

January 2017

The History of IANA: An Extended Timeline with Citations and Commentary

Contributors

Joel Snyder / jms@opus1.com

Konstantinos Komaitis / komaitis@isoc.org

Andrei Robachevsky / robachevsky@isoc.org



This document presents a timeline of the history of IANA, the Internet Assigned Numbers Authority, from its birth in 1972 to the end of 2016. In addition to highlighting key issues and important events, we have made an attempt to provide unbiased commentary and related historical information to help the reader understand the technical and political context that surrounds the events within. The commentary and contextual information appear as sidebars on either side of the main timeline.¹

May 30, 1972 Jon Postel, then a graduate student at UCLA, proposes that a “numbering czar” be appointed to allocate and manage socket numbers for the emerging ARPANET network established by the US Department of Defense’s Advanced Research Projects Agency (DARPA). Although the ARPANET was small, some coordination was required to ensure uniqueness, so that two groups weren’t using the same numbers for different things. In December 1972, with the agreement of the research community, Postel becomes the de-facto central authority for assigning and keeping track of identifiers. Over time he also becomes the RFC Editor and maintains the official list of host names and addresses. [1] [2] [3] [4]

March, 1976 Dr. Postel, taking his volunteer job as Internet numbers coordinator with him, joins the Information Sciences Institute (ISI) at the University of Southern California (USC), which became the home of IANA for the next 22 years, until 1998. ISI had been established at USC four years before by Keith Uncapher. [5] [6] [7]

The coordination of numbers, names, and addresses across the Internet began very early, as an obvious requirement to be sure that identifiers were globally unique and well known to all who might be using them. Maintaining this tight coordination remains a clear priority for the Internet technical community as a fundamental requirement for a functioning Internet.

January, 1983 TCP/IP becomes the new standard protocol suite for the ARPANET. Technical management of the ARPANET had been vested in the Internet Configuration Control Board (ICCB) established a few years earlier by Vint Cerf, then at DARPA, who named Dave Clark at MIT the first chairman. In 1983, this is renamed the Internet Activities Board (IAB) and given oversight over the Internet Engineering Task Force (IETF) and Internet Research Task Force (IRTF). The IANA function, newly important with the shift to TCP/IP and growth of the network, is under control of the IAB. (The IAB is renamed Internet Architecture Board in 1992). [8] [9] [10]

July, 1987 The NSFnet, created by the National Science Foundation (NSF) to link researchers and organizations supporting research (including universities, private companies, and government bodies), now exceeds the size of the ARPANET. As the distinction between the different networks disappears and other networks in the Americas, Europe, and Asia attach to a common TCP/IP backbone, the term “Internet” becomes a common name for the linked “network of networks.” The military part of the ARPANET is separated from the research part, and by the end of 1990, the ARPANET itself is gone. [11] [12]

December, 1988 The term **IANA** is coined during the transition from ARPANET to Internet, when a DARPA grant to USC-ISI includes funding for performance of IANA services, among other tasks. IANA is first referred to in an RFC in RFC1083 (“IAB Official Protocol Standards”), where Joyce Reynolds is named as the contact point for IANA and Jon Postel is both “Deputy Internet Architect” and “RFC Editor.” The services are continued under the umbrella of the Tera-node Network Technology contract with USC-ISI until 1998. [13] [14] [15]

October, 1992 The National Science Foundation eliminates the ban on commercial traffic—already quietly ignored by many—across the portions of the Internet funded by the NSF. This makes the Internet a safe place for commercial traffic. In September 1995, the NSF allowed Network Solutions to begin charging for domain name registration services (which were free in the .COM, .NET, .ORG, .EDU, and .GOV top-level domains up to that point). [16] [17] [18]

¹ An earlier version of this document included the history up to March 10, 2016, the date of the submission of the IANA Transition Proposal to the US Department of Commerce. This version adds significant events between March and October, 2016, when the US Department of Commerce’s stewardship of IANA ended.

March, 1994 RFC 1591 “Domain Name System Structure and Delegation” is published, noting that IANA is “responsible for the overall coordination and management of the DNS.” The Internet has grown in importance, and the monopoly of Network Solutions in the lucrative .COM domain registration leads to calls for competition. IETF and IANA leadership seek to move from an informal technocracy to a more transparent operation style, and RFC 1591 offers the first statement of policy regarding domain names. An informational document, RFC 1591 didn’t lay new territory, but was a way to put down on paper some of the procedures and policies that had been followed informally for years. [19]

In 1994, the Internet culture is highly technical, and policy and governance discussions are strongly colored by this background. The experiences of the most influential members of the community are firmly rooted in research, academia, and open sharing of ideas. Tension grows between commercial and national interests and the history and viewpoints of the Internet’s leaders.

In RFC 1591, Postel writes: “The designated manager is the trustee of the top-level domain for both the nation, in the case of a country code, and the global Internet community. Concerns about “rights” and “ownership” of domains are inappropriate. It is appropriate to be concerned about “responsibilities” and “service” to the community.”

At the time, new gTLDs were not envisioned (RFC 1591 says “It is extremely unlikely that other TLDs will be created”²), but country-code TLDs (ccTLDs) were not only in operation but the subject of contention in some countries. RFC 1591 helped to codify the policy for handling arguments and disputes regarding ccTLDs. RFC 1591 will be cited for the next 20 years as a basis for policy for DNS management. [20]

June, 1996 Postel publishes an Internet Draft “New Registries and the Delegation of International Top Level Domains” that proposed the process for creation of new gTLDs (generic Top-Level Domains, similar to .COM). (Note: at the time, these were called “International TLDs” or iTLDs; the term gTLD has generally replaced iTLD.) This draft results, in November, 1996, in the formation of the International Ad-Hoc Committee (IAHC) to refine and establish policy. In February, 1997, the IAHC produces a “gTLD MoU” (generic Top Level Domain Memorandum of Understanding) as its final report. [21] [22] [23]

The IAHC narrowly focused on gTLDs, leaving aside the existing country-specific TLDs and policies regarding the control and operation of the root servers. The IAHC attempted to separate the mechanics of IANA’s operation from the policy-making associated with the DNS. The IAHC proposed a policy framework with an Oversight Committee of representatives from ISOC, IANA, IAB, UN ITU, the World Intellectual Property Organization (WIPO), the International Trademark Association (INTA), and “CORE,” the Council of gTLD Registrars, to be incorporated and housed in Switzerland. Although there is substantial support for the IAHC approach, there is also substantial opposition, for a variety of reasons.

July 2, 1997 The IAHC’s gTLD MoU incites significant discussion and criticism, and their proposed changes to the DNS and DNS management are never implemented. As part of the response, and building on the Clinton administration’s “Framework” directives, the US Department of Commerce publishes a “Request for Comments on the Registration and Administration of Internet Domain Names,” effectively asserting their own control over the DNS in preference to the IAHC. The Department of Commerce receives over 430 comments, including some supportive of the work of the IAHC. [24] [25] [18]

January 28, 1998 Postel emails the operators of the non-US Government root servers and asks that they use a server at IANA (dnsroot.iana.org) for authoritative root zone information rather than the “A” root server (a.root-servers.net) at Network Solutions. This effectively moved control of the DNS root from Network Solutions and the US Government to IANA—and immediately created a firestorm of controversy. On Feb 3, Postel requested that the change be backed out and that root updates should be taken from the “A” root server. Postel explained the change as a technical experiment,

but not everyone is satisfied with this explanation. The unexpected nature of the change and the ability for a single individual take control over the DNS acts as a wakeup call serves to accelerate the process that would eventually lead to the formation of ICANN. [26] [27] [28] [29]

² As of November, 2016, more than 1200 new gTLDs had been introduced into the Internet.

June, 1998 The National Telecommunications and Information Administration (NTIA) of the Department of Commerce publishes a statement of policy “Management of Internet Names and Addresses” (also known as the “White Paper”) that defines a path forward for management and administration of DNS, IP addresses, and protocol parameters.

This is the result of a long process, beginning with the July 1997 “Request for Comments,” [24] [25] continuing with a February 20, 1998 “A Proposal to Improve the Technical Management of Internet Names and Addresses” (often called the “Green Paper”) [30]. Commerce receives over 650 comments by the end of March 1998, and uses these to develop the final US policy, signed on June 4, 1998 and published June 10, 1998. [3]

In December, 1996, a US government working group (under the leadership of Vice President Gore) publishes the first draft of “A Framework For Global Electronic Commerce” that outlines the principles for policy development, provides positions on key issues, and gives a road map for future work. When the Framework is finalized on July 1, 1997, the US President will specifically direct the Department of Commerce to “*make the governance of the domain name system private and competitive and to create a contractually based self-regulatory regime that deals with potential conflicts between domain name usage and trademark laws on a global basis.*” [129,130]

Key parts of the process include direction to create a private, not-for-profit corporation to manage the coordinating functions, and an indication that the US Government’s “unique role in the Internet DNS should end as soon as is practical.” [30]

The White Paper is so significant that it requires additional clarification in this timeline.

Over a year of discussion, public comment, and input from many stakeholders, all come together in one of the Internet’s first governance documents. Up to this point, the US Government was considered by many to have final say in most matters of Internet governance. The 1998 White Paper identified key Internet infrastructure elements, including names and numbers, and proposed a completely new governance model for these elements based on self-management by Internet stakeholders.

The White Paper called for the creation of a private non-profit organization, incorporated in the US and headquartered in the US. (This eventually became ICANN, the Internet Corporation for Assigned Names and Numbers.) This single organization would take over four parts of Internet administration and management (including all of the IANA functions), specifically:

- setting policy regarding IP numbering;
- overseeing operations of the root name servers;
- overseeing policy for new gTLDs in the DNS; and
- co-ordinating the assignment of other technical parameters (such as protocol numbers).

