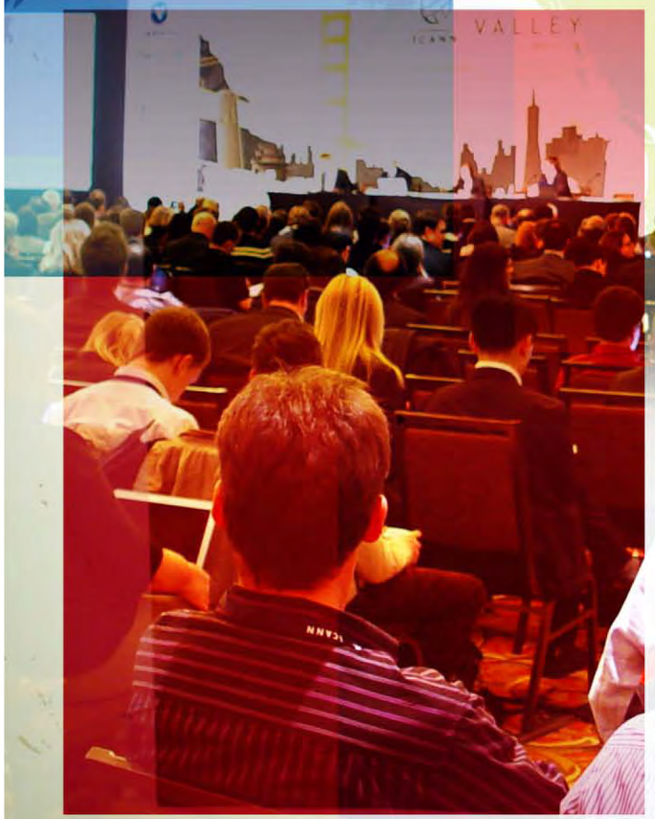
Original

Internet Assigned Numbers Authority (IANA)

U.S. Department of Commerce,
National Telecommunications and
Information Administration

Volume I – Technical Proposal

Solicitation Number: SA1301-12-RP-0043
May 31, 2012



Submitted to:
Ms. Mona-Lisa Dunn
U.S. Department of Commerce
Office of Acquisition Management
Commerce Acquisition Solutions, Room 6521
14th and Constitution Avenue, NW
Washington, D.C. 20230

ICANN

The Internet Corporation for Assigned Names and Numbers

ICANN

May 31, 2012

Ms. Mona-Lisa Dunn
Contracting Officer
United States Department of Commerce
Office of Acquisition Management
Commerce Acquisition Solutions, Room 6521
14th and Constitution Avenue, N. W.
Washington, D. C. 20230

Reference: Request for Proposal (RFP) Number SA1301-12-RP-0043

Subject: Submission of Proposal

Dear Ms. Dunn:

The Internet Corporation for Assigned Names and Numbers ("ICANN") submits the enclosed proposal in response to the above-captioned solicitation to perform technical services known as the Internet Assigned Numbers Authority ("IANA") Functions. The proposal is submitted in three (3) originals, i.e. one original proposal with three original signatures, and one (1) copy. This proposal is valid for ninety (90) days through August 29, 2012. As the incumbent contractor, ICANN has a strong knowledge and familiarity with the IANA Functions and has all the necessary technical personnel, materials, equipment and facilities to perform the requirements of the solicitation.

ICANN is a not-for-profit public benefit corporation organized under the laws of the State of California. The Headquarters of ICANN is currently located in 4676 Admiralty Way, Suite 330, Marina del Ray, California. As of June 18, 2012, ICANN's Headquarters will move to 12025 Waterfront Drive, Suite 300, Playa Vista, CA 90094-2536. The IANA work will be performed at ICANN's Headquarters under the resultant contact.

This proposal consists of two volumes and sections in binders with dividers clearly indicating each section. Volume 1, Technical Proposal, includes the technical and management approach to executing the IANA Functions; all certifications and documents that will be used to perform the IANA Functions requirements; and resumes of key personnel. Volume II, Financial Information and Project Funding Strategy, includes the partially executed Standard Form 33, Solicitation, Offer and Award, Standard Form 30, Amendment of Solicitation, Representations, Certifications and Other Statements Of Offerors from Section K of the RFP; the audited financial statements; and a project funding plan that describes the sources of funds that will be used to cover the costs of providing the IANA Functions

requirements. Each volume includes all certifications, documents, reports and/or templates that ICANN proposes to use in fulfilling the requirements of the contract as well as the resumes of the ICANN key personnel that will perform and/or manage the requirements of the contract.

All primary operations of the IANA requirement will be performed within the continental United States at the above address for the entire life cycle of the resultant contract and at no cost to the Federal Government. ICANN is the incumbent contractor under contract number SA131-06-C-N0048. We have performed those requirements well and have received several complimentary evaluations. ICANN intends to use the same personnel on the resultant contract to continue its exemplary performance. ICANN will not charge any fees to the users of the IANA services for the life cycle of the contract.

ICANN is and will be a responsible contractor to the Federal government because (1) it has adequate financial resources to perform the contract; (2) it has the experience and capabilities to provide the required services in a timely and satisfactory manner to users under the contract; (3) it has a demonstrated record of performance; (4) it has performed the IANA functions with integrity and according to sound business ethics; and (5) it has the organization, experience, technical skills, accounting, and system of internal controls to provide quality service to third parties under a resultant contract.

ICANN certifies that it does not have an Organizational Conflict of Interest ("OCI"). Notwithstanding its' incumbency, ICANN has not obtained nor has it been exposed to unequal access to nonpublic information. ICANN has a competitive advantage by reason of its work on the current contract but it has not been furnished nor had access to any proprietary or source selection sensitive information because it did not participate in any way in the development of the reference RFP. Furthermore, ICANN did not provide any information to the government that would ensure an award of a resultant contract to itself. In addition, there are no covered employees who are performing an inherently governmental function requiring a financial disclosure statement, so there is no personal conflict of interest. Finally, ICANN has not provided any biased information to the government.

ICANN has prepared a list of Assertions that identify the Intellectual Property that was developed exclusively at private expense that will be used in the resultant contract and to which ICANN will retain title. In the event that ICANN develops a subject invention during the course of performance of the resultant contract, it will furnish written disclosure to the Contracting Officer within 60 days of the date of conception of the invention.

ICANN is a responsible contractor that is providing a proposal in compliance with the Solicitation. ICANN has the expertise and qualifications to provide the highest quality IANA services

representing the best value to the Federal government and to the third party users of the services. ICANN is keenly aware of its responsibility and accountability to the global Internet community and is constantly working to affirm this obligation, and will continue to do so under the resultant contract. ICANN continues to invest in a Business Excellence Program, based on the globally recognized standard EFQM, to assess what it is doing well and where improvement in the performance of the IANA functions may be achieved.

The Standard Form 33 Solicitation, Offer, and Award, and the Standard Form 30, Amendment of Solicitation, signed by Mr. Rod Beckstrom, President and CEO of ICANN, who is authorized to bind and commit the company, is included in Volume II, immediately following this cover letter.

Thank you for your consideration of the enclosed proposal. Should you have any questions or concerns, please do not hesitate to contact me at (202) 570-7240, or by e-mail at jamie.hedlund@icann.org.

Best regards,
ICANN

By: _____
Jamie Hedlund
Vice President, North America

Internet Assigned Numbers Authority (IANA)

U.S. Department of Commerce, National Telecommunications and Information Administration

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ICANN

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Acronym List

AC	Advisory Committees
AD	Actions for the Document
AfNOG	African Network Operators Group
AFRINIC	Internet Numbers Registry for Africa
AfTLD	African Top Level Domains
AICPA	American Institute of Certified Public Accountants
ALAC	At Large Advisory Committee
ANSI	American National Standards Institute
AoC	Affirmation of Commitments
APNIC	Asia Pacific Network Information Center
APTLD	Asia Pacific Top Level Domain
ARIN	American Registry for Internet Numbers
ARPA	Address and Routing Parameter Area
AS	Address Space
ASN	Address Supporting
ASO	Address Supporting Organization
CA	Certification authorities
ccNSO	Country Code names Supporting Organization
CCOP	Contingency and Continuity of Operations Plan
CENTR	Council of European National Top Level Domain Registries
CEO	Chief Executive Officer
CISSP	Certified Information Systems Security Professional
CO	Contract Office
COR	Contracting Officer's Representative
CSCRP	Customer Service Complaint Resolution Process
CSR	Certificate Signing Requests
DNCRI	Division of Networking and Communication Research and Infrastructure
DNS	Domain Name System
DNSSEC	Domain Name System Security
DoC	Department of Commerce
DPS	DNSSES Policy Statement
DS	Delegation Signer
DoC	Department of Commerce
DPS	DNSSES Policy Statement
ECML	Electronic Commerce Language
EPP	Extensible Provisioning Protocol
ETNO	European Telecommunications Network Operators
ETSI	European Telecommunications Standards Institute
FAR	Federal Acquisition Regulation
FCFS	First Come First Served
FISMA	Federal Information Security Management Act

FNOI	Further Notice of Inquiry
GAC	Government Advisory Committee
GNSO	Generic Names Supporting Organization
GSI	Generic Signing Infrastructure
HSM	Hardware Security Modules
HTML	Hyper Text Markup Language
HTTPS	Hypertext Transfer Protocol Suite Secure
I-D	IPS Documents
IAB	Internet Architecture Board
IANA	Internet Assigned Numbers Authority
IAOC	IETF Administrative Oversight Committee
IASA	IETF Administrative Support Activity
IC	Internet Corporation
ICANN	Internet Corporation for Assigned Names and Numbers
ICP	Internet Coordination Policy
ID	Internet Draft
IDN	Internationalized Domain Names
IESG	Internet Engineering Steering Group
IETF	Internet Engineering Task Force
IKOS	ICANN KSK Operations Security
INR	Internet Number Resource
IP	Internet Protocol
IPS	IANA Project Specialist
IRSG	Internet Research Steering Group
IRTF	Internet Research Task Force
ISC	Internet Systems Consortium
ISMS	Information Security Management System
ISO	International Organization for Standardization
ISOC	Internet Society
ISP	Internet Service Providers
ITAC	Internet Technical Advisory Committee
ITAD	Internet Technical Advisory
ITU	International Telecommunication Union
KPI	Key Performance Indicators
KSK	Key Signing Key
KSR	Key Signing Request
LACNIC	Latin American Network Information Center
LACTLD	Latin American and Caribbean TLD Association
MENOG	Middle East Network Operators Group
MIME	Multipurpose Internet Mail Extensions
MOU	Memorandum of Understanding
N/A	Not Applicable
NANOG	North American Network Operations Group

NCC	Network Coordination Center
NIST	National Institute of Standards and Technology
NOI	Notice of Inquiry
NRM	Number Resources Manager
NRO	Number Resources Organization
NS	Name Server
NSF	National Science Foundation
NSFNET	National Science Foundation Network
NSRC	Network Startup Resource Center
NTIA	National Telecommunications and Information Administration
NTT	Nippon Telegraph and Telephone Corporation
OECD	Organization for Economic Co Development
OFAC	Office of Foreign Assets Control
PCH	Packet Clearing House
PDF	Portable Document Format
PDP	Policy Development Program
PEN	Private Enterprise Number
PGP	Pretty Good Privacy
PM	Program Manager
PMA	Policy Management Authority
POC	Point of Contact
PPM	Protocol Parameter Manager
QNAME	Qualified Name
RALO	Regional at Large Organizations
RFC	Requests for Comments
RFP	Request for Proposal
RIR	Regional Internet Registries
RR	Registries
RRSet	Resource Record Set
RRSIG	Resource Record Signature
RSSAC	Root Server System Advisory Committee
RT	Requester Time
RZ	RZ ZSK
RZM	Root Zone Management
S/MIME	Secure/Multipurpose Internet Mail Extension
SANOG	South Asian Network Operators Group
SDLC	Software Development Life Cycle
SHA	Secure Hash Algorithm
SKR	Signal Key Response
SLA	Service Level Agreement
SO	Supporting Organizations
SOA	Statement of Authority
SOW	Statement of Work

SSAC	Security and Stability Advisory Committee
SSL	Secure Sockets Layer
TCP	Transmission Control Protocol
TCR	Trusted Community Representative
TLD	Top Level Domain
TLG	Technical Liaison Group
TLS	Technical Liaison
U.S.	United States
UDP	User Datagram Protocol
UK	United Kingdom
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
VP	Vice President
VPN	Virtual Private Network
WEIRDS	WHOIS-based Extensible Internet Registration Data Service
WG	Working Group
WGC	Working Group Chair
ZSK	Zone Signing Key

Cross Reference Matrix

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EXECUTIVE SUMMARY

For more than a decade, the Internet Corporation of Assigned Names and Numbers (ICANN) has performed the Internet Assigned Numbers Authority (IANA) Functions on behalf of the National Telecommunications and Information Administration (NTIA), an agency within the U.S. Department of Commerce (DoC). A major NTIA activity is promoting the stability and security of the Internet's Domain Name System (DNS) through its management of the IANA Functions Contract.

In seeking an organizational partner to perform the IANA Functions, the NTIA requires an established and trusted contractor with existing close and constructive relationships with the multistakeholder community, and a contractor relied on by the stakeholders to bring IANA Functions' experienced personnel to support this program. Importantly, NTIA requires a contractor that presents the lowest possible risk.

WHY CHOOSE ICANN?

- ✓ ***PROVEN AND UNIQUE CAPABILITY:*** *ONLY CONTRACTOR WITH 13+ YEARS PERFORMING IANA SUPPORT TO NTIA, PROVIDING ALL PERSONNEL, MATERIALS, EQUIPMENT, SERVICES AND FACILITIES*
- ✓ ***SHARED GOALS:*** *TRUSTED PARTNERSHIP ESTABLISHED BETWEEN NTIA AND ICANN ON IANA FUNCTIONS PROGRAM OVER FOUR CONTRACTS AND 20 AMENDMENTS*
- ✓ ***PRIME CONTRACTOR PERFORMING AT NO:*** *COST TO GOVERNMENT AND DELIVERING SECURE AND STABLE MANAGEMENT OF GLOBAL INTERNET'S SYSTEMS OF UNIQUE IDENTIFIERS*
- ✓ ***CONTINUITY:*** *ICANN LEVERAGES COMPETENCIES GARNERED UNDER CURRENT IANA FUNCTIONS CONTRACT*
- ✓ ***PM AND KEY PERSONNEL:*** *SUPPORTED BY STAFF WITH AN AVERAGE OF 5+ YEARS OF EXPERIENCE PERFORMING IANA FUNCTIONS IN ALL EIGHT SOW FUNCTIONAL AREAS*

Only ICANN offers NTIA a demonstrated track record of contributing professional support to all IANA Functions.

ICANN was established in 1998 as a not-for-profit, public benefit corporation organized under the laws of the State of California. ICANN has two primary functions: (1) to coordinate, at the top level, the global Internet's systems of unique identifiers (names, numbers and protocol parameters) and (2) to operate as the private sector-led, multistakeholder organization responsible for bottom-up policy development reasonably and appropriately related to these technical functions. ICANN is dedicated to keeping the Internet secure, stable and interoperable.

ICANN has successfully performed the IANA Functions since December 24, 1998. Beginning in February 2000, and, most recently, in August 2006, the DoC entered into four successive agreements with ICANN to perform the IANA Functions. Over the past 13 years, ICANN enhanced the IANA Functions capabilities to include 11 assigned staff, a redundant systems infrastructure and incorporating improvements recommended by DNS stakeholders and our own internal experts.

The multistakeholder community supports ICANN's selection and has indicated that we are highly competent in our provision of the IANA Functions. More than 70 of the responses to NTIA's Notice of Inquiry (NOI) and Further Notice of Inquiry (FNOI) urged ICANN's continued performance of the IANA Functions contract. Many invoked the benefits of the close relationship between the successful administration of the IANA Functions and the other

capabilities within ICANN. The ICANN community support strongly attests to ICANN's success in fulfilling the IANA Functions and believes it is the best choice moving forward.

As the Prime Contractor, ICANN will perform all IANA Functions, providing a single Point of Contact (POC) to NTIA with ultimate accountability for successful contract execution and completion. ICANN will continue to bring NTIA competent organizational oversight, strong central contract management, and excellence in execution – all essential for successful contract performance. We have a demonstrated track record of providing practical solutions in performance of current IANA Functions Contract. ICANN is committed to retaining the skills and expertise garnered from the current IANA Functions staff, and to bringing new and relevant technology to all interested and affected parties.

For this IANA Functions Contract, ICANN will provide highly qualified professionals to maintain the continuity and stability in the performance of the Functions, we will meet all Statement of Work (SOW) requirements and schedules, and we will respond in a timely manner to all requests. **Figure ES-1** summarizes NTIA's requirements in the SOW with a brief description of the salient features of our offer, and the benefits that will accrue to NTIA and the multistakeholder community with an award to ICANN.

Figure ES-1. ICANN Approach. NTIA benefits from continuity and stability brought by experienced personnel.

NTIA'S NEEDS	ICANN PROPOSED APPROACH	GENUINE, VALUE-ADDED BENEFITS TO NTIA AND STAKEHOLDERS
Continuity – Experienced team with proven technical expertise and in-depth understanding of IANA Functions	• ICANN provides highly competent support to the IANA Functions Contract with same/similar SOW requirements; ICANN will continue to provide same level of competence • ICANN will capitalize and leverage on our extensive experience of over 13 years' continuous performance of IANA Functions.	• High quality, responsive performance on day one • No transition and performance risk • Deep institutional knowledge • Resident technical experts in DNS, Internet numbering, Domain Name System Security (DNSSEC), and Root Server Operations
Relationships – Established close, constructive working relationships with all interested and affected parties, including all stakeholders	• ICANN will continue to meet monthly with the Internet Engineering Steering Group (IESG) and IANA Working Group. • ICANN will continue to attend and participate annually in ten regularly scheduled meetings of the Regional Internet Registries (RIRs). • Twice annually, ICANN will continue to participate in a workshop with the leadership of Internet Society (ISOC), American Registry for Internet Numbers (ARIN), The Internet Numbers Registry for Africa (AFRINIC), Latin American and Caribbean Internet Addresses Registry (LACNIC), Asia-Pacific Network Information Center (APNIC), Réseaux IP European Network	• Quality • Superior performance • Existing high-quality relationships on day one • Well-established communication channels with the multistakeholder community

NTIA'S NEEDS	ICANN PROPOSED APPROACH	GENUINE, VALUE-ADDED BENEFITS TO NTIA AND STAKEHOLDERS
	Coordination Center (RIPE NCC), Internet Architecture Board (IAB), Internet Engineering Task Force (IETF), and World Wide Web Consortium (W3C). • ICANN will continue to facilitate regular teleconferences of the Country Code Name Supporting Organization (ccNSO), Generic Name Supporting Organization (GNSO), At-Large Advisory Committee (ALAC), and Governmental Advisory Committee (GAC). • ICANN will continue to host face-to-face international public meetings annually where all interested and affected parties are invited to participate (currently three per year). • ICANN will attend the three meetings that are held annually by the IETF. • ICANN will meet regularly with the Root Zone Maintainer on technical matters and to support the end-to-end root zone process.	
Stability – Ability to quickly place seasoned and qualified personnel to fill positions	• Experienced personnel will continue to support the contract. • Effective recruiting and employee retention programs; access to excellent personnel worldwide • Very low turnover	• Full customer satisfaction • No risk transition • No loss of productivity • No learning curve
Quality – Proven, reliable management practices and procedures	• Led by proven IANA Functions PM, Elise Gerich, with 23 years of experience • Field-tested quality and management plans	• Timely submission of deliverables • High quality performance • Quality management of team and products
Smooth Transition – Low risk, smooth transition	• Already tested IANA Functions PM • Incumbent experienced staff in place • Established close and constructive relationships with stakeholders • Established headquartered in Los Angeles, California, where all IANA Functions are performed	• Management continuity • Continuity – no learning curve

Transitioning responsibilities as complex as the IANA Functions Contract adds risk. NTIA will have a truly seamless and low risk delivery of service, lacking any disruptions to the multistakeholder community by selecting an experienced operator. ICANN stands ready to continue and enhance support we currently provide.

PERFORMANCE CAPABILITY
ENHANCED BY ICANN'S IANA FUNCTIONS TEAM WITH SPECIALIZED SKILLS AND CORE COMPETENCIES HONED TO THE IANA FUNCTIONS CONTRACT STATEMENT OF WORK

For more than 13 years, ICANN has performed the IANA Functions, delivering continuity, stability and expertise for every task and SOW requirement. We are ready to continue providing the dependable, high-quality support we currently deliver. We offer continuity and retention of institutional knowledge as we continue our close partnership with NTIA. ICANN possesses an intimate understanding of IANA Functions processes and procedures, and we have an in-depth understanding of the SOW requirements. We will leverage our experience and expertise to avoid mistakes, reduce program risks and fulfill the objectives of this contract in a timely and efficient manner achieving full customer satisfaction.

Our strong IANA Functions team has significant experience in the technical aspects of this contract and will continue to add value on the new contract. ICANN's IANA Functions Program Manager (PM), Liaison for Technical Protocol Parameters Assignment, Liaison for Root Zone Management, and Liaison for Internet Number Resource Management developed strong and healthy relationships with the interested parties identified in Section C.1.3 for more than six years on average. The Liaison for Technical Protocol Parameters does and will continue to meet monthly with the IETF-IANA Working Group. This group comprises the leaders of the Internet Technical community. Three times annually, the IANA Functions PM as well as the Liaison for the Technical Protocol Parameters Assignment meet and will continue to meet with the IAB Chair, Bernard Aboba; the IETF Chair, Russ Housley; IETF Administrative Director, Ray Pelletier; and other leaders of the Internet Engineering Steering Group (IESG). These regular meetings have forged a strong and collaborative working relationship between ICANN and this important technical stakeholder, the IETF.

The Liaison for Root Zone Management regularly attends and will attend regional Top-Level Domain meetings like CENTR and APTLD. In addition, the ccNSO has invited the Liaison for Root Zone Management to participate in meetings on a variety of topics. The invitations are a measure of the mutual respect between the leadership of the ccNSO, Lesley Cowley, Keith Davidson and Chris Disspain, and ICANN's Liaison of Root Zone Management. At the three annual ICANN meetings, the Liaison for Root Zone management has and will continue to meet with the ccNSO and to report on the status of the IANA Functions activities.

The Liaison for Internet Number Resource Allocation and the IANA Functions PM represent and will continue to represent ICANN at the ten annual meetings hosted by the five RIRs. At these meetings, the IANA Functions PM will attend face-to-face meetings with the CEOs of the RIRs. The CEOs with whom ICANN has established excellent relationships include John Curran, ARIN; Adiel Akplogan, AFRINIC; Axel Pawlik, RIPE NCC; Paul Wison, APNIC; and Raul Echeberria, LACNIC. In addition to the regular meetings with the leadership of the RIRs, ICANN today presents and will continue to present updates on the IANA Functions to the RIR membership at each of these ten meetings per year. The Address Supporting Organization (ASO) is one of ICANN's supporting organizations, and it is composed of members nominated by the RIRs. The

Liaison for Internet Number Resource Allocation participates and will continue to participate in the monthly ASO teleconferences as an invited and respected subject matter expert.

PAST PERFORMANCE
AN INDICATOR OF THE FUTURE EXCELLENCE: MORE THAN 13 YEARS OF EXPERIENCE AND QUALITY PERFOMING IANA FUNCTIONS

ICANN is proud of our historical record supporting the IANA Functions since 1998 under the Transition Agreement with the University of Southern California and the subsequent agreements with the Department of Commerce entered in 2000, 2001, 2003, and 2006.

Since September 2006, ICANN has been managing the current IANA Functions with renewals on each anniversary through the term of five years. ICANN has performed the IANA Functions since 1998 on a no-fee basis. In recognition of ICANN's success in this endeavor, more than 70 responses to the NOI and FNOI supported ICANN's IANA Functions Contract renewal. ICANN will bring this accumulated wealth of experience, long-standing relationships with the IANA Functions stakeholders, and key expertise in the IANA Functions areas into the new contract and continue to perform this job with excellence. The experience of this seasoned team is shown in more detail in Section 3 Factor 3 Past Performance of this proposal. ICANN provides the best option for a no risk transition by retaining our experts in the relevant SOW areas.

In summary, ICANN eagerly anticipates continuing our partnership with the DoC and NTIA under the IANA Functions Contract. We are confident our technical approach, management plan and past performance—along with experienced, incumbent personnel—will provide value-added expertise to exceed the goals of providing the continuity and stability of the IANA Functions. We will continue to perform in a flexible and responsive manner to implement evolving policies and procedures. ICANN looks forward to bringing our proven capability to support NTIA and the IANA Functions in the future.

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1.0 Technical Approach, Factor 1 [L.6; M.8; C.1-8; Appendices 1,2; B.; E.2; F; H.8,9]

ICANN'S TECHNICAL APPROACH FOR 1.0 EXCEEDS EVALUATION FACTORS
Quality: Results from the April 2012 Customer Survey indicates strong satisfaction with how ICANN provides the IANA Functions: 94% are very satisfied/satisfied with how we provide accurate registries, 93% are very satisfied/satisfied with how courteous we are in providing the services, 90% are very satisfied/satisfied with the ease of the registration process, 87% are very satisfied/satisfied with the quality of process documentation, and 84% are very satisfied/satisfied with the speed with which the requests are handled. In 2010, Assistant Secretary for Communication and Information, Larry Strickling, sent a letter of commendation to ICANN for our successful deployment of DNSSEC. In the letter Mr. Strickling said: "The dedicated and methodical approach taken by you and your team in effecting the implementation is commendable and a testament to the success of the deployment. Congratulations for seeing this effort through so effectively."
Completeness: ICANN carefully analyzed the programmatic and technical requirements of the IANA Functions effort. Accordingly, we addressed in this proposal all requisite areas of the SOW and Instructions. Throughout our discussion below, we present our thorough understanding of the tasks and offer a comprehensive complete approach and response to meeting or exceeding all evaluation criteria.
Responsiveness: ICANN's responsiveness during the term of the 2006 contract has shown continuous improvement, and ICANN will continue to bring high-quality and courteous delivery of the IANA Functions. ICANN has reported monthly on the delivery of the IANA Functions to the NTIA since 2006 and will continue to report on its performance of the IANA Functions. ICANN has delivered on its Service Level Agreements with the IETF as defined in the MoU between ICANN and the IETF.
Relevance: The IANA Functions are integral to maintaining a stable and interoperable Internet. ICANN initiated a Business Excellence Program for the IANA Department three years ago based on the internationally recognized European Standard EFQM. This program has introduced a systemic and sustainable process for continuous improvement. ICANN has adopted this methodology for the IANA Functions operations and will continue to follow this methodology for quality management.
Credibility: ICANN has demonstrated its reputation for effectiveness in building consensus for new programs. Examples of areas where ICANN has built consensus and was effective in the implementation are the Fast Track IDN Program and the Signing of the Root Zone (DNSSEC). The IDN Fast Track Program was a cooperative activity with the ccNSO and the GAC to introduce Top-Level Domain names in non-Latin scripts. The deployment of DNSSEC was the result of cooperation between ICANN, IETF, NTIA, and Verisign. ICANN is recognized for our technical expertise and has been selected to chair IETF working groups. Being chosen as a Working Group Chair (WGC) demonstrates the respect shown by the technical community to ICANN. ICANN has been invited to speak at GOIPv6, RSA conferences, Regional Internet Registry meetings, Network Operator meetings such as NANOG and MENOG, and as technical advisors at ITU IPv6 and IDN meetings. A partial list of ICANN's employees who have been invited speakers at the various events include: Elise Gerich, Jeff Moss, Whit Diffie, Joe Abley, Kim Davies, Leo Vegoda, Michelle Cotton, Naela Sarras, and Mehmet Ackin.

The Internet Corporation for Assigned Names and Numbers (ICANN) offers the National Telecommunications and Information Administration (NTIA) and the multistakeholder community the demonstrated capabilities to successfully maintain continuity and stability of the Internet Assigned Numbers Authority (IANA) Functions. We are the only organization that fully understands the unique operational characteristics of IANA Functions.

ICANN has served as the Prime Contractor on the current IANA Functions contract since September 2006. The Department of Commerce (DoC) and NTIA have demonstrated their full

confidence in ICANN with renewals on each anniversary through the term of five years. Additionally, the DoC granted two extensions to ICANN in 2011 and 2012 as the current solicitation process was underway. Including the 2006 contract, ICANN has provided continuous and stable technical and management support for the IANA Functions since 1998 on a no-fee basis. In recognition of ICANN's success, more than 70 positive responses from international governments and other organizations to the Notice of Inquiry (NOI) and Further Notice of Inquiry (FNOI) urging ICANN's continued performance of the IANA Functions Contract. ICANN will bring this accumulated wealth of experience and long-standing relationships with the IANA Functions customers and stakeholders and key expertise in the IANA Functions areas into the new contract and continue to perform this job with excellence.

We are also the only organization with the experience and knowledge necessary to ensure continuity of service with no disruption. Our past performance demonstrates a strong emphasis on stakeholder satisfaction. ICANN remains prepared to provide the highest quality support by continuing our constructive working relationships with all interested and affected parties. ICANN is proficient in implementing policies, operational doctrine, techniques, and procedures related to the IANA Functions. ICANN is well positioned to continue providing NTIA the technical support specified in the SOW, is intimately familiar with these requirements and demonstrates a success record executing all requirements under the current contract. We are prepared to continue our successful record of compliance with all the general requirements of the contract.

Per Section M.8, Factor 1, ICANN will comply with the instructions to maintain the current services and not to expand the scope of the IANA Functions.

The following sections of the proposal describe in detail (step-by-step) ICANN's ability to understand and perform all the SOW requirements (SOW C.1 through C.8) and achieve the objects of the IANA Functions contract.

1.1 Background [L.6; M.8; C.1]

ICANN was incorporated in September 1998 as the not-for-profit organization responsible for coordinating, at the overall level, the global Internet's systems of unique identifiers and ensuring the stable and secure operation of the Internet's unique identifier systems. ICANN has two primary functions: The first is to coordinate, at the top level, the global Internet's systems of unique identifiers (names, numbers and protocol parameters). The second is to operate as the private sector-led, multistakeholder organization responsible for bottom-up policy development reasonably and appropriately related to these technical functions. For a detailed discussion of ICANN's history, please see Section 2.3 of this proposal.

ICANN's Bylaws limit activities to those matters within ICANN's mission requiring or significantly benefiting from global coordination and, to the extent feasible and appropriate, delegating coordination functions to or recognizing the policy role of other responsible entities that reflect the interests of affected parties. The Bylaws also direct ICANN to seek and support broad, informed participation reflecting the functional, geographic and cultural diversity of the Internet at all levels of policy development and decision-making.

Two important indicators of satisfaction with ICANN's performance are our follow-on work and commendations to the organization. NTIA has demonstrated full confidence in our performance by entrusting the IANA Functions to ICANN through four contracts and 20 amendments. We work hard to develop trusted and lasting relationships with our many stakeholders. ICANN regularly receives kudos from customers and stakeholders:

> *"We congratulate ICANN on the very impressive performance of the IANA function, the steady progress on DNSSec and the overall improvements to the ICANN process especially the better organization of meetings and associated preparatory papers."*
> – Richard Currey, CEO of InternetNZ, in a letter to Rod Beckstrom, October 2009

> *"The [IETF IANA WG] monthly calls were once quite important and had a lot to do. Nowadays, there are any fewer issues, and the calls are shorter and often have few participants. I view that as a sign of goodness. People presumably feel like things are generally in good shape and there isn't a need to discuss such. In short, the IETF is largely happy with the reports and the information they contain. And more importantly, with the overall quality of IANA service to the IETF."*
> – Thomas Narten, IETF Liaison to the ICANN Board,
> in e-mail to the Board IANA Committee, December 2009

> *"The IAOC [IETF Administrative Oversight Committee] extends its thanks and appreciation for the exceptional performance of IANA on behalf of the IETF over the last few years. This performance has been marked by its professionalism, cooperation, open communications and can-do spirit. Your capable staff and ongoing investment in improving the robustness of your infrastructure have contributed to our successful partnership."*
> – Ray Pelletier in e-mail to Elise Gerich and Rod Beckstrom, November 2010

"I am taking this opportunity to place on record my sincere gratitude for an excellent experience in the handling by your Root Management Team of our recent request for nameserver changes for .DM […] The first acknowledgement of our submission and all communications thereafter were professional, clearly instructional and most remarkably, expeditiously handled."

– H.E. Jennifer M. Aird in e-mail to Kim Davies, August 2011

1.1.1 Collaboration with Interested and Affected Parties [C.1.3]

No one person, organization or government controls the Internet. Like an ecosystem, the Internet has many different interested and affected parties and multi-layered interdependencies. ICANN will continue to play a high-level, important but limited role in how the Internet is organized. ICANN will continue to coordinate its efforts with several other independent entities or groups that also play important roles in the Internet ecosystem and are dependent on satisfactory performance of the IANA Functions. These independent entities are as follows:

- **Internet Architecture Board (IAB):** The IAB is a committee of the Internet Engineering Task Force (see definition below). Its responsibilities include oversight of the architecture for protocols and procedures used by the Internet. IAB's major role is long-range planning and coordination between different areas of IETF activity.
- **Internet Engineering Steering Group (IESG):** A management committee of the Internet Engineering Task Force (see definition below).
- **Internet Engineering Task Force (IETF):** The IETF develops and designs standards for the Internet system. It is international and decentralized and has many different working groups on various technical issues.
- **Internet Research Steering Group (IRSG):** A management committee of the Internet Research Task Force.
- **Internet Research Task Force (IRTF):** An unincorporated association overseen by the Internet Architecture Board.
- **Internet Service Providers (ISPs):** ISPs are companies that provide subscribers with access to the Internet.
- **Internet Society (ISOC):** ISOC operates the .org top-level domain registry and does Internet capacity development in developing countries. It supports the IETF.
- **Number Resources Organization (NRO):** The Regional Internet Registries (see definition below) formed the NRO to protect the unallocated Number Resource pool, to promote and protect the bottom-up policy development process and to act as a focal point for Internet community input into the RIR system.
- **Regional Internet Registries (RIRs):** These non-profit organizations distribute Internet Number Resources regionally to Internet service providers and local Internet registries. There are currently five RIRs: African Network Information Centre (AfriNIC), Asia Pacific Network Information Centre (APNIC), American Registry for Internet Numbers (ARIN), Latin American and Caribbean Internet Addresses Registry (LACNIC), and Réseaux IP Européens Network Coordination Centre (RIPE NCC).

- **Registrars:** Companies that assist individuals and organizations in registering a new domain name within higher-level domain spaces. Registrars sell domain name registrations for the registries.
- **Registries:** Each registry has a listing of each domain name registered in that registry. There are two types: generic top-level domain registries (such as .COM or .INFO) and country code top-level domain registries (such as .DE for Germany or .JO for Jordan).
- **Root Server Operators:** The root server operators publish the list of all top-level domains and respond to queries of what the proper network address is for each name. ICANN operates the L-root server, one of 13 domain name system root servers in the world.

As manager of Internet names and addresses, ICANN will continue to support and encourage broad representation from industry, governments, registries, registrars, commercial users, non-commercial users, and individual Internet users into its policy-making processes. This "multistakeholder model," allows issues to develop from the "bottom-up" and resolve through consensus.

Understanding the Requirement

ICANN fully understands that close, constructive working relationships with all interested and affected parties is and will continue to be critical to the successful implementation of the IANA Functions and the continued evolution of the Domain Name System toward the goals of ensuring stability, competition, private bottom-up coordination and representation. ICANN will leverage and continue to grow strong, collaborative relationships with the IANA Functions stakeholders.

Technical Approach

Broadly stated, ICANN collaborates with these interested and affected parties as listed above—sometimes called the Internet community—in two key ways.

First, ICANN will continue to work with other Internet organizations, such as IETF, IAB and the RIRs as well as regional TLD operators' groups, like the Council of European National Top-Level Domain Registries (CENTR). ICANN will also continue to implement the policies and standards developed by those groups. In some cases, a Memorandum of Understanding (MoU) details the parameters of the relationship. For example, ICANN has an MoU with the IETF that specifies that ICANN will assign and register Internet protocol parameters only as directed by the criteria and procedures specified in the Requests for Comments (RFCs), including proposed, draft and full Internet Standards and Best Current Practice documents and any other RFC that calls for ICANN assignment. The MoU between ICANN and IETF also specifies that ICANN will work with the IETF to develop any missing criteria or procedures over time and that ICANN will adopt these when approved by the IESG.

The second way ICANN will continue to collaborate with interested and affected parties is in facilitating the development of policies regarding matters within the scope of our mission. Following the bottom-up, consensus-driven policy development process, ICANN will remain a forum for all who share an interest in the IANA functions and the domain name system, including top-level domain operators and managers, governments and the Internet user community.

ICANN's decentralized governance model will continue to place citizens, industry and governments on an equal level. Unlike more traditional top-down governance models, the multistakeholder model mimics the structure of the Internet itself—borderless and open to all. This ensures that everyone who uses the Internet has a voice in how it is governed.

Close Constructive Working Relationship. Part of the broader Internet ecosystem, ICANN as the IANA Functions provider will have a limited but important role in ensuring the stability and security of the Internet's domain name system. It is critical that the IANA Functions provider has close and constructive relationships with all affected and interested parties. ICANN, as the incumbent, has established and will maintain these relationships in performance of the IANA Functions. ICANN will implement policy developed by other organizations, such as employing technical protocol parameters policy developed by the IETF or policies for the operation of .ARPA developed by the IAB. ICANN will also facilitate the development of pertinent policy as it relates to our own mission through a bottom-up, consensus-driven process with interested and affected parties.

Working Groups will form around an issue and consider it from all angles, making decisions by consensus wherever possible. As in the past, these Working Groups will be open to everyone in ICANN's volunteer community. All Working Group discussions will be recorded and transcribed so that the public has full access to discussions and debate. Major documents and executive summaries will typically be translated into the five non-English United Nations languages.

Public comments will be sought at several stages in the policy development process to let interested community members provide their views on policy proposals and to ensure policy recommendations reflect the concerns and perspectives of the broader Internet community. Working Groups' decisions or recommendations will be considered first by each relevant Supporting Organization and then by the ICANN Board of Directors. The ICANN Board will have ultimate authority to approve or reject policy recommendations.

ICANN Liaisons. In addition to the strong working relationships already in existence between ICANN and the relevant groups, ICANN will appoint liaisons to the IETF, IAB, RIRs, and top-level domain operators and managers. Relationships will be fostered through face-to-face meetings, Working Groups and various forms of online collaboration. For example, ICANN has established and will continue to support an IETF-IANA Working Group that meets monthly to review service-level agreements and Requests for Comments that impact ICANN's performance of the IANA Functions. ICANN will continue to employ an integrated, multi-threaded approach towards maintaining constructive working relationships, taking time to hear each group's needs for operational support and other assistance they need in relation to effectively accessing the IANA Functions.

The IANA Functions stakeholders, broadly understood, include everyone who uses the Internet. In addition to the Internet stakeholders who are part of the ICANN structure, ICANN also maintains a strong working relationship with ISOC. In cooperation, ICANN and ISOC provide workshops to less developed regions, engage with government representatives to address key Internet governance issues, and coordinate announcements on key Internet milestones of importance to everyday users of the Internet. Many ISOC chapters have joined ICANN's At-

Large community as At-Large Structures, further supporting the relationship between the two organizations.

ICANN will continue to attend operator meetings, such as African Network Operators Group (AfNOG) and South Asian Network Operators Group (SANOG), to liaise with ISPs and promote discussions of technical implementation issues that require community cooperation.

1.1.1.1 ICANN model

ICANN's consensus-driven, bottom-up, policy-making governance model is built on transparency, accountability, openness, inclusion, trust, and collaboration. It serves the global public interest. When all voices are heard, no single voice can dominate an organization. We will continue to support the multistakeholder model as the best means for engaging with the many parties both interested and affected by the performance of the IANA Functions.

The ICANN model comprises Supporting Organizations and Advisory Committees, which encompass communities directly benefiting from ICANN's management of the IANA Functions:

- ccTLD managers
- gTLD managers
- Internet engineers engaged in standards development
- Regional Internet Registries
- Root server operators
- Hardware, software, and routing engineers who rely on the unique identifiers in their day-to-day work
- ISP operators
- End users through At-Large and ALAC

Each of these groups will have a place in ICANN's policy development process—either through their own standards development organization that has agreements with ICANN or in one of ICANN's Supporting Organizations or Advisory Committees.

A key component of the model is the Ombudsman, an independent, impartial and neutral officer of ICANN. As an alternative dispute resolution practitioner for the ICANN community, the Ombudsman is available to help in disputes about fairness and process. This person has jurisdiction over problems or complaints about decisions, actions or inactions by ICANN, the Board of Directors or unfair treatment of a community member by ICANN, the Board or a constituency body.

Illustrating the importance of full participant involvement, ICANN's Board of Directors consists of 21 members, many drawn from the community directly. In addition to the voting role of ICANN's President and CEO, this includes seven voting members selected by the following ICANN Supporting Organizations and Advisory Committees:

- Two voting Board members are selected by the Address Supporting Organization (ASO), which comprises members of the Regional Internet Registries.

- Two voting Board members are selected by the Country Code Names Supporting Organization (ccNSO), which comprises those members representing country code top-level domain operators.
- Two voting members are selected by the Generic Names Supporting Organization (GNSO), which includes those members representing stakeholder groups and constituencies with business and policy interests in generic top-level domains.
- One voting member is selected by the At-Large, the primary organizational home within ICANN for individual Internet users.

Eight voting members of ICANN's Board are selected by ICANN's Nominating Committee, which comprises members of each of the ICANN stakeholder communities. See **Figure 1.1-1**.

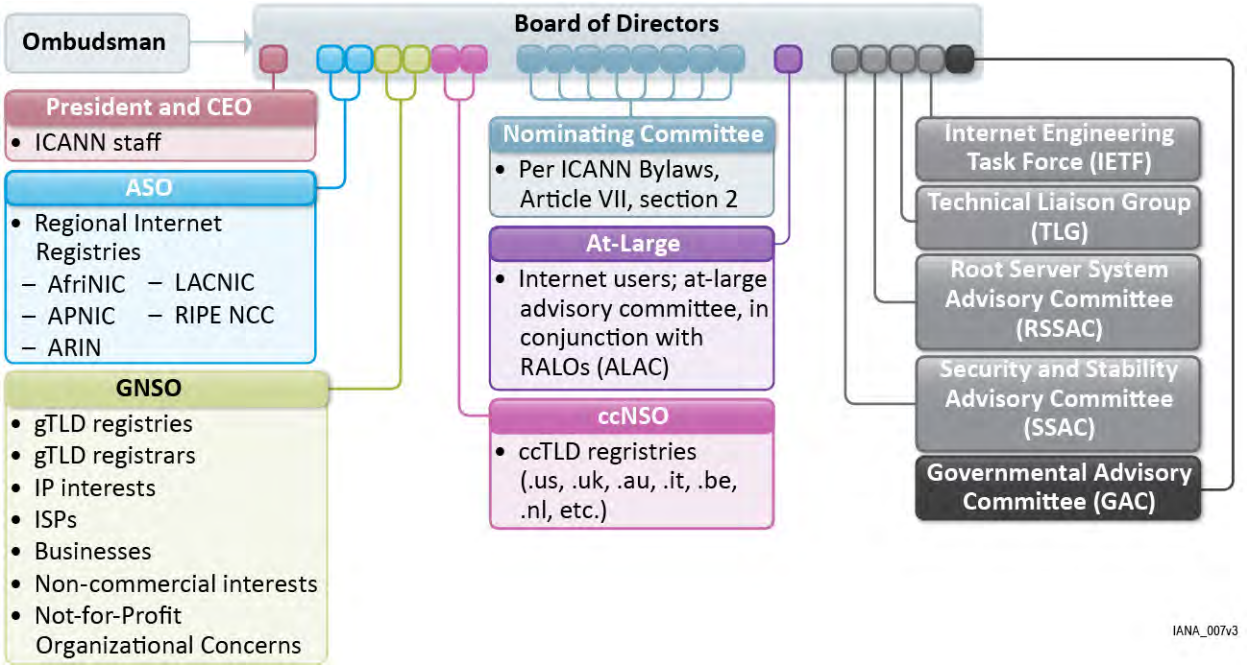

Figure 1.1-1. ICANN's Multistakeholder Model

The Board also has one non-voting Liaison from each of the following:

- Internet Engineering Task Force represents the engineers and developers engaged in protocol-parameter standards development.
- ICANN's Governmental Advisory Committee (GAC) represents governments and economies as recognized by the UN ISO 3166 Maintenance Agency.
- ICANN's Root Server System Advisory Committee (RSSAC) represents the root server operators.
- ICANN's Security and Stability Advisory Committee (SSAC) is a group of DNS experts who provide guidance to ICANN on issues that may threaten the stability or security of the DNS system.
- The Technical Liaison Group (TLG) consists of four organizations: the European Telecommunications Standards Institute (ETSI), the International Telecommunications

Union's Telecommunication Standardization Sector (ITU-T), the World Wide Web Consortium (W3C), and the Internet Architecture Board (IAB). Annually, in rotation, one TLG organization appoints one non-voting liaison to the Board and one non-voting member to the Nominating Committee. (The IAB does not take a role in this rotation due to the participation of an IETF liaison.)

ICANN will work with each of these groups to facilitate their participation in the ICANN processes and to meet their IANA Functions requirements.

Certain issues regarding management of the IANA Functions are covered by formal agreements with the IETF or NRO or by an RFC (like the management guidelines and operational requirements for .ARPA as detailed in RFC 3172). For issues outside of those agreements and RFCs, ICANN-specific policy recommendations will be formed and refined through ICANN's Supporting Organizations (SOs) and influenced by Advisory Committees (ACs)—all composed of volunteers from over 130 countries and territories—in a bottom-up, open and transparent process. Members of any SO and AC as well as the ICANN Board may raise an issue they believe requires policy development.

1.1.1.2 Internet Engineering Task Force (IETF) and Internet Architecture Board (IAB)

ICANN will continue to operate under the existing MoU with the IETF. This MoU sets out technical requirements for use in performance of the IANA function in assigning and registering Internet protocol parameters only as directed by the criteria and procedures specified in Requests for Comments (RFCs), including Proposed, draft and full Internet Standards and Best Current Practice documents and any other RFC that calls for IANA Actions. If there is no documentation for an existing registry, then ICANN will continue to assign and register Internet protocol parameters that have traditionally been registered, following past and current practice for such assignments, unless otherwise directed by the IESG. If in doubt or in case of a technical dispute, ICANN will seek and follow technical guidance exclusively from the IESG. Where appropriate the IESG will appoint an expert to advise ICANN. ICANN will work with the IETF to develop any missing criteria or procedures over time, which ICANN will adopt when so instructed by the IESG. In the event of a technical dispute between the ICANN and the IESG, both will seek guidance from the IAB, whose decision will be final.

Regarding Internet Number Resources policies, ICANN will continue to operate under the existing MoU with the Numbers Resource Organization (NRO), a group comprising five Regional Internet Registries. The MoU defines the NRO's role in global policy development, providing recognition of other registries. The MoU also establishes that the NRO will fulfill the role, responsibilities and functions of the Address Supporting Organization (ASO) in advising the ICANN Board on Internet number resource allocation policy. This agreement ensures that the RIRs, an affected and interested party, have a voice in shaping relevant policy.

The IETF will continue to appoint a representative as a non-voting liaison to the ICANN Board of Directors. Thomas Narten has served as the IETF's liaison to the ICANN Board for several years and actively participates in the IETF community as well as with the RIR communities.

As ICANN's IANA Functions Liaison for Technical Protocol Parameters Assignment, Michelle Cotton will continue to lead the development of the excellent relationship ICANN maintains

with the IETF. Ms. Cotton will continue as the IANA Liaison to the IESG and, as such, will participate in the IESG's fortnightly telechats and facilitate the relationship between ICANN and the IETF. Ms. Cotton will continue to build the trust she has developed over time with the IETF community by ensuring ICANN performs its protocol-parameter and Internet Draft (ID) review tasks ably, by making ICANN's IANA functions staff available at IETF meetings for consultation on open issues, and by working directly with the Request for Comment (RFC) Editor to provide introductory guidance to those who are new to writing RFCs.

ICANN's IANA Functions Program Manager and IANA Function Liaison to the IESG will discuss issues of common interest during regular meetings with the IAB chair, the IETF chair and the IETF Liaison to the ICANN Board, usually taking place during the three annual IETF meetings. The relationship between ICANN and the IETF is and will continue to be governed by a formal MoU from June 2000, published as RFC 2860. It is supplemented with an ICANN-IETF MoU Supplemental Agreement and includes a Service Level Agreement (SLA), which ICANN has met or exceeded 51 of the last 54 months, reviewed each year by the IETF's Administrative Oversight Committee. Finally, ICANN will continue to participate in the annual "I*"(I-star) meeting of the senior leaders from the IAB, IETF, Internet Society (ISOC), NRO, RIRs, and W3C at which shared strategic issues are discussed.

1.1.1.3 Regional Internet Registries (RIRs)

In 2007, the five RIRs formed the NRO to conserve the unallocated Number Resource pool, promote and protect the bottom-up policy development process and act as a focal point for Internet community input into the Regional Internet Registries system. Each RIR conducts regional meetings where the participants develop number resource policy. ICANN's ASO brings the global number policy to the ICANN Board and community. Kuo-Wei Wu and Ray Plzak are the current ICANN Directors selected by the ASO.

Kuo-Wei Wu served on Asia-Pacific Network Information Center's executive council for 11 years and now chairs ICANN'S Board IANA Committee, which will continue to provide oversight of ICANN's performance of the IANA functions. Ray Plzak was President and CEO for nine years of the ARIN and the RIR for the United States, Canada and parts of the Caribbean and has served on ICANN's Board IANA Committee.

As ICANN's IANA Functions Liaison for Internet Number Resource Allocation, Leo Vegoda will maintain the excellent relationship ICANN maintains with the RIRs and NRO. He and other ICANN staff members will attend RIRs' open policy development meetings; attend the ASO Address Council's monthly meetings as observers; provide staff implementation impact analyses of global policy proposals on request; and engage in joint technical development work of interest to the RIRs, domain registries and others, such as the IETF WHOIS-based Extensible Internet Registration Data Service (WEIRDS) work towards developing a more versatile registration information system than the current WHOIS protocol. Being present at these meetings will allow ICANN to fully recognize the needs of the number resource community regarding the IANA Functions.

The relationship between ICANN and the NRO was formalized in November 2007 with an exchange of letters in which both parties reaffirmed their commitment to each other. This

exchange of letters has been renewed and the strength of the relationship is evident in the statement of support the NRO offered on the 2007 Midterm Review of the United States Department of Commerce and the Internet Corporation for Assigned Names and Numbers Joint Project Agreement in which it described ICANN as "a stable and trustworthy organization." In the 2009 NOI on the Assessment of the Transition of the Technical Coordination and Management of the Internet's Domains Name and Addressing System, the NRO stated its "commitment to continue to work closely with ICANN through the ASO MoU and other agreements, to ensure and safeguard the bottom-up policy development process that has proven highly successful as the foundation of an open and transparent management of Internet numbering resources." Finally, the March 2011 letter from the NRO to ICANN expresses the strongest possible faith in both ICANN and the model multistakeholder model ICANN implements.

These statements of support arise from the strong sense of satisfaction at the way in which the allocation of Internet Protocol (IP) address space and Autonomous System (AS) numbers has been handled over the period of the current IANA Functions contract. Clear request templates have been agreed to by RIRs and turnaround times are typically very fast and far exceed the RIRs' operational needs.

1.1.1.4 TLD Operators/Managers

Two ICANN Supporting Organizations represent Top Level Domain (TLD) operators and those with a business or policy interest in TLDs within ICANN policy development: the Country Code Names Supporting Organization (ccNSO) for country code top-level domains and the Generic Names Supporting Organization (GNSO) for generic top-level domains.

The GNSO consists of four stakeholder groups, each with an interest in gTLD activities and policy.

- Registries Stakeholder Group representing all gTLD registries under contract to ICANN.
- Registrars Stakeholder Group representing all registrars accredited by and under contract to ICANN.
- Commercial Stakeholder Group representing the full range of large and small commercial entities of the Internet.
- Non-Commercial Stakeholder Group representing the full range of non-commercial entities of the Internet.

The ccNSO and GNSO are the ICANN Supporting Organizations that will continue to be responsible for, among other things, initiating development of the policies governing the management of top-level domain names. This includes the policies governing their delegation and redelegation, as well as the policies governing registration within the TLD space.

As ICANN's IANA Functions Liaison for Root Zone Management, Kim Davies will continue to lead the work that has seen the strengthening of the relationship between ICANN and the TLD operators. This is partly a result of the way processing times for Root Zone Management requests have improved over the period of the current contract through implementing new

documentation, systems and methods. This has been done while demand for services has doubled.

On behalf of ICANN and as the IANA Functions Liaison for Root Zone Management, Mr. Davies has participated in technical capacity development work that is meant to spread the technical knowledge of the root zone and DNS to the broader Internet community. Mr. Davies will participate in this outreach to the TLD community both through attending regional TLD operators' groups, like CENTR and APTLD, and through teaching at DNS workshops. Workshops that are held in less developed regions are often done in cooperation with the Network Startup Resource Center (NSRC) as well as the African Network Operators Group (AfNOG). Collaboration with NSRC and AfNOG is another example of how ICANN has and will continue to work with other interested parties in fulfilling ICANN's purpose to improve the management of Internet names and numbers.

