IAB response to the IANA FNOI

1 Introduction

The IAB would like to thank the NTIA for its assessment of the comments on the earlier NOI and for the ability to comment on the IANA statement of work through this further notice of inquiry (FNOI).

As was the case with the earlier NOI, the IAB responds to this FNOI as the body that approves the entity that serves as IANA for the Internet Engineering Task Force (IETF), representing the IETF in these matters. At the same time we are taking a broader view of the IANA functions and related stability and interoperability issues for the Internet.

Generally the IETF and the IAB use the term IANA in a broader context, but in this feedback we use the term "IANA" or "IANA function" to refer specifically to the set of registries as currently operated by ICANN under contract between ICANN and the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA). The use of the term IANA in other IETF/IAB contexts does not necessarily relate to functions performed under this contract.

We start with providing some general feedback and continue to provide more detailed suggestions for SOW language.

2 Generic Comments

2.1 The IANA function is broader than DNS

The IANA function maintains tables and registries that are necessary for the interoperability of protocols and systems connected to the Internet. The Domain Name System parameters have a high visibility and therefore their economic importance is recognized. However, it is not the case that in terms of stability and economic relevance the other registries are of less value. The modus operandi is the same for all tables: A policy development body defines the policy and IANA creates and populates the tables in a mechanical fashion.

Consequently, we believe the FNOI, and whatever documents or contracts that follow it, would better serve the US Government, IANA, and the broader Internet user and producer communities if the DNS, addressing, and protocol functions of the IANA were treated on an equal footing, rather than having the document imply, however indirectly or accidentally, that the other IANA functions essentially support the DNS function.

2.2 Governance

We don't consider the present situation in which a single governmental agency is seen as having close, management-level, oversight of IANA as ideal and hope that NTIA is working toward more autonomy for the IANA function. At the same time,

we recognize the continued value of the NTIA role in the current situation and have responded to the FNOI in a way that responds narrowly to their text and questions in the context of current conditions.

As mentioned in the response to the original NOI, '*we believe that the IANA functions should evolve together. There exists synergy and interdependencies between the functions, and having them performed by a single operator facilitates coordination among registries, even those that are not obviously related. It also makes it easier to have consistency of formats and registry structure, which aids users of the registries and assists with quality control. Additionally, it facilitates cooperation and coordination among different communities and organizations participating in policy setting and using IANA services, thus contributing to the overall stability of the IANA.*'[1] That goal can be established under various governance models and the IAB is willing to explore those.

2.3 Materially Affected Parties versus Stakeholders

We applaud NTIA's recognition of the multi-stakeholder nature of the environment in which the IANA functions are grounded and its desire to require close working relationships between the Contractor and all materially affected parties. If the IANA is to effectively and efficiently carry out its key functions (which are primarily administrative and technical, and explicitly not policy-making), it is probably desirable that NTIA write requirements (and interpret requirements once written) in a way that focuses on "working relationships" with those who specify IANA actions or who are direct consumers of IANA decisions and registries rather than requiring close constructive working relations with anyone who merely claims to be interested and affected.

Note that this requirement does not exclude any stakeholder from participating in the policy development that governs the maintenance of the IANA tables and registries. That policy development is done by entities that specify the fundamentals of registries to be maintained and the conditions for creating or updating values in those registries (roughly: the relevant ICANN supporting organizations for the DNS, RIRs through the NRO for addresses and AS number registries, and in the IETF for other protocol parameters.)

One way to accomplish the above mentioned insulation would be to clarify, and make more transparent, the boundary between the IANA function and the policy-making functions carried out by the policy development bodies. We observe that the draft SOW already includes this boundary. A number of the suggestions below are made with the purpose of clarifying that boundary.

2.4 Security, Performance, and Audit Requirements

The requirements for Security, Performance, and the maintenance of an Audit trail serve to improve the overall robustness and stability of the IANA functions. They are first and foremost the responsibilities towards the Internet community.

Speaks to Q 6 and Q9

1 http://www.ntia.doc.gov/comments/110207099-1099-01/comment.cfm?e=5EBBB0ED-CBE1-44EA-9FAF-0AFC662A1534

One of the best ways to create a high level of stability and robustness is to maintain a high standard of openness and transparency and to seriously consider any feedback received.

