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Task Force on the Internet

Organizations involved in technical coordination of the Internet

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Introduction

The Internet is made up of three layers. "At the bottom is a 'physical' layer, across which communication travels. This is the computer, or wires, that link computers on the Internet. In the middle is a 'logical' or 'code' layer – the code that makes the hardware run. Here we might include the protocols that define the Internet and the software upon which those protocols run. At the top is a 'content' layer – the actual stuff that gets transmitted across the wires."¹ This document describes how that middle layer of the Internet, the 'code' layer, is run, by whom, and how business can stay involved. It also looks to the future, and issues such as VoIP², ENUM³ and Instant Messaging – technologies which straddle the 'code' layer and the 'physical' layer. Many organizations are involved in this space, for example, traditional telecoms regulators and the new, self-regulatory coordination bodies of the Internet. Business needs to better understand how these organizations and technologies interact in order to ensure the Internet continues to be a vibrant medium for commerce.

The Internet is a collection of networks that are joined together, and its operation is a highly collaborative activity. It requires the voluntary cooperation of the root servers, the

¹ Lessig, 2001, 23

² VoIP is 'voice over internet protocol' – using the Internet to send voice in digital packets instead of traditional telecommunications methods of the public switched telephone network

³ ENUM, or e-numbering, is mapping a telephone number to a Uniform Resource Identifier which can be used to contact a resource associated with that number. It would mean that individuals or organizations could be contacted using the same number, whether by the internet or telephone, or using other technologies. ITU-T and the IAB are cooperating on developing ENUM.



coordinated operation of the Internet backbone that is made up of thousands of Internet service providers worldwide, the coordinated assignment of IP address space by the four regional Internet address registries, and the collaborative development and implementation of standards. As the networks that make up the Internet have many different properties, technical protocols, and naming systems, widely accepted standards have been developed to allow communication to run relatively seamlessly across the entire network.

The protocols and standards the Internet runs on have been developed by organizations whose roles have evolved over time. These organizations have different roles to play. The organizations that do technical coordination of the 'code' layer of the Internet have evolved differently from those concerned with the physical layer of the communications networks. Organizations like ICANN, the Internet Engineering Task Force and the World Wide Web Consortium are more self-regulatory in approach than traditional organizations such as telecoms regulators and the International Telecommunications Union. The organizations involved in technical coordination of the Internet depend on constant input and interaction on technical matters from relevant experts in order to keep the Internet and its related technologies developing and providing a platform for business-led innovation.

The continued success of the Internet depends on constant involvement of the standards, protocols and policies on which the Internet is based. The development of these standards, protocols, etc. continues today, based on technical input from business, universities, individuals, and governments. Business needs to ensure that the right personnel are involved in developing appropriate technical protocols and standards. It is essential for the health of the Internet and our continued ability to do electronic commerce that business remains active and engaged and continues to lead.

Background

In the 1980's, technical coordination of what came to be the Internet was managed by a set of contracts and 'request for comments' (RFCs) administered by US government agencies. The RFCs were edited under contract to the US Defense Advanced Research Projects Agency. After the formation of the Internet Society (ISOC) in 1992, funding for this work was undertaken by ISOC. This situation gradually evolved into a set of inter-linked organizations or committees; the Internet Architecture Board (IAB – see below) and the Internet Engineering Task Force (IETF – see below), which developed technical standards and also ran the emerging domain name system. The Internet Assigned Numbers Authority (IANA) was also operated under contract to the US Defense Advanced Research Projects Agency until 1998 when the Internet Corporation for Assigned Names and Numbers (ICANN) was created to undertake this and other responsibilities with industry funding and a memorandum of understanding with the US Department of Commerce. Although these organizations were initially anchored by US government contracts and funding, their structure was essentially autonomous and self-governing. Standards and structures were developed by participants (mostly volunteers) in a very active process of review based purely on technical merits and their ability to stand up to intense scrutiny.



Internet Society (ISOC)

www.isoc.org

The Internet Society (ISOC) was set up in the US in 1992 to provide financial support for IETF activities and to protect the individuals developing technical standards at IAB and IETF from personal liability. Its role has evolved, and it is now an international, non-profit, membership organization that fosters the expansion of the Internet. One of the ways that ISOC does this is through financial and legal support of the IETF, Internet Engineering Steering Group (IESG) and IAB. ISOC provides insurance coverage for many of the people in the standards development process, and coordinates public announcements and relations for those organizations. ISOC encourages membership and participation by business and other organizations.

Internet Architecture Board (IAB)

www.iab.org

The Internet Architecture Board (IAB) is the organizing and oversight committee of the Internet Engineering Task Force (IETF). IAB is responsible for the strategic technical direction of the Internet, and oversees the activity of IESG and IETF. IAB stays informed about important long-term issues in the Internet and pays special attention to emerging activities. IAB also sponsors and organizes the Internet Research Task Force, and convenes invitational workshops that provide in-depth reviews of specific Internet architectural issues.

