

IANA Stewardship Transition CWG RFP Section 1 Proposal – 1 November 2014 Draft

[Note: Subgroup 1-2A-2B has not dealt with IANA functions related to the .INT and .ARPA TLDs. Regarding .INT, the issue has been flagged in the triage of the existing IANA contract (Subgroup 2C) with a suggestion that the GAC representatives might consider how to treat it. As to .ARPA, Subgroup 1-2A-2B does not believe that it falls within the remit of the ccNSO or the GNSO. It might be a good idea to reach out to the IETF to see if they are dealing with it. The CWG should decide how to deal with both of these TLDs.]

0. Proposal type: Names

Introduction

Although just one of three operational communities served by the IANA contract, the Names community presents the most complex set of issues and requirements.

A large, and growing, number of companies and organizations are reliant on services provided by IANA for their very presence on the Internet. To the individual organization, these services are critical yet infrequent; in the whole, they represent the single most significant connection between the global network and Internet users.

In large part IANA performs a checking function to the Names community. Much of the work is *pro forma*. However due to the inherent complexities of names, which have diverse and culturally specific requirements, those functions do not lend themselves well to a general set of rules or precise processes.

Within the Names community are a number of sub-groups that have the same broad requirements and relationship to both IANA functions operator and current operator of the IANA contract, ICANN. However these groups have marked differences between them.

It is important for the overall stability of the Internet that each group, regardless of its size, is able to approach and use the IANA functions on its own terms. As such, the Names community comes with a number of related but varied proposals for the IANA contract transition.

I. Community use of IANA functions

The Naming community incorporates a number of different groups, each with its own needs and requirements. These differences are significant enough that within the Domain Name System industry, they have their own representatives, organizations, meetings, policy processes and are almost always referred to with different prefixes.

The most significant division of comes in the form of "country code" top-level domains (ccTLDs) and "generic" top-level domains (gTLDs).

In large part, the ccTLDs, which as the "country code" name implies are representative of individual countries or territories, are autonomous both within global Internet bodies and their own group. Each ccTLD is in a position to develop its own policies and as a result, many of the decisions made about the functioning of the ccTLD are culturally specific. It is a requirement that a ccTLDs Administrative Contract reside in the country or territory associated with that ccTLD.

That is not to say all ccTLDs are different: in many cases, information sharing between them has led to large numbers adopting similar approaches to a multitude of different issues. However, each ccTLD will insist on its right to decide upon and develop its own approach.

The situation is very different with generic top-level domains. The operators of gTLDs are, almost without exception, bound by a single set of policies that are developed collectively within ICANN. An operator's rights to a specific gTLD are also designated by ICANN.

These fundamental differences between ccTLDs and gTLDs impact not only the use of IANA functions but also the relationship and underlying understanding of the role of IANA and its contractor, ICANN. Where there may be opportunities to simplify processes for gTLDs given the tight relationship between a gTLD operator, the IANA functions and ICANN; such simplification would be anathema to a ccTLD community that has consistently rejected a contractual relationship with ICANN.

Within the ccTLD and gTLD groupings, there are a number of significant sub-groups whose main characteristics are unlikely to change and so must be considered equally.

While the ccTLDs were originally developed with reference to an international standard for two-letter representations for countries¹, in recent years a number of new top-level domains have been introduced that represent local-language versions of a country's online namespace². These "internationalized" names or 'IDN ccTLDs' have broadly adopted the same legal and philosophical approach as other ccTLDs (particularly in terms of independence from the IANA functions operator and ICANN). However they can also present unique issues due to their non-Latin-language nature.

Within the ccTLDs, there are also two broad groups of operators who, for cultural or historical reasons, are either happy to collectively organize, or who continue to insist on a large degree of individual independence³.

In pragmatic terms, the more autonomous a top-level domain operator wishes to be, the less willing they will be to accept changes to the current IANA arrangements without adequate consultation and safeguards.

Within the gTLD community, there are subtle differences that may need to be accounted for. For example, a specific category of 15 top-level domains, so-called "sponsored" top-level domains (sTLDs), were created between 2001-2002 that have different contractual agreements with ICANN as well as different policy processes. Likewise, in the current wave of gTLD additions under the "new gTLD" program, there are a number of subtly different categories, from community-based applications, to so-called "brand" applications that will exert greater control over their domains, to applications that have agreed to stricter registration requirements either after pressure from governments or in order to differentiate themselves in the market.

While many of these variations are unlikely to impact day-to-day IANA functions, the fact that the IANA functions operator is often required to check changes against specifically agreed policies, any transitional arrangements would need to account for such complexities.