Allowing a high level of visibility keeps the contractor accountable and improves confidence within the community, while obscure procedures will tend to hide flaws which can surprise the community when they are exposed and can be abused, either unintentionally or by rogue parties.

Therefore, the guiding principles are that:

1. the requirements should be set by the materially affected parties; and that
2. reporting is done publicly.

IANA should never be in the position where they are not able to point to publicly available data, reports and procedures. If for any reason particular data or reports cannot be made public their existence should be made public together with the reasoned explanation of why the information is not being made available.

2.5 Architectural Boundary Conditions on the IANA functions.

As mentioned in our first response: "*The IANA registries are created for specific protocols. Development of specifications of these protocols is part of the overall architectural role, which the IAB/IETF assumed [...] The architectural role may also set the standards for the methods by which the content of a registry is made available.*"

The relevance of this sentence is that IANA's actions are constrained by the technical boundary conditions as set by the IETF. For example, an IETF specification allocates a subset of the Internet Addresses for allocation through the RIR system while it reserves others for use by future IETF specifications. IETF specifications also set boundary conditions on the labels that are usable in the DNS.

3 Specific Comments

In this section we provide specific responses to the SOW. References are to the section numbers provided therein.

C.1 Background

We believe the Background sections should call out the separation between the procedural execution by the Contractor and the policies developed by policy development bodies (PDBs). We suggest the addition of a new section.

C.1.3*:* For some of the tables and registries maintained by IANA there are no requirements for confidentiality, while for others there are. It is up to the PDBs to set those requirements.

C.1.4: We suggest that instead of “interested and affected parties” the term “materially affected parties” be used.

C.1.5: Should apply only to confidential data.

In making these modifications it might be useful to change the order of the sections.

Concretely we suggest:

> **C.1.3** The IANA functions involve the maintenance and publication of various tables and registries of technical parameters, together with the maintenance of associated administrative data. Publication mechanisms include publication in the DNS (e.g., the root zone and .ARPA), and publication in XML tables through the IANA website.
>
> The IANA functions are of a procedural and mechanical nature based on policies determined by various Policy Development Bodies.
>
> **C.1.4** The Contractor, in the performance of its duties, has a need to have close constructive working relationships with all materially affected parties and Policy Development Bodies, to ensure satisfactory performance of the IANA functions. The Policy Development Bodies are ICANN, represented through its board, the IETF and IAB, and the regional address policy groups as represented by the ASO/NRO. The materially affected parties include, but are not limited to, the Policy Development Bodies, regional registries, country code top-level domain (ccTLD), operators/managers, and governments.
>
> **C.1.5** The Government acknowledges that data submitted by applicants in connection with the IANA functions may be confidential information (dependent on policies set by the Policy Development Bodies).
> To the extent permitted by law, the Government shall accord any confidential data submitted by applicants in connection with the IANA functions with the same degree of care as it uses to protect its own confidential information, but not less than reasonable care, to prevent the unauthorized use, disclosure, or publication of confidential information. In providing data that is subject to such a confidentiality obligation to the Government, the Contractor shall advise the Government of that obligation.

Q1:*Does the language in "Provision C.1.3" capture views on how the relevant stakeholders as sources of the policies and procedures should referenced in the next IANA functions contract. If not, please propose specific language to capture commenters' views.*

C 2.1 Contractor requirements

The IAB recognizes the US Government's requirement that "all security and operational components" shall all maintain physical residency within the United States. However services on which the whole Internet relies should be designed with off-continent replication and general systems robustness in mind. The SOW should allow for that.

> **C.2.1** […]The Government reserves the right to inspect

> the premises, systems, and processes of all security and operational components used for the performance of these requirements, which, in addition, shall all maintain physical residency, for at least one instance of a replicated service, within the United States.

C.2.2.1

While the first sentence correctly notes the importance of the IANA functions for stable operation of the Internet, the IANA functions are not the 'Internet's core infrastructure'. The tables and registries maintained by IANA are critical for the proper functioning for the Internet's core infrastructure, but they do not constitute that Infrastructure. More substantive is that the function is maintained in not only a stable and secure, but also a transparent manner.

> **C.2.2.1** The Contractor is required to maintain the IANA functions, which are critical for the operation of the Internet's core infrastructure, in a transparent, stable and secure manner. [...]