IAB responsibilities include:

- Architectural oversight – oversight of architecture for the protocols and procedures used by the Internet.
- Standards process oversight and appeal – oversight of the process used to create Internet standards. IAB is an appeal board for complaints of improper execution of the standards process of IESG.
- External liaison – manages external relations for the IETF, for example by appointing liaisons to other organizations concerned with standards and other technical and organizational issues relevant to the worldwide Internet, for example, ICANN.
- Advice to ISOC – IAB acts as a source of advice and guidance to the Board of Trustees and Officers of the Internet Society concerning technical, architectural, procedural, and, where appropriate, policy matters pertaining to the Internet and its enabling technologies.

Internet Engineering Steering Group (IESG)

www.iesg.org

The Internet Engineering Steering Group (IESG) is responsible for technical management of IETF activities and the Internet standards process. It administers the process according to rules and procedures ratified by ISOC. IESG initiates IETF working groups and ratifies or remands their output for further work. IESG consists of the Area Directors who are selected by the Nominations Committee (itself randomly selected from a body of volunteers from the general IETF community) and are appointed for two years.



Internet Engineering Task Force (IETF)

www.ietf.org

The Internet Engineering Task Force (IETF) is a large, open and international community of network designers, operators, vendors, and researchers concerned with the evolution of Internet architecture and the smooth operation of the Internet. It is the principal body engaged in the development of new Internet standard specifications. The IETF secretariat is largely self-funding through attendance fees for meetings and is operated by a subsidiary of the non-profit Corporation for National Research Initiatives.⁴

IETF membership is open to any interested individual. It operates an open consultation process by issuing Internet drafts and proposing to the IESG the issuing of RFCs on technical issues. IETF develops rough consensus based on the participation of IT experts around the world and makes recommendations to IESG regarding the standardization of protocols and protocol usage in the Internet.

Current work product of IETF includes:

- ENUM is a protocol for mapping telephone numbers into Uniform Resource Identifiers (URIs) which could be used on practically any information or communications device. It opens the way for even greater convergence between packet switched telephone networks and data networks. ENUM is being developed by IETF's Telephone Number Mapping working group and is not yet operational. IETF is responsible for the ENUM specification while the ITU-T is working on promoting and administering the standard.
- Instant messaging or Internet messaging (for example IRC, AOL Instant Messenger, Yahoo Messenger) is increasingly being used by the business community. IETF is working on protocols and data formats to develop an overall architecture for instant messaging and to improve inter-operability of the proprietary text and voice messaging systems currently in use.
- Internationalized domain names involve the use of non-Latin characters in domain names. This is an extremely complex area and with the recently developed standards for encoding of UNICODE representations of many language scripts in ASCII-encoded domain name registrations, efforts have now moved to ICANN for implementation.

To join IETF, members simply subscribe to a working group of relevance and interest, and to which they can usefully contribute. IETF also organizes working meetings that are open to participants.

⁴ <http://www.cnri.reston.va.us/>



World Wide Web Consortium (W3C)

www.w3.org

The World Wide Web Consortium (W3C) is led by Tim Berners-Lee and develops interoperable technologies (specifications, guidelines, software, and tools) to promote the evolution and interoperability of the World Wide Web which sits on top of the Internet. Since 1994, W3C has developed more than forty technical specifications for the Web's infrastructure. W3C is transforming the architecture of the original Web (essentially HTML, URIs, and HTTP) using the foundation of XML.

W3C aims to make the Web more accessible by promoting technologies that account for differences in culture, languages, education, ability, material resources, and the physical limitations of users. W3C contributes to efforts to standardize Web technologies by producing specifications (called "Recommendations") that describe the building blocks of the Web.

W3C groups are made up of representatives from member organizations, W3C itself, and invited experts. These groups produce the bulk of W3C's results: technical reports, open source software, and services (e.g., validation services). W3C also coordinates with other standards bodies and technical communities. There are currently over thirty W3C Working Groups.

W3C work products have included:

- HTML - Several versions of HTML.
- CSS - cascading style sheets, a standard that allows users to update their entire websites very quickly.
- PNG - Portable Network Graphics is a graphic file format that allows compressed images to be created and sent quickly around the Internet without losing image quality.
- Guidelines for good practices, for example the Web Accessibility Guidelines.

Future W3C work will include ensuring access to the entire Web from the range of devices which will offer connectivity.

Internet Corporation for Assigned Names and Numbers (ICANN)

www.icann.org

The Internet Corporation for Assigned Names and Numbers (ICANN) was established in 1998 to administer the allocation of the internet protocol (IP) address space and to manage the Domain Name System (DNS) and the root server system functions. Prior to 1998, the work now done by ICANN was carried out by the Internet Assigned Numbers Authority (IANA)⁵, under the authority of the US Government. ICANN has oversight responsibilities for address space allocation and assignment, in the DNS in the area of generic top level domain names (gTLDs), sponsored TLDs and country code TLD (ccTLD) organizations, and for root servers.