The White Paper explicitly disclaims that it is a general governance document for the Internet. Rather, it sets out a comprehensive view on how names and numbers should be managed and administered in the future, based on public comment. (Irving, 1997)

The White Paper also anticipated that the US Government involvement in this new organization would end before September, 2000. Having explicitly forbidden the new organization to be controlled by a governmental or intergovernmental organization, such as the United Nations, the US Government wanted to hand over these policy-making and administrative functions to the Internet itself. (Department of Commerce National Telecommunications and Information Administration, 1998) (Department of Commerce National Telecommunications and Information Administration, 1998)

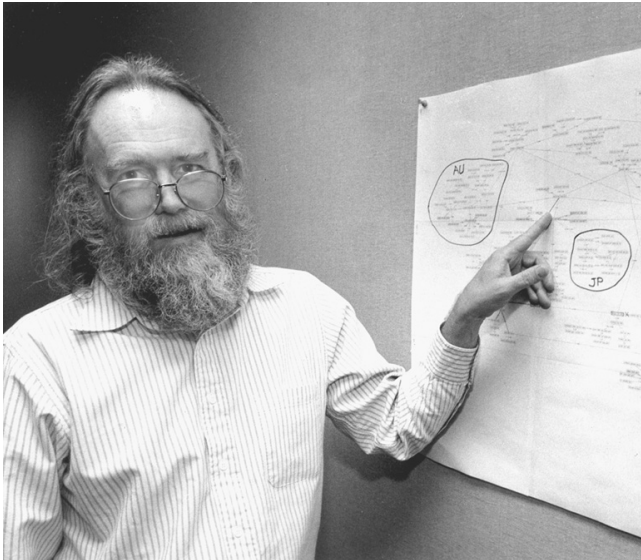


Photo Credit 1 Irene Fertik, USC News Service. © 1994, USC.

October 2, 1998 Jon Postel (still at IANA, but under his own name) submits the first draft of a possible ICANN structure to NTIA. [32]

October 16, 1998 Postel passes away from complications after heart surgery. [4] [5] (Photo by Irene Fertik, USC News Service, Copyright 1994, USC. Used with permission.)

November 25, 1998 ICANN is designated by the NTIA as their partner in the “DNS Project” to begin the transfer of both policy and technical management of DNS, IP addresses, and protocol parameters to the private sector. In response to the new US policy, extensive discussions had begun with multiple groups on the form and structure of an organization to meet the requirements of the White Paper. ICANN emerged from these discussions, finalized its Bylaws on November 6, 1998, and immediately began operation under interim chair Esther Dyson [33] [34] [35] [36]

December 24, 1998 ICANN formally takes over the IANA functions from USC. [37] [38]

NTIA would create three significant agreements with ICANN within the first two years:

(1) the original November, 1998, Memorandum of Understanding (“DNS Project”, although the scope includes all of IANA’s functions, later called the “Joint Project Agreement”),

The IANA Functions Contract is renewed in February 2000, and then extended through a long series of new contracts in 2001, 2003, 2006, and 2012. Although the contracts become more detailed and specific, the most significant recent additions make it clear that the IANA Functions do not include policy development. In fact, IANA is prohibited from changing policies without permission, and IANA functions staff are not allowed to “initiate, advance, or advocate” any policy related to IANA. [131] [132] [133] [134] [49] At the same time, ICANN and IETF establish (and later revise) a Memorandum of Understanding detailing the execution and service level agreements for some (but not all) of the IANA functions in the NTIA contract. Specifically excluded from the IETF MoUs are operation of the DNS and IP address assignments. [119]

(2) a Root Server Study Agreement, to collaborate on a study and process for making the management of the root server system more “robust and secure,” [39] and

(3) the IANA Functions sole source contract.

All three agreements originally are set to terminate in September 2000. [40]

However, NTIA maintains final policy authority over the DNS root zone. This is made clear in November, 1999, when NTIA approves a package of five agreements with ICANN and Network Solutions (Verisign acquired Network Solutions in 2000). One of these agreements gives Network Solutions the authority “to function as the administrator for the primary root server for the root server system and as a root zone administrator.” [41] The package also opens up registry competition and gives ICANN policy control over the DNS, subject to Department of Commerce oversight. [42]

September, 2009 The original November, 1998 DNS Project “Memorandum of Understanding” expires, having survived seven amendments, a renaming as the “Joint Project Agreement” (in 2006) and significant changes in scope. [43] [44] [45] [46] It is replaced by the “Affirmation of Commitments” which emphasizes the policy aspects of ICANN’s job without specifically mentioning the technical IANA functions performed by ICANN. [47]

The establishment of ICANN was controversial, and a variety of groups had widely different ideas on how the organization should be constituted. Five different groups proposed structures for what would become ICANN, including IANA, the Boston Working Group, the Open Root Server Coalition, Ronda and Michael Hauben, and Jeffrey Williams on behalf of the fictitious Information Network Engineering Group [40]. Readers may wish to review extensive resources on the formation of ICANN and International Forum for the White Paper at [128] and [127].

The “Affirmation of Commitments” is a significant event in the evolution of ICANN and Internet Governance. By allowing the Memorandum of Understanding to lapse (and be replaced by the “Affirmation of Commitments”), the Department of Commerce gave up a significant supervisory role over ICANN, including the ability to “fire” ICANN. Although the Affirmation, like almost every other action involving ICANN, was the subject of heated criticism, it changed the governance function within ICANN. The US Department of Commerce “surrendered the most formal and visible legal control [it] had over ICANN.” [48]

Notwithstanding the US Government’s role in the management of ICANN by virtue of its participation in the Government Advisory Committee (GAC), which the Affirmation of Commitments increased in power, the only remaining direct relationship is the IANA Functions Contract between ICANN and US Department of Commerce. This contract [49] lists four specific IANA functions that ICANN provides under a zero-dollar contract:

- 1) the coordination of the assignment of technical Internet protocol parameters;
- 2) the administration of certain responsibilities associated with the Internet DNS root zone management;
- 3) the allocation of Internet numbering resources; and
- 4) other services related to the management of the ARPA and INT top-level domains (TLDs)

September, 2011 The India-Brazil-South Africa (IBSA) Dialogue Forum meets in Rio de Janeiro and creates a discussion document on Internet governance as input to the IBSA Summit in Tshwane in October. The discussion document

recommends creation of a new global Internet Governance body within the UN that would, among other things, “Integrate and oversee the bodies responsible for technical and operational functioning of the Internet, including global standards setting.” The proposed scope is huge, covering not only the IANA functions (performed at that time by ICANN), but the work of the IETF and other similar groups. At the Summit, the leaders fall short of outright endorsement of the recommendations, but the prospect of a significant UN involvement in Internet Governance becomes a hot topic in the Internet community. The IBSA never holds another summit or ministerial meeting. [50] [51] [52]

The prospect of the UN and the ITU trying to assert their own control inspires discussion and action, and the House Committee on Energy and Commerce, Subcommittee on Communications and Technology hold hearings in May, 2012 on “International Proposals to Regulate the Internet.”

May 30, 2012 The US House and Senate jointly pass House Concurrent Resolution 127/Senate Concurrent Resolution 50 which instructs the Department of Commerce to “continue working to implement the position of the United States on Internet governance that clearly articulates the consistent and unequivocal policy of the United States to promote a global Internet free from government control and preserve and advance the successful multi-stakeholder model that governs the Internet today.” [53]

The May Resolution by Congress acts as unequivocal instructions to the Department of Commerce: the UN may have a seat at the table, but cannot be in charge of Internet governance. The US Government will insist on a multi-stakeholder model. Although IANA and Internet governance are not the same thing, Congress’ support of the multi-stakeholder model will be a key influence on the IANA stewardship discussions.

A similar bill, House Resolution 1580, states “it is the policy of the US to preserve and advance the successful multi-stakeholder model that governs the Internet,” and is passed by the House in 2013. [54] [55]

December, 2012 The WCIT meets in Dubai. Although the meeting was meant to have a narrow focus, covering topics such as how to charge for international long distance and how to call an ambulance, many countries used the negotiations to press for binding

international, intergovernmental regulation for the Internet.

In early 2012, preparations for the UN International Telecommunications Union (ITU) World Conference on International Telecommunications (WCIT) in December 2012 are fully underway and some proposals by Member States are clearly aimed at bringing the Internet under the jurisdiction of the International Telecommunication Regulations (ITRs). Although the role that the NTIA has in the IANA Functions contract is clerical, the contract itself is symbolic to many as US Government control over the operation of the Internet.

Fifty-five nations refuse to sign the International Telecommunication Regulations (ITR) Treaty. The US Department of Commerce viewpoint on the negotiations is profoundly negative: “Some authoritarian regimes however do not accept this model and seek to move Internet governance issues, including the DNS, into the United Nations system in order to exert influence and control over the Internet. This played out during the 2012 World Conference on International Telecommunications in Dubai where the world split on fundamental issues of Internet governance.” (Asst. Secretary of Commerce Strickling) [56] [57] [58] [59] [60]

The Montevideo Statement is considered to be highly political, and directly references the issues related to mass and pervasive surveillance highlighted by Edward Snowden’s actions in May, 2013. Many feel that the Montevideo Statement helped spur the NTIA into beginning the IANA transition process.

