

JUS5680 – 2012
Lecture: Development of Core Internet Standards – Players and Processes
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1. Disposition

- Overview of principal procedural elements.
- Overview of main players and processes.
- Consideration of reasons for success.

2. Chief procedural elements

- Standard (in context of IETF) = “the specification of a protocol, system behaviour or procedure that has a unique identifier, and where the IETF has agreed that ‘if you want to do this thing, this is the description of how to do it’”: RFC 3935, section 2.
- Standards development based on bottom-up, open, fair and inclusive procedures with emphasis on ‘rough consensus and running code’. See further IG book, chapter 4 (section 4.1). See also, e.g., Froomkin, “Habermas@discourse.net. Toward a Critical Theory of Cyberspace”, *Harvard Law Review*, 2003, vol. 116, pp. 749 *et seq.*, espec. 777ff – <http://osaka.law.miami.edu/~froomkin/discourse/ils.pdf>.
- Standards are documented in Requests for Comments (RFCs).
- The standards-development process involves multiple actors, the most important of which are the following ...

3. Main players

3.1 Internet Society (ISOC)

- Formed in 1992 under chairmanship of Vinton Cerf.
- Registered as non-profit corporation in Washington, DC.
- Functions set out in RFC 3935.
- Provides organisational umbrella for Internet standards development.
 - Gives insurance coverage to IETF (to cover liability for potential damage incurred by created standards) and funds standards development.
 - Funds RFC Editor position (see below) and retains copyright in all published RFCs.
- Two membership categories: organisational and individual. Currently over 100 organisational members and over 20,000 individual members. Membership fees payable.
- Objects (see articles of incorporation): “to be non-profit corporation ... operated exclusively for educational, charitable and scientific purposes ... including ... to facilitate and support the technical evolution of the Internet as a research and education infrastructure, and to stimulate the involvement of the scientific community, industry, government and others in the evolution of the Internet ...”
- Governed by Board of Trustees elected by constituency as determined by Board or directly by Board itself.
- Funds itself through m/ship fee payments and ability to allocate domain names under .org gTLD for fee (ca. USD 7 per name).

3.2 Internet Architecture Board (IAB)

- Formed in 1992. Predecessors = International Network Working Group formed in 1972 → Internet Configuration Control Board (1979) → Internet Advisory Board (1984) → Internet Activities Board (1986) → Internet Architecture Board (1992).
- Tasks: oversee and co-ordinate IETF (applying long-term perspective).
 - Appoints members of IESG. Approves appointment of RFC Editor. Delegates IANA functions. Approves new IETF working groups. One of its members functions as IETF chairperson. Serves as appeal board for complaints alleging improper execution of standards process.
- Consists of 13 full members (serving 1 year renewable terms) and several *ex officio* members; members elected by ISOC Board of Trustees; chair is selected by IAB itself which also appoints Exec. Director – see RFC 2850 articles 3.1, 3.2.

3.3 Internet Engineering Task Force (IETF)

- Formed in 1986.
- The real workhorse in RFC standards development.
- Not incorporated; no elected board, formal membership criteria, nor dues.
- Its work is overseen by IESG, IAB and, indirectly ISOC.
- Basic object = to assume “general responsibility for making the Internet work and for the resolution of all short- and mid-range protocol and architectural issues required to make the Internet function effectively” (RFC 1160).
- Open and free international membership – anyone can, in principle, participate in its face-to-face meetings held 3 times per year, and/or in its email-lists.
- Chief tasks: identify pressing operational and technical problems in the Internet and propose solutions to these by standards specification.
- Work is organised in working groups (e.g., working group on IPv6) organised in certain areas led by Area Directors (currently over 120 working groups divided into 7 areas).
- Main working principles set out in, inter alia, RFC 3935:
 - “Open Process”; “Technical Competence”; “Volunteer Core”; “Rough Consensus and Running Code”

3.4 Internet Engineering Steering Group (IESG)

- Oversees technical standards setting process (“standard track”) in IETF.
- No formal charter established. Tasks specified in RFC 3710 (informational only).
- Comprises IETF Chairperson, IETF Area Directors, IAB Chairperson, and IETF Exec. Director.
- Members selected through special “NomCom” process.

3.5 Internet Research Task Force (IRTF)

- Created “to promote research of importance to the evolution of the future Internet by creating focused, long-term and small Research Groups working on topics related to Internet protocols, applications, architecture, and technology” (<http://www.irtf.org>).
- Charter published as RFC 2014.
- Managed by Internet Research Steering Group made up of IETF Chairperson, chairs of the various research groups and ad hoc “members-at-large”.
- Currently 11 groups (e.g., Anti-Spam RG and Crypto Forum RG).

3.6 RFC Editor

- Manages RFCs.
- Role originally held by Jon Postel.
- Now under management of ISOC.

3.7 IANA

- Managed protocol specifications for domain name system and certain other number functionalities (e.g., assignment of “port numbers”).
- Functions transferred to ICANN in 1999.
- Dealt with in more detail in next lecture.

