Internet Ecosystem:

Naming and addressing, shared global services and operations, and open standards development.

FEBRUARY 2014

Introduction

This paper offers a brief introduction to some of the Internet organizations and processes that shape naming and addressing, shared global services and operations, and open standards development in the Internet ecosystem. It builds on the Internet Society's well-received graphic: The Internet Ecosystem:

http://www.internetsociety.org/who-makes-internet-work-internet-ecosystem[1]

This paper looks at many of the key organizations and processes that shape Internet policy, with a focus on how any interested stakeholder can get involved in their work. It is not exhaustive; nor does it cover all aspects in detail. It is recommended that readers use this document as a starting point in their exploration of the Internet ecosystem, its players and policy processes. Extensive hyperlinked references are provided throughout to assist anyone seeking deeper understanding or involvement.

As a discussion paper, "Exploring the Internet Ecosystem" will remain a work in progress. Readers who wish to suggest improvements are invited to send suggestions to the Internet Society at isoc@isoc.org.

[1] This presentation of the Internet ecosystem is not the only way to look at all or part of the complex environment that supports the global Internet. See also the following examples:
http://www.internetsociety.org/sites/default/files/is-internetresources-201308-en.pdf
http://www.icann.org/sites/default/files/assets/governance-2500x1664-21mar13-en.png

The Importance of Participation

A diverse set of players has shaped the Internet and continues to contribute to its future success. Yet the Internet is not a static thing. Since it was established as a research network more than 40 years ago, it has evolved from a small government-run network of researchers to a network of networks that is the cornerstone for the global economy and an indispensable tool for individuals worldwide.

These phenomenal changes pose significant challenges for policy processes and actors in the Internet policy field. The organizations and processes that shape Internet policy have proven to be resilient and adaptable in large part because they have assumed that change is a constant and because they recognize that the best solutions to new issues that arise stem from willing collaboration between informed stakeholders.

The Internet Society encourages all stakeholders to become involved in the policy and standardization processes that support the ongoing evolution of the Internet and the equally evolving management of Internet resources.

Within the Internet ecosystem, various organizations have responsibilities for the protocols and standards that enable basic end-to-end communications (such as the Internet Protocol); the resources that direct these communications (such as IP addresses and the Domain Name System); the provision of reliable connectivity that ensures the communications reach their intended destinations, thus linking end-users (such as global telecommunication, satellite and cable system operators, Internet Exchange Points, etc.); and the policies, frameworks and educational activities necessary to ensure the Internet's openness, continuity and flexibility.

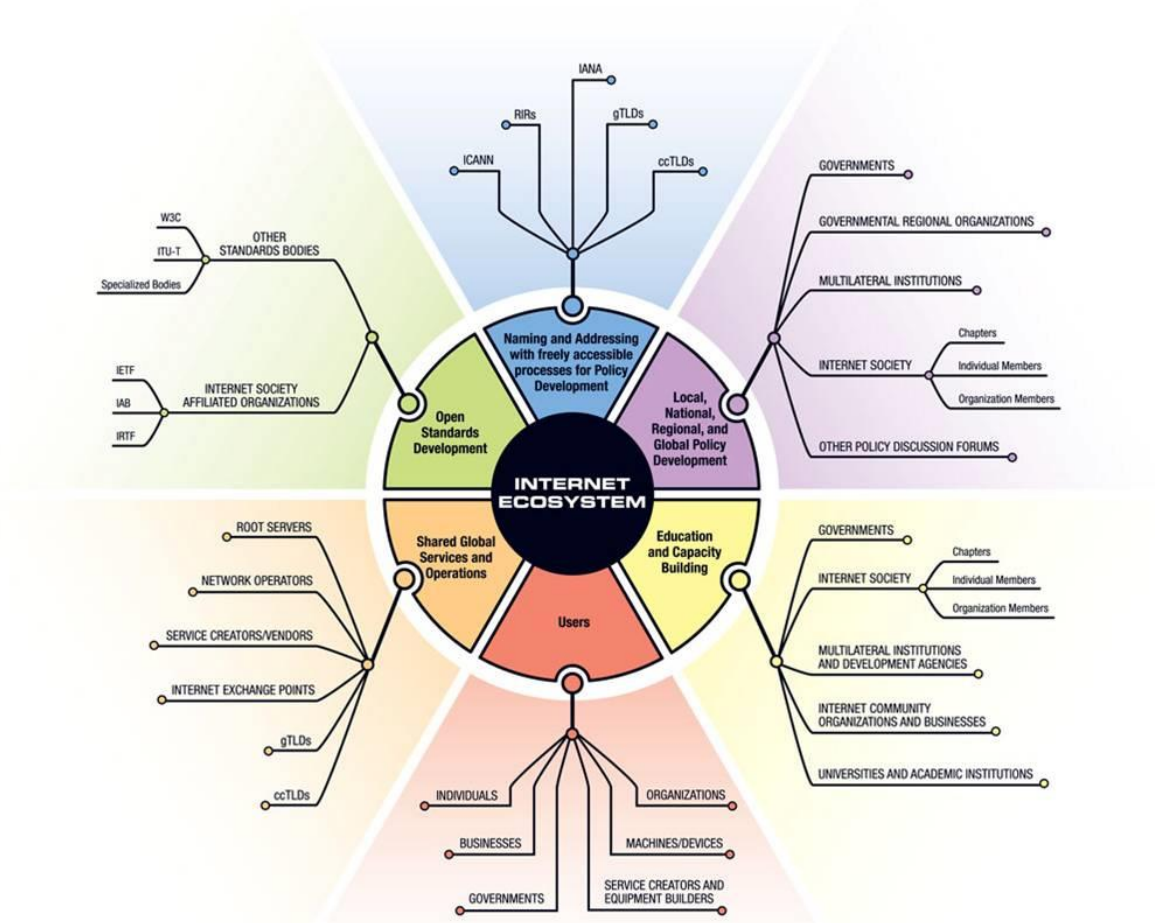
These technologies, resources and services are all highly interdependent and require a significant amount of coordination. The organizations responsible for standardization, coordination, administration and day-to-day management in the Internet sphere include the IETF, ICANN, the IANA function, the RIRs, and many others that will be touched upon in this paper. Each organization has a specific role and provides fundamental value to the overall functioning of the Internet.

These organizations have a proven, long-standing relationship with one another in coordinating the technical infrastructure of the Internet and have contributed to its incredible growth and stability. They make use of well-established mechanisms, including open, public meetings, mailing lists and bottom-up policy development processes that enable direct participation by any interested party. This way of working ensures that policies are defined by those who require them for their operations. It also gives the system the flexibility to respond and adapt to the Internet's rapidly evolving technology and to the changing needs of the Internet community. It has resulted in the creation of a significant body of knowledge and experience in the successful administration and management of the technologies, resources and services that make the Internet the success it is today.

The development, governance and coordination of the Internet result from discussions, debates and policy development processes in many specialized forums. Active participation by end users, governments, business, civil society and technical experts (whether as individuals or organizational representatives) is essential to make the policies, approve the procedures and write the standards, etc., that make the Internet the efficient and effective system it is today.

The Internet Society is pleased to offer this guide to the Internet stakeholders, their policy processes and participation mechanisms related to naming and addressing, shared global services and operations and open standards development within the Internet Ecosystem. It is hoped that this paper helps encourage and facilitate participation in these important areas of Internet policy development.

The Internet Ecosystem



Internet ecosystem is the term used to describe the organizations and communities that have organically evolved to guide the operation and development of the technologies and infrastructure that comprise the global Internet. These organizations share common values and a shared commitment to the open development of the Internet.