C2.2.1.1

Q2: Does the new "Provision C.2.2.1.1" adequately address concerns that the IANA functions contractor should refrain from developing policies related to the IANA functions? If not, please provide detailed comments and specific suggestions for improving the language.

This section expresses that IANA should perform its responsibility in a neutral, transparent and mechanical way. Trying to separate IANA staff from policy development is a method to establish that and we support it as a guiding principle. However, in practice IANA staff is involved in an advisory role; it will need to be able to clarify, provide operational background, perform impact analysis, or provide data and statistics, or request clarification or guidance during the development of policy. For instance, IANA staff may be in a very good position to provide the arguments why a certain policy might not be implementable, or more effective if certain boundary conditions are taken into account. As such IANA staff will need to be able to work with the policy development bodies.

Hence we suggest the following modification:

> **C.2.2.1.1** The Contractor shall ensure that any and all staff dedicated to executing the IANA functions will not initiate or drive policy development related to the performance of the IANA functions. However, IANA staff may be requested by the policy development bodies to collaborate in an advisory role. IANA staff may request guidance or clarification from policy development bodies as necessary for the performance of the IANA functions.

C.2.2.1.2 Coordinate the Assignment of Technical Protocol Parameters

Q3: Does the language in "Provisions C.2.2.1.2, C.2.2.1.3, C.2.2.1.4, and C.2.2.1.5" adequately address concerns that the IANA functions contractor should perform these services in a manner that best serves the relevant stakeholders? If not, please propose detailed alternative language.

This section should clearly identify the policy development body: the IETF.

Also, the performance standards and metrics should primarily be oriented toward the *consumer* of the services – the IETF. The draft SOW carries a potential conflict of interest in that the metrics as approved by the COTR might not meet the IETF's requirements, or the IETF's requirements might not be approved by the COTR. To

reduce that risk we suggest narrowing the cases in which the COTR cannot approve due to conflicts.

Below is a suggested text that also partly takes into account our comment n C.2.2.1.5.1 (the ARPA TLD).

> **C.2.2.1.2 Coordinate The Assignment Of Technical Protocol Parameters** -- This function involves the review and assignment of unique values to various parameters (e.g., operation codes, port numbers, object identifiers, protocol numbers) used in various Internet protocols based on guidelines and policies as developed in the IETF. This function also includes the dissemination of the listings of assigned parameters through various means (including on-line publication e.g. on the web and in the DNS under the .ARPA domain) and the review of technical documents for consistency with assigned values.
>
> **C.2.2.1.2.1 The ARPA TLD** -- The Contractor shall operate the .ARPA TLD within the current registration policies for this TLD, documented in RFC 3172. The Contractor shall be responsible for implementing DNSSEC in the ARPA TLD consistent with the requirements of the materially affected parties for this function as represented by the IAB.
>
> **C.2.2.1.2.2 Performance --** Within six (6) months of award, the Contractor shall submit to NTIA performance standards and metrics developed in collaboration with materially concerned parties for approval. The performance standards and metrics will be approved by the Contracting Officer's Technical Representative (COTR) unless they explicitly contradict some aspect of the contract. Upon approval by the COTR the Contractor shall perform this task in compliance with approved performance standards and metrics. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C.6.

C.2.2.1.3.2 Responsibility and Respect for the Stakeholders

This section generically applies to the interaction of the Contractor with all the materially affected parties. This can be achieved by elevating this section to the C.2.2.X level. We also believe that the requirement for documenting the sources of policies should be made stronger.

It is not clear what is meant by "*the Contractor shall act in accordance with the relevant national laws of the jurisdiction which the TLD registry serves*". According to the governance model the Contractor shall act in accordance with the policies developed by the relevant PDB. It is the responsibility of the PDB to ensure that these policies are not in conflict with national laws where appropriate. Requesting

Q5: *Does the new "Provision C.2.2.1.3.2 Responsibility and Respect for Stakeholders" adequately address concerns related to the root zone management process in particular how the IANA functions contractor should document its decision making with respect to relevant national laws of the jurisdiction which the TLD registry serves, how the TLD reflects community consensus among relevant stakeholders and/or is supported by the global public interest. If not, please provide detailed suggestions for capturing concerns. Are the timeframes for implementation reasonable?*

this from the IANA would likely be out of scope for the mechanical function, unless there is a clear and unambiguous process to be followed (such as checking whether a declaration of conformity has been made by the requesting party).