October 7, 2013 At a meeting in Uruguay, the leaders of ICANN, the five Regional Internet Registries, the IAB, the ISOC, the IETF and the W3C all sign the “Montevideo Statement” calling for (among other things) an acceleration of the globalization of ICANN and IANA functions and an ongoing effort to address Internet governance challenges. The statement also “expressed strong concern that the recent revelations of pervasive monitoring and surveillance will undermine global trust in the Internet.” (These leaders of ICANN, IAB, ISOC, and IETF are colloquially called the “I-*, I-stars.) [61]

March 14, 2014 “NTIA Announces Intent to Transition Key Internet Domain Name Functions” reads the press release headline. The announcement notes that ICANN is the current IANA functions operator, and therefore is being charged with convening the multi-stakeholder process to develop a transition plan for continuing the IANA functions after the expiry of the IANA Functions Contract on September 30, 2015.

The NTIA sets out four key requirements of the transition plan:

- 1) It must support and enhance the multi-stakeholder model;
- 2) it must maintain the security, stability, and resilience of the DNS;
- 3) it must meet the needs and expectations of the global customers and partners of the IANA services; and,
- 4) it must maintain the openness of the Internet.

The NTIA also explicitly forbids ICANN from forwarding a proposal that “replaces the NTIA role with a government-led or inter-governmental organization solution.” [62] [63]

March 26, 2014 At the ICANN 49 meeting in Singapore, the process of developing a proposal kicks off. What will become the “IANA Stewardship Transition Coordination Group” (ICG) is established with a single deliverable: the proposal to NTIA regarding the IANA functions. A first meeting is scheduled for July in London.

At the ICANN 49 Singapore meeting, ICANN also launches an Accountability self-assessment. (ICANN inventories their existing accountability efforts and internal infrastructure at [64]). These are not coincidental efforts, but are linked together. As the NTIA notes in a report on the transition, “These two multi-stakeholder processes [...] are directly linked, and [...] both issues must be addressed before any transition takes place.” [65] The effort leads to the establishment of the “Enhancing ICANN Accountability and Governance Cross Community Working Group (CCWG-Accountability),” and the scope of the working group expands far beyond the IANA transition requirements to a general ICANN reform. [66] [67] [68]

Not everyone agrees how much US Government oversight the IANA Functions contract brings with it. The Department of Commerce maintains that the role of the government is clerical.

When Larry Strickling, Ass’t Secretary for Communications and Information at NTIA is questioned by Texas Rep. Blake Farenthold at an official hearing [70] on the IANA transition, Strickling is adamant:

FARENTHOLD: “We basically invented [the Internet], you know. Our tax dollars funded DARPA which became the Internet. I would argue, it may be the only successful computing project this government has actually ever undertaken. So, you know, I am concerned about giving up our leadership role. Finally, I—”

STRICKLING: “Sir, please, I must push back on you. We are not giving up our leadership role. We are stepping out of a clerical function that we currently perform, but [...] we are not giving up our leadership role in this space.”

However, there is a “last resort option” that does represent leverage that NTIA holds over ICANN: because the IANA functions are performed under a contract, the NTIA does have the ability to terminate the IANA functions contract or award it to another organization if they feel that ICANN has not performed adequately or fairly.

In the end, the plan to do away with the contract is called the “transition plan of NTIA’s stewardship of IANA functions,” leaving open the argument whether “oversight” and “stewardship” are synonyms.

The rationale for the establishment of the CCWG-Accountability is based on specific concerns from the ICANN community about the withdrawal of the US Government from its direct involvement with ICANN, specifically related to accountability regarding domain name policies. In the process document, ICANN writes:

“The proposed process defined the scope as ensuring ICANN remains accountable in the absence of its historical contractual relationship with the U.S. Government (USG), and the perceived backstop with regard to ICANN's organization-wide accountability provided by that role, such as the renewal process of the IANA functions contract. It called for an examination, from an organizational perspective, of how ICANN's broader accountability mechanisms should be strengthened to address the absence of its historical contractual relationship with the USG, including looking at strengthening existing accountability mechanisms (e.g., the ICANN Bylaws and the Affirmation of Commitments). [...] The process is intended to deal with focused systemic issues caused by the changing historical relationship with the United States, including for example, by stress testing against internal or external captures or takeovers, and safeguards against capture at all levels, which is a pre-condition of the IANA Stewardship Transition. Statements made by the NTIA [...] clarify that this process is limited to ensuring ICANN remains accountable in the absence of its contractual relationship with the USG.” [69]

March 27, 2014 Rep. John Shimkus (Illinois) introduces House Resolution 4342, the “DOTCOM (Domain Openness Through Continued Oversight Matters) Act of 2014,” which requires that GAO prepare a report on whatever transition plan is received by NTIA before NTIA can act. [55] [141] (The requested GAO report is available as [94].) On April 2, Rep. Mike Kelly (Pennsylvania) introduces House Resolution 4367, the “Internet Stewardship Act of 2014.” On April 4, Sep. Sean Duffy (Wisconsin) introduces House Resolution 4398, the “GIF (Global Internet Freedom) Act of 2014.” [136] [137] Both bills prohibit NTIA from moving forward. None of the bills are passed.

April 10, 2014 US House of Representatives Committee on the Judiciary Subcommittee on Courts, Intellectual Property and the Internet holds hearings on “Should the Department of Commerce Relinquish Direct Oversight over ICANN?” Although the hearings don’t result in anything specific, the testimony from both sides reflects deeply held beliefs and misconceptions about the relationship between the US Government and ICANN. This same pattern of confusion and chaos is repeated over and over again over the next 18 months. [70] [71]

April 24, 2014 A global, multi-stakeholder meeting, the NETmundial, [72] is held in São Paulo, Brazil. NETmundial’s goal is to bring together a wide variety of interested parties to develop a global Internet governance ecosystem. At this meeting, the Netmundial Multi-stakeholder Statement is published which includes specific reference to the IANA transition: [73]



“[T]he discussion about mechanisms for guaranteeing the transparency and accountability of [the IANA functions] after the US Government role ends has to take place through an open process with the participation of all stakeholders extending beyond the ICANN community. The IANA functions are currently performed under policies developed in processes hosted by several organizations and forums. Any adopted mechanism should protect the bottom up, open and participatory nature of those policy development processes and ensure the stability and resilience of the Internet.”

July 18, 2014 The IANA Stewardship Coordination Group (ICG), established at the ICANN meeting in Singapore a few weeks earlier, holds its first meeting in London.

Within a month, the ICG finalizes the methodology it will use to develop the Internet’s response to the NTIA regarding the transition of IANA functions.

ICG decides to break its proposal to NTIA out into three separate pieces, one each for the IANA functions of names, IP addresses, and protocol parameters (along with the .ARPA zone). A Request for Proposals is created and each of the communities most directly affected is invited to respond. (These are called “operational communities,” each corresponding to one of the main IANA functions.)

The three operational communities set up groups to respond to the ICANN Stewardship Transition Coordination Group (ICG) Request for Proposals: [74]

- for IP addresses, the Numbering Resource Organization (NRO) establishes the CRISP (Coordinated RIR IANA Stewardship Proposal) Team. This group also includes the 5 Regional Internet Registries (AFRINIC, APNIC, ARIN, LACNIC, and RIPE-NCC). [75] [76]
- for Protocol Parameters, the IETF established a working group called IANAPLAN. [76]
- for Domain Names, the community charters a cross-community Names working group called CWG. [77]

In September, 2014, the ICG publishes a Timeline and a Request for Proposals, with a deadline of January 15, 2015. [78] [71] [79] [80]

October 29, 2014 The domain names working group, one of three charged with developing proposals for the IANA transition, publishes their charter and begins meetings in earnest. The domain names group calls itself the “Cross Community Working Group to Develop an IANA Stewardship Transition Proposal on Naming Related Functions,” abbreviated CGW. To reduce confusion, we will use the term “Names Group” in this paper to refer to the CGW. [81]

November 3, 2014 The Enhancing ICANN Accountability and Governance Cross Community Working Group (CCGW-Accountability) finalizes its charter (after considerable heated discussion) and begins operation. The CCGW-Accountability divides its work into two Work Streams. Work Stream 1 is “focused on mechanisms enhancing ICANN accountability that must be in place or committed to within the time frame of the IANA Stewardship Transition;” leaving Work Stream 2 to everything else, presumably important but not important enough to delay the IANA Stewardship Transition. [82]

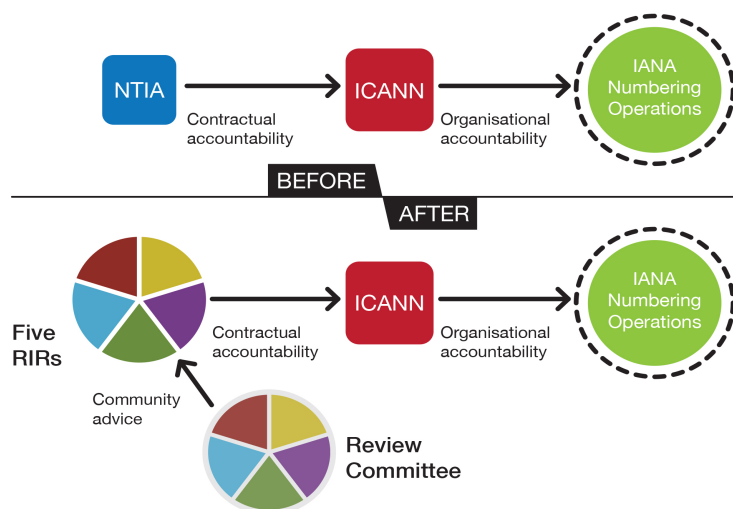
January 6, 2015 The IETF, in agreement with the IAB, submits their response for the Protocol Parameters part of the IANA transition, beating the ICG deadline. The IETF does not suggest substantive changes to the status quo:



“No new organizations or structures are required. Over the years since the creation of ICANN, the IETF, ICANN, and IAB have together created a system of agreements, policies, and oversight mechanisms that already cover what is needed. This system has worked well without any operational involvement from the NTIA. IANA protocol parameters registry updates will continue to function day-to-day, as they have been doing for the last decade or more. The IETF community is very satisfied with the current arrangement with ICANN. RFC 2860

remains in force and has served the IETF community very well. RFC 6220 has laid out an appropriate service description and requirements.” [83]

January 15, 2015 The CRISP (Coordinated RIR IANA Stewardship Proposal) Team, established by the Internet Number Community through the Regional Internet Registries, submits their response for the Number part of the IANA transition. They express confidence in continuing with ICANN as the executor of the IANA Numbering Services Operator: “... and considering the Internet Number Community’s strong desire for stability and a minimum of operational change, the Internet Number Community believes that ICANN should remain in the role of the IANA Numbering Services Operator [...]” After 13 months of discussion in each of the five regional communities, the Number Community still manages to meet the ICG deadline. [84] [85]



The issue of accountability is particularly important for the DNS and naming community.