⁵ www.iana.org



ICANN is made up of three supporting organizations. Two deal with domain names; the Generic Domain Name Support Organization (GNSO), and the Country Code Name Support Organization (CCNSO). The third deals with addressing (the Address Support Organization) and is populated by the Regional Internet Address Registries. In addition, ICANN has standing advisory committees including the Root Server Advisory Committee, the Government Advisory Committee, the Security and Stability Advisory Committee, the At Large Advisory Committee and the Technology Advisory Group. The three support organizations nominate six of the ICANN board members and an additional eight are selected by a nominating committee that is itself made up of wide representation from the many ICANN constituencies.

While a large part of ICANN's work is affected and often guided by the standards-development activities of IETF, W3C, and other organizations, ICANN is a different organization from any of these. ICANN's purview is broader and more politically charged than the other technical coordination organizations. The policy implications of its decisions mean it has a very different structure and mission from most standards-setting bodies, reflecting a need for very broad participation in policy development.

Multilingual Internet Names Consortium (MINC)

<http://www.minc.org>

MINC was formed in June 2000 to promote the internationalization of Internet domain names (IDN), particularly with respect to different languages and character sets, and the development of best practices for IDN and the Multilingualization of the Internet. The organization recently passed a resolution and adopted a policy that internationalized domain names (IDN) development must be derived from and by the respective regions of IDN while taking into consideration the linguistic relevance of each region, its people, and their culture based on the IETF standard. MINC runs several language working groups, for example, Arabic, Russian, Cyrillic, Chinese, Urdu and Tamil amongst others, and has links with key language organizations. MINC's language working groups of experts from the local regions are developing language tables for their own languages for IDN. In addition, MINC's interoperability testing has been in preparation for 3 years and is now being finalized for deployment in IDN to ensure stability of the Internet as a truly global phenomenon. MINC collaborates formally or informally with IETF, ICANN, ITU, WIPO and other organizations to promote awareness of internationalized domain names.

ITU Telecommunication Standardization Sector (ITU-T)

www.itu.int/ITU-T/

The ITU Telecommunication Standardization Sector (ITU-T) is one of the three sectors of the International Telecommunication Union (ITU), based in Geneva, Switzerland. ITU-T produces non-binding technical recommendations which effectively serve as standards in all fields of telecommunications. The Telecommunication Standardization Bureau (TSB) is the secretariat of the ITU-T. Every four years, the ITU holds its Plenipotentiary Conference to set general policies, adopt five-year strategic and financial plans and elect the senior management team. The most recent 'plenipot' was held in Marrakech in September 2002.



Current work items (called study questions) of ITU-T include standards work on interactive television, ENUM, and next generation networks, as well as some coordination with ccTLDs. In 2002, ICC publicly expressed its view that ICANN, and not the generally government-led ITU, should continue to lead in the domain name space. ITU-T also cooperates with other standards setting organizations, including the International Organization for Standardization (ISO), the Internet Engineering Task Force (IETF), the United Nations Economic Commission for Europe (UN/ECE), and the European Telecommunications Standards Institute (ETSI).

ITU-T has three types of members; state members, sector members, and associate members. Communications service providers and equipment manufacturers, as well as other companies, are represented in the sector and associate membership. Associate membership, which allows participation in only one study group, is often chosen by smaller companies because of its smaller commitment. Members participate in the development of standards by submitting written comments and attending ITU-T study group meetings and assemblies. Traditionally, ITU-T's standards development procedures have been rather slow, and occasionally dogged by inter-state politics, but the procedures have been streamlined into a rather more efficient approval process.

ICC member involvement – who should represent business?

Business needs to stay engaged at both the 'code' and 'content' level of Internet technologies. We need to work to make sure these and other technologies are freely developed and used, and that the Internet continues to be a source of innovation and profit.

ICC members should examine the functions and role of the main organizations involved in technical coordination of the Internet and consider if they can become involved, or increase their involvement in, one or more of these institutions. Information Systems managers of all kinds of companies may have a significant contribution to make, even if the company's primary business is not directly dependent on the Internet. Types of companies that might particularly consider involvement are hardware and software vendors, network operators and communications service providers. It should be noted that these organizations do much of their work online, using the web and email to disseminate documents. Businesses can get involved in the important work of these organizations without physically attending conferences and meetings.

Conclusions

Future opportunities for business innovation on the Internet depend on business continuing to engage with and drive the technical standards and rules of the Internet today. ICC encourages business leaders to continue to inform themselves about the key decision-making institutions on technical coordination of the Internet, and to make sure that business continues to lead the way.

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