The term Internet ecosystem implies a Darwinian evolution focusing on the rapid and continued development and adoption of Internet technologies and which is characterized by the involvement of a broad range of actors; open, transparent, and collaborative processes; and the use of products and infrastructure with dispersed ownership and control.

Organizations that comprise the Internet Ecosystem include:

- Technical standards bodies such as the Internet Engineering Task Force (IETF), the World Wide Web Consortium (W3C), and the Institute of Electrical and Electronic Engineers (IEEE)

- Organizations that manage resources for global naming and addressing capabilities such as the Internet Corporation for Assigned Names and Numbers (ICANN), including its operation of the Internet Assigned Numbers Authority (IANA) function, Regional Internet Registries (RIR), and Doman Name Registries and Registrars

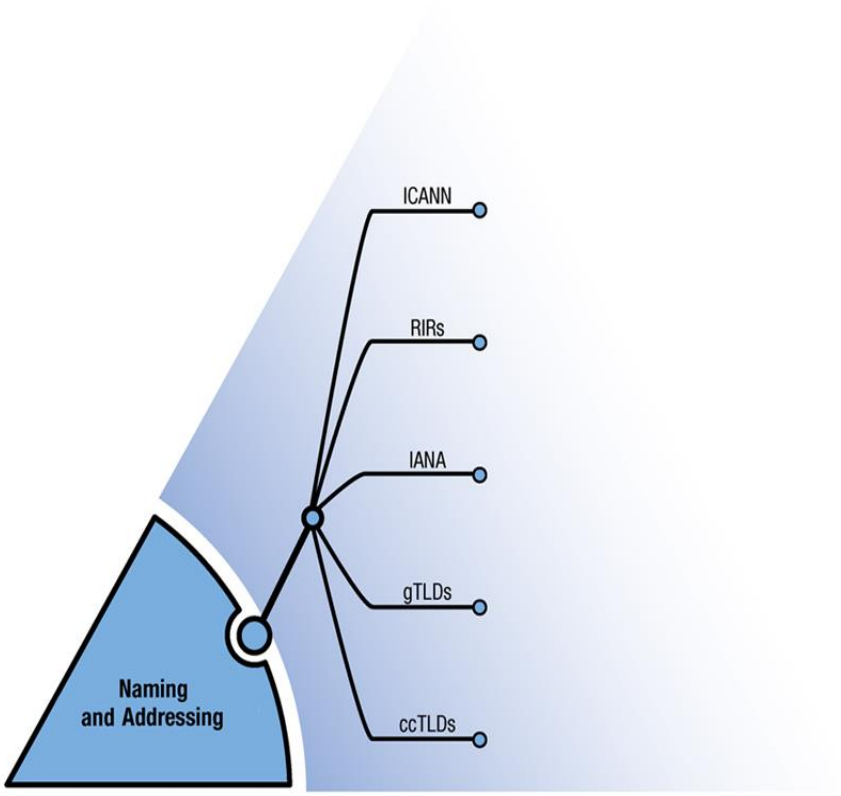
- Companies that provide network infrastructure services such as Domain Name Service (DNS) providers, network operators, cloud and content delivery network providers, and Internet Exchange Points (IXPs)

- Individuals and Organizations that use the Internet to communicate with each other and offer services and applications, or develop content, and

- Organizations that provide education and build capacity for developing and using Internet technologies, such as multilateral organizations, educational institutions, and governmental agencies.

This paper looks at each component of the Internet ecosystem in turn.

Naming and Addressing



Focus Areas:

- Internet Protocol (IP) Addresses
- Generic Top Level Domains (gTLDs)

Internet Protocol Addresses (IP Addresses)

Background

Internet Protocol (IP) addresses are unique numeric identifiers that are needed by every device that connects to the global Internet. The numeric identifier is assigned to a device or end point that enables data to be accurately transported between origination and destination points within a network or networks. IP addresses are a shared common resource that must be managed carefully and consistently to ensure the continued growth and stability of the Internet.

Players

IANA

The Internet Assigned Numbers Authority (IANA) maintains registries of unique codes and numbers that are used in the technical standards ("protocols") that drive the Internet. IANA's activities can be broadly grouped in to three categories:

Domain Names
IANA manages the Domain Name System (DNS) Root zone, the .int and .arpa domains, and an Internationalized Domain Names (IDN) language table registry. http://www.iana.org/domains

Number Resources
IANA coordinates the global pool of unicast IP addresses and Autonomous System (AS) numbers, providing them to Regional Internet Registries. http://www.iana.org/numbers/

Protocol Assignments
Other numbers, names and resources for Internet protocols developed by the Internet Engineering Task Force (IETF) are maintained in IANA-managed registries under the direction of the IETF. http://www.iana.org/protocols

The IANA function is performed by ICANN under contract with the United States Department of Commerce.

ICANN

The Internet Corporation for Assigned Names and Numbers (ICANN) has responsibility for unicast Internet Protocol (IP) address space allocation (through IANA), and the operation and evolution of the Domain Name System, along with the coordination of policy development reasonably and appropriately related to these technical functions. http://www.icann.org/en/about

ASO

The ICANN Address Supporting Organization (ASO) was established by means of a Memorandum of Understanding (MoU) between the Numbering Resource Organization (NRO) and ICANN. This MoU establishes that the NRO fulfills the role, responsibilities, and functions of the ASO as defined within the ICANN Bylaws.

The functions of the ASO are carried out by the ASO Address Council (ASO AC), whose members are elected and appointed by their respective RIR communities. Its purpose is to review and development of recommendations on Internet number resource policy and to advise the ICANN board. http://aso.icann.org/

NRO

The NRO is composed of the 5 Regional Internet Registries (RIRs). The purpose of the Number Resource Organization is to ensure global coherence of certain RIR activities, and to provide a single common interface to all the RIRs where this is necessary. The NRO also undertakes joint RIR activities, including technical projects and liaison activities. http://www.nro.net/

RIR

The five Regional Internet Registries (RIRs) are responsible, within their respective regions, for allocating Internet number resources such as globally unique IP addresses (IPv4 and IPv6) and autonomous system numbers. These resources are required by Internet service providers and users to identify elements of the basic Internet infrastructure such as interfaces on routers, switches and computers.[2] RIRs hold open policy forums to discuss and establish regional policies for number allocation.

The African Network Information Center (AFRINIC): http://www.afrinic.net

The Asia Pacific Network Information Centre (APNIC): http://www.apnic.net/

The American Registry for Internet Numbers (ARIN): https://www.arin.net/

The Latin American and Caribbean Internet Addresses Registry (LACNIC): http://www.lacnic.net/

The Réseaux IP Européens Network Coordination Centre (RIPE NCC): http://www.ripe.net/

NIR

A National Internet Registry (NIR) primarily allocates address space obtained from the relevant RIR, consistent with RIR policies, to its members or constituents, which are typically LIRs/ISPs. A limited number of NIRs exist in the Asia and Latin American and Caribbean regions.[3]

[2] http://www.nro.net/about/internet-registries.html

[3] For a full list: http://en.wikipedia.org/wiki/National_Internet_registry

LIR

A Local Internet Registry (LIR) is typically an Internet Service

Provider (ISP), which assigns address space to users of its network services (who may be other ISPs, which then assign address space to their own customers).[4]

ISPs

Internet Service providers.[5]

IP Address Allocation Process

The allocation of unicast Internet Protocol addresses is undertaken by IANA, in accordance with the IP specification laid out by IETF specifications.

