



New gTLD Program Explanatory Memorandum

Root Zone Scaling

Date of Original Publication:

15 April 2011

Background – New gTLD Program

This is one of a series of new Explanatory Memos related to recent consultations between ICANN's Board and Governmental Advisory Committee concerning ICANN's New gTLD Program.

These memos were developed to document the latest position on these topics by taking into account the current thinking, discussions and public comments received. Each memo not only reflects GAC advice but also contains the reasoning and rationale on each of the relevant issues regarding the Applicant Guidebook and the launch of the New gTLD Program.

For current information, timelines and activities related to the New gTLD Program, please go to <<http://www.icann.org/en/topics/new-gtld-program.htm>>.

Please note that this is a discussion draft only. Potential applicants should not rely on any of the proposed details of the new gTLD program as the program remains subject to further consultation and revision.

Introduction

Current Environment

In relation to Root Zone Scaling, there are two broad areas that will be impacted by the delegation of new gTLDs and registries:

A) Root Zone Operations

The root zone currently operates in a stable manner. Occasional attacks result in improvements to create a more robust infrastructure. (This is not to suggest that ICANN is: (a) reporting on what is heard privately from other root server operators, nor (b) purporting to speak for other root server operators. We can talk authoritatively about L-Root.) The root zone is expected to grow in size significantly with the introduction of new gTLDs. The results of the first application round may double (or more) the number of resource records in the root zone.

B) Delegation and registry support Operations

As with any business, the influx of a significant number of transactions and customers will have an impact to existing operations. Certainly ICANN operations will be impacted with the influx of a significant number gTLDs delegations and registries. Although it is difficult to ascertain the exact impact without knowing the number of TLDs to be delegated the primary areas of concern can be planned for with a flexible organization that can grow with demand.

To mitigate possible negative effects, ICANN, and as appropriate, the technical community, have studied these areas. The studies have been conducted over several meetings with a number of papers published.

In relation to the Root Zone, it was generally and clearly concluded that root zone stability would not be put at risk if delegation rates were limited in some way and the delegation rates proposed by and committed to by ICANN were below the ceiling. See, Delegation Rate Scenarios for New gTLDs, and Summary of the Impact of Root Zone Scaling.

In relation to ICANN Operations, several efforts have been underway to estimate the operational impact (e.g., people, processes and systems) to certain departments. Those efforts include the recently completed Business Excellence initiative in IANA and the ongoing Operational Excellent Initiative (OEI) activities across all of ICANN. Those efforts have concluded with certain staffing plans and process improvement initiatives to accommodate the needs of various

levels of new gTLDs strings being delegated.

In its Indicative Scorecard on this issue, the GAC stated:

The Board should continue implementing a monitoring and alerting system and ensure a) that ICANN can react predictably and quickly when there are indicators that new additions and changes are straining the root zone system, and b) that the processes and possible resulting restorative measures that flow from its results are fully described in the Application Guidebook before the start of the first application round.

The Board commits to defer the launch of a second round or batch of applications unless an evaluation shows that there are indications from monitoring the root system etc. that a first (limited) round did not in any way jeopardize the security and stability of the root zone system.

The Board commits to make the second round or batch of applications contingent on a clean sheet from full technical and administrative assessment of impact of the first round with recommendations which should go out to public comment for approval.

The Board commits to avoid the possibility that other activities will be impacted by the possible diversion of resources to processing new gTLD applications

Recommendation

The Root Zone

ICANN proposes a two-pronged approach to monitoring root zone behavior. The proposal is outlined in the attached document ("Root Server System Measurement Strategy") and can be briefly described as follows:

1. ICANN will open (continue, in some cases) a dialogue with root server operators in order to identify what measurements within each root server operator's infrastructure might be usefully combined and published in order to contribute to the understanding of the performance of the root server system as a whole, and how that performance varies over time. ICANN plans to begin this conversation before the IETF 81 meeting in Québec in July 2011.
2. ICANN will design and implement a distributed measurement platform to perform active measurement of all root servers, and will seek assistance from qualified third parties to ensure that the measurement points are well-distributed, e.g., in order to obtain representative results for root servers which are widely

anycast. ICANN will publish raw data through an independent third party in the interests of transparency, and to encourage other parties to engage in data analysis and visualization.

Timing on (1) above is difficult to predict with precision, since it necessarily involves discussion and coordination with the eleven other root server operators, and it is not known what the specific outcomes of these discussions will be.

The components of (2) above which ICANN will deploy and operate will be deployed as a proof of concept before the end of T1 FY12.

ICANN will condition its acceptance of new gTLD applications such that application processing will cease if it appears that the root server system is under strain. The thresholds at which the root server system will be considered under strain will be developed and published as part of the approach outlined in the second item above. Since the rate at which we expect performance to vary is very low, we anticipate such decisions being made carefully, and that there is unlikely to be any requirement to make rapid decisions about observed data.