While gTLD operators have a contractual relationship with ICANN, no contractual relationship is or will be required for the operation of ccTLDs, which currently form the overwhelming majority of TLDs. Many ccTLD operators have voluntarily entered into accountability frameworks, exchanges of letters and other formal agreements with ICANN. As of May 15, 2012, 130 ccTLD operators have joined the ccNSO, the ICANN Supporting Organization for ccTLDs. In March 2011, in response to NTIA's Notice of Inquiry on the IANA Functions, the ccNSO wrote the following:

> *IANA's work in managing the root zone is an essential part of ICANN. It is key to the interests and engagement of a large number of ccTLDs and is equally significant to many governments and stakeholders in the gTLD space. As such, ICANN's multistakeholder model and processes could be significantly undermined if the IANA functions were to be removed and managed by an entirely unrelated entity.*

Members, like auDA, supported the ccNSO's comments:

> *auDA has been closely involved in the formulation of the ccNSO's response to the NTIA's call for comments on the IANA functions and fully supports the observations and recommendations contained within that submission.*

Similarly, the European Telecommunications Network Operators Association (ETNO), wrote the following:

> *ETNO believes that management of the Internet Assigned Numbers Authority (IANA) functions should transition from a Government oversight contractual responsibility to that of the Internet Corporation for Assigned Names and Numbers (ICANN), as an independent organization, such transition taking place with the understanding that ICANN complies with the obligations set out under the Affirmation of Commitments.*
>
> *ETNO believes that ICANN is the best placed body to oversee these functions, assuming that ICANN continues to comply with the obligations set out in the Affirmation of Commitments.*

> *ETNO agrees with the NTIA that policies and procedures developed by technical Internet communities, such as the Regional Internet Registries and the country code top-level domain (ccTLD) operators, have an impact on the performance of the IANA functions. These technical communities are fully represented within ICANN through the appropriate bodies (such as the Country Code Names Supporting Organisation). This representation demonstrates that the IANA function is an integral part of ICANN and that the necessary co-operation and co-ordination of a variety of technical groups is already in place.*

Bill Graham and Bruce Tonkin are the serving ICANN Board Directors selected by the GNSO; Chris Disspain and Mike Silber are those selected by the ccNSO. Bruce Tonkin is currently Chief Strategy Officer for Melbourne IT Limited, which was the first commercial administrator for the COM.AU namespace and one of the first five test-bed registrars when ICANN established registrar competition for the existing .COM/.NET/.ORG registry. Director Chris Disspain has been the Chief Executive Officer of .AU Domain Administration Ltd (auDA), a non-profit company that is the independent governing body/manager of the Australian Internet domain name space (.AU) and the policy body governing the DNS in Australia since October 2000. Director Mike Silber is from the .ZA Domain Name Authority and has served as Director of the Authority since its formation in 2004.

1.1.1.5 Governments

ICANN will continue to interact with governments in a variety of ways. Three key approaches include involving governments in ICANN through the Governmental Advisory Committee (GAC), reaching out to governments in various inter-governmental organizations and one-on-one meetings with governments. ICANN will continue to regularly provide briefings on various aspects of ICANN's execution of the IANA Functions.

Under ICANN's Bylaws, the GAC considers and provides advice on Internet policy matters as they relate to the concerns of governments, particularly where there may be an interaction between ICANN's policies and various laws and international agreements or where they may affect public policy issues. In Article XI, section 2.1.j, it states:

"The advice of the Governmental Advisory Committee on public policy matters shall be duly taken into account, both in the formulation and adoption of policies. In the event that the ICANN Board determines to take an action that is not consistent with the Governmental Advisory Committee advice, it shall so inform the Committee and state the reasons why it decided not to follow that advice. The Governmental Advisory Committee and the ICANN Board will then try, in good faith and in a timely and efficient manner, to find a mutually acceptable solution."

The GAC has engaged in dialogue—and will continue to do so—with ICANN's Board on issues such as the New gTLD Program. The New gTLD Program Applicant Guidebook reflects a number of revisions resulting from the intensive collaboration between the GAC and the Board, including the development of procedures for the review of sensitive strings and the strengthening of many trademark and consumer protections. To engage with the larger ICANN community, the GAC holds face-to-face meetings with ICANN's Supporting Organizations and Advisory Committees about issues of mutual concern.

The GAC selected Heather Dryden to serve as Interim Chair at the ICANN Brussels meeting in June 2010 until the conclusion of the first GAC meeting of 2011. Subsequently, she was elected to a two-year term (ending in 2013) as Chair of the GAC. Ms. Dryden currently serves as Senior Policy Advisor at the International Telecommunications Policy and Coordination Directorate at the Canadian Department of Industry (Industry Canada) and has worked for the Department since 2002. She also serves as a non-voting liaison to the ICANN Board.

ICANN will continue to work with governments through inter-governmental organizations, such as the International Telecommunication Union (ITU). The ITU's Telecommunication Standardization Sector is a member of ICANN's Technical Liaison Group (TLG) where it shares a non-voting Liaison seat on the ICANN Board in rotation with the other TLG members. ICANN participates as an invited expert in ITU meetings on key issues including IPv6 and Internationalized Domain Names (IDNs).

ICANN will continue to participate in the Organization for Economic Co-Development (OECD) as another means for interacting with governments. ICANN is a founding member of the OECD's Internet Technical Advisory Committee (ITAC), which assists the OECD's work on issues such as measuring IPv6 deployment. ICANN has been a key participant on these issues and will continue to participate in discussions.

ICANN Board members are closely involved in working with governments. For instance, both Chris Disspain and Bill Graham have been members of the Internet Governance Forum's Multistakeholder Advisory Group since its formation in 2006.

Finally, ICANN will continue to engage directly with individual governments around the world on a variety of matters related to ICANN's mission and the multistakeholder model.

1.1.1.6 Internet Community

Individual Internet users who participate in the policy development work of ICANN are part of ICANN's "At-Large" community. Currently, about 140 groups, or At-Large Structures, representing the views of individual Internet users are active in approximately 100 countries. ICANN will continue to expand the number of organizations certified as At-Large Structures to bring in more voices from the individual Internet user community. The At-Large Advisory Committee (ALAC) maintains a website, http://www.atlarge.icann.org, with information on how individual Internet users can join and participate in building the future of the global domain name system and other unique identifiers on which every Internet user relies every time they go online. The ALAC is selected from within these regional entities.

Sébastien Bachollet was the first Board member selected by the At-Large community. Mr. Bachollet has been a member of the Internet Society French Chapter since 2001, served on its Board since 2003 and was declared its Honorary President in 2009.

The Internet user community is broad, so ICANN will continue to use a number of approaches to develop and maintain close and constructive working relationships with this community. Primary among these strategies is encouraging membership in the At-Large community through Regional At-Large Organizations (RALOs). These are locally developed communities of Internet

users who have an interest in Internet governance and ICANN activities. ICANN often sees a large contingent of local At-Large participants in our regional meetings.

ICANN will continue to provide technical briefings for the ALAC and At-Large community on topical issues, when requested, such as IPv6 address allocation.

1.1.2 Confidential Information [C.1.4]

ICANN acknowledges and agrees that we will inform the U.S. Government if we have been advised that data submitted in association with the IANA Functions is confidential.

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1.2 Contractor Requirements [L.6; M.8; C.2; E.2]

ICANN reviewed the Contractor Requirements detailed in Request For Proposal (RFP) Section C.2 and we are confident that we can meet or exceed every requirement in the fulfillment of the IANA Functions. The global coordination of the domain name system root and Internet protocol addressing has remained an essential part of ICANN's responsibilities, since our formation in 1998.

1.2.1 Prime Contractor [M.8; C.2.1; E,2; H.1.f]

ICANN has and will continue to perform the required services for this contract as a Prime Contractor, not as an agent or subcontractor. ICANN is incorporated and organized under the laws of the State of California and the United States. ICANN has no parent corporation , is wholly U.S. owned, and will directly perform the primary IANA Functions of the contract within the United States. ICANN is currently headquartered in Marina del Rey, Los Angeles, California. As of June 18, 2012, ICANN's corporate headquarters will be relocated a few miles away within the City and County of Los Angeles, California. The primary IANA Functions will be performed in the Los Angeles area headquarters.

Understanding the Requirement

ICANN fully understands the requirement to perform all requisite services as a Prime Contractor incorporated and located within the United States. ICANN will be the Prime Contractor and will continue to perform the primary IANA Functions within the United States.

Technical Approach

Since 1998, ICANN has performed the IANA functions. We will carry out the required services for this contract as a Prime Contractor, not as an agent or subcontractor. ICANN is a private sector, multistakeholder organization currently entrusted with the operation of the IANA Functions. ICANN's first MoU with the Department of Commerce's National Telecommunications and Information Administration (NTIA) contained provisions governing ICANN's performance of the IANA Functions. Shortly thereafter, ICANN and NTIA executed the first IANA Functions contract. As the only experienced and qualified contractor, ICANN has provided the IANA Functions efficiently and effectively, building trust and confidence among ICANN's many stakeholders.

In September 2009, the DoC and ICANN signed the Affirmation of Commitments (AoC), expressing the Government's support for the multistakeholder, private-sector, bottom-up policy development model for DNS technical coordination that acts for the benefit of global Internet users.

ICANN has affirmed to the Government via the AoC that it will remain a private, non-profit organization headquartered in the United States. Also, ICANN has affirmed it is independent and is not controlled by any one entity. The AoC commits ICANN to reviews performed by the global community. All of these facts are still true and are hereby reaffirmed.

1.2.1.1 ICANN and Subcontracts

ICANN hereby affirms that it will not enter into any subcontracts for the performance of the services or assign or transfer any of its rights or obligations under the resultant contract, without the Government's prior written consent.

1.2.1.2 ICANN Profile

ICANN is formally organized as a non-profit public benefit corporation under the Laws of the State of California. ICANN's mission is to coordinate, at the overall level, the global Internet's systems of unique identifiers and to ensure the stable and secure operation of the Internet's unique identifier systems.

1.2.1.3 ICANN Primary Operations and Systems

At the time of this filing, ICANN's main office is located at 4676 Admiralty Way, Suite 330, Marina del Rey, California, 90292. As of June 18, 2012, ICANN's new main office will be 12025 Waterfront Drive, Suite 300, Los Angeles, California, 90094. Additional U.S. offices are located at 325 Lytton Avenue, Suite 300, Palo Alto, California, 94301 and 1101 New York Avenue NW, Suite 930, Washington, DC, 20005. ICANN also has data centers located in California and Virginia. ICANN has performed the primary IANA Functions within the United States since 1998 and will continue to do so in the future.

1.2.1.4 Contractor and Government Inspections [E.2; H.1.f]

ICANN acknowledges the Government's right to inspect the premises, systems and processes of all security and operational components used for the performance of all contract requirements and obligations. In addition, ICANN will make available at its office at all reasonable times the records, materials and other evidence specified in Solicitation Section H.1 (Audit and Records) for examination, audit or reproduction until three years after final payment under this contract or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation (FAR), or for any longer period required by statute or by other clauses of this contract. If the contract is completely or partially terminated, ICANN will make available the records relating to the work terminated until three years after any resulting final termination settlement. ICANN will make available records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract until such appeals, litigation or claims are finally resolved.

In addition, ICANN will provide and maintain an inspection system acceptable to the Government covering the material, fabricating methods, work, and services under this contract. ICANN will maintain complete records of all inspection work it performs and make these available to the Government during contract performance and for as long afterwards as the contract requires.

If the Government performs inspection or tests on ICANN's premises, ICANN will furnish and require any subcontractors to furnish all reasonable facilities and assistance for the safe and convenient performance of these duties.

ICANN will disclose any corrective ation taken to replace materials and services we have given to the U.S. Government. ICANN will comply with E.2.k when applicable.

1.2.2 Personnel, Material, Equipment, Services, Facilities [M.8; C.2.2]

ICANN has firsthand knowledge of the technical needs and more than a decade of experience in recruiting, staffing and retaining the appropriate personnel, material, equipment, services, and facilities for execution of the IANA Functions. Our current contract demonstrates that we have consistently maintained the appropriate personnel, material, equipment, services, and facilities to perform the IANA Functions, and we will continue to meet these resource requirements in our provision of these Functions. ICANN has and will continue to conduct due diligence in hiring, including full background checks. ICANN will furnish the necessary personnel, material, equipment, services, and facilities to perform the IANA Functions requirements without any cost to the Government. Both the Technical Approach in Section 1 and the Management Approach in Section 2 of this proposal describe in greater detail ICANN's established practices and procedures for ensuring the IANA Functions are well-resourced with personnel, materials, equipment, services, and facilities.

Understanding the Requirement

As the incumbent contractor for the IANA Functions, ICANN fully understands the requirement to furnish all necessary personnel, material, equipment, services, and facilities to perform the IANA Functions without any cost to the Government. As we have in the past and do currently, ICANN will continue to meet this requirement to full customer satisfaction.

Technical Approach

ICANN developed its IANA Functions capabilities to meet current and future operational needs efficiently and effectively. Today, ICANN's IANA Functions department includes 11 staff assigned to IANA Functions under the contract. The processes and procedures and a redundant systems infrastructure is designed to ensure continuation of the IANA Functions in the event of cyber or physical attacks, emergencies or natural disasters. ICANN affirms that it will continue to maintain that functional capability as well as the appropriate personnel, materials, equipment, services, and facilities.

As a division within ICANN, the IANA Functions department draws upon ICANN's organizational resources such as human resources and information technology for specialized expertise in recruiting, staffing, facility management, security, and network connectivity. As new generic top-level domains (gTLDs) are added to the root zone, ICANN will continue to evaluate the number of requests for root zone changes and delegation or redelegation and invest in the IANA Functions infrastructure as needed without cost to the Government. Security is of the utmost importance, and ICANN conducts full background checks on all new hires. ICANN affirms that it will continue to maintain any additional appropriate personnel, materials, equipment, services, and facilities that are required to perform the IANA Functions.

1.2.2.1 Personnel, Material, Equipment, Services, and Facilities at No Cost

As the incumbent, ICANN has in place the necessary personnel, material, equipment, services, and facilities to perform the IANA Functions. Current personnel assigned to the IANA Functions are all located within the United States. Four are assigned to handling approximately 12,400 root zone change requests and PEN/Office of Foreign Assets Control (OFAC) requests per year, and one handles approximately 40 delegation/redelegation requests annually. In the future and

as new gTLDs come online, ICANN will continue to evaluate staff requirements based on volume of requests and the time to process them, as well as the time needed to maintain registries. As part of ongoing efforts to improve efficiency and maintain optimal staffing levels, ICANN management conducts ongoing evaluations of existing resources, processes and tools and forecasts future needs. This ensures ICANN will continue to adapt to any changes in workload volume or deadlines quickly and nimbly. ICANN commits and affirms that it will obtain whatever additional personnel, material, equipment, services, and facilities necessary to perform the IANA Functions.

As stated above, ICANN will furnish the necessary personnel, material, equipment, services, and facilities in order to perform the IANA Functions at no cost to the Government. ICANN describes its project funding strategy and recent financial statements within Volume II of this proposal.

1.2.2.2 Due Diligence in Hiring

ICANN has a professional human resources department that manages recruitment, background screening, hiring, and retention of a sophisticated, highly educated workforce that shares a legally compliant and global point of view. Please see Section 2 Management Approach of this proposal for a detailed discussion of our recruiting and retention plan.

New employees are guided through an "on-boarding process" that provides an introduction to ICANN, orientation to its policies and procedures, enrollment in benefits, and job training. As part of this process, each employee will continue to be required to read and agree to comply with company policies on such topics as Confidentiality, Conflicts of Interest and Disclosure of Outside Business Activities. Each employee working in the United States is and will continue to be required to provide proof of the right to work in this country.

ICANN will continue to perform background checks on individuals at the time of hire. Some countries restrict certain types of specific checks; however, to the extent laws allow, ICANN will continue to check identity (e.g., Social Security Number verification), driver record and criminal records. For individuals who have "bank account access" (i.e., prepare checks, release wires, etc.), ICANN also performs a credit check. ICANN will also continue to conduct reference checks on new hires, including those in management or in positions of confidence or security, contacting prior employers to both verify employment and obtain a subjective evaluation of the individual's performance. For positions requiring a college degree ICANN verifies receipt of a college degree.

Regarding staff who have access to the L-Root, ICANN will continue to perform each of the checks above in accordance with the job type as described above. We will continue to check identity, driver record and criminal records on all, education for those positions requiring a degree, a credit check if the individual has access to bank accounts, and reference checks as appropriate.

1.2.3 Contractor Fees [M.8; C.2.3]

ICANN has operated the IANA Functions without charging a fee to the United States Government since 1998. ICANN's mission is to ensure the stable and secure operations of the Internet's unique identifier systems. To that end, it has for more than 13 years offered the IANA Functions at no charge to the Government or to the users of the IANA Functions. ICANN has

demonstrated with its continuous delivery of the IANA Functions since 1998 its support for the stability and security of the global Internet. ICANN's no cost support of the IANA Functions has served the identified interested parties defined in section 1.3 of this document by providing the underlying infrastructure for a stable Internet. ICANN will provide at no cost to the Government the delivery of the requirements to maintain the root zone, to administer the protocol parameter registries, manage the .ARPA and .INT domains, and allocate the Internet Numbers in a stable and secure way as we have done over many years. ICANN will collaborate with the interested parties by meeting with them in the regularly scheduled meetings hosted by IETF, RIRs, regional TLDs and ICANN. This approach for collaboration has proven effective in building a strong relationship with the interested and affected parties.

Understanding the Requirement

ICANN will not charge the United States Government for the performance of the requirements of the contract. Because ICANN has been performing the IANA Functions since 1998, we have a unique understanding of the associated costs to operate the IANA Functions, an understanding no other contractor possesses. As in the previous contracts with NTIA, ICANN will not charge the U.S. Government or third parties for the services and will not seek to make a profit from offering the services. The costs associated with performing the IANA Functions and developing tools to support the Functions are all borne by ICANN. Please refer to the financial section of Volume II for supporting detail on ICANN's funding strategy; our revenue and our assets that have successfully supported the operation of these services for more than 13 years.

Technical Approach

ICANN describes our technical approach to meeting the requirement below.

1.2.3.1 ICANN Will Not Charge the Government

ICANN will not charge the United States Government for performance of the IANA Functions.

1.2.3.2 ICANN Will Not Charge Fees in First Year

ICANN will not collect fees from the users of the IANA Functions services in the first year. ICANN understands that we are permitted to propose an interim fee for the first year, and we will not exercise that right.

1.2.3.3 Fees Beyond the First Year

ICANN will not establish nor collect fees for any of the years of the contract; neither the first year nor subsequent years.

1.2.3.4 Submission of Proposed Fees

ICANN will not charge fees in the first nor subsequent years of the contract.

1.2.4 Contractor Performance [M.8; C.2.4]

ICANN has been performing the IANA Functions in a stable and secure manner for over 13 years, and we are committed to continuing the accurate and timely execution of the IANA Functions. ICANN will continue to seek feedback from the communities that the IANA Functions serve and will revise processes and procedures that incorporate this input. As ICANN has demonstrated over the preceding years of delivering the IANA Functions, ICANN will continue

to update and improve methods for streamlining the delivery of the service to maintain the stability and security of the Internet's core infrastructure.

ICANN will continue to be open to new technologies and new approaches that increase the stable and secure performance of the IANA Functions. ICANN demonstrated that willingness to deploy new technologies in our collaboration with the Root Zone Maintainer (Verisign) and NTIA in 2010 when the three parties deployed DNSSEC for the root zone.

Understanding the Requirement

ICANN understands the importance of maintaining accurate and timely information in the root zone, the protocol parameter registries, the Internet number allocation records, and the ARPA and INT domains. The maintenance of timely and accurate information is important to the security and stability of the global Internet.

The root zone is at the apex of the Domain Name System (DNS), and the information stored in the root zone file is used by almost all Internet applications. The role of the IANA Functions operator is to maintain and validate the information that is accepted into the root zone is in keeping with the established policies and technical criteria. ICANN has and will continue to provide the expertise necessary to evaluate potential change requests and ensure the integrity of the information that is approved for the root zone.

The technical protocol parameters and ARPA administration provides the technical standards and protocol registries which form the basis for creating products, applications and the core infrastructure of the Internet. ICANN has a proven track record in working closely with the Internet Engineering Task Force (IETF) to administer and maintain these important registries and domains, as documented in the monthly reports published on our website. ICANN will continue to meet the service level agreements documented in the MoU with the IETF for maintenance and administration of the technical protocol parameters and ARPA. We will continue to publish the monthly reports supporting our performance of the Technical Protocol Parameters IANA Function.

The allocation of Internet numbers such as IPv4, IPv6 and Autonomous System numbers are governed by the Global Policies that are defined and adopted by all five Regional Internet Registries and ICANN. These unique identifiers, like the root zone, are fundamental components of a smoothly working Internet. ICANN will continue to work in close collaboration with the Regional Internet Registries to administer the allocation of Internet numbers promptly and efficiently and will report on performance of the IANA Functions.

Technical Approach

ICANN describes our technical approach to meeting this requirement below.

1.2.4.1 ICANN Will Treat Each of the IANA Functions with Equal Priority Promptly and Efficiently

The non-discriminatory procedure that ICANN will use to process requests related to the IANA Functions has been well-tested and refined over the more than 13 years that ICANN has been performing the IANA Functions. All requests for actions related to the IANA Functions will be logged in the IANA Functions' trouble ticket system in the order in which they were received

and automatically sorted by the system into queues. The rules for sorting the incoming requests are based on the subject line of the request. ICANN will review the queues daily to confirm the system has correctly classified the incoming requests (Step 13 of the Trouble Ticketing Process Flow). Individual staff members will be assigned responsibility for handling the tickets in the various queues. ICANN will have weekly meetings to review the ticket queue and the volume and progress of open tickets. It is at the weekly meetings that ICANN will make adjustments in staffing assignments to address queue management. All tickets will be handled on a first come, first served basis. ICANN's experience in performing the IANA Functions has taught us that sorting the tickets by functional area and assigning specific ticket queues to individual staff members is the most efficient way of processing the tickets in a fair and equal way. ICANN will strive to continuously evaluate the best way to process all requests in a timely and efficient way and will enhance the processes to reflect improved techniques for delivering the IANA Functions.

Figure 1.2-1 describes what the steps will be used for receiving IANA Functions requests and treating them with equal priority.

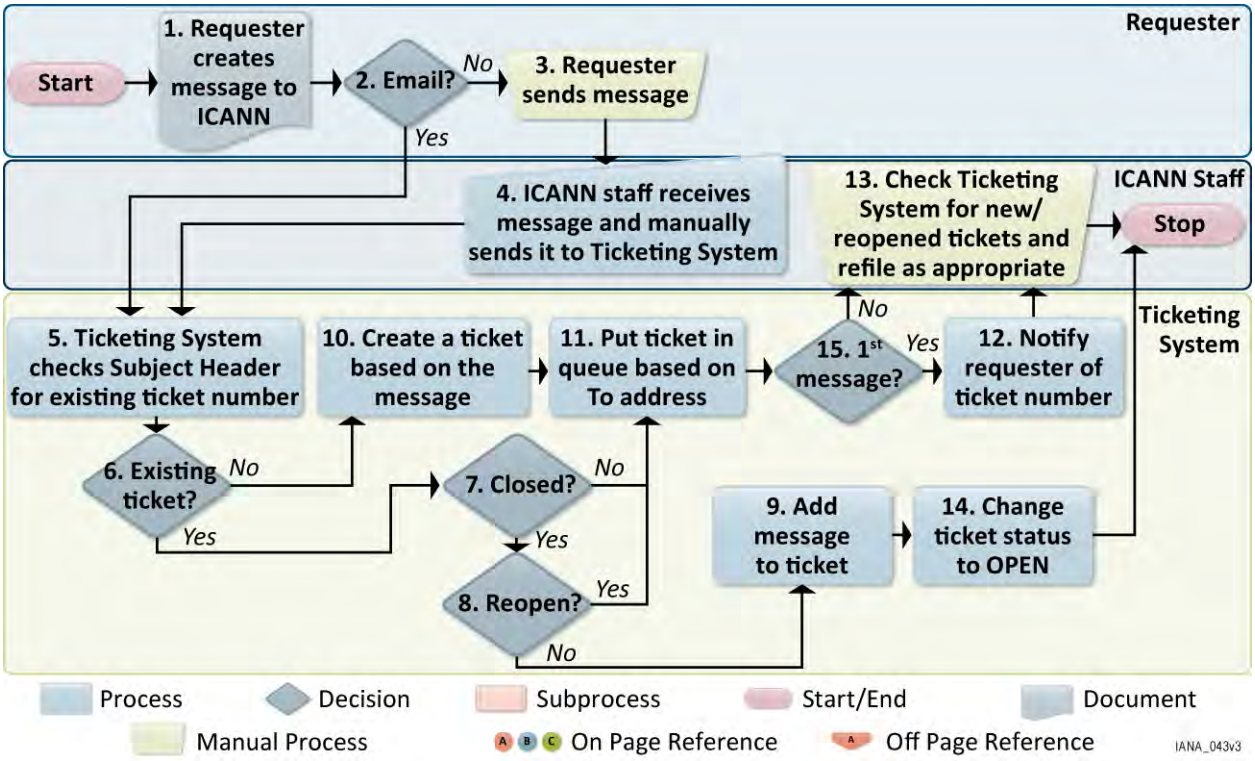


Figure 1.2-1. Process for Treating IANA Functions Requests

ICANN will follow well-defined processes to administer the IANA Functions for a consistent execution of policies and procedures. Adhering to a consistent execution of the defined policies will ensure a stable performance of the IANA Functions.

Below you will find the documented processes that ICANN will use to administer IANA Functions:

- Root Zone Change Requests (important to the integrity and stability of the root zone)
- Autonomous System Number Allocation Process (associated with the Internet Number Function)
- IPv6 Number Allocation Process (associated with the Internet Number Function)
- Root Key Management Process (associated with DNSSEC for the root zone)
- Internet Draft Review Process (associated with the Technical Protocol Parameters function)
- Private Enterprise Number (PEN) New Application Process (associated with the Technical Protocol Parameters function)
- Expert Review Process (associated with the Technical Protocol Parameters function)
- Register New ARPA Domain Process (associated with the Technical Protocol Parameters function)

Recently a Policy for Allocation of IPv4 Addresses Post-Exhaustion has been adopted. Once the community agrees on an implementation plan for the policy, ICANN will define a process to execute the impemenation plan for this new Internet Number policy.

The Root Zone Change Requests Process will include evaluating a change request for eligibility, for compliance with technical criteria and confirming accuracy of information. ICANN will follow this process to ensure the integrity of the information in a stable and consistent manner. See **Figure 1.2-2**.

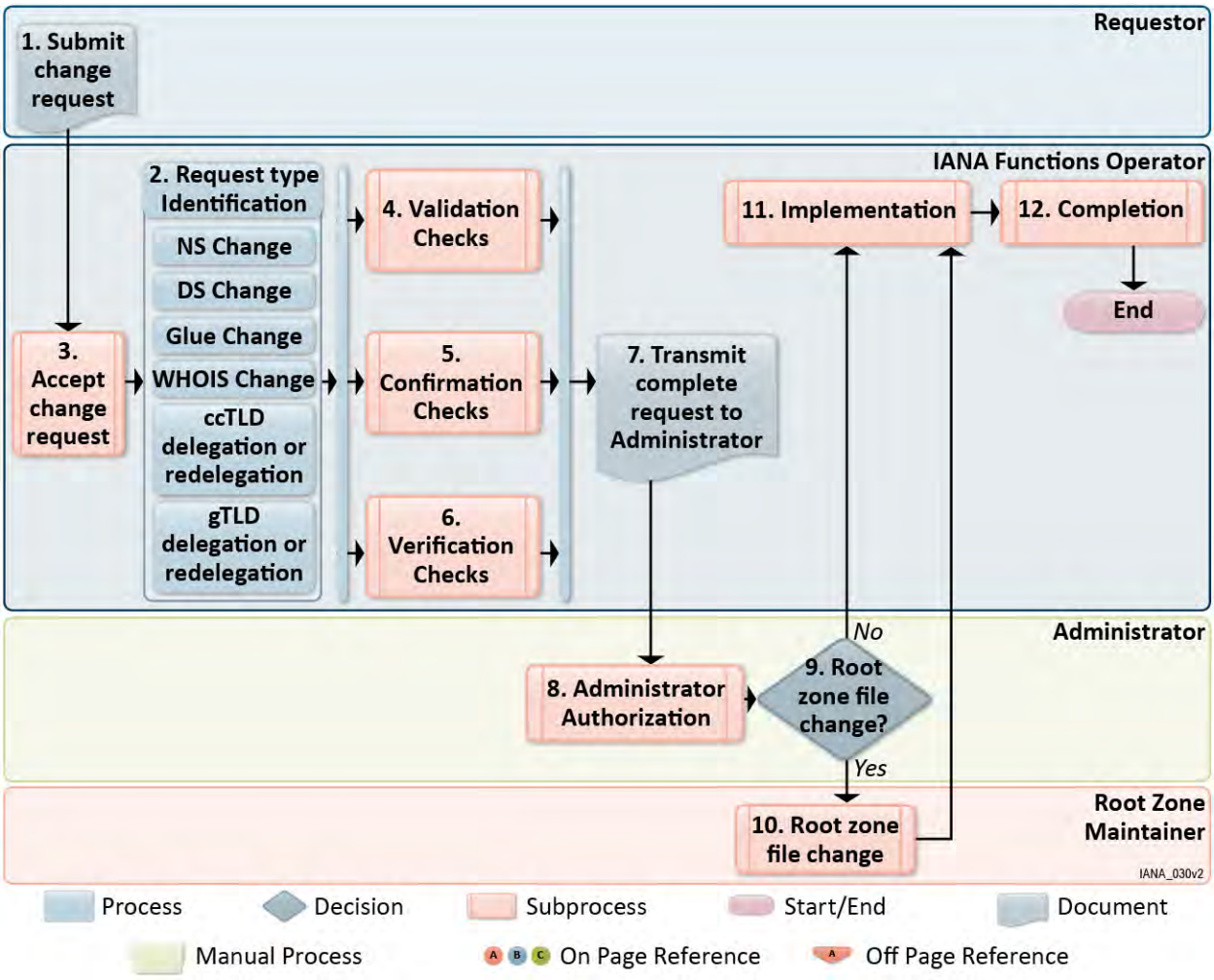


Figure 1.2-2. Root Zone Change Request Process

Autonomous System (AS) Number Allocation Process defines the process that ICANN will follow to allocate AS numbers to the Regional Internet Registries. The process is an implementation of the Global Policy for allocation of AS numbers that was adopted by the five RIRs and ICANN. See **Figure 1.2-3.**

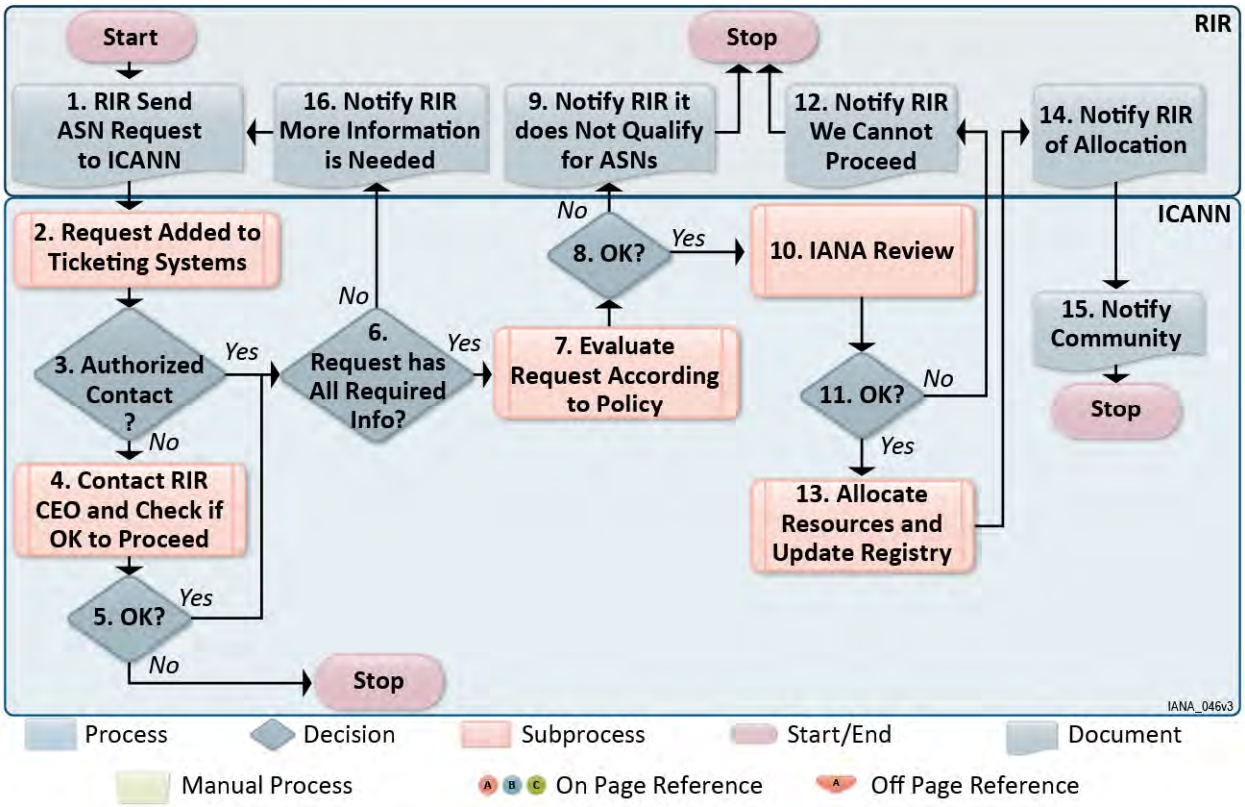


Figure 1.2-3. Autonomous System (AS) Number Allocation Process

The IPv6 Number Allocation Process implements the Global Policy for allocation of IPv6 addresses that was adopted by the five RIRs and ICANN. ICANN will follow this process to allocate IPv6 Addresses in a consistent and stable way. See **Figure 1.2-4.**

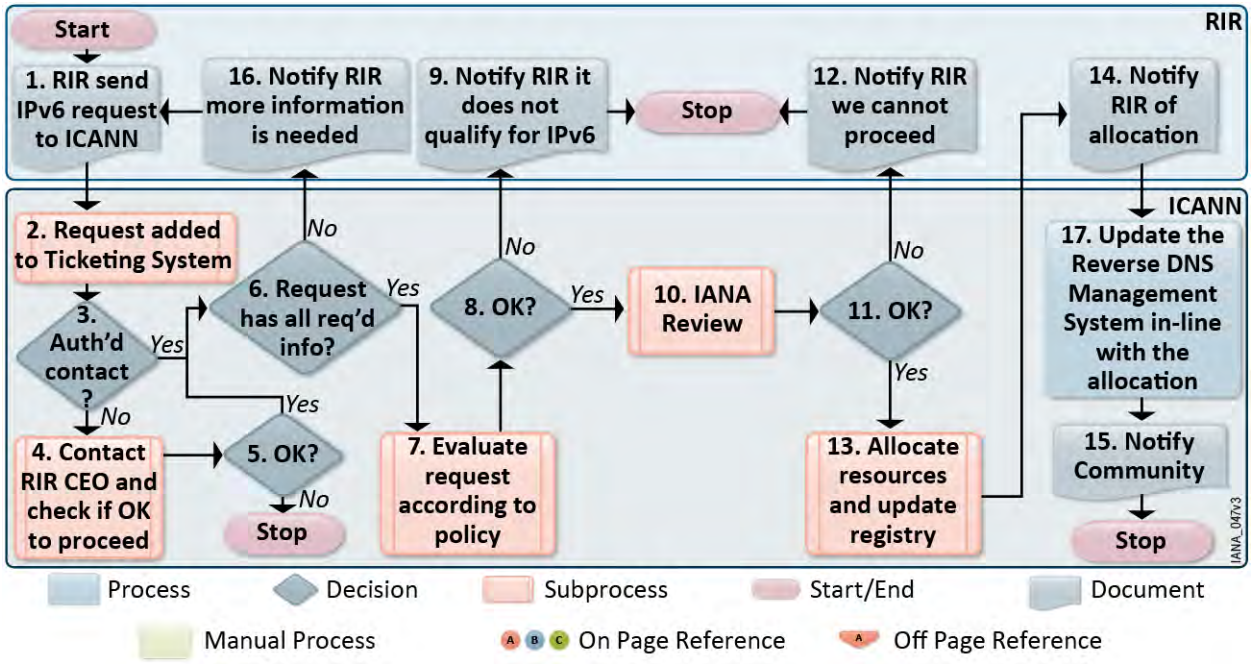


Figure 1.2-4. IPv6 Number Allocation Process

The process for maintaining a secure and stable DNSSEC deployment of the root is defined in the Root Key Management Process. ICANN will follow this process to ensure the integrity of the root key management in a consistent and stable way. See **Figure 1.2-5**. The DNSSEC Key Ceremony Script can be found in **Appendix A**.

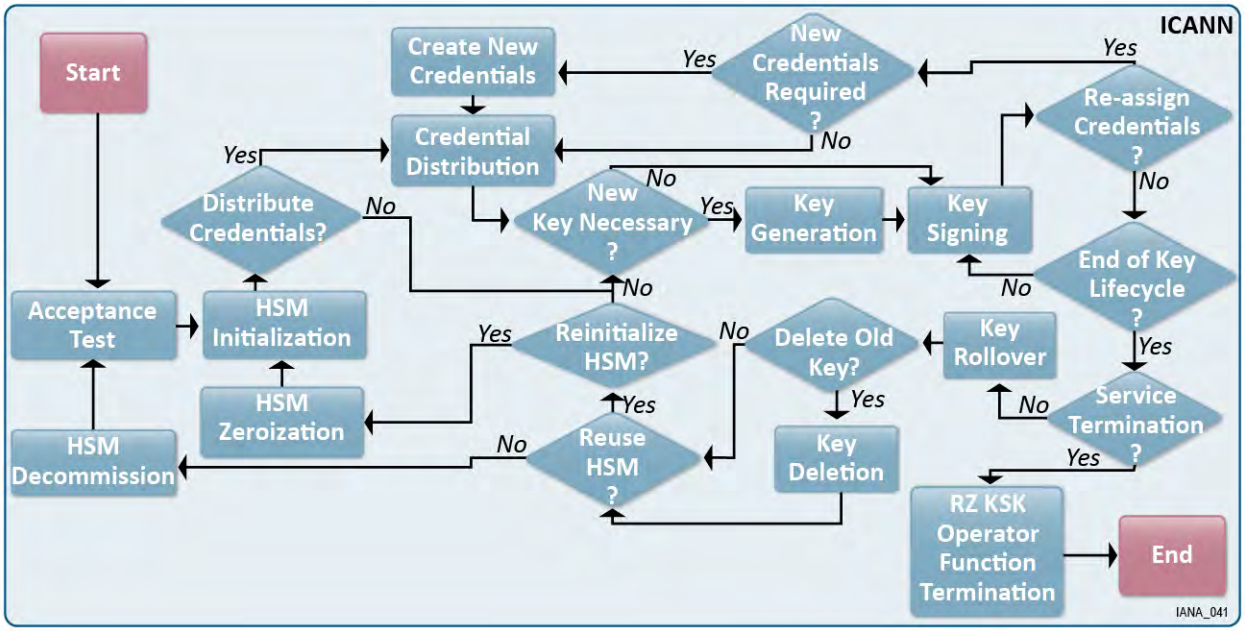


Figure 1.2-5. Root Key Management Process

The Internet Draft Review Process is defined in collaboration with the IETF and is in support of the Technical Protocol Parameters function. ICANN will follow this process in executing the responsibilities for the Technical Protocol Parameters function. See **Figure 1.2-6**.

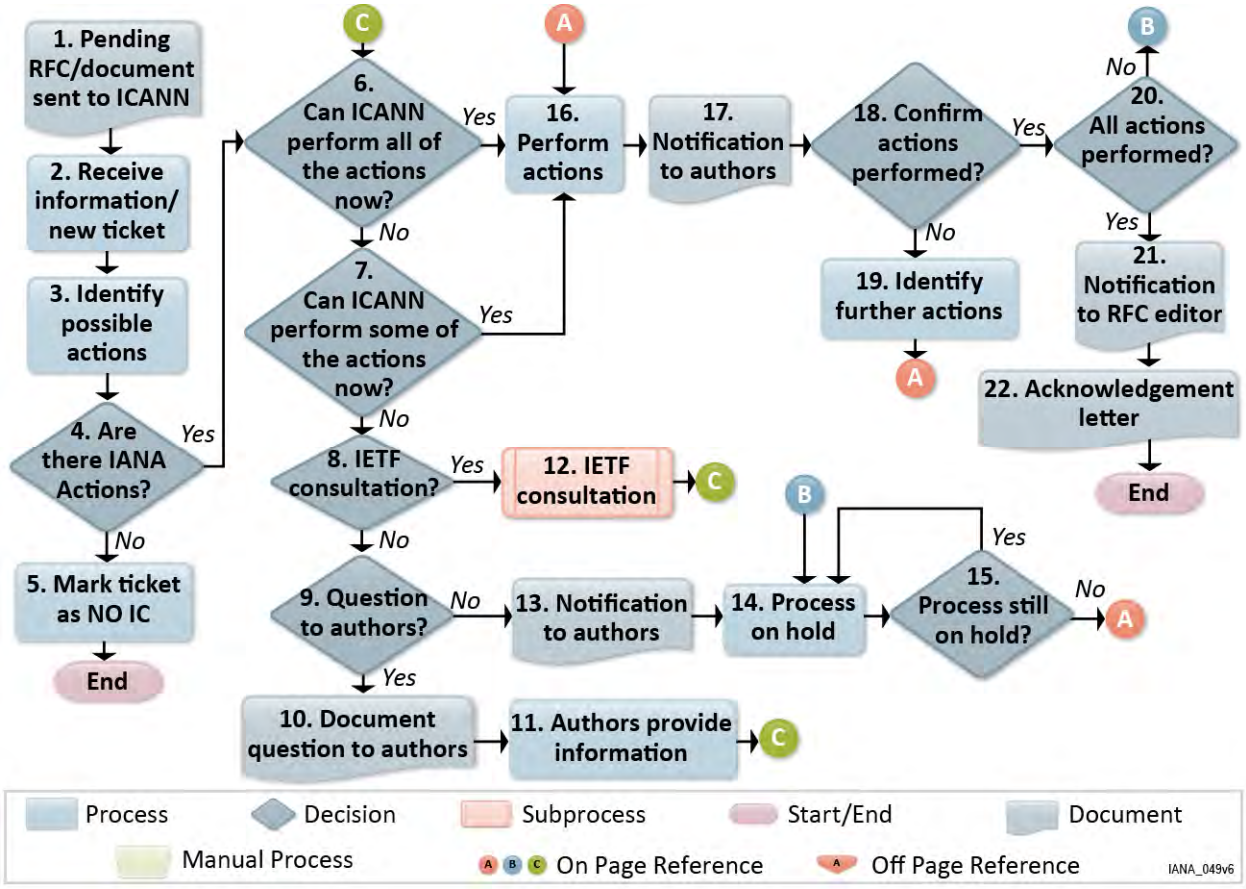


Figure 1.2-6. Internet Draft Review Process

The Private Enterprise Number (PEN) New Application Process is defined in collaboration with the IETF and is in support of the Technical Protocol Parameters function. ICANN will follow this process in executing the responsibilities for the Technical Protocol Parameters function. See **Figure 1.2-7**. The templates for requesting a new PEN or modifying an existing one can be found in **Appendix A**.

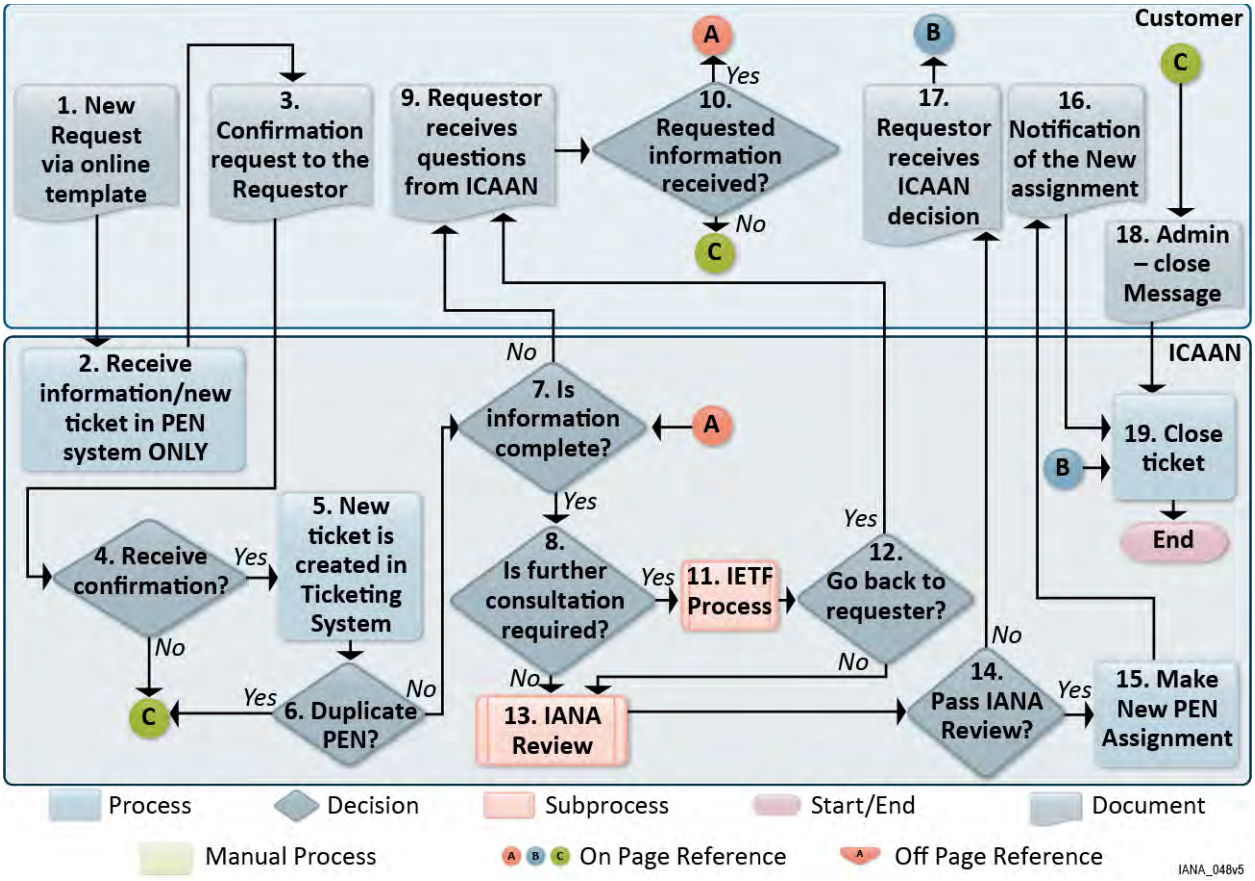


Figure 1.2-7. PEN New Application Process

The Expert Review Process is defined in collaboration with the IETF and is in support of the Technical Protocol Parameters function. ICANN will follow this process in executing the responsibilities for the Technical Protocol Parameters function. See **Figure 1.2-8**.

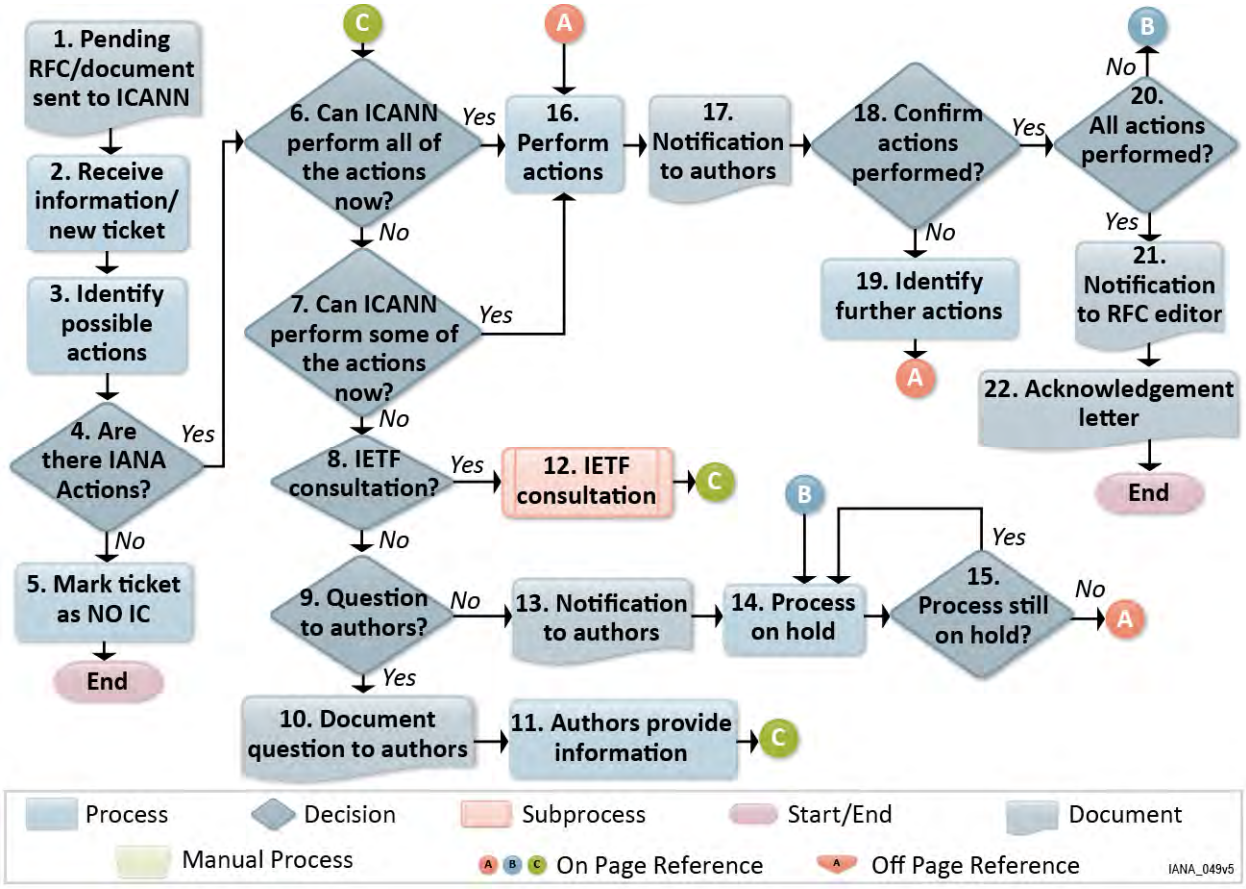


Figure 1.2-8. Expert Review Process

The Register New ARPA Domain Process is defined in collaboration with the IETF and is in support of the Technical Protocol Parameters function. ICANN will follow this process in executing the responsibilities for the Technical Protocol Parameters function. See **Figure 1.2-9**.

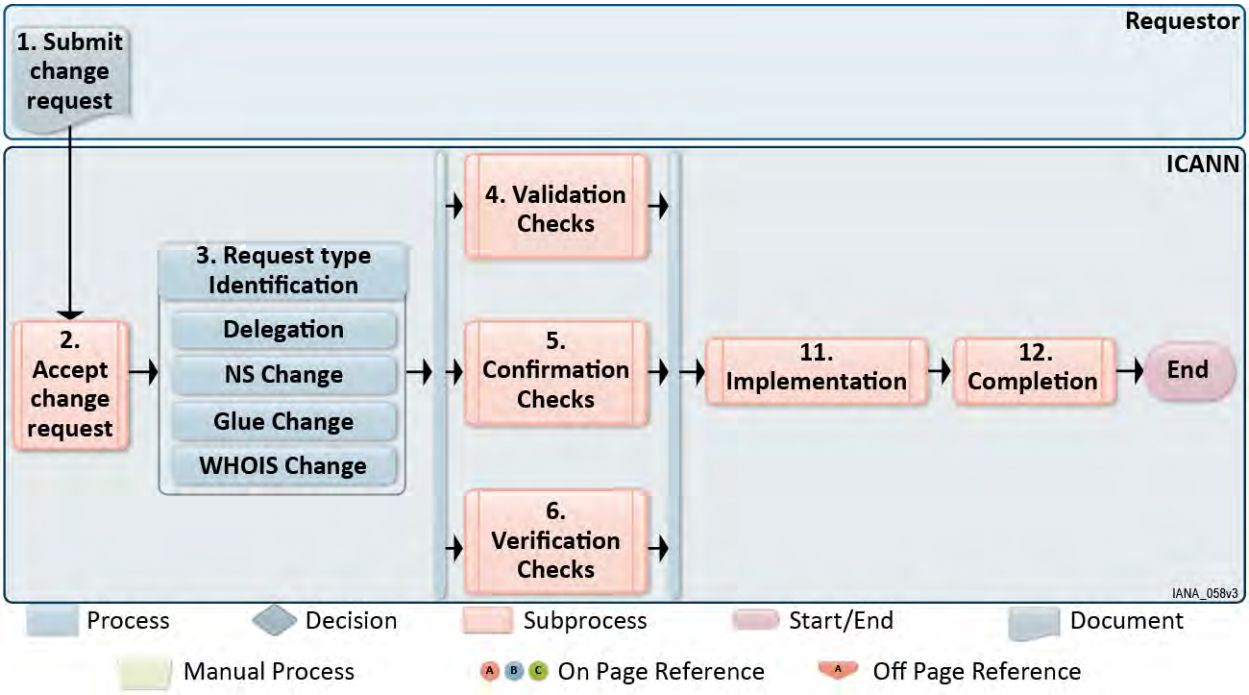


Figure 1.2-9. Register New ARPA Domain Process

ICANN will implement methods to secure communications with relevant parties and secure the integrity of data required to perform the IANA functions. ICANN will follow the documented processes to demonstrate the stable and consistent performance of the IANA Functions.