Requests for IP addresses are typically made by LIRs (usually an ISP) either to the appropriate Regional Internet Registry (RIR), or, in limited cases, to the National Internet Registry (NIR) – if any such exist in the particular jurisdiction. (The LIRs and NIRs also receive their allocations from the RIR in their particular region.) [6]

As an RIR completes allocations from the space it has been given from IANA, the RIR will request a new allocation from IANA. Once IANA has determined that the request meets various clearly defined conditions (agreed on in global policy), the allocation is made to the RIR. IANA does not make allocations directly to ISPs, LIRs and NIRs.

For an in-depth review of the RIRs and the evolution of address allocation policy: http://www.internetsociety.org/fine-balance-internet-number-resource-distribution-and-de-centralisation

Whether an ISP requests addresses from an RIR or an RIR requests a new block of addresses from IANA, there must be a demonstrated need for the request to be granted. The allocation processes outlined above are clearly defined in policy documents agreed between the RIRs and ICANN (as the responsible party for IANA's operations). These documents are listed below.

Global Policy for Post Exhaustion IPv4 Allocation Mechanisms by the IANA: https://www.icann.org/en/resources/policy/global-addressing/allocation-ipv4-post-exhaustion

[4] ibid

[5] http://en.wikipedia.org/wiki/Internet_service_provider

[6] For more information on the operational relationships between NIRs and APNIC: http://www.apnic.net/policy/operational-policies-nirs/text

Internet Assigned Numbers Authority (IANA) Policy for Allocation of ASN Blocks to Regional Internet Registries: https://www.icann.org/en/resources/policy/global-addressing/global-policy-asn-blocks-21sep10-en.htm

IANA Policy for Allocation of IPv6 Blocks to Regional Internet Registries: https://www.icann.org/en/resources/policy/global-addressing/allocation-ipv6-rirs

Additionally, certain protocol parameter-related technical aspects of IANA's work, including IP addresses, are governed by a MoU between the Internet Engineering Task force (IETF) and ICANN: MoU Concerning the Technical Work of the IANA: http://tools.ietf.org/html/rfc2860

IP Address Policy Processes

Unicast IP addresses are allocated based on policies that are proposed and agreed through bottom-up and open consultation mechanisms. The RIRs, NIRs, ISPs and end users allocate, assign and use IP addresses. Two additional policy-focused entities are also involved in policy development for IP address distribution: the NRO and the ICANN ASO (Address Supporting Organization).

Regional IP address allocation policy development usually begins when an individual or organization submits an idea to an RIR. RIRs host open policy forums and mailing lists to discuss these ideas and establish regional policies for Internet number delegation. While the RIR policy development processes may differ slightly across the regions, they are based upon the principles of openness, transparency and deliberation, and any individual or organization can participate.[7]

Global policy proposals that affect how the RIRs receive resources from IANA also start as policy ideas submitted to the RIR policy forums. For a policy to be declared global, it has to be one that affects all five RIRs and IANA.

Global policy proposals are discussed within each of the RIR communities. When each RIR community adopts the same proposal (minor word differences that don't change the meaning are acceptable), the proposal is then forwarded to the ASO. The ASO then communicates the proposal to the ICANN Board and, once the Board has accepted, the proposal becomes global policy and is formally published on the NRO and ICANN websites.[8]

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[7] http://www.afrinic.net/en/community/policy-development

http://www.apnic.net/community/policy

https://www.arin.net/policy/pdp.html

http://www.lacnic.net/web/lacnic/proceso-de-desarrollo-de-politicas

http://www.ripe.net/ripe/policies

[8] For more information on the global policy process, see:

Attachment A: Global Policy Development Process, ICANN Address Supporting Organization (ASO) MoU: http://aso.icann.org/documents/memorandum-of-understanding

The policy development processes (PDPs) for both regional and global policy proposals are open and all interested parties and stakeholders are encouraged to participate. This is discussed in the following section.

How to Participate in IP Address Allocation Policy Processes

Interested individuals and organizations can follow and participate in IP address allocation policy development through the RIRs' open meetings, policy development processes and forum mailing lists, ICANN's public meetings, and through the open ASO[9] mailing lists.

Government representatives are encouraged to participate directly in the RIR policy process, and several do. In addition, they can also be informed of recent developments in IP address allocation discussions through the ICANN's Governmental Advisory Committee (GAC) via the NRO report: http://gac.icann.org/

Additionally, government representatives can and do participate in the RIR and ICANN open meetings and subscribe to their open mailing lists. Some RIRs also hold specific roundtable meetings focused on issues of interest to governments and regulators.[10]

While participation in the IP address allocation policy is important, participation in the uptake and transition to IPv6 is equally so. Most of the Internet is currently addressed via IP version 4 (IPv4) addresses. IPv6 addresses are also increasingly used, but not yet to the same extent. IPv6 is a more recent protocol, offering a much larger address pool than IPv4. The deployment of IPv6 does not mean that the whole Internet switches over to IPv6 on some specified date; rather the deployment is a process during which the new protocol will increasingly be adopted. During the deployment both protocols will coexist. At some future time, IPv6 is expected to be the dominant IP version, and IPv4 use will drop off.

This deployment of IPv6 is becoming increasingly critical as the IPv4 address pool is running out and the time to implement IPv6 in networks is now. The deployment is taking place, thanks to a concerted effort that is growing across the Internet ecosystem. For example, with World IPv6 Day, hosted by the Internet Society, major web companies and other industry players came together to enable IPv6 on their main websites for 24 hours. The goal was to motivate organizations across the industry — Internet service providers, hardware makers, operating system vendors and web companies — to prepare their services for IPv6 to ensure a successful transition as IPv4 address space runs out. In 2012, the World IPv6 Launch took place, with many more Internet service providers (ISPs), home networking equipment manufacturers, and Web companies around the world permanently deploying IPv6 for their

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Board's Review Procedures for Global Internet Number Resource Policies: http://www.icann.org/en/news/in-focus/global-addressing/review-procedures

[9] http://aso.icann.org/contact/aso-mailing-lists/

[10] 2010 RIPE meeting for governments and regulators: http://www.ripe.net/meetings/roundtable/feb2010/

products and services. Between World IPv6 Day and the World IPv6 Launch, IPv6 use around the world doubled, and it doubled again by one year later in 2013. These efforts demonstrate what can be achieved through the collective and collaborative action within the Internet ecosystem.

For more information on IPv6 and its importance to the future growth and continuity of the Internet see: http://www.worldipv6launch.org/infographic/ or http://www.internetsociety.org/what-we-do/internet-technology-matters/ipv6

The Internet Society is expanding its efforts to catalyze the adoption of IETF standards and technologies. Its Deploy360 Programme supports the deployment and use of key Internet technologies by bridging the gap between IETF standards documentation and final adoption of those standards by the global operations community. Deploy360 provides real-world IPv6, DNSSEC, and Routing Resiliency/Security deployment information including detailed, technical how-to resources and educational articles, best current operational practices, case studies, and other in-depth information.

http://www.internetsociety.org/deploy360/ipv6/

http://www.internetsociety.org/deploy360/dnssec/

http://www.internetsociety.org/deploy360/routing/

http://www.internetsociety.org/deploy360/about/bcop/

Generic Top Level Domain Names

Background

A generic top-level domain (gTLD) is one of a number of different types of top-level domains (TLDs) maintained by the Internet Assigned Numbers Authority (IANA) for use in the Domain Name System of the Internet. These categories include, among others, generic top level domains (gTLD) and country code top level domains (ccTLD). A domain name is a way of making an Internet Protocol address (a series of numbers and dots) more comprehensible to users. Typical gTLDs that we are all familiar with include .com, .net, .org, etc.