Both the Protocol Parameters and Numbering Resource groups see ICANN/IANA as a contractor that could be, if necessary, replaced with another organization at their discretion. Thus, they would determine whether ICANN/IANA is acting in their best interests.

The DNS and naming community doesn't have the same option to establish a contract because the name community is represented by ICANN, and the IANA functions operator would be ICANN as well. ICANN would be contracting with itself.

Thus, the community seeks very strong accountability within ICANN and proposes the creation of "Post-Transition IANA," a wholly-owned subsidiary of ICANN that would execute the IANA Functions, while oversight and accountability would be maintained within ICANN.

January, 2015 An important early action of the Names Group (CWG) is to link the work of the Names Group with the work of another group, the Enhancing ICANN Accountability Group (CCGW-Accountability) contemporaneously working on ICANN governance.

The Names Group (CGW) calls for seven specific accountability actions to be resolved by Enhancing ICANN Accountability Group (CCGW-Accountability) before the IANA Transition Proposal can advance. [86] [87] [88] [89]

June 25, 2015 The Names Group (CWG) completes their work and submits their proposal to the ICG at ICANN53 in Buenos Aires. [90] This proposal is complete, but makes a very explicit link to the Enhancing ICANN Accountability (CCWG-Accountability) group and the seven dependencies:

"The CWG-Stewardship proposal is significantly dependent and expressly conditioned on the implementation of ICANN-level accountability mechanisms by the Cross Community Working Group on Enhancing ICANN Accountability (CCWG-Accountability) as described below.... ICANN Budget/IANA Budget; Community Empowerment Mechanisms; IFR; CSC; Separation Process; Appeal Mechanism; Fundamental Bylaws"

July 31, 2015 The IANA Stewardship Transition Group (ICG) makes a preliminary combination of all three proposals and opens a 40-day public comment period on July 31, ending September 8, 2015. [91] [92]

August 3, 2015 The Enhancing ICANN Accountability Group (CCWG-Accountability) publishes the second draft of their proposal. Comments are open until September 12, 2015. [93]

August, 2015 The US Government Accountability Office publishes "Internet Management: Structured Evaluation Could Help Assess Proposed Transition of Key Domain Name and Other Functions," a report on the IANA transition driven by the DOTCOM Act of 2014 (HR 4342). The GAO report provides an excellent overview of the IANA transition process and current status of ICANN, as well as a discussion of some of the risks associated with a transition away from the NTIA/IANA contracting environment. [94]

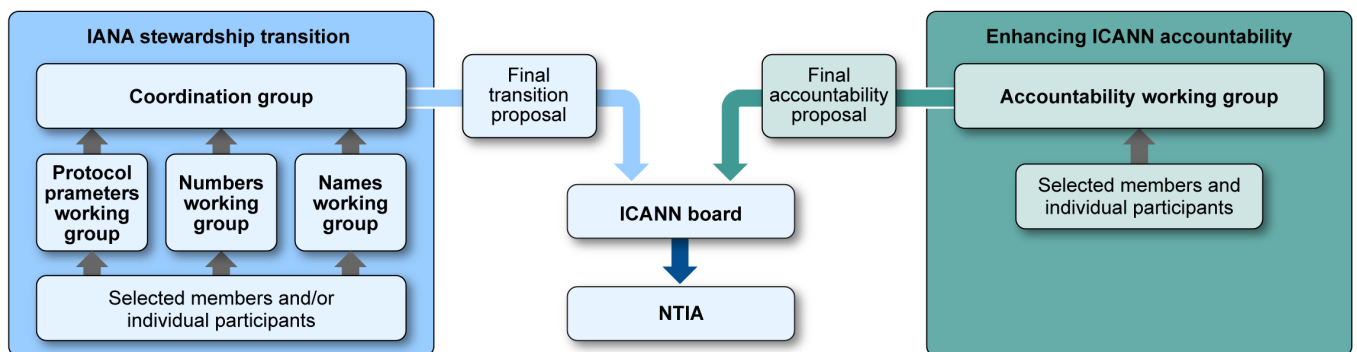


Diagram source: US Government Accountability Office, from [94]



September 17, 2015 Aware that some of the accountability dependencies identified by the Enhancing ICANN Accountability Group (CCGW-Accountability) are not near to completion, the NTIA extends the IANA Functions Contract with ICANN for another year, to September 2016. [95]



October 29, 2015 With the public comment period closed in September, the IANA Stewardship Transition Coordination Group (ICG) combines the three revised proposals from the three communities into a single second draft of the IANA Transition Proposal. However, because the Names Group (CWG) has conditioned their proposal on the work of Enhancing ICANN Accountability (CCWG-Accountability) group (as described above), the ICG says that they will hold onto the proposal before sending it to NTIA until the Domain Names group (CWG) has agreed that the Enhancing ICANN Accountability Group has met the CWG’s requirements. [96] [97]

November 30, 2015 The Enhancing ICANN Accountability Group (CCWG-Accountability) publishes their third (and final) draft proposal and opens up a 3-week comment period. [98] The report is made up of a main body and twelve major annexes, one for each of the recommendations made by the working group, in all nearly 250 pages, plus an additional 50 pages of ten appendices. Each part of the third draft will go through multiple group readings and comment periods, legal review, and a final consolidation before being published. The CCWG-Accountability sets an ambitious schedule to complete the comment periods by the middle of February, 2016.

The Enhancing ICANN Accountability Group (CCWG-Accountability) makes a significant step forward at ICANN 54 in Dublin (October, 2015) when the ICANN board and the CCWG agree on an enforcement mechanism for new governance model. This is a complicated and contentious issue, not only because it codifies how the powers of the community will be enforced within ICANN, but also because it requires a structure that can fit within normal corporate law. The main accomplishment of the second draft and its ensuing discussion was the resolution of this major issue.

Now that governance enforcement is agreed, other undecided issues within the CCWG discussions, such as human rights, mission and scope of ICANN, and the role of governments (the famous “Stress Test 18”) in ICANN begin to be discussed in earnest and are the focus of the third draft. [144]

December 14, 2015 The US Congress passes the US budget, the “Consolidated Appropriations Act of 2016,” which makes a specific prohibition on NTIA relinquishing responsibility for Internet DNS functions until September 30, 2016. [99]

January, 2016 The IANA trademark and domain name (iana.org) are currently held by ICANN. Following the recommendation by the CRISP team in their submission to the ICG in October, 2015, all three operational communities agree that this is not appropriate. In January, it is agreed to move these to the IETF Trust as the “simplest, fastest, and least expensive approach [that is] more than adequate to meet the needs of all parties. The transfer officially takes place on October 1, 2016. [100]

February 23, 2016 The Enhancing ICANN Accountability Group (CCWG-Accountability) completes the report on “Work Stream 1” (changes tied to the IANA stewardship transition) and requests approval from the other stakeholder bodies. Over the next two weeks, the six Chartering Organizations of the group (ICANN Security and Stability Advisory Committee, Address Supporting Organization, At-Large Advisory Committee, Government Advisory Committee, Generic Names Supporting Organization, and Country Codes Names Supporting Organization) give their approval. The report is forwarded to the ICANN Board of Directors on March 10, 2016.

The Enhancing ICANN Accountability Group’s work was a significant effort. The group included 28 members and 175 participants, held 209 public meetings taking over 400 hours and 16,500 person-hours of time in meetings, and sent over 14,000 email messages across 14 mailing lists to deliver a 335-page document.

March 10, 2016 The IANA Stewardship Transition Coordination Group, with the approval of the ICANN Board, submits the combined proposal for the IANA transition to the NTIA. With the Names Group’s (CWG) agreement on February 25 that the Enhancing ICANN Accountability Group’s (CCWG-Accountability) work had met their requirements, there were no more community barriers to forwarding the combined proposal.