1.2.5 Separation of Policy Development and Operational Roles [M.8; C.1.3; C.2.5]

ICANN has an established track record of successfully managing IANA Functions while providing relevant information to the various policy bodies in the community to inform their work in developing relevant policy. We have done this while being careful to ensure staff performing IANA Functions are not engaged in initiating, advancing, or promoting any policy development relating to IANA Functions. ICANN will continue to strike this balance by focusing on performance of IANA Functions while providing appropriate support at the request of the policy development community.

A good example of this form of measured collaboration is our work over the last few years on the delegation and redelegation of country-code top-level domains (ccTLDs) within the Country-Code Names Supporting Organization (ccNSO) and the Governmental Advisory Committee (GAC). This collaborative work will conclude with refinements to the implementation of the policy with respect to the processing of ccTLD delegation and redelegation requests. ICANN's IANA Functions staff members have participated in the

community development work by providing expertise on how the current policy has been enacted and implemented, but has not been involved in initiating, advancing, promoting, voting on, or otherwise deciding upon specific proposals for new policies or to alter existing policies. Similarly, staff members have been involved in forums of Regional Internet Registries, the Internet Engineering Task Force, and other Internet Governance forums conveying experience on how existing IANA Functions are performed, in order to better inform policy makers' work.

Throughout ICANN's performance of the IANA Functions, countless RFC standards have been published through the IETF with "IANA Considerations" that prescribe how ICANN, in performing the IANA Functions, must conduct the ongoing operation of specific registries. In these cases, the IESG has communicated with ICANN to identify practical considerations concerning the proposed policy implementations. These consultations have resulted in timely and implementable policy directives that govern the IANA Functions' operations.

Understanding the Requirement

ICANN recognizes that central to the IANA Functions is the neutral execution of a set of agreed policies that have been developed by the multistakeholder community. These policies include those that are developed within the ICANN policy development processes, such as those developed within the Generic Names Supporting Organisation (GNSO) and the Country Code Names Supporting Organisation (ccNSO), and ratified by the ICANN Board of Directors. They also include addressing policies developed through the Regional Internet Registry (RIR) communities, and the various requirements of Internet Protocols published in technical specifications originating through the Internet Engineering Task Force.

ICANN recognizes that core to the IANA Functions is executing against these various established policies that are developed by relevant communities. In order to be trusted in neutrally executing against the policies, it will be be inappropriate for IANA Functions staff to be simultaneously generating the policy that we will implement and under which we will operate.

While this is clear, the multistakeholder community also recognizes the value of leveraging the expertise and experience that rests within the IANA Functions staff to help inform ongoing policy work. Experience has shown that ICANN staff members have played important informational roles in the working groups that lead to policy development within ICANN. ICANN's IANA Functions staff members are uniquely placed to share expertise in how the IANA Functions have been performed on behalf of the multistakeholder community. This transparent sharing of information allows for interested and affected parties to be well informed when developing policy. Without this feedback into the process, there is a risk the community will develop policy that cannot be properly implemented due to the lack of understanding of the practical implications on how the IANA Functions will be executed. ICANN will work to ensure the process avoids these unintended consequences.

Technical Approach

ICANN will continue to maintain a clear separation between policy development and operational roles. ICANN staff involved in the IANA Functions will be trained to be fully aware of the limitations on their involvement. Such staff members will be counseled to refer items

where the nature of staff participation is unclear to the IANA Functional Liaisons or IANA Functions Program Manager for review before participation.

Importantly, ICANN staff performing IANA Functions will continue to have no role on the ICANN Board of Directors — whose role is to ratify policy proposals for many of the IANA Functions — and no role on any of the councils that develop and vote on policy within the ICANN framework (i.e., the GNSO, CCNSO, ASO, etc.). Any roles for the IANA staff in bodies that develop policy will be either clearly in an advisory capacity — acting as subject matter experts conveying their experience — or relate to operations-level communication separate from policy development.

1.2.5.1 Ensuring staff will not initiate, advance, or advocate policy

To ensure that staff will not initate, advance, or advocate policy, ICANN will adopt policies in its employee handbook and train IANA Functions staff that no IANA Functions staff may participate in any policy development work related to the IANA Functions. In the event that a request for staff participation may violate the separation requirement, ICANN will consult with NTIA to obtain a determination on whether staff shall participate, and on what basis. IANA Functions staff that violate these policies will be subject to sanctions, up to and including termination.

1.2.5.2 Responding to requests for information from interested and affected parties

In the ordinary course of business, ICANN will respond to enquiries relating to how IANA Functions are performed. This includes requests from interested and affected parties asking what the procedures are for certain aspects of the IANA Functions, and answering questions relating to how certain aspects of the Functions operate.

ICANN will track all requests for information through a tracking system when they are lodged through ICANN's advertised methods of communication (such as through the established email addresses for the various functions). The tracking system will lodge the entire history of the request, including all communications that occur and the precise timestamps when they occur.

Upon receipt of a request, staff managing the appropriate request queue in the ticketing system will review its particulars. Once identified as a request for information from an interested and affected party, it will be assigned in the ticketing system to the relevant Subject Matter Expert for a response.

The ticketing system will generate regular internal reports, and will form the basis for weekly meetings within the IANA Functions staff. At these meetings, staff will review all outstanding requests and ensure all such requests have received a response or have an appropriate path to timely resolution. A key metric that is and will be used by ICANN is the amount of time that has elapsed since there has been activity on the request. Requests that have not had progress within the prior business week will be escalated for discussion to ensure any impediments to their timely resolution will be indentified and ameliorated.

The ICANN Board also has a standing Board IANA Committee that will review at a high level IANA Functions staff participation in a variety of forums. Issues that warrant consideration by ICANN's Board will be escalated to this committee for review.

1.2.5.3 Requesting guidance or clarification from interested and affected parties

In executing IANA Functions policies and procedures, staff members who encounter issues in implementing policies that are not adequately covered in existing documentation will refer the issue to the IANA Functional Liaison as the subject matter expert. This expert will be responsible for evaluating the issue to identify if guidance or clarification on the policies or procedures may be required from interested and affected parties.

In the event it is deemed that external clarification will be required from interested and affected parties, the IANA Functional Liaison will coordinate with the IANA Functions Program Manager to develop a plan to request the necessary guidance or clarification. Where possible, existing channels for communication with relevant interested and affected parties will be used. The IANA Functions Program Manager will also communicate the issue to the Contracting Officer's Representative.

1.2.6 Transparency and Accountability [M.8; C.1.3; C.2.6]

Developing and sharing user instructions for each IANA Function is essential to developing trust with the community regarding how IANA Functions are performed, and aids in the constructive review of policies that govern the Functions. During the term of the current contract, ICANN developed drafts on an increased range of user documentation related to IANA Functions. ICANN looks forward to the publication of these drafts for community review, and the opportunity to work with interested and affected parties in developing and publishing such documentation under the terms of the new contract.

An illustration of ICANN's accomplishments in thoroughly detailing ICANN's methods of operation is the work that has gone into the management of the Root Zone Key Signing Key. Documentation of these processes is provided as comprehensive documentation on how the processes will be conducted. This documentation is augmented by comprehensive audit materials that are posted afterward, including archival documentation, video, and audio that allow for later scrutiny.

Understanding the Requirement

ICANN knows that transparency of the IANA Functions is foundational to the successful and credible operation of the Functions. Community confidence that the IANA Functions are being executed in a correct and accountable way is key to meeting the needs of the interested and affected stakeholders. ICANN will live up to its commitments to transparency and accountability by sharing clear documentation on the procedures and processes used for executing the IANA Functions. Such information will allow interested and affected parties to become fully informed about the performance of the Functions, which in turn will enable them to evaluate ICANN's performance. The accessible information will help in the community's future work on policy development, and will also help in the day-to-day performance of the IANA Functions. The absence of clear user documentation can lead to confusion with respect to how requests will be processed and what information is required. Availability of complete user documentation will allow for critical analysis on the suitability of the various requirements of the existing processes, including relevant technical requirements.

ICANN will enhance its documentation with input from the relevant stakeholders and will strive to improve customer satisfaction. Currently, a customer may not be aware how a process is conducted when ICANN informs them of a defect in a particular request. These defects are typically resolved after various back-and-forth communications with the applicant. The delay resulting from the time taken to explain the various requirements reduces customer satisfaction and introduces additional costs for all of the parties. Having complete, accessible, and up-to-date documentation readily available will reduce such problems.

Technical Approach

ICANN describes our technical approach to meeting this requirement below.

1.2.6.1 Developing user instructions

ICANN will review all of the various services provided in connection with this contract and, based on the existing corpus of both documentation and procedural descriptions, will define a complete list of operational procedures for which user documentation should be published.

ICANN will then develop user instructions for each identified item, including any technical requirements associated with specific procedures, based on existing operational procedures. Much of this documentation is already developed, and some is already published on ICANN's IANA website. For example, the technical requirements for authoritative name servers — used in evaluating changes to the DNS Root Zone and for .INT domain registrations — are posted online after consultative development with the affected community.

ICANN's goal in developing user instructions will be to make the documentation as clear as possible, reducing the risk that procedures are not communicated in an easy to understand fashion. While much of the work of ICANN is highly technical and necessarily involves conveying complex technical concepts, ICANN will seek to make the descriptions as easy to understand as possible without sacrificing technical accuracy. ICANN recognizes many of the users of the IANA Functions are not technically-minded, and also come from countries where English is not the primary language. We will therefore develop documents that consider this wide range of potential readers.

ICANN will post this documentation, clearly marked as draft, and solicit input from interested and affected parties. The primary mechanism to solicit feedback will be ICANN's own institutional mechanism for conducting public comment periods. ICANN regularly employs this process to review most aspects of our operation including draft policy changes, and it is well suited for reviewing the draft IANA documentation. Once posted, the availability of the documentation for review will be posted via ICANN's standard communication channels by posting a notice on ICANN's IANA website, and notifying others in the user community through presentations given by ICANN at conferences.

During this process, it will be clearly noted that the goal is not to alter the policies upon which the procedures are based, but rather to solicit feedback on making the documentation as clear and as useful as possible. It would not be appropriate to alter procedures based on community feedback as a mechanism of altering the underlying policy.

Following this review process, ICANN will then appropriately revise the draft documentation and ready it for ultimate publication. ICANN will share this revised documentation with NTIA prior to general publication. Please see timeline in **Figure 1.2-10**.

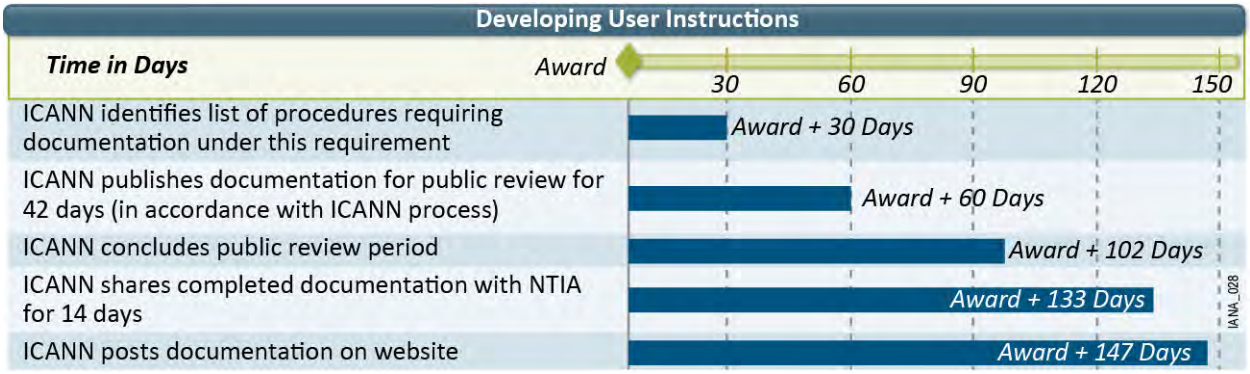


Figure 1.2-10. Timeline for Developing User Instructions

ICANN's timeline will meet the requirement that the process be concluded within six months of the date of contract award. The specific milestones within the timeline may be modified by the scheduling of events such as ICANN, IGF and other Internet Governance meetings. It is important that considered review of these documents is conducted by the community of interested and affected parties, and they have a meaningful opportunity to review these documents. Therefore, this timeline may be altered slightly to properly provide adequate time for consideration while not conflicting with these other commitments. The timeline leaves enough additional time to accommodate any such changes and unexpected contingencies, while still adhering to the requirement that the process be concluded within six months of the date of award. ICANN will consult with NTIA on any such revisions.

1.2.6.2 Posting on a website

Following the development of user instructions in accordance with Section 1.2.6.1, and approval by the COR, ICANN will post the procedures on ICANN's IANA website, the primary website on which ICANN maintains information relevant to IANA Functions. These procedures will be hyperlinked from the relevant focus areas for individual functions, which will make them easy to identify and find for those interested in a particular topic.

As described in Section 1.2.6.1, ICANN anticipates posting will occur approximately 148 days after award. While this is subject to change to ensure maximum input from the community, ICANN will post the documentation within six months of the date of award.

1.2.6.3 Collaboration with Stakeholders

As described in Section 1.2.6.1, ICANN's approach to developing user instructions is focused on public review using ICANN's public comment process. The review process involves collaboration with the various stakeholders identified in C.1.3. This review will assist in developing user instructions that best suit the needs of these parties.

1.2.7 Responsibility and Respect for Stakeholders [M.8; C.1.3; C.2.7]

ICANN is well placed to work with the community on identifying the source of the policy and procedures used in executing the IANA Functions. ICANN has historically sought review by interested and affected parties for material changes to the IANA Functions' operational procedures. As the operator of the IANA Functions for over 13 years, ICANN has accumulated significant experience in performing the current operational processes.

Through the years, ICANN has worked with the community to refine implementation guidance, providing explanations of historical contexts and other factors that have resulted in the IANA operational environment. ICANN's experience in this area has facilitated informed review by the interested and affected parties in the community.

Understanding the Requirement

Much of the policy that defines much of ICANN's performance of the IANA Functions is documented in technical standards documents published by the Internet Engineering Task Force (IETF) known as "Request for Comments" (RFCs). Today, ICANN already publishes a tabular index of the hundreds of registries it maintains and references the relevant RFCs that are the determinants of the policies and procedures that govern each specific registry. In 2010, ICANN concluded a complete audit of over 4,000 RFCs to ensure accurate implementation of the procedures contained within.

For the Root Zone Management function, the history is complex, and a process will need to be developed that is careful to consider this history. ICANN's ccNSO and GAC have been grappling to identify much of this work, and this work continues after over three years of intensive discussion.

Those who have performed the IANA Functions have a long history of publishing updated operational practices as circumstances have evolved. In 1984, the then IANA Functions staff at the University of Southern California published RFC 920, which documented the structure of the root zone and its operational practices. In 1994, this was revised and published as RFC 1591. In 1997, IANA Functions staff published the first in a series of "ccTLD Memos" providing further clarification on how operational practices had evolved. In 1999, the IANA Functions staff again updated the documentation to reflect contemporary practices and published it as Internet Coordiantion Policy (ICP)-1. None of these documents is considered to be definitive descriptions of the current policies and procedures that are applicable today, but they represent an evolution of the processes over time. They will act as important input into the review processes to be developed.

ICANN recognizes that certain issues may be more complex and necessitate more dialogue or multiple rounds of iteration. For changes relating to stewardship of the Protocol Parameter Registries, ICANN recognizes that the community of interested and affected parties already has in-place mechanisms for reaching consensus on how the registries should be maintained. These mechanisms are the product of the IETF, and ICANN implements the registries in accordance to guidance from the IESG.

Technical Approach

ICANN understands that the scope of work in connection with this requirement will involve multiple aspects. It will involve developing an approach to documenting the existing practices as they are in practice today, as well as developing an approach for how future changes to policy will be reflected in updates to the IANA Functions processes and procedures.

ICANN will leverage its extensive network of community members and relationships, as well as its unique knowledge of the history that lead to the current procedures, to develop an appropriate process by which all parties will follow to develop an agreeable process. The process is described in detail below.

1.2.7.1 Developing Processes for Documenting the Source of Policies and How They Are Applied

In conjunction with the work to be performed as described in 1.2.6.1, ICANN will use its historical understanding of the evolution of the IANA Functions procedures to document the policies that have informed the various procedures and identify them for each process. We will then develop a draft discussion paper that describes the scope of the policies and procedures for which documentation needs to be produced under this requirement.

ICANN will then post the discussion paper and solicit input from interested and affected parties on what the appropriate process(es) by which the identified procedures should be reviewed and documented in a way that satisfied the requirements of C.2.6. The primary mechanism to solicit feedback on the discussion paper will be ICANN's own institutional mechanism for conducting public review. ICANN regularly engages this process to review most aspects of its operation, including draft policy changes, and is well suited for reviewing the draft IANA documentation. The discussion paper will be available for review and posted via ICANN's standard communication channels, including a notice on ICANN's IANA website. We will notify other members of the user community through presentations given by ICANN at conferences and various events.

During this process, it will be clearly noted that the goal is not to alter the policies upon which the procedures are based, but rather to solicit feedback on what the community recommends as the appropriate process for documenting the source of the policies and procedures and how ICANN will apply the relevant policies and procedures for the corresponding IANA Function.

Following this review process, ICANN will then appropriately revise the draft documentation and ready it for ultimate publication. ICANN will share this revised documentation with NTIA prior to general publication.

Finally, on the basis of the agreed procedures for documenting the source of the policy and procedures and how they will be applied, ICANN will undertake a new effort in conjunction with NTIA to develop a timeline for executing the procedures. How this will be conducted can only be determined once the community has agreed on the relevant approaches and timelines. See timeline in **Figure 1.2-11**.

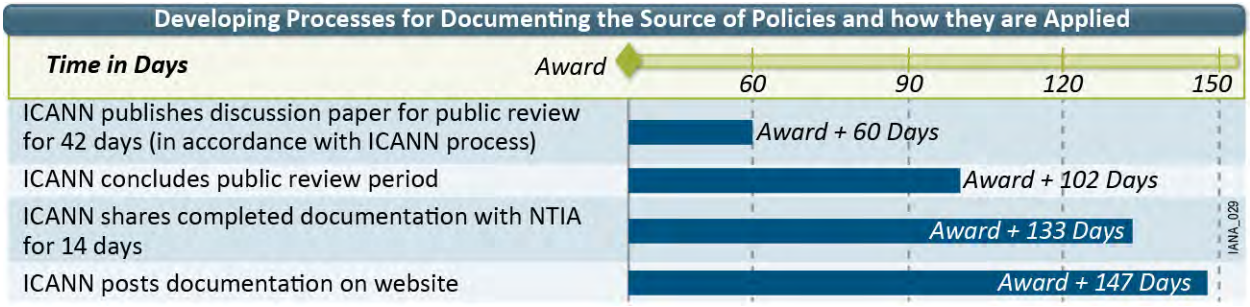


Figure 1.2-11. Timeline for Developing Processes for Documenting the Source of Policies and How Applied

It is important that the community of interested and affected parties conduct a review of these documents. Their availability is often dictated by the timing of significant Internet Governance related events (such as ICANN meetings, IGF meetings, etc.). Therefore, this timeline may be adapted slightly to provide adequate time for consideration while not conflicting with these meetings. The proposed timeline will leave enough additional time to accommodate any such changes, while still adhering to the requirement that the process be concluded within six months of the date of award. ICANN will consult with NTIA on any such adaptions to ensure full concurrence with the final timeline based on the ultimate date of award.

1.2.7.2 Posting Processes on a Website

ICANN will produce a proposal for NTIA at the conclusion of the consultation process planned with the interested and affected parties listed above for each of the IANA Functions. Upon acceptance by NTIA, ICANN will publish the document on the *www.iana.org* website in a section dedicated to processes. ICANN will publish the accepted document within a week of NTIA's notification that it has been accepted. ICANN will notify the interested and affected parties that the document has been published using its established links with each of the key stakeholders. These links include dedicated private mailing lists for announcements and discussions and regularly scheduled meetings.

1.2.7.3 Post via Website

Following the development of the processes and procedures in accordance with 1.2.7.1 and 1.2.7.2 and after receiving required approvals from the COR, ICANN will post the procedures on ICANN's IANA website, the primary website on which ICANN maintains information relevant to the IANA Functions.

1.2.7.4 Collaboration with Stakeholders

ICANN will collaborate closely with each of the relevant stakeholder groups to develop a process for documenting the source the policies and procedures ICANN will implement for each of the IANA Functions. ICANN will make sure that the stakeholder will be able to contribute text and comment on drafts prior to seeking approval and publishing the documentation, which will explain how ICANN will apply the relevant policies and procedures for each IANA Function.

1.2.8 Performance Standards [M.8; C.1.3; C.2.8; C.2.9]

ICANN has engaged in a multi-year Business Excellence activity based on the globally recognized EFQM model, which is widely used in Europe, the Middle East and Africa. The EFQM model is structurally similar to the U.S. Baldrige Award and the Japanese Deming Prize models. It is focused on providing systematic, sustainable, continuous improvement, and ICANN has brought this analysis to its delivery of the IANA Functions since 2009. In 2011, ICANN conducted a thorough review of our business processes and documented Key Performance Indicators (KPIs) for our most important core processes. For each KPI, ICANN identified measurements and set internal performance targets. ICANN will use these KPIs and internal performance targets as the starting point for discussions with the interested and affected parties.

Understanding the Requirement

ICANN understands that within six months of the award, we must develop performance standards for each of the IANA Functions in collaboration with the interested and affected parties for each of those functions. ICANN further understands that the agreed performance standards must be posted on ICANN's IANA website. ICANN understands that the interested and affected parties include the ICANN Supporting Organizations; the IETF community, including the IAB; the RIRs; TLD operators; governments; and the Internet user community. ICANN understands that this offer must include a detailed narrative of how we intend to work with the interested and affected parties to develop the required performance standards.

Technical Approach

ICANN has established processes for proposing documents, discussing them with key stakeholders and then publicly reviewing them before reaching a final version. ICANN will use these established processes, in the manner described below, to work with the interested and affected parties for each of the IANA Functions to develop performance standards.

ICANN will work with the key stakeholder group for each IANA Function when developing performance standards. ICANN has identified the key stakeholder groups, the interested and affected parties:

- **ccTLDs** – the ccNSO (an ICANN Supporting Organization) and regional ccTLD operator groups, including but not limited to CENTR, Latin American and Carribean TLD Association (LACTLD) and African Top Level Domain (AfTLD); Verisign, the root zone maintainer; ICANN's Government Advistory Committee; and NTIA.
- **gTLDs** – the GNSO (an ICANN Supporting Organization); Verisign, the root zone maintainer; ICANN management, which is responsible for the contractual relationship with gTLD operators; and NTIA.
- **IP address allocation** – the RIRs, who participate in ICANN as the Address Supporting Organization (ASO), for unicast address allocations, and the IETF, including the IESG and IAB, for special address allocations that includes multicast address space.
- **Protocol Parameter management, including management of .ARPA** – the IETF, including the IESG and IAB. ccTLD operators, gTLD operators and the RIRs all have staff who participate in the IETF.
- **.INT management** – ICANN's Government Advisory Council and NTIA.

Performance standards for each distinct function will be discussed with the interested and affected parties that use the service.

ICANN already has established relationship with all these organizations. The ICANN Supporting Organizations and Advisory Committees are part of ICANN's participatory and decision making structure and ICANN management engages with them on a regular basis via mailing lists, telephone calls and face-to-face at ICANN and other meetings. ICANN management also engages with Supporting Organizations on joint projects. An ongoing example is the IDN Variant project, which has involved participants from the ccNSO and the GNSO as well as ICANN. In addition, ICANN has a positive relationship with the IETF, which is formalized in an MoU and involves ICANN providing a Liaison to the IESG, currently Michelle Cotton.

1.2.8.1 Develop Performance Standards for SOW C.2.9

ICANN's proposal for developing performance standards in collaboration with the interested and affected parties is described below in points i–viii.

i. Develop Performance Standards for SOW C.2.9.1 – Coordinate Assignment of Technical Protocol Parameters

ICANN has an excellent relationship with the IETF community, which is the principal interested and affected party for protocol parameters management. ICANN entered into a Service Level Agreement (SLA) with the IETF Administrative Support Activity (IASA) in January 2007. It supplements the Memorandum of Understanding (MoU) between the IETF and ICANN concerning the technical work of the IANA Functions, dated March 1, 2000, which was published as RFC 2860 in June 2000. ICANN and IETF Administrative Oversight Committee (IAOC) cooperatively review and revise the SLA's targets every year in a process that involves all interested and affected parties. The most recent update was signed in May 2012. ICANN will continue this annual process. The current SLA can be found on the ICANN website, and the monthly performance reports ICANN produces for the IETF community are published on ICANN's IANA website.

ICANN and the interested and affected parties associated with protocol parameter management, IETF and IAB, have publicly discussed and agreed to a set of performance standards for the Coordination of the Assignment Of Technical Protocol Parameters. The performance standards and public reporting of ICANN's fulfillment of its service level commitment have been in place for five years and are updated every year. ICANN will continue to refine the performance metrics and SLAs for the administration of the technical protocol parameters in consultation with the organizations, the IETF and IAB, responsible for creating Internet standards.

In addition to publishing monthly performance reports on ICANN's IANA website, ICANN's performance reports have regularly been presented in the plenary session of IETF meetings by the IETF Chair, thereby offering an opportunity for the technical community to ask questions and comment on ICANN's performance of this IANA Function. These meetings are shown via webcast and use remote participation technologies, such as audio and video streaming and Jabber instant messaging, for those unable to join onsite. ICANN provides support to the interested and affected parties associated with protocol parameter management, who engage in public discussion of the performance standards for the Coordination of the Assignment Of Technical Protocol Parameters in public email lists. This support is principally in the form of data.

Given the existence of a defined set of SLAs with the interested and affected parties (IETF and IAB), ICANN will schedule a meeting with the COR within 30 days of the contract award to present and discuss the existing protocol parameter function. After this initial meeting, ICANN will schedule a follow-up meeting 30 days later to include representatives from the IETF and IAB to continue the conversation about performance metrics in delivering the service. Assuming the COR is satisfied with the consultation and cooperative working relationship with the relevant parties, the next step will be to request acceptance of the report format by the COR and to publish the reports. ICANN will establish performance standards with the agreement of the relevant parties and publish them within six months of the award. See **Figure 1.2-12a**.

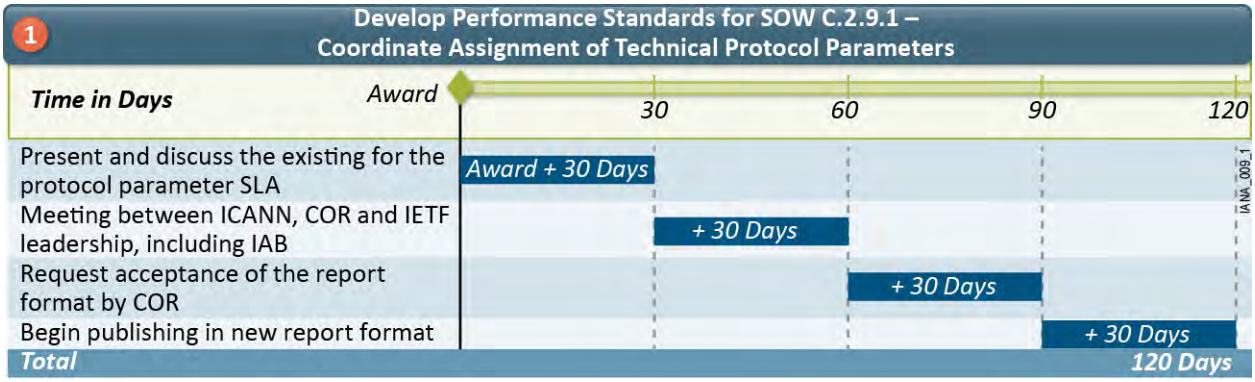


Figure 1.2-12a. Timeline

ii. Perform Administrative Functions Associated with Root Zone Management, Root Zone File Change Request Management, Root Zone "WHOIS" Change Request and Database Management, and Root Zone Automation

ICANN will consult the ccNSO (the ICANN Supporting Organization for ccTLDs), the GNSO (the ICANN Supporting Organization for gTLDs), the Root Zone Maintainer (currently Verisign), and the COR regarding appropriate performance standards. ICANN will share the data it has collected for the following:

- IANA Timeliness
- IANA Accuracy
- IANA Process Quality
- IANA Transparency
- IANA Reporting

Along with the measurements and internal targets for these Key Perfomance Indicators (KPIs), ICANN will use these data and goals as a starting point for discussion.

In order to fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe® Connect™. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting, which will demonstrate our fulfillment of that service level commitment within six months of the award. See **Figure 1.2-12b.**

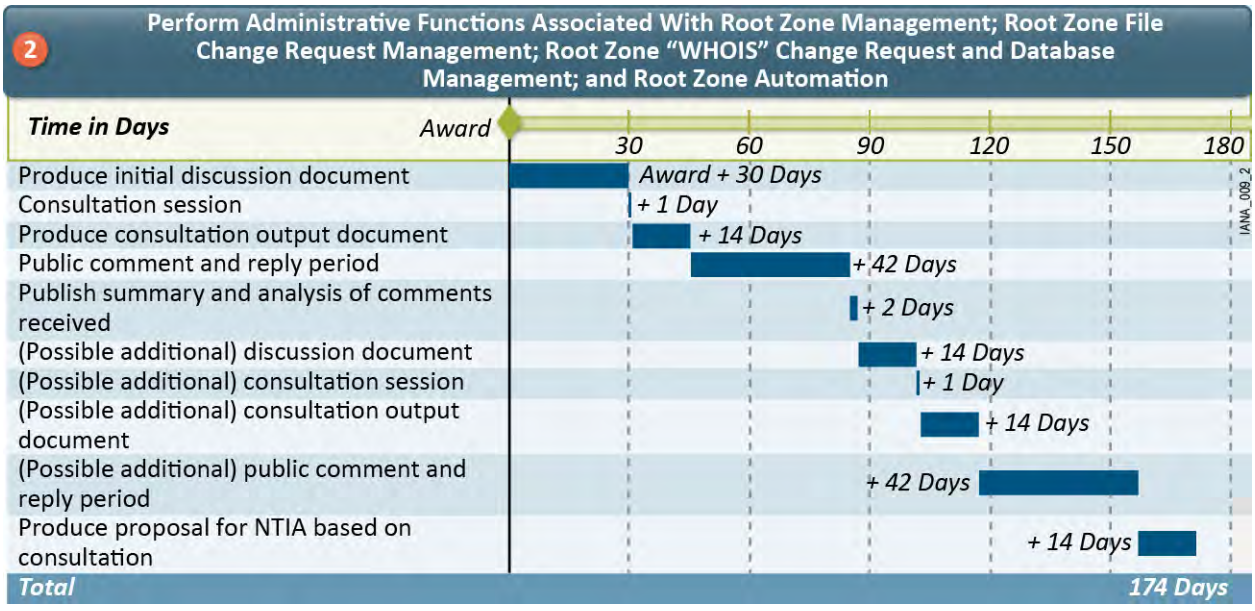


Figure 1.2-12b. Timeline

iii. Delegation and Redelegation of a Country Code Top Level-Domain (ccTLD)

ICANN will consult with the ccNSO, NTIA, the Root Zone Maintainer (currently Verisign), and the Governmental Advisory Committee (GAC), which provides advice to ICANN on issues of public policy regarding appropriate performance standards. Seeking input from the GAC is especially helpful where there may be an interaction between ICANN's activities or policies and national laws or international agreements. ICANN will leverage its experience with current KPIs for root management to begin these consultations:

- IANA Timeliness
- IANA Accuracy
- IANA Process Quality
- IANA Transparency
- IANA Reporting

ICANN has developed measurements and internal targets for these KPIs and will use these data and goals as a basis for discussion.

To fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that an additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting, which will demonstrate our fulfillment of that service level commitment. See Figure **1.2-12c.**

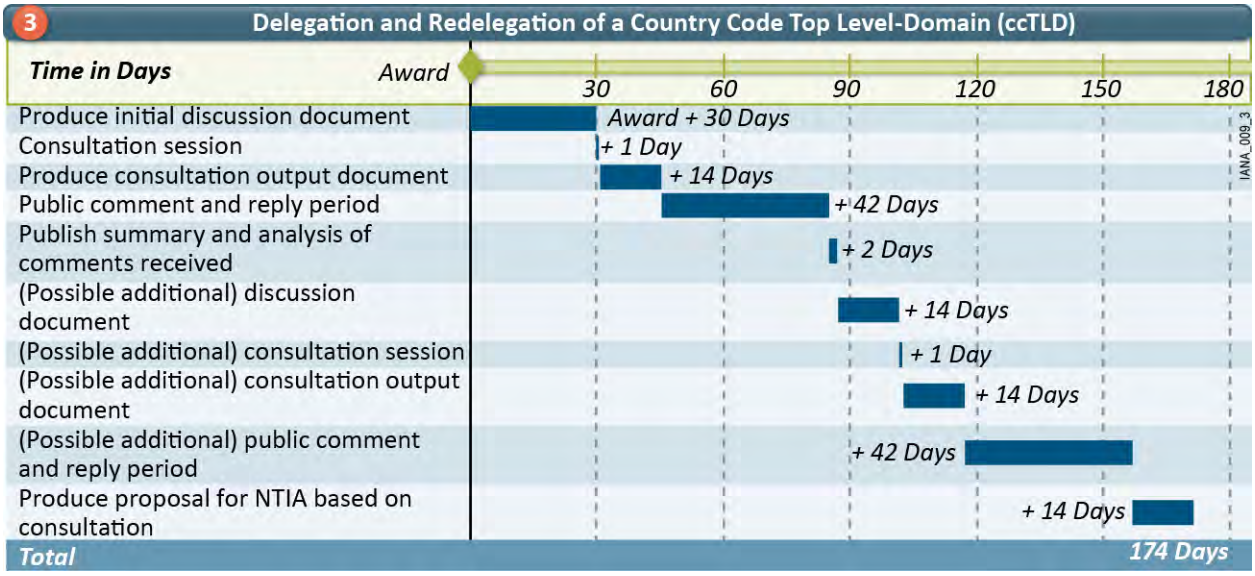


Figure 1.2-12c. Timeline

iv. Delegation and Redelegation of a Generic Top Level Domain (gTLD)

Staff from ICANN's IANA and gTLD relationship management departments will consult with the GNSO, along with Verisign (the Root Zone Maintainer), and NTIA regarding appropriate performance standards. ICANN will leverage its experience with current KPIs for root management to begin these consultations:

- IANA Timeliness
- IANA Accuracy
- IANA Process Quality
- IANA Transparency
- IANA Reporting

ICANN has developed measurements and internal targets for these KPIs and will use these data and goals as a basis for discussion.

To fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that an additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting, which will demonstrate our fulfillment of that service level commitment. See **Figure 1.2-12d**.

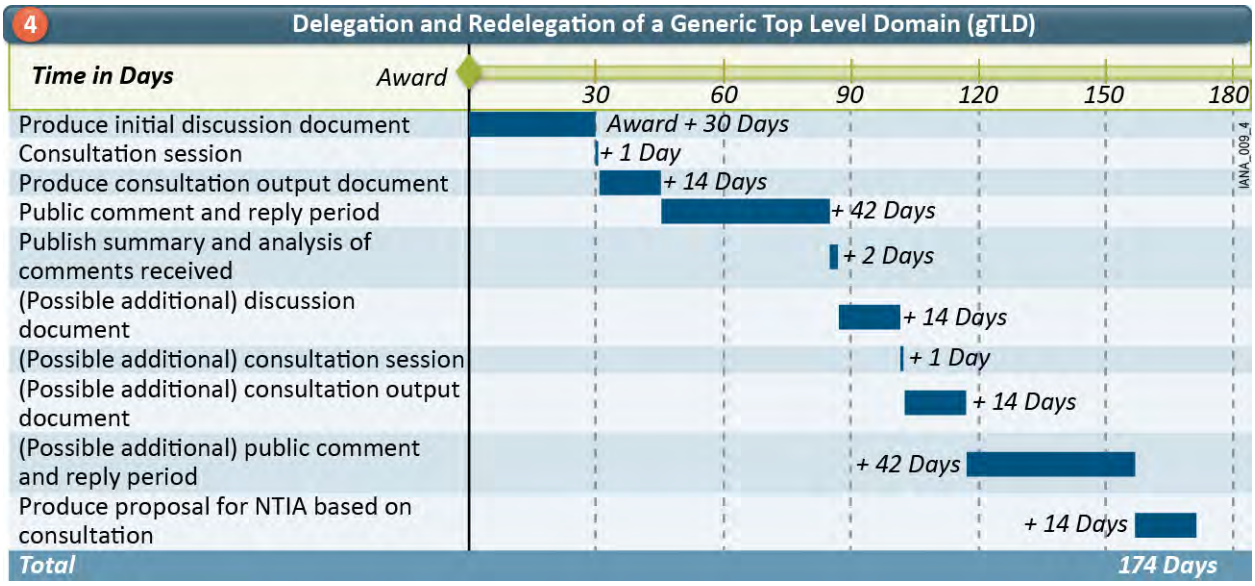


Figure 1.2-12d. Timeline

v. Root Domain Name System Security Extensions (DNSSEC) Key Management

ICANN cooperated with NTIA and Verisign in 2010 on a broad consultation with industry groups regarding DNSSEC Key Management activities. The groups consulted included but were not limited to the following:

- IETF
- ICANN Supporting Organizations, including ccNSO, gNSO, RSSAC, SSAC, and ALAC
- Regional Network Operations Groups, including RIPE, Middle East Network Operations Group (MENOG), AUSNOG, and NANOG
- Government stakeholders, including NIST

ICANN intends to involve all these groups in consultations as interested and affected parties when developing performance standards. ICANN will leverage its experience with current KPIs for root management to begin these consultations:

- IANA Reporting
- IANA Timeliness
- IANA Accuracy
- IANA Transparency

ICANN has developed measurements and internal targets for these KPIs and will use these data and goals as a basis for discussion.

To fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting which will demonstrate our fulfillment of that service level commitment. See **Figure 1.2-12e**.

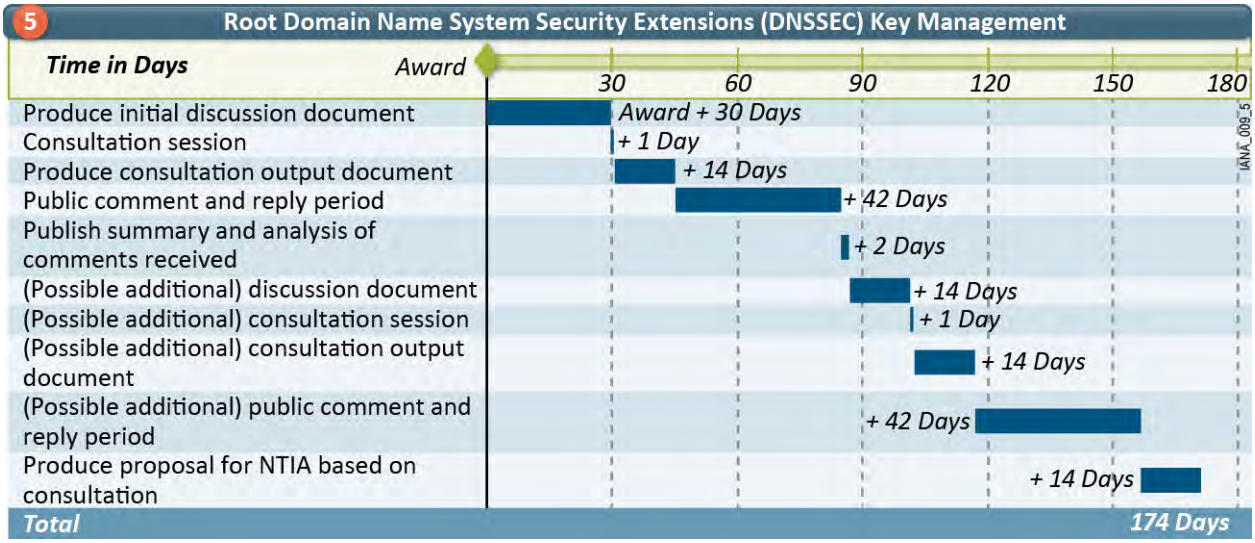


Figure 1.2-12e. Timeline

vi. Develop Performance Standards for SOW C.2.9.3 Allocate Internet Numbering Resources

ICANN entered into an Exchange of Letters with the Number Resource Organization (NRO) in December 2007. The NRO performs the role of the ICANN Address Supporting Organizatin (ASO). ICANN's letter to the NRO included an invitation to the NRO to work with ICANN to document service levels associated with Internet Number Resource (INR) allocation processes. ICANN will renew it invitation to collaborate on service levels and will arrange a meeting at a mutually convenient location, such as an RIR or ICANN meeting or office, so ICANN and the NRO can develop performance standards. ICANN will use its KPIs for INR management, along with historical performance data as a starting point for discussions:

- IANA Accuracy
- IANA Timeliness
- IANA Process Quality
- IANA Transparency

ICANN has developed measurements and internal targets for these KPIs and can supply historical performance data. ICANN will use these data and goals as a basis for discussion.

To fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that an additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting which will demonstrate our fulfillment of that service level commitment. See **Figure 1.2-12f.**

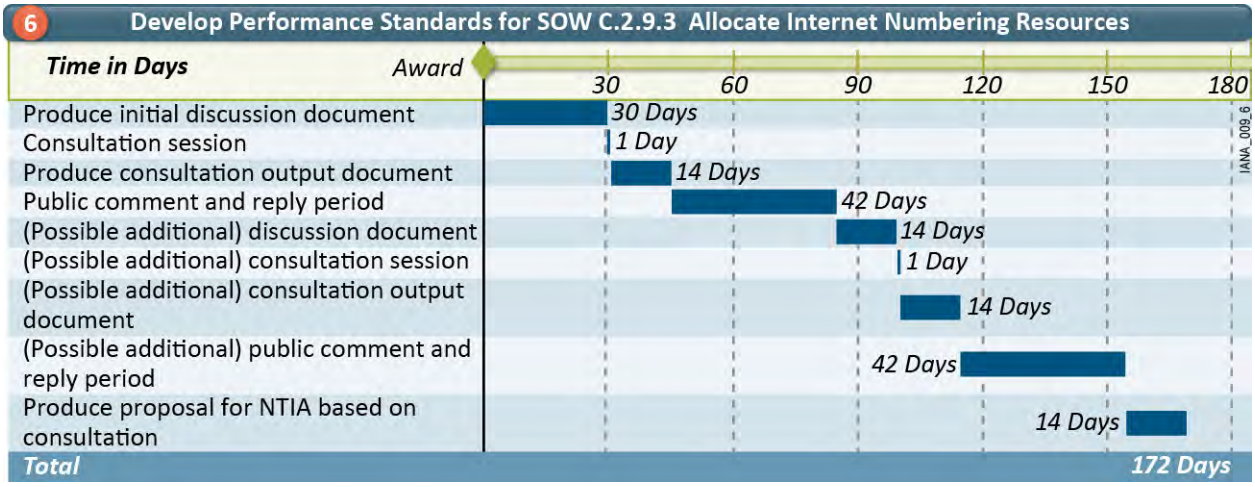


Figure 1.2-12f. Timeline

vii. Customer Service Complaint Resolution Process (CSCRP)

ICANN worked with the ccNSO and IETF leadership to develop an Escalation Procedure in 2006. This procedure, which has been published on ICANN's IANA website *(https://www.iana.org/procedures/escalation),* forms a part of the SLA ICANN reviews and updates with the IAOC each year. ICANN will convene a group from all key stakeholder customer organizations: ccNSO, gNSO, NRO, IETF IANA WG, GAC, and NTIA. This group will review the current escalation procedure to see whether it continues to meet the needs of the organizations or if it should be refined. ICANN will publish any updates on ICANN's IANA website and discuss with the IAOC incorporation of agreed changes into future revisions to the IAOC's SLA.

To fully consult with all interested and affected parties on an appropriate CSCRP, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN will hold a public comment and reply period for the documents produced following these sessions. In the event that additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on a CSCRP proposal. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the CSCRP on ICANN's IANA website. ICANN will implement the CSCRP.

In addition to a current IANA Escalation Procedure, ICANN has an Ombudsman who can be reached thru the ICANN website and who reports directly to ICANN's Board of Directors. The Ombudsman is available to conduct an independent, impartial and neutral review of facts and can also investigate complaints of unfairness using Alternative Dispute Resolution techniques. See **Figure 1.2-12g.**

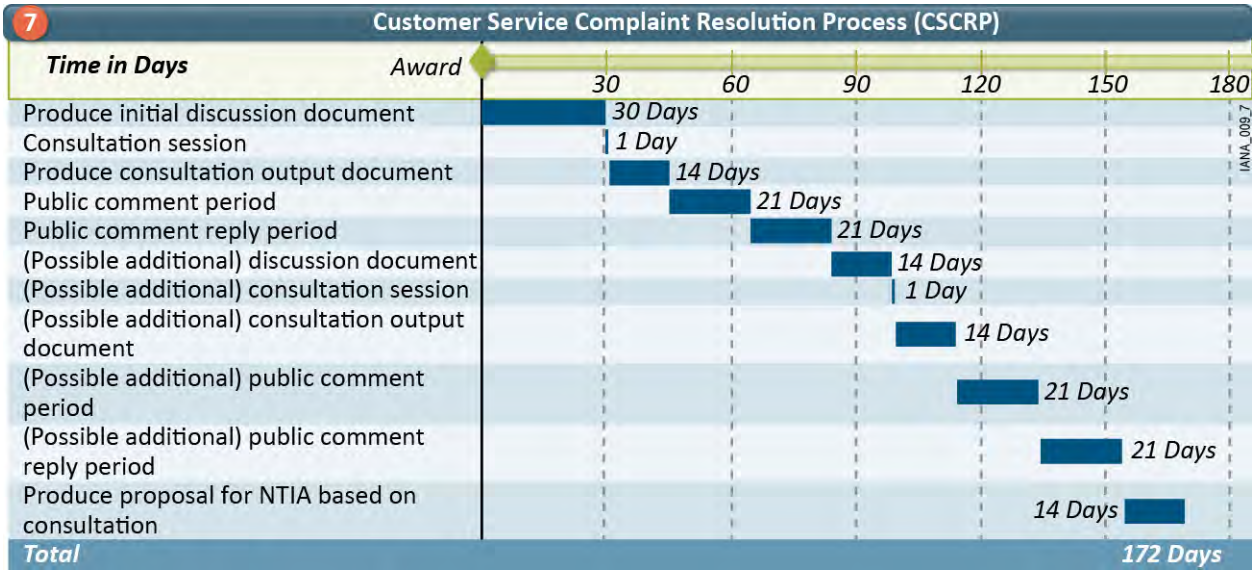


Figure 1.2-12g. Timeline

viii. Develop Performance Standards for SOW C.2.9.4 Other Services

ICANN will consult with NTIA regarding appropriate performance standards. ICANN will use the KPIs it has developed for root management as a starting point for this discussion:

- IANA Timeliness
- IANA Accuracy
- IANA Process Quality
- IANA Transparency
- IANA Reporting

ICANN has historical performance data and will use these data as a basis for discussion.

To fully consult with all interested and affected parties on appropriate performance standards for these Functions, ICANN will schedule and conduct consultation sessions with opportunities for remote participation using Adobe Connect. ICANN plans to hold a public comment and reply period for the documents produced following these sessions. In the event that additional discussion is necessary, ICANN will repeat these steps, so additional input can be collected from all interested and affected parties on performance standards. ICANN will then prepare a detailed proposal for NTIA to review and, upon acceptance by NTIA, will publish the performance standards on ICANN's IANA website. ICANN will implement these performance standards and the reporting, which will demonstrate our fulfillment of that service level commitment. See **Figure 1.2-12h.**

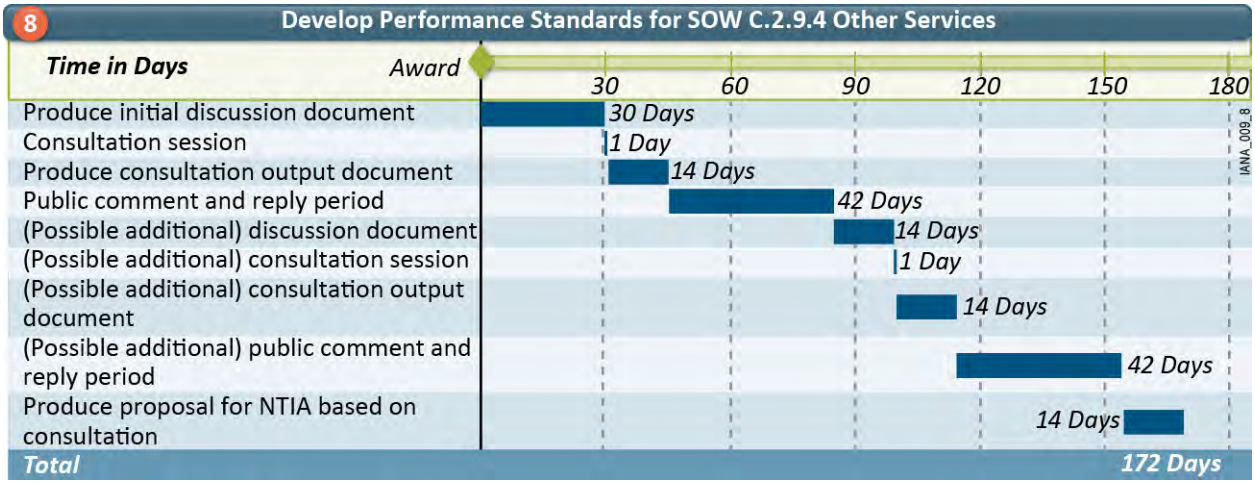


Figure 1.2-12h. Timeline

1.2.8.2 Post Via a Website

As described above, ICANN will produce a proposal for NTIA at the conclusion of the consultation process planned with the interested and affected parties listed above for each of the IANA Functions. The plan is to complete the performance requirements phase of the consultation within three months of the award. Eight weeks will be reserved for discussions and iterations on the format of the web pages where the performance metrics will be published. The plan is to receive approval to publish from the COR on or before five and one half months after the award. Upon acceptance by NTIA, ICANN will publish within six months of the award

the document on ICANN's IANA website in a section dedicated to performance standards. ICANN will publish the accepted document within a week of NTIA's notification that it has been accepted. ICANN will notify the interested and affected parties that the document has been published using its established links with each of the key stakeholders. These links include dedicated private mailing lists for announcements and discussions and regularly scheduled meetings.

1.2.8.3 Collaboration with Stakeholders

To develop the performance standards, ICANN will work with each of the IANA Functions. ICANN will collaborate closely with each of the relevant stakeholder groups. ICANN will make sure that the stakeholders will be able to contribute text and comment on drafts prior to seeking approval and publishing the performance standards for each IANA Function.

1.2.9 Internet Assigned Numbers Authority (IANA) Functions [M.8; C.2.9]

ICANN will provide support for requisite IANA Functions including the following: (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). The following section discusses in detail our understanding and technical approach to each SOW requirement.

1.2.9.1 Coordinate the Assignment of Technical Protocol Parameters Including the Management of the Address and Routing Parameter Area (ARPA) TLD [M.8; C.2.9.1]

ICANN recognizes the Assignment of Technical Protocol Parameters and the management of the Address and Routing Parameter Area (ARPA) TLD as an essential component for successfully operating the IANA Functions. Assigning unique operation codes, port numbers, object identifiers (such as private enterprise numbers), protocol numbers, and other technical protocol parameters are vital parts of how the Internet works.

The process of managing the protocol parameter registries depends on a close working relationship with the IESG as well as the trust and confidence of the IETF community that the registries will remain accurate and available. ICANN has built this relationship over a long period of time and enjoys the trust and confidence of the IETF, IESG and IAB in the management of the protocol parameter registries.

In parallel with this, ICANN entered into an MoU with the IETF in 2000 (RFC 2860, Memorandum of Understanding Concerning the Technical Work of the Internet Assigned Numbers Authority). Subsequent yearly SLAs—which define the service time commitment goals, escalation procedures and projects for the IETF related work—will be reviewed annually and agreed to by both ICANN and the IETF. ICANN will continue to meet the deliverables of the SLA defined in the supplemental agreements. Over the last three years, ICANN has consistently met or exceeded the cumulative SLA goal for IANA Department processing times for IETF related requests.