Two recent developments that are touched upon in this paper that have been the product of extensive policy deliberation are the introduction of new gTLDs and the introduction of internationalized ccTLDs and internationalized gTLDs.

Actors in the ICANN gTLD Policy Process

GNSO

The Generic Names Supporting Organization (GNSO) is the main policy-making body of ICANN for gTLDs. http://gnso.icann.org/

CSG

The GNSO's Commercial Stakeholder Group (CSG) represents the views of small businesses, business organizations, Internet connectivity providers, intellectual property owners and intellectual property organizations. CSG is official represented at ICANN by the following constituencies: Commercial business users; Intellectual property interests, and Internet service providers. http://gnso.icann.org/en/about/stakeholders-constituencies/csg

NCSG

The Non-commercial Stakeholder Group (NCSG) in the GNSO is the home for civil society organizations, individuals and non-for-profit organizations within ICANN. NCSG is officially represented at ICANN by the following constituencies: a) Non-Commercial Users Constituency (NCUC); and, b) the Non-for Profit Operational Constituency. http://gnso.icann.org/en/about/stakeholders-constituencies/ncsg

gTLD Registries Stakeholder Group

The gTLD Registries constituency represents those organizations running gTLD registries within the GNSO. http://gnso.icann.org/en/about/stakeholders-constituencies/rysg

Registrar Stakeholder Group

The registrar constituency represents companies that register domains for Internet users for a fee within the GNSO. http://gnso.icann.org/en/about/stakeholders-constituencies/rrsg

Structure of gTLD Policy Process

gTLD policy discussions are typically initiated by or within ICANN's Generic Names Supporting Organization (GNSO) following input from its six "stakeholder" communities: the Commercial Stakeholder Group (Commercial Business Users, Intellectual Property, Internet Service Providers, the Non-Commercial Stakeholder Group (Non-Commercial Users, Not-for-Profit Operational Concerns), Registry Stakeholder Group (those that manage the TLDs), Registrar Stakeholder Group, Nominating Committee Appointees and Liaisons, Board Appointees and

NomCom Appointees. Information on the structure of the GNSO can be found at: http://gnso.icann.org/en/about/structures/2012

Each of these stakeholder groups has its respective policy processes to allow positions to be submitted to the GNSO Council for review. For further details of memberships and policy processes it is recommended that the reader visit the relevant stakeholder group website (see above). Each of these stakeholder groups elects representatives to the GNSO Council.

The GNSO has a policy development process that is outlined in ICANN's bylaws.[11] The ICANN Board, the GNSO Council or an ICANN Advisory Committee (GAC, ALAC, SSAC, RSSAC)[12] may raise issues for consideration within the policy development process of the GNSO. Typically the GNSO will meet with the Advisory Committees, notably the GAC, during each ICANN meeting to inform and encourage discussion. Once the issue has satisfied the necessary requirements the policy development process (PDP) can begin.

Once a proposal has passed through the GNSO's PDP and has the recommendation of the GNSO Council it is submitted to the ICANN Board for approval.

The New gTLD Policy

In 2008, agreement was reached in ICANN for the introduction of new gTLDs. The largest new gTLD process to date is now in its final stages and some new gTLDs have already been added to Root Zone file. ICANN is expected to add many more in 2014 and, after a review of the process, may hold additional rounds.

- A full review of the new gTLD process and updates: http://newgtlds.icann.org/en/
- Final version of the applicant guidebook: http://newgtlds.icann.org/en/applicants/agb

How to Participate in gTLD Policy Processes

The gTLD landscape is changing and the introduction of new gTLDs and Internationalized Domain Names should encourage a greater number of stakeholders to participate in the associated policy processes.

As an interested individual one can follow and participate in the policy discussions through ICANN's public comment webpage where all the substantive pieces of work of a policy nature (and more) are listed and open to comment.[13]

[11] GNSO policy development process: http://www.icann.org/en/general/bylaws.htm#AnnexA

[12] ICANN Advisory Committees overview: http://www.icann.org/en/structure/

[13] http://www.icann.org/en/public-comment/

For a more in-depth engagement, interested individuals can join the constituency representing their particular interest. For example, those involved in civil society organizations or not-for-profit organizations, or who are interested in participating as individuals could decide to join the non-commercial stakeholder group (NCSG): http://gnso.icann.org/en/about/stakeholders-constituencies/ncsg

Organizations have an opportunity to participate in the various ICANN supporting structures (through the constituencies outlined above). This requires a greater level of engagement, but for those organizations that are involved in or have a material interest in the domain name space participation is important.

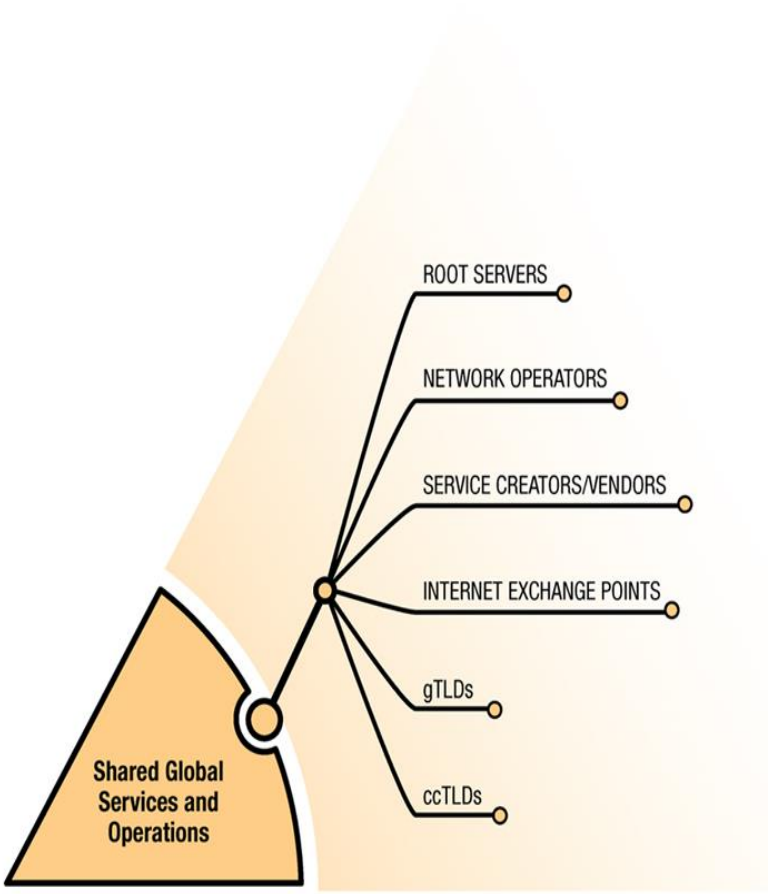
Many representative organizations participate in the ICANN processes. It is not essential, therefore, to participate directly, although a decision whether to do so will of course depend upon the importance of ICANN deliberations to the organization in question. The International Chamber of Commerce in the GNSO's CSG is an example of a representative association that participates in the ICANN GNSO and many other forums.[14] Many other national, regional or international associations participate in ICANN processes, and these provide a useful first entry point for individuals and organizations that are new to the world of gTLD policy.

And, as with IP address allocation, governments will typically participate directly in ICANN gTLD deliberations through the GAC, although GAC representatives are free to participate directly in any ICANN constituency.