Finally, C.2.2.1.3.2 currently mentions : "*For delegation requests for new generic TLDs(gTLDs), the Contractor shall include documentation to demonstrate how the proposed string has received consensus support from relevant stakeholders and is supported by the global public interest.*"

As written now the article conflates the maintenance and the policy role by imposing a requirement that is in the policy realm.

The Contractor should not be brought in the position that it has to make judgment calls about the quality of the documentation that demonstrates the consensus. As soon as the Contractor needs to 'collect the documentation' a third party might appeal that the documentation does not demonstrate consensus and the Contractor would have to defend the policy decision. That is not its role. It is the policy body that should make that determination of the quality of consensus. Hence the only way for a contractor to act on this requirement is to provide a reference to the ICANN Board decision that approved the gTLD delegation. The Article should make that explicit by replacing the end of the final sentence by:

"the Contractor shall include a reference to the ICANN board decision that approved the gTLD."

The suggestions above would lead to (including re-ordered section numbering):

C.2.1 Responsibility to Stakeholders – The Contractor shall, in collaboration with all materially affected parties for the IANA functions, document the source of the policies and procedures, as mentioned in 1.4, and document how it has applied the relevant policies and procedures.

C.2.2 The Contractor shall furnish

C.2.3 The Contractor must perform […]

[…]

C.2.3.1 The contractor is required […]
[…]

C.2.2.3.2.2 With reference to C.2.1. The Contractor shall document the source of relevant policies and procedures, such as RFC 1591, to process requests associated with TLDs. In addition, processing of requests for delegation and re-delegation of a CCTLD should be consistent with policies and procedures developed by the Policy Development bodies (CCNSO and GAC). For delegation requests for new generic TLDS (gTLDs), the Contractor shall include a reference to the relevant instructions from the Policy Development Body *i.e.*, ICANN's supporting organizations as represented by

the board.

C.2.2.1.4 Allocate Internet Numbering Resources

Similar to our comments on C.2.2.1.2 we believe that the role of the NRO/ASO, representing the regional address policy development bodies, should be enforced. Not only calling out the NRO/ASO as the PDB but also as the entity that is the materially affected party and approval body for the performance standards and metrics.

C.2.2.1.4 Allocate Internet Numbering Resources -- This function involves overall responsibility for allocated and unallocated IPv4 and IPv6 address space and Autonomous System Number (ASN) space. It includes the responsibility to delegate Unicast IP address blocks, specified as such through the IETF Standards process, to regional registries, as per policies approved by the NRO/ASO for routine allocation, typically through downstream providers, to Internet end-users within the regions served by those registries and under the policies of those registries. This function also includes reservation and direct allocation of space for special purposes as specified through the IETF Standards Process, such as multicast addressing, addresses for private networks as described in RFC 1918, and other globally specified applications.

C 2.2.1.5 Other Services

The SOW text talks about 'The Contractor shall […] implement modifications […] upon mutual agreement of the parties'.

The IANA Contractor and NTIA may not be the only parties that are affected by such modification. Any such change should be discussed transparently with the materially affected parties.

Suggested text:

2.2.1.5 Other Services -- The Contractor shall perform other IANA functions, including the management of the INT TLDs. The Contractor shall also implement modifications in performance of the IANA functions as needed upon mutual agreement of the parties, following a transparent review and input by materially affected parties. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C.6.

C2.2.1.5.1 ARPA TLD

The ARPA TLD contains values from the protocol parameter registries which need to be published in the DNS. In other words, the ARPA TLD is a publication mechanism for registries that are maintained under the protocol registry function. Therefore, we

believe that this section should be moved to Section '2.2.1.2 Coordinate The Assignment Of Technical Protocol Parameters' (in its original numbering). The role of the IAB as the representative of the IETF for policy that govern the content of .ARPA – as documented in RFC 3172 – should be recognized. See our suggestion on page 5.