Following guidance from the IAB and under the terms of the MoU (RFC2860), ICANN will continue to administer the .ARPA domain used exclusively for Internet-infrastructure purposes.

ICANN will continue to follow the management guidelines and operational requirements defined in RFC3172 for the management of the .ARPA domain. ICANN will continue to observe the interim arrangement for DNSSEC for .ARPA and will work with integral parties to deploy a long-term architecture for DNSSEC in .ARPA to replace the interim arrangement.

Understanding the Requirement

ICANN understands that upon award of the contract, its responsibility for the assignment of technical protocol parameters, including the management of the Address and Routing Parameter Area (ARPA) TLD, will continue. In fulfilling this requirement, ICANN will assign unique values to various protocol parameters and maintain the list of existing and future registries created by the approved documents becoming Request for Comments (RFCs). There are currently more than 1,500 protocol parameter registries that have been created through what starts as an Internet-Draft (I-D), mostly initiated within the IETF, ultimately becoming a published RFC. Dozens of registries are added each year as more I-Ds that request new protocol registries become published RFCs. ICANN will continue to support the IETF and the RFC process by reviewing I-Ds before they are approved for publication to ensure that the request for actions complies with existing registration policies.

The relationship between ICANN and the IETF in coordinating the assignment of technical protocol parameters is described in a Memorandum of Understanding (MoU), published as RFC 2860 (See Appendix B). Since 2007, ICANN and the IETF have signed supplemental annual agreements which are integral to protocol parameter work. Under the new contract, ICANN will continue to develop these agreements together with the IETF leadership as their input helps guide the deliverables related to the protocol parameter work for the IETF.

ICANN will continue to manage the technical protocol parameters according to the instructions contained in the RFCs definition documents published through the IETF process. These documents define the creation of the protocol parameter registries and their registration policies. The strong working relationship ICANN has developed with these two groups ensures that any concerns about how requests are being processed are quickly communicated to ICANN and can be addressed rapidly. Similarly, any clarification ICANN needs for registration policies can be quickly provided.

ICANN understands the importance and responsibility of the management of .ARPA, including the addition of new second-level domains and updates to existing names and the implementation of DNSSEC in the .ARPA TLD. Through direction of the IAB, working with NTIA and Verisign, ICANN understands the deployment of a replacement for the current interim agreement for DNSSEC in .ARPA will fulfill the requirement as described in this contract.

Technical Approach

ICANN will have experienced staff assigned to support the technical protocol parameter assignments and the .ARPA management. ICANN will continue to use the processes in place utilizing the registration policies and procedures that have been developed by the IETF, IAB and ICANN for protocol parameter registries and .ARPA management. With over 13 years of experience, ICANN has created and will maintain productive working relationships with the

IETF, IESG and IAB and knows how to perform the protocol parameter and .ARPA work, delivering at service levels requested by these stakeholder groups.

ICANN will follow the established formal process review process, which is designed to improve processes in response to environmental changes, deployment experience and customer feedback. ICANN will remain responsive and flexible with receiving instructions from the IETF regarding requests for changes in processes while working collaboratively to continually improve processes for protocol parameter requests and document reviews. Process managers formally will review each step-by-step process every year in a change management process. Changes to processes will be the result of new definitions in RFCs providing instructions regarding registration policies to ICANN or instructions from IESG members and designated experts regarding registration procedures.

1.2.9.1.1 Review and Assign Unique Values

ICANN will responsibly review and assign unique values for protocol parameters in the registries currently maintained and for those future registries created through the RFC process. Protocol parameters (e.g., operation codes, port numbers, object identifiers, and protocol numbers) are an essential part of what makes the Internet work. ICANN will continue to process protocol parameter requests according to the established guidelines and policies defined in RFCs and will work together with the IETF leadership to determine appropriate service level goals.

There will be two ways in which ICANN will continue to receive requests for the assignment and registration of protocol parameters. The first will be through approved I-Ds becoming RFCs. Second will be through requests submitted directly to ICANN (not through the IETF document process). For approved Internet-Drafts becoming RFCs, the request for the protocol parameter assignments will be found in the IANA Considerations section of the document. The document will describe the specific actions to be taken by ICANN. This may include setting up a new registry with initial assignments, adding new assignments to existing registries or making modifications to existing registries. The Internet community will be able to submit requests directly to ICANN through online webforms or via email to request assignment of protocol parameters. Examples of webforms that will be used for requesting protocol parameter assignments can be found in **Appendix B**.

Together with the IETF, ICANN will continue to develop SLAs for the protocol parameter registry maintenance and document reviews. These agreements will include goal times for processing all types of requests for protocol parameters, specifically how much time is spent with ICANN. These agreements will be integral to the IANA Functions related to technical protocol parameters and they will define what ICANN delivers.

Figure 1.2-13 lists the process flowcharts that will be used to review and assign unique values for protocol parameters.

Figure 1.2-13. List of Process Flowcharts

FIGURE #	CHART TITLE	DESCRIPTION
1.2-14	Internet-Draft Approval Process	This process will be used for documents approved to become RFCs, which may contain actions for ICANN to perform (new protocol parameter registries or assignments in existing registries).
1.2-16	First Come First Served (FCFS) Process	This process will be used for requests that are in registries with a First Come First Served registration policy per RFC 5226.
1.2-18	Private Enterprise Number (PEN) – New Request Process	This process will be used for new PEN requests that are in registries with a FCFS registration policy per RFC 5226.
1.2-20	Private Enterprise Number (PEN) – Modification Request Process	This process will be used for PEN modification requests that are in registries with a FCFS registration policy per RFC 5226.
1.2-22	Private Enterprise Number (PEN) – Removal Request Process	This process will be used for PEN deletion requests that are in registries with a FCFS registration policy per RFC 5226.
1.2-24	Expert Review Process	This process will be used for requests that are in registries with a Expert Review registration policy per RFC 5226.
1.2-26	IESG Approval Process	This process will be used for requests that are in registries with a IESG Approval registration policy per RFC 5226.

Top Level Approvals Review of Internet-Drafts

Figure 1.2-14 depicts the top-level, step-by-step process that will be used for I-Ds that begins with a document approval (to become an RFC) and ends with ICANN's completion of the actions requested in the IANA Considerations section of the document.

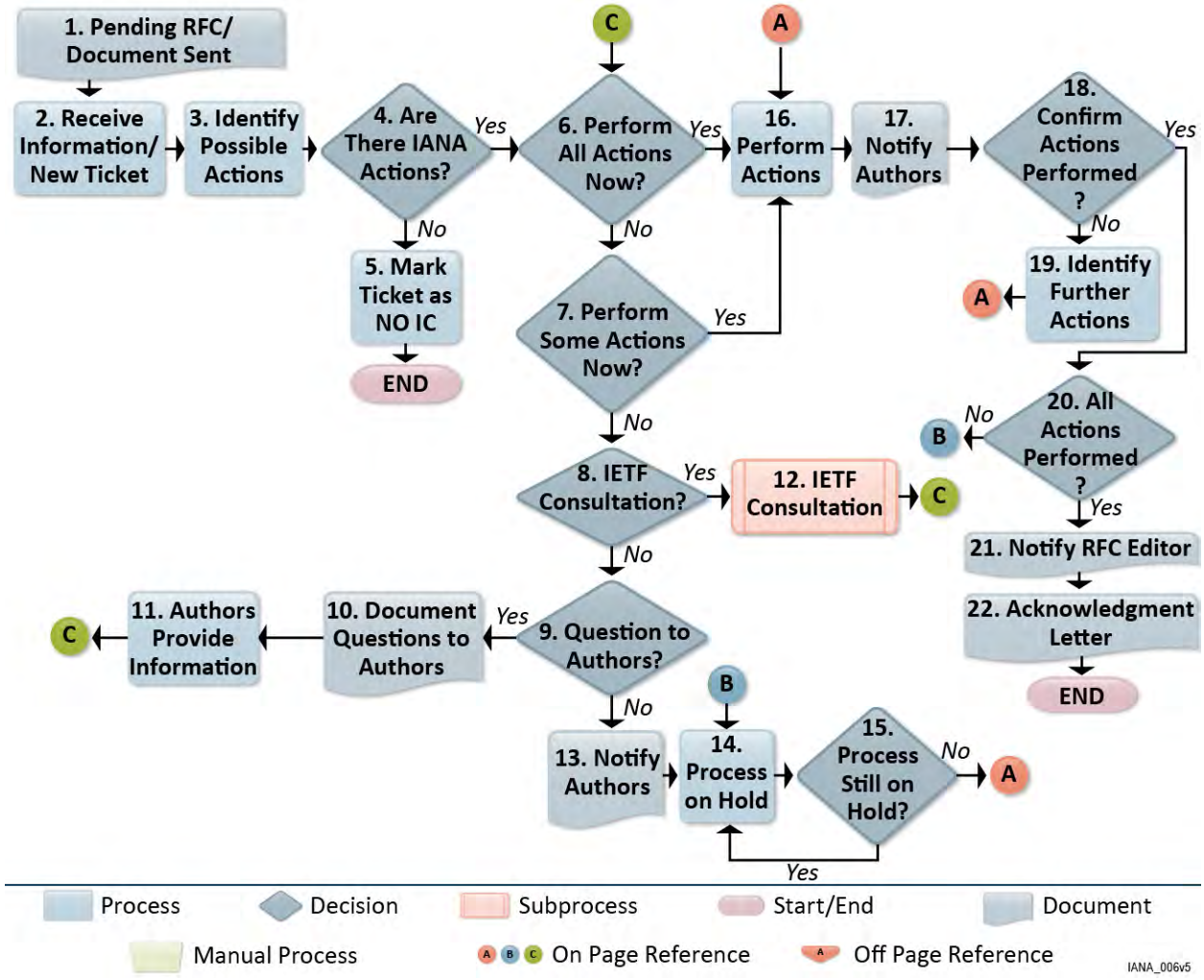


Figure 1.2-14. Internet-Draft (I-D) Approval Process

Figure 1.2-15 shows the step-by-step process.

Definitions

- **AUTO** – Automatically through Ticketing System
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functiosn Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist

- **PPM** – Protocol Parameter Manager
- **Authors** – the authors for the I-D that has been approved for publication as an RFC

Figure 1.2-15. Internet-Draft Approval Process Step-by-Step Description

1	PENDING RFC/DOCUMENT SENT TO ICANN
Description	An approval or intent to publish for an I-D is sent to ICANN.
Actor	IETF Secretariat or RFC Editor
Documents	N/A
Steps	• A message is sent to the ticketing system. • A message is sent to the ticketing system. • Message from Secretariat comes in a specified format. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created and either ticketing system automatically adds the ticket to the correct queue, or the ticket is manually placed in the right queue.
Actor	AUTO and/or IPS
Documents	N/A
Steps	• E-mail sent directly to the queue is automatically added to the appropriate ticket queue. • Tickets that arrive elsewhere are manually moved to the appropriate Ticketing System queue. • Ticket is manually assigned to an IPS. • Go to Action box 3.
3	**IDENTIFY POSSIBLE ACTIONS**
Description	Gather all information needed to determine if there are actions to be performed by ICANN. This step also includes filling in custom fields for the ticket.
Actor	IPS
Documents	n/a
Steps	• Review the most recent version of the document. • Check the Last Call ticket (if applicable). • Check the Evaluation ticket. • Check for any other related tickets. • Go to Decision box 4.
4	**ANY IANA ACTIONS TO PERFORM?**
Description	Staff checks all the information identified to see if there are any actions for ICANN to perform.
Actor	IPS
Documents	N/A
Steps	• Input to making decision based on the review of the Last Call, Evaluation and other related tickets, are there actions to perform? • If yes, go to Decision box 6. • If no, go to Action box 5.
5	**MARK TICKET AS NO IC**
Description	The ticket needs to be marked as having “NO IC” or No IANA Considerations. This means the Internet-Draft has no IANA Actions to perform.
Actor	IPS

Documents	N/A
Steps	• When the Internet-Draft does not contain any IANA Actions the ticket can be resolved. • Go to END.
6	**CAN ICANN PERFORM ALL OF THE ACTIONS NOW?**
Description	Can ICANN perform ALL the actions right now? This means the document is not dependent on another document getting approved and actions performed.
Actor	IPS
Documents	N/A
Steps	• Verify that all the actions can be performed immediately (not having to wait for a registry to be created by a dependant document). • If yes, go to Action box 16. • If no, go to Decision box 7.
7	**CAN ICANN PERFORM SOME OF THE ACTIONS NOW?**
Description	Can ICANN perform SOME of the actions now? This means that some of the actions can be performed now and some will require waiting until later.
Actor	IPS
Documents	N/A
Steps	• Identify which actions, if any, can be performed immediately. • Identify which actions need to be performed later and what document is required to be processed before the actions can be completed. • If yes, go to Action box 16. • If no, go to Decision box 8.
8	**IS IETF CONSULTATION NEEDED?**
Description	Does the IETF (IESG, Area Directors, WG Chairs, and/or experts) need to be consulted regarding the pending actions?
Actor	PPM or IPS
Documents	N/A
Steps	• Determine if further consultation is needed. • If yes, go to Sub Process box 12. • If no, go to Decision box 9.
9	**DOES ICANN NEED TO SEND QUESTIONS TO AUTHORS?**
Description	Do questions or requests for clarification need to be sent to the authors of the document?
Actor	IPS
Documents	N/A
Steps	• Determine if further questions need to be asked of the authors to clarify the actions. • Identify what questions need to be asked or what needs clarified. • If yes, go to Action box 10. • If no, go to Action box 13.
10	**SEND QUESTIONS TO AUTHORS**
Description	Send an email to the authors with questions regarding actions.
Actor	IPS
Documents	N/A
Steps	• Send email to authors.

	• This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. • Go to Action box 11.
11	**AUTHORS PROVIDE INFORMATION**
Description	Authors send back information to help clarify the requested actions.
Actor	Authors
Documents	N/A
Steps	• ICANN receives an email from the authors with answers to questions and/or clarification. • Go to Decision box 6.
12	**PERFORM IETF CONSULTATION – SUB PROCESS**
Description	Perform the IETF Consultation by using the defined sub process.
Actor	PPM or IPS
Documents	N/A
Steps	• Follow the steps in the IETF Consultation Sub Process. • Go to Decision box 6.
13	**NOTIFICATION TO AUTHORS**
Description	Inform the authors that we cannot proceed with the actions for the document, as it will need to be put on hold. (This could be ALL the actions or only SOME actions.)
Actor	IPS
Documents	N/A
Steps	• Send email to Authors. • Go to Decision box 14.
14	**PROCESS ON HOLD**
Description	In order to perform all the actions for the approved Internet-Draft, another document must be approved and actions performed for it first.
Actor	IPS
Documents	N/A
Steps	• This ticket will stay in this Action box until the dependent actions are performed. A weekly check to see if the dependent document has been approved is performed where the next decision is asked again. • Go to Decision box 15.
15	**PROCESS STILL ON HOLD?**
Description	Weekly check to see if the document holding up the approved Internet-Draft is approved yet.
Actor	IPS
Documents	n/a
Steps	• Check against relevant queues to see if the dependent document has been approved and the actions completed. • If yes, go to Action box 14. • If no, go to Action box 16.
16	**PERFORM ACTIONS**
Description	Perform the actions in the IANA registries.
Actor	IPS
Documents	N/A

Steps	• Create new registries and/or add/modify/delete registrations from existing registries. • Change references to show the RFC-to-be. • Update the matrix to include new registries, registration procedures and references. • Go to Action box 17.
17	**NOTIFICATION TO THE AUTHORS**
Description	Inform the Internet-Draft authors (cc'ing WG chairs and ADs) that the actions for the document have been completed.
Actor	IPS
Documents	N/A
Steps	• Confirm the actions are visible in the IANA Registries. • Write to the authors (cc'ing the WG chairs and ADs) and send them details of the actions completed. • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. • Go to Decision box 18.
18	**CONFIRM IANA ACTIONS PERFORMED**
Description	Receive response from the authors indicating the actions taken are correct.
Actor	Authors and IPS
Documents	N/A
Steps	• Check response from authors to see if all actions taken are correct. • If yes, go to Decision box 20. • If no, go to Action box 19.
19	**FURTHER ACTIONS**
Description	The authors may have provided feedback to ICANN regarding changes to the actions performed.
Actor	IPS
Documents	N/A
Steps	• Identify if there are any corrections and/or additions to be made in the registries and/or matrix. • Identify if there are any questions to answer. • Go to Action box 16.
20	**ALL IANA ACTIONS PERFORMED?**
Description	Have ALL the Actions been performed and confirmed? (Some actions may have been completed at different times if there was a dependency.)
Actor	IPS
Documents	N/A
Steps	• Confirm the actions are visible in the IANA Registries. • Confirm there are no additional actions that are waiting on other documents. • If yes, go to Action box 21. • If no, go to Action box 14.
21	**NOTIFICATION TO THE RFC-EDITOR**
Description	Inform RFC-Editor that the IANA Actions have been completed and identify which actions were performed.
Actor	IPS

Documents	N/A
Steps	• Send message to RFC-Editor. • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. • Go to Action box 22.
22	**ACKNOWLEDGMENT LETTER**
Description	The RFC-Editor informs ICANN that they have received (acknowledged) receipt of confirmation of IANA Actions completed.
Actor	RFC Editor/IPS
Documents	N/A
Steps	• Receive message from RFC-Editor indicating acknowledgment. • Go to END.

The status of documents that have been approved for publication will be publicly available on ICANN'S IANA website.

Protocol parameters will be submitted either using the forms available on ICANN's IANA website or via email. Requests will be made on behalf of individuals or organizations/companies. Upon receipt of a request, ICANN will verify what the requester is seeking to register and what the registration procedures are for that parameter type. The registration procedures for each registry will be established by the RFC authors and will be in most cases reviewed by the IETF community including Working Groups, IESG and IAB. The definitions of the registration procedures can be found in RFC 5226. If clarification is required, ICANN will work with subject matter experts and the IESG to answer any questions.

First Come First Served Protocol Parameter Request Process

Figure 1.2-16 shows the top-level, step-by-step process that will be used for requests for protocol parameters that follow the FCFS registration procedures. Examples of FCFS requests are TRIP ITAD numbers and Vendor Specific Application IDs. These requests do not require additional review by experts or do not require additional documentation. They will be reviewed to make sure the minimal information requested has been submitted and then are processed.

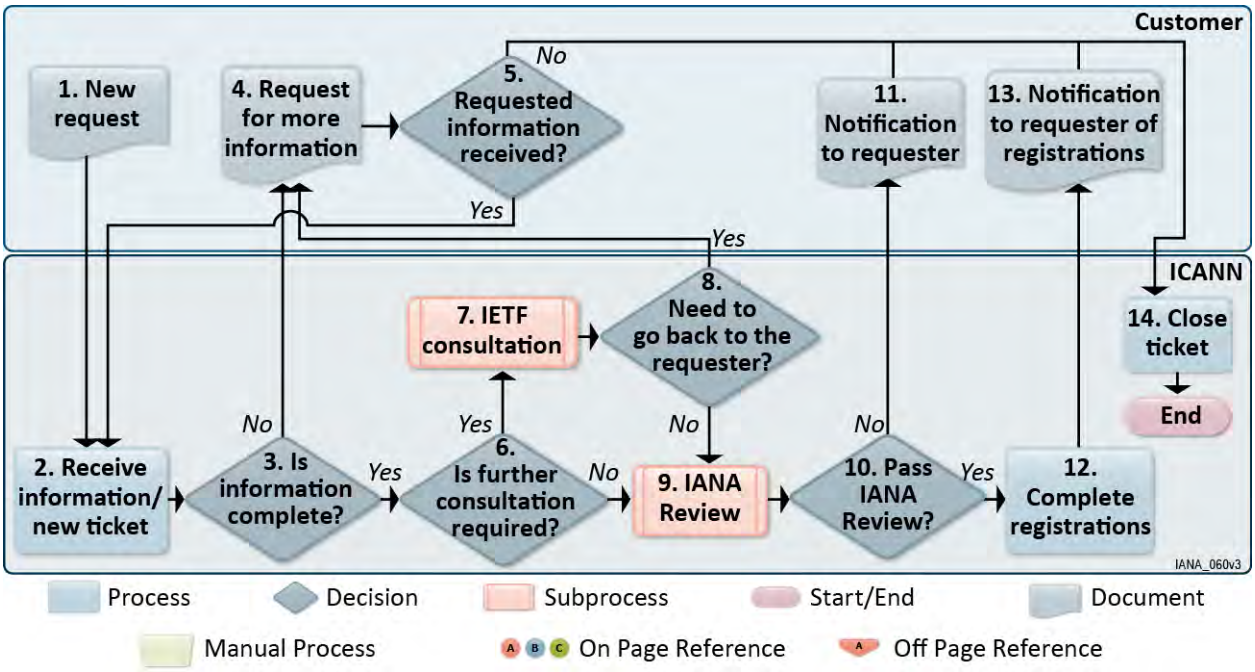


Figure 1.2-16. First Come First Served (FCFS) Process

Note: The PEN registry will also use the FCFS process; however, because of the volume of requests, they use a separate processing system.

Figure 1.2-17 shows the top-level, step-by-step process used for requests for protocol parameters.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functiosn Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Requesters** – The requester who submitted the request.
- **IETF** – Internet Engineering Task Force

- **IESG** – Internet Engineering Steering Group
- **AD** – Area Director
- **WGC** – Working Group Chair

Figure 1.2-17. FCFS Process Step-by-Step Description

1	NEW REQUEST SENT TO ICANN
Description	A request for a new registration in IANA maintained registries is sent to ICANN.
Actor	Requester
Documents	N/A
Steps	• A message is sent to *iana@iana.org* or to a specific queue via email or through an online template. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	If this is the initial information being received, a new ticket is created. Ticketing system automatically puts the ticket in the correct queue or the ticket is manually placed in the appropriate queue. If this is additional information being received, it will either directly go to the existing ticket, or a new ticket will be created and will be merged with the existing ticket.
Actor	AUTO and/or IPS
Documents	Tools needed: Ticketing system
Steps	• Tickets that arrive in *iana@iana.org* are manually moved to the appropriate ticketing system queue. • Some tickets will automatically arrive in the appropriate queue. • Ticket is manually assigned to an IPS. • Go to Decision box 3.
3	**IS INFORMATION COMPLETE?**
Description	Review the information in the ticket. Check to make sure all required information for the registration requested is included.
Actor	IPS
Documents	*www.iana.org/protocols* (to verify which registry and registration procedures) *www.rfc-editor.org* (to verify any information in the guiding RFC)
Steps	• Review the ticket information. • Check which registry they are requesting a parameter in. • Add the registry information if applicable to a custom field. • Are all criteria met according to the governing RFC? Check the RFC that created the registry and established the registration procedures. Are there any specific criteria that need to be met to submit a fully formed request? Are only specific characters allowed in the name being registered? Are there any other rules to be followed for the registry the applicant is seeking registration in? Check to see if there is already a registration with the same name/number (duplicates). • If yes, go to Decision box 6. • If no, go to Action box 4.
4	**REQUEST FOR MORE INFORMATION**
Description	A message is sent to the requester asking for more information regarding the requested parameter registration.
Actor	IPS

Documents	N/A
Steps	• Send message to requester. • Ask clarifying questions as needed. • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • Go to Decision box 5.
5	**REQUESTED INFORMATION RECEIVED?**
Description	Has the requested information been sent back to ICANN by the requester?
Actor	IPS
Documents	N/A
Steps	• Information has been sent back to ICANN. • If yes, go to Action box 2. • If no AND past 30 days, go to Action box 14.
6	**IS FURTHER CONSULTATION REQUIRED?**
Description	Does ICANN need to consult with someone in the IETF community regarding this request?
Actor	IPS
Documents	ICANN's Private Network link: *https://wiki.icann.org/display/icanniana/Designated+Experts+List * (This page lists all the designated experts/email addresses for registries *http://datatracker.ietf.org/wg/* (This page includes all the names/email addresses for Area Directors and WGCs.)
Steps	• Are there questions that cannot be answered by the requester or ICANN that require sending a question to the IETF (IESG, AD, WGC and/or Expert)? • If yes, go to Sub Process box 7. • If no, go to Sub Process box 9.
7	**IETF CONSULTATION SUB PROCESS**
Description	IETF Consultation Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	Go to Decision box 8.
8	**NEED TO GO BACK TO THE REQUESTER?**
Description	Does ICANN need to go back to the requester with requests for clarification and/or questions?
Actor	PPM or IPS
Documents	N/A
Steps	• Determine if ICANN needs to go back to the requester with questions/clarification. • If yes, go to Action box 4. • If no, go to Sub Process box 9.
9	**IANA REVIEW SUB PROCESS**
Description	IANA Review Sub Process
Actor	IPS
Documents	ICANN's Private Network link: *https://wiki.icann.org/display/icanniana/IANA+Review+Process*
Steps	• Go to Decision box 10.

10	PASS IANA REVIEW?
Description	Did the request pass IANA Review?
Actor	IPS
Documents	N/A
Steps	• If yes, go to Action box 12. • If no, go to Action box 11.
11	**NOTIFICATION TO REQUESTER**
Description	Notify the requester that the request can not be processed.
Actor	PPM
Documents	N/A
Steps	• Send email to the requester. • Go to Action box 14.
12	**COMPLETE REGISTRATIONS**
Description	Perform the actions in the IANA Registries.
Actor	IPS
Documents	Tools needed: Subversion and Oxygen
Steps	• Complete registrations in existing registries. • Go to Action box 13.
13	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the registration has been completed.
Actor	IPS
Documents	N/A
Steps	• Confirm the registration is visible in the IANA Registries. • Write to the requester and send them details of the registration completed. • Go to Action box 14.
14	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	IPS
Documents	N/A
Steps	• Go to END.

Private Enterprise Number (PEN) Protocol Parameters

Private Enterprise Numbers (PENs) are a type of object identifier protocol parameter. Because of the large volume of requests, ICANN will use a separate system to process PEN requests. ICANN will automate the current system to allow for more automation and to improve both administrative and user interfaces. ICANN will also produce more statistical information from an automated system. Below are the step-by-step processes ICANN will use to handle requests for new PENs, modifications of existing PENs and the removal of PENs.

New Private Enterprise Numbers (PENs)

Figure 1.2-18 shows the top-level, step-by-step process that will be used for requests for New Private Enterprise Numbers that follow the first come first served registration procedures.

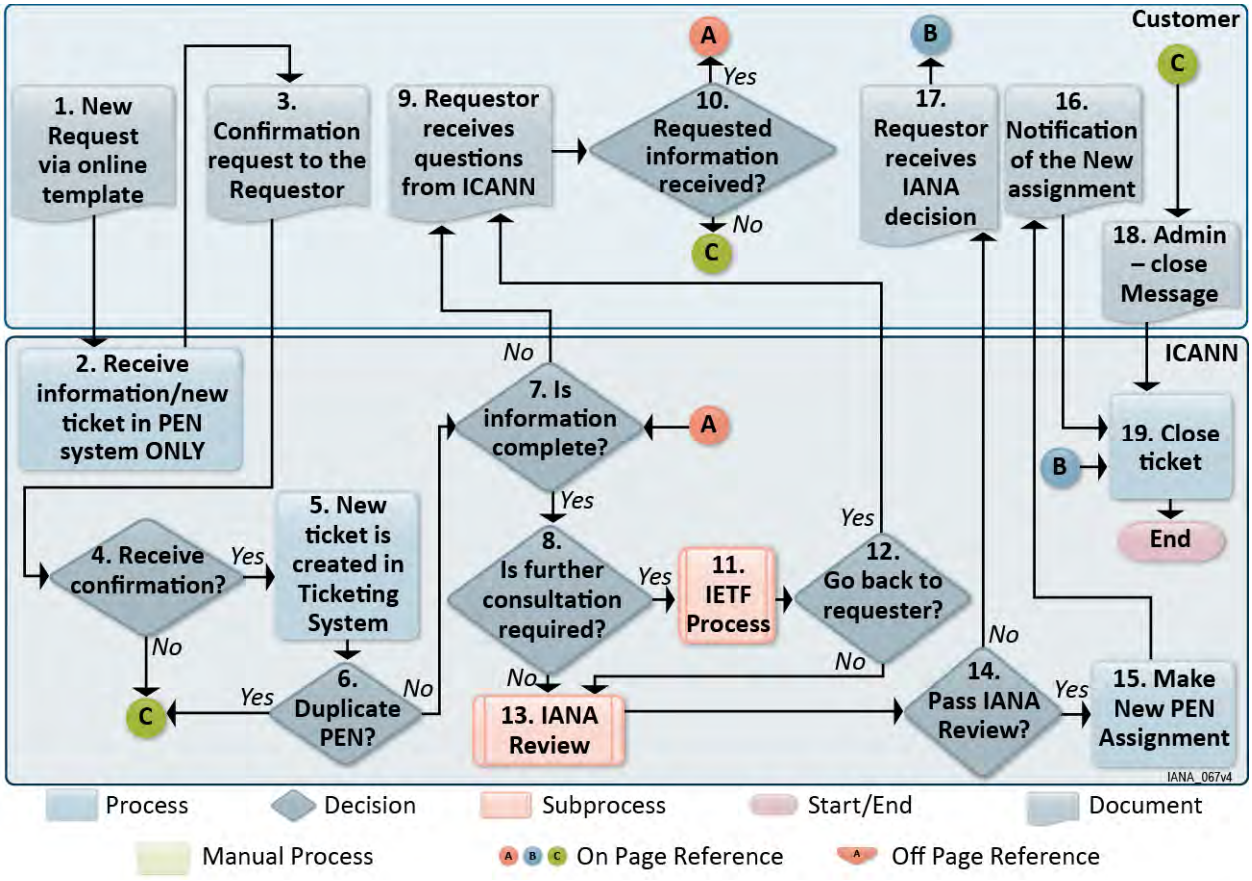


Figure 1.2-18. Private Enterprise Number (PEN) – New Request Process

Figure 1.2-19 describes the top-level, step-by-step process that will be used for requests for new Private Enterprise Numbers that follow the first come first served registration procedures.

Definitions

- **AUTO** – Automatically through PEN system and/or ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functiosn Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Requesters** – The requester who submitted the request
- **IETF** – Internet Engineering Task Force

- **IESG** – Internet Engineering Steering Group
- **AD** – Area Director
- **WGC** – Working Group Chair

Figure 1.2-19. Private Enterprise Number (PEN) – New Request Process Step-by-Step Description

1	NEW REQUEST SENT TO ICANN
Description	A request for a new registration in IANA PEN registry is sent to ICANN. See **Appendix A**.
Actor	Requester
Documents	N/A
Steps	Go to Action box 2
2	**RECEIVE INFORMATION/NEW TICKET (IN PEN SYSTEM ONLY)**
Description	A new ticket is created in the IANA PEN system ONLY. The request will NOT be created in the ticket system at this time.
Actor	AUTO
Documents	Online template
Steps	Go to Action box 3
3	**CONFIRMATION REQUEST TO THE REQUESTOR**
Description	The IANA PEN system automatically generates a "confirmation message" and sends it to the email address specified in the template to request one confirmation. The "confirmation message" contains a secure non-guessable and non-sequential web-based link.
Actor	AUTO
Documents	N/A
Steps	• The IANA PEN system – The outgoing message is logged in the system. – 30-days timeout starts. – IPS reviews the ticket information. • Ticket system: NO Event occurred. • WHEN it is spam, IPS can interfere and manually close the request: Set the Request state to "Admin-close." No further action and outgoing message are required. • Go to Step 4.
4	**RECEIVE CONFIRMATION?**
Description	A confirmation is returned via the secure web-based link.
Actor	Requester
Documents	N/A
Steps	• IF the requestor confirms the request within the 30 calendar days: – A web-based "Confirmation" message is automatically displayed on the website. • IF the requestor CANCELS the request: – A web-based "Request has been cancelled" message is automatically displayed on the website. • This ticket will stay in this Step until a response is received. Automated Pings/Reminders will be sent from the PEN system every seven calendar days. The request will be closed if there is no response after 30 days. • If yes, go to Step 5. • If no AND past 30 days, go to Step 18.
5	**NEW TICKET IS CREATED IN TICKET SYSTEM**
Description	The PEN request has been confirmed by the requester. A new request is now created in the

	ticketing system and will be reviewed by ICANN.
Actor	AUTO
Documents	An AutoReply message is sent from the system upon the creation of the new ticket. The AutoReply message provides an acknowledgement of receipt of the PEN request and provides the Ticket System URI, so the requestor can check the status of the request in any given time.
Steps	Go to Action box 6
6	**DUPLICATE PEN?**
Description	Review the information in the ticket. Check whether 1) the company already has existing allocations in the registry, 2) there is another new application in the queue and 3) there is a modification request in the queue.
Actor	IPS
Documents	N/A
Steps	• "Duplicate Check" function to allow IPS to check this requirement: – Case 1: the company already has existing allocations in the registry: • If yes, go to Step 18. • If no, go to Step 7. – Case 2: there is another new application in the queue: • Go to Step 7. – Case 3: there is a modification request in the queue: (The requester submitted a modification request when the requester realized the company already has an existing PEN after the requester submitted the New request.) • If yes, go to Step 18. • If no, go to Step 7.
7	**IS INFORMATION COMPLETE?**
Description	Review the information in the ticket. Check to make sure all required information for the registration is included.
Actor	IPS
Documents	N/A
Steps	• IPS reviews the ticket information. • If yes, go to Step 8. • If no, go to Step 9.
8	**IS FURTHER CONSULTATION REQUIRED?**
Description	Does ICANN need to consult with someone in the IETF community regarding this request?
Actor	IPS
Documents	N/A
Steps	If yes, go to Step 11. If no, go to Step 13.
9	**REQUESTOR RECEIVES QUESTIONS FROM ICANN**
Description	A message is sent to the requester asking for more information regarding the requested parameter registration.
Actor	IPS and Requestor
Documents	N/A
Steps	• The message is logged in the PEN system. • The outgoing message is logged in ticketing system. • Send questions for clarifications to requestor and/or request additional information from requestor. • Go to Step 10.
10	**REQUESTED INFORMATION RECEIVED?**
Description	Has the requested information been sent back to ICANN by the requester?
Actor	Requestor

Documents	N/A
Steps	• Information has been sent back to ICANN. • The message is logged in the PEN system. • The outgoing message is logged in ticketing system. • This ticket will stay in this Action box until a response is received. Automated Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • If yes, go to Step 7. • If no AND past 30 days, go to Step 18.
11	**IETF CONSULTATION SUB PROCESS**
Description	IETF Consultation Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	Go to Step 12.
12	**GO BACK TO THE REQUESTER?**
Description	Does ICANN need to go back to the requester with requests for clarification and/or questions?
Actor	PPM or IPS
Documents	N/A
Steps	• Determine if ICANN needs to go back to the requester with questions/clarification. • If yes, go to Step 10. • If no, go to Sub Process box 13.
13	**IANA REVIEW SUB PROCESS**
Description	Requests are required to perform an IANA review under the contractual obligation with the instructions from the ICANN Legal Department. A well-defined request will be sent to legal (outside consultant) to perform the IANA Review. The request will be stalled within this state until ICANN receives clearance to continue processing the request.
Actor	IPS
Documents	N/A
Steps	• Go to Step 14.
14	**PASS IANA REVIEW?**
Description	Did the request pass IANA Review?
Actor	IPS
Documents	N/A
Steps	• If yes, go to Step 15. • If no, go to Step 17.
15	**COMPLETE ASSIGNMENT**
Description	A new allocation is immediately made in the IANA PEN registry.
Actor	AUTO and IPS
Documents	N/A
Steps	• ICANN reviews result in the ticket. • The PEN system assigns the next available number in the PEN database. • Go to Step 16.
16	**NOTIFICATION OF THE NEW ASSIGNMENT**
Description	Inform the requester that the registration has been completed.
Actor	AUTO and IPS
Documents	N/A
Steps	• The registration will be visible in the IANA PEN registry. • Send a “Completion” message including the details of the registration to the requester.

	• The PEN system records the outgoing "Completion" message. • The ticketing system records the outgoing "Completion" message. • Go to Step 19.
17	**REQUESTER RECEIVES ICANN DECISION**
Description	Notify the requester that the request cannot be processed.
Actor	PPM
Documents	An email message informing the requester that the request cannot be processed at this time.
Steps	• The PEN system records the outgoing message. • In the ticketing system send email to the requester. • Go to Step 19.
18	**"ADMIN-CLOSED" MESSAGE**
Description	Inform the requester that the request has been administratively closed due to the following one of the scenario: • Past 30 days • An existing PEN • Incomplete Info
Actor	AUTO or IPS
Documents	N/A
Steps	• The PEN system records the outgoing "Admin-closed" message. • The ticketing system records the outgoing "Admin-closed" message. • Send an "Admin-closed" message including the original template. • Go to Step 19.
19	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	AUTO and IPS
Documents	N/A
Steps	• Go to END.

Modification of Private Enterprise Numbers (PENs)

Figure 1.2-20 is the top-level, step-by-step process that will be used for requests for Modification of existing PENs that follow the first come first served registration procedures.

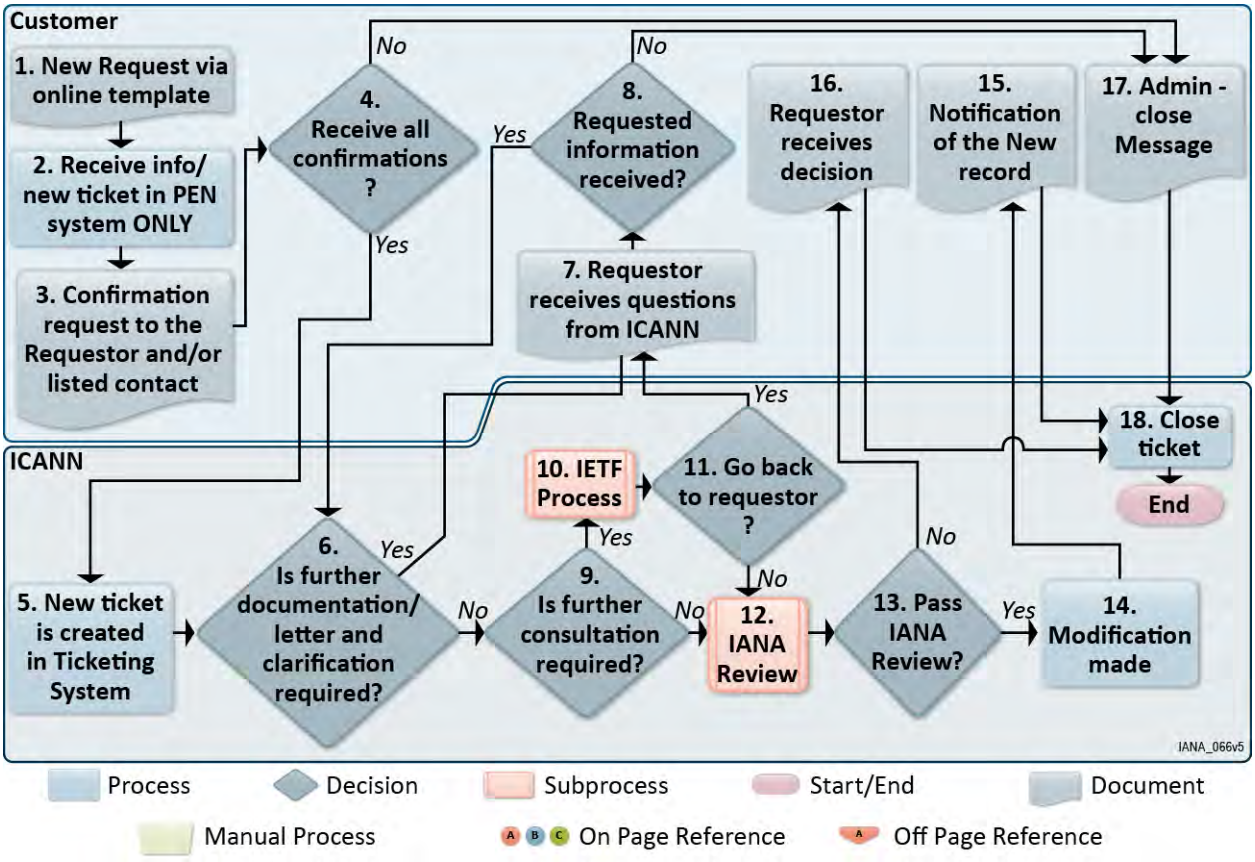


Figure 1.2-20. Private Enterprise Number (PEN) – Modification Request Process

Figure 1.2-21 is the step-by-step process that will be used for requests for Modification of existing Private Enterprise Numbers.

This process will define the PEN modification application workflow.

Definitions

- **AUTO** – Automatically through PEN and/or ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functiosn Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Requesters** – The requester who submitted the request.
- **List Contact** – The old contact listed in the PEN registry

- **IETF** – Internet Engineering Task Force
- **IESG** – Internet Engineering Steering Group
- **AD** – Area Director
- **WGC** – Working Group Chair

Figure 1.2-21. Private Enterprise Number (PEN) – Modification Request Process

1	NEW REQUEST SENT TO ICANN
Description	A request to edit an existing registration from IANA PEN registry is sent to ICANN.
Actor	Requester
Documents	N/A
Steps	• An online template is submitted via http://pen.iana.org/pen/ModifyPen.page. See **Appendix A** for template. • Only ONE template to update a PEN record is allowed at any given time. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET IN PEN SYSTEM ONLY**
Description	A new ticket is created in the PEN system ONLY. The request will NOT be created in ticketing system at this time.
Actor	AUTO
Documents	N/A
Steps	– Templates will automatically arrive in the PEN system. • Go to Step 3.
3	**REQUESTOR RECEIVES MESSAGE TO REQUEST CONFIRMATION(S)**
Description	• The PEN system automatically generates a "confirmation message" and sends it to relevant addresses to request confirmation(s): – The proposed email address specified in the template – The current email address associated with the requested PEN record in the PEN database • "Confirmation messages" will contain secure non-guessable and non-sequential web-based links responding to the requests.
Actor	AUTO and/or IPS
Documents	N/A
Steps	• The PEN system – Request state stays as "PENDING_CONFIRMATION." – The outgoing messages are logged in the system; two outgoing messages IF the listed email address and proposed email address are different addresses. – Request clock is automatically set to "the requestor" time. – 30-days timeout starts. – IPS reviews the ticket information. • When it is spam or test ticket, IPS can interfere and close the request: – Set the Request state to "Admin-close." No further action and outgoing message are required. • Ticket system: NO Event occurred. • In the PEN system the outgoing messages are logged in the system; two outgoing messages IF the listed email address and proposed email address are different addresses. • Request clock is automatically set to "the requestor" time • 30-days timeout starts.

	• IPS reviews the ticket information. • When it is spam or test ticket, IPS can interfere and close the request. • Go to Decision box 4.
4	**IS CONFIRMATION (OR CONFIRMATIONS) RECEIVED?**
Description	One or two confirmations are returned via the secure web-based link
Actor	Requester and/or Listed Contact
Documents	N/A
Steps	• A web-based "Confirmation" message is automatically displayed on the website when a contact visits a secure web-based link. • IF either the requester or the listed contact returns one confirmation via the secure web-based link: • This ticket will stay in this step until a response is received. Automated Pings/Reminders will be sent from the PEN system every seven calendar days. The request will be closed if there is no response after 30 days. Set Request state to "Expired." • If no (one confirmation) AND past 30 days, go to Step 17. • IF the requestor or listed contact CANCEL the request: – A web-based "Request has been cancelled" message is automatically displayed on the website. – Go to Step 17.
5	**CREATE NEW TICKET**
Description	The PEN request has been confirmed by either the current contact or the proposed contact. A new ticket is now created in the ticketing system.
Actor	AUTO and/or IPS
Documents	N/A
Steps	– Tickets will arrive in a new/appropriate queue *iana-pen@iana.org.* – Go to Decision box 6.
6	**IS FURTHER DOCUMENTATION/LETTER AND CLARIFICATIONS REQUIRED?**
Description	Review the information in the ticket. Check whether 1) a letter is required and 2) supplemental documents and information is required to verify the requested changes.
Actor	IPS or AUTO
Documents	N/A
Steps	• The PEN system • IPS checks the requested changes and compares with the existing record in the PEN database, determines whether we have received an email confirmation from the listed contact or a bounce from the listed email address, and if additional supplemental documents and/or a letter are required to process the requested changes. • If yes, go to Step 7. • If no, go to Decision box 9.
7	**REQUEST FOR MORE INFORMATION**
Description	A message is sent to the requester asking for more information regarding the requested changes.
Actor	IPS
Documents	N/A
Steps	• The PEN system records the outgoing message. • Ticketing system records the outgoing message. • IPS reviews the ticket information and sends a message to requester to request additional information and clarifications to verify the requested changes.

	• Go to Decision box 8.
8	**REQUESTED INFORMATION RECEIVED?**
Description	Has the requested documentation and/or information been sent back to ICANN by the requester?
Actor	Requester and/or Listed Contact
Documents	A signed letter, documentation of sale or acquisition, a copy of the original assignment notification, etc., in pdf or fax
Steps	• The PEN system records the returned information • Ticketing system records the returned information • Information has been sent back to ICANN for further review • This ticket will stay in this Step until a response is received. Automated Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • If yes, go to Decision box 6. • If no AND past 30 days, go to Step 17.
9	**IS FURTHER CONSULTATION REQUIRED?**
Description	Does ICANN need to consult with someone in the IETF community regarding this request?
Actor	IPS
Documents	N/A
Steps	• The PEN system – IPS changes "Request state" to "PENDING_IESG_REVIEW." – Request clock is automatically set to "Others" time. • Ticketing system – Are there questions that cannot be answered or determined by the requestor or ICANN that requires sending questions to the IETF (IESG, AD, WGC and/or Expert)? • If yes, go to Sub Process box 10. • If no, go to Sub Process box 12.
10	**IETF CONSULTATION SUB PROCESS**
Description	IETF Consultation Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	Go to Decision box 11.
11	**NEED TO GO BACK TO THE REQUESTER?**
Description	Does ICANN need to go back to the requester with requests for clarification and/or questions?
Actor	PPM or IPS
Documents	Additional documentation, if required
Steps	• Determine if ICANN needs to go back to the requester with questions/clarification. • If yes, go to Step. • If no, go to Sub Process box 12.
12	**IANA REVIEW SUB PROCESS**
Description	IANA Review Sub Process
Actor	IPS
Documents	N/A
Steps	Go to Step 13
13	**PASS IANA REVIEW?**
Description	Did the request pass IANA Review?
Actor	IPS

Documents	N/A
Steps	• The IANA Review result is recorded in the ticketing system. • If yes, go to Action box 14. • If no, go to Action box 16.
14	**MODIFICATION COMPLETED**
Description	The PEN record has been updated in the IANA PEN registry.
Actor	AUTO and IPS
Documents	N/A
Steps	• The PEN system – Change "Request state" to "MODIFIABLE." – Update the registry. • Ticketing system – IPS changes ticket state to "open." – IPS changes the IANA_Prot-Param_State to "Modifiable." – IPS logs the IANA Review result in the ticket. • Go to Step 15.
15	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the modification has been completed.
Actor	AUTO and IPS
Documents	N/A
Steps	• Send a "Completion" message including the details of the new information to the requester (current contact). • The PEN system records the outgoing "Completion" message. • Ticketing system records the outgoing "Completion" message in RT. • The changes will be visible in the IANA PEN registry. • Go to Action box 19.
16	**NOTIFICATION TO REQUESTER ABOUT THE DECISION (PER OFAC)**
Description	Notify the requester that the request cannot be processed.
Actor	PPM
Documents	An email message informing the requester that the request can not be processed at this time.
Steps	• The PEN system – Record the outgoing message. • Send email to the requester. • Go to Action box 18.
17	**"ADMIN-CLOSED" NOTIFICATION TO REQUESTER**
Description	Inform the requester that the request has been administratively closed due to the one of the following scenarios: • Past 30 days • Incomplete information or lack of supportive documentation • Rejected by the listed contact or other reasons
Actor	AUTO or IPS
Documents	N/A
Steps	• The PEN system – Record the outgoing "Admin-closed" message. • Ticketing system – Record the outgoing "Admin-closed" message.

	• Send an "Admin-closed" message including the original template. • Go to Action box 18.
18	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	AUTO
Documents	N/A
Steps	• The PEN system: no action required. • Tecketing system – Change ticket state to "Resolved." • Go to END.

Removal of Private Enterprise Numbers (PENs)

Figure 1.2-22 shows the top-level, step-by-step process that will be used for requests for Removal of existing Private Enterprise Numbers that follow the first come first served registration procedures.

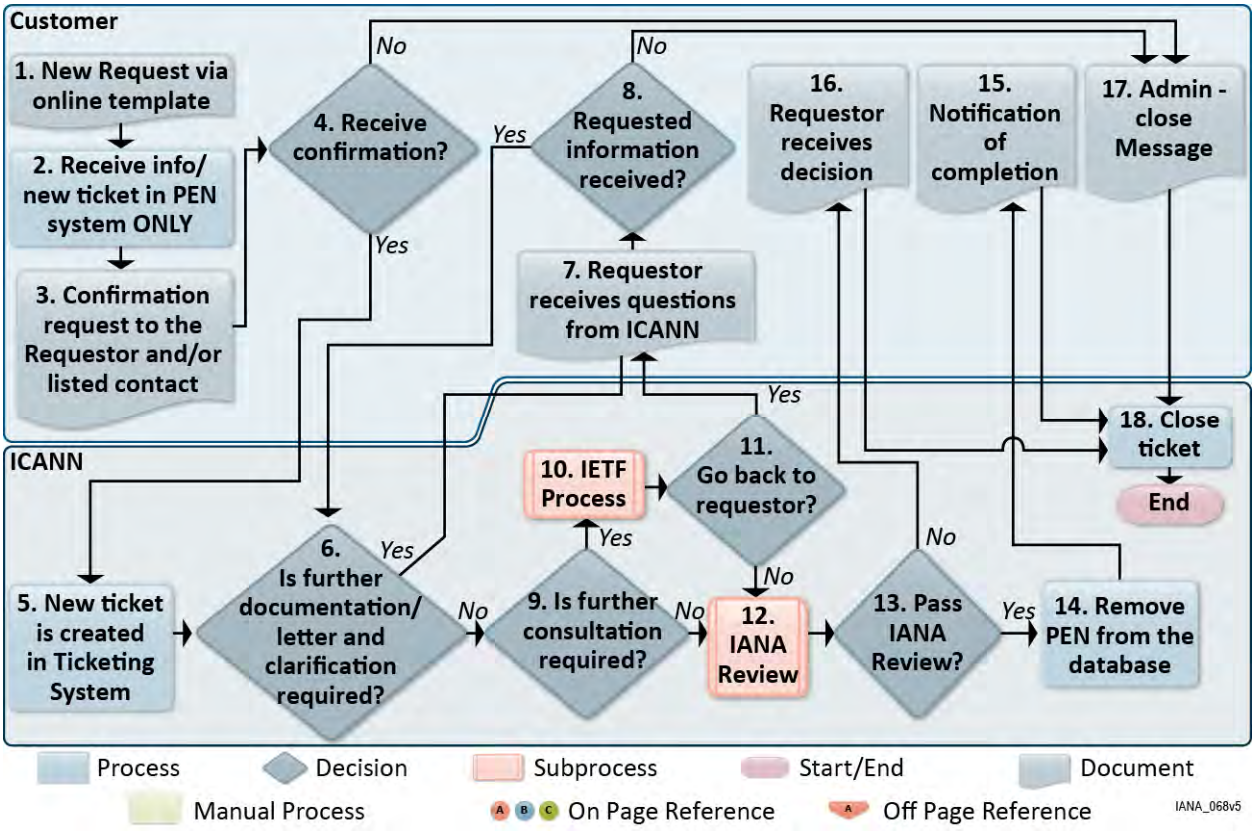


Figure 1.2-22. Private Enterprise Number (PEN) – Removal Request Process

Figure 1.2-23 presents the top-level, step-by-step process that will be used for requests for Removal of existing PENs that follow the FCFS registration procedures.

