Project Overview for the RSSAC028 Implementation RFP

Request for Proposal
ICANN Office of the CTO

1 November 2021

1. Introduction

1.1 About This Document

The Internet Corporation for Assigned Names and Numbers (ICANN) organization is soliciting proposals to identify a contractor qualified to conduct a study to help the Root Server System Advisory Committee (RSSAC). This study is called for in Section 7.2 of RSSAC028, "Technical Analysis of the Naming Scheme Used For Individual Root Servers", which discusses how individual root server operators (RSOs) are identified in the root server system (RSS). The contractor will perform the investigation and write a document outlining the findings; the specific requirements for the study are defined in this document.

This document provides an overview of the request for proposal (RFP). It aims to provide background and pertinent information regarding the requirements. The RFP comprises this document as well as others that are hosted in the ICANN sourcing tool (SciQuest/Jaggaer). Indications of interest are to be received by emailing RSSAC028.Implementation-RFP@icann.org latest by 13 December 2021 at 23:59 UTC.

Complete proposals must be electronically submitted latest by 14 January 2022 at 23:59 UTC using the RFP portal. Access will be granted after receipt of an indication of interest to the email address above.

1.2 Overview of the Internet Corporation for Assigned Names and Numbers (ICANN)

The ICANN organization is a non-profit public benefit corporation dedicated to ensuring the stable and secure operation of the Internet's unique identifier systems; to promoting competition; to achieving broad representation of global Internet communities; and to developing policy appropriate to its mission through bottom-up, consensus-based processes. More specifically, the ICANN organization:

1. Coordinates the allocation and assignment of the four sets of unique identifiers for the Internet, which are:
   a. Domain names (forming a system referred to as the Domain Name System, or DNS);
   b. Internet Protocol (IP) addresses;
   c. Autonomous System (AS) numbers; and
   d. Protocol port and parameter numbers.
2. Coordinates the operation and evolution of the DNS root name server system.
3. Coordinates policy development reasonably and appropriately related to these technical functions.

See www.icann.org for more information.

2. Background

2.1 Study Background

An understanding of how DNS works, the importance of the DNS root zone, and the current way that the RSS is served are required to understand the scope of the requested study. The provider is expected to already have a strong understanding of the DNS and the importance of the DNS root zone, so they are not covered here.

The nameservers for the DNS root are in the "root-servers.net" zone. That zone is currently not protected with DNSSEC signatures. In RSSAC028, the RSSAC studied the naming scheme used for individual root servers (such as "a.root-servers.net" and so on), and considered the consequences of making changes to the naming scheme in order to allow the nameserver records to be protected by DNSSEC.

RSSAC028 includes a risk analysis of different alternative naming schemes, such as:
- Where the names reside in the DNS hierarchy
- Who administers the zone in which the names reside
- How different naming schemes affect DNSSEC validation of priming responses
- The size of priming responses

Many RSSAC documents come with recommendations to the ICANN Board of Directors. Section 7 of RSSAC028 has four recommendations. In order to be able to implement the recommendations, a provider needs to understand the whole of RSSAC028.

This RFP solicits a provider to perform a study of the questions in Recommendation 2, with some changes and additions described in Section 3 of this document.

3. Scope of Work

The study described in this RFP will be based around an analysis of the questions in Recommendation 2 of RSSAC026. This section details the requirements for the study.

3.1 Survey of RSO Authoritative Server Software

Before doing the technical analysis, the provider must survey the RSOs about which software they use to provide authoritative service for the root zone. Their responses will inform which

software is used in the study. The study must include all versions of open source software that are used by RSOs at the time of the survey, and it should include any proprietary software used by RSOs if those RSOs can provide copies for the study.

3.2 Software Testbed

The provider will perform the study using the open source "Resolver Testbed" software already created by ICANN. That software will need to be updated by the provider for this study, both with new versions of authoritative server software and to handle various configurations of resolver software. ICANN will assist in these updates.

3.3 Main Analysis

The provider will repeat the analysis that led to Appendix A of RSSAC028 using the current software in use by the RSOs as described above. This analysis will also require the provider to update the "Resolver Testbed" software to include current versions of resolver software.

In addition to producing an up to date version of Appendix A of RSSAC028, the main analysis must include the four bullet points from Recommendation 2. Those are:

- *"The acceptable response size (beyond the default UDP packet size) for priming queries. For example, IoT devices acting as DNS resolvers might not be able to receive long priming responses."* This will require collecting research on the typical maximum packet sizes of various types of networks, and comparing the results to the packet sizes of the proposed naming schemes.
- *"How different resolver software responds when answers contain a reduced set of glue records."* This will require crafting responses from a test authoritative server with various amounts of glue, and testing those responses against a wide variety of resolver software.
- "*How current resolver implementations behave if they set the "DNSSEC OK" (DO) bit to 1 in their priming queries, such as if they validate the response and, if so, how they handle a bogus response."* This will require crafting responses from a test authoritative server with various types of bogus responses, and testing those responses against a wide variety of resolver software which is configured to set the DO bit to 1.
- *"How search lists might be relevant. In the unusual case that a resolver also uses a DNS search list, using a single label for the root servers may interfere with that search list mechanism unless the final '.' is given in the searched-for names."* This will require testing a wide variety of resolver software, determining which resolver software allows setting DNS search lists on the requesting side, and sending such software all the proposed types of names for the root servers.

Important note: The provider will not make an assessment on a specific change to the naming scheme, and is therefore not required to create the transition plan referenced in the paragraph after the four bullet points from Recommendation 2.