C.3 Security requirements

As mentioned in section 2.4 the Security requirements serve to improve the stability and robustness and serve the general Internet community. In cases where there is interaction with 'customers' (such as the IETF) the customers need to cooperate with the changes. The suggested modifications are in that spirit:

> **C.3.2 Secure Systems** -- The Contractor shall install and operate all computing and communications systems based on requirements developed in collaboration with the materially affected parties and in accordance with best business and security practices. The Contractor shall implement a secure system for authenticated communications between it and its customers when carrying out all IANA function requirements within nine (9) months after date of contract award. The Contractor shall publicly document practices and configuration of all systems.

C.4. Performance Metrics Requirements

With reference to section 2.4 a few suggestions follow that focus on transparency, customer requirements, and prevention of duplicated effort.

> **C.4.1 Monthly Performance Progress Report** -- The Contractor shall prepare and publish on its website a performance and progress report every month (no later than 15 calendar days following the end of each month) that contains statistical and narrative information, in a format developed with the materially concerned parties, on the performance of the IANA functions […]
> The COTR will be notified as soon as the report is made available.
>
> **C.4.2 Root Zone Management Dashboard** -- The Contractor shall collaborate with NTIA and VeriSign, Inc., (or any successor entity as designated by the U.S. Department of Commerce) and other materially concerned parties to develop and make publicly available a dashboard to track the process flow for root zone management within nine (9) months after date of contract award.

__Q9:__ Does the new "Section C.4 Performance Standards Metric Requirements" adequately address concerns regarding transparency in root zone management process, and performance standards and metrics? Should the contractor be required to gather and report on statistics regarding global IPv6 and DNSSEC deployment? If so, how should this requirement be reflected in the SOW? What statistics should be gathered and made public?

We believe section C.4.3 is not needed with the modification to C.4.1 as suggested above.

C.5 Audit Requirements

It is not clear what '*security process audit record data*' is. If it is a term of art related to Root Zone management then the whole section should be renamed to “C.5. Root Zone Audit Requirements”.

The general requirements of being: “publicly available and developed with materially affected parties” should apply here as well.

C.6 Performance Exclusions

Changes in methods that are requested by the materially affected parties should not be blocked because of the need for approval by the COTR. As argued above the default action should be to approve changes unless they explicitly contradict some aspect of the contract, requests, and approval or denial actions should be publicly archived.

We find the current wording over-reaching and suggest the section to be removed.

Closing Remarks

The IAB appreciates the opportunity to provide feedback on the draft SOW. While we reserve the right for final approval of the IANA service for the IETF (cf. RFC 2850), we are confident that with these comments and suggestions implemented the procurement will lead to satisfactory results.

Appendix: Edited Statement of Work

For context and convenience we have added a SOW with our suggested changes below. The order of the articles have been modified based on the remarks above therefore the numbering may be inconsistent with the numbering above and in the FNOI.

1. BACKGROUND

   1.1. The U.S. Department of Commerce (DoC), National Telecommunications and Information Administration (NTIA) has initiated this agreement to maintain the continuity and stability of services related to certain interdependent Internet technical management functions, known collectively as the Internet Assigned Numbers Authority (IANA).

   1.2. Initially, these interdependent technical functions were performed on behalf of the Government under a contract between the Defense Advanced Research Projects Agency (DARPA) and the University of Southern California (USC), as part of a research project known as the Tera-node Network Technology (TNT). As the TNT project neared completion and the DARPA/USC contract neared expiration in 1999, the Government recognized the need for the continued performance of the IANA functions as vital to the stability and correct functioning of the Internet.

   1.3. The IANA functions involve the maintenance and publication of various tables and registries of technical parameters, together with the maintenance of associated administrative data. Publication mechanisms include publication in the DNS (e.g., the root zone and .ARPA), and publication in XML tables through the IANA website.

   The IANA functions are of a procedural and mechanical nature based on policies determined by various Policy Development Bodies.

1.4. The Contractor, in the performance of its duties, has a need to have close constructive working relationships with all materially affected parties and Policy Development Bodies, to enable satisfactory performance of the IANA functions. The Policy Development Bodies are ICANN, represented through its board, the IETF and IAB, and the regional address policy groups as represented by the ASO/NRO. The materially affected parties include, but are not limited to, the Policy Development Bodies, regional registries, country code top-level domain (ccTLD), operators/managers, and governments.