It is also essential that interested individuals and organizations monitor related policy initiatives or consultations in their home countries. Some national governments may issue updates or notices to their citizens and may also hold consultations on Internet policy matters. In these cases, it is important that interested parties contribute to those discussions at a national level. Input and comments to national governments help shape the positions that their representatives will take in the GAC at ICANN. For more on the ways in which individuals and organizations can participate in ICANN: http://www.icann.org/en/participate/how-do-i-participate.html

[14] http://www.iccwbo.org/

Shared Global Services and Operations



Focus Areas:

- Root Servers
- Country Code Top Level Domains (ccTLDs)

Root Servers

Background

The root zone file is at the apex of the Domain Name System (DNS) database. It contains information only about the authoritative domain name servers for each top-level domain name, and is used to ensure a request for information from any client for any top-level domain is directed to the correct place. This database is used by almost all Internet applications as part of the process of translating globally unique names like internetsociety.org into other identifiers; the web, e-mail and

many other services make use of the DNS. That is to say, the DNS query for www.example.org includes the full name; however, the response from the root server only points to the nameservers for .org. In general terms, the root server operator does not typically log, share or analyze the type of request except in aggregated form, or even have access to the original source address from which the query is sent. While such data could be available under some circumstances, Industry best practices for the protection of the security and integrity of the service dictate that it be protected in accordance with data privacy laws.

The root zone file is housed in hundreds of computers known as root servers, located in many countries in every region of the world. Root servers contain the IP addresses of all the TLD registry name servers, including the gTLDs such as .com and the ccTLDs such as .de (Germany). Root servers "translate" names into next-level nameserver IP addresses, allowing the user's software to take the next step to finding desired Internet content. They perform a critical if somewhat "back-office" role in ensuring the continuity and therefore reliability of the Internet.

Players

IANA

IANA is the global coordinator of the DNS root, which is the uppermost part of the DNS hierarchy. http://www.iana.org/domains/

ICANN

In the context of root servers, ICANN is the responsible party for the operational management of IANA under contract with the United States Department of Commerce.[15] ICANN is also the operator of the L Root.

Root Server Operators

The root server operator function is limited to making the data held in the root quickly, securely, and reliably accessible to Internet users worldwide through the DNS protocol. Root server operators and their organizations do not take part in editorial decisions about the content of the DNS root zone, except to advise IANA on strictly technical matters such as management of DNSSEC-related records. For a full list of the root server operators and locations: http://www.root-servers.org/

RSSAC

The Root Server System Advisory Committee advises the ICANN Board and community on the operation of the root name servers of the domain name system. Its Executive Committee consists of representatives from each root name server; it

[15] http://www.ntia.doc.gov/ntiahome/domainname/iana/ianacontract_081406.pdf

consults other DNS experts as well in forming its advice. http://www.icann.org/en/groups/rssac

In addition to their work in the RSSAC, the root server operators have maintained a loose, informal association that predates ICANN for discussion of operational and security matters relating to the service they provide. http://www.root-servers.org/

The Role of Root Servers and Root Server Operators

The root zone file is housed centrally and distributed periodically to each of the other root servers around the world. At present, Verisign performs this function under a cooperative agreement with the U.S government (see below). (Verisign also operates the A-root, but separately from this function.) The root zone file is distributed to the root server operators using the same mechanisms as any other DNS zone, and then further distributed by the operators using a methodology known as *anycast*. Anycast, also widely used by DNS operators for important zones besides the root, makes possible a more geographically distributed and resilient Internet, and provides for more local access to the root servers around the world. (Anycast uses standard, well-tested features of DNS and internet routing protocols to enable the use of many more operational DNS servers for the root zone than the original 13; for example, “f.root-servers.net,” managed by Internet Systems Consortium, provides service for the root zone from dozens of locations worldwide.)

The root server operators are a group of independent and autonomous organizations that are responsible for the management and maintenance of the root servers. Each operator is responsible for the way in which its particular service is operated. This diversity is one of the strengths of the system. Neither the IANA nor ICANN have any executive authority over the operation of root name servers. By the same token, the root server operators have minimal involvement in setting policy. They do not control what information is in the root zone or the process of making changes to the root zone. They do play an important role, drawing on their operational experience to share data, and to provide information and advice to one another and to the IANA on operational matters and in policy setting; for example, during the deployment of DNSSEC (Domain Name Security). This is consistent with the root server operators’ strong operational focus.

To fulfill their role within ICANN, which is set out in that organization’s Bylaws, the root server operators participate in the Root Server System Advisory Committee (RSSAC). The RSSAC is to advise the ICANN community and Board on matters relating to the operation, administration, security, and integrity of the Internet's root server system. The administrative work of the RSSAC is carried out by its Executive Committee, while a Caucus of DNS and root server system experts are responsible for the essential work of the RSSAC in providing that advice.

The Internet Architecture Board provides a liaison to the RSSAC, reflecting the fact that the IETF has a key role in documenting the technical requirements of the DNS root servers together with the root server operators themselves, ICANN and the various stakeholders. The ICANN Security and Stability Advisory Committee (SSAC) also provide a liaison to RSSAC to promote discussion of

issues of mutual interest. The root server operators meet regularly at IETF and ICANN meetings. They also participate in IETF processes, such as the DNSOP WG, which develops guidelines for the operation of DNS software servers and the administration of DNS zones, and contribute to the work on individual Internet drafts where their expertise can be useful.

Participation in Root Server Related Policy Activities

Anyone interested wishing to understand or participate in root server operators' policy development activities should explore the opportunities available with each of the root server operators directly, because there are considerable differences among them. As a group, the root server operators operate transparently and provide information to the public via their web site. http://www.root-servers.org

In addition, some individual operators maintain their own web sites, usually under the letter naming the root they operate.

http://$letter.root-servers.org, e.g. http://k.root-servers.org or http://i.root-servers.org

For those who are not themselves directly involved in operating a root server, perhaps the most appropriate avenue for interacting with the root server operators is through the ICANN process, including the RSSAC, or through participation in the IETF.

Within ICANN, the RSSAC operates in accordance with ICANN community norms of openness, and thus conduct open meetings and publish meeting minutes.

Within the IETF, the root server operators interact in accordance with IETF community norms, including inviting open participation in the development of any Internet drafts or RFCs relevant to the DNS root name service protocol or the operation and administration of DNS root servers.

Anycast and Increasing Capacity

The root server operators are involved at the operational level in many efforts to improve Internet capacity throughout the world. Having one or more anycast instances of root servers nearby can improve the speed, reliability, and security of internet service for users, so the root server operators are generally willing to add anycast capacity wherever there is infrastructure to make it possible to operate locally. Root server operators have collaborated with ISPs, Internet exchange point (IXP) operators, RIRs, and some governments in order to bring improved DNS service for the root as part of improving capacity overall.