Definitions

- **AUTO** – Automatically through PEN and/or ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functiosn Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Requesters** – The requester who submitted the request
- **List Contact** – The old contact listed in the PEN registry
- **IETF** – Internet Engineering Task Force
- **IESG** – Internet Engineering Steering Group
- **AD** – Area Director
- **WGC** – Working Group Chair

Figure 1.2-23. Private Enterprise Number (PEN) – Removal Request Process

1	NEW REQUEST SENT TO ICANN
Description	A request to remove an existing registration from IANA PEN registry is sent to ICANN.
Actor	Requester
Documents	N/A
Steps	• An online template is submitted via a template form. Only ONE template to update a PEN record is allowed at any given time. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET IN PEN SYSTEM ONLY**
Description	A new ticket is created in the PEN system ONLY. The request will NOT be created in ticketing system at this time.
Actor	AUTO
Documents	N/A
Steps	– Templates will automatically arrive in the PEN system. – • Go to Step 3.
3	**REQUESTOR RECEIVES MESSAGE TO REQUEST CONFIRMATION(S)**
Description	• The PEN system automatically generates a "confirmation message" and sends it to relevant addresses to request confirmation(s): – 1) the proposed email address specified in the template – 2) the current email address associated with the requested PEN record in the PEN database • "Confirmation messages" will contain secure non-guessable and non-sequential web-based links responding to the requests.
Actor	AUTO and/or IPS
Documents	N/A
Steps	• The PEN system records the outgoing messages and logs in the system if the listed email

	address and proposed email address are different addresses. – 30-days timeout starts. – Review the ticket information. • When it is spam or test ticket, IPS can interfere and close the request. • Go to Decision box 4.
4	**IS CONFIRMATION (OR CONFIRMATIONS) RECEIVED?**
Description	One or two confirmations are returned via the secure web-based link.
Actor	Requester and/or Listed Contact
Documents	N/A
Steps	• A web-based "Confirmation" message is automatically displayed on the website when a contact visits a secure web-based link. • IF either the requester or the listed contact returns one confirmation via the secure web-based link: – The PEN system records the returned confirmation and timestamps. – The PEN system records both returned confirmations and timestamps. – This ticket will stay in this Step until a response is received. Automated Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • If yes, go to Decision box 5. • If no AND past 30 days, go to Action box 18. • IF the requestor or listed contact CANCEL the request. – A web-based "Request has been cancelled" message is automatically displayed on the website. – Go to Step 17.
5	**CREATE NEW TICKET**
Description	The PEN request has been confirmed by either the current contact or the proposed contact. A new ticket is now created in the IANA ticketing system.
Actor	AUTO and/or IPS
Documents	N/A
Steps	– Tickets will arrive in the appropriate new queue *iana-pen@iana.org.* – Ticket is manually assigned to an IPS. • Go to Decision box 6.
6	**IS FURTHER DOCUMENTATION/LETTER AND CLARIFICATIONS REQUIRED?**
Description	Review the information in the ticket. Check whether 1) a letter is required and 2) supplemental documents and information is required to verify the requested changes.
Actor	IPS or AUTO
Documents	N/A
Steps	• The PEN system – Request state—no change – Request clock is still in the "IANA" time—no change. • Ticketing system – IIPS checks the requested changes and compares them with the existing record in the PEN database, determines whether we have received an email confirmation from the listed contact or a bounce from the listed email address, and if additional supplemental documents and/or a letter are required to process the removal request. • If yes, go to Step 7. • If no, go to Decision box 9.
7	**REQUEST FOR MORE INFORMATION**
Description	A message is sent to the requester asking for more information regarding the requested

	changes.
Actor	IPS
Documents	N/A
Steps	• The PEN system records the outgoing message. • The ticketing system records outgoing message. • IPS reviews the ticket information and sends a message to the requester to request additional information and clarifications to verify the requested changes. • Go to Decision box 8.
8	**REQUESTED INFORMATION RECEIVED?**
Description	Has the requested documentation and/or information been sent back to ICANN by the requester?
Actor	Requester and/or Listed Contact
Documents	A signed letter, a copy of the original assignment notification, etc., in pdf or fax
Steps	• The PEN system records the returned information. • Ticketing system records the returned information. • Information has been sent back to ICANN. • This ticket will stay in this Step until a response is received. Automated Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • If yes, go to Decision box 6. • If no AND past 30 days, go to Step 17.
9	**IS FURTHER CONSULTATION REQUIRED?**
Description	Does ICANN need to consult with someone in the IETF community regarding this request?
Actor	IPS
Documents	N/A
Steps	• The PEN system – IPS changes “Request state” to “PENDING_IESG_REVIEW.” – Request clock is automatically set to “Others” time. – • Are there questions that cannot be answered or determined by the requestor that require IANA to go to the IETF (IESG, AD, WGC and/or Expert)? • If yes, go to Sub Process box 10. • If no, go to Sub Process box 12.
10	**IETF CONSULTATION SUB PROCESS**
Description	IETF Consultation Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	Go to Decision box 11.
11	**NEED TO GO BACK TO THE REQUESTER?**
Description	Does ICANN need to go back to the requester with requests for clarification and/or questions?
Actor	PPM or IPS
Documents	Additional documentation if required
Steps	• Determine if ICANN needs to go back to the requester with questions/clarification. • If yes, go to Step 7. • If no, go to Sub Process box 12.
12	**IANA REVIEW SUB PROCESS**
Description	IANA Review Sub Process

Actor	IPS
Documents	N/A
Steps	• Go to Decision box 13.
13	**PASS IANA REVIEW?**
Description	Did the request pass IANA Review?
Actor	IPS
Documents	N/A
Steps	• The IANA Review result is recorded in the ticketing system. • If yes, go to Action box 14. • If no, go to Step 16.
14	**UPDATE THE PEN DATABASE**
Description	The PEN record is immediately being removed from the IANA PEN registry.
Actor	AUTO
Documents	N/A
Steps	• The PEN system updates the registry. • Go to Action box 15.
15	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the modification has been completed.
Actor	AUTO
Documents	N/A
Steps	• Send a “Completion” message to the requester (current contact). • The PEN system records the outgoing “Completion” message. • Ticketing system records the outgoing “Completion” message. • Go to Action box 18.
16	**NOTIFICATION TO REQUESTER ABOUT ICANN DECISION (PER OFAC)**
Description	Notify the requester that the request can not be processed.
Actor	PPM
Documents	N/A
Steps	• The PEN system records the outgoing message. • Send email to the requester. • Go to Action box 18.
17	**“ADMIN-CLOSED” NOTIFICATION TO REQUESTER**
Description	Inform the requester that the request has been administratively closed due to the one of following scenarios: • Past 30 days • Incomplete information or lack of supportive documentation • Rejected by the listed contact or other reasons
Actor	AUTO or IPS
Documents	N/A
Steps	• The PEN system records the outgoing “Admin-closed” message. • Ticketing system records the outgoing “Admin-closed” message. • Send an “Admin-closed” message including the original template. • Go to Action box 18.
18	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	AUTO
Documents	N/A

Steps	• Go to END.

Expert Review protocol parameter request process (Also includes Specification Required)

Figure 1.2-24 shows the top-level process that will be used for requests for protocol parameters that follow the Expert Review registration procedures. Requests that follow the Specification Required policy will also follow this process, as there is a mandatory Expert Review as part of the IETF defined process. Examples of Expert Review protocol parameters are port numbers and media types.

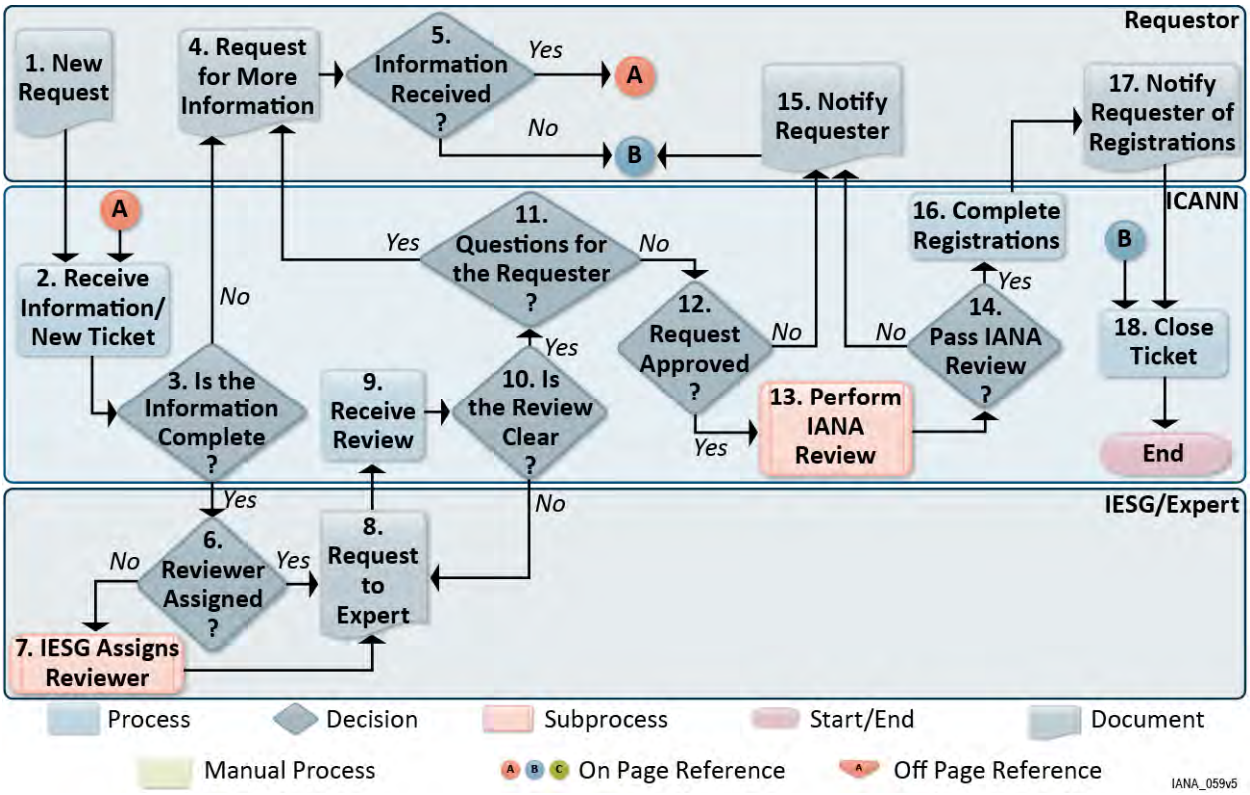


Figure 1.2-24. Expert Review Process

Figure 1.2-25 shows the top-level process that will be used for requests for protocol parameters that follow the Expert Review registration procedures.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functions Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist

- **PPM** – Protocol Parameter Manager
- **Requesters** – the requester who submitted the request
- **Expert** – the Designated Expert who reviews the request
- **IESG** – Internet Engineering Steering Group

Figure 1.2-25. Expert Review Process Step-by-Step Description

1	NEW REQUEST SENT TO ICANN
Description	A request for a new registration in IANA registries is sent to ICANN.
Actor	Requester
Documents	N/A
Steps	• A message is sent via email or through an online template. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created. Ticketing system automatically puts the ticket in the correct queue or the ticket is manually placed in the appropriate queue.
Actor	AUTO and/or IPS
Documents	N/A
Steps	• Tickets not sent directly to the ticket queue are manually moved to the appropriate queue. • Some tickets will automatically arrive in the appropriate queue. • Ticket is manually assigned to an IPS. • Go to Decision box 3.
3	**IS INFORMATION COMPLETE?**
Description	Review the information in the ticket. Check to make sure all required information for the registration requested is included.
Actor	IPS
Documents	N/A
Steps	• Review the ticket information. • Check which registry they are requesting a parameter in. • Are all criteria met according to the governing RFC? • If yes, go to Decision box 6. • If no, go to Action box 4.
4	**REQUEST FOR MORE INFORMATION**
Description	A message is sent to the requester asking for more information regarding the requested parameter registration.
Actor	IPS
Documents	N/A
Steps	• Send message to requester. • Ask clarifying questions as needed. • Change custom state to “Waiting on Requester.” • Change ticket state to “stalled.” • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • Go to Decision box 5.
5	**INFORMATION RECEIVED?**
Description	Has the requested information been sent back to ICANN by the requester?
Actor	IPS
Documents	N/A

Steps	• Information has been sent back to ICANN. • If yes, go to Action box 2. • If no AND past 30 days, go to Action box 15.
6	**REVIEWER ASSIGNED?**
Description	Identify the expert who should review this request.
Actor	IPS
Documents	N/A
Steps	• Has an expert been designated to review requests in this registry? • If yes, go to Action box 8. • If no, go to Sub Process box 7.
7	**IESG ASSIGNS REVIEWER SUB PROCESS**
Description	IESG Consultation Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	• Go to Action box 8.
8	**REQUEST TO EXPERT**
Description	ICANN sends Expert a request for review or clarification.
Actor	IPS
Documents	N/A
Steps	• Forward request to the designated expert. • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. If no response after 30 days, go to Action box 7. • Go to Action box 9.
9	**RECEIVE REVIEW**
Description	The Expert sends his/her review to ICANN.
Actor	Expert/IPS
Documents	N/A
Steps	• Ticket state is automatically set to “open.” • Change custom state to “In Progress.” • Go to Decision box 10.
10	**IS THE REVIEW CLEAR?**
Description	Determine whether ICANN needs more information from the reviewer before proceeding.
Actor	IPS
Documents	N/A
Steps	• Can ICANN determine what to do next, based on the expert’s instructions? • If yes, go to Decision box 11. • If no, go to box 8.
11	**QUESTIONS FOR THE REQUESTER?**
Description	Does the expert want more information from the requester?
Actor	IPS
Documents	N/A
Steps	• If yes, go to Action box 4. • If no, go to Decision box 12.
12	**REQUEST APPROVED?**
Description	Did the expert approve this request?
Actor	IPS
Documents	N/A

Steps	• The expert doesn't want more information from the requester. Has the expert approved this request for registration? • If yes, go to Sub Process 13. • If no, go to Action box 15.
13	**IANA REVIEW SUB PROCESS**
Description	IANA Review Sub Process
Actor	IPS
Documents	N/A
Steps	• Go to Decision box 10.
14	**PASS IANA REVIEW?**
Description	Did the request pass IANA Review?
Actor	IPS
Documents	N/A
Steps	• If yes, go to Action box 16. • If no, go to Action box 15.
15	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the registrations cannot be made.
Actor	IPS
Documents	N/A
Steps	• Write to the requester and explain that the registration cannot be completed. • Go to Action box 18.
16	**COMPLETE REGISTRATIONS**
Description	Perform the actions in the IANA Registries.
Actor	IPS
Documents	N/A
Steps	• Complete registrations in existing registries. • Go to Action box 17.
17	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the request is complete
Actor	IPS
Documents	N/A
Steps	• Confirm that registrations are visible in the IANA Registries. • Write to the requester and send them details of registrations. • Go to Action box 18.
18	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	IPS
Documents	N/A
Steps	• Go to END.

IESG Approval protocol parameter request process

Figure 1.2-26 shows the top-level process that will be used for requests for protocol parameters that follow the IESG Approval registration procedures. Examples include DNS Label Types and Electronic Commerce Modelling Language (ECML) Parameter Types.

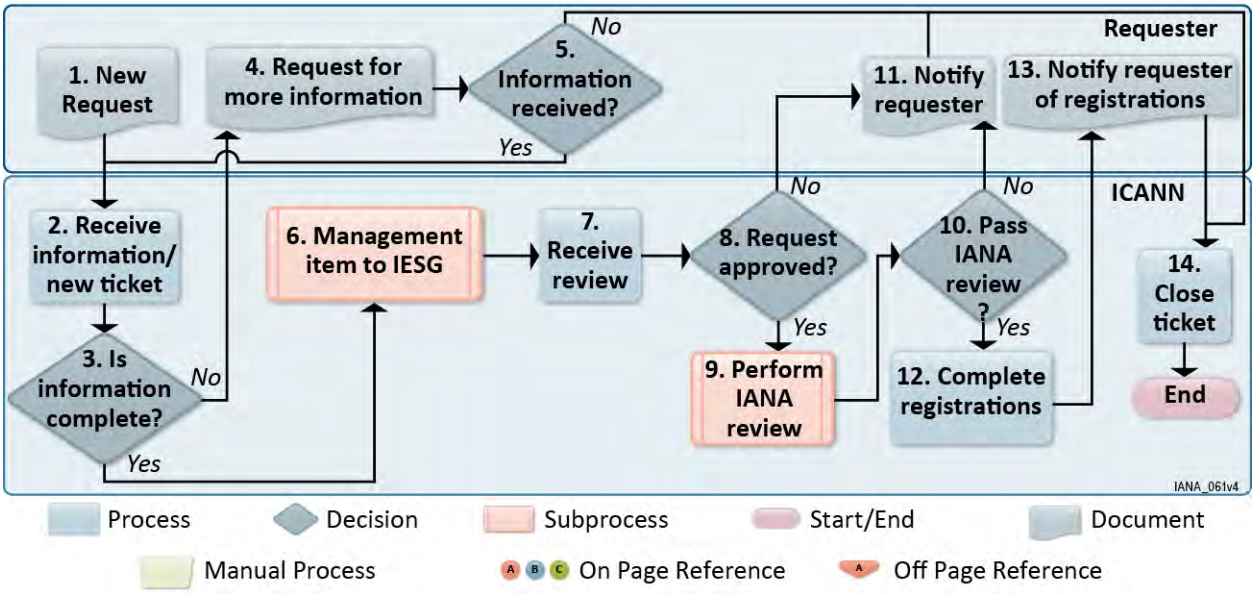


Figure 1.2-26. IESG Approval Process

Figure 1.2-27 shows the top-level process will be used for requests for protocol parameters that follow the IESG Approval registration procedures.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functions Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Requesters** – the requester who submitted the request
- **IETF** – Internet Engineering Task Force
- **IESG** – Internet Engineering Steering Group

Figure 1.2-27. IESG Approval Process Step-by-Step Description

1	NEW REQUEST SENT TO ICANN
Description	A request for a new registration in IANA registries is sent to ICANN.
Actor	Requester
Documents	N/A
Steps	• A message is sent to iana@iana.org or to a specific queue via email or through an online template. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created. Ticketing system automatically puts the ticket in the correct queue or the ticket is manually placed in the appropriate queue.
Actor	AUTO and/or IPS
Documents	N/A
Steps	• Tickets that arrive in *iana@iana.org* are manually moved to the appropriate queue. • Some tickets will automatically arrive in the appropriate queue. • Ticket is manually assigned to an IPS. • Go to Decision box 3.
3	**IS INFORMATION COMPLETE?**
Description	Review the information in the ticket. Check to make sure all required information for the registration requested is included.
Actor	IPS
Documents	N/A
Steps	• Review the ticket information. • Check which registry they are requesting a parameter in. • Add the registry information if applicable to a custom field. • Are all criteria met according to the governing RFC? • If yes, go to Decision box 6. • If no, go to Action box 4.
4	**REQUEST FOR MORE INFORMATION**
Description	A message is sent to the requester asking for more information regarding the requested parameter registration.
Actor	IPS
Documents	N/A
Steps	• Send message to requester. • Ask clarifying questions as needed. • This ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. The request will be closed if there is no response after 30 days. • Go to Decision box 5.
5	**REQUESTED INFORMATION RECEIVED?**
Description	Has the requested information been sent back to ICANN by the requester?
Actor	IPS
Documents	N/A

Steps	• Information has been sent back to ICANN. • If yes, go to Action box 2. • If no AND past 30 days, go to Action box 14.
6	**IESG MANAGEMENT ITEM SUB PROCESS**
Description	IESG Management Item Sub Process
Actor	PPM or IPS
Documents	N/A
Steps	• Go to Action box 7.
7	**RECEIVE REVIEW**
Description	The IESG sends the IESG's decision to ICANN.
Actor	IESG
Documents	N/A
Steps	• Go to Decision box 8.
8	
Description	Request approved?
Actor	PPM or IPS
Documents	N/A
Steps	• If yes, go to Action box 9. • If no, go to Action box 11.
9	**IANA REVIEW SUB PROCESS**
Description	IANA Review Sub Process
Actor	IPS
Documents	N/A
Steps	• Go to Decision box 10.
10	**PASS IANA REVIEW?**
Description	Did the request pass IANA Review?
Actor	IPS
Documents	N/A
Steps	• If yes, go to Action box 12. • If no, go to Action box 11.
11	**NOTIFICATION TO REQUESTER**
Description	Notify the requester that the request cannot be processed.
Actor	PPM
Documents	N/A
Steps	• Send email to the requester. • Go to Action box 14.
12	**COMPLETE REGISTRATIONS**
Description	Perform the actions in the IANA registries.
Actor	IPS
Documents	N/A
Steps	• Complete registrations in existing registries.

	• Go to Action box 13.
13	**NOTIFICATION TO REQUESTER**
Description	Inform the requester that the registration has been completed.
Actor	IPS
Documents	N/A
Steps	• Confirm the registration is visible in the IANA registries. • Write to the requester and send them details of the registration completed. • Go to Action box 14.
14	**CLOSE TICKET**
Description	Final step to close the ticket.
Actor	IPS
Documents	N/A
Steps	• Go to END.

1.2.9.1.2 Disseminate listings of assigned Parameters; Review documents

ICANN will disseminate the listing of assigned protocol parameters through online publication on ICANN's IANA website. On the website, a list of every registry that ICANN maintains for the IETF will be found along with other important information including the document defining the registry, registration procedures, and the names of the IESG designated experts if applicable. Every time a new registry is created, ICANN will add the necessary information to the protocol parameters listing.

In addition to the listing of all the registries, registration procedures and documents defining the registries, ICANN will make available each registry in the required formats as requested by the defining RFC or through requests from the IETF. Most registries will be available in multiple formats: xml, text and csv. These multiple formats will allow viewers of the registries to use the information in ways that work for them.

ICANN will review Internet-Drafts requesting the creation of registries or revisions to existing registries to make sure they include all necessary information needed to perform those actions. ICANN will continue to review each document at pre-defined stages as defined by the IETF. Working closely with the IESG, ICANN will confirm the instructions, usually located in an "IANA Considerations" section, making sure that they have identified all the necessary pieces to a new registry (e.g., titles, registration procedures, initial registrations, and range of registry values if applicable). For updates to existing registries, ICANN will make sure that the request follows the existing registration procedures and any other established rules in the defining RFC. When Internet-Drafts do not clearly document the requested actions, ICANN will work together with the IESG, Working Group Chairs and Internet-Draft authors to resolve unresolved issues or unanswered questions. ICANN will participate in twice monthly teleconferences with the IESG where the Internet-Draft documents are discussed.

After the requested actions have been performed and the RFC-Editor has assigned a number for the published document, ICANN will review what has been published in the RFC and what will appear in the registry to verify there are no discrepancies. In the case of discrepancies, ICANN

will work with the RFC-Editor, RFC authors, Working Group Chairs, and Area Directors of the IESG to either make modifications to the maintained registries or to submit an RFC erratum to document the issue. During this process, the references in the registry that point to the approved document wil be changed from an Internet-Draft to the RFC number for the published document.

Figure 1.2-28 lists the process flowcharts that will be used to review technical documents (Internet-Drafts) and how information will get in the listing of the protocol parameter registries.

Figure 1.2-28. List of Process Flowcharts

FIGURE #	CHART TITLE	DESCRIPTION
2.1-29	Internet-Draft Last Call Process	This process will be used to review an Internet-Draft in IETF Last Call. The document is reviewed for proposed protocol parameter related actions, usually described in the "IANA Considerations" section of the document.
2.1-31	Internet-Draft Evaluation Process	This process will be used to review an Internet-Draft in IESG Evaluation. The document is compared to a version reviewed during Last Call to see if the requested actions are still clearly defined, as there can sometimes be changes between document versions. For I-Ds that are not going through the IETF process, this is the first official review that ICANN performs.
2.1-33	Internet-Draft Update Reference Process	This process will be used to update the references in the registries maintained by ICANN. After ICANN performs the actions during the Approvals process, ICANN puts placeholders as references until the final document is published in the form of an RFC.

Top level Last Call review of Internet-Drafts process

Figure 1.2-29 shows the top-level process that will be used for the review of Internet-Drafts that are entering the IETF Last Call and ends with ICANN's submission of review comments.

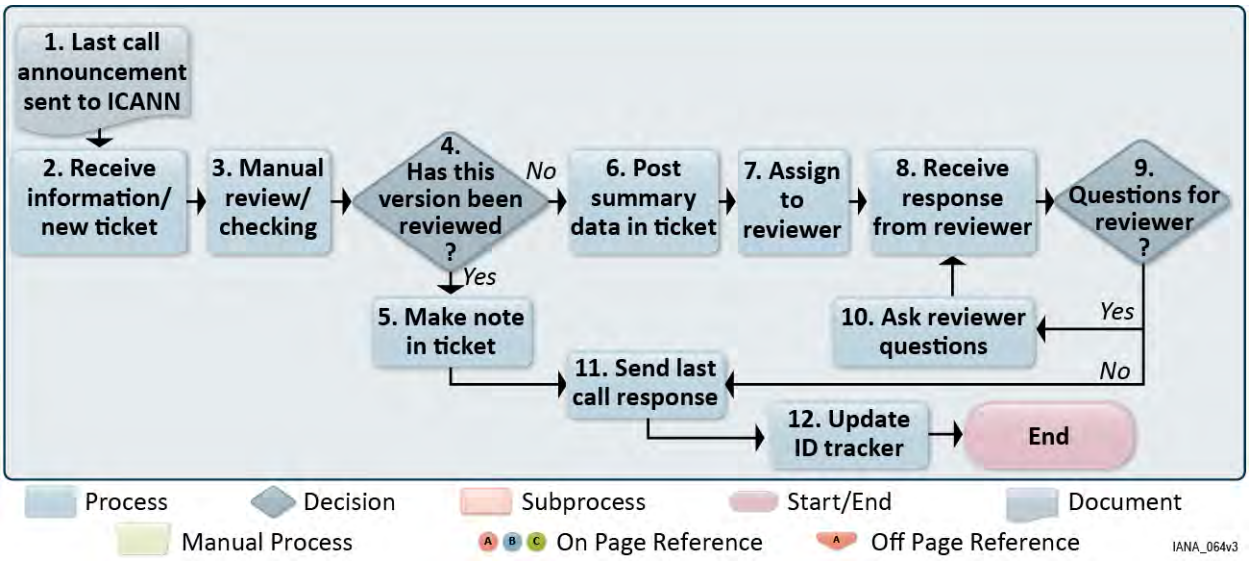


Figure 1.2-29. Internet-Draft Last Call Process

Figure 1.2-30 shows the top-level process that will be used for the review of I-Ds that are entering the IETF Last Call and ends with ICANN's submission of review comments.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functions Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Authors** – the authors of the Internet-Draft that has been approved for publication as an RFC
- **Reviewer** – reviews the Internet-Draft on ICANN's behalf and determines IANA Actions

Figure 1.2-30. Internet-Draft Last Call Process Step-by-Step Description

1	LAST CALL ANNOUNCEMENT SENT TO ICANN
Description	Notification that an Internet-Draft has entered IETF Last Call is sent to ICANN.
Actor	IETF Secretariat
Documents	N/A
Steps	• A message is sent to *drafts-lastcall@iana.org.* • Message from Secretariat comes in a specified format. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created and ticketing system automatically adds the ticket to the correct queue.
Actor	AUTO
Documents	N/A
Steps	• E-mail sent to *draft-approval@iana.org* is automatically added to the appropriate queue. • Tickets that arrive in *drafts-lastcall@iana.org* are manually moved to the appropriate ticketing system queue. • Ticket is manually assigned to an IPS. • Go to Action box 3.
3	**MANUAL REVIEW/CHECKING**
Description	Gather all information needed to determine the actions to be performed by ICANN. This step also includes filling in custom fields for the ticket.
Actor	IPS
Documents	N/A
Steps	• Add the draft string to a custom field. • Add the version number to a custom field. • Refer to the Last Call expiration date in the message and fill in the "Last Call Duration" and "Due Date" fields accordingly. • Check for any related tickets and add as a "refers to." • Go to Decision box 4.

4	HAS THIS VERSION BEEN REVIEWED?
Description	Staff checks to see if a Last Call ticket for the same version of the document has already been processed.
Actor	IPS
Documents	N/A
Steps	• Input to making decision. • Has staff already sent the IESG a review for this version of the document? • If yes, go to Decision box 5. • If no, go to Action box 6.
5	**MAKE NOTE IN TICKET**
Description	Staff adds comment in ticket noting that this version of the document has already been reviewed.
Actor	IPS
Documents	N/A
Steps	• Staff comments in ticket. • Go to Action box 11.
6	**POST SUMMARY DATA IN TICKET**
Description	Staff summarizes document data for the reviewer's benefit.
Actor	IPS
Documents	Internet-Draft posted on IETF website
Steps	• Open the I-D and check its length. • Send the reviewer a note from the ticket listing the document's title, string, length, and due dates. • Go to Action box 7.
7	**ASSIGN TO REVIEWER**
Description	Assign the ticket to reviewer who will determine what (if any) ICANN actions this Internet-Draft will require upon approval.
Actor	IPS
Documents	N/A
Steps	• Assign ticket to reviewer. • Go to Action box 8.
8	**RECEIVE RESPONSE FROM REVIEWER**
Description	The reviewer sends his response to the ticket.
Actor	Reviewer
Documents	N/A
Steps	• ICANN receives review. • Go to Decision box 9.
9	**DOES ICANN HAVE QUESTIONS FOR THE REVIEWER?**
Description	Do questions or requests for clarification need to be sent to the reviewer?
Actor	IPS
Documents	N/A
Steps	• Determine if further questions need to be asked to clarify the review. • Identify what questions need to be asked or what needs to be clarified. • If yes, go to Action box 10. • If no, go to Action box 11.
10	**ASK REVIEWER QUESTIONS**
Description	Send an email to the reviewer with questions regarding actions.

Actor	IPS
Documents	N/A
Steps	• Send email to reviewer. • Go to Action box 8.
11	**SEND LAST CALL RESPONSE**
Description	Send list of ICANN actions to authors, WGCs and IESG.
Actor	IPS
Documents	N/A
Steps	• ICANN sends list of actions to be performed and/or questions to the authors, relevant IETF Working Group chairs and IESG. • Go to Action box 12.
12	**UPDATE I-D TRACKER**
Description	Post response in the IETF I-D tracker.
Actor	IPS
Documents	N/A
Steps	• Post the same comments sent to the authors and IESG in Action box 11 in the IETF's I-D tracker. • Go to END.

Top-level Evaluation Review of I-Ds Process

Figure 1.2-31 is the top-level process that will be used for the review of Internet-Drafts that are entering the IESG Evaluation step and ends with ICANN's submission of review comments.

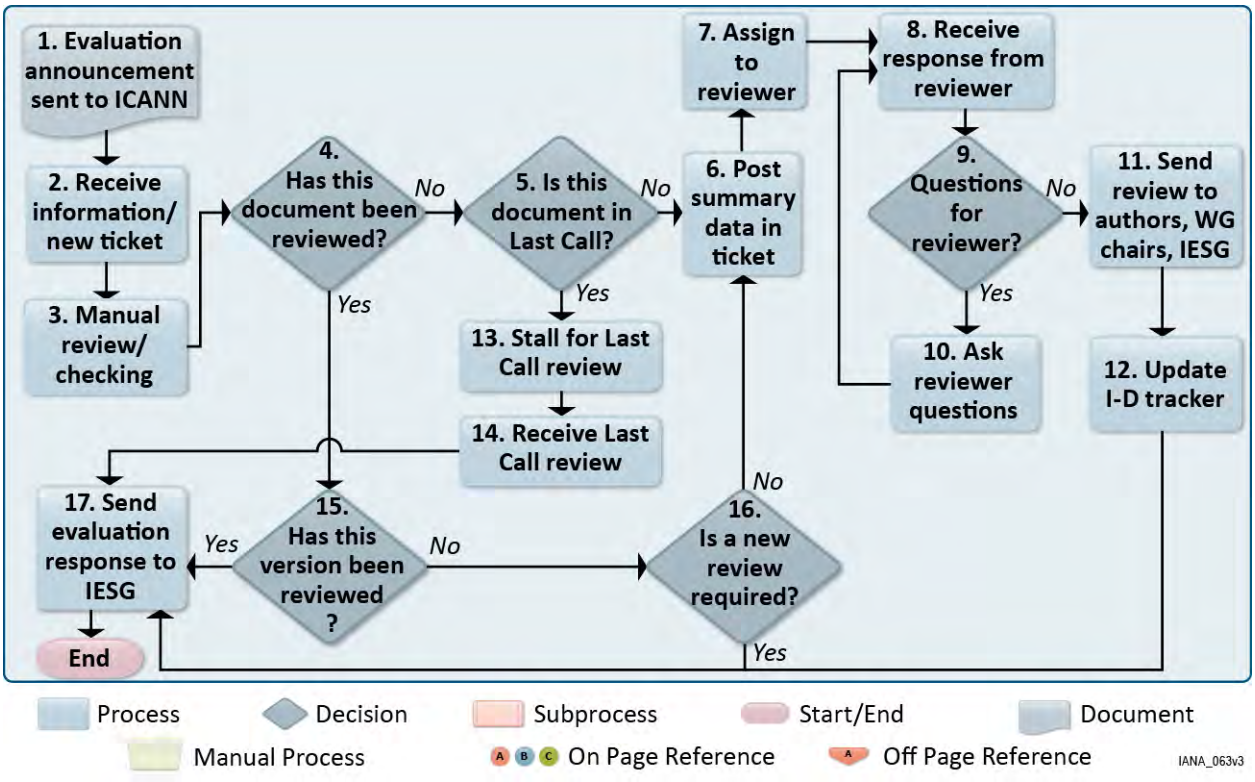


Figure 1.2-31. Internet-Draft Evaluation Process

Figure 1.2-32 is the top-level process that will be used for the review of I-Ds that are entering the IESG Evaluation step and ends with ICANN's submission of review comments.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functions Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Authors** – the authors for the I-D that has been approved for publication as an RFC
- **Reviewer** – reviews the I-D on ICANN's behalf and determines IANA Actions

Figure 1.2-32. Internet-Draft Evaluation Process Step-by-Step Description

1	LAST CALL ANNOUNCEMENT SENT TO ICANN
Description	Notification that an Internet-Draft has entered IESG Evaluation is sent to ICANN.
Actor	IETF Secretariat
Documents	N/A
Steps	• A message is sent to *drafts-eval@iana.org.* • Message from Secretariat comes in a specified format. • Go to Action box 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created and ticketing system automatically adds the ticket to the correct queue.
Actor	AUTO
Documents	N/A
Steps	• E-mail sent to *draft-approval@iana.org* is automatically added to the appropriate queue. • Tickets that arrive in *drafts-eval@iana.org* are manually moved to the appropriate queue. • Ticket is manually assigned to an IPS. • Go to Action box 3.
3	**MANUAL REVIEW/CHECKING**
Description	Gather all information needed to determine the actions to be performed by ICANN. This step also includes filling in custom fields for the ticket.
Actor	IPS
Documents	N/A
Steps	• Add the draft string to a custom field. • Add the version number to a custom field. • Check for any related tickets and add as a "refers to." • Go to Decision box 4.
4	**HAS THIS DOCUMENT BEEN REVIEWED?**
Description	Staff checks to see if a Last Call ticket for the document has already been resolved.

Actor	IPS
Documents	n/a
Steps	• Input to making decision Has staff already sent the IESG a Last Call review for this document? • If yes, go to Decision box 15 • If no, go to Decision box 5
5	**IS THIS DOCUMENT IN LAST CALL?**
Description	Staff checks to see if a Last Call ticket for the document is currently in process.
Actor	IPS
Documents	N/A
Steps	• Input to making decision. • Is there an open ticket for this document in the drafts-last call queue? • If yes, go to Action box 13. • If no, go to Action box 6.
6	**POST SUMMARY DATA IN TICKET**
Description	Staff summarizes document data for the reviewer's benefit.
Actor	IPS
Documents	Internet-Draft posted on IETF website.
Steps	• Open the Internet-Draft and check its length. • Send the reviewer a note from the ticket listing the document's title, string, length, and due date. • Go to Action box 7.
7	**ASSIGN TO REVIEWER**
Description	Assign the ticket to reviewer who will determine what (if any) IANA Actions this I-D will require upon approval.
Actor	IPS
Documents	N/A
Steps	• Assign ticket to reviewer. • Go to Action box 8.
8	**RECEIVE RESPONSE FROM REVIEWER**
Description	The reviewer sends his response to the ticket.
Actor	Reviewer
Documents	N/A
Steps	• ICANN receives review. • Go to Decision box 9.
9	**DOES ICANN HAVE QUESTIONS FOR THE REVIEWER?**
Description	Do questions or requests for clarification need to be sent to the reviewer?
Actor	IPS
Documents	N/A
Steps	• Input to making decision. • Determine whether further questions need to be asked to clarify the review. • Identify what questions need to be asked or what needs to be clarified.

	• If yes, go to Action box 10. • If no, go to Action box 11.
10	**ASK REVIEWER QUESTIONS**
Description	Send an email to the Reviewer with questions regarding actions.
Actor	IPS
Documents	N/A
Steps	• Send email to Reviewer. • Go to Action box 8.
11	**SEND REVIEW TO AUTHORS, WG AND IESG**
Description	Send list of IANA Actions to authors, Working Group chairs, and IESG.
Actor	IPS
Documents	N/A
Steps	• ICANN sends list of actions to be performed and/or questions to the authors, relevant IETF WGCs and IESG. • Go to Action box 12.
12	**UPDATE I-D TRACKER**
Description	Post review in the IETF I-D tracker
Actor	IPS
Documents	N/A
Steps	• Post the same comments sent to the authors and IESG in Action box 11 in the IETF's I-D tracker. • Go to Action box 17.
13	**STALL FOR LAST CALL REVIEW**
Description	Stall ticket and note that it is waiting for the document's Last Call review to end.
Actor	IPS
Documents	N/A
Steps	• Go to Action box 14.
14	**RECEIVE LAST CALL REVIEW**
Description	Evaluation processing can be resumed upon receipt of Last Call review and subsequent resolution of Last Call ticket.
Actor	IPS/reviewer
Documents	N/A
Steps	• Receive Last Call review and follow process to resolution of Last Call ticket. • Go to Action box 17.
15	**HAS THIS VERSION BEEN REVIEWED?**
Description	Staff checks to see whether a Last Call ticket for the same version of the document has already been processed.
Actor	IPS
Documents	N/A
Steps	• Input to making decision. • Has staff already sent the IESG a review for this version of the document? • If yes, go to Action box 17.

	• If no, go to Action box 16.
16	**IS A NEW REVIEW REQUIRED?**
Description	Staff determines whether the new version of the document has changed enough to require a new review.
Actor	IPS
Documents	Multiple versions of Internet-Draft posted on IETF website.
Steps	• Input to making decision. • Review difference between current version of the document and the version reviewed during Last Call. • Determine whether IANA Actions are clear. • If yes, go to Action box 17. • If no, go to Action box 6.
17	**SEND EVALUATION RESPONSE TO IESG**
Description	Send Evaluation Response telling IESG whether the document requires IANA Actions and whether the actions (if any) are clear.
Actor	IPS
Documents	N/A
Steps	• Check most recent review to determine whether the document requires actions and whether the actions are clear. • Send message to IESG that says whether there are actions and whether IANA Considerations are “OK” or “NOT OK.” • Go to END.

Top-level Updating References for Internet-Drafts process

Figure 1.2-33 is the top-level process that will be used for the review of published RFCs, beginning at the announcement of the publication and ending with ICANN updating all references in the protocol parameter registry and in the listing of registries.

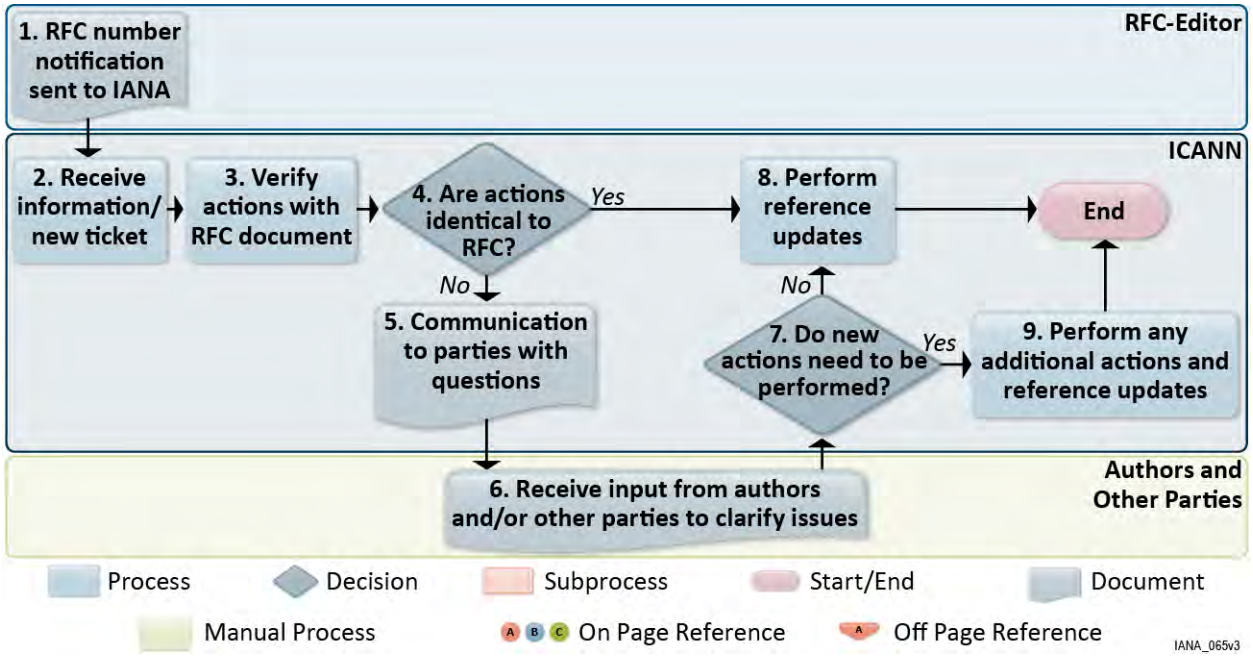


Figure 1.2-33. Internet-Draft Update Reference Process

Figure 1.2-34 is the top-level process that will be used for the review of published RFCs, beginning at the announcement of the publication and ending with ICANN updating all references in the protocol parameter registry and in the listing of registries.

Definitions

- **AUTO** – Automatically through ticketing system
- **IANA Actions** – The actions defined by the IETF theat will be performed by ICANN as the IANA Functions Operator
- **IANA Considerations** – The actions defined in the IANA Considerations section of the RFC that will be performaed by ICANN as the IANA Functions Operator
- **IANA Review** – The process to confirm adherence to national laws and international agreements
- **IPS** – IANA Project Specialist
- **PPM** – Protocol Parameter Manager
- **Authors** – the authors for the I-D that has been approved for publication as an RFC
- **AD** – Area Director for the I-D *(http://tools.ietf.org/area/)*
- **RFC-Editor** – *http://www.rfc-editor.org/index.html*

Figure 1.2-34. Internet-Draft Update Reference Process Step-by-Step Description

1	RFC NUMBER NOTIFICATION SENT TO ICANN
Description	An RFC-to-be notification or Intent to a new RFC is sent to ICANN.
Actor	RFC-Editor
Documents	Email notification from RFC Editor
Steps	• A message is sent to *drafts-update-ref@icann.org.* • Message contains the following basic information:

	– The RFC Editor has made the following assignment: • RFC ### (draft-string) • Title of the document • Date of Pub: Month Year • Go to Step 2.
2	**RECEIVE INFORMATION/NEW TICKET**
Description	A new ticket is created and ticketing system automatically adds the ticket to the correct queue.
Actor	AUTO
Documents	N/A
Steps	• E-mail sent to *drafts-update-ref@icann.org* is automatically added to the appropriate queue. • Ticket is manually assigned to an IPS. • Go to Step 3.
3	**VERIFY IANA ACTIONS WITH RFC DOCUMENT**
Description	Review the published RFC and determine if the requested registrations in the IANA Considerations section match those in the IANA registries. This step also includes filling in custom fields for the ticket.
Actor	IPS
Documents	*http://www.rfc-editor.org/rfcsearch.html,* previous "resolved" draft related tickets and, if applicable, any open or resolved tickets related to the RFC-to-be in ticketing system.
Steps	• Add the draft string to a custom field; the draft string can be located in the subject line and with the message. • Add the version number to a custom field; the version number can be located in the subject line. • Review the RFC and relevant registries to determine if they match. • Go to Step 4.
4	**ARE ACTIONS IDENTICAL TO RFC?**
Description	Are Actions identical to RFC?
Actor	IPS
Documents	RFC Email notification in Step 1 and *http://www.rfc-editor.org/rfcsearch.html*
Steps	• Verify if the requested actions (in IANA registries) are identical to the assignments documented in the IANA Considerations section in the RFC. • If yes, go to Step 9. • If no, go to Step 5.
5	**COMMUNICATION TO PARTIES WITH QUESTIONS**
Description	ICANN sends questions to Authors and/or RFC-Editor (if applicable) regarding the discrepancies.
Actor	IPS
Documents	N/A
Steps	• Identify the discrepancies between the IANA registries and the RFC, and send the questions to Authors for clarifications. • Go to Step 6.
6	**RECEIVE INPUT FROM AUTHORS AND/OR OTHER PARTIES TO CLARIFY ISSUES**
Description	Authors send back information to clarify the discrepancies.
Actor	Authors and/or other involved parties (i.e., experts, ADs, etc.)
Documents	N/A

Steps	• ICANN receives feedback from the authors to clarify the issues. • Identify if the issues have been answered. • The ticket will stay in this Action box until a response is received. Pings/Reminders will be sent every seven calendar days. If no response is received in a reasonable timeframe, IPS will bring this to the PPM's attention and/or escalate this ticket to the Area Directors (ADs) of the RFC. • Go to Step 7.
7	**DO NEW ACTIONS NEED TO BE PERFORMED?**
Description	Is there any new actions resulting from the Action box #6?
Actor	IPS
Documents	N/A
Steps	• Identify if an errata is required for the addressed discrepancy to be submitted to the RFC-Editor. • Determine if further questions need to go back to the authors for further clarification. • If yes, go to Step 9. • If no, go to Step 8.
8	**PERFORM REFERENCE UPDATES**
Description	Update the draft string in the IANA registries to the RFC numbers.
Actor	IPS
Documents	N/A
Steps	• Update draft string in both the IANA registries and Matrix to the RFC number. • Go to END.
9	**PERFORM ANY ADDITIONAL ACTIONS AND REFERENCE UPDATES**
Description	Perform any additional actions and update draft string in the IANA registries to the RFC number.
Actor	IPS
Documents	N/A
Steps	• Add/Edit/Remove any entries of assignments from the IANA registries upon confirmation by the Authors in Action Box #6; confirm with Authors for the additional edits if needed. • Update draft string in both the IANA registries and Matrix to the RFC number. • If an erratum is needed, authors (or ICANN) will submit errata to the RFC Editor. • Go to END.

In response to the IETF community's request for more transparency during the review of Internet-Drafts, the RFC-Editor, IETF Secretariat and ICANN collaborated on documentation for end-to-end tracking of documents in the IETF's datatracker (RFC 6359). ICANN will continue to work with the IETF to develop the mechanisms to record the information for reviews of Internet-Drafts, showing states of documents that are being reviewed by ICANN in the IETF's datatracker. ICANN will remain the authoritative source of information for the "IANA" states for documents that are being reviewed for protocol parameters actions.

1.2.9.1.3 Operate .ARPA TLD

ICANN understands the importance and responsibility of the management of .ARPA and, through direction of the IAB, will perform this requirement for the addition of new second-level domains to the .ARPA zone and updates to existing names.

ICANN will operate the .ARPA TLD within the current registration policies as documented in RFC 3172 and under the guidance of the IAB. The .ARPA domain is the "Address and Routing Parameter Area" domain and is designated for use exclusively for Internet-infrastructure purposes. The addition of new second-level domains in .ARPA must be requested and approved by the IAB, and the requests are usually documented in the form of an RFC. After an RFC creating a new second-level domain in .ARPA is approved for publication as an RFC, ICANN will create a request, in the form of a template (see **Appendix B**), to delegate a new second-level domain in .ARPA.

ICANN will perform Technical checks to see if the proposed name servers for the new .ARPA second-level name are working. These checks will include the following shown in **Figure 1.2-35**.

Figure 1.2-35. Technical Checks

TERMS AND DEFINITIONS USED	
The designated zone is the domain for which the change of delegation is sought, and for which IANA maintains the parent zone.	
For purposes of these technical checks, an authoritative name server is a DNS server that has been designated to answer authoritatively for the designated zone and is being requested to be listed in the delegation. It is recorded by its fully-qualified domain name, potentially along with its IP addresses.	
Name server tests are completed against each unique tuple of a hostname, an IP address and a protocol. If a hostname has multiple IP addresses, for example, the tests will be conducted against each IP address.	
Minimum Number of Name Servers	• There must be at least two NS records listed in a delegation, and the hosts must not resolve to the same IP address.
Valid Hostnames	• The hostnames used for the name servers must comply with the requirements for valid hostnames described in RFC 1123, section 2.1.
Name Server Reachability	• The name servers must answer DNS queries over both the User Datagram Protocol (UDP) and Transmission Control Protocol (TCP) on port 53. • Tests will be conducted from multiple network locations to verify the name server is responding.
Answer Authoritatively	• The name servers must answer authoritatively for the designated zone. Responses to queries to the name servers for the designated zone must have the "AA"-bit set. • This will be tested by querying for the Statement of Authority (SOA) record of the designated zone with no "RD"-bit set.
Network Diversity	• The name servers must be in at least two topologically separate networks. • A network is defined as an origin autonomous system in the BGP routing table. • The requirement is assessed through inspection of views of the BGP routing table.
Consistency Between Glue and Authoritative Data	• For name servers which have IP addresses listed as glue, the IP addresses must match the authoritative A and AAAA records for that host.
Consistency Between Delegation and Zone	• The set of Name Server (NS) records served by the authoritative name servers must match those proposed for the delegation in the parent zone.

TERMS AND DEFINITIONS USED	
Consistency Between Authoritative Name Servers	• The data served by the authoritative name servers for the designated zone must be consistent. • All authoritative name servers must serve the same NS record set for the designated domain. • All authoritative name servers must serve the same SOA record for the designated domain. • If for operational reasons the zone content fluctuates rapidly, the serial numbers need only be loosely coherent.
No Truncation of Referrals	• Referrals from the parent zone's name servers must fit into a non-EDNS0 UDP DNS packet; therefore, the DNS payload must not exceed 512 octets. • The required delegation information in the referral is a complete set of NS records and the minimal set of requisite glue records. The response size is assessed as a response to a query with a maximum-sized Qualified Name (QNAME).
The Minimal Set of Requisite Glue Records	• One A record, if all authoritative name servers are in-bailiwick of the parent zone; and, • One AAAA record, if there are any IPv6-capable authoritative name servers and all IPv6-capable authoritative name servers are in-bailiwick of the parent zone.
Prohibited Networks	• The authoritative name server IP addresses must not be in specially designated networks that are either not globally routable or are otherwise unsuited for authoritative name service. • IPv4 networks considered not globally routable are 0.0.0.0/8, 10.0.0.0/8, 127.0.0.0/8, 169.254.0.0/16, 172.16.0.0/12, 192.0.2.0/24, 192.168.0.0/16, 198.18.0.0/15, and 224.0.0.0/3. (See RFC 3330.) • IPv6 networks considered not globally routable are ::/128, ::1/128, 2001:2::/48, 2001:10::/28, 2001:DB8::/32, FC00::/7, and FE80::/10. (See RFC 5156.)
Other Prohibited Networks	• ::FFFF:0:0/96 (IPv4 mapped addresses, see RFC 4291) • 2001::/32 (Teredo, see RFC 4380) • 2002::/16 (6to4, see RFC 3056) • 192.88.99.0/24 (6to4, see RFC 3068)
No Open Recursive Name Service	• The authoritative name servers must not provide recursive name service. • This requirement is tested by sending a query outside the jurisdiction of the authority with the "RD"-bit set.
Same Source Address	• Responses from the authoritative name servers must contain the same source IP address as the destination IP address of the initial query.

The template request will be sent to the proposed administrative and technical contacts—those who will be responsible for the second-level domain, requesting confirmation and approval of the proposed template. After the confirmations from both the administrative and technical contacts are received, the technical checks will be repeated. After a successful pass, ICANN will send the request to Verisign, currently operating the .ARPA zone, for completion. Verisign will confirm that the second-level domain has been added to the .ARPA zone, and ICANN will confirm to both the administrative and technical contacts that the request is completed.

For both adding new second-level names or modifications to existing names in .ARPA, the below step-by-step process will be used. The only difference between adding new second-level names and making changes to existing names will be which party sends the text template

requesting the changes. For new second-level names, this step will be completed by ICANN after publication of the RFC.

Top-level Process for Managing the .ARPA Domain

Figure 1.2-36 is the top-level process that will be used for the .ARPA management.