ICANN Operations

Efforts to maintain and improving ICANN operations through the introduction of new gTLDs on staffing plans and improving efficiencies by standardizing and automating certain processes where appropriate. Initial plans consider the operational impact of a certain number of expected delegations. The three immediately impacted departments; IANA, Registry Services, and Contractual Compliance, have undertaken efforts to determine the required staffing needs under the assumptions of 100, 500, and 1,000 newly delegated strings. The current and expected staffing needs are in the table below. These numbers are based upon assumptions described in other documents. Those assumptions are expected to change as plans are refined and developed. Therefore, these staffing numbers should not be considered firm until embedded in the ICANN Operating Plan and Budget. In the meantime, ICANN will continue to model the new environment to ensure departmental objectives in these areas are met.

Department Number of FTEs (rounded)

	Current	100 new gTLDs	500 new gTLDs	1,000 new gTLDs
IANA	12.5	3	5	9
Registry Services	23	7	10	13
Contract Compliance	37	9	12	18

1 - IANA's staffing analysis is based on quantifying the hours to complete certain steps for simple and complex delegations and redelegations. The analysis considers certain assumptions including: 1) an allocation of simple versus complex applications, 2) the number of delegations will not exceed the maximum number of delegations per year as described in the "Delegation Rate Scenarios for new gTLDs" paper, and 3) the existing ratio of IANA staff to registries (200:1) will not materially change as a result of Business Excellence activities.

2 - While the addition of gTLD registries increases the number of FTEs needed to accomplish existing processes, it also affects some processes disproportionately and is expected to introduce additional tasks such as Registry on boarding. Assuming certain processes are standardized (e.g., Registry Agreements) and automated (e.g., Customer Relationship Management tools), efficiency gains are expected and the FTE count per Registry will be reduced from the current 8:1 ratio.

3 - A number of key processes and tasks will be directly impacted by the addition of new registries and their respective registry agreements. In particular, contractual enforcement and monitoring activities will see a significant impact since not only will the population of registries expand, but the level of registry sophistication and experience will likely fall, at least temporarily. In addition to the increase in registry oriented contractual compliance activities, a significant amount of new registrar compliance work is anticipated. While it is difficult to accurately forecast this impact, it is expected that the registrar population and geographical diversity will increase along with an expected increase in 2nd level domains. As a result, there are a number of compliance activities, such as auditing, customer complaint processing, and UDRP grievance handling that will require additional technology and headcount to manage.

Staffing plans and process changes should be re-evaluated as the number of expected applicants and delegations of new strings becomes clearer. In addition, an analysis of the overall impact to ICANN operations should be completed soon after the end of the first round to determine what impact, if any, there has been to other operations. The aim of this analysis will be to inform the application processing program as well as other departments on necessary process and staffing improvements.

Finally, an area that requires further understanding are the approval and delegation processes managed by NTIA and VeriSign. ICANN continues to pursue a working plan of each organization's preparedness for the delegation of new gTLDs. Both the NTIA and Verisign have committed to working as a team to create a tripartite strategy for the delegation of new gTLDs.

Rationale for recommendation

The Root Zone

The root server system operates through the loose technical coordination of twelve independent organizations, and the recommendations in this paper seek as far as possible to preserve that autonomy and not to impose specific requirements on the root server operators.

Active measurement performed by ICANN will take place on hardware already distributed as part of ICANN's operation of L-Root. Although this approach has the advantage that it requires little budget and no additional network deployment, it will naturally bias the results received which relate specifically to L-Root. ICANN hence will seek additional third parties to perform matching data collection so that the results for L are representative, and a more accurate picture of the performance trends of the root server system as a whole can be obtained.

We note that the root server system today is deployed with significant unused capacity in order to accommodate flash crowds and other high traffic events. The rate at which we expect the system to react to root zone growth is correspondingly low. Our approach therefore is based on building an extensible platform for root server measurement that can grow incrementally (e.g. with additional contributors of data, or additional types of data being collected) to facilitate long-term trend analysis.

ICANN Operations

Operational impact analysis must be performed without a certain quantity of gTLD applications and an expected number of delegations. A number of initiatives are underway to maintain or improve processes in those departments that will be impacted immediately (e.g. IANA, compliance and Registry Services) who have considered the impact of 100, 500 and 1,000 new gTLDs. In addition, the gTLD operational readiness project has worked with other departments that will participate in the application process (i.e., legal and finance) to design processes and identify resource needs to ensure applications are processed timely without impacting existing operations.

Using IANA as an example, the effort to competently double or even triple the frequency of root zone requests handled cannot be dismissed, It seems more manageable, however, when translated as the need to build capacity to handle 2-3 requests per working day.