual link between the gTLD and the domain name applicant



Contractual web (2)

- Re ccTLDs:
 - Most ccTLDs were delegated by Jon Postel *without written agreements*
 - Postel's RFC1591 contains the general framework for the role of a ccTLD Registry.
 - After ICANN took over in 1998, there were a series of so-called “*Exchange of Letters*” between such ccTLDs and ICANN
 - Re new member countries/regional TLDs/redelegation: contract with ICANN
 - In the Applicant Guidebook, with regards to new gTLDs of national importance, there is also need for consent /no objection from the national authority.
 - ccTLD Registry – Registrar:
 - Two-party agreement
 - Registrar – Registrant:
 - Contractual link between the ccTLD or gTLD and the domain name applicant

Contractual web (2)

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 - Re new member delegations, the delegating ccTLDs had to enter into a contract with ICANN
 - In the draft contract, the delegating ccTLDs of national top-level domains were required to agree to “*exchange of letters*” with ICANN. The contract stated: “It is the intention of both parties that this exchange of letters will not form the basis for any claim for any legal or equitable relief, or create reliance on the part of either party. For avoidance of doubt nothing contained in this letter shall give rise to any liability, monetary or otherwise by either one of us to the other.”
 - The contract also stated that the delegating ccTLDs were to be responsible for the domain name



ICANN's role in IG (1)

- Two opposing views of ICANN's role in IG:
 - ICANN = technical co-ordination body; it does not “govern” in true sense.
 - ICANN = political actor engaged in more than mere technical co-ordination.
 - See discussion in, i.a. Mueller, *Ruling the Root*, chapter 10.
- Examples where ICANN arguably takes on a political role:
 - Composition of BOD
 - Deciding which new gTLDs get recognized
 - Note, e.g. controversy around .xxx proposal in 2005.
 - Similar sorts of controversies bound to arise with coming expansion of gTLD space



ICANN's role in IG (2)

- For other concerns, see WGIG Background Report, pp. 19-23
- Ombudsman to rescue?
 - ICANN appointed ombudsman in November 2004. Impact difficult to assess, but considerable number of complaints handled.