1.5. The Government acknowledges that data submitted by applicants in connection with the IANA functions may be confidential information (dependent on policies set by the Policy Development Bodies).
To the extent permitted by law, the Government shall accord any confidential data submitted by applicants in connection with the IANA functions with the same degree of care as it uses to protect its own confidential information, but not less than reasonable care, to prevent the unauthorized use, disclosure, or publication of confidential information. In providing data that is subject to such a confidentiality obligation to the Government, the Contractor shall advise the Government.

2. CONTRACTOR REQUIREMENTS

2.1. Responsibility to Stakeholders -- The Contractor shall, in collaboration with all materially affected parties for the IANA functions, document the source of the policies and procedures, as mentioned in 1.4, and document how it has applied the relevant policies and procedures.

2.2. The Contractor must perform the required services for this contract as a prime Contractor, not as an agent or subcontractor. The Contractor shall not enter into any subcontracts for the performance of the services, or assign or transfer any of its rights or obligations under this Contract, without the Government's prior written consent and any attempt to do so shall be void and without further effect. The Contractor must possess and maintain through the performance of this acquisition a physical address within the United States. The Government reserves the right to inspect the premises, systems, and processes of all security and operational components used for the performance of these requirements, which, in addition, shall all maintain physical residency, for at least one instance of a replicated service, within the United States.

2.2.1. The Contractor shall furnish the necessary personnel, material, equipment, services, and facilities, to perform the following requirements without any cost to the Government. The Contractor shall conduct due diligence in hiring, including full background checks. On or after the effective date of this purchase order, the Contractor may establish and collect fees from third parties (i.e., other than the Government) for the functions performed under this purchase order, provided the fee levels are approved by the Contracting Officer before going into effect, which approval shall not be withheld unreasonably and provided the fee levels are fair and equitable and provided the aggregate fees charged during the term of this purchase order do not exceed the cost of providing the requirements of this purchase order. The Government will review the Contractor's accounting data at anytime fees are charged to verify that the above conditions are being met.

2.2.2. The Contractor shall ensure that any and all staff dedicated to executing the IANA functions will not initiate or drive policy development related to the performance of the IANA functions. However, IANA staff may be requested by the policy development bodies to collaborate in an advisory role. IANA staff may request guidance or clarification from policy development bodies as necessary for the performance of the IANA functions.

2.2.3. The Contractor is required to maintain the IANA functions, which are critical for the operation of the Internet's core infrastructure in a transparent, stable and secure manner. In performance of this purchase order, the Contractor shall furnish the necessary personnel, material, equipment, services, and facilities (except as otherwise specified), to perform the following IANA function requirements.

2.2.3.1. Coordinate The Assignment Of Technical Protocol Parameters -- This function involves the review and assignment of unique values to various parameters (e.g., operation codes, port numbers, object identifiers, protocol numbers) used in various Internet protocols based on guidelines and policies as developed in by the IETF. This function also includes the dissemination of the listings of assigned parameters through various means (including on-line

publication e.g. on the web and in the DNS under the .ARPA domain) and the review of technical documents for consistency with assigned values.

2.2.3.1.1. The ARPA TLD -- The Contractor shall operate the .ARPA TLD within the current registration policies for this TLD, documented in RFC 3172. The Contractor shall be responsible for implementing DNSSEC in the ARPA TLD consistent with the requirements of the materially affected parties for this function as represented by the IAB.

2.2.3.1.2. Performance -- Within six (6) months of award, the Contractor shall submit to NTIA performance standards and metrics developed in collaboration with materially affected parties for approval. The performance standards and metrics will be approved by the Contracting Officer's Technical Representative (COTR) unless they explicitly contradict some aspect of the contract, Upon approval by the COTR the Contractor shall perform this task in compliance with approved performance standards and metrics. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C. 6.