3.8 ICANN

- Non-profit corporation registered in California.
- Dealt with in more detail in next lecture.

3.9 World Wide Web Consortium (W3C)

- Established 1994 by Tim Berners-Lee at MIT, in collaboration with CERN (European Organisation for Nuclear Research (in Switzerland); WWW began as CERN project under Berners-Lee in 1989) and with support from DARPA and EU Commission.
- Has attracted little attention in WSIS and IG discourses, despite significance of WWW for exponential growth of Internet.
- Unincorporated. Relies on 3 host institutions for facilities and infrastructure: MIT (Computer Science and Artificial Intelligence Laboratory), University of Keio (Japan) and European Research Consortium in Informatics and Mathematics (ERCIM)(France). Also has 15 regional offices (e.g., in Australia, Finland, India, Korea, Morocco) which are often located within larger research institutions.
- Has almost 400 member organisations. Membership fee payable.
- “Bylaw” = World Wide Web Consortium Process Document, binding on Consortium members by way of contract. Latest version was 14.10.2005 available at <http://www.w3.org/2005/10/Process-20051014/>.
- Main agenda: develop web-standards (in form of W3C Recommendations – primarily http- and related standards, XML (extensible markup language) and CSS-standards (Cascading Style Sheets – important for presenting documents in uniform way across multiple media and devices). Other examples of initiatives = P3P (Platform for Privacy Preferences); PICS-standards (information content labelling scheme). More than 80 W3C Recommendations adopted so far.
- Key governing bodies:
 - W3C Team = composed of more than 60 researchers and engineers (most employed at host institutions); run by Director of W3C (Berners-Lee) and Chief Operating Officer (Steve Bratt) and Management Team; has co-ordination and management role.
 - Advisory Board = advises Team; has no decision-making powers; 10 members (chair appointed by Team; other 9 elected from Advisory Council (see below).
 - Advisory Committee = composed of one representative from every member organisation. Provides advice to Team primarily through AB.
 - Technical Architecture Group = main task is to document, clarify and build consensus on Web architecture principles; composed of 8 persons and W3C Director (who chairs TAG); 3 appointed by Team and 5 appointed by AC.
 - Working Groups = carry out nitty-gritty of standards development.

3.10 Other noteworthy bodies

- ISC (Internet Systems Consortium)
- IEEE (Institute of Electrical and Electronics Engineers)
- ISO (International Organization for Standardization)
- ITU-T (Telecommunications Standardization Sector of the International Telecommunications Union)

4. Further on processes

Internet Standard Process (ISP)

- Key technical process leading to IETF standard – described in RFC 2026 (under revision).
- Goals = technical excellence; prior implementation and testing; clear, concise and easily understood documentation; openness and fairness; timeliness.
- Two types of standards: Technical Specifications and Applicability Statements (describing how TS work).
- Process by which specification becomes Internet Standard = “standard track” (managed by IESG). Three main stages (maturity levels): Proposed Standard; Draft Standard; Internet Standard. Advancement from PS to DS requires successful operational experience from at least two independent and interoperable implementations.
- Other types of documents published by IETF = informational and experimental RFCs and Best Current Practice RFCs.
- Great emphasis on transparency of ISP.
- Stipulated periods of review – 6 months for PS to DS process; 4 months for DS to IS process.
- Most if not all decisions are made bottom-up and by “rough consensus” – see RFC 3935.
- New pressures to change this model.
- Dispute resolution procedures also provided for, with IAB or ISOC Board of Trustees as final arbiters.

W3C’s Recommendation Track Process

- Roughly similar processes with respect to WWW standards – viz. “Recommendation Track Process” – though 4 maturity levels: Working Draft, Candidate Recommendation, Proposed Recommendation, W3C Recommendation.
- Also emphasis on transparency and due process. Director (Berners-Lee) has final say in disputes.
- Note innovative feature in “heartbeat requirement” = if Working Group has document on RTP which has not yet reached final maturity, the Group must issue new drafts of or updates on the document at least every 3 months (Process Document section 6.2.7).

Standards and IPR

- Common to develop standards subject to RAND (reasonable and non-discriminatory terms). IETF permits this. RAND allows IPR holders to impose restrictions on use of their work including right to charge for patent fees or royalties, but only when terms are reasonable and non-discriminatory.
- Cf. W3C policy on patents – so far requires Royalty Free license terms. Much disputed.

5. Success factors

- Note praise for IETF processes in Fromkin, “Habermas@discourse.net”.
- What accounts for success?
- Major issue: will this success continue?
- Note considerable potential for development of standards to be influenced directly or indirectly by government decisions. E.g., legislation mandating use of certain technology (broadcast flags), legislation providing tax relief for certain industrial sectors (thus stimulating investment): see further, e.g., J.P. Kesan & R.C. Shah, “Shaping Code”, *Harvard Journal of Law & Technology*, 2005, vol. 18, pp. 319 *et seq.*