May 27, 2016 ICANN changes its bylaws in accordance with the recommendations from the IANA Stewardship Transition Group and the Enhancing ICANN Accountability Group. [101]

June 8, 2016 Capping contentious accusations of ICANN conflicts of interest and dangers to the Internet from the IANA transition made by US Senators Ted Cruz, James Lankford, Sean Duffy, and Michael Lee, [102] [103] [104] [105] [106], Senator Cruz introduces the “Protecting Internet Freedom Act,” a bill to prohibit NTIA from allowing the IANA functions contract to lapse unless authorized by Congress. The bill is referred to the Senate Committee on Commerce, Science, and Transportation and dies in committee. [107] In September, Senator Cruz also holds a hearing on the topic. [108]

June 9, 2016 NTIA agrees that the IANA stewardship transition proposal meets NTIA’s requirements and those suggested by the GAO, and publishes their report, concluding: “Based on its multi-faceted assessment of the proposal, NTIA finds

that the IANA Stewardship Transition Proposal meets NTIA's established criteria [...], and corporate governance best practices. The U.S. government agencies participating in the NTIA-led DNS Interagency Working Group, as well as senior officials participating in a regular interagency process for review of global Internet matters, all support NTIA's conclusion that the IANA Stewardship Transition proposal meets our criteria." [109] [110]

August 10, 2016 "Public Technical Identifiers" (PTI) is incorporated in California as a non-profit public benefit corporation. (The company was originally referred to as PTI, Post-Transition IANA, in the transition documents, thus giving birth to the awkward final name.) This company will be responsible for performing all of the IANA functions regarding DNS names, IP Addresses, and Protocol Parameters under three separate contracts with ICANN. Because PTI's status is, effectively, a contractor to ICANN operating under specific tasks and with specific Service Level Agreements (SLAs), the day-to-day functions are completely separated from policy making and general Internet governance functions that are performed by stakeholder groups (including a restructured ICANN). [111]

September 28, 2016 Four state attorneys general (Texas, Arizona, Oklahoma, and Nevada) file a lawsuit in a Federal District court in Texas, requesting a restraining order and preliminary injunction to prevent the NTIA from letting the IANA Functions Contract expire. [112] [113] In addition to a statement from the defendants, an extensive amicus brief from 15 of the participants in the multi-stakeholder process is persuasive to the court. [114] After a hearing of approximately 1 hour, the Court denies the request. [115]

September 30, 2016 The IANA Functions Contract between the US Department of Commerce and ICANN expires. Originated during the birth of ICANN (December 1998) and originally slated to last only two years, the contract's expiration symbolically represents to many that the management of the Internet is now fully vested in the Internet's own stakeholders.

October 1, 2016 PTI begins operation and is responsible for the IANA functions.

- 1) For IP address functions, PTI's operation is defined according to the May 27, 2016 Service Level Agreement for the IANA Numbering Services between ICANN and the Regional Internet Registries regarding operation of IP address registries. [116] [117] [118]
- 2) For protocol parameters, PTI's operation is defined according to the June 24, 2016 Memorandum of Understanding (RFC 2860) and Supplemental Agreement between ICANN and the IETF. [119] [120]
- 3) For Naming functions, PTI's operation is defined according to the September 15, 2016 IANA Naming Functions Contract between ICANN and PTI. [121] [122] [123]

October 20, 2016 Verisign (formerly Network Solutions) has been responsible for operation of the DNS Root Zone since 1992, under an agreement with the National Science Foundation. [124] A new contract for this service is established between Verisign and ICANN to replace one with NTIA. This shifts oversight of root zone operation from NTIA to ICANN. [125] [126]

January 6, 2017 The "Affirmation of Commitments," [47] established in September 2009, set the tone for IANA management by redefining the relationship between the US Government and the Internet and pushing the IANA aspects of Internet towards self-governance. With the changes suggested by the Enhancing ICANN Accountability Group (CCWG-Accountability) in place, ICANN and NTIA formally agree that the Affirmation can be terminated. [127]

"[T]he timing of this lawsuit and manufactured urgency of the motion seek to force a hasty ruling on a paltry record without hearing from the many different interests who have long labored to negotiate this process. This suit makes a mockery of the multistakeholder approach to solving complex and thorny problems that touch upon the widely varying interests of persons across the globe. This Court should reject the effort of one political department of one state, through Arizona's motion, to subvert two years of work that built a remarkable global consensus on protecting the future of the Internet." (from Amicus Brief [114])

Acknowledgements

The authors offer thanks to Karl Auerbach, Scott Bradner, Dave Clark, John Klensin, Olaf Kolkman, John Levine, Izumi Okutani, Dave Piscitello, Karen Rose, Jan Trumbo, and Sally Wentworth for their help in putting this document together. Any errors are entirely the fault of the authors.

For Further Reading

Readers interested in learning more about the history of IANA may find the following reference documents (listed in alphabetical order) very helpful in providing summaries of events and overview information:

“Almost Free: An Analysis of ICANN’s ‘Affirmation of Commitments’ (A. Michael Froomkin, University of Miami School of Law), 2011. Available online at <http://ssrn.com/abstract=1744086>

“Department of Commerce: Relationship with the Internet Corporation for Assigned Names and Numbers” (Robert P. Murphy as General Counsel of US General Accounting Office), 2000. Available online at <http://www.gao.gov/new.items/og00033r.pdf>

“Internet Domain Names: Background and Policy Issues” (Lennard G. Kruger, Congressional Research Service), 2014. Available online at <https://www.fas.org/sqp/crs/misc/97-868.pdf> (Note that CRS is not allowed to provide on-line copies of reports and this is an unofficial archive copy.)

“Launching the DNS War: DOT-COM Privatization and the Rise of Global Internet Governance” (Craig Lyle Simon, PhD Dissertation, University of Miami), 2006.

“Memorandum of Understanding on the Generic Top-Level Domain Name Space of the Internet Domain Name System” (Heather N. Mewes, Berkeley Technology Law Journal, Vol 13, No. 1), 1998. Available online at <http://scholarship.law.berkeley.edu/btlj/vol13/iss1/15>

“Overview and History of the IANA Functions” (ICANN Security and Stability Advisory Committee publication SAC067), 2014. Available online at <https://www.icann.org/en/system/files/files/sac-067-en.pdf>

Bibliography

- [1] Jon Postel. (1972, May) RFC 349 - Proposed Standard Socket Numbers. [Online]. <https://tools.ietf.org/html/rfc349>
- [2] Jon Postel and Nancy Neigus. (1972, December) RFC 433 - Socket Number List. [Online]. <https://tools.ietf.org/html/rfc433>
- [3] Department of Commerce National Telecommunications and Information Administration, "Management of Internet Names and Addresses (Statement of Policy)," *Management of Internet Names and Addresses (Statement of Policy)*, vol. 63, no. 111, pp. 31741-31751, June 1998, <https://www.gpo.gov/fdsys/pkg/FR-1998-06-10/html/98-15392.htm>.
- [4] Vint Cerf. (1998, October) RFC 2468 - I Remember IANA. [Online]. <https://tools.ietf.org/html/rfc2468>
- [5] BBC. (1998, October) God of the Internet is Dead. [Online]. <http://news.bbc.co.uk/2/hi/science/nature/196487.stm>
- [6] Gary Malkin. (1992, May) RFC 1336 - Who's Who in the Internet: Biographies of IAB, IESG, and IRSG Members. [Online]. <https://tools.ietf.org/html/rfc1336>
- [7] University of Southern California Information Sciences Institute. (2016, Jan) History of the Information Sciences Institute. [Online]. <http://www.isi.edu/about/history/overview/>
- [8] Corporation for National Research Initiatives, "Proceedings of the Fourteenth Internet Engineering Task Force, July 25-28, 1989, Stanford University, California," in *IETF-14*, Reston, VA, 1989, pp. 1-344.
- [9] Internet Activities Board. (1990, June) Minutes of IAB Meeting - June 28-29, 1990. [Online]. <https://www.iab.org/documents/minutes/minutes-1990/iab-minutes-1990-06-28/>
- [10] Internet Activities Board. (1992, June) Meeting Minutes of IAB, June 18-19, 1992 (Kobe, Japan, INET '92 Meeting). [Online]. <https://www.iab.org/documents/minutes/minutes-1992/iab-minutes-1992-06-18/>
- [11] Internet Engineering Task Force, "Proceedings of the July 27-29, 1987 Meeting," in *IETF-7*, McLean, 1987, pp. 1-323.
- [12] Internet Engineering Task Force, "Proceedings of the 13th Meeting, April 11-14, 1989, Cocoa Beach, Florida," in *IETF-13*, Cocoa Beach, 1989, pp. 1-378.
- [13] Internet Activities Board. (1988, December) RFC 1083 - IAB Official Protocol Standards. [Online]. <https://tools.ietf.org/html/rfc1083>
- [14] Joe Bannister and Jon Postel. (2000, March) Tera-node Network Technology (TASK 4) Network Infrastructure Activities final report. [Online]. <http://www.osti.gov/scitech/biblio/802104>
- [15] ICANN Security and Stability Advisory Committee. (2014, August) Overview and History of the IANA Functions (SAC067). [Online]. <https://www.icann.org/en/system/files/files/sac-067-en.pdf>
- [16] US Senate. (1991, May) S. 1146 - Scientific and Advanced Technology Act of 1992. [Online]. <https://www.congress.gov/bill/102nd-congress/senate-bill/1146>
- [17] US Code. (1992, Nov) 42 US Code Chapter 16 Section 1862 - Functions of the National Science Foundation. [Online]. <https://www.law.cornell.edu/uscode/text/42/1862>
- [18] National Science Foundation. (1995, Sept) NSF Cooperative Agreement No. NCR-9218742, Amendment 4. [Online]. <http://www.cavebear.com/nsf-dns/laws.htm>