Formal Policy and Documentation

Historically, because of their operational focus and the fact that their role predates ICANN and most formal Internet governance debates, the root server operators have not been major participants in formal policy processes. In addition to the informal mechanisms discussed above,

however, there are a few documents regarding root server operations that have served to describe relevant relationships:

Verisign agreements covering the root with USG:
http://www.ntia.doc.gov/page/verisign-cooperative-agreement

ISC "accountability framework" document with ICANN:
http://archive.icann.org/en/froot/ICANN-ISC-MRA-26dec07.pdf

An exchange of letters between the root server operators and ICANN, indicating their intention to coordinate and collaborate. For example, the exchange between Netnod, operator of the I-root and ICANN:

http://www.icann.org/en/news/correspondence/lindqvist-to-twomey-08may09-en.pdf

http://www.netnod.se/sites/default/files/ICANN-AUTONOMICA-Iroot.pdf

Country Code Top Level Domains (ccTLDs)

Background

A **country code top-level domain (ccTLD)** is an Internet top-level domain generally used by a country – for example, .de (Germany), .ke (Kenya) and .jp (Japan) – and designated according to the ISO two-letter country code standard.[16]

ICANN's introduction of a fast track for internationalized ccTLDs has proven successful and popular, while work continues to resolve a range of technical issues.[17]

The Players

IANA

ICANN

ccNSO

The Country Code Names Supporting Organization (ccNSO) is the policy development body created for and by ccTLD managers for ccTLD issues within ICANN. http://ccnso.icann.org/

[16] http://en.wikipedia.org/wiki/ISO_3166-1_alpha-2

[17] http://www.icann.org/en/topics/idn/fast-track/

ccTLD operators

See the list from the IANA website: http://www.iana.org/domains/root/db/

Regional ccTLD associations

There are a number of regional ccTLD organizations:

AFTLD for Africa http://www.aptld.org

APTLD for Asia Pacific http://www.aptld.org

CENTR for Europe http://www.centr.org

LACTLD for Latin America and the Caribbean http://www.lactld.org

Structure of ccTLD Policy Processes

Policies are set by the trustee/operator (formally called “the manager”) for the day-to-day management of a particular country’s ccTLD and by the ccTLD community, the regional ccTLD associations and the ccNSO within ICANN, for policies relevant to the operation of ccTLDs overall.

Requests for the delegation or redelegation of a ccTLD, as with all TLDs, are handled by the IANA function. Basic principles govern the delegation or redelegation of a ccTLD; for example, it is required that the manager be a responsible and technically competent trustee of the domain on behalf of the national and global Internet communities. In many cases a government agency acts as a trustee for the delegation of the ccTLD and may also act as the operator of the ccTLD.

When a delegation or redelegation of a ccTLD is requested, the U.S. Department of Commerce, as the Root Zone Administrator, is responsible for verifying that processing procedures have been followed, and authorising any related changes to the DNS root zone and root zone database.

Policy that relates to the overall operation of the ccTLDs is set by the ccTLDs through ICANN. Any policy proposal would likely start when a proposal is brought forward to the ccNSO by an individual ccNSO member (a ccTLD operator) or by one of the regional ccTLD associations (CENTR for Europe, for example).

The policy development process of the ccNSO is described fully in the ICANN Bylaws: http://www.icann.org/en/about/governance/bylaws#AnnexB

Policy changes can also be proposed by the GAC - the government advisory body to ICANN. Indeed the ccNSO and the GAC often cooperate within ICANN to propose policy changes. For

example, the ccNSO and the GAC collaborated to develop policy proposals for the introduction of IDN (internationalized domain name) ccTLDs.

Proposals that will affect the operation of ccTLDs globally are presented to the ICANN Board for review and approval. The recent introduction of “fast-track” Internationalized ccTLDs is a useful example of the ccNSO’s policy development process and can be found here: http://ccnso.icann.org/policy/cctld-idn

For more information on the IDN ccTLDs fast track: http://www.icann.org/en/topics/idn/fast-track/

How to Participate in ccTLD Policy Processes

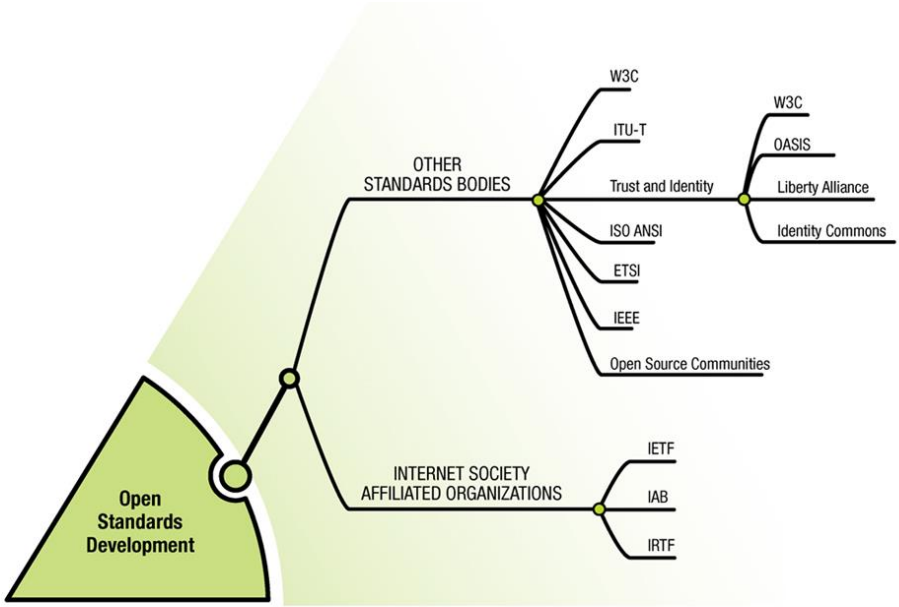
As an interested individual or organization participation is possible through a number of routes. Some ccTLD operators have their own open policy development processes, and it is possible to participate in those processes online or through open meetings. For example, Nominet, the ccTLD operator for .uk, encourages engagement in its policy development processes: http://nominet.com/policy/process/

ICANN also has open consultations. To be more involved in ICANN interested individuals can participate in, for example, the ALAC (At-Large Community) that represents the interests of individual Internet users.

As a government representative or as an affiliated entity (registry, associated business, etc.) it is best to contact the appropriate ccTLD first to better understand how to engage in related national policy development. With some ccTLD operators it is possible to contribute to policy development without being a member, registrar or other associated entity. Mechanisms for participation will differ from ccTLD operator to ccTLD operator.

As of 2013, the ccNSO counts 146 Member ccTLD Registries. http://ccnso.icann.org/about/members.htm

Open Standards Development



Focus Area:

- Internet Society affiliated organizations and other Internet standards bodies

Background

The Internet is built on technical standards that allow devices, services, and applications to be interoperable across a wide and dispersed network of networks. By focusing on interoperability for passing traffic between networks, Internet standards describe the protocols without prescribing device characteristics, business models, or content.

The Internet depends on several types of technical standards, developed by a range of organizations. These include, among others: standards and protocols developed by the Internet Engineering Task Force (IETF), as well as telecommunications infrastructure standards developed by the International Telecommunications Union (ITU); hardware standards developed by bodies such as the Institute of Electrical and Electronics Engineers (IEEE); and application and software standards, such as those developed by the World Wide Web Consortium (W3C). A key principle for effective standards development is respectful cooperation between standards organizations, with each respecting the autonomy, integrity, processes, and intellectual property rules of the others. The leading Internet standards organizations have jointly agreed on the essence of the modern paradigm for standards, and encourage others to adopt and support these proven principles through the OpenStand movement.

The Players

ISOC

The Internet Society (ISOC) is the organizational home of the Internet Engineering Task Force (IETF), the Internet Architecture Board (IAB), the Internet Engineering Steering Group (IESG), and the Internet Research Task Force (IRTF)[18] — the standards setting and research arms of the Internet community.
http://www.internetsociety.org/

IETF

The Internet Engineering Task Force (IETF) is a large, open and international standardization community comprising network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. The IETF is responsible for developing and maintaining the specifications for key Internet protocols such as IP (v4 and v6), as well as HTTP (the communication protocol for the World Wide Web).
http://www.ietf.org/

IAB

The IAB (Internet Architecture Board) is chartered as a committee of the IETF. Its responsibilities include architectural[19] oversight of IETF activities, Internet Standards Process oversight and appeal, and the appointment of the RFC Editor. The IAB is also responsible for the management of the IETF protocol parameter registries.[20]
http://www.iab.org/

IESG

The IESG (Internet Engineering Steering Group) is responsible for the technical management of IETF activities and the Internet standards process. It is also responsible for the actions associated with entry into, and movement along, the Internet "standards track", including final approval of specifications as Internet Standards. http://www.ietf.org/iesg/

[18] http://www.irtf.org/

[19] The IAB provides oversight of, and occasional commentary on, aspects of the architecture for the protocols and procedures used by the Internet.