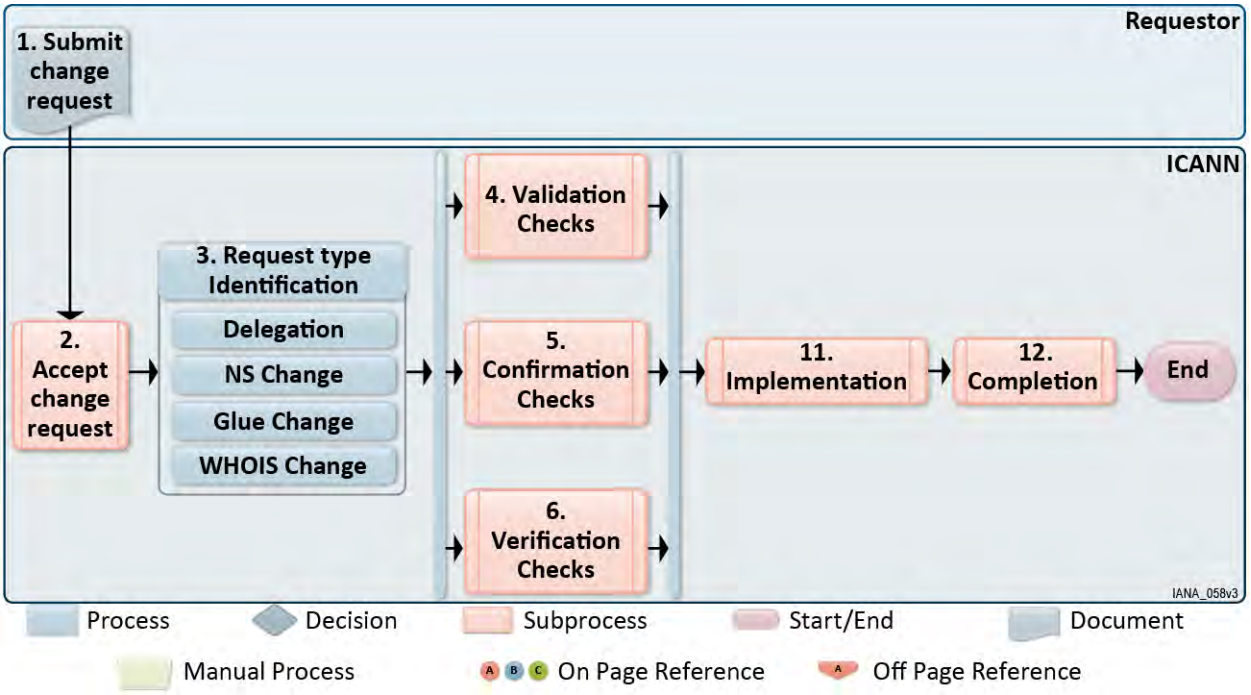


Figure 1.2-36. Process for .ARPA Management

The following steps include those listed below:

- **.ARPA Request —** A request is created when a template (see **Appendix B**) is submitted to ICANN. For requests adding a new second-level domain to the .ARPA zone, ICANN creates the request upon the publication of the RFC.
- **Validation Checks —** Technical checks
- **Procedural Checks —** Confirmations
- **Legal Checks —** Any necessary legal reviews are performed on the request.
- **Process Request —** For requests requiring changes to the .ARPA zone (e.g., new second-level names, name server changes, and DS records), the requests are sent to Verisign (current .ARPA administrator) for implementation. For requests requiring data changes (e.g., contact names, addresses, and phone numbers), the requests are processed by ICANN.
- **Request Confirmation —** The requester is informed of the registration and that the request is complete.

1.2.9.1.4 Implementation

ICANN understands the importance and responsibility of the implementation of DNSSEC in the .ARPA TLD. Through direction of the IAB and working with NTIA and Verisign, ICANN

understands the deployment of a replacement for the current interim agreement for DNSSEC in .ARPA will fulfill the requirement as described in this proposal.

ICANN notes that an interim arrangement for the deployment of DNSSEC in the .ARPA TLD was made in early 2010, and the .ARPA TLD was operationally signed on 2010-03-17. Under this interim arrangement, the .ARPA zone is signed and distributed by Verisign. ICANN understands this requirement to be direction to deploy production, long-term architecture for DNSSEC in .ARPA to replace the interim arrangement. ICANN commits to implementing such an arrangement. A proposed schedule and high-level summaries of the approach and implementation are included below.

ICANN observes that the interim arrangement has proven to be stable and considers that there is no operational urgency in replacing it. ICANN therefore proposes a conservative, measured approach to replacing the interim arrangement.

ICANN is and will continue to be committed to transparency in its operation of critical Internet infrastructure. Changes made to the technical operation of the .ARPA TLD will be widely announced, following the model of the wide technical review facilitated by ICANN, Verisign and NTIA in their successful deployment of DNSSEC in the root zone.

ICANN will follow a schedule for the production, long-term infrastructure supporting DNSSEC in the .ARPA TLD. The milestones specified refer to the proposed implementation, included below, and will be subject to change depending on the implementation plan agreed with NTIA and Verisign. A list of milestones is shown in **Figure 1.2-37.**

Figure 1.2-37. List of Milestones

STEP 1	Detailed technical proposal sent to RSSAC and the IAB for discussion.
STEP 2	Consensus reached with RSSAC and IAB on the detailed technical proposal.
STEP 3	Detailed technical proposal submitted to NTIA and Verisign.
STEP 4	Production DNSSEC infrastructure for ARPA deployed.
STEP 5	Dual operation
STEP 6	Report on dual operation period submitted to NTIA with proposal to enter full production.
STEP 7	Successor DS Resource Record Set (RRSet) submitted through IANA root zone management process.
STEP 8	Replacement NS RRSet submitted through IANA root zone management process.
STEP 9	Root Server Operators (A, B, C, D, E, F, G, H, I, K, L, M; J does not serve .ARPA currently) have all dropped the .ARPA zone from their servers.
STEP 10	Outgoing DS RRSet removal submitted through IANA root zone management process.
STEP 11	Final DS RRSet for ARPA published in root zone.
STEP 12	Full production

The following is a high-level description of what ICANN will propose as the architecture intended to illustrate the approach. ICANN will deliver a detailed technical proposal to NTIA and the IAB for discussion, as described in the proposed schedule, above. ICANN also will seek a review on its technical approach from RSSAC and the IAB and to address any concerns raised.

ICANN considers that operational security and stability of a signed .ARPA zone are best achieved by a single entity performing the unsigned zone maintenance, zone signing and zone distribution functions. This is consistent with the stable operation of the interim arrangement for DNSSEC in .ARPA, and also follows industry best practices for operation of top-level domain infrastructure. ICANN, as IANA Functions Operator, will perform these three functions.

The .ARPA zone is currently served by 12 of the 13 root servers (A, B, C, D, E, F, G, H, I, K, L, M). Consistent with the approach indicated by the IAB in RFC 3172 section 2 and RFC 2870 section 5, ICANN will change the nameservers for the .ARPA zone, and, following implementation, root servers will no longer serve the .ARPA zone.

ICANN proposes that .ARPA be served by the same nameservers used for IANA.ORG, namely A.IANA-SERVERS.NET, B.IANA-SERVERS.NET, C.IANA-SERVERS.NET, D.IANA-SERVERS.NET, and NS.ICANN.ORG. ICANN observes that this nameserver set incorporates significant operational diversity and has been proven to be stable over a considerable period of time. Nameservers in that set are currently operated (under ICANN's direction and administrative control) by Packet Clearing House (PCH), Internet Systems Consortium (ISC), ICANN's Information Technology department, and ICANN's DNS Operations department. ICANN continually reviews performance of these nameservers and incorporates changes from time to time to best ensure the security and stability of their operation.

ICANN will use its Generic Signing Infrastructure (GSI) platform for key management and DNSSEC signing of the .ARPA zone. The GSI is currently used to sign other important, non-IANA Functions infrastructure zones such as IN-ADDR.ARPA (for IPv4 reverse mapping) and IP6.ARPA (for IPv6 reverse mapping). ICANN will publish a DNSSEC Policy and Practice Statement (DPS) for the GSI, and the controls associated with key management and operations will be subject to external audit, following which ICANN expects to receive SysTrust accreditation, consistent with the audit and accreditation awarded to ICANN by PricewaterhouseCoopers for its management of the Root Zone Key Signing Key (KSK). External audit and subsequent accreditation will take place once the new architecture is in full production.

ICANN will follow a substantial period of dual operation, during which the existing .ARPA zone (maintained and signed by Verisign) will continue to be served by the 12 root servers. The .ARPA zone, maintained and signed by ICANN, will be published on new production nameservers such that the stability, performance and availability of the successor .ARPA zone will be accurately gauged during this period.

The transition from the Verisign-maintained and -signed .ARPA zone to one maintained and signed by ICANN will be coordinated by ICANN according to the high-level schedule included above. The transition will incorporate a KSK rollover in the .ARPA zone (we do not propose the transfer of any key materials from Verisign to ICANN) and will be seamless to end-users. Root Server Operators will be engaged via RSSAC, and ICANN expects full cooperation from Root Server Operators for this transition, building on the excellent operational relationship between Root Server Operators and ICANN that was evident in the deployment of DNSSEC in the root zone.

ICANN will extend the monthly reports to NTIA relating to the .ARPA TLD to incorporate elements relating to the performance, stability and availability of the .ARPA nameservers and to relevant events and procedures carried out on the GSI pertaining to DNSSEC in the .ARPA TLD.

1.2.9.2 Administrative Functions Associated with Root Zone Management

ICANN has successfully performed the IANA Functions for more than 13 years, most recently in accordance with the 2006 Contract. Consequently, many of the processes defined within this response have been historically documented and implemented by ICANN, relying on the deep understanding that ICANN brings to the non-obvious complexities of the IANA Functions. The proposed workflow for Requirement C.2.9.2 reflects the process currently used in operating the Administrative Functions associated with Root Zone Management, and ICANN proposes to continue this workflow. This will be fully conformant with the overall workflow described in the Solicitation and the illustration in Appendix 1 of the Statement of Work.

ICANN has improved its performance of the IANA Functions to accommodate the growing complexity and requirements of the Root Zone Management task. Some of the new demands that did not exist in 1999 include the complex operational requirements of DNSSEC, introduction of IPv6 records, increased speed at which changes need to be implemented, requirements of introducing new gTLDs in two early rounds (in 2000 and 2004), and introduction of Internationalized Domain Names.

All of these new services have been successfully introduced by ICANN into IANA Functions in a timely fashion. To support this, ICANN has implemented new systems to optimize the process and improve accuracy. When ICANN took over IANA Functions in 1998, the Root Zone Management process was completely manual and paper-based. During ICANN's stewardship, the process evolved with new tools including a dedicated Root Zone Database management system deployed in 2000, a fully electronic ticket tracking system in 2005, implementation of automation and fully objective technical tests in 2007, and migration to an automated workflow management system that was deployed in 2011.

ICANN has a deep and thorough understanding of the requirements of the DNS Root Zone Management process. As the IANA Functions operator since 1998, ICANN has many years of practical experience in the unique requirements of the Root Zone process, including the historical legacy that is the basis upon which many of the details of the functions are executed. The staff and management are comprised of experts with many years of experience managing the root zone process, and who maintain personal relationships with the majority of TLD Managers and other actors involved in the process.

Understanding the Requirement

To execute the Root Zone Management functions in a responsible way, ICANN recognizes the most important criterion is the technical stability of the Root Zone. Without a correctly functioning Root Zone, the ongoing stability of the Domain Name System is compromised. The series of checks-and-balances in the process ensure that changes are reviewed several times by multiple parties, and do not to impact secure and stable Root Zone operation before implementation. The process also will ensure accuracy for the changes by ensuring TLD Managers review and positively confirm the correctness of the change, and confirming the

accuracy of changes by using the DNS protocol to reconcile the proposed changes to the DNS Root Zone with the contents of the TLD's NS, A, AAAA, and DNSKEY records obtained independently from other DNS zones. As the DNS Root Zone is designed to reflect existing information located elsewhere in the DNS, this form of checking acts as an important indicator that any request is properly implemented and accurately reflects the wishes of the operator.

The requirements for a deliberate process are tempered by the recognition that TLD Managers require timely service to maintain ongoing stable operation of their individual registries. Therefore, ICANN implements a service that minimizes the amount of time that a request requires for processing to that which is necessary to correctly execute the function.

To ensure timely operation, the process must be predictable, repeatable, and well understood by the various parties. ICANN notes that a common cause of delay when processing requests is TLD Managers submitting incomplete or inaccurate requests. Ensuring that process and requirements are fully understood helps reduce that delay and allow TLD Managers to better plan for the process.

ICANN also recognizes that accountability is essential to maintain the trust required by the community to successfully operate the function. ICANN provides a comprehensive level of detail to TLD Managers about how their requests are being processed, including regular status updates and a complete timeline describing the processing of a request. ICANN reports to the community its execution of the function through a combination of presentations and regular reporting.

Technical Approach

ICANN describes our technical approach to meeting this requirement in the following sections.

1.2.9.2(1) Facilitate and Coordinate Root Zone

ICANN will use its established process, described below, that are well understood by the various parties involved in Root Zone Management in order to continue to facilitate and coordinate the root zone's contents.

Using the language of the Solicitation, and in accordance with the existing process workflow, a TLD manager will submit a change request to the IANA Functions Operator (ICANN), which will then be processed and evaluated according to the type of change being requested. Once the various checks are satisfactorily conducted, the request will be transmitted to the Administrator, NTIA, for authorization. Following successful authorization, the Root Zone Maintainer, Verisign, will execute changes to the root zone file. Finally, ICANN as the IANA Functions Operator will implement the authorized changes to the WHOIS database and the request will be completed.

The process is designed to be as lightweight as possible within the requirements of the DNS Root Zone management process. This allows for straight-through processing with almost full automation for the significant majority of DNS Root Zone change requests. Manual processing will be performed only in cases where automation cannot be achieved without compromising the integrity of the evaluation required.

General Process Workflow for Root Zone Change Requests

This process workflow will be used for the life cycle of a Change Request. During the life of a request, the process will go through a number of phases. These phases will be conducted for all types of changes requested under Requirement C.2.9.2, however the specifics of the process conducted within each phase will vary depending on factors such as whether it is a technical or non-technical change, and whether it involves a substantive change of who operates the domain (commonly known as a "TLD redelegation"). These differences in processing details are elaborated upon individually under the responses to Requirements C.2.9.2.a through C.2.9.2.d. See **Figures 1.2-38 and 1.2-39.**

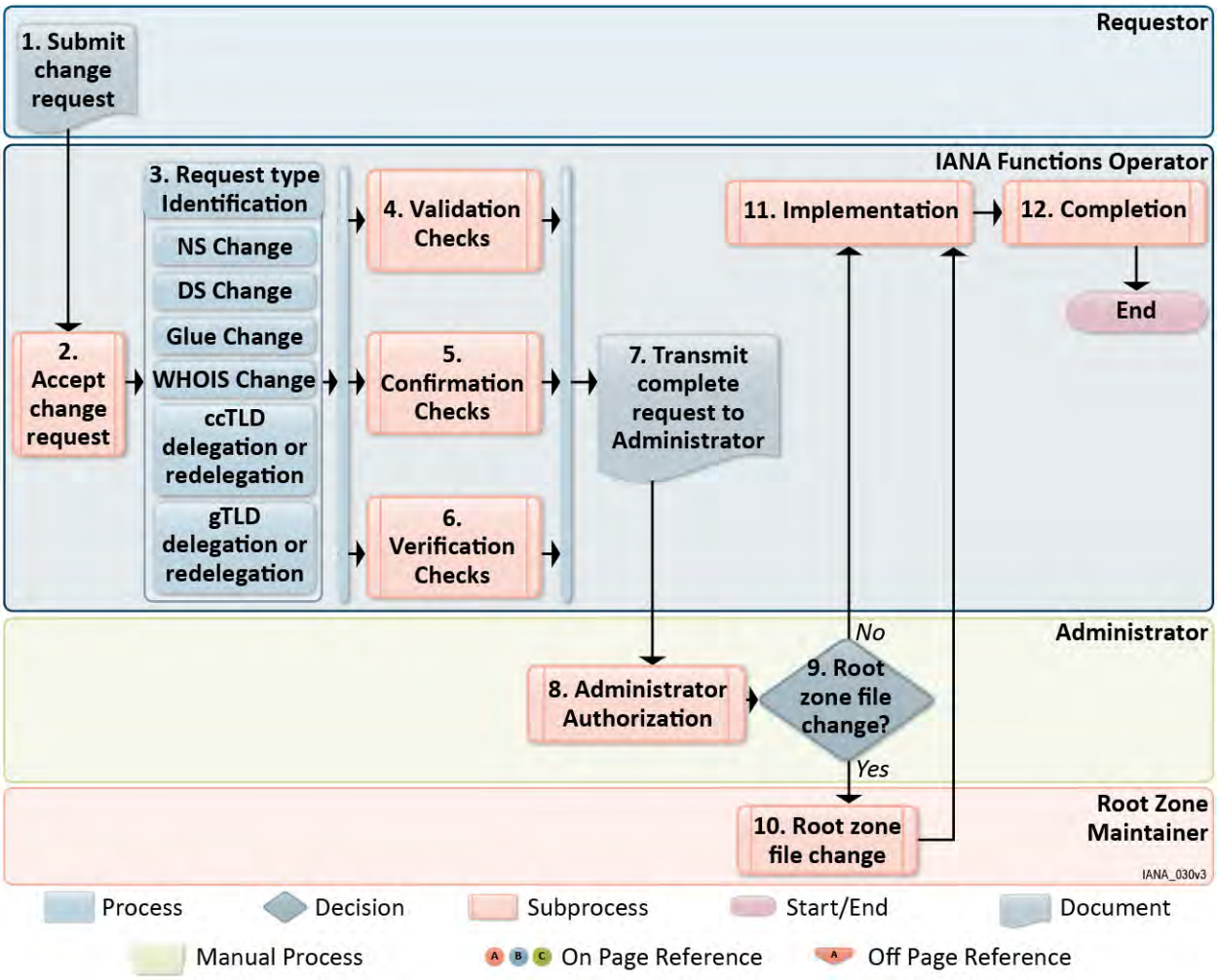


Figure 1.2-38. Top-Level Root Zone Process

Figure 1.2-39. Top-Level Root Zone Change Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request is submitted by requestor, typically through ICANN's IANA Root Zone Management website.. ese requests will typically be lodged through ICANN's IANA Root Zone Management website. The software used for processing standard root zone change requests is an existing system that was developed by ICANN and coordinates operations for updating the root zone with the Administrator and Root Zone Maintainer. Should a requestor not to use this

	system, the request may be emailed to root-mgmt@iana.org, submitted via facsimile or postal mail.
2	**ACCEPT CHANGE REQUEST**
Description	A change request is accepted.
3	**REQUEST TYPE IDENTIFICATION**
Description	The type of change request (i.e., Name Server (NS) record change, Delegation Signer (DS) record change, glue record change, WHOIS database change, ccTLD (re-)delegation, gTLD (re-)delegation, or a combination thereof) will be identified in order to determine which checks must be performed during the processing of the request.
4	**VALIDATION CHECKS**
Description	Checks for request completeness are performed, as well as technical checks on the technical elements of the request. In the case of those requests submitted via the automated root zone management system, many of these checks are performed automatically in tandem with accepting the change request. If the request is unclear or has validation issues, further clarification is sought from the requester.
5	**CONFIRMATION CHECKS**
Description	For existing top-level domains, the existing administrative and technical contacts for the top-level domain are asked to consent to the proposed change. For changes that involve inducting new contact persons, the new contacts are asked to consent to their new responsibility. The Sponsoring Organization is asked to endorse certain changes, particularly relating to personnel changes in the contacts for the domain (e.g., staff succession). In some cases, third parties are involved in consenting to changes to the root zone. This is either through explicit request from the operator (who has placed "special handling instructions" on file), or through legal, contractual, or governmental obligation. In the specific case of changing the IP addresses ("glue") of a name server shared by multiple top-level domains, the contact persons from other affected TLDs will also be asked to confirm the change.
6	**VERIFICATION CHECKS**
Description	Requests are reviewed to deem whether they represent a material change to the operator of the domain. If they are, they are considered a "redelegation" and must be reviewed against a set of additional public interest criteria, as described under C.2.9.2.c and C.2.9.2.d. Additionally, at this stage any necessary legal reviews are performed on the request, and any special handling of the request as requested by certain TLD managers is performed.
7	**TRANSMIT COMPLETE REQUEST TO ADMINISTRATOR**
Description	The complete request is transmitted to administrator.
8	**AUTHORIZATION**
Description	Changes to the DNS Root Zone File, as well as changes to the DNS Root Zone WHOIS Database, are transmitted to the Administrator for authorization. Such changes cannot be enacted without explicit positive authorization from the Administrator. Once a request has passed review and is ready for transmittal to the Administrator for authorization, the system will instantiate a Change Request in the Root Zone Maintainer's system using the EPP protocol. At this stage of the process, the Root Zone Maintainer's system will hold the request as pending until it receives proper authorization from the Administrator.
9	**ROOT ZONE FILE CHANGE?**
Description	If yes, go to Step 10. If no, go to Step 11.
10	**ROOT ZONE FILE CHANGE**

Description	The Root Zone Maintainer conducts changes to the Root Zone File following authorization by the Administrator.
11	**IMPLEMENTATION**
Description	ICANN conducts changes to the Root Zone Whois Database. Changes to the Root Zone File are cross-verified by ICANN to ensure they were enacted correctly. Any potential implementation issues are identified, researched, and if necessary remedied through mutual communication between the parties.
12	**COMPLETION**
Description	The Root Zone Maintainer propagates any changes to the Root Zone File to the Authoritative Root Zone Servers; and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at whois.iana.org by the IANA Functions Operator, ICANN. The requester is informed that the request is completed.

Online interface for Request Management

ICANN will recommend to TLD managers that they submit their change requests via a secure online website that ICANN has developed which provides an advanced interactive interface that allows existing managers to enter changes, review their proposed changes, and revert or make further changes, all prior to lodgment as a formal Change Request. The interface also will provide complex functionality to advise the TLD manager of common scenarios, such as when the request may need to be split into multiple parts in order to expedite processing. During this lodgment process, online feedback will be immediately provided on common errors associated with request completeness and technical accuracy. Upon lodgment as a formal Change Request, a reference number will be immediately provided via the web interface, and the status will be tracked moving forward.

Figure 1.2-40 is a representative screen shot of the currently deployed interface for TLD managers.

Subsequent to lodging a change request, TLD managers will use this online interface to review currently pending requests to identify their current status, as well as review historical requests that have been concluded. The interface will provide the ability for TLD managers to withdraw any request that has not yet advanced to its final implementation phases, and perform common administrative tasks such as updating their login credentials to the system.

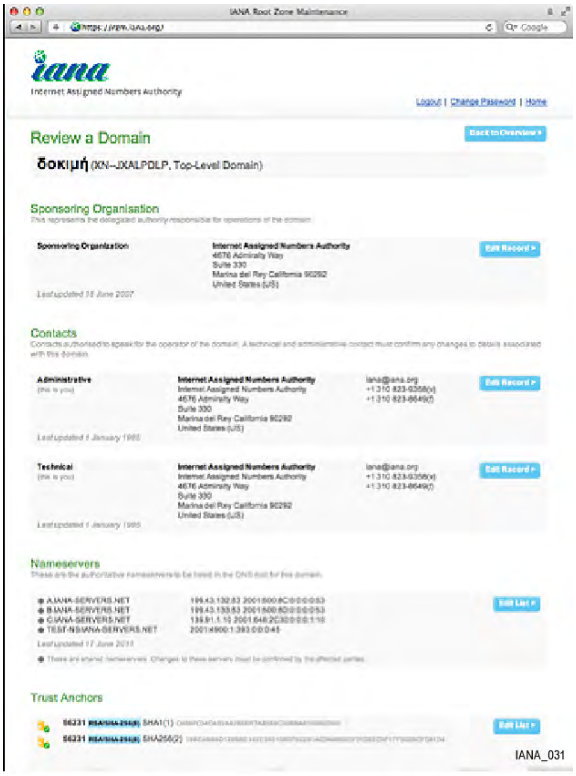


Figure 1.2-40. ICANN Interface for TLD Managers

Template

If a change request is submitted via means other than through the automated web interface — such as email, facsimile, or postal mail — the requestor will be encouraged to do so using a template posted on ICANN's IANA website. This form reflects the transmittal format used for the Administrator's Authorization prior to the migration to the automated root zone management workflow in 2011. Using the form will not be a mandatory requirement: so long as the applicant clearly and unambiguously articulates the nature of the request, any request will be accepted by ICANN and will be entered into the online system on the requestor's behalf.

The proposed template is attached in **Appendix B**.

1.2.9.2(2) Maintain 24×7 Operation

ICANN will maintain all online services in relation to the performance of C.2.9.2 and ensure they are available 24×7, with the exception of any scheduled maintenance that may need to be performed from time to time.

ICANN will ensure any scheduled maintenance does not impact the full 24×7 availability of the DNS Root Zone, DNS Root Zone Servers, or ICANN's ability for the IANA Functions Operator to facilitate emergency change requests. In order to effect this, ICANN will ensure additional systems are in place to handle any requirements during such maintenance windows, and schedule maintenance with its root management partners and other involved parties to ensure ongoing service.

The online systems for performing the tasks of C.2.9.2 will be deployed using multiple redundant facilities.

Normal root zone management operations will not require ICANN to process routine requests on a 24×7 basis. Instead, what is essential is that the online systems will be available on a 24×7 basis, that requests will be lodged on a 24×7 basis, and that ICANN Staff will be available for escalation of emergency requests on a 24×7 basis. ICANN will staff its offices, at a minimum, according to normal business hours in the US Pacific time zone. Normal routine changes that require handling by staff will be processed during these hours.

ICANN will provide an online self-service interface whereby credentialed TLD managers will submit change requests at any time. Credentialed TLD managers will also log in at any time to review the status of their request, and perform other actions, without necessitating direct involvement of ICANN staff.

As well as general staff availability during standard business hours, ICANN will continue to provide TLD managers with a 24×7 emergency contact number that allows TLD managers to quickly reach ICANN to declare an emergency and seek to expedite a Root Zone change request. ICANN will execute such changes in accordance with the obligations of the standard root zone management workflow as expeditiously as possible. This prioritization will inlcude performing emergency reviews of the request as the first priority, out of ordinary business hours if necessary, and informing its contacts at NTIA and Verisign, in their roles as Administrator and Root Zone Maintainer, of any pending changes that will require priority authorization and implementation. See **Figures 1.2-41 and 1.2-42**.

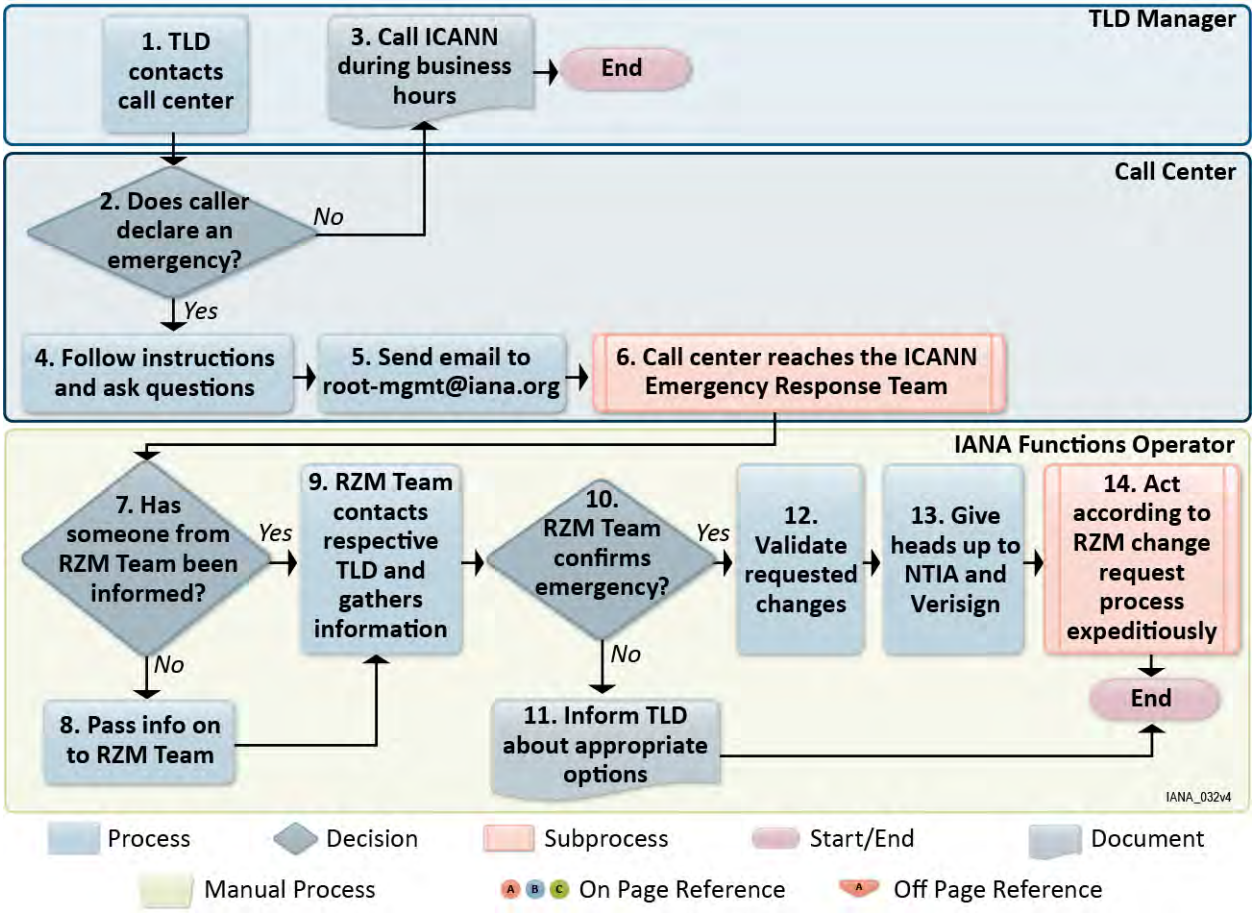


Figure 1.2-41. 24x7 Emergency Process

Figure 1.2-42. 24x7 Emergency Process Step-by-Step Description

1	TLD CONTACTS CALL CENTER
Description	All TLD managers are provided with an emergency contact telephone number that will reach a 24x7 call center.
2	**DOES CALLER DECLARE AN EMERGENCY?**
Description	The caller is asked if the issue is an emergency that requires an urgent root zone change, and can not wait until regular business hours.
3	**CALL ICANN DURING BUSINESS HOURS**
Description	In the event the caller decides it is not an emergency, their contact details are logged and they are advised to speak to ICANN's IANA Function staff during regular business hours.
4	**FOLLOW INSTRUCTIONS AND ASK QUESTIONS**
Description	Call center staff follow a set of instructions to solicit relevant information relating to the nature of the emergency, and the contact details of the TLD manager.
5	**SEND EMAIL TO ROOT-MGMT@IANA.ORG**
Description	The particulars of the emergency call are sent by the call center staff to the ticketing system. This opens a ticket and starts an audit log of the specific request.

6	CALL CENTER REACHES THE ICANN EMERGENCY RESPONSE TEAM
Description	The call center has the emergency roster of ICANN's IANA Functions staff, as well as escalation points for ICANN senior management. The call center will call through the roster until they contact a person to hand the issue to. The ICANN staff member that receives the issue will be the primary person responsible for resolution of the issue.
7	**HAS SOMEONE FROM THE ROOT ZONE MANAGEMENT (RZM) TEAM BEEN INFORMED?**
Description	The primary person responsible checks if the Root Zone Management team within the ICANN's IANA Functions staff is aware of the issue.
8	**PASS INFO ON TO RZM TEAM**
Description	If necessary, information relating to the emergency request is communicated to the Root Zone Management team.
9	**RZM TEAM CONTACTS TLD MANAGER**
Description	The IANA Functions staff performing the root zone management functions contact the TLD manager using the contact details provided to the call center. The nature of the issue is discussed in more detail, and a plan is devised to resolve the issue.
10	**RZM TEAM CONFIRMS EMERGENCY**
Description	Following dialog with the TLD manager, the RZM team confirms the particulars of the issue and the need to perform an emergency root zone change to resolve the issue.
11	**INFORM TLD ABOUT APPROPRIATE OPTIONS**
Description	In the event the TLD manager and RZM team deem that an emergency root zone change can not resolve the issue, ICANN will inform the TLD manager about what other options they have to resolve the issue.
12	**VALIDATE REQUESTED CHANGES**
Description	ICANN validates the request in accordance with the standard procedures described in the Root Zone Change process, including performing technical checks and performing contact confirmations. ICANN takes steps to conduct these as quickly as possible.
13	**GIVE HEADS UP TO NTIA AND VERISIGN**
Description	ICANN takes all available steps to inform personnel at NTIA and Verisign that there is an active emergency change request being conducted, and encourages NTIA and Verisign to process the request as quickly as possible.
14	**ACT ACCORDING TO ROOT ZONE CHANGE REQUEST PROCESS EXPEDITIOUSLY**
Description	ICANN executes the root zone change request as quickly as possible according to all standard policies and procedures. ICANN prioritizes the rapid implementation of the request above other requests at normal priority.

1.2.9.2(3) Contractor shall work collaboratively with NTIA and the Root Zone Maintainer

ICANN will continue to work with the NTIA and the Root Zone Maintainer following the successful manner in which collaboration has been conducted over the course of the current contract. This collaboration will include regularly scheduled coordination meetings on general Root Zone Management issues, and several meetings per year specifically on the topic of emergency response and scenario planning. ICANN will also work with the parties on face-to-face workshops as needed on a variety of root zone management topics.

In the execution of the Root Zone Management function, from time to time, specific operational issues warrant immediate questioning and response. Ad-hoc meetings will be called

between Verisign, ICANN, and NTIA to resolve these issues as they arise. ICANN staff will be available on-call outside of regular business hours, and ICANN staff contact details will be provided to NTIA and Verisign to allow for immediate dialogue on any operational issues that arise.

Above and beyond the successful working relationships demonstrated in executing the routine Root Zone Management functions under the current contact, ICANN has demonstrated its ability to work collaboratively with the parties during the process of developing, testing, and deploying the Root Zone Workflow Automation System. This project involved intensive coordination and liaison between the parties over an extended period of time. The work involved complex requirements and specifications development, and a multi-year development and testing process that concluded with its successful launch in 2011.

ICANN will continue advancing these relationships by continuing regularly scheduled coordination meetings, and will work with the parties to identify areas where coordination can be improved.

1.2.9.2.a Root Zone File Change Request Management

ICANN has successfully performed the IANA Functions for more than 13 years, most recently in accordance with the 2006 contract. Consequently, many of the processes defined within this response have been historically documented and implemented by ICANN, relying on the deep understanding that ICANN brings to the complexities of the IANA Functions. The proposed workflow for Requirement C.2.9.2.a reflects the process currently used in operating the Administrative Functions associated with Root Zone Management, and ICANN will continue to use this workflow. This will be fully conformant with the overall workflow described in the Solicitation, and the illustration in Appendix 1 of the Statement of Work.

In performing the work for more than 13 years, ICANN has improved the function to accommodate the growing complexity and requirements of the Root Zone Management task. Some of the new demands that did not exist in 1999 include the complex operational requirements of DNSSEC, introduction of IPv6 records, increased speed at which changes need to be implemented, and introduction of Internationalised Domain Names.

All of these new services have been successfully introduced by ICANN in performing the IANA Functions in a timely fashion. To support this, ICANN has implemented new systems to optimize the process and improve accuracy. When ICANN took over the IANA Functions in 1998, the Root Zone Management process was completely manual and paper-based. During ICANN's stewardship, the process evolved with new tools including a dedicated Root Zone Database management system deployed in 2000, a fully electronic ticket tracking system in 2005, implementation of automation and fully objective technical tests in 2007, and migration to an automated workflow management system that was deployed in 2011.

ICANN has a deep and thorough understanding of the requirements of the DNS Root Zone Management process. As the IANA Functions operator, ICANN has many years of practical experience in the unique requirements of the Root Zone process, including the historical legacy that is the basis upon which many of the details of the functions are executed. The staff and management are comprised of experts with many years of experience in managing the root

zone process, and based on this experience maintain personal relationships with the majority of TLD Managers and other actors involved in the process.

Understanding the Requirement

To execute the Root Zone Management functions in a responsible way, ICANN recognizes the most important criteria is the technical stability of the Root Zone. Without a correctly functioning Root Zone, the ongoing stability of the Domain Name System is compromised. The series of checks-and-balances in the process ensure changes are reviewed several times by multiple parties, and ensured not to impact secure and stable Root Zone operation before implementation. The process also ensures accuracy for the changes by ensuring that TLD Managers review and positively confirm the correctness of the change, and confirming the accuracy of changes by using the DNS protocol to reconcile the proposed changes to the DNS Root Zone, with the contents of the TLD's NS, A, AAAA, and DNSKEY records obtained independently from other DNS zones. As the DNS Root Zone is designed to reflect existing information located elsewhere in the DNS, this form of checking acts as an important indicator that any request is properly implemented and accurately reflects the wishes of the operator.

The requirements for a deliberate process are tempered by the recognition that TLD Managers require timely service to maintain ongoing stable operation of their individual registries. Therefore, ICANN implements a service that minimizes the amount of time that a request requires processing by ICANN to that necessary to correctly execute the function.

To ensure timely operation, the process must be predictable, repeatable, and well understood by the various parties. ICANN notes that a common cause of delay when processing requests is TLD Managers submitting incomplete or inaccurate requests. Ensuring that process and requirements are fully understood helps reduce that delay and allow TLD Managers to better plan for the process.

ICANN also recognizes that accountability is essential to maintain the trust required by the community to successfully operate the function. ICANN provides a comprehensive level of detail to TLD Managers about how their requests are being processed, including regular status updates, and a complete timeline describing the processing of a request. ICANN reports to the community our execution of the function, through a combination of presentations and regular reporting.

Technical Approach

ICANN's approach to this requirement will be to conduct a Change Request review to ensure it is consented to by the relevant parties, and meets minimum criteria that serve to ensure common technical issues will be identified and corrected or will not otherwise impact the stable and secure operation of the DNS Root Zone. The technical checks that will be used were developed collaboratively with the community of TLD managers and with the Root Zone Maintainer, Verisign.

The specific approach to Root Zone Change files will be based on the general process described in Section 1.2.9.2, with specific processing elements specific to Root Zone File changes.

1.2.9.2.a.1 Receiving and processing root zone file change requests

ICANN will use the following process workflows to implement the requirements of C.2.9.2.a. These process workflows are modeled on the general process workflow described in section 1.2.9.2 of our response. As requests of different types will not be mutually exclusive (for example, a Name Server Change and a DS Record Change, can be part of the same request), the process will follow the same overall flow but will be tailored in specific elements in accordance with what is being requested in a specific instance.

The three categories of technical changes under Requirement C.2.9.2.a that will be requested for TLDs are:

- **Name server changes** – changes to the set of NS records listed for a given TLD, including adding, changing, and removing individual NS records
- **Delegation Signer Resource Record changes** – changes to the set of DS records listed for a given TLD, including adding and removing individual DS records
- **Glue record changes** – changes to the set of A and/or AAAA records listed for a given name server, including adding and removing individual A/AAAA records

For each of these three categories, ICANN will implement a specific process flow modeled on the general process flow, as described below.

Name Server Change

Figures 1.2-43 and 1.2-44 depict the process for Name Server Change.

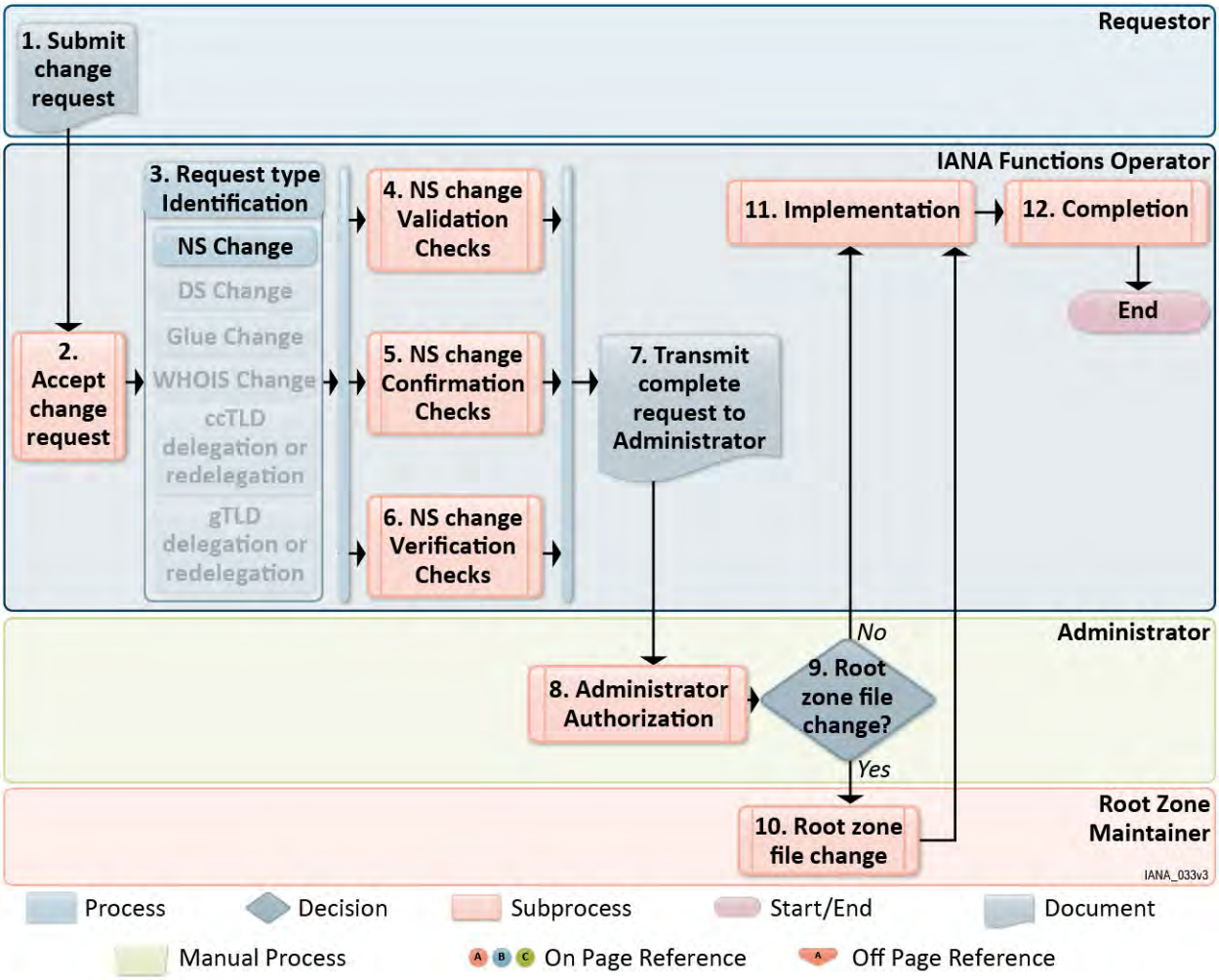


Figure 1.2-43. Name Server Change Root Zone Management Process Flow

Figure 1.2-44. Name Server Change Root Zone Management Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when a requestor lodges it with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. The software used for processing standard root zone change requests is an existing system that was developed by ICANN and coordinates operations for updating the root zone with the Administrator and Root Zone Maintainer. Should a requestor not to use this system, the request may be emailed to root-*mgmt@iana.org,* submitted via facsimile or postal mail.
2	**ACCEPT CHANGE REQUEST**
Description	A change request is accepted.
2	**REQUEST TYPE IDENTIFICATION**
Description	This type of change request is classified as relating to changes to one or more NS records listed in the DNS Root Zone.

4	NS VALIDATION CHECKS
Description	Initially, checks for request completeness are conducted against the supplied NS records, such that they are comprised of properly formed and legal fully-qualified host names suitable for listing in NS records. A set of technical checks are performed. Failures against these technical checks are reported to the requester to remedy. In certain circumstances, some of these requirements can be waived if the applicant can satisfactorily demonstrate the implications are fully understood, and there is no adverse impact on DNS operation in implementing the change.
5	**NS CONFIRMATION CHECKS**
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted. There are no additional specific confirmation checks unique to NS record changes.
6	**NS VERIFICATION CHECKS**
Description	Standard verification checks, as described in the response to Requirement C.2.9.2, are conducted. There are no additional specific verification checks unique to NS record changes.
7	**TRANSMIT COMPLETE REQUEST**
Description	Changes to NS records are transmitted to the Administrator for authorization.
8	**AUTHORIZATION**
Description	Changes cannot be enacted without explicit positive authorization from the Administrator.
9	**ROOT ZONE FILE CHANGE?**
Description	If yes, go to Step 10. If no, go to Step 11.
10	**CHANGE ROOT ZONE FILE**
Description	Changes to NS records are conducted by the Root Zone Maintainer following authorization by the Administrator.
11	**IMPLEMENTATION**
Description	Changes to NS records in the Root Zone File are cross-verified by ICANN to ensure they were enacted correctly. Any potential implementation issues are identified, researched, and if necessary remedied through mutual communication between the parties.
12	**COMPLETION**
Description	The Root Zone Maintainer propagates changes to the Root Zone File to the Authoritative Root Zone Servers; and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's whois.iana.org. The requester is informed that the request is completed.

1.2.9.2.a.2 Delegation Signer Resource Record Change

Figures 1.2-45 and 1.2-46 depict the Delegation Signer resource record change process.

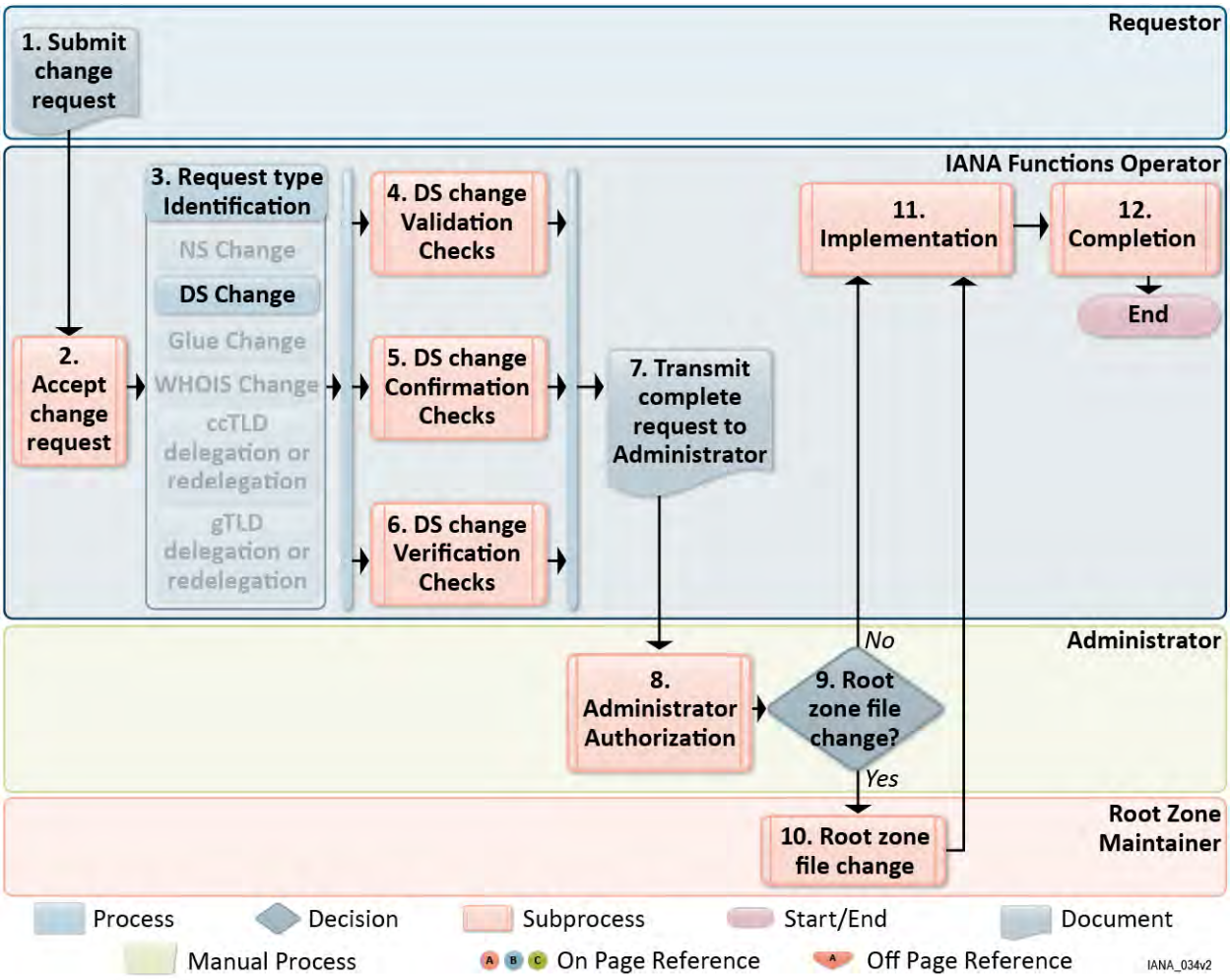


Figure 1.2-45. Delegation Signer Change Root Zone Management Process Flow

Figure 1.2-46. Delegation Signer Change Root Zone Management Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when a requestor lodges it with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. The software used for processing standard root zone change requests is an existing system that was developed by ICANN and coordinates operations for updating the root zone with the Administrator and Root Zone Maintainer. Should a requestor not to use this system, the request may be emailed to root-*mgmt@iana.org,* submitted via facsimile or postal mail.
2	**ACCEPT CHANGE REQUEST**
Description	A change request is accepted.
3	**REQUEST TYPE IDENTIFICATION**
Description	This type of change request is classified as relating to a DS record change.

4	DS VALIDATION CHECKS
Description	Checks for request completeness are conducted against the supplied DS records, such that they are comprised of properly formed digests of the correct length suitable for listing in DS records. A set of technical checks are performed. Failures against these technical checks are reported to the requester to remedy. In certain circumstances, some of these requirements can be waived if the applicant can satisfactorily demonstrate the implications are fully understood, and there is no adverse impact on DNS operation in implementing the change.
5	**DS CONFIRMATION CHECKS**
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted. There are no additional specific confirmation checks unique to DS record changes.
6	**DS VERIFICATION CHECKS**
Description	Standard verification checks, as described in the response to Requirement C.2.9.2, are conducted. There are no additional specific verification checks unique to DS record changes.
7	**TRANSMIT REQUEST**
Description	Changes to DS records are transmitted to the Administrator for authorization.
8	**AUTHORIZATION**
Description	Changes cannot be enacted without explicit positive authorization from the Administrator.
9	**ROOT ZONE FILE CHANGE?**
Description	If yes, go to Step 10. If no, go to Step 11.
10	**ROOT ZONE FILE CHANGE**
Description	DS record changes are conducted by the Root Zone Maintainer following authorization by the Administrator.
11	**IMPLEMENTATION**
Description	DS record changes in the Root Zone File are cross---verified by ICANN to ensure they were enacted correctly. Any potential implementation issues are identified, researched, and if necessary remedied through mutual communication between the parties.
12	**COMPLETION**
Description	The Root Zone Maintainer propagates changes to the Root Zone File to the Authoritative Root Zone Servers; and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's whois.iana.org. The requester is informed that the request is completed.

1.2.9.2.a.3 Glue Change

Figures 1.2-47 and 1.2-48 depict the Glue Change Root Zone Management process.

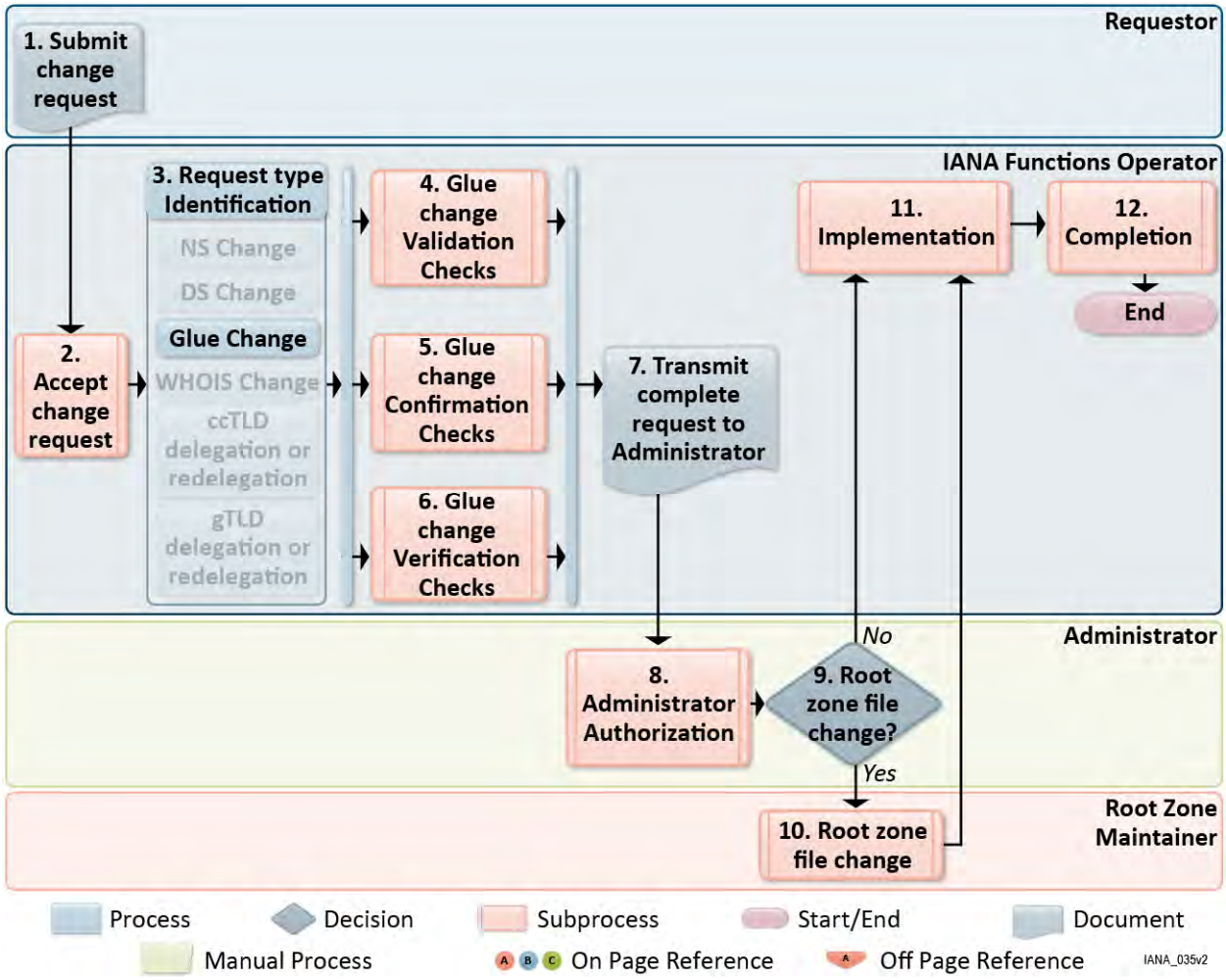


Figure 1.2-47. Glue Change Root Zone Management Process Flow

Figure 1.2-48. Glue Change Root Zone Management Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when a requestor lodges it with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. The software used for processing standard root zone change requests is an existing system that was developed by ICANN and coordinates operations for updating the root zone with the Administrator and Root Zone Maintainer. Should a requestor not to use this system, the request may be emailed to root-*mgmt@iana.org,* submitted via facsimile or postal mail.
2	**ACCEPT CHANGE REQUEST**
Description	A change request is accepted.
3	**REQUEST TYPE IDENTIFICATION**
Description	This type of change request is classified as relating to a glue record change.
4	**GLUE VALIDATION CHECKS**

Description	Checks for request completeness are conducted against the supplied IP addresses, such that they are comprised of properly formed IPv4 or IPv6 addresses. A set of technical checks are performed. Failures against these technical checks are reported to the requester to remedy. In certain circumstances, some of these requirements can be waived if the applicant can satisfactorily demonstrate the implications are fully understood, and there is no adverse impact on DNS operation in implementing the change.
5	GLUE CONFIRMATION CHECKS
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted. In addition, glue records can be shared amongst two or more top-level domain operators. If there is a request to alter a glue record that impacts third-party top-level domains, those third-party top-level domains are asked to also consent to the proposed glue change.
6	GLUE VERIFICATION CHECKS
Description	Standard verification checks, as described in the response to Requirement C.2.9.2, are conducted. There are no additional specific verification checks unique to glue record changes.
7	TRANSMIT REQUEST
Description	Changes to glue records are transmitted to the Administrator for authorization.
8	AUTHORIZATION
Description	Glue record changes are transmitted to the Administrator for authorization. Such changes cannot be enacted without explicit positive authorization from the Administrator.
9	ROOT ZONE FILE CHANGE?
Description	If yes, go to Step 10. If no, go to Step 11.
10	ROOT ZONE FILE CHANGE
Description	Glue record changes are conducted by the Root Zone Maintainer following authorization by the Administrator.
11	IMPLEMENTATION
Description	Glue record changes in the Root Zone File are cross-verified by ICANN to ensure they were enacted correctly. Any potential implementation issues are identified, researched, and if necessary, remedied through mutual communication between the parties.
12	COMPLETION
Description	The Root Zone Maintainer propagates changes to the Root Zone File to the Authoritative Root Zone Servers; and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's *whois.iana.org*. The requester is informed that the request is completed.