2.2.3.2. Perform Administrative Functions Associated With Root Zone Management -- This function addresses facilitation and coordination of the root zone of the domain name system, with 24 hour-a-day/7 days-a-week coverage. This function includes receiving delegation and redelegation requests, and investigating the circumstances pertinent to those requests. This function also includes receiving change requests for and making routine updates to all top-level domains (TLDs) contact (including technical and administrative contacts), nameserver, and delegation signer (DS) resource record (RR) information as expeditiously as possible. Within six (6) months of award, the Contractor shall submit to NTIA performance standards and metrics developed in collaboration with materially affected parties for approval. The performance standards and metrics will be approved by the Contracting Officer's Technical Representative (COTR) unless they explicitly contradict some aspect of the contract, Upon approval by the COTR the Contractor shall perform this task in compliance with approved performance standards and metrics. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C. 6.

2.2.3.2.1. Transparency and Accountability -- The Contractor shall process all requests for changes to the root zone and the authoritative root zone database, collectively referred to as "IANA root zone management requests," promptly and efficiently. The Contractor shall, in collaboration with all relevant materially affected parties, develop user documentation. The Contractor shall prominently post on its website the performance standards and metrics, user documentation, and associated policies.

2.2.3.2.2. Responsibility and Respect for Stakeholders -- With reference to C.2.1. The Contractor shall document the source of relevant policies and procedures, such as RFC 1591, to process requests associated with TLDs. In addition, processing of requests for delegation and re-delegation of a CCTLD should be consistent with policies and procedures developed by the Policy Development bodies (CCNSO and GAC). For delegation requests for new generic TLDS (gTLDs), the Contractor shall include a reference to the relevant instructions from the Policy Development Body *i.e.* ICANN's supporting organizations as represented by the board.

2.2.3.2.3. Root Zone Automation -- The Contractor shall work with NTIA and VeriSign, Inc. (or any successor entity as designated by the U.S. Department of Commerce) to deploy an automated root zone management system within six (6) months after date of contract award. The automated system shall at a minimum include: secure (encrypted) system for customer communications; automated provisioning protocol allowing customers to develop systems to manage their interactions with the Contractor with minimal delay; an online database of change requests and subsequent actions whereby each customer can see a record of their historic requests and maintain visibility into the progress of their current requests; and a test system, which customers can use to check that their change request will meet the automated checks.

2.2.3.2.4. Root Domain Name System Security Extensions (DNSSEC) Key Management -- The Contractor shall be responsible for the management of the root zone Key Signing Key (KSK), including generation, publication, and use for signing the Root Keyset.

2.2.3.2.5. Customer Service Complaint Resolution Process -- The Contractor shall establish a process for IANA function customers to submit complaints for timely resolution.

2.2.3.3. Allocate Internet Numbering Resources -- This function involves overall responsibility for allocated and unallocated IPv4 and IPv6 address space and Autonomous System Number (ASN) space. It includes the responsibility to delegate Unicast IP address blocks, specified as such through the IETF Standards process, to regional registries, as per policies approved by the NRO/ASO for routine allocation, typically through downstream providers, to Internet end-users within the regions served by those registries and under the policies of those registries. This function also includes reservation and direct allocation of space for special purposes as specified through the IETF Standards Process, such as multicast addressing, addresses for private networks as described in RFC 1918, and other globally specified applications. Within six (6) months of award, the Contractor shall submit to NTIA performance standards and metrics developed in collaboration with materially affected parties for approval. The performance standards and metrics will be approved by the Contracting Officer's Technical Representative (COTR) unless they explicitly contradict some aspect of the contract, Upon approval by the COTR the Contractor shall perform this task in compliance with approved performance standards and metrics. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C. 6.

2.2.3.4. Other services -- The Contractor shall perform other IANA functions, including the management of the INT TLDs. The Contractor shall also implement modifications in performance of the IANA functions as needed upon mutual agreement of the parties, following a transparent review and input by materially affected entities. The performance of this function shall be in compliance with the performance exclusions as enumerated in Section C.6.

2.2.3.5. INT TLD -- The Contractor shall operate the INT TLD within the current registration policies for the TLD. Upon designation of a successor registry, if any, the Contractor shall use commercially reasonable efforts to cooperate with NTIA to facilitate the smooth transition of operation of the INT TLD. Such cooperation shall, at a minimum, include timely transfer to the successor registry of the then-current top-level domain registration data.

3. SECURITY REQUIREMENTS

3.1. Secure Systems – The Contractor shall install and operate all computing and communications systems based on requirements developed in collaboration with the materially affected parties and in accordance with best business and security practices. The Contractor shall implement a secure system for authenticated communications between it and its customers when carrying out all IANA function requirements within nine (9) months after date of contract award. The Contractor shall publicly document practices and configuration of all systems.