[20] For more on the protocol parameter registries: http://tools.ietf.org/html/rfc6220

W3C

The W3C (World Wide Web Consortium) develops interoperable technologies (specifications, guidelines, software, and tools) for the World Wide Web. The W3C is an international forum for information, commerce, communication, and collective understanding. One of the most important outcomes of the W3C is the standard specification of HTML and its successors, which are the publishing languages of the World Wide Web. http://www.w3.org/

IEEE

The IEEE (Institute of Electrical and Electronics Engineers) is an international organization that develops electrical and electronic technology standards. Many of the IEEE standards are integral to computing science and networking technologies. Some examples of key technologies include Ethernet, WiFi, Bluetooth, and Fiber optic connection standards. http://standards.ieee.org/

ITU-T

The International Telecommunications Union (ITU) is a specialized agency of the United Nations dealing with information and communication technology issues. The ITU coordinates the shared global use of the radio spectrum, promotes international cooperation in assigning satellite orbits, works to improve telecommunication infrastructure in the developing world, and produces recommendations that foster the interconnection of communications systems. ITU-T (the telecommunications standardization sector of the ITU) produces global telecommunications recommendations. The recommendations produced by the ITU-T are not specific to the Internet, but because a portion of Internet traffic is carried over telecommunication networks, ITU-T is a part of the greater ecosystem. http://www.itu.int/ITU-T/

Structure of Internet Standards Development

The following offers a brief and necessarily broad-brush outline of the standardization processes/structures of the IETF, the W3C and the IEEE-SA. These organizations work to ensure that the standards they develop contribute to and further the stability and continuity of the Internet. However, these organizations have differing approaches and processes and differing membership structures – or none at all in the case of the IETF.

These organizations have responsibility for different, but complementary, areas of standardization. For example, the IETF *does not* standardize transmission hardware – that is the responsibility of organizations like the IEEE. Nor does it standardize specialized World Wide Web specifications such as HTML and XML, which are the responsibility of the W3C. The IETF *does* standardize all the protocol layers in between, from IP itself up to general applications like email and HTTP.

Whether infrastructure, hardware or software standards, each plays an important role in contributing to the Internet's success and increasing ubiquity. Ensuring that relevant standards organizations cooperate and actively work together to maximize effectiveness, and thereby avoid duplication, market confusion and resource inefficiencies, is essential in this increasingly converged Internet, computing and telecommunications world.

IETF

The Internet Engineering Task Force is a self-organized group of experts who contribute to the engineering and evolution of Internet technologies. It is the principal body engaged in the evolution of existing Internet standards and the development of new Internet standard specifications. The IETF is unusual in that it exists as a collection of gatherings, but is not as a corporation. It has no board of directors, no members, and no dues.[21]

The IETF's mission includes the following, among others: identifying, and proposing solutions to pressing operational and technical problems in the Internet; specifying the development or usage of protocols and the near-term architecture to solve such technical problems for the Internet; making recommendations regarding the standardization of protocols and protocol usage in the Internet; providing a forum for the exchange of information within the Internet community between vendors, users, researchers, agency contractors, and network managers. The IETF meets 3 times a year in locations around the world.[22] These face-to-face meetings are opportunities for engineers to share knowledge and expertise – whether long time participants, or newcomers.

For an in-depth introduction to the IETF, please see: http://www.ietf.org/tao.html

The Internet Standards developed by the open processes of the IETF and related organizations are published in the Request For Comments (RFC) document series: http://en.wikipedia.org/wiki/Request_for_Comments

Every IETF standard is published as an RFC (a "Request for Comments), and every RFC starts out as an Internet Draft (often called an "I-D"). An Internet Draft is the working document of the IETF, its work areas[23], and its Working Groups. Once the Internet Draft has received comments and is considered to have achieved sufficient agreement it is given to a work Area Director for presentation to the IESG. Further review of the Internet Draft by the wider IETF is also recommended.

[21] Much of the text for this section has been excerpted from the introductory document to the IETF: http://www.ietf.org/tao.html

[22] http://www.ietf.org/meeting/

[23] List of work areas and Working Groups: http://tools.ietf.org/area/

The IESG will then announce an IETF-wide Last Call, which invites comment from the IETF community prior to further consideration by the IESG and possible approval. Once the Internet Draft is approved it is published as a Proposed Standard by the RFC Editor.

An important aspect of the IETF's process is that decisions are taken on a "rough consensus" basis, meaning that a very large majority of those who care about whether an Internet Draft is approved must agree and all issues have been discussed and addressed. This consensus does not require that all participants agree although this is, of course, preferred. In general, the dominant view of the working group prevails.[24]

The full standards development process can be found here: http://tools.ietf.org/html/rfc2026[25]

The IETF is focused in its activities and does not develop new activities when expertise is better represented elsewhere. The IETF is chiefly scoped to work on "protocols and practices for which secure and scalable implementations are expected to have wide deployment and interoperation on the Internet, or to form part of the infrastructure of the Internet." Adhering to this scope also allows the IETF to work in partnership with other standards organizations, where appropriate, on items of mutual interest: http://www.ietf.org/liaison/managers.html

W3C

The World Wide Web Consortium (W3C) is an international consortium that develops Web standards and guidelines designed to ensure long-term growth for the Web. W3C is administered via a joint agreement among its host institutions: MIT in the USA, the European Research Consortium in Informatics and Mathematics (ERCIM) in France, Keio University in Japan, and Beihang University in China.

Sir Tim Berners-Lee, W3C Director and author of WWW and HTML, established the W3C in 1994 to ensure compatibility and agreement among industry members in the adoption of new WWW standards.[26] The W3C's mission is to lead the World Wide Web to its full potential by developing protocols and guidelines that ensure the long-term growth of the Web.[27]

[24] http://tools.ietf.org/html/rfc2418

[25] Portions of RFC2026 have been updated in subsequent RFCs. Please see http://www.rfc-editor.org/info/rfc2026

[26] The Internet is a vast network of networks, interconnected in many different physical ways, yet all speaking a common language, specified by standardized protocols. The Web is one – albeit, the most influential and well known – of many different applications which run over the Internet.

[27] http://www.w3.org/Consortium/mission#vision

Membership is open to all types of organizations (including commercial, educational and governmental entities) and individuals.[28] Individual Web developers and other interested stakeholders are also invited to participate in W3C Working Groups and Community Groups without taking out formal membership.

At the W3C, standardization work items start as a Working Draft (not dissimilar to the Internet Draft at the IETF) which is subject to W3C and broader review, proceeds through a set of stages based largely on the maturity of the work in question, including candidate recommendation, proposed recommendation and finally W3C Recommendation (a standard reviewed and endorsed by W3C members and the Director).

