REPORT FROM THE 2nd RSSAC WORKSHOP

26 June 2016

The Root Server System Advisory Committee (RSSAC) held its second workshop from May 11 to 12, 2016, graciously hosted by Verisign and enthusiastically supported by ICANN. The workshop was attended by ten Root Server Operators (RSO) and all RSSAC liaisons.

The purpose of this workshop was to continue addressing issues identified during the previous workshop. The approach taken by RSSAC was to "peel the onion," getting to the next layer of deliberations on an array of overarching themes, including accountability, continuity, operational and organizational evolution, all of which remained consistent themes throughout the two days of intense work.

Similar to the first workshop, a Workshop Planning Committee (WPC) was assembled from the RSSAC membership. To assist in the discussions, the WPC articulated statements that helped define and frame the discussions. The statements were grouped under the headings of Architecture, Evolution, and Reinventing RSSAC. WPC members facilitated the discussions during the workshop.

What follows is a high-level outline of the work conducted during the two days of effort.

Architecture

The DNS root service has proven to be very resilient, continuous and robust, providing a requisite key underpinning of the Internet and enabling a global communications ecosystem. The RSSAC collectively agreed that the architecture of the service deserved deeper examination. Discussions centered and coalesced around three key areas:

1. **Reliability and Robustness:** The DNS root service consistently provides a reliable and robust service for the global Internet. This is attributed in large part to the evolving architecture of the root server system over the past decade. The highly distributed and anycasted nature of the root server system contributes to the performance and resilience of the service. The RSSAC postulated that the DNS root service is effectively one of the earliest cloud services, if not ***the original***, even before the moniker "cloud service" became commonplace in the vernacular of modern-day information technology services.

   Outcome: An outcome of this discussion was to document the core underlying reasons why an outage or otherwise unavailability of service of any single root operator has not and does not pose an immediate problem for the collective root server system, or for the global Internet. An RSSAC work party was assembled, and work is currently underway to create a document that speaks to the

This document contains corrections to section "DNS Root Service and Availability" on page 2 and section "Evolution" on page 3.

architectural and service robustness of the root server system, as well as its critical role as the apex of the global Internet DNS.

2. **DNS Root Service Performance and Availability:** Another architectural element discussed was the technical risks and benefits to the global root server system of adding or removing authoritative name server (NS) records to the root zone, given that 13 authoritative NS records are currently defined in the root zone as a result of technical and historical artifacts. The initial discussions focused on what the minimum and maximum number of NS records in the root zone needed to be for providing a highly resilient and robust global name resolution service. However, as a result of these discussions, the RSSAC agreed that the emphasis and preoccupation with the number of authoritative NS records should not be the focal point for ensuring high levels of performance and availability. Rather than focus on the number of authoritative NS records, the RSSAC concluded that the more appropriate issue to consider is what the maximum latency a relying party should experience when transacting with the DNS root service as opposed to with a single "root server."

   Outcome: Consensus was reached that there is no technical need for more authoritative name servers today, particularly as the root zone is DNSSEC enabled and the information provided is cryptographically verifiable. A statement of work (SOW) is being created, which will be sent to the RSSAC Caucus for further work, consideration, and analysis of this topic.

3. **Root Server Operator Expectations:** Yet another element discussed was documenting the commitment of the twelve DNS Root Server Operators. Specifically, formally memorializing that the operators are committed to serving the IANA global root DNS namespace. The RSOs provide complete and unmodified DNS responses using DNSSEC as a means for a client to cryptographically verify that the responses have not been altered. DNS root services are thereby ensured of their integrity throughout the system.

   Outcome: RSSAC will issue a statement that will be released to the community reflecting these commitments of the RSOs.

Evolution

Under the rubric of Evolution, the workshop focused on "technical metrics" that define expectations for operating a root server – a key element in a yet-to-be-defined root server operator designation process. Consensus was reached that, with appropriate resourcing, there is no technical challenge in achieving the "technical metrics" that will define the appropriate expectations for operations of a DNS root server. An RSSAC work party was assembled to create a document that captures these ideas. The working group will draft a document that describes a number of technical requirements against which potential root operators could be evaluated. Such requirements will be specific whenever possible. RSSAC001 is an obvious starting point for such requirements, as it contains expectations

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related to infrastructure, accuracy, availability, capacity, security, diversity, monitoring, and measurements. The work party is expected to reference the expectations detailed in RSSAC001 and expanding, strengthening, and amending them as appropriate. The scope of this work party is purely technical in defining the "technical bar."

Outcome: An RSSAC work party was assembled to create a document that describes a number of technical requirements against which potential root operators could be evaluated. The work party will solicit RSSAC Caucus input and subsequently publish the document after ICANN 56 for broader consideration by the community.

Reinventing RSSAC
The last focus of the workshop was titled "Reinventing RSSAC." It became evident that there was confusion within the RSSAC, the root operators, and the broader community as to whether the RSSAC was purely an ICANN Advisory Committee (AC) per its charter or also a mode for reaching the twelve RSOs. Consensus was reached that the RSSAC will be the place that ICANN and the broader Internet community can go to for interaction with the root operators. In the event that there are questions about a specific root server operator, or the root service as a whole, then the RSSAC will be that conduit to the RSOs.

Outcome: The RSSAC took action to be the front door to the global DNS root service, and to the RSOs.

The RSSAC Workshop 2 was deemed a success. The global DNS root service is a critical element in the operation of the Internet, and certainly, a key element of the underlying Internet infrastructure substrate. Since its inception, RSSAC has provided critical advice to the ICANN Board and community in matters pertaining to the DNS root service. The workshops are enabling RSSAC to focus on important elements of architecture and evolution of both DNS and the root server system, with an emphasis on sustaining the future of this service while also enabling more effective strategic and operational communications with the global Internet community.

The RSSAC would like to express its gratitude to ICANN for supporting the workshop, to Verisign for hosting it, and to all individuals involved in their tireless efforts in making it a success.

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