1.2.9.2.a.4 Processing changes as expeditiously as possible

ICANN will assign staff to the Root Zone Management function, and their goal will be the timely and correct execution of all requests received by the function. ICANN will review on a monthly basis the number of requests that are received and the time taken to execute the requests. According to this review, ICANN will project the number of requests anticipated for the future based on the number of TLDs, and the pipeline of potential known requests (based on such factors as the New gTLD Program, upcoming expected ccTLD delegations, and other policy development that may impact the Root Zone Management function). On the basis of this project, ICANN will review the number of staff, and if it is identified further staffing will be

required to adequately support the timely execution of requests, ICANN will recruit additional staff.

All requests will be fully tracked in a ticket management system. This system, amongst other features, will record exact timestamps when all events in the processing in the ticket occur. This provides for an accurate record of how long the various steps in the process took. TLD Managers will be able to inspect this timeline for any of their own requests through the web-based interface that ICANN will provide, as well as through a summary that ICANN will email the TLD manager at the conclusion of a request.

In accordance with the increased reporting provisions elsewhere in this proposal, improved information on how ICANN is executing on the timely implementation of requests will be made available to the community of interested and affected parties. This information will help improve dialogue amongst these parties on the efficacy of ICANN's implementation, and will spur dialogue on any adjustments that need to be considered.

1.2.9.2.b Root Zone "WHOIS" Change Request and Database Management

ICANN has successfully performed the IANA Functions for more than 13 years, most recently in accordance with the 2006 contract. Consequently, many of the processes defined within this response have been historically documented and implemented by ICANN, relying on the deep understanding that ICANN brings to the non-obvious complexities of the IANA Functions. The proposed workflow for Requirement C.2.9.2 reflects the process currently used in operating the Administrative Functions associated with Root Zone Management, and ICANN will continue to use this workflow. This will be fully conformant with the overall workflow described in the Solicitation, and the illustration in Appendix 1 of the Statement of Work.

During the last 13+ years, ICANN has improved performance to accommodate the growing complexity and requirements of the Root Zone Management task. Some of the new demands that did not exist in 1998 include the complex operational requirements of DNSSEC, introduction of IPv6 records, increased speed at which changes need to be implemented, requirements of introducing new gTLDs in two separate rounds (in 2000 and 2004), and introduction of Internationalized Domain Names.

All of these new services have been introduced successfully by ICANN in performing the IANA Functions in a timely fashion. To support this, ICANN has implemented new systems to optimize the process and improve accuracy. When ICANN took over IANA Functions in 1999, the Root Zone Management process was completely manual and paper-based. During ICANN's stewardship, the process has evolved with new tools including a dedicated Root Zone Database management system deployed in 2000, a fully electronic ticket tracking system in 2005, implementation of automation and fully objective technical tests in 2007, and migration to an automated workflow management system that was deployed in 2011.

ICANN has a deep and thorough understanding of the requirements of the DNS Root Zone Management process. As the IANA Functions operator, ICANN has many years of practical experience in the unique requirements of the Root Zone process, including the historical legacy that is the basis upon which many of the details of the functions are executed. The staff and management are comprised of experts with many years of experience in managing root zone

processes and maintaining personal relationships with the majority of TLD Managers and other actors involved in the process.

Understanding the Requirement

To execute the Root Zone Management functions in a responsible way, ICANN recognizes the most important criteria is the technical stability of the Root Zone. Without a correctly functioning Root Zone, the ongoing stability of the Domain Name System (DNS) is compromised. The series of checks-and-balances in the process will ensure changes are reviewed several times by multiple parties, and will not impact secure and stable Root Zone operation before implementation. The process also will ensure accuracy for the changes by ensuring that TLD Managers review and positively confirm the correctness and accuracy of the changes by using the DNS protocol to reconcile the proposed changes to the DNS Root Zone, with the contents of the TLD's NS, A, AAAA, and DNSKEY records obtained independently from other DNS zones. As the DNS Root Zone is designed to reflect existing information located elsewhere in the DNS, this form of checking will act as an important indicator that any request is properly implemented and accurately reflects the wishes of the operator.

The requirements for a deliberate process are tempered by the recognition that TLD Managers require timely service to maintain ongoing stable operation of their individual registries. Therefore, ICANN will implement a service that minimizes the amount of time that a request requires processing by ICANN staff to that which is necessary to correctly execute the function.

To ensure timely operation, the process will be predictable, repeatable, and well understood by the various parties. ICANN notes that a common cause of delay when processing requests is TLD Managers submitting incomplete or inaccurate requests. Ensuring that process and requirements are fully understood will help reduce that delay and allow TLD Managers to better plan for the process.

ICANN also recognizes accountability will be essential to maintain the trust required by the community to successfully operate the function. ICANN provides a comprehensive level of detail to TLD Managers about how their requests will be processed, including regular status updates and a complete timeline describing the processing of a request. ICANN will report to the community its execution of the function through a combination of presentations and regular reporting.

Technical Approach

ICANN's approach to this requirement will be to conduct a review of a Change Request to ensure it is consented to by the relevant parties, and that the proposed contact details are functional and complete. A small number of checks will be performed, particularly in relation to the requirement that ccTLD administrative contacts be "based in country."

1.2.9.2.b.1 Maintaining and Updating a Root Zone WHOIS Database

The specific approach to Root Zone Change files will be based on the general process described in Section 1.2.9.2, with specific processing elements specific to WHOIS Change requests. See **Figures 1.2-49 and 1.2-50**.

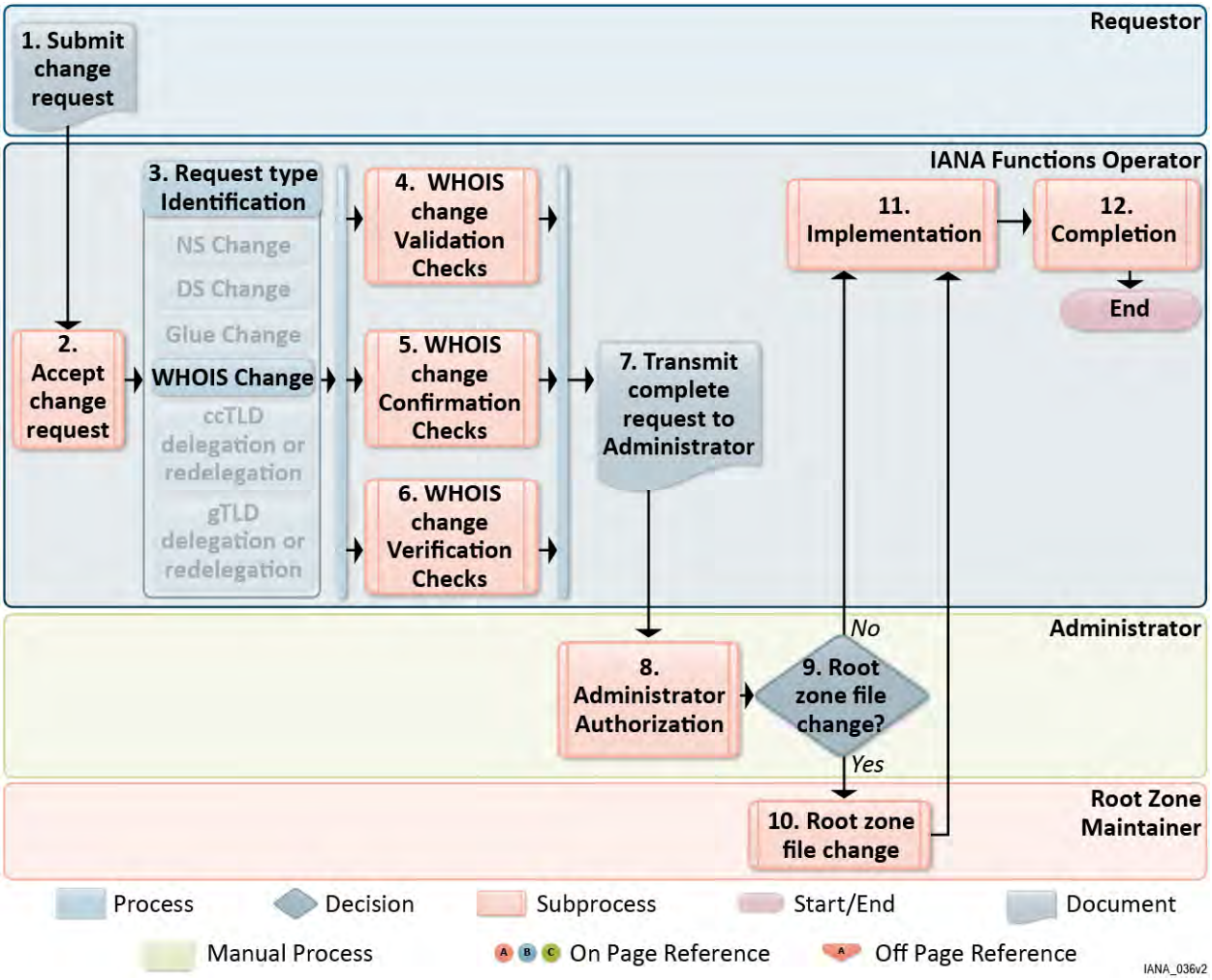


Figure 1.2-49. WHOIS Change Root Zone Management Process Flow

Figure 1.2-50. WHOIS Change Root Zone Management Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when a requestor lodges it with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. The software used for processing standard root zone change requests is an existing system that was developed by ICANN and coordinates operations for updating the root zone with the Administrator and Root Zone Maintainer. Should a requestor not to use this system, the request may be emailed to root-*mgmt@iana.org,* submitted via facsimile or postal mail.
2	ACCEPT CHANGE REQUEST
Description	A change request is accepted.
3	REQUEST TYPE IDENTIFICATION
Description	This type of change request is classified as relating to a WHOIS record change.
4	WHOIS CHANGE VALIDATION CHECKS
Description	Checks for request completeness are conducted against the supplied contact details. Contact details need to be provided in Latin script (i.e., English) for listing in the WHOIS, email addresses provided must be valid email addresses, and provided telephone and facsimile numbers must be

	valid, internationally callable telephone numbers (i.e., adhering to the E.164 standard).
5	WHOIS CHANGE CONFIRMATION CHECKS
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted.
6	WHOIS CHANGE VERIFICATION CHECKS
Description	Specific technical checks are not conducted for changes to WHOIS data that does not appear in the DNS Root Zone, i.e., for contact names and addresses. Changes are reviewed to ensure the WHOIS data changes do not reflect a substantive change of control of the top-level domain, under which it is classified as a redelegation as specified in C.2.9.2.c and C.2.9.2.d. Changes are reviewed for compliance with the requirement, noted in RFC 1591 and other documents that the Administrative Contact for country-code top-level domains is based in the country to which the domain is designated.
7	TRANSMIT REQUEST
Description	Changes to WHOIS records are transmitted to the Administrator for authorization.
8	AUTHORIZATION
Description	WHOIS record changes are transmitted to the Administrator for authorization. Such changes cannot be enacted without explicit positive authorization from the Administrator.
9	ROOT ZONE FILE CHANGE?
Description	If yes, go to Step 10. If no, go to Step 11.
10	CHANGE ROOT ZONE FILE
Description	WHOIS record changes are conducted by the Root Zone Maintainer following authorization by the Administrator.
11	IMPLEMENTATION
Description	Changes to the WHOIS database are implemented by ICANN following positive authorization by the Administrator.
12	COMPLETION
Description	Changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's *whois.iana.org*. The requester is informed that the request is completed.

1.2.9.2.b.2 Making publicly accessible a Root Zone WHOIS Database

ICANN will make the contents of the WHOIS database publically available using standard WHOIS protocol. The WHOIS database, as the name suggested, will be presented as standard via this protocol. This protocol is used by almost all other domain registries as the standard way of transmitting the "WHOIS" information for a given domain or network object.

ICANN will operate this WHOIS server at *whois.iana.org* on port 43, in accordance with RFC 3912.

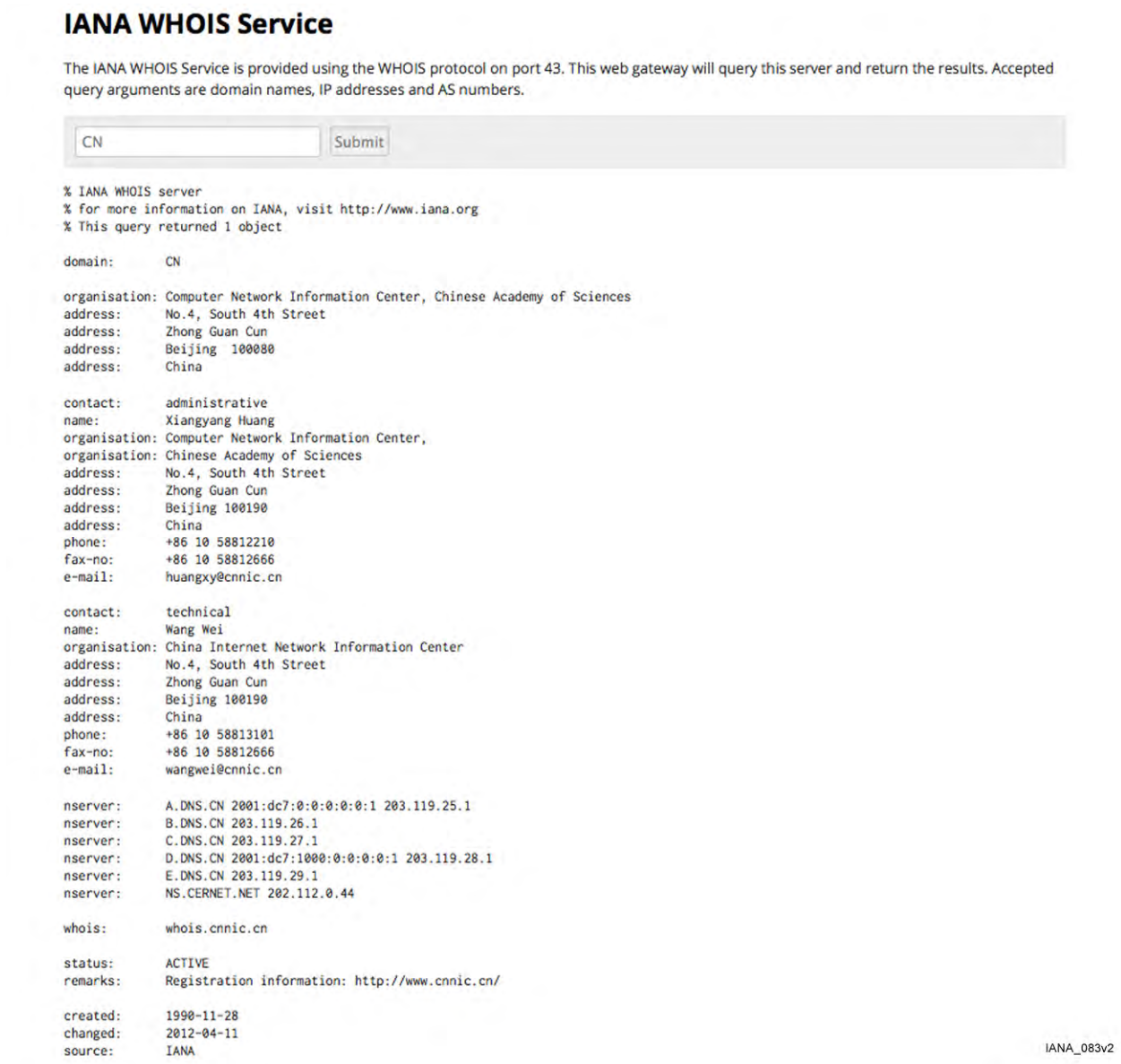
As an additional service, ICANN will also publish extracts of the WHOIS data on its website. This will provide an additional, customer friendly, interface to the data and also will provide for more interactivity that the WHOIS protocol does not allow for. For example, searches conducted on other attributes such as when the TLD's data was last updated, the country to which the TLD is designated, or sorting the TLDs by language/script will be possible.

1.2.9.2.b.3 Contents of the Root Zone WHOIS Database

ICANN will make available all of the elements available via its web-based interface, namely:

- "TLD Name," i.e., the domain label listed in the DNS Root Zone, in both "A-label" and "U-label" form in the case of Internationalised Domain Names.
- IP addresses and corresponding names of all authoritative name servers for a given TLD (including those that may have been nominated as the "primary" and "secondary" nameservers).
- Complete contact details for the administrative contact of the TLD, including the name, address, email address, telephone, and fax numbers.
- Complete contact details for the technical contact for the TLD, including the name, address, email address, telephone, and fax numbers.
- Reports that have been compiled by IANA that pertain to the specific TLD.
- Dates relating to the record, including the creation date and last modified date.
- Other informational fields that are helpful to the community in learning about the function of the TLD, such as the website for the domain registry, the location of the WHOIS server for the given TLD, references to a list of registrars where domain registrations may be made (in the case of registries that use ICANN-accredited registrars).

ICANN will make publically available all the elements of the WHOIS Database via the WHOIS protocol, with the exception of "reports." As the WHOIS protocol can only transmit plain text, it is not technically possible for reports (which are contained in more complex formats like HTML and PDF) through a WHOIS server. These reports will still be made available via ICANN's IANA website. The website will provide ready access to these reports by providing links to the reports for a specific top-level domain from the web-based presentation of that TLD's information. See **Figures 1.2-51 and 1.2-52.**



IANA WHOIS Service

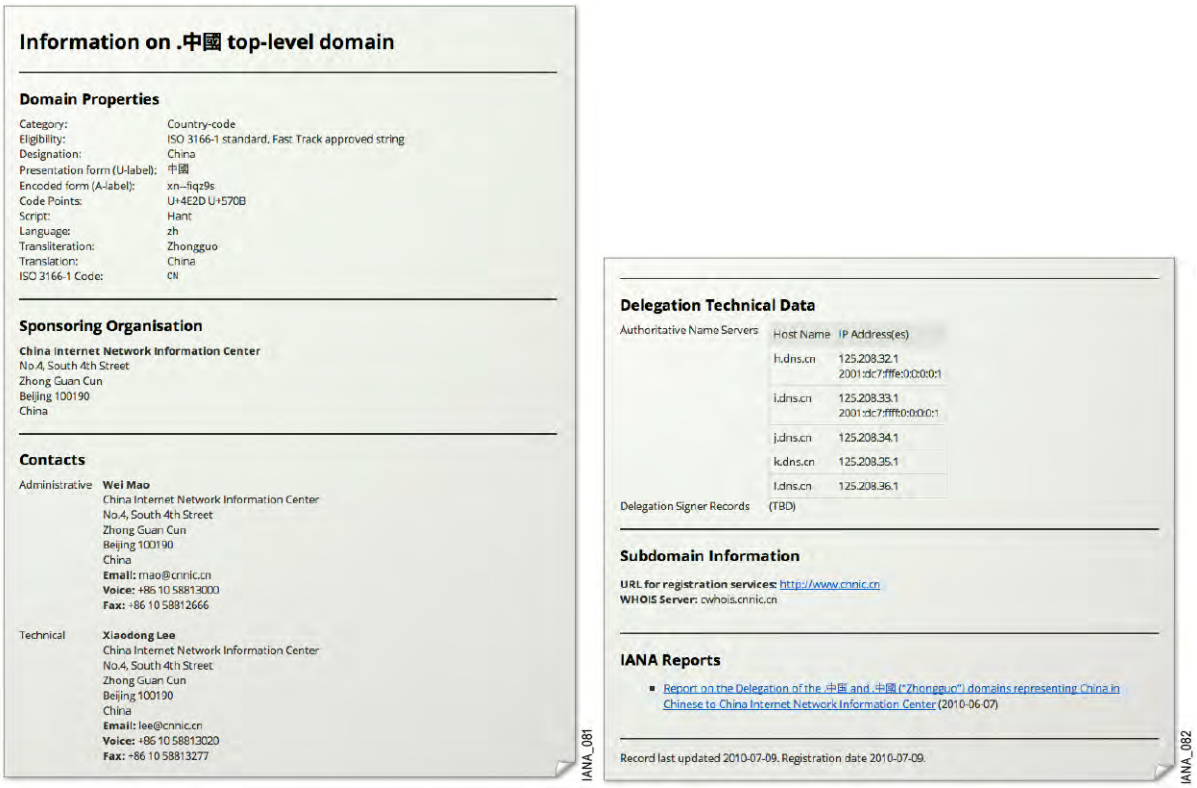
The IANA WHOIS Service is provided using the WHOIS protocol on port 43. This web gateway will query this server and return the results. Accepted query arguments are domain names, IP addresses and AS numbers.

CN Submit

```
% IANA WHOIS server
% for more information on IANA, visit http://www.iana.org
% This query returned 1 object

domain:       CN

organisation: Computer Network Information Center, Chinese Academy of Sciences
address:      No.4, South 4th Street
address:      Zhong Guan Cun
address:      Beijing  100080
address:      China

contact:      administrative
name:         Xiangyang Huang
organisation: Computer Network Information Center,
organisation: Chinese Academy of Sciences
address:      No.4, South 4th Street
address:      Zhong Guan Cun
address:      Beijing 100190
address:      China
phone:        +86 10 58812210
fax-no:       +86 10 58812666
e-mail:       huangxy@cnnic.cn

contact:      technical
name:         Wang Wei
organisation: China Internet Network Information Center
address:      No.4, South 4th Street
address:      Zhong Guan Cun
address:      Beijing 100190
address:      China
phone:        +86 10 58813101
fax-no:       +86 10 58812666
e-mail:       wangwei@cnnic.cn

nserver:      A.DNS.CN 2001:dc7:0:0:0:0:0:1 203.119.25.1
nserver:      B.DNS.CN 203.119.26.1
nserver:      C.DNS.CN 203.119.27.1
nserver:      D.DNS.CN 2001:dc7:1000:0:0:0:0:1 203.119.28.1
nserver:      E.DNS.CN 203.119.29.1
nserver:      NS.CERNET.NET 202.112.0.44

whois:        whois.cnnic.cn

status:       ACTIVE
remarks:      Registration information: http://www.cnnic.cn/

created:      1990-11-28
changed:      2012-04-11
source:       IANA
```

IANA_083v2

Figure 1.2-51. A Sample WHOIS Output



Information on .中國 top-level domain

Domain Properties

Category:	Country-code
Eligibility:	ISO 3166-1 standard, Fast Track approved string
Designation:	China
Presentation form (U-label):	中國
Encoded form (A-label):	xn--fiqz9s
Code Points:	U+4E2D U+570B
Script:	Hant
Language:	zh
Transliteration:	Zhongguo
Translation:	China
ISO 3166-1 Code:	CN

Sponsoring Organisation

China Internet Network Information Center
No.4, South 4th Street
Zhong Guan Cun
Beijing 100190
China

Contacts

Administrative **Wei Mao**
China Internet Network Information Center
No.4, South 4th Street
Zhong Guan Cun
Beijing 100190
China
Email: mao@cnnic.cn
Voice: +86 10 58813000
Fax: +86 10 58812666

Technical **Xiaodong Lee**
China Internet Network Information Center
No.4, South 4th Street
Zhong Guan Cun
Beijing 100190
China
Email: lee@cnnic.cn
Voice: +86 10 58813020
Fax: +86 10 58813277

IANA_081

Delegation Technical Data

Authoritative Name Servers	Host Name	IP Address(es)
	h.dns.cn	125.208.32.1 2001:dc7:fffe:0:0:0:0:1
	i.dns.cn	125.208.33.1 2001:dc7:ffff:0:0:0:0:1
	j.dns.cn	125.208.34.1
	k.dns.cn	125.208.35.1
	l.dns.cn	125.208.36.1
Delegation Signer Records	(TBD)	

Subdomain Information

URL for registration services: http://www.cnnic.cn
WHOIS Server: cwhois.cnnic.cn

IANA Reports

- Report on the Delegation of the .中国 and .中國 ("Zhongguo") domains representing China in Chinese to China Internet Network Information Center (2010-06-07)

Record last updated 2010-07-09. Registration date 2010-07-09.

IANA_082

Figure 1.2-52. A Sample Web-based View

1.2.9.2.b.4 Receiving and processing Root Zone WHOIS Change Requests

ICANN will receive and process Root Zone WHOIS Change Requests according to all the mechanisms described in its approach to 1.2.9.2. Specifically, the ordinary mechanisms for other Root Zone related changes — such as email, and lodgment via the web-based interface — will allow for the submission of Root Zone Change requests to ICANN.

1.2.9.2.c Delegation and Redelegation of a Country Code Top-Level Domain (ccTLD)

In executing the IANA Functions, ICANN has always paid careful consideration in how it performs the delegation and redelegation of country-code top-level domains. ICANN recognizes it as an important focal point where the interests of different countries and various actors converge, and there is great sensitivity in how the task is conducted.

In ICANN's execution of this responsibility, it has evolved the process from one that was ad-hoc and poorly documented, to one that is executed in a consistent manner while evolving to meet the growing requirements from the community of interested and affected parties. For example, the role of Governments was not defined in the operating procedures prior to 1997, but the process has been evolved to make the concerns of government a specific part of the evaluation process.

Understanding the Requirement

In performing the IANA Functions since 1998, ICANN has been responsible for conducting due diligence in relation to applications to either instantiate a new country-code top-level domain

(ccTLD) in the DNS Root Zone (known as a "delegation"), or enact any change that will facilitate a substantive change of operation of the domain (known as a "redelegation").

ICANN's approach to conducting this review will be to assess the various requirements of a regular root zone change request (i.e., that it meets the requirements identified in C.2.9.2.a and C.2.9.2.b), as well as assess how the request meets a number of public interest criteria that have been reflected in documents such as RFC 1591 and the GAC Principles and Guidelines for the Delegation and Administration of Country Code Top Level Domains. After analysis, a report on these items will be presented to the ICANN Board of Directors for consideration. After approval by the ICANN Board, such requests will be transmitted with a Delegation and Redelegation Report to the Administrator for authorization, and then will be implemented in the same fashion as routine requests under C.2.9.2.a and C.2.9.2.b. ICANN's own structures, the Country Code Name Supporting Organization (ccNSO) and Governmental Advisory Committee (GAC), currently are developing improved guidance via a Policy Development Process (PDP) that will be fed into the future evolution of how the assessment criteria is applied. Once this guidance is ratified through the ICANN process by the ICANN Board, a proposed implementation plan will be developed.

Technical Approach

ICANN describes our technical approach to meeting this requirement in the following sections.

Figures 1.2-53 and 1.2-54 depict workflows. **Figure 1.2-55** is a step-by-step description. A sample report is in **Appendix B**.

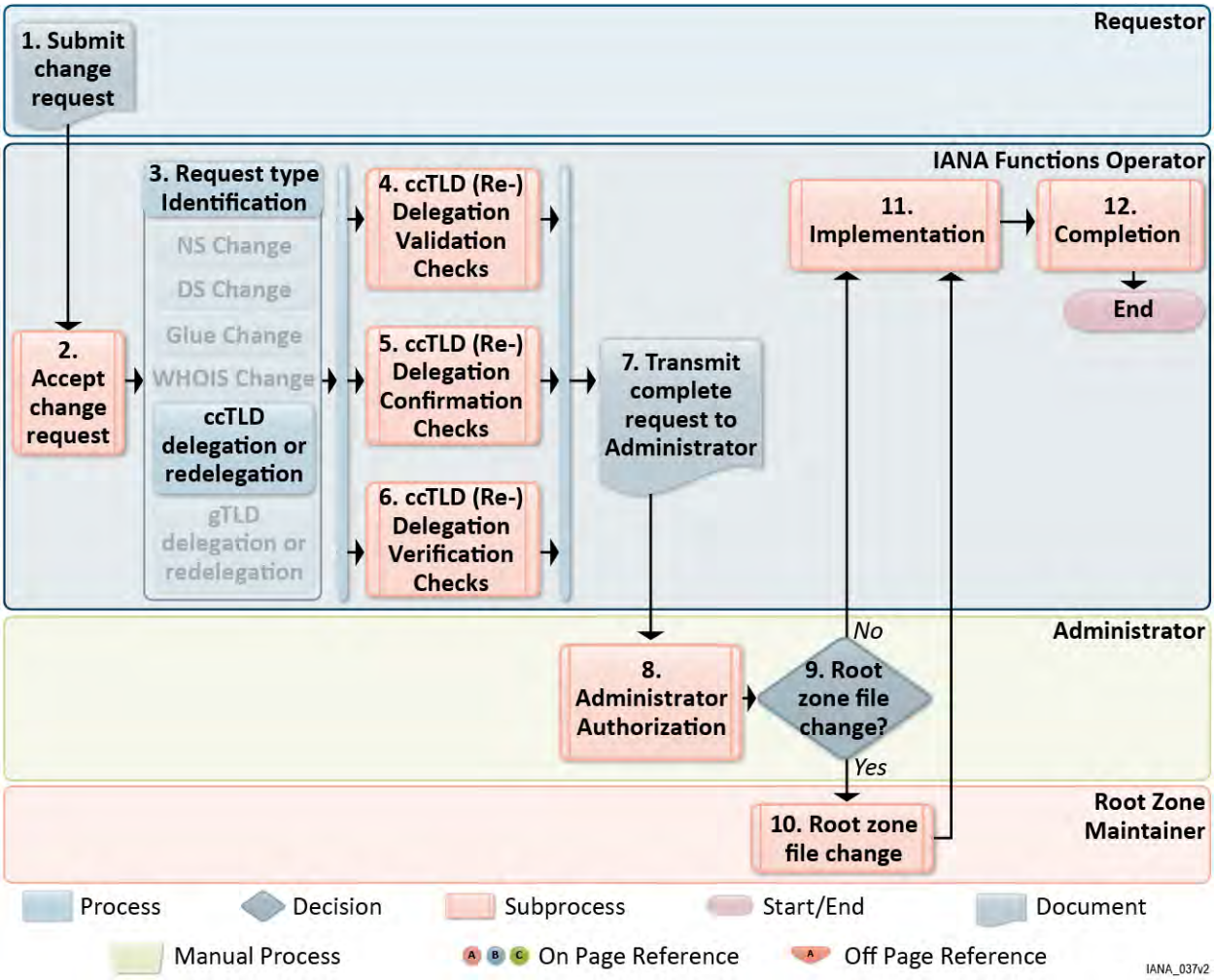


Figure 1.2-53. Process Workflow for Country-Code Top-Level Domain Delegation and Redelegation Requests

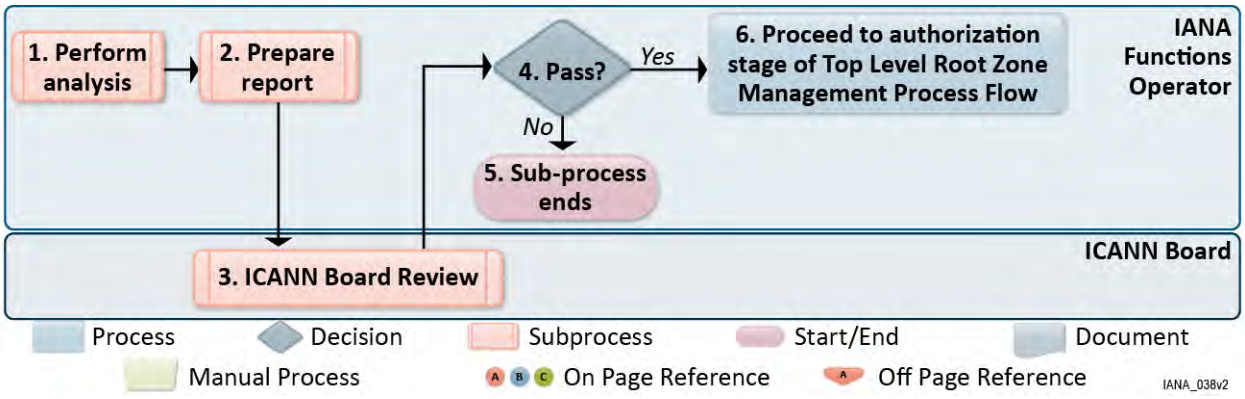


Figure 1.2-54. ccTLD Review Root Zone Management Sub-Process Flow

Figure 1.2-55. ccTLD Review Root Zone Management Sub-Process Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when it is lodged with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. Should a TLD operator choose not to use this system, the request can be emailed to root-mgmt@iana.org, or submitted via facsimile or postal mail. In addition to describing the particulars of the proposed change, the requester is required to tender documentation that allows the request to be reviewed in line with the delegation/redelegation assessment criteria.
2	ACCEPT CHANGE REQUEST
Description	A change request is accepted.
3	REQUEST TYPE IDENTIFICATION
Description	This type of change request is classified as relating to the delegation or redelegation of a country-code top-level domain.
4	ccTLD DELEGATION/REDELEGATION VALIDATION CHECKS
Description	As delegations and redelegations involve changes to the DNS Root Zone File, and the WHOIS Database, the standard checks that are performed in sections C.2.9.2.a and C.2.9.2.b are performed. In addition, the request is reviewed to ensure supporting documentation has been provided by the requester as required.
5	ccTLD DELEGATION/REDELEGATION CONFIRMATION CHECKS
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted. The consent of the relevant directly involved actors is one of the assessment criteria involved in performing a ccTLD delegation or redelegation, and will be referenced in the related Delegation and Redelegation Report.
6	ccTLD DELEGATION/REDELEGATION VERIFICATION CHECKS
Description	As delegations and redelegations involve changes to the DNS Root Zone File and the WHOIS Database, the standard checks listed in sections C.2.9.2.a and C.2.9.2.b are performed.
SUB-PROCESS 1	PERFORM ANALYSIS
Description	Significant additional processing of this type of request involving staff analyzing the request against a number of public interest criteria. This evaluation is described in detail below.
SUB-PROCESS 2	**PREPARE ccTLD DELEGATION OR REDELEGATION REPORT**
Description	A distillation or Report of the relevant criteria is produced by ICANN. This Report and relevant supporting information is presented to ICANN's Board of Directors for acceptance, and is later presented to the Administrator as part of the request for authorization.
SUB-PROCESS 3	ICANN BOARD REVIEW
Description	Upon completion of the Delegation or Redelegation Report, it is transmitted to ICANN's Board of Directors for review and consideration. The Board may request additional information before making a determination.
7	TRANSMIT REQUEST
Description	Changes are transmitted to the Administrator for authorization.
8	AUTHORIZATION
Description	Delegation and Redelegation requests for ccTLDs are transmitted to the Administrator for authorization, including the Delegation and Redelegation Report. Such changes cannot be enacted without explicit positive authorization from the Administrator.
9	ROOT ZONE FILE CHANGE?
Description	If yes, go to Step 10.

	If no, go to Step 11.
10	CHANGE ROOT ZONE FILE
Description	Root Zone File changes are conducted by the Root Zone Maintainer following authorization by the Administrator.
11	IMPLEMENTATION
Description	Changes in the Root Zone File are cross-verified by ICANN to ensure they were enacted correctly. Any potential implementation issues are identified, researched, and if necessary remedied through mutual communication between the parties.
12	COMPLETION
Description	The Root Zone Maintainer propagates changes to the Root Zone File to the Authoritative Root Zone Servers and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's *whois.iana.org*. The Delegation and Redelegation Report for the request is posted on ICANN's IANA website. The requester is informed that the request is completed.

1.2.9.2.c.1 Performing the review and analysis

ICANN will apply existing policy frameworks and precedents in processing requests relating to the delegation and redelegation of a ccTLD. The areas of assessment are as follows:

(a) Whether the proposed request meets the standard root zone change criteria, described in 1.2.9.2.a and 1.2.9.2.b.

(b) Whether the proposed string is eligible for delegation under the ICANN policies, which currently means it is either (i) a current alpha-2 code listed in the ISO 3166-1 standard; (ii) an approved "IDN Fast Track" string for a country or territory currently listed in the ISO 3166-1 standard; (iii) a reserved code under the definition in ICANN Board Resolution 00.74 (currently applicable to "EU"); or (iv) a grandfathered TLD that was considered an "exceptionally reserved" code at the time of its initial delegation, prior to the existence of ICANN (currently applicable to "UK" and "AC").

(c) Whether the proposed contacts for the domain consent to their responsibilities.

(d) Whether there is documented support from significantly interested parties in the local Internet community.

(e) Whether the relevant government or public authority provides support or non-objection.

(f) Whether the proposed operation is accountable under local law to the local Internet community.

(g) Whether the request is compatible with any specific laws regarding how the ccTLD is operated in the country.

(h) Whether the proposal provides for fair and equitable treatment of registrants.

(i) Whether the registry and/or its representatives, notably the administrative contact, are based in the country.

(j) Whether the request is consented or contested by significantly interested parties, including the current operator (if any).

(k) Whether there are any specific stability risks associated with the application that need to be considered.

(l) Whether the proposed registry is properly configured and technically ready.

(m) Whether an acceptable technical plan has been developed to support proper registry operation.

(n) Whether an acceptable operational plan has been provided to support proper registry operation.

(o) Whether there is an appropriate transition plan, which ensures existing registrations are not adversely impacted should the proposal be implemented.

1.2.9.2.c.2 Application of existing policy frameworks and clarifications

The current procedures associated with delegation and redelegation of ccTLDs is the result of the evolution of the process over the past 30 years. While there has been no definitive policy document published that represents all factors that must be considered, a number of notable documents are considered references that influence how the process is conducted:

- RFC 1591, an articulation written by staff performing the IANA Functions of what the procedures and policy considerations were as of 1994
- ccTLD Memo #1, an articulation that governments had a role to play in determining how ccTLDs are operated, written by staff performing the IANA Function in 1997
- The Principles and Guidelines for Delegation and Administration of ccTLDs, a framework developed by governments for the relationship between governments, ccTLD managers and ICANN.

ICANN will continue to implement the procedures based on these key documents, and the significant amount of precedent that has been developed through the execution of many ccTLD delegations and redelegations. Furthermore, ICANN will continue to support efforts — such as the work being conducted by the Framework of Interpretation Working Group — to clarify the interpretation of these frameworks by the community to better inform the work of he IANA Functions.

1.2.9.2.c.3 Consultation with interested and affected parties

The process which will be undertaken involves consulting with interested and affected parties. Specifically, the process always involves communication with the parties who are proposed to operate the ccTLD; and the parties who currently operate the ccTLD (if any). Applicants are required to document a number of factors involving interested and affected parties, including the disposition of the relevant local government, and significantly interested parties in the local Internet community.

ICANN notes that the Framework of Interpretation Working Group is actively evaluating exactly what kinds of consultation ICANN should conduct with interested and affected parties during

the evaluation of a delegation or redelegation request. Its guidance on the matter will inform future procedures in this area.

1.2.9.2.c.4 Consideration of relevant national frameworks and applicable laws

The process of evaluating requests asks the applicant to identify relevant regulations and laws that govern how a specific country-code top-level domain is operated. These will be an important part of the review of any specific request. It is expected that ccTLDs will be operated under the relevant laws of the country concerned. While there are a small number of ccTLDs operated outside of a specific country, these are rare and largely historical, relating to the fact that the specific country has had inadequate Internet infrastructure to sustain a reliable registry function. In such cases, the local Internet community is encouraged to consider locally-appropriate arrangements (such as data escrow) to ensure they retain ongoing availability of registry data.

In presenting the details of the evaluation of an individual request, the relevant laws and other regulations will be identified in the delegation and redelegation report in relation to how they impacted the assessment of the request.

1.2.9.2.c.5 Submission of recommendations via a Delegation and Redelegation Report

For each application to delegate a new ccTLD, or redelegate an existing country code top level domain, a Delegation and Redelegation Report will be developed for transmittal to the Administrator. This report will identify at a minimum the following elements:

a) The applied-for string

b) The identity of the organization seeking delegation of the string

c) The identity of the proposed administrative and technical contacts for the string

d) When the request to the IANA Functions Operator was lodged to obtain the delegation or redelegation

e) The evaluation of relevant facts pertaining to the assessment criteria described in 1.2.9.2.c.1

f) The date ICANN's Board of Directors reviewed and approved the application.

This proposed report format will demonstrate that the IANA Functions Operator followed the policy framework in processing the request.

The template for the delegation and redelegation report is as follows. ICANN anticipates that on the basis of ongoing work to refine policies, it will receive revised guidance in the future that will necessitate changes to this format. Any such changes will be agreed with NTIA in accordance with the appropriate change control process, in order to adhere to the requirement that ICANN implement policy guidance and clarifications, described in 1.2.9.2.c.2; and in consultation with parties described in 1.2.9.2.c.3.

See **Appendix B** for Sample Delegation Report.

1.2.9.2.d Delegation and Redelegation of a Generic Top Level Domain (gTLD)

Generic top-level domains (gTLDs) represent the other major category of top-level domains on which ICANN, in performance of the ICANN Functions, is required to provide recommendations for delegation and redelegation. In executing the IANA Functions, ICANN has successfully processed these requests for delegation of gTLDs in a manner consistent with ICANN policy during the two previous phases of creating new gTLDs — namely the "proof-of-concept round" in 2000 which resulted in seven new top-level domains such as .INFO, and .MUSEUM; and the "sponsored round" of 2004 which resulted in eight new top-level domains such as .MOBI and .TEL. In addition, ICANN has processed requests to redelegate generic top-level domains when the contracted party responsible for their operation has requested that a change of control be implemented. In each case, the action was reflected through a change to the Root Zone "WHOIS" Database.

Understanding the Requirement

In contrast with the approach for ccTLDs described in 1.2.9.2.c, requestors for delegation of a gTLD must have completed an evaluation for the eligibility as a registry operator with ICANN prior to lodging a Root Zone Change Request. In the case of the current "New gTLD Program," this means they must have successfully concluded the relevant evaluation process, and have executed a registry agreement with ICANN, before a Root Zone Change can be considered. The process guiding eligibility for root zone delegations resulting from the New gTLD Program is defined in ICANN's New gTLD Applicant Guidebook. The processes for the 2000 and 2004 rounds are documented elsewhere on the ICANN website.

For a request to redelegate an existing gTLD, the role of the IANA Functions will be to process requests that relate to the change of control provisions in the gTLD registry agreement with ICANN.

In performing the IANA Functions, ICANN will verify that all delegation and redelegation requests under C.2.9.2.d are consistent with the approved processes and, with respect to delegation requests resulting from the New gTLD Program, will demonstrate how the process provided the opportunity for input from relevant stakeholders and was supportive of the global public interest. This review will be distilled into a Delegation and Redelegation Report which will be presented to the Administrator, and upon authorization, published on ICANN's IANA website.

Technical Approach

The process for handling requests to delegate and redelegate a generic top-level domain will be modeled on the top-level process flow described in section 1.2.9.2. While some of the individual elements will be the same as other types of changes — such as ensuring the correct configuration according to the technical requirements — it introduces specialized handling at steps of the process that will relate specifically to eligibility to delegate or redelegate the gTLD. See **Figures 1.2-56, 1.2-57, and 1.2-58**. A sample report is in **Appendix B**.

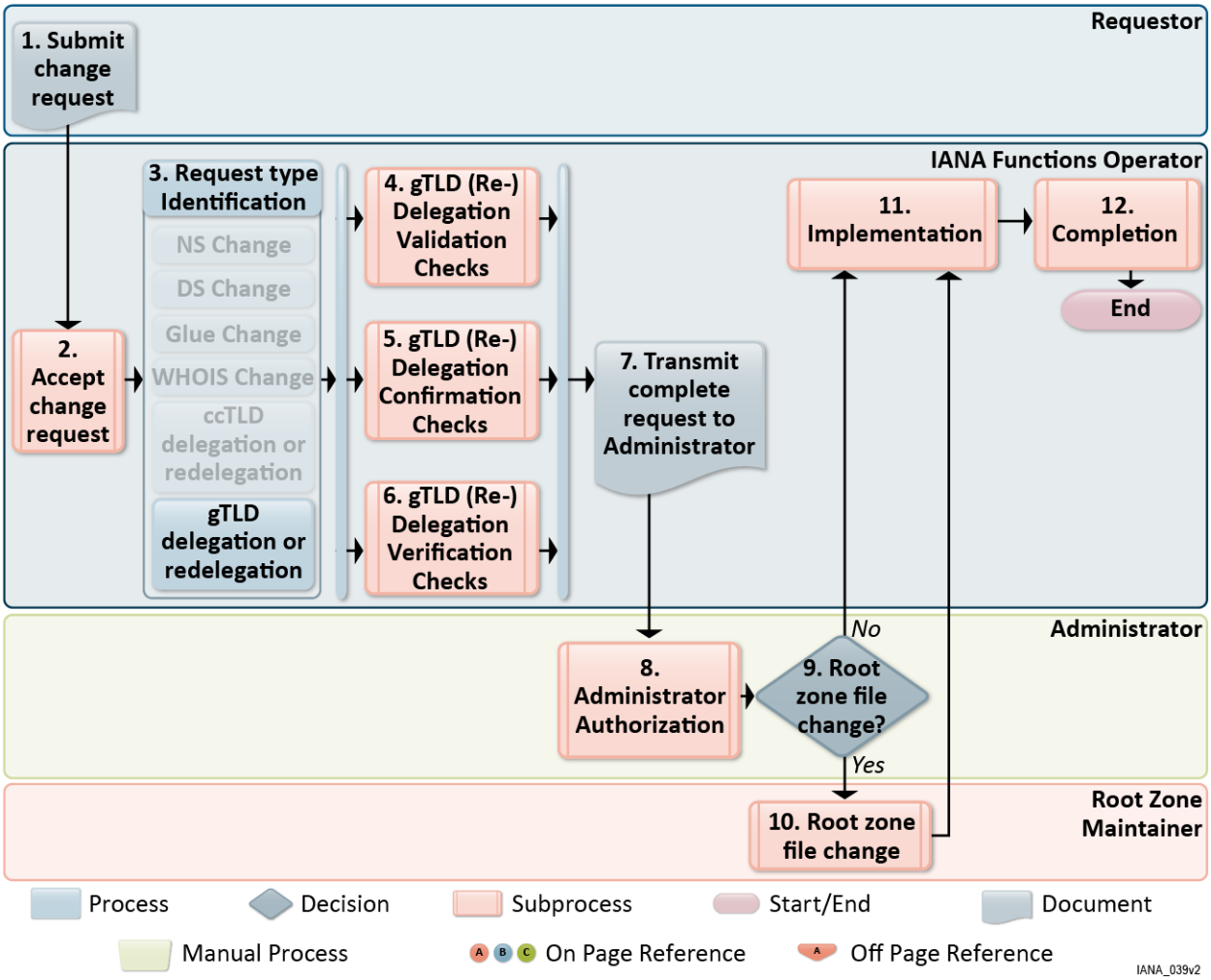


Figure 1.2-56. gTLD Delegation and Redelegation Root Zone Management Process Flow

Figure 1.2-57. gTLD Delegation and Redelegation Root Zone Management Step-by-Step Description

1	SUBMIT CHANGE REQUEST
Description	A change request will be created when it is lodged with ICANN. These requests will typically be lodged through ICANN's IANA Root Zone Management website. Should a TLD operator choose not to use this system, the request can be emailed to root-mgmt@iana.org, or submitted via facsimile or postal mail.
2	**ACCEPT CHANGE REQUEST**
Description	A change request is accepted.
3	**REQUEST TYPE IDENTIFICATION**
Description	This type of change request is classified as relating to the delegation or redelegation. **See Figure 2.1-50**.
4	**GTLD DELEGATION/REDELEGATION VALIDATION CHECKS**
Description	As delegations and redelegations involve changes to the DNS Root Zone File and the WHOIS Database, the standard checks in sections C.2.9.2.a and C.2.9.2.b are performed. These checks are designed to ensure the request is technically accurate and complete, and to

	ensure the ongoing stability of the DNS Root Zone.
5	**gTLD Delegation/Redelegation Confirmation Checks**
Description	Standard confirmations, as described in our response to C.2.9.2, are conducted. These checks ensure the consent of the various parties involved in the process.
6	**gTLD Delegation/Redelegation Verification Checks**
Description	As delegations and redelegations involve changes to the DNS Root Zone File and the WHOIS Database, the standard checks that are performed in sections C.2.9.2.a and C.2.9.2.b are performed.
Sub-Process 1	**Request gTLD delegation report**
Description	Staff compiles pertinent documentation to demonstrate that ICANN's process was followed for the particular gTLD.
Sub-Process 4	**Verify to checklist**
Description	If there is any question about conformance with process, clarification is requested from relevant parties.
Sub-Process 8	**Prepare Report**
Description	ICANN prepares a Report for the Administrator.
7	**Transmit Request**
Description	Changes are transmitted to the Administrator.
8	**Authorization**
Description	Delegation and Redelegation requests for gTLDs are transmitted to the Administrator for authorization, including the gTLD Delegation and Redelegation Report. Such changes cannot be enacted without explicit positive authorization from the Administrator.
9	**Root Zone File Change?**
Description	If yes, go to Step 10. If no, go to Step 11.
10	**Root Zone File Change**
Description	Root Zone File changes are implemented by the Root Zone Maintainer following authorization by the Administrator.
11	**Implementation**
Description	Changes in the Root Zone File are cross---verified by ICANN to ensure the changes were enacted correctly. Any potential implementation issues are identified, researched, and if necessary remedied through mutual communication between the parties.
12	**Completion**
Description	The Root Zone Maintainer propagates changes to the Root Zone File to the Authoritative Root Zone Servers; and changes to the Root Zone WHOIS Database are propagated to the WHOIS server located at ICANN's whois.iana.org. The Delegation and Redelegation Report for the request is posted on ICANN's IANA website. The requester is informed by ICANN that the request is completed.