- [19] John Klensin, Email discussion between the author and Klensin, February 2016, (Klensin is one of the contributors to RFC 1591).
- [20] Jon Postel. (1994, March) RFC 1591 - Domain Name System Structure and Delegation. [Online]. <https://tools.ietf.org/html/rfc1591>
- [21] Jon Postel. (1996, June) New Registries and the Delegation of International Top Level Domains. [Online]. <https://tools.ietf.org/html/draft-postel-iana-itld-admin-01>
- [22] International Ad-Hoc Committee. (1997, Feb) Final Report of the IAHC: Recommendations for Administration and Management of gTLDs. [Online]. <https://web.archive.org/web/20040602185016/http://www.gtld-mou.org/draft-iahc-recommend-00.html>
- [23] ISOC. (1996, Nov) Formation of International Ad-Hoc Committee (IAHC). [Online]. <https://www.internetsociety.org/history-timeline/formation-international-ad-hoc-committee-iahc>
- [24] Department of Commerce National Telecommunications and Information Administration. (1997, July) Request for Comments on the Registration and Administration of Internet Domain Names. [Online]. <https://www.gpo.gov/fdsys/pkg/FR-1997-07-02/pdf/97-17215.pdf>
- [25] Department of Commerce National Telecommunications and Information Administration. (1997, Aug) Registration and Administration of Internet Domain Names - Summary of Comments (Docket No. 97061337-7137-01). [Online]. <https://www.ntia.doc.gov/other-publication/1997/registration-and-administration-internet-domain-names-summary-comments-docket>
- [26] John Levine, Email discussion between the author and Levine, Feb 2016.
- [27] Craig Simon and Joe Touch. (2002, Nov) [ih] Re: anyone remember when the root servers were hi-jacked? fwd. [Online]. <http://mailman.postel.org/pipermail/internet-history/2002-November/000123.html>
- [28] Rajiv Chandrasekaran. (1998, Jan) Internet Reconfiguration Concerns Federal Officials. [Online]. <http://songbird.com/pab/mail/0472.html>
- [29] Craig Lyle Simon, *Launching the DNS War: DOT-COM Privatization and the Rise of Global Internet Governance*. Coral Gables, Florida, USA: University of Miami, 2006, (PhD Dissertation submitted December, 2006).
- [30] Department of Commerce National Telecommunications and Information Administration, "Improvement of Technical Management of Internet Names and Addresses (15 CFR C hapter XXIII Docket No 980212036-8036-01)," *Improvement of Technical Management of Internet Names and Addresses (15 CFR C hapter XXIII Docket No 980212036-8036-01)*, vol. 63, no. 34, pp. 8826-8833, Feb 1998.
- [31] Larry Irving. (1997, September) Testimony of Larry Irving Assistant Secretary of Commerce for Communications and Information before the House Committee on Science Subcommittee on Basic Research. [Online]. <https://www.ntia.doc.gov/speechtestimony/1997/testimony-assistant-secretary-irving-basic-research-internet-domain-name-polic>
- [32] Jon Postel. (1998, October) Letter to William Daley (Secretary of Commerce) Regarding Management of Internet Names and Addresses. [Online]. <https://www.ntia.doc.gov/legacy/ntiahome/domainname/proposals/icann/Letter.htm>
- [33] ICANN. (1998, November) Bylaws of ICANN (First adopted set) Effective as of 6 November 1998. [Online]. <https://www.icann.org/resources/unthemed-pages/bylaws-1998-11-06-en>
- [34] Becky Burr. (1998, October) Letter to ICANN of October 20, 1998. [Online]. <https://www.ntia.doc.gov/legacy/ntiahome/press/icann102098.htm>

- [35] Sallianne Fortunato. (1998, November) NTIA Reviewing ICANN Bylaws. [Online]. <https://www.ntia.doc.gov/legacy/ntiahome/press/ICANN111098.htm>
- [36] NTIA. (1998, November) Memorandum of Understanding between the U.S. Department of Commerce and the Internet Corporation for Assigned Names and Numbers. [Online]. <https://www.ntia.doc.gov/page/1998/memorandum-understanding-between-us-department-commerce-and-internet-corporation-assigned->
- [37] Commerce Business Daily, Internet Assigned Numbers Authority Sole Source Contract, January 4, 1999, December 24, 1998 effective date.
- [38] University of Southern California. (1999, December) USC/ICANN Transition Agreement. [Online]. <https://www.icann.org/resources/unthemed-pages/usc-icann-transition-2012-02-25-en>
- [39] NIST. (1999, May) Cooperative Research and Development Agreement between ICANN and US Department of Commerce. [Online]. <https://www.icann.org/resources/unthemed-pages/crada-2012-02-25-en>
- [40] United States General Accounting Office. (2000, July) Department of Commerce: Relationship with the Internet Corporation for Assigned Names and Numbers. [Online]. <http://www.gao.gov/new.items/og00033r.pdf>
- [41] Department of Commerce National Telecommunications and Information Administration. (1992, October) Verisign Cooperative Agreement. [Online]. <https://www.ntia.doc.gov/page/verisign-cooperative-agreement>
- [42] ICANN. (1999, September) Fact Sheet on Tentative Agreements among ICANN, the U.S. Department of Commerce, and Network Solutions, Inc. [Online]. <http://archive.icann.org/en/nsi/factsheet.htm>
- [43] US Department of Commerce. (2002, September) Amendment 5 to ICANN/DOC Memorandum of Understanding. [Online]. <https://www.icann.org/resources/unthemed-pages/amend5-jpamou-2002-09-19-en>
- [44] ICANN. (2003, Jan) Fifth Status Report under ICANN/US Government Memorandum of Understanding. [Online]. <https://www.icann.org/resources/unthemed-pages/status-report-2003-01-08-en>
- [45] US Department of Commerce. (2006, September) Joint Project Agreement between the US Department of Commerce and the Internet Corporation for Assigned Names and Numbers. [Online]. <https://www.icann.org/en/system/files/files/jpa-29sep06-en.pdf>
- [46] US Department of Commerce. (2003, September) Amendment 6 to ICANN/DOC Memorandum of Understanding. [Online]. <https://www.icann.org/resources/unthemed-pages/amend6-jpamou-2003-09-17-en>
- [47] ICANN and US Department of Commerce. (2009, September) AFFIRMATION OF COMMITMENTS BY THE UNITED STATES DEPARTMENT OF COMMERCE AND THE INTERNET CORPORATION FOR ASSIGNED NAMES AND NUMBERS. [Online]. <https://www.icann.org/resources/pages/affirmation-of-commitments-2009-09-30-en>
- [48] A. Michael Froomkin. (2011, Jan) Almost Free: An Analysis of ICANN's "Affirmation of Commitments". [Online]. <http://ssrn.com/abstract=1744086>
- [49] US Department of Commerce. (2012, July) IANA Functions Contract (July 2, 2012). [Online]. https://www.ntia.doc.gov/files/ntia/publications/sf_26_pg_1-2-final_award_and_sacs.pdf
- [50] India-Brazil-South Africa Dialogue Forum. (2013, June) About IBSA Background. [Online]. <http://www.ibsa-trilateral.org/about-ibsa/background>
- [51] India-Brazil-South Africa Dialogue Forum. (2011, October) IBSA Dialogue Forum Firth Summit of Heads of State and Government Tshwane Declaration. [Online]. http://www.ibsa-trilateral.org/images/stories/documents/declarations/FINAL_Tshwane_Declaration_18Oct_12h23.pdf

- [52] India-Brazil-South Africa Dialogue Forum. (2011, September) Recommendations of IBSA Multistakeholder meeting on Global Internet Governance (Sept 1-2, 2011 Rio de Janeiro, Brazil). [Online]. http://www.itforchange.net/sites/default/files/ITfC/rio_recommendations.pdf
- [53] US Congress. (2012, May) House Concurrent Resolution 127 "Expressing the sense of Congress regarding actions to preserve and advance the multistakeholder governance model under which the Internet has thrived." [Online]. <https://www.gpo.gov/fdsys/pkg/BILLS-112hconres127ih/pdf/BILLS-112hconres127ih.pdf>
- [54] US House of Representatives. (2013, April) HR 1580 "To affirm the policy of the United States regarding Internet Governance". [Online]. <https://www.congress.gov/bill/113th-congress/house-bill/1580>
- [55] US House of Representatives. (2014, March) HR 4342 - "DOTCOM Act of 2014". [Online]. <https://www.congress.gov/bill/113th-congress/house-bill/4342>
- [56] UN International Telecommunications Union. (2012, Dec) Conference concludes in Dubai with 89 countries having signed the updated International Telecommunication Regulations. [Online]. <http://www.itu.int/osg/wcit-12/highlights/dec13-14.html>
- [57] UN International Telecommunications Union. (2012, December) Signatories of the Final Acts (89) of WCIT 2012. [Online]. <http://www.itu.int/osg/wcit-12/highlights/signatories.html>
- [58] United States House of Representatives Judiciary Committee. (2014, April) Hearing: Should the Department of Commerce Relinquish Direct Oversight over ICANN (April 10, 2014). [Online]. <http://judiciary.house.gov/index.cfm/2014/4/hearing-should-the-dept-of-commerce-relinquish-direct-oversight-over-icann>
- [59] Paul Conneally. (2012, November) The Google Campaign - an ITU View. [Online]. <https://itu4u.wordpress.com/2012/11/23/the-google-campaign-an-itu-view/>
- [60] Lynn St. Amour. (2012, December) Internet Society Disappointed over Fundamental Divides at World Conference on International Telecommunications. [Online]. <http://www.internetsociety.org/news/internet-society-disappointed-over-fundamental-divides-world-conference-international>
- [61] John Curran et al. (2013, Oct) Montevideo Statement on the Future of Internet Cooperation. [Online]. <https://www.icann.org/news/announcement-2013-10-07-en>
- [62] National Telecommunications & Information Administration. (2014, March) NTIA Announces Intent to Transition Key Internet Domain Name Function. [Online]. <https://www.ntia.doc.gov/press-release/2014/ntia-announces-intent-transition-key-internet-domain-name-functions>
- [63] National Telecommunications & Information Administration. (2014, March) IANA Functions and Related Root Zone Management Transition Questions and Answers. [Online]. <https://www.ntia.doc.gov/other-publication/2014/iana-functions-and-related-root-zone-management-transition-questions-and-answ>
- [64] ICANN. (2014, May) Enhancing ICANN Accountability: Opportunity for public dialogue and community feedback. [Online]. <https://www.icann.org/resources/pages/enhancing-accountability-2014-05-06-en>
- [65] National Telecommunications & Information Administration. (2015, January) Report on the Transition of the Stewardship of the IANA Functions. [Online]. https://www.ntia.doc.gov/files/ntia/publications/iana_report_013015.pdf
- [66] NETmundial. (2014, April) Live Transcript of NETmundial conference, Day 2 (23, 24/April/2014, São Paulo, Brazil). [Online]. <https://prakash.im/text-netmundial-day2.html>