3.2. Secure Systems Notification -- Within nine (9) months after date of contract award, the Contractor shall implement and thereafter operate and maintain a secure notification system at a minimum, capable of notifying all materially affected parties of the discrete IANA functions, of such events as outages, planned maintenance, and new developments.

3.3. Secure Data -- The Contractor shall ensure the authentication, integrity, and reliability of the data in performing the IANA requirements, including the data relevant to DNS, root zone change request, and IP address allocation.

3.4. Computer Security Plan – The Contractor shall develop and execute a Security Plan. The plan shall be developed and implemented within nine (9) months after date of contract award, and updated annually. The Contractor shall deliver the plan to the Government annually.

3.5. Director of Security -- The Contractor shall designate a Director of Security who shall

be responsible for ensuring technical and physical security measures, such as personnel access controls. The Contractor shall notify and consult in advance the COTR when there are personnel changes in this position.

3.6. Contingency and Continuity of Operations Plan (The CCOP) -- The Contractor shall, in collaboration with relevant Materially affected parties, develop and implement a CCOP for the IANA functions within nine (9) months after date of contract award. The Contractor shall update and exercise the plan annually. The CCOP shall include details on plans for continuation of the IANA functions in the event of a logical or physical attack or emergency. The Contractor shall deliver the CCOP to the Government annually.

4. PERFORMANCE METRIC REQUIREMENTS

4.1. Monthly Performance Progress Report -- The Contractor shall prepare and publish on its website a performance a progress report every month (no later than 15 calendar days following the end of each month) that contains statistical and narrative information, in a format developed with the materially affected parties, on the performance of the IANA functions (i.e., assignment of technical protocol parameters administrative functions associated with root zone management and allocation of Internet numbering resources) during the previous 30-day period. The report shall include a narrative summary of the work performed for each of the functions with appropriate details and particularity. The report shall also describe major events, problems encountered, and any projected significant changes, if any, related to the performance of duties set forth in Section C.2. The COTR will be notified as soon as the report is made available.

4.2. Root Zone Management Dashboard --The Contractor shall collaborate with NTIA and VeriSign, Inc., (or any successor entity as designated by the U.S. Department of Commerce), and other materially affected parties to develop and make publicly available a dashboard to track the process flow for root zone management within nine (9) months after date of contract award.

4.3. Performance Standards Metrics Reports -- The Contractor shall develop and publish consistent with the developed performance standards and metrics reports for each discrete IANA function consistent with Section C.2. The Performance Standard Metric Reports will be published every month (no later than 15 calendar days following the end of each month) starting no later than nine (9) months after date of contract award.

4.4. Performance Survey -- The Contractor shall develop and conduct and annual performance survey consistent with the developed performance standards and metrics for each of the discrete IANA functions. The survey shall include a feedback section for each discrete IANA function. The Contractor shall publish the Survey Report annually on its website.

4.5. Final Report -- The Contractor shall prepare and submit a final report on the performance of the IANA functions that documents standard operating procedures, including a description of the techniques, methods, software, and tools employed in the performance of the IANA functions. The Contractor shall publish this report and notify the Contracting Officer and the COTR no later than 30 days after expiration of the purchase order.

5. AUDIT REQUIREMENTS

5.1. Audit Data -- The Contractor shall generate and retain security process audit record data for one year and publish an annual audit report on its website and provide it to the Contracting Officer and the COTR. All root zone management operations shall be included in the audit, the format and requirements of which will be developed by the materially affected parties. The Contractor shall provide specific audit record data to the Contracting Officer and COTR upon request.

5.2. Root Zone Management Audit Data -- The Contractor shall generate a monthly (no later than 15 calendar days following the end of each month) audit report based on information in the performance of Provision C.2.2.1.3 Perform Administrative Functions Associated With Root Zone Management, the format and requirements of which will be developed by the materially affected parties. Publication of the report will be starting no later than nine (9) months after date of contract award.

5.3. External Auditor -- The Contractor shall have an external, independent, specialized compliance auditor conduct an audit of the IANA functions security provisions annually.


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