¹ ISO 3166-1. Examples being "DE" for Germany (Deutschland) and "US" for United States. Note: there are also a number of exceptions and historical oddities such as the use of "UK" for United Kingdom, rather than "GB" for Great Britain.

² Examples being السعودية ('Al-Saudiah' in Arabic, for Saudi Arabia) and 中国 (Zhōngguó, the most common name for China)

³ For example, while there are 248 ccTLDs (not including IDN ccTLDs), the main organizing body for ccTLDs within ICANN, the country code Names Supporting Organizations (ccNSO), has 152 members (just under 60 percent of all ccTLDs). [Information accurate on 24 October 2014.]

I.a List of IANA functions used by the Naming communities

The table below uses a key part of the existing IANA contract⁴ to identify functions and direct customers, split between ccTLD and gTLD operators⁵. A CWG number has been given to each to identify the function in the rest of the document:

Contract	CWG Item #	Function	ccTLDs	gTLDs
C.2.9.2	1	Perform Administrative Functions Associated With Root Zone Management	Yes	Yes
a	2	Root Zone File Change Request Management	Yes	Yes
b	3	Root Zone “WHOIS” Change Request and Database Management	Yes	Yes
c	4	Delegation and Re-delegation of a Country Code Top Level -Domain (ccTLD)	Yes	No
d	5	Delegation and Re-delegation of a Generic Top Level Domain (gTLD)	No	Yes
e	6	Root Zone Automation	Yes	Yes
f	7	Root Domain Name System Security Extensions (DNSSEC) Key Management	Yes	Yes
g	8	Customer Service Complaint Resolution Process (CSCRCP)	Yes	Yes

Note: the key aspect in terms of use here is that there are separate processes for selecting or changing the operator of a ccTLD or gTLD, developed due to the fundamental differences between the two, as noted earlier.

There are a number of additional functions and services that are not listed in the NTIA services contract but which are used by the Names communities. The table below outlines them: [Note: this remains a work in progress.]

CWG Item #	Function	ccTLDs	gTLDs
9	Repository of IDN Practices ⁶	Yes	Yes
10	Retirement of ccTLD codes	Yes	No

⁴ Between the NTIA and ICANN and found at: http://www.ntia.doc.gov/files/ntia/publications/sf_26_pg_1-2-final_award_and_sacs.pdf

⁵ It is fully recognized that indirect customers of the IANA functions are very important but they are not listed in the table to conserve space.

⁶ See <https://www.iana.org/domains/idn-tables>

I.b Description of Functions

1: Perform Administrative Functions Associated With Root Zone Management

The "root zone" is the highest level of the domain name system and lists all of the top-level domains available under that system, complete with associated technical details.

There are a range of different details that each operator can provide with respect to their top-level domain (TLD)⁷, although as a bare minimum they must provide two name server (NS) addresses, which provide details to all the domains underneath that TLD e.g. 'example.com', and a glue record (A) that provides a machine-readable IP address for the same servers.

In addition, TLD operators provide details over who to contact if there are any issues such as "signing keys" that are used to verify that the data is coming from the right person, and the name(s) of those authorized to make changes to these details.

The IANA functions operator is responsible (among other root zone tasks⁸) for keeping this data up to date and making the relevant parts of it available continuously all of the time.

The process by which new top-level domains are added to the root zone, and changes are made to existing TLDs is a three-stage process, with each stage currently operated by a different entity. If a TLD operator wishes to make a change, this is the process that is followed⁹:

1. It is sent to the IANA functions Operator (ICANN). The request is validated (does it come from the right person?) and checked (does it fit with the TLD's policy?). If all is fine, the request is sent on to the root zone management process administrator.
2. The NTIA reviews the request to make sure the IANA functions operator has done its job properly and then authorizes it. The request is then sent to the root zone Maintainer.
3. The Root Zone Maintainer (Verisign) checks the request is technically correct, for example that a new name server is actually online, and then makes the change to the root zone itself. Once done, a notification is sent to the Operator.

⁷ See a list of DNS record types here: http://en.wikipedia.org/wiki/List_of_DNS_record_types

⁸ The three key public files can be found here: <https://www.iana.org/domains/root/files>

⁹ The NTIA's official graphic for this process can be found at: <http://www.ntia.doc.gov/legacy/DNS/CurrentProcessFlow.pdf>

This process is carried out through two separate contracts: between the Operator and the Administrator; and between the Administrator and the Maintainer.

2: Root Zone File Change Request Management

This is the process by which changes are made to the root zone (see function 1 above for more detail). For an existing top-level domain, the majority of requests will come in the form of an update of existing information, such as the address for a new name server (and its corresponding 'glue record'). This is reflected in the "root zone file" that lists all top-level domains.

