



18 April 2013

To: ICANN Board

From: SSAC Chair

Via: SSAC Liaison to the ICANN Board

ICANN Board of Directors' Resolution 2012.09.13.06, dated 13 September 2012, asks the Security and Stability Advisory Committee (SSAC) to provide advice on how "interdisciplinary studies of security and stability implications from expanding the root zone more than an order of magnitude should be carried out and whom else should be consulted."

The following response addresses the Board's request for advice.

In accordance with our usual practice, 48 hours after this document is sent to the Board, ICANN Staff will post the document to the SSAC web site.

The SSAC welcomes comments from the Board concerning this response and thanks the Board for its consideration of this important document.

Patrik Fältström

Chair, ICANN Security and Stability Advisory Committee

Response to The ICANN Board Regarding Interdisciplinary Studies

Introduction

ICANN Board of Directors' Resolution 2012.09.13.06, dated 13 September 2012, asks the Security and Stability Advisory Committee (SSAC) to provide advice on how “interdisciplinary studies of security and stability implications from expanding the root zone more than an order of magnitude should be carried out and whom else should be consulted.”¹

This letter is the SSAC's response to that request. The SSAC believes that the community would benefit from additional inquiry into areas in which uncertainty remains relating to the expansion of the root zone. This letter provides the SSAC's advice on the composition of the interdisciplinary study team, broad topics and specific examples the team may wish to consider, and suggestions on how the studies should be performed.

The goal of the studies should be two fold:

1. Engage with communities that may not have been fully consulted by previous investigations on the impacts of the new generic Top Level Domain (gTLD) program; and
2. Explore areas of concern relating to expansion of the root zone that either derive from those communities or which have been identified by previous studies but that may not have been fully resolved.

Composition of the Interdisciplinary Study Team

Additional interdisciplinary studies should add to the work that has already been done by including the perspective of communities that may not have been fully consulted or engaged during previous investigations into the impacts of the new gTLD program. The SSAC suggests that ICANN appoint a cross-functional team composed of experts from disciplines such as:

- Application, Web, and Server Software Engineering;
- DNS / DNSSEC Protocol Definition and Implementation;
- DNS Operations / Network Engineering;
- Risk Analysis / Management;
- Business (both directly related to the DNS industry and outside that industry);

¹ See Board Resolution: <http://www.icann.org/en/groups/board/documents/resolutions-13sep12-en.htm#1.c>.

- Public Policy / Government / Internet Governance;
- Behavioral Science / Human Computer Interaction;
- Internet Crime and other abuses / Law Enforcement;
- Intellectual Property Rights; and
- Other fields potentially significantly affected by large-scale expansion of the root zone.

In order to gain new perspectives on issues involving root zone expansion, the SSAC recommends the interdisciplinary study team should be composed of non-conflicted individuals who have not previously been involved in root zone scaling inquiries.

Areas of Inquiry

The goal of the interdisciplinary study should be to focus on areas that have not already been explored in other studies related to scaling the root or on areas within completed studies that the community felt were inadequately addressed, as evidenced by responses provided during those studies' public comment periods. Once formed, the interdisciplinary study team should be tasked with an inquiry into some or all of the following areas:

- Technical Concerns:
 - **Protocol issues:** Revisiting and extending the studies described in SAC 016 and SAC 017 on the availability of Extension Mechanisms for Domain Name System (EDNS0) support among resolvers and hosts; the impact on devices connected to the Internet; increased usage of Transmission Control Protocol (TCP) transport for DNS messages; increased use of Internet Protocol Version 6 (IPv6); load impacts on resolvers related to the existence of new top-level domains.
 - **Namespace issues:** Many enterprises have local environments that include strong assumptions about the number of top-level domains and/or have introduced local-scope top-level domains that may conflict with names allocated as new gTLDs. Examples of possible issues include the potential overlap of DNS and non-DNS namespace and how the expansion of the number of top-level domains could affect users and enterprises in unintended ways; software/firmware impacts caused by the variations in names that make up the root namespace; the impact of the new gTLDs on whitelist and blacklist systems; and the potential implications for current Sender Policy Framework/DomainKeys Identified Mail (SPF/DKIM) best practices or assumptions when new top-level domains are encountered.
 - **DNS Security Extensions (DNSSEC) issues:** The transition and rollover sequences for DNSSEC deployment and operation at all levels of the namespace.

- Non-technical Concerns:
 - **Economic issues:** The impact of root zone expansion on the economic model of root name service as a system and on the economic and business models of individual actors, such as the Root Server operators, TLD operators and backend service providers, resolver operators, registrars, DNS software developers, and other parties, including those entrusted with ensuring that adequate safeguards for the integrity of the delegated namespace exist.
 - **Business issues:** The impact of a wider array of top-level names in the context of marketing and intellectual property rights protection, and how new TLDs will interact with X.509 certificates both at Certificate Authorities and in browsers.
 - **End user issues:** Confusion as a result of ambiguity in top-level names and lack of uniform support for the visual display of Internationalized Domain Names (IDN) starting with “xn--” from the perspective of behavioral science and human–computer interaction.
 - **Law enforcement/Internet Crime issues:** The potential for phishing or pharming attacks to take advantage of a more diverse top-level namespace; the control and accessibility of registration data; takeover of a registry or registrar by criminal elements; the implications of a significant increase in the size of TLD zone files on the ability to monitor for abusive or malicious registrations; coordination of abuse reporting among a larger and more diverse community of registries and registrars; changes in the registrar/reseller landscape including more accredited registrars and more non-accredited registrars that ccTLDs can choose from; and Domain Generation Algorithms that span 1000 registries and the related matter of sink-holing, blocking, or transferring registrations.

In addition to these areas of inquiry, other areas may be identified by reviewing the public comments and other input provided in response to previously performed studies on root zone expansion.

Performance of the Study

After establishing the interdisciplinary study team, the SSAC recommends two efforts be undertaken:

1. Identify concerns regarding the expansion of the root zone that were either unaddressed or inadequately addressed in responses to that input; and
2. Explore potential interactions among the areas of inquiry suggested above: for example, how DNSSEC-related requirements may affect end users, or how protocol issues may impose new demands on business.

With regard to the first effort, the SSAC recommends the public comments and other input received relating to previous root expansion studies be reviewed and correlated with their responses, with all unaddressed or inadequately addressed concerns explored by the study team, particularly in the context of longer-term impact to the DNS system as a whole.

Conclusion

The SSAC believes that the community would benefit from further inquiry into lingering issues related to expansion of the root zone as a consequence of the new gTLD program. Specifically, the SSAC recommends those issues that previous public comment periods have suggested were inadequately explored as well as issues related to cross-functional interactions of the changes brought about by root zone growth should be examined. The SSAC believes the use of experts with experience outside of the fields on which the previous studies relied would provide useful additional perspective regarding stubbornly unresolved concerns about the longer-term management of the expanded root zone and related systems.