- [67] Steve DelBianco. (2014, April) Parallel Processes: ICANN Accountability and the IANA Transition. [Online]. http://www.circleid.com/posts/20140429_parallel_processes_icann_accountability_and_the_iana_transition/
- [68] ICANN. (2014, March) ICANN Accountability - Event report at ICANN 49 (24 March 2014) Singapore. [Online]. <https://singapore49.icann.org/en/schedule/mon-icann-accountability>
- [69] ICANN. (2014, October) Enhancing ICANN Accountability: Process and Next Steps. [Online]. <https://www.icann.org/resources/pages/process-next-steps-2014-10-10-en>
- [70] US House of Representatives, Subcommittee on Courts, Intellectual Property, and the Internet. (2014, April) Hearing: Should the Department of Commerce Relinquish Direct Oversight over ICANN? (April 10, 2014). [Online]. <http://judiciary.house.gov/index.cfm/2014/4/hearing-should-the-dept-of-commerce-relinquish-direct-oversight-over-icann>
- [71] ICANN. (2014, April) Call for Public Input: Draft Proposal, Based on Initial Community Feedback, of the Principles and Mechanisms and the Process to Develop a Proposal to Transition NTIA's Stewardship of the IANA Functions. [Online]. <https://www.icann.org/resources/pages/draft-proposal-2014-04-08-en>
- [72] NETmundial Initiative. (2014, April) Home Page of NETmundial. [Online]. <https://www.netmundial.org/>
- [73] NETmundial. (2014, April) NETmundial Multistakeholder Statement of April 24, 2014 (São Paulo, Brazil). [Online]. <http://netmundial.br/wp-content/uploads/2014/04/NETmundial-Multistakeholder-Document.pdf>
- [74] ICANN Stewardship Transition Coordination Group. (2014, September) Communities Contributing to the ICG Request for Transition Proposals. [Online]. <https://www.icann.org/en/stewardship/community>
- [75] CRISP. (2014, March) Home Page of Coordinated RIR IANA Stewardship Proposal (CRISP). [Online]. <https://www.nro.net/nro-and-internet-governance/iana-oversight>
- [76] IANAPLAN IETF Working Group. IETF IANAPLAN Working Group Home Page. [Online]. <https://datatracker.ietf.org/wg/ianaplan/charter/>
- [77] Cross-Community Working Group to Develop an IANA Stewardship Transition Proposal on Naming Related Functions. CWG on Naming Related Functions. [Online]. <https://community.icann.org/x/37fhAg>
- [78] IANA Stewardship Transition Coordination Group. (2014, August) Charter of the Group, v.10 (August 27, 2014). [Online]. <https://www.icann.org/en/system/files/files/charter-icg-27aug14-en.pdf>
- [79] ICANN. (2014, September) IANA Stewardship Transition Coordination Group Request for Proposals. [Online]. <https://www.icann.org/en/system/files/files/rfp-iana-stewardship-08sep14-en.pdf>
- [80] ICANN Stewardship Transition Coordination Group. (2014, Sept) IANA Stewardship Transition Coordination Group Process Timeline. [Online]. <https://www.icann.org/en/system/files/files/icg-process-timeline-08sep14-en.pdf>
- [81] Cross-Community Working Group to Develop an IANA Stewardship Proposal on Naming Related Functions. (2014, Oct) Charter of the CWG Group. [Online]. <https://community.icann.org/display/gnsocwgdtstwrdsbp/Charter>
- [82] ICANN. (2014, November) Proposed Charter for Enhancing ICANN Accountability Cross Community Working Group (CCWG) Submitted for Consideration. [Online]. <https://www.icann.org/news/announcement-2014-11-05-en>
- [83] Eliot Lear and Russ Housely. (2015, Jan) Draft Response to the Internet Coordination Group Request for Proposals on the IANA protocol parameters registries. [Online]. <http://tools.ietf.org/html/draft-ietf-ianaplan-icg-response-09>
- [84] Number Resource Organization (NRO). (2016, Jan) NRO and Internet Governance: IANA Stewardship Transition Home Page. [Online]. <https://www.nro.net/nro-and-internet-governance/iana-oversight>

- [85] Number Resource Organization (NRO). (2015, January) Response to the IANA Stewardship Transition Coordination Group Request for Proposals on the IANA from the Internet Number Community. [Online]. <https://www.nro.net/wp-content/uploads/ICG-RFP-Number-Resource-Proposal.pdf>
- [86] ICANN. (2014, August) Charter of the Cross Community Working Group to Develop an IANA Stewardship Transition Proposal on Naming Related Functions. [Online]. <https://community.icann.org/download/attachments/48347144/CWG-DT%20Draft%20Charter%20-%202014%20August%202014%20Updated.doc?api=v2>
- [87] CWG-Stewardship. (2015, Jan) Accountability Dependencies. [Online]. https://docs.google.com/document/d/1c4Eab_fZMCQeeYvhy8OcE6f_PqhGza2qW4-UgFn8Pvc/edit
- [88] Alan Greenberg. (2015, Jan) Accountability measures required by CWG Proposal(s) (submission to CWG-Stewardship mailing list). [Online]. <http://mm.icann.org/pipermail/cwg-stewardship/2015-January/001390.html>
- [89] Jonathan Robinson. (2015, Jan) Conditional Accountability Requirements (submission to CWG-Stewardship mailing list). [Online]. <http://mm.icann.org/pipermail/cwg-stewardship/2015-January/001393.html>
- [90] CWG-Stewardship. (2015, June) Response to the IANA Stewardship Transition Coordination Group Request for Proposals on the IANA Stewardship Transition from the Cross Community Working Group on Naming Related Functions. [Online]. <https://community.icann.org/x/aJ00Aw>
- [91] IANA Stewardship Transition Coordination Group. (2015, Sept) ICG Summary Report on Comments Received during the Public Comment Period on the Combined Transition Proposal. [Online]. <https://www.ianacg.org/icg-files/documents/Public-Comment-Summary-final.pdf>
- [92] IANA Stewardship Transition Coordination Group. (2015, July) IANA Stewardship Transition Proposal: Call for Public Comment. [Online]. <https://www.ianacg.org/calls-for-input/combined-proposal-public-comment-period/>
- [93] Enhancing ICANN Accountability CCWG. (2015, August) Cross Community Working Group on Enhancing ICANN Accountability 2nd Draft Report (Work Stream 1). [Online]. <https://www.icann.org/public-comments/ccwg-accountability-2015-08-03-en>
- [94] US Government Accountability Office. (2015, August) Internet Management: Structured Evaluation Could Help Assess Proposed Transition of Key Domain Name and Other Technical Functions (GAO-15-642). [Online]. <http://www.gao.gov/assets/680/672055.pdf>
- [95] US Department of Commerce. (2015, September) Amendment 4 to IANA Functions Contract Extending Period of Performance to September 30, 2016. [Online]. https://www.ntia.doc.gov/files/ntia/publications/iana_mod_option_1_exercised.pdf
- [96] IANA Stewardship Transition Coordination Group (ICG). (2015, October) Proposal to Transition the Stewardship of the Internet Assigned Numbers Authority (IANA) Functions from the U.S. Commerce Department's National Telecommunications and Information Administration (NTIA) to the Global Multistakeholder Community. [Online]. <https://www.ianacg.org/icg-files/documents/IANA-transition-proposal-v9.pdf>
- [97] ICANN. (2015, Nov) Overview and Timeline of NTIA IANA Functions' Stewardship Transition. [Online]. <https://www.icann.org/en/stewardship>
- [98] Enhancing ICANN Accountability CCWG. (2015, November) Third Draft Report (published on 30 November). [Online]. <https://community.icann.org/pages/viewpage.action?pageId=56145016>
- [99] US Congress. (2015, December) Consolidated Appropriations Act of 2016 (section 539). [Online]. <https://www.gpo.gov/fdsys/pkg/BILLS-114hr2029enr/pdf/BILLS-114hr2029enr.pdf>