For the complete W3C standardization process, see: http://www.w3.org/2005/10/Process-20051014/

A list of all W3C Working Groups: http://www.w3.org/Consortium/activities

IEEE-SA

The Institute for Electrical and Electronics Engineering (IEEE) undertakes its standardization work through the IEEE Standards Association (IEEE-SA). In addition to producing the 802 Standards for Local and Metropolitan Area Networks and wireless networks such as WiFi, IEEE-SA also develops the standards for:

- Intelligent highway systems and vehicular technology
- Distributed generation renewable energy
- Voting Equipment Electronic Data Interchange
- Rechargeable Batteries for PCs
- Components Architecture for Encrypted Shared Media Organic Field Effect Technology, and many others[29]

The IEEE-SA has many thousands of members from businesses, universities and governments as well as members who participate in an individual capacity.[30] There are three levels of membership: individual, as well as basic and advanced corporate membership.

[28] http://www.w3.org/Consortium/membership-faq

[29] http://standards.ieee.org/sa/sa-view.html

[30] IEEE-SA membership: http://standards.ieee.org/sa-mem/ind_overview.html

In brief, the following is required before the publication of a new IEEE standard:

1. sponsorship (support) for the proposed standard must be secured from one of the technical subgroups within IEEE;
2. approval of the sponsored work item by the IEEE-SA New Standards Committee;
3. the creation of a Working Group to draft the standard based on the approved work item;
4. a ballot of the membership (and other interested parties) to approve the draft standard;
5. review by the IEEE-SA Standards Review Committee; and 6) approval of the draft by the IEEE-SA Standards Board.[31]

For the full standards development process:
http://standards.ieee.org/develop/index.html

A list of the IEEE-SA Working Group areas:
http://grouper.ieee.org/groups/index.html

How to Participate in Internet-Related Standards Development

IETF

The IETF is an open organization. There is no formal membership, no membership fee, and nothing to sign. By participating (joining a mailing list discussion or a meeting), one agrees automatically to accept the IETF's rules, including rules about intellectual property (patents, copyrights and trademarks).[32]

There are a number of ways of participating in the IETF depending on one's level of interest. Because much of the detailed technical work is done online, primarily via email, joining the mailing lists for one or two Working Groups is a good way to get a feel for the work and processes. Proposals are made and discussed, issues are raised and, ultimately, consensus is established online.

Another way to participate is to attend an IETF meeting. This allows for a more immediate feel for the IETF and also provides for an opportunity to participate in some introductory sessions. Following issues of interest through the mailing lists can be hugely beneficial prior to going to an IETF meeting.[33]

For more information on getting started at the IETF:
http://www.ietf.org/newcomers.html

[31] http://www.talkstandards.com/wp-content/uploads/2009/05/case-study-ieee-20090505.pdf

[32] http://www.ietf.org/newcomers.html

[33] http://www.itu.int/en/ITU-T/publications/Pages/recs.aspx

The Internet Society also offers fellowships to the IETF as a part of its Next Generation Leadership program: http://www.isoc.org/educpillar/fellowship/index.php

The Internet Society also recognizes that, although they are very technical, IETF working group discussions define the future of Internet-based communications protocols. At the same time, policy influences how these technical solutions are implemented and used by society at large. To encourage government policy makers to understand the importance of these linkages, the Internet Society has established the IETF Policy Program. Invited policy makers from both developing and developed countries are encouraged to interact closely with IETF participants in an environment that supports dialogue, information sharing, and problem solving. The goal is to build support among policy makers worldwide for the IETF's unique model of standards development and to provide an opportunity for the IETF to gain a better understanding of Internet related policy concerns and priorities in developing countries.

The topics addressed in the program include: technical aspects of the Domain Name System; an overview of IP routing, interconnection and traffic exchange; security and privacy protocols; and the open standards processes. The program also creates an alumni network of past participants to keep in touch and provides a networking platform.
http://www.internetsociety.org/what-we-do/education-and-leadership-programmes/ietf-and-ois-programmes/internet-society-fellowship-5

W3C

Participation in the W3C standardization processes occurs largely through its membership, but there are opportunities for non-members and the public at large to participate, as well as opportunities for individual experts.

The "W3C invites the public to participate in W3C via discussion lists, events, blogs, translations, and other means described below. Participation in Community and Business Groups is open to all. Participation inW3C Working Groups (and other types) is open to W3C Members and other invited parties. W3C groups work with the public through specification reviews as well as contributions of use cases, tests, and implementation feedback."[34]
http://www.w3.org/community/ or http://www.w3.org/Consortium/activities

Non-members have opportunities to comment on draft standards and other work items once they have reached Working Draft status. This outlined here in section 7.4: http://www.w3.org/2005/10/Process-20051014/tr.html - rec-advance

[34] http://www.w3.org/participate/

Interested organizations should refer to the following:
http://www.w3.org/Consortium/join

IEEE-SA

Participation in the IEEE-SA standardization processes is limited to its individual and corporate membership although it does encourage public sector organizations to join. Working documents are only available to members.

Interested organizations should refer to the following:
http://standards.ieee.org/sa-mem/index.html

OpenStand Principles for Open Standards Development

In 2012, five leading global Internet standards organizations announced their agreement on jointly developed principles establishing a modern paradigm for standards. The shared OpenStand principles grew from their collective experience of standardization processes that have made the Internet and the World Wide Web today's premiere platforms for innovation and borderless commerce. The effectiveness and efficiency of these principles and the modern paradigm for standards are proven by their ability to foster competition and cooperation, support innovation and interoperability and drive market success.

The OpenStand principles encapsulate that successful standardization model and make it extendable across the contemporary, global economy's gamut of technologies and markets. The principles comprise a modern paradigm in which the economics of global markets—fueled by technological innovation—drive global deployment of standards, regardless of their formal status within traditional bodies of national representation.

The OpenStand principles demand:

1. Cooperation

Respectful cooperation between standards organizations, whereby each respects the autonomy, integrity, processes, and intellectual property rules of the others.

2. Adherence to Principles

Adherence to the five fundamental principles of standards development:

- **Due Process.** Decisions are made with equity and fairness among participants. No one party dominates or guides standards development. Standards processes are transparent and opportunities exist to appeal decisions. Processes for periodic standards review and updating are well defined.
- **Broad Consensus.** Processes allow for all views to be considered and addressed, such that agreement can be found across a range of interests.

- **Transparency.** Standards organizations provide advance public notice of proposed standards development activities, the scope of work to be undertaken, and conditions for participation. Easily accessible records of decisions and the materials used in reaching those decisions are provided. Public comment periods are provided before final standards approval and adoption.

- **Balance.** Standards activities are not exclusively dominated by any particular person, company or interest group.

- **Openness.** Standards processes are open to all interested and informed parties.

3. Collective Empowerment

Commitment by affirming standards organizations and their participants to collective empowerment by striving for standards that:

- are chosen and defined based on technical merit, as judged by the contributed expertise of each participant;

- provide global interoperability, scalability, stability, and resiliency;

- enable global competition;

- serve as building blocks for further innovation; and

- contribute to the creation of global communities, benefiting humanity.

4. Availability

Standards specifications are made accessible to all for implementation and deployment. Affirming standards organizations have defined procedures to develop specifications that can be implemented under fair terms. Given market diversity, fair terms may vary from royalty-free to fair, reasonable, and non-discriminatory terms (FRAND).

5. Voluntary Adoption

Standards are voluntarily adopted and success is determined by the market. Since the statement was announced, hundreds of organizations, individuals and firms have formally endorsed or expressed their support for the OpenStand principles. http://open-stand.org/

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About the Internet Society

The Internet Society is a non-profit organization founded in 1992 to provide leadership in Internet related standards, education, and policy. With offices in Washington, D.C., and Geneva, Switzerland, it is dedicated to ensuring the open development, evolution, and use of the Internet for the benefit of people throughout the world. More information is available at: http://InternetSociety.org

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