4. High-Level Selection Criteria

The decision to select a contractor as an outcome of this RFP will be based on, but not limited to, the following selection criteria:

- Capability and experience of key personnel
- Trust and reliability of key personnel
- Availability of key personnel
- Demonstrated understanding of the scope of work, including required deliverables
- Proposed approach to the work including timeframe for completion
- Quality of similar prior work
- Responsiveness and flexibility to work with ICANN-specific requirements, agreement terms, etc.
- Financial value / pricing
- Reference checks
- Mitigation of any conflicts of interest

5. High-Level Business Requirements

5.1 Deliverables

The following deliverables are required:

1. A proposed work plan and timeline, to be created first and reviewed by the ICANN org before any other work is performed.
2. Perform a survey of RSO authoritative software in use.
3. Update resolver software testbed to include modern versions of resolver software.
4. A draft study report for consultation with ICANN org, which will include:
   a. Results from the survey of RSO authoritative software in use
   b. Description of all tests performed
   c. Description of the updates to the "Resolver Testbed", including configuration files needed for the analysis
   d. Results of the study, including an expansion of Appendix A of RSSAC028 based on the study results
5. A final study report, resulting from any revisions necessary to the draft study report based on the consultation with ICANN org.

We expect steps 1 through 4 to be complete within six months of the beginning of the contract, and step 5 to be within two months after the draft study is sent to ICANN.

5.2 Process

The process for executing the study is anticipated to include the following major tasks:

- Developing a work plan and timeline (to be reviewed with ICANN org)
- Execution of step 2 from Section 5.1 above
- Delivering a draft study report to the ICANN org
- Updating the study report to address comments received from ICANN org
- Delivering a final report to the ICANN org

5.3 Summary of Requirements

A summary of the requirements for a contractor to perform the study is:

- Provide a complete response based on ICANN specifications by the designated due date.
- Participate in finalist presentations via conference call/remote participation.
- Execute a professional services agreement substantially in accordance with the terms and conditions of ICANN's Contractor Consulting Agreement (contact ICANN staff for copy).
- Possess the subject matter expertise and technical skills required to understand, analyze and write about the DNS root zone management system.
- Produce all the deliverables listed above in Section 5.1 Deliverables.
- Provide bi-weekly status updates via phone/email/meeting, as appropriate. Contractor must be able to accommodate bi-weekly status meetings with key personnel during business hours in Pacific or Eastern Time Zone.
- Communicate (verbally and in writing) in English.

6. Project Timeline

The following dates have been established as milestones for this RFP. ICANN reserves the right to modify or change this timeline at any time as necessary.

Activity	Estimate Date
RFP opened	1 November 2021

Participants to indicate interest in submitting RFP proposal	**13 December 2021 at 23:59 UTC**
Participants submit any questions to ICANN via the RFP portal Q&A Board, by	**14 December 2021 at 23:59 UTC**
ICANN responds to participant question	21 December 2021
Participant proposals due by	**14 January 2022 at 23:59 UTC**
Evaluation of responses	Thru February 2022
Vendor contracting and award	Thru March 2022

7. Terms and Conditions

General Terms and Conditions

1. Submission of a proposal shall constitute Respondent's acknowledgment and acceptance of all the specifications, requirements and terms and conditions in this RFP.
2. All costs of preparing and submitting its proposal, responding to or providing any other assistance to ICANN in connection with this RFP will be borne by the Respondent.
3. All submitted proposals including any supporting materials or documentation will become the property of ICANN. If Respondent's proposal contains any proprietary information that should not be disclosed or used by ICANN other than for the purposes of evaluating the proposal, that information should be marked with appropriate confidentiality markings.

Discrepancies, Omissions and Additional Information

1. Respondent is responsible for examining this RFP and all addenda. Failure to do so will be at the sole risk of Respondent. Should Respondent find discrepancies, omissions, unclear or ambiguous intent or meaning, or should any question arise concerning this RFP, Respondent must notify ICANN of such findings immediately in writing via email no later than ten (10) days prior to the deadline for bid submissions. Should such matters remain unresolved by ICANN, in writing, prior to Respondent's preparation of its proposal, such matters must be addressed in Respondent's proposal.
2. ICANN is not responsible for oral statements made by its employees, agents, or representatives concerning this RFP. If Respondent requires additional information, Respondent must request that the issuer of this RFP furnish such information in writing.

3. A Respondent's proposal is presumed to represent its best efforts to respond to the RFP. Any significant inconsistency, if unexplained, raises a fundamental issue of the Respondent's understanding of the nature and scope of the work required and of its ability to perform the contract as proposed and may be cause for rejection of the proposal. The burden of proof as to cost credibility rests with the Respondent.
4. If necessary, supplemental information to this RFP will be provided to all prospective Respondents receiving this RFP. All supplemental information issued by ICANN will form part of this RFP. ICANN is not responsible for any failure by prospective Respondents to receive supplemental information.

Assessment and Award

1. ICANN reserves the right, without penalty and at its discretion, to accept or reject any proposal, withdraw this RFP, make no award, to waive or permit the correction of any informality or irregularity and to disregard any non-conforming or conditional proposal.
2. ICANN may request a Respondent to provide further information or documentation to support Respondent's proposal and its ability to provide the products and/or services contemplated by this RFP.
3. ICANN is not obliged to accept the lowest priced proposal. Price is only one of the determining factors for the successful award.
4. ICANN will assess proposals based on compliant responses to the requirements set out in this RFP, responses to questions related to those requirements, any further issued clarifications (if any) and consideration of any other issues or evidence relevant to the Respondent's ability to successfully provide and implement the products and/or services contemplated by this RFP and in the best interests of ICANN.
5. ICANN reserves the right to enter into contractual negotiations and if necessary, modify any terms and conditions of a final contract with the Respondent whose proposal offers the best value to ICANN.