

JUS5640/41 – 2012
Lecture: Domain Name System and ICANN
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1. Disposition

- Basic explication of Domain Name System (DNS).
- Prehistory of ICANN.
- Overview of ICANN's status, structure and mandate.

2. DNS

- Linked to (but formally distinct from) IP number/address system.
- Under IPv4, an IP address is 32 bit string of 1s and 0s; this string 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 56.4.67.238 tells most people little or nothing; <telenor.no> is much more easily remembered and catchy.
- Main reason for DNs 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. Usually 3 domains.
- 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)
 - ccTLDs (country-code) – au., .no, .ru, .us ... etc. For complete list, see <<http://www.iana.org/cctld/cctld-whois.htm>>.
- Examples of fairly new TLDs:
 - .cat
 - .xxx
- June 2008: ICANN announces radical liberalization of its policy on recognizing new TLDs. As part of this, it permits internationalized DNs (IDNs). Examples = “.中国” and “.中國” (two ccTLDs designated for China); “.рф” (ccTLD designated for Russian Federation); and “.ไทย” (Thai script equivalent for .th). Consequences of policy change remain to be seen.
- DNS = system for mapping, allocating and registering DNs.
- Most fundamental design goal = to provide same answers to same queries issued from any place on Internet. DNS ensures (i) that no two computers have same DN; (ii) that all parts of Internet know how to convert DNs into numerical IP addresses, so that packets of data can be sent to right destination.

- 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 regarding 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.
- Two main points of conflict and politics:
 1. Allocation of DNS to persons/organisations: Basic principle here has been “first come first served”.
 2. Which TLDs (and, more generally, DNS) are permitted.
- Another relatively minor point of conflict concerns issue of accessibility of WHOIS database.
- 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*, decided 25.7.2003 by US Ct. of App. (9th Cir.).
- Growing tension too over number distribution and role of Regional Internet Registries (RIRs): see Mueller, *Networks and States* (2010), 219–230. This is mainly due to scarcity of IPv4.

3. Prehistory of ICANN

- Postel / IANA → US Dept. of Commerce → ICANN
- Work on establishing and co-ordinating DNS originally carried out by Jon Postel at Information Sciences Institute of Univ. 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 Dept. of Commerce (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.

4. ICANN’s status, structure and mandate

- ICANN = non-profit corporation registered in California.
- Operated with blessing of DOC. Relationship with DOC formerly formalized in 3 separate agreements: MoU (terminated at end of Sept. 2006) by which ICANN to prove it can do its job efficiently and sustainably; contract for performance of IANA

function(s); Cooperative Research and Development Agreement – gave DOC power to terminate if control of ICANN transferred to foreign company or govt.

- October 2006, new Joint Project Agreement signed between DOC and ICANN. JPA expired 30th Sept. 2009.
- 30th Sept. 2009, DOC and ICANN make joint “affirmation of commitments”, effective 1st Oct. 2009. Text at: <<http://www.icann.org/en/announcements/announcement-30sep09-en.htm#affirmation>>. Legal status of this is far from self-evident. Essentially seeks to maintain status quo and principles underlying that s.q., especially with respect to upholding security, stability and resiliency of DNS, but DOC’s formal oversight powers have been reduced if not extinguished. Unclear, though, what would happen if ICANN breached its commitments.
- Note old allegations that US government’s approval and sponsorship of ICANN is in breach of US Constitution: see Froomkin, “Wrong Turn in Cyberspace: Using ICANN to route around the APA and the Constitution”, *Duke Law Journal*, 2000, vol. 50, pp. 17 *et seq.* This is really only of historical interest.
- 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 Organisations.
- Board made up of 15 voting members; election is extremely complicated process
- 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, prepares proposals (PDP) that are rubberstamped by Board; recent liberalization of policy on permitting new gTLDs emanated from gNSO.
- GAC composed mainly of national govt. representatives; has advisory role only but influence over Board is gradually being strengthened. Nature of GAC as voice for every country disallows majority actions; if consensus not reached, all views must be communicated to ICANN Board.
- ASO advises Board on policy issues relating to operation, assignment, and management of Internet addresses.
- SSAC advises Board on “matters relating to the security and integrity of the Internet’s naming and address allocation systems”.
- RSSAC advises Board on operation of DNS root name servers.
- ALAC represents individual net users.

- 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 approves/accredits DN registries and registrars for broad range of gTLDs (e.g., .aero, .biz, .com, .coop, .info, .jobs, .mobi, .museum, .name, .net, .org, .pro, .travel).
- Two opposing views of ICANN’s role in IG:

1. ICANN = technical co-ordination body; it does not “govern” in true sense;
 2. ICANN = political actor engaged in more than mere technical co-ordination.
 - See discussion in, i.a., Mueller, *Ruling the Root*, chapt. 10.
- Examples where ICANN arguably takes on political role:
 - Composition of Board of Directors
 - Deciding which new gTLDs get recognised.
 - Note, e.g., controversy around .xxx approval
 - Similar sorts of controversies bound to arise with coming expansion of gTLD space (dealt with in next lecture)
 - For other concerns, see, e.g., WGIG Background Report, pp. 19–23.
 - Much controversy in past about transparency, balance etc. of ICANN’s decision making; formalised “Policy Development Process” and commitment to “multistakeholderism” attempt to address these concerns.
 - Ombudsman to rescue? ICANN appointed ombudsman in November 2004. Impact difficult to assess, but considerable number of complaints handled.
 - Major ongoing tensions regarding ICANN’s relationships to various governments. Various constellations of relationship: e.g., ICANN ↔ USG (DOC); ICANN/USG ↔ other governments and ITU; ICANN ↔ GAC.
 - Ongoing tension too between ICANN and TM-holders.