- [100] Steve Crocker. (2016, Jan) [CWG-Stewardship] [client com] IPR Memo (posting to CWG-Stewardship mailing list). [Online]. <http://mm.icann.org/pipermail/cwg-stewardship/2016-January/004597.html>
- [101] ICANN. (2016, May) ICANN Resolutions: Approval of new ICANN Bylaws for IANA Stewardship Transition. [Online]. <https://features.icann.org/approval-new-icann-bylaws-iana-stewardship-transition>
- [102] Ted Cruz, James Lankford, and Michael Lee. (2016, Feb) Letter to Fadi Chehade of ICANN (Feb 4, 2016). [Online]. http://www.cruz.senate.gov/files/documents/Letters/20160203_FadiChehadeLetter.pdf
- [103] Ted Cruz, James Lankford, and Michael Lee. (2016, March) Letter to Stephen Crocker, Chairman of ICANN (March 3, 2016). [Online]. https://www.cruz.senate.gov/files/documents/Letters/20160303_CruzLankfordLee_ICANNLetter.pdf
- [104] Ted Cruz, James Lankford, and Michael Lee. (2016, April) Letter to Stephen Crocker, Chairman of ICANN (April 4, 2016). [Online]. http://www.cruz.senate.gov/files/documents/Letters/20160404_ICANNCruzLankfordLee.pdf
- [105] Ted Cruz. (2016, July) Sen. Cruz Speech to Heritage Foundation: We Must Keep the Internet Free. [Online]. https://www.cruz.senate.gov/?p=press_release&id=2730
- [106] Ted Cruz, Michael Lee, and Sean Duffy. (2016, August) Letter to Renata B. Hesse, Acting Assistant Attorney General US Dept of Justice (August 12, 2016). [Online]. http://www.cruz.senate.gov/files/documents/Letters/20160812_DOJ-ICANNLetter.pdf?
- [107] Ted Cruz. (2016, June) S. 3034 "Protecting Internet Freedom Act" (referred to committee; not passed). [Online]. <https://www.congress.gov/bill/114th-congress/senate-bill/3034/text>
- [108] Senate Committee on the Judiciary. (2016, Sept) Protecting Internet Freedom: Implications of Ending U.S. Oversight of the Internet. Hearing by the Subcommittee on Oversight, Agency Action, Federal Rights and Federal Courts. [Online]. <http://www.judiciary.senate.gov/meetings/protecting-internet-freedom-implications-of-ending-us-oversight-of-the-internet>
- [109] Department of Commerce National Telecommunications and Information Administration. (2016, June) IANA Stewardship Transition Proposal Assessment Report. [Online]. https://www.ntia.doc.gov/files/ntia/publications/iana_stewardship_transition_assessment_report.pdf
- [110] Department of Commerce National Telecommunications and Information Administration. (2016, June) NTIA Finds IANA Stewardship Transition Proposal Meets Criteria to Complete Privatization. [Online]. <https://www.ntia.doc.gov/press-release/2016/iana-stewardship-transition-proposal-meets-criteria-complete-privatization>
- [111] ICANN. (2016, August) ICANN Announces Incorporation of Public Technical Identifiers (PTI). [Online]. <https://www.icann.org/news/announcement-2-2016-08-11-en>
- [112] Mark Brnovich, Ken Paxton, Scott Pruitt, and Adam Paul Laxalt. (2016, Sept) Case 3:16-CV-00274 "Complaint for Declaratory and Injunctive Relief and Application for Temporary Restraining Order and Preliminary Injunction". [Online]. https://www.texasattorneygeneral.gov/files/epress/Net_Complaint_-_FILED.pdf
- [113] US Government (United States Attorney General). (2016, Sept) No. 3:16-cv-00274 : Defendants' Opposition to Plaintiffs' Motion for a Temporary Restraining Order or Preliminary Injunction. [Online]. <http://ia601201.us.archive.org/17/items/gov.uscourts.txsd.1386946/gov.uscourts.txsd.1386946.7.0.pdf>
- [114] Internet Association et al. (2016, Sept) In re: Case 3:16-cv-00274 Amicus Brief in support of Defendants. [Online]. <http://www.internetsociety.org/sites/default/files/iana-amicus.pdf>

- [115] George Hanks. (2016, Sept) Cause No. 3:16cv274 State of Arizona et al. v. NTIA, et al. Hearing Minutes and Order. [Online]. <http://ia801201.us.archive.org/17/items/gov.uscourts.txs.1386946/gov.uscourts.txs.1386946.15.0.pdf>
- [116] ICANN. (2016, May) ICANN Resolutions - Service Level Agreement (SLA) with RIRs for the IANA Numbering Services. [Online]. <https://features.icann.org/service-level-agreement-sla-rirs-iana-numbering-services>
- [117] ICANN. (2016, May) Service Level Agreement for the IANA Numbering Services. [Online]. <https://www.nro.net/wp-content/uploads/ICANN-RIR-SLA-signature.pdf>
- [118] ICANN. (2016, June) 2016 Supplemental Agreement with the Internet Engineering Taskforce (IETF). [Online]. <https://www.icann.org/en/stewardship-implementation/2016-supplemental-agreement-with-the-internet-engineering-taskforce-ietf>
- [119] IETF and ICANN. (2000, March) RFC2860 - Memorandum of Understanding Concerning the Technical Work of the Internet Assigned Numbers Authority. [Online]. <https://www.icann.org/en/about/agreements/ietf/ietf-icann-mou-01mar00-en.htm>
- [120] IETF and ICANN. (2016, June) 2016 ICANN-IETF MoU Supplemental Agreement. [Online]. https://www.icann.org/iana_imp_docs/59-2016-icann-ietf-mou-supplemental-agreement-v-1-0
- [121] ICANN. (2016, Sept) ICANN Resolutions - IANA Naming Function Contract between ICANN and PTI. [Online]. <https://features.icann.org/iana-naming-function-contract-between-icann-and-pti>
- [122] Trang Nguyen. (2016, Sept) IANA Naming Function Agreement (overview and discussion). [Online]. <https://www.icann.org/public-comments/iana-naming-function-agreement-2016-08-10-en>
- [123] ICANN and PTI. (2016, August) IANA Naming Function Agreement. [Online]. <https://www.icann.org/en/system/files/files/proposed-iana-naming-function-agreement-10aug16-en.pdf>
- [124] National Science Foundation and Network Solutions. (1993, January) NCR 92-18742 Network Information Services Manager for NSFNET and the NREN: INTERNIC Registration Services Cooperative Agreement. [Online]. <https://archive.icann.org/en/nsi/coopagmt-01jan93.htm>
- [125] Department of Commerce. (2016, October) Amendment 33 to NCR 92-18742. [Online]. https://www.ntia.doc.gov/files/ntia/publications/amendment_33.pdf
- [126] ICANN and Verisign. (2016, September) Root Zone Maintainer Service Agreement. [Online]. https://www.icann.org/iana_imp_docs/63-root-zone-maintainer-agreement-v-1-0
- [127] Ellen Rony and Peter Rony, *The Domain Name Handbook: High Stakes and Strategies in Cyberspace*. Lawrence, Kansas, USA: R&D Books, 1998, <http://www.domainhandbook.com/ifwp.html>.
- [128] Jeremy Malcolm. (2008, February) Multi-Stakeholder Public Policy Governance and its Application to the Internet Governance Forum. [Online]. <https://www.malcolm.id.au/thesis/>
- [129] The White House. (1997, July) About a Framework for Global Electronic Commerce. [Online]. <http://clinton4.nara.gov/WH/New/Commerce/about.html>
- [130] Interagency Working Group on Electronic Commerce. (1997, July) A Framework for Global Electronic Commerce. [Online]. <http://clinton4.nara.gov/WH/New/Commerce/read.html>
- [131] US Department of Commerce. (2000, February) IANA Functions Contract (February 9, 2000). [Online]. <https://www.ntia.doc.gov/files/ntia/publications/ianacontract.pdf>

- [132] US Department of Commerce. (2001, March) IANA Functions Contract (March 21, 2001). [Online]. <https://www.ntia.doc.gov/files/ntia/publications/sb1335-01-w-0650.pdf>
- [133] US Department of Commerce. (2003, March) IANA Functions Contract (March 13, 2003). [Online]. https://www.ntia.doc.gov/files/ntia/publications/ianaorder_03142003.pdf
- [134] US Department of Commerce. (2006, August) IANA Functions Contract (August 11, 2006). [Online]. https://www.ntia.doc.gov/files/ntia/publications/ianacontract_081406.pdf
- [135] Wikipedia. (2013, May) Edward Snowden (from Wikipedia, the free encyclopedia). [Online]. https://en.wikipedia.org/wiki/Edward_Snowden
- [136] US House of Representatives. (2014, April) HR 4398 - GIF Act of 2014. [Online]. <https://www.congress.gov/bill/113th-congress/house-bill/4398>
- [137] US House of Representatives. (2014, April) HR 4367 - Internet Stewardship Act of 2014. [Online]. <https://www.congress.gov/bill/113th-congress/house-bill/4367>
- [138] W3C. (2016, Jan) Facts about W3C. [Online]. <https://www.w3.org/Consortium/facts>
- [139] Amazon.COM Investor Relations. (2016, Jan) History and Timeline of Amazon.COM. [Online]. <http://phx.corporate-ir.net/phoenix.zhtml?p=irol-corporateTimeline&c=176060>
- [140] eBay, Inc. (2016, Jan) [eBay Inc] History. [Online]. <https://www.ebayinc.com/our-company/our-history/>
- [141] US House of Representatives. (2014, December) House Report 113-715 from the Committee on Energy and Commerce to accompany H.R. 4342 (DOTCOM Act of 2014). [Online]. <https://www.gpo.gov/fdsys/pkg/CRPT-113hrpt715/html/CRPT-113hrpt715.htm>
- [142] CWG-Stewardship. (2015, Jan) IANA CWG Meeting #17 (11-January-2015) Report. [Online]. <https://community.icann.org/pages/viewpage.action?pageId=51416954>
- [143] Internet Governance Forum. (2014, September) IGF 2014 - Ninth Meeting of IGF in Istanbul on 2-5 September 2014. [Online]. <http://www.intgovforum.org/cms/igf-2014>
- [144] Kathryn Brown. (2015, October) We're Almost There. IANA Stewardship Transition (Blog entry). [Online]. <https://www.internetsociety.org/blog/public-policy/2015/10/were-almost-there-iana-stewardship-transition>
- [145] IETF-ICANN. (2000, March) Memorandum of Understanding Concerning the Technical Work of the Internet Assigned Numbers Authority. [Online]. <https://www.icann.org/resources/unthemed-pages/ietf-icann-mou-2000-03-01-en>

x