Sometimes, there are changes to the person that is authorized to make future changes as in the case of someone moving jobs or changing responsibilities. These are reflected in the 'Root Zone Whois' listings which provide the contact details for each TLD operator¹⁰. Occasionally there are minor technical changes such as how frequently a TLD file is updated.

Recently the two most significant *additions* to the root zone file have been the creation of "signing keys" for existing registries due to the implementation of the security protocol DNSSEC on individual top-level domains, and the creation of entire new top-level domains as ICANN's new gTLD process has become a reality. In 2014 so far (up to 25 October), there have been over 400 new top-level domains added to the root zone.

3: Root Zone “WHOIS” Change Request and Database Management

Although this is listed as a separate function in the current IANA contract, in reality it is no more than part of function 2: managing change requests from TLD operators.

The Root Zone Whois comprises contact details for each TLD operator, including: the TLD name and creation date; its primary and secondary name servers; the name, postal and email address, and telephone and fax numbers for its administrative and technical contacts; and when the record was last updated.

¹⁰ These 'Whois' details can be found online, either through IANA's Whois search box at <https://www.iana.org/whois> or its Root Database file at <http://www.iana.org/domains/root/db>

4: Delegation and Re-delegation of a Country Code Top Level-Domain (ccTLD)

The relationships between ccTLD operators and the IANA functions operator vary greatly due to a range of historical and cultural factors. A small number¹¹ of ccTLD operators have a similar relationship to gTLD operators in that they have signed a contract with ICANN as the IANA functions operator (typically called a "sponsorship agreement"). A larger number¹² have agreements with ICANN (again, as the IANA functions operator) that are characterized as either an "accountability framework" or an "exchange of letters"¹³ and are not legally binding. And lastly, the majority of ccTLDs have no formalized agreement with ICANN.

Since there is typically not a contractual relationship between a ccTLD and the IANA functions operator, the "delegation and re-delegation" of a ccTLD is an entirely separate process to that of the delegation and re-delegation of a gTLD. In simple language, "delegation" means that a particular organization or individual is identified and acknowledged and being in charge of a specific top-level domain, and "re-delegation" is when that organization or individual is changed.

The ccTLD delegation/re-delegation process has changed significantly over the years and has also varied between ccTLDs. Its foundation however stems from two documents: a series of principles written in 1994 by the first IANA functions operator Jon Postel¹⁴, and a further list of principles produced in 2000, later updated in 2005, by ICANN's Governmental Advisory Committee (GAC)¹⁵.

An effort to create greater clarity around the delegation process was begun in 2011 by the supporting organization of ICANN for ccTLDs (the Country Code Names Supporting Organization, ccNSO). A final draft report from the "framework of interpretation" working group was published in October 2014¹⁶.

¹¹ 11 (as of 28 October 2014)

¹² 69 (as of 28 October 2014)

¹³ For a full list go to: <https://www.icann.org/resources/pages/cctlds-2012-02-25-en>

¹⁴ RFC 1591, Domain Name System Structure and Delegation, which can be found at: <https://www.ietf.org/rfc/rfc1591.txt>

¹⁵ The 2000 Principles for the Delegation and Administration of Country Code Top Level Domains can be found at: <http://archive.icann.org/en/committees/gac/gac-cctldprinciples-23feb00.htm>. The updated 2005 version added the term "Guidelines" to the title and stressed the principle of "subsidiarity" i.e. decisions being made at the local level, and can be found at: <https://archive.icann.org/en/committees/gac/gac-cctld-principles.htm>

¹⁶ The *Framework of Interpretation of current policies and guidelines pertaining to the delegation and redelegation of country-code Top Level Domain Names* can be found at: <http://ccnso.icann.org/workinggroups/foi-final-07oct14-en.pdf>

The current IANA contract contains a clause¹⁷ that identifies a broad group of parties that could or should be consulted if the existing policy framework does not cover a specific instance. Those parties are: ICANN, IETF, IAB, the RIRs, top-level domain operators, governments and the Internet user community. In addition, "relevant public authorities" are listed as a group that should be consulted if a recommendation is made with respect to delegation/re-delegation that is "not within or consistent with an existing policy framework".

Any recommendations are also expected to account for "the relevant national frameworks and applicable laws of the jurisdiction that the TLD registry serves".

The result is a process of delegation/re-delegation that is largely tailored to each specific case.

5: Delegation and Re-delegation of a Generic Top Level Domain (gTLD)

The rules and procedures for selecting or changing the operator of a generic top-level domain are developed by ICANN, largely through its relevant supporting organization, the Generic Names Supporting Organization, or GNSO.