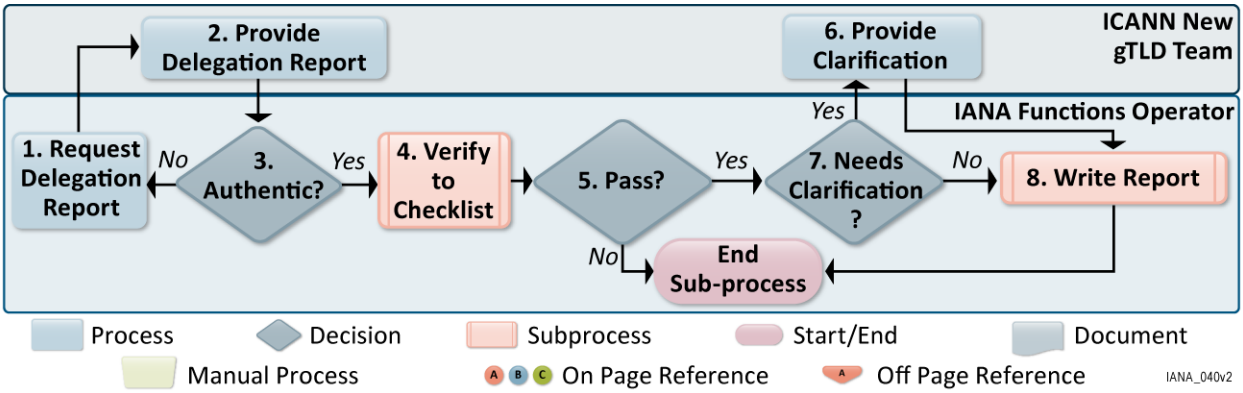


Figure 1.2-58. Root Zone Management gTLD Review Sub Process Flow

1.2.9.2.d.1 Verifying consistency with ICANN's processes

With respect to TLDs, including new gTLDs, ICANN adopts processes and procedures in consultation with the stakeholders of ICANN in support of the global public interest. ICANN commits to implementing those processes and procedures, and ICANN will verify that it has followed them at all stages of the validation and delegation process.

ICANN recognizes there are several different classes of generic top-level domains, depending on the terms of their agreement, that will require processing under the provisions of Section C.2.9.2.d. These include the early gTLDs assigned before ICANN was established, those from the "proof of concept" round in 2000, those from the "sponsored TLD" round in 2004, and those anticipated from the New gTLD Program rounds. The different processes applicable to different gTLDs will be considered during the review of a delegation or redelegation request for a gTLD.

During the "Staff Review" phase, ICANN will be responsible for validating that the application meets the following criteria:

- The string is eligible for delegation, as it has passed the appropriate and approved evaluation process
- The entity applying for delegation is the same entity that matches the party with which ICANN has executed the relevant registry agreement
- ICANN has documentation demonstrating that its process has been followed

For the redelegation of existing gTLDs, the central role of verifying the request will be ensuring that the proposed new registry operator has been properly evaluated and that an appropriate contract amendment process was conducted and documented.

1.2.9.2.d.2 Documentation verifying ICANN followed its Process

ICANN will review all requests to either delegate a new gTLD or to redelegate an existing gTLD in order to ensure that the approved ICANN process that led to the Root Zone Change Request was followed. In doing so, ICANN will evaluate the request in the context of such factors as: (i) which new gTLD round the TLD is the product of; (ii) the current state of ICANN policy that governs gTLDs; and (iii) the contractual status of the specific gTLD registry operator. The review will also rely on the various outputs of the evaluation process that has been conducted prior to

the submission of the Root Zone Change Request, namely, the outcomes of review panels and other processes that have been conducted.

As the majority of requests for delegation or redelegation for gTLDs in the IANA Functions contract period covered by the RFP will be subject to the process established for the New gTLD Program, it is important to consider that a few elements of the New gTLD Program are still under development and subject to change, although none are expected to materially affect the delegation or redelegation process.

For redelegations, ICANN will ensure that the evaluation process that is currently in place was and will continue to be followed.

For the delegations under the New gTLD Program ICANN will compile documentation to demonstrate that ICANN complied with the evaluation process leading to contract execution, including the following:

- Whether a background check was required, and if so, that it was conducted and the application passed.
- The applicant and the application passed evaluation on required aspects (i.e., DNS, Registry, Geographic Names, Financial, Technical, and String Similarity).
- Evaluation panels had access to any application comments that were provided in a timely manner.
- Under the GAC Early Warning System, notice was provided to the GAC, and if the process was invoked, whether the applicant amended the application in response.
- If the Governmental Advisory Committee provided advice on a given application, ICANN followed its Bylaws in considering that advice.
- If objections were filed, the results were available to ICANN before the string was approved and the registry agreement was executed.
- ICANN approved the application.
- ICANN has executed a registry agreement with the party requesting delegation.
- Applicant has successfully concluded all of its pre-delegation testing.

For each request to delegate a new gTLD, or redelegate an existing gTLD, an ICANN "Delegation and Redelegation Report" will be developed for transmittal to the Administrator. Sample reports can be found in **Appendix B**. This report will identify at a minimum the following elements:

- The TLD string
- The identity of the organization seeking delegation or redelegation of the string
- The identity of the proposed administrative and technical contacts for the string
- When the delegation or redelegation request to ICANN was lodged

For delegation requests for gTLDs resulting from the New gTLD Program, there will be additional considerations that will be identified in the Report. ICANN will: (i) identify in the Report all relevant processes in place at the time of the proposed delegation: (ii) verify that those processes were followed; and (iii) provide documentation of how the processes were followed.

ICANN will finalize the checklist and format of the Reports prior contracting with any registry operators resulting from the New gTLD Program. ICANN will review the format and details of the checklist with the NTIA COR before implementation.

1.2.9.2.d.3 Submitting a Delegation and Redelegation Report

Upon completion of the review for sufficiency, the Delegation and Redelegation Report will be finalized for transmittal to the Administrator. See **Appendix B** for a sample Delegation Report for new gTLDs. Any such changes to the template will be agreed with NTIA in accordance with the appropriate change control process.

1.2.9.2.e Root Zone Automation

Since 2006, ICANN has — in its role as the incumbent IANA Functions Operator — collaboratively worked with the TLD management community, Verisign as the Root Zone Maintainer, and NTIA as the Administrator, to develop and deploy an automated workflow management system for the Root Zone Management tasks. The system automated all practicable steps of the workflow while not impeding the ability of the parties to execute the established Root Management workflow. ICANN, NTIA, and Verisign completed the deployment in July 2011. Today, the majority of root zone change requests are lodged through this online system with the remainder manually entered into the system by ICANN staff. TLD managers that use the system have been overwhelming in their feedback that the new system has greatly improved their interactions with the Root Zone Management functions.

Understanding the Requirement

ICANN recognizes the significant benefits of an automated root zone management system. It has championed the deployment of such a system and, since 2006, led the deployment of a system that meets the various criteria of C.2.9.2.e.

In developing the system, ICANN focused on a comprehensive set of requirements that delivered on the wishes of TLD managers, Verisign, and NTIA:

- **Speed of processing.** A key focus of the system was to improve processing times as much as possible, without compromising the integrity of the process or the system. Some of the key methods of improving processing time was the automated system sending emails and processing tasks that previously were manually performed by ICANN Staff. The ability of TLD managers to submit their requests and get immediate automatic feedback from the system regarding any errors on their submission also reduces the amount of time taken to process a request.
- **Elimination of unnecessary manual effort.** While some of the steps of the process require manual review, many of the process steps can be objectively performed in a fully automated fashion. ICANN sought to identify all such steps, and then implemented automated approaches for all of them.
- **Accuracy.** The system had to maintain accuracy of the process, and in fact enhances accuracy. The details of a request are only entered into the system once, by the requestor at the beginning of the process. This is an improvement on the previous process that involved re-entry of the data by ICANN, Verisign , and potentially others. By ensuring data is

automatically transmitted between the parties, a class of potential errors associated with mis-transcription is eliminated.

- **Real-time status.** Historically, TLD managers who wish to enquire regarding the status of an ongoing request would need to consult with ICANN. ICANN felt functionality was critical to allow TLD managers to log in at any time to review the current status of a request, without needing to talk to staff.
- **Ease of use.** ICANN modeled user interactions with the system by creating an experience that was intuitive and did not require training to use. As such, TLD managers that utilize the system are presented with a straight-forward and easy-to-use interface that greatly reduces the amount of explanation required. The interface allows TLD managers to prepare requests effortlessly, review them before submission, and then track them after submission through to completion. The system also allows TLD managers to test their proposed changes and receive immediate feedback on any technical check issues prior to processing.
- **Integration.** As there are multiple parties involved in the Root Management workflow, the system focuses on cleanly integrating the ICANN components of the workflow, with those conducted by NTIA and Verisign. Notably, ICANN developed a system that uses the established EPP protocol to communicate with Verisign. In tandem with this, ICANN co-developed with Verisign an application for NTIA to use to interact with the system according to NTIA's specific requirements.
- **Security.** It is important to preserve and enhance the security associated with the Root Zone Management function so that trusted representatives of the TLD Manager are able to perform functions, but unauthorized actors are not. The system was designed to use established secure protocols such as SSL for security, and is extensible to allow for future security additions such as two-factor security. The software operational model is designed so that the public customer-facing component is isolated from the internal workflow management component, reducing security exposure of the core management systems.

Technical Approach

The current system comprises multiple components that interconnect to form a cohesive functioning Root Zone Management system. These components are as follows:

- **"ICANN User Application" —** A user facing application, available on the web at *https://rzm.iana.org/,* which allows TLD managers to log in through a secure protected interface and manage their delegations in the root zone. Functionality of this application includes reviewing current details for their TLD in the Root Zone and ICANN's IANA WHOIS Database, lodging a Change Requests to these details through an interactive and intuitive process, testing any proposed technical changes for defects in accordance with the various technical requirements, monitoring the status of the request through the lifetime of the change, and reviewing a history of changes that have been conducted.
- **"ICANN Administrative Application" —** This interface is provided to ICANN staff to perform their roles in the administration of change requests. ICANN staff roles include lodging requests that have been tendered through means other than the ICANN User Application (e.g., those submitted via email, facsimile, telephonic, or postal means), reviewing and

processing in-process requests, checking system status, and obtaining relevant statistics for various reporting requirements.

- **"ICANN Backend Application" —** The internal application that manages the business logic and lifecycle of a Root Zone or Root Database change request. This system performs workflow management on any given change request. The application is also responsible for communication with the other systems (i.e., the User Application, Administrative Application, the NTIA Application, and the Verisign Application).
- **"ICANN Ticketing Application" —** The internal application is responsible for keeping a record of all email, facsimile, and postal communication ICANN receives and transmits in executing IANA Functions. Its functions include recording unique reference numbers for particular requests, storing a complete audit trail of each request, and facilitating management of the various queues of ICANN work. The ICANN Ticketing Application is integrated with the ICANN Administrative Application, such that the two systems are fully informed of Root Zone Change Requests. The Ticketing Application is used for other aspects of performance of the IANA Functions, such as protocol parameter assignments and number resource allocations.
- **"NTIA Application" —** A dedicated application, jointly developed and managed by ICANN and Verisign , to provide NTIA with a Dashboard of requests outstanding that require NTIA's authorization in accordance with the workflow. NTIA staff has secure access to the system, and can use it to authorize change requests and perform other functions associated with their role on specific change requests. This system was developed in accordance with NTIA's requested functionality, and will be updated in the future in accordance with new system requirements.
- **"Verisign Application" —** A dedicated workflow management system for accepting proposed root zone change requests from ICANN after they are validated, performing Verisign's internal processing on the request, and updating the contents of the DNS Root Zone. The ICANN Backend Application communicates with the Verisign Application via a secure pathway using the Extensible Provisioning Protocol (EPP), with custom extensions to accommodate the unique root zone workflow.

In addition to the benefits conferred by the automation system, ICANN understands the importance of preserving all legacy methods of interaction with its customers. Customers will be able to submit requests via email, for example, using this traditional methodology. The system has been designed to provide full flexibility in this regard.

For changes to the Root Zone File, Verisign is required to implement the changes to the file itself. ICANN's systems will monitor status of this process using the EPP protocol to provide timely updates to the requestor on the status of their request. ICANN's systems will recognize what the resulting root zone will look like once a change is conducted. Once Verisign's systems indicate via EPP that the root zone file change has been implemented, ICANN's systems will automatically obtain the revised file and cross-verify its contents with what ICANN's systems expect will be the product of the change. Only once ICANN's and Verisign's systems concur on the correct implementation of a change will it be deemed implemented and complete.

Technical Approach

ICANN describes our technical approach to meeting this requirement below.

1.2.9.2.e.1 Deployment of a Fully Automated Root Zone Management System

ICANN will deploy a fully automated root zone management system on the first day.

ICANN will do this by continuing to operate the deployed automated root zone management system it co-developed with NTIA and Verisign and will deploy incremental updates to the system to accommodate changes to the management workflow and requirements. The system as deployed today meets and exceeds the requirements described in the RFP.

As this system is in place and functioning, it will therefore be available at the time of the award of the contract (see **Figure 1.2-59**). This is in full conformance with the requirement that the system be deployed within nine months. ICANN will continue to develop and refine the system in light of customer feedback, in adherence with the requirements of this contract.

Figure 1.2-59. Root Zone Management System Deployed at Award of Contract

1.2.9.2.e.2 Secure (Encrypted) System for Customer Communications

ICANN will continue to provide the secure and encrypted mechanisms that are in place in its current automation systems. All TLD operators have been, and will continue to be, provided with access to a secure web-based portal that is encrypted via the HTTPS protocol and requires authentication using a unique username and password for each TLD contact.

ICANN will also explore with the TLD operator community adding new methods for secure communication. In particular, ICANN will investigate with the various parties adding two-factor authentication mechanisms to the existing systems. This will be available for TLD managers on an opt-in basis and, once chosen, will require the execution of additional security protocols before a Root Zone Change Request can be made. Its introduction must be carefully considered in liaison with TLD managers to ensure the correct procedures are in place to make certain unauthorized requests are not executed, while not unduly impeding requests from parties that have lost or misplaced their security credentials.

1.2.9.2.e.3 Automated Provisioning Protocol for Customers

ICANN will continue to provide a secure, fully automated web-based interface for customers (i.e., TLD managers) to interact with the root zone management system to submit their requests. The interface was developed in conjunction with users to fully support the needs they had expressed to ICANN as the incumbent IANA Operator in previous years. ICANN will continue to solicit feedback from users of the system to inform future upgrades and feature improvements to improve the system's utility and easy of use.

1.2.9.2.e.4 Online Database of Change Requests

ICANN will continue to provide secured access to the history of user-submitted requests to the Root Zone Management system. This system allows for credentialed users to login and review

both pending and historical root zone change requests. The interface provides significant detail of the request, including exactly what was requested, and the numerous events that occurred in the lifecycle of a request. For example, when the request was lodged, when confirmations were performed and by whom, and when the request was implemented.

1.2.9.2.e.4 Test System for Checking Technical Requirements

ICANN will continue to provide an interface for TLD managers to enter in their proposed technical changes to the root zone and obtain immediate feedback on what technical errors ICANN's systems detect with their configuration. This interface will allow TLD managers to immediately remedy any technical defect, or commence a dialogue with ICANN to better understand the issues that have been identified. **Figure 1.2-60** shows a sample of the diagnostic output a user will see.

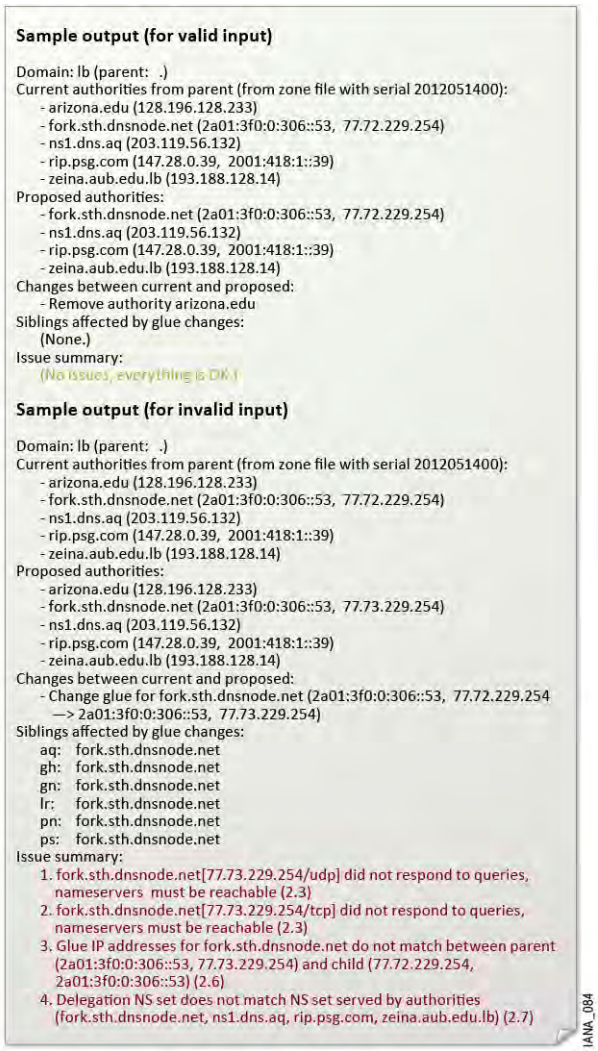


Figure 1.2-60. Sample Diagnostic Output

ICANN recognizes the importance of ensuring technical errors to not enter the root zone, while continuing to provide a responsive and accountable service to TLD managers. In addition to providing this tool, ICANN openly will publish a detailed explanation of the technical checks it performs, which will allow for third parties to independently perform the checks without being dependent on ICANN's systems. In order to provide a safeguard for the root zone management process, Verisign has already independently re-implemented the checks published by ICANN in order to be satisfied of the correctness of proposed root zone changes.

ICANN will also consult with its user communities about further refinements to the interface for performing technical checks. As the incumbent manager, ICANN has received feedback on how the interface for conducting checks could be improved and will implement revisions to reflect these areas of improvement.

1.2.9.2.e.5 Internal Interface for Secure Communications

ICANN will continue to operate and provide a secure communications interface between NTIA, Verisign and ICANN. This interface is currently deployed and is composed of the multiple components described earlier.

Fundamentally, the internal interface between the parties involves transmissions using the standardized Extensible Provisioning Protocol (EPP) between the components of the system operated by ICANN and Verisign. The EPP protocol will avoid potential errors in communication between the parties by using a standardized way of expressing the nature of a requested change and its status. The EPP protocol also will provide inherent mechanisms for ensuring the integrity and authenticity of the communications.

ICANN, in partnership with Verisign, also provides the "NTIA Application," which allows for authorized NTIA personnel to execute many of their functions by logging into the system. When logged into the system, the NTIA personnel will review requests that are pending for NTIA action and perform those actions. This application was developed through consultation with NTIA on what their requirements were.

In addition to the online interfaces, it is recognized that there has been, and will continue to be occasions where there needs to be formal communications that are beyond the scope of the automation system. Such scenarios include requests that have unique concerns such as questions to be resolved between the various parties. ICANN will secure its communications using PGP email signing using known keys that have been mutually shared between NTIA personnel, Verisign personnel and ICANN. These transmissions will be conducted using dedicated email addresses devoted to the purpose of secured communications relating to Root Zone Management between NTIA, Verisign and ICANN. This method will also be retained for use in the unlikely event a major outage of the automation system necessitates the use of more manual processing.

1.2.9.2.f Root Domain Name System Security Extensions (DNSSEC) Key Management

ICANN has been a leader in the deployment of DNSSEC in the Authoritative Root Zone, including an inclusive project that saw publication of a signed DNS Root Zone starting in July 2010 after a successful collaboration between ICANN, Verisign (acting as Root Zone Maintainer) and NTIA. This process involved implementing and having ICANN's processes deemed compliant with the requirements specified by NTIA in 2009, which match those specified in Appendix 2 of the RFP. ICANN has been responsible for the management of the root zone Key Signing Key (KSK), including generation, publication and use for signing the Root Keyset since deployment, and ICANN commits to continue performing this role.

A major component of this deployment was developing processes and systems to support the secure generation and management of the KSK. The systems, procedures and policies used in the performance of this function have been subject to extensive external review and include the following:

- U.S. Department of Commerce NTIA
- U.S. Department of Commerce NIST
- Attendees at numerous technical conferences
- Subscribers of various technical e-mail lists
- All Root Server Operators
- The general public, via a dedicated website for the project

Comments on the proposed implementation were solicited from these stakeholders before deployment, and all the concerns communicated to ICANN were addressed. The public part of the KSK key-pair (the root zone trust anchor) was published in accordance with documented procedures on July 15, 2010.

The generation and use of the KSK for signing the Root Keyset has occurred at regular, scheduled Key Ceremonies. All Key Ceremonies have been executed successfully. A Key Ceremony Script is in **Appendix A**. See **Figure 1.2-61**.

Figure 1.2-61. Key Ceremonies

CEREMONY	LOCATION	DATE	ACTIONS
1	Culpeper, VA	2010-06-16	Initialization, enrollment, key generation, KSR processing (Q3/2010)
2	El Segundo, CA	2010-07-12	Initialization, enrollment, key delivery, KSR processing (Q4/2010)
3	Culpeper, VA	2010-11-01	KSR processing (Q1/2011)
4	El Segundo, CA	2011-02-07	KSR processing (Q2/2011)
5	Culpeper, VA	2011-05-11	KSR processing (Q3/2011)
6	El Segundo, CA	2011-07-20	KSR processing (Q4/2011)
7	Culpeper, VA	2011-09-30	KSR processing (Q1/2012)
8	El Segundo, CA	2012-02-02	KSR processing (Q2/2012)

Ceremonies are for ongoing key management functions, including key generation and use of the KSK for signing the Root Keyset as appropriate.

ICANN's execution of the systems, procedures and policies used in the performance of this function have been subject to extensive external review and include the following:

- Trusted Community Representatives (all ceremonies)
- External Witnesses (all ceremonies)
- Representatives of the Root Zone Maintainer (all ceremonies)
- The general public via archived video footage, logs, software, and annotated scripts (all ceremonies)
- The general public, via live Internet video stream (starting with ceremony three and including all subsequent ceremonies)
- PricewaterhouseCoopers, acting as SysTrust auditors

As part of this initiative, ICANN has established a comprehensive array of procedures for managing the KSK. Central to this is ICANN's "DNSSEC Practice Statement for the Root Zone KSK Operator" (DPS). No concerns have been communicated to ICANN, NTIA or the Root Zone Maintainer relating to the accuracy with which published procedures have been followed by ICANN in Key Ceremonies.

ICANN's processes have been reviewed for availability, processing integrity and security objectives, and this has resulted in ICANN being awarded SysTrust certification by

PricewaterhouseCoopers. This certification means that ICANN's processes passed a rigorous independent review and provides assurance that ICANN's systems are reliable and the procedures have been followed accurately. ICANN has been certified with this certification for both its first and second year of operation.

Understanding the Requirement

ICANN understands that it is required to be responsible for the management of the root zone KSK, including generation, publication and use for signing the Root Keyset. ICANN further understands that the technical approach used to perform such management functions must comply with the document included as Appendix 2 in the Scope of Work. ICANN understands the requirement to work collaboratively with NTIA and the Root Zone Maintainer in the performance of this function.

Technical Approach

ICANN describes our technical approach to meeting this requirement in the following sections.

1.2.9.2.f.1 Management of the Root Zone Key Signing Key

The key management methodology used in the Root Zone Key Signing Key operations will be based on standards such as ISO 21188 and ANSI X9.79: 2001. These represent best practices for key management in the industry and are adopted by financial institutions and commercial Certification Authorities (CAs). Every element of key management will be rigorously documented and executed in a highly secure and fully auditable manner. In addition, ICANN will demonstrate the transparency of the process by making ceremony footage, ceremony scripts and signing software publicly available after the ceremony.

1.2.9.2.f.1.1 Root Zone Key Signing Key Generation and Signing Operations

Root Zone Key Signing Key (KSK) key pair generation and the Key Signing Request (KSR) signing will be performed by multiple pre-selected, trained and trusted individuals using Trustworthy Systems and processes that provide for the security and required cryptographic strength for the generated keys.

All KSK related operations are executed in pre-planned Key Ceremonies in accordance with the requirements of the Key Ceremony Reference Guide. The activities performed in each key ceremony are recorded, dated and signed by the Ceremony Administrator and the Internal Witness.

1.2.9.2.f.1.2 Publication of the Root Zone Key Signing Key

ICANN will publish the public component of the Root Zone Key Signing Key using a number of secure methods, consistent with the published specification for trust anchor publication. The Trust Anchor set will be published in two formats:

1. In DS record format (i.e., as the hashes of corresponding individual DNSKEY resource record sets in DS format)
2. As Certificate Signing Requests (CSRs) in PKCS#10 format for further processing by Certificate Authorities and validation of proof of possession of each corresponding private key

Paper-copy representations of trust anchors will be distributed to Key Generation Ceremony participants when the corresponding keys are generated. These participants may attest to the generated key in any way they find suitable.

Trust anchor sets and shorthand representations thereof will be distributed among the Key Generation Ceremony participants. These participants may attest to the generated key in any way they find suitable.

In addition, the Trust Anchor set will be transported to the ICANN Trust Anchor signing infrastructure (separate from the DNSSEC signing infrastructure) in a secure manner to preclude substitution attacks. These signed Trust Anchor sets will then be published with these signatures along with the original Certificate Signing Request.

Signed key sets will be made available by HTTP. The various components will be published as:

- The Uniform Resource Locator (URL) for retrieving the CSR will be *<http://data.iana.org/root-anchors/<key-label>.csr>.*
- The URL for retrieving the ICANN signed Certificate will be *<http://data.iana.org/root-anchors/<key-label>.crt>.*
- The URL for retrieving the complete trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.xml>.*
- The URL for a detached S/MIME signature for the current trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.p7s>.*
- The URL for a detached OpenPGP signature for the current trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.asc>.*

The current root zone trust anchor set is published using the mechanisms described above. All future new trust anchor sets will be published using compatible mechanisms.

The methodology used by ICANN to publish the Key Signing Key is supported by vendors that have implemented DNSSEC in their software. The methodology used was reviewed by the community of stakeholders as part of the process to design to Root Zone Key Signing Key management process.

1.2.9.2.f.2 Collaborating with NTIA and the Root Zone Maintainer

ICANN will continue to collaborate with NTIA and the Root Zone Maintainer as it has during the design and development of it RZ KSK system as advancements in technology, processes and procedures necessitate. For instance, ICANN will work closely with both parties to perform business continuity exercises to test the effectiveness of the business continuity plan and improve the resiliency of the overall Root Zone operation.

1.2.9.2.f.3 Requirements outlined in Appendix 2

ICANN's technical approach to the specific requirements in Appendix 2 of the Scope of Work is enumerated below. ICANN will fully adhere to these requirements.

1.2.9.2.f.3.1 Overall Security Lifecycle

ICANN has developed and will continue to maintain an Information Security Management System (ISMS) based on ISO 27001 to manage the lifecycle of the overall security for the Root DNSSEC operations.

1.2.9.2.f.3.2 Technical Security Controls required by a HIGH IMPACT system

As per the original baseline requirements, ICANN's RZ KSK root operations are designed to meet technical security controls described in NIST 800-53 for HIGH IMPACT systems. These Special Publications documents represent guidelines and recommendations to establishing a viable IT security policy.

1.2.9.2.f.3.3 Security Authorization and Management Policy

ICANN will develop, implement and maintain a series of security policies that will cover all aspects of the Root Zone KSK operation. The primary purpose is to get management's commitment to reserve the resources required to maintain and enhance the secure operation. ICANN recognizes that proper policy settings are extremely significant in case an unplanned event, such as when incidents and disasters occur.

The security policies for the Root Zone KSK operations will include but are not limited to the following:

- Root Zone KSK Operator Function Information Security Policy
- Root Zone KSK Operator Function Audit and Accountability Policy
- Root Zone KSK Operator Function Key Management Policy
- Root Zone KSK Operator Function Physical Security Policy
- Root Zone KSK Operator Function Policy Management Authority Charter
- Root Zone KSK Operator Function Personnel Security Policy
- Root Zone KSK Operator Function Business Continuity Policy
- Root Zone KSK Operator Function Incident Response Policy
- Root Zone KSK Operator Function Document Management Policy

All documents are, and will be, managed in accordance with the Root Zone KSK Operator Document Management Policy, which is a document designed to ensure that the processes are properly documented and are compliant with the requirements. This policy encompasses all range of requirements including but not limited to regulatory, technical and consistency with the governing document. The aim of this policy is to make sure the actual operation reflects what is documented and vice versa, so either the process or the document can be corrected. All documents will be reviewed, updated and approved as appropriate to maintain its effectiveness and practicality.

1.2.9.2.f.3.4 IT Access Control

The signer system that includes the ceremony laptop, HSM and the OS/DVD will be completely offline and will never be connected to the Internet. Because of this, it is virtually impossible to perform a cyber attack on the signer system; therefore, it is only protected by rigorous the physical countermeasures described in 1.2.9.2.f.3.7.

Communication of ZSK Key Signing Requests (KSR) from the Root Zone Maintainer/Zone Signing Key (ZSK) Operator will be done using a separate TLS client-side authenticated web server that resides on ICANN's production network. Transfer of a KSR from the web server to the signer system is performed manually using removable media.

ICANN's production network will be logically separated from other components. This separation will prevent network access except through defined application processes. ICANN will use firewalls to protect the production network from internal and external intrusion. These firewalls will limit the nature and source of network activities that may access production systems that are related to key signing activities.

1.2.9.2.f.3.5 Security Training

ICANN will develop and implement a training program that covers all personnel involved in the Root Zone KSK Operation. This training will take the form of an on-the-job training that will be provided to the personnel to perform their job responsibilities adequately, competently and satisfactorily. ICANN will periodically review and enhance its training programs upon necessity.

The training will be tailored for each role and responsibility listed below:

- Ceremony Administrator
- Internal Witness
- Safe Security Controller
- ICANN KSK Operations Security
- Crypto Officer
- Recovery Key Share Holder

The topics covered by the program will include but are not limited to the items below:

- Basic DNS/DNSSEC concepts
- Job responsibilities
- Use and operation of deployed hardware and software
- Key management concepts and principles
- Security and operational policies and procedures
- Incident and compromise reporting and handling procedures
- Disaster recovery and business continuity procedures

1.2.9.2.f.3.6 Audit and Accountability Procedures

ICANN will establish an Audit and Accountability policy in order to define the types of audit data and how it must be handled. ICANN recognizes that an Audit and Accountability policy is essential to assess the effectiveness of the implemented security controls and countermeasures. This content of the policy will include but are not limited to the following:

- Roles and responsibilities
- Scope of the audit
- Types of events recorded
- Frequency of processing log
- Retention period

- Protection of audit log
- Audit log backup

The policy will be reviewed at least once a year to maintain its applicability and effectiveness.

The types of events that will be recorded for the annual security audit include but are not limited to the following:

- Specific auditing events related to KSK key lifecycle management
  - Key generation, backup, storage, recovery, archival, and destruction
  - Exporting of public key components
- KSK signing and management events
  - Key activation
  - Receipt and validation of public key material (i.e., from the ZSK holder)
  - Successful or unsuccessful signing requests
- Security related events
  - Assignment and revocation of credentials
  - Successful and unsuccessful system access attempts
  - Key and security system actions performed by trusted personnel
  - Security sensitive files or records read, written or deleted
  - Security profile changes
  - System crashes, hardware failures and other anomalies
  - Facility visitor entry and exit
  - System changes and maintenance / system updates
  - Incident response handling
- Log entries
  - Date and time of entry
  - Identity of the entity making the journal entry

If ICANN detects an event that has lead to, or could have lead to, a security compromise of any of the security mechanisms, an investigation will be performed to determine the nature of the incident. If the incident is suspected to have compromised the private component of an active KSK, the Emergency KSK rollover procedure will be executed.

Otherwise, the risk of the incident will be assessed and a remediation plan will be developed and executed. The plan will include additional countermeasures to prevent the event from repeating. The incident handling procedures include reporting of all events to ICANN KSK Operations Security (IKOS), which in turn reports to the Policy Management Authority (PMA). Depending on the severity of the event, it will be reported to the U.S. Department of Commerce (DoC) in a timeframe and format mutually agreed by the DoC, IANA Functions Operator and the Root Zone Maintainer.

An audit report will be created in collaboration with the COR and delivered monthly. Besides the periodical generation and submission of this report, ICANN will maintain the capability to generate ad-hoc audit reports. The audit reports will be made publicly available.

1.2.9.2.f.3.7 Physical Protection Requirements

All Root KSK operations will be conducted within a physically protected environment that is designed to deter, prevent and detect any unauthorized use, access, or disclosure of sensitive information and systems, whether covert or overt.

ICANN will maintain disaster recovery capabilities for its DNSSEC operations by maintaining more than one site with comparable physical security. The signer systems will be protected by a minimum of four tiers of physical security with access to lower tiers required before gaining access to higher tiers. Progressively more restrictive physical access controls to each tier are applied. Unauthorized access becomes increasingly difficult as one reaches higher tiers. Sensitive DNSSEC operational activity and any activity related to the lifecycle of the RZ KSK occur within these restrictive physical tiers.

Physical access will be automatically logged and video recorded. All tiers enforce individual access control through the use of two-factor authentication. Unescorted personnel, including visitors or employees without specific authorization, will not be allowed into such secured areas. The physical security system includes additional controls for tiers used for key management activity that serves to protect storage of Hardware Security Modules (HSMs) and keying material.

Areas used to create and store cryptographic material will enforce dual access control, each through the use of two-factor authentication. HSMs will be protected through the use of tamper-evident bags, locked safes, cabinets, and containers. Access to HSMs and keying material will be restricted in accordance with ICANN's segregation of duty requirements. The opening and closing of cabinets or containers in these tiers will be logged for auditing purposes.

ICANN's key management facilities are equipped with primary and backup power systems to ensure continuous, uninterrupted access to electric power and backup heating/ventilation/air conditioning systems to control temperature and relative humidity. ICANN will also take reasonable precautions to prevent and extinguish fires or other damaging exposure to flame or smoke. ICANN's fire prevention and protection measures have been designed to comply with local fire safety regulations.

1.2.9.2.f.3.8 Maintenance and Update Procedures

The signer system will be designed to require a minimum of maintenance. Updates critical to the security and operations of the signer system will be applied after formal testing and approval. The origin of all software and firmware will be securely authenticated by available means.

Critical hardware components of the signer system will be procured directly from the manufacturer and transported in tamper-evident bags to their destination in the secure facility. Any hardware will be decommissioned well before the specified life expectancy.

ICANN's Software Development Life-Cycle (SDLC) procedures for the Root Zone KSK key generation and signer software will implement relevant parts of NIST SP 800-64 for incorporating security and trustworthiness into the SDLC.

In addition, all critical parts of the signers modules developed by ICANN will be subject to external code review. The code review is required to certify the following:

- There is a documented architectural design describing the security domains and functions maintained by the signer.
- The architectural design demonstrates that the signer system prevents bypass of the security-enforcing functionality.
- There is a functional specification completely representing the signer system and all operations associated with it.
- There is a modular design description and a one-to-one correspondence with the modular decomposition of the implementation.
- The implementation representation completely and accurately implements the security-enforcing functions.

The software developed by ICANN, when first loaded, will provide a method to verify that the software on the system originated from ICANN, has not been modified prior to installation and is the version intended for use.

1.2.9.2.f.3.9 Requirements for Root Zone Key Signing Key (KSK) Holder

ICANN acknowledges that the responsibility as the Root Zone KSK Holder is to generate and protect the private component of the RZ KSK, securely export or import any public key components, authenticate and validate the public portion of the RZ Zone Signing Key, and sign the Root Zone DNSKEY record.

The requirements that are specific to the Root Zone KSK holder are described in the following sections.

1.2.9.2.f.3.9.1 Cryptographic Requirements

The Root Zone KSK pair managed by ICANN is currently an RSA key pair with a modulus of 2048 bits. ICANN will generate all future Root Zone KSK pairs as RSA key pairs with a modulus not less than 2048 bits.

RSA Key Generation of the current Root Zone KSK met the requirements specified in FIPS 186-3, in particular the FIPS 186-3 requirements for exponent size and preliminary testing.

The current Root Zone KSK was generated and is stored on four FIPS 140-2 level 4 hardware cryptographic modules (HSM). All future Root Zone KSKs will be generated and stored on FIPS140-2 level 4 validated HSMs.

All signatures generated using the Root Zone KSK to date have used SHA-256. All future signatures generated using the current or future Root Zone KSKs will use SHA-256.

All cryptographic functions involving the private component of the Root Zone KSK to date have been performed within an HSM. All future such functions will be performed only within an HSM.

The private component of the Root Zone KSK has only ever been exported from an HSM with appropriate controls (FIPS 140-2) for the purpose of key backup. The private component of the current Root Zone KSK or any future Root Zone KSK will only be exported from an HSM with the same controls for the same purpose.

1.2.9.2.f.3.9.2 Multi-Party Control

ICANN will implement technical and procedural mechanisms that require the participation of multiple trusted individuals to perform sensitive cryptographic operations.

The activation data needed to make use of the RZ KSK private key will be split onto separate smartcards controlled by Crypto Officers selected from members of the Internet community that are not part of root zone management operations. Specifically, organizationally separate parties, not affiliated with ICANN, the Root Zone Maintainer or the DoC. A threshold number of smartcards (m) out of the total number of smartcards created and distributed for a particular hardware security module (n) will be required to activate a RZ KSK private key stored on the module. The threshold number of cards required to sign an object out using the RZ KSK is three out of seven. A key possessed by the cardholder physically protects the smartcards.

The RZ KSK will be backed up on a total of four HSMs that are FIPS 140-2 level 4 overall compliant in two locations. In addition, encrypted copies of the RZ KSK private key will be backed up onto a smartcard. The key used to encrypt the private key will be backed up using a five-out-of-seven threshold scheme with smartcards distributed to trusted Recovery Key Share Holders that will be selected from members of the Internet community not already part of root zone management operations. Specifically, organizationally separate parties, not affiliated with ICANN, the Root Zone Maintainer or the DoC. The Recovery Key Share Holders will keep the cards in tamper-evident bags, stored in geographically dispersed location under their control.

Trusted personnel will be selected using the approach documented for selected Trusted Community Representatives (TCRs). ICANN's approach involves assessing TCRs based on the following attributes:

1. Persons of integrity, objectivity, and intelligence, with reputations for sound judgment and open minds
2. Persons with an understanding of the domain name system and the potential impact of DNSSEC operations on the global Internet community
3. Persons who can help ICANN represent the broadest cultural and geographic diversity consistent with meeting the other criteria set forth in this Section
4. Persons who, in the aggregate, have personal familiarity with the operation of gTLD and ccTLD registries and registrars; with IP address registries; with Internet technical standards and protocols; with policy-development procedures, legal traditions and the public interest; and with the broad range of business, individual, academic, and non-commercial users of the Internet
5. Persons who are willing to serve as volunteers without compensation other than the reimbursement of certain expenses
6. Persons who are able to work and communicate in written and spoken English

ICANN KSK Operations Security (IKOS) will maintain a list of contact information for all personnel involved in the Root KSK operations.

1.2.9.2.f.3.9.3 Root Zone KSK Rollover

Root Zone KSK rollover will be executed as required or after five years of operation. Cryptographic algorithm rollover will also be taken into account when planning a RZ KSK rollover.

The RZ KSK rollover will be scheduled to facilitate automatic updates of the Trust Anchors in the DNS resolvers as described in RFC 5011 [RFC5011]. This rollover will allow seamless transition from the old Trust Anchor to the new Trust Anchor without jeopardizing the chain of trust. After a RZ KSK has been removed from the key set, it will be retained after its operational period until the next scheduled key ceremony, which is when the private component will be destroyed in a secure manner.

1.2.9.2.f.3.9.4 Contingency Planning

ICANN will develop, implement and maintain a Business Continuity Plan to mitigate the effects of natural, man-made or technological disasters or other disasters that requires temporary or permanent cessation of operations from any of ICANN's facilities. The Business Continuity Plan will be deployed to address the restoration of information systems services and key business functions. The plan will address the following:

- Roles and responsibilities in the event of a disaster
- Fallback procedures for restoring business-critical processes within acceptable times
- Resumption procedures for restoring normal operations
- The criteria for activating the plan

At a minimum, ICANN will maintain the capability to restore or recover essential operations within 48 hours following a disaster with support for the following functions:

- Public communications
- Ability to import KSRs and export SKRs
- Generation of KSK
- Processing and signing of KSR contents
- Publishing the Trust Anchor

The Business Continuity Plan will be designed to provide full recovery within one week at the alternative site following any incident or disaster occurring at any of ICANN's sites. When possible, operational status will be restored as soon as possible following any incident or disaster.

The plan will be periodically tested, validated and updated to be operational in the event of any incident or disaster. Results of such tests will be reviewed and kept for audit and planning purposes.

ICANN will also preserve the capability to generate and publish an interim Trust Anchor within 48 hours. This interim Trust Anchor will be used to facilitate an orderly RFC 5011 [RFC5011]

automatic KSK rollover to a new and sanctioned Trust Anchor generated at an appropriately planned key ceremony held within a reasonable timeframe.

1.2.9.2.f.3.9.5 DNS Record Generation

The RZ ZSK public keys within the KSR will be self-signed by the Root Zone Maintainer with SHA-256 with RSA encryption to provide proof of possession of the corresponding private key.

The signature embedded in the KSR and the parameters will be automatically validated when the Root Zone Maintainer posts the KSR to a dedicated online system to exchange the KSR and SKR. Access to this system is protected with TLS client-side authentication. The signer software that will be used during the ceremony also performs the identical validation prior to processing the KSR during the key signing ceremony.

In addition, the RZ KSK Operator will verify the authenticity and integrity of the KSR by performing an out-of-band verification (verbally over the phone, by fax or by another appropriate and available method) of the hash of the KSR before processing the KSR in the key ceremony.

1.2.9.2.f.3.9.6 Audit Generation and Review Procedures

An independent accounting firm that is accredited by the American Institute of Certified Public Accountants (AICPA) will be selected to perform annual security compliance audits for the Root KSK operations. This accounting firm will not participate in the multi-person control for the RZ KSK or RZ KSK and will be a different accounting firm from the firm the Root Zone Maintainer has engaged.

ICANN will back up electronic archives of its audit information to an off-site secure facility after each key ceremony. Copies of paper-based records are also stored off-site and are maintained in the same manner. In addition, audit logs will be kept off-line and secured in accordance with an Audit Logging Procedure that describes the mechanisms to protect the log files from unauthorized viewing, modification, deletion, or other tampering.

ICANN will ensure that all audit data will be available for the CO and COR within a reasonable timeframe upon request. The audit data is considered confidential, thus it will be sent through encrypted channels.

1.2.9.2.f.3.9.7 RZ KSK Public Key Distribution

ICANN will publish the public component of the Root Zone Key Signing Key using a number of secure methods, consistent with the published specification for trust anchor publication. The Trust Anchor set will be published in two formats:

7. In DS record format (i.e., as the hashes of corresponding individual DNSKEY resource record sets in DS format)
8. As Certificate Signing Requests (CSRs) in PKCS#10 format for further processing by Certificate Authorities and validation of proof of possession of each corresponding private key

Paper-copy representations of trust anchors will be distributed to Key Generation Ceremony participants when the corresponding keys are generated. These participants may attest to the generated key in any way they find suitable.

Trust anchor sets and shorthand representations thereof will be distributed among the Key Generation Ceremony participants. These participants may attest to the generated key in any way they find suitable.

In addition, the Trust Anchor set will be transported to the ICANN Trust Anchor signing infrastructure (separate from the DNSSEC signing infrastructure) in a secure manner to preclude substitution attacks. These signed Trust Anchor sets will then be published with these signatures along with the original Certificate Signing Request.

Signed key sets will be made available by HTTP. The various components will be published as the following:

- The URL for retrieving the CSR will be *<http://data.iana.org/root-anchors/<key-label>.csr>.*
- The URL for retrieving the ICANN signed Certificate will be *<http://data.iana.org/root-anchors/<key-label>.crt>.*
- The URL for retrieving the complete trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.xml>.*
- The URL for a detached S/MIME signature for the current trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.p7s>.*
- The URL for a detached OpenPGPsignature for the current trust anchor set will be *<http://data.iana.org/root-anchors/root-anchors.asc>.*

The current root zone trust anchor set is published using the mechanisms described above. All future new trust anchor sets will be published using compatible mechanisms.

The methodology used by ICANN to publish the KSK is supported by vendors that have implemented DNSSEC in their software. The methodology used was reviewed by the community of stakeholders as part of the process to design to Root Zone Key Signing Key management process.

1.2.9.2.f.3.10 Requirements for Root Zone Zone Signing Key (RZ ZSK) Holder

ICANN understands that this section of the requirements is intended for the Root Zone Maintainer; therefore, none of these requirements are applicable to the IANA Functions Operator.

ICANN will continue the technical dialogue with the Root Zone Maintainer as established during the deployment of DNSSEC in the root zone and will continue to verify that the systems and processes documented by the Root Zone Maintainer meet the corresponding requirements as set forth in Appendix 2 of the Scope of Work.

1.2.9.2.f.3.11 Transition Planning

ICANN will establish and implement a Root Zone KSK Operation Function Termination Plan that specifies the steps that ICANN will take if required to securely transition its duties and

responsibilities as the Root Zone KSK Operator to another entity in case ICANN is required to relinquish its role and associated duties as the Root Zone KSK Operator.

ICANN will be responsible for cooperatively transferring the Root Zone KSK Operator role and providing the successor with the relevant logs and audit information necessary to continue the operations.

The termination and transition process will be carefully planned and carried out in collaboration with the DoC.

Circumstances that may trigger a transition of duties may include, but are not limited to, a corporate merger, acquisition, bankruptcy, catastrophic disaster, or other situations that would require a permanent termination of the Root Zone KSK operations.

1.2.9.2.f.3.12 Personnel Security Requirements

ICANN has developed and will continue to maintain a Personnel Security Policy that sets the requirements for the background checks, segregation of duties matrix, training requirements, role assignment process, and other personnel security related provisions.

Tasks requiring separation of duties include, but are not limited to, the generation, use and destruction of Root Zone DNSSEC key material. Personnel holding a role in the multi-party access to the RZ KSK will not hold a role in the multi-party access to the RZ ZSK or vice versa. The auditor will not participate in the multi-person control for the RZ KSK or RZ ZSK. ICANN will assign a third-party auditor that is not selected by the Root Zone Maintainer.

All personnel that have access to the sensitive cryptographic materials are trained in accordance with section 1.2.9.2.f.3.5.

1.2.9.2.f.3.13 Root Zone Maintainer Basic Requirements

ICANN understands that this section of the requirements is intended for the Root Zone Maintainer; therefore, none of these requirements are applicable to the IANA Functions Operator.

ICANN will continue the technical dialogue with the Root Zone Maintainer that was established during the deployment of DNSSEC in the root zone and will continue to verify that the systems and processes documented by the Root Zone Maintainer meet the corresponding requirements as set forth in Appendix 2 of the Scope of Work.

1.2.9.2.f.3.14 IANA Functions Operator Interface Basic Functionality

Publishing a signed Delegation Signer (DS) resource record in the root zone forms the chain of trust in DNSSEC from the Root Zone to a Top Level Domain (TLD). The DS record is a cryptographic shorthand representation, or hash, of the TLD generated and controlled KSK.

The TLD manager will submit the DS record to request activation of DNSSEC. The identity and authority of the TLD manager will be verified using the appropriate method for that specific TLD. The DS resource record provided by the TLD Manager is authenticated and processed by the IANA Functions Operator and incorporated into a change request, requesting authorization from the DoC to make the change in the root zone.

The DS resource record must be valid and submitted in the DS RR Presentation Format as described in RFC 4034. As part of the vetting process, the DS record is checked against the TLDs DNSKEY keyset and signatures. After Root Zone Administrator authorization, the DS resource record is incorporated into the Root Zone and signed by the Zone Signing Key held by the Root Zone Maintainer.

The IANA Functions Operator will also take efforts to ensure the availability and integrity of the TLD by validating the DS resource record to the currently published Domain Name System Key (DNSKEY) Resource Record Signatures (RRSIGs). If a DS resource record does not validate, there will be an out-of-band process in order to confirm the authenticity and intention of publishing the DS resource record.

Only a TLD manager can request removal of DS resource records. DS removal requests will also be authenticated and processed by the IANA Functions Operator and authorized by the Root Zone Administrator like any other changes to the Root Zone file.

1.2.9.2.f.3.15 Root Zone Management Requirements

ICANN will manage the DS Resource Record sets for TLD delegations in accordance with its commitments described in section 1.2.9.2.a. The methodology used for management of DS records is part of the process for Root Zone File Change Request Management.

This process will provide for the ability and process to store TLD delegations and DS RRs, according to the process described in 1.2.9.2.a.1.2.

ICANN will support the ability to store multiple keys with different algorithms. The DNS Root Zone currently has a number of TLDs using both multiple keys and different algorithms that were submitted using the processes that ICANN will implement under this proposal.

ICANN will maintain a history of DS records used for a given TLD. This history is maintained in the system as described in 1.2.9.2.e.4.

ICANN will provide procedures and guidance to TLD managers regarding how to roll over TLD key materials, using the procedures described in 1.2.9.2.a.1.2. Further, ICANN will provide 24x7 operations as described in 1.2.9.2.2, which provides TLD managers with a 24×7 emergency contact number in order to reach the IANA Functions Operator to conduct an emergency key roll over.

ICANN will provide procedures and the ability for a TLD to be moved from signed to unsigned status, through the execution of a change in accordance with the process described in 1.2.9.2.a.1.2. To move to an unsigned status, the TLD manager makes a DS record change request to remove all DS records currently listed in the DNS Root Zone.

ICANN will provide procedures and the ability for the revocation of DNSSEC capability from the DNS Root Zone, which will return the root zone to its pre-signed state. To move to unsigned status, the process will include removing the DNSKEY records from the DNS Root Zone. ICANN recognizes this process involves coordination with the Root Zone Maintainer, which is responsible for the process of ceasing signing of the root zone itself.

Experimental Use

ICANN will register the Experimental Use policy in the appropriate registry in-line with instructions received from the IETF. These instructions will normally be in the form of a document approval and follow the process detailed in the Draft Approval process described previously.

Expert Review (or Designated Expert)

ICANN will register assignments made under the Expert Review policy in line with the Expert Review process described in the following section. Multicast addresses are assigned using the Expert Review process. Application templates for multicast IPv4 and IPv6 addresses are in **Appendix C**.

Expert Review Process

In the process shown in **Figures 1.2-75 and 1.2-76,** a potential registrant lodges a request via ICANN's IANA website. ICANN reviews the request for completeness and addresses any deficiencies in that area with the registrant. Complete requests are forwarded to the IESG Designated Expert for review. Questions and comments are passed on to the requester and, based on the responses; the expert decides whether to approve the request. This is the process ICANN will follow for registries the IETF has designated with an Expert Review policy.

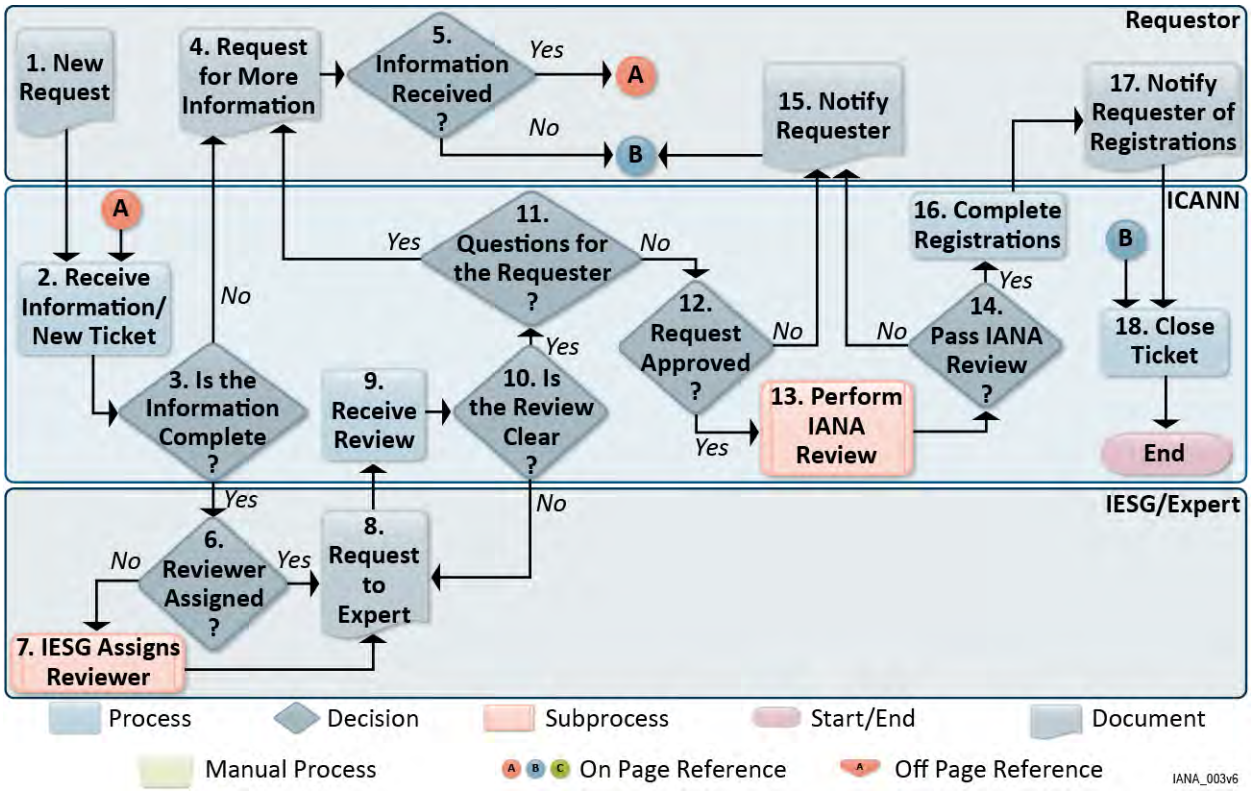


Figure 1.2-75. Expert Review Process