In September 2013, the IANA functions operator published *User Documentation on Delegating and Redelegating a Generic Top Level Domain*¹⁸ for public comment¹⁹. There were no comments so the document stands as the main guide for the delegation process for gTLDs.

In each case of delegation/re-delegation, the IANA functions operator is obliged to provide documentation verifying that it followed the agreed policy framework, including information on how input was invited from "relevant stakeholders" and why the decision is "supportive of the global public interest"²⁰.

The new TLD program, which has seen the introduction of hundreds of new gTLDs to the root zone in just a few months, has helped improve and standardize this reporting process.

¹⁷ Section/paragraph C.1.3.

¹⁸ Downloadable as a PDF at: <https://www.icann.org/en/system/files/files/gtld-drd-ui-10sep13-en.pdf>

¹⁹ Comment period details online at: <https://www.icann.org/public-comments/gtld-drd-ui-policy-2013-09-10-en>

²⁰ Examples of this process in action can be seen with the dot-academy new gTLD here: <http://www.iana.org/reports/c.2.9.2.d/20131212-academy>. Including a "readiness report" here: <http://www.iana.org/reports/2013/gtld-readiness-1-1336-51768.pdf>

6: Root Zone Automation

With many of the changes made to the root zone being effectively *pro forma*, there has been a push for over a decade for a greater degree of automation²¹. An "eIANA" system was introduced in 2006 and implemented in 2008 which allowed TLD operators to create a set of root zone edits that would then be automatically included in a new root zone file with the Administrator role (see function 1 above) simply auditing the process.

In 2011, further improvements were made including a web interface for making requests and automated transfer of data between the IANA functions operator and the root zone maintainer²².

In 2012, the revised IANA contract between ICANN and the NTIA required further automation including, at a minimum, a secure system for communications, the ability for TLD operators to manage their root zone entries and an online database that showed TLD operators their history of change requests. Further improvements are ongoing.

7: Root Domain Name System Security Extensions (DNSSEC) Key Management

A key component of the increased security at the root zone level made possible by the introduction of the DNSSEC security system is the creation and management of the "key signing key", or KSK²³. Since June 2010 and then approximately every three months, the IANA functions operator has been responsible for generating and publishing the KSK which is then used to digitally sign the root zone and ensure that top-level domains are able to communicate securely.

The key is created in an elaborate ceremony that last approximately four hours and features approximately 20 people drawn from across the world who all play a part in the key's creation²⁴.

²¹ See for example this letter from 2005 where the chair of Centr asks for improve automation of IANA functions:

<https://www.icann.org/en/system/files/files/kane-to-verhoef-19apr05-en.pdf>

²² See presentation from IANA's Kim Davies at ICANN's Dakar meeting in October 2011 at: <http://ccnso.icann.org/files/27465/presentation-root-zone-automation-davies-24oct11-en.pdf>

²³ Much more information is available at: <https://www.iana.org/dnssec>

²⁴ More information on the key signing ceremonies is available online at: <https://www.iana.org/dnssec/ceremonies>

8: Customer Service Complaint Resolution Process (CSCRCP)

This is a typical customer complaint process where anyone unhappy with the IANA functions operator's services can send an email to a specific address (escalation@iana.org) and be entered into a ticketing system²⁵. The system allows complaints to be escalated from the IANA functions operator staff to ICANN management and ultimately ICANN's CEO if the customer is not satisfied.

9: Management of the Repository of IDN Practices

The IANA functions operator maintains a collection of “IDN tables”, which represent permitted code points (letters) allowed for Internationalised Domain Name registrations in particular registries such as IDN ccTLDs and gTLDs.

10: Retirement of ccTLD codes

The ISO3166-1 list is a dynamic list which follows international political changes with respect to country and territory names being added or modified or being retired (The Dissolution of Czechoslovakia, which took effect on 1 January 1993, was an event that saw the self-determined split of the federal state of Czechoslovakia into the Czech Republic and Slovakia). As such the IANA functions operator oversaw the Retirement of the .CS country code from active use (although currently there is no official ICANN policy for the retirement of ccTLDs this action was completed based on a specific motion of the ICANN Board).

I.c Registries Involved in Providing the Functions

The registries involved in providing the functions are: Root Zone File and Root Zone Whois database.

I.d Overlaps or interdependencies between IANA requirements and other customer community functions

²⁵ More information at: <http://www.iana.org/help/escalation-procedure>

The DNS requires IP addresses to function (both IPV4 and IPV6) from the Address Registries and offers its services based on a large number of protocols developed and maintained by the IETF.