TECHNICAL EXPERTS MEETING, Wednesday 26 March 2014,
ICANN 49, Singapore, 15:30 PM – 17:00 PM

Steve Crocker welcomed the nearly sixty participants to the meeting and stressed the importance for ICANN of starting to actively seek high-level technical input into its work, in addition to the input it receives from the Security and Stability Advisory Committee (SSAC), the Root Server System Advisory Committee (RSSAC) and from ICANN's technical staff.

He reminded participants of the recent (February 2014) ICANN bylaws change in which the Board had decided to strengthen the Technical Liaison Group comprised of the European Telecommunications Standards Institute (ETSI), World Wide Web Consortium (W3C), International Telecommunications Union's Telecommunication Standardization Sector (ITU-T), and the Internet Architecture Board (IAB). He explained that the Board wanted to solidify the institutional relationships with them, to better benefit from the group members' expertise and knowledge, while also broadening the group of experts to include SSAC, RSSAC, the Supporting Organizations (SOs), ICANN staff and others in a larger 'Technical Experts Group'.

Dr. Crocker proposed that the new group start to discuss its charter via a mailing list technical-experts@icann.org and volunteer ideas of topics for the next meeting to take place on Wednesday 25 June 2014 at ICANN 50 in London, and thereafter on Wednesday afternoons during ICANN meetings.

Some of the ideas that arose from the discussion at ICANN 49 included participants' views on:

THE TECHNICAL CHALLENGES FACING ICANN AS AN ORGANIZATION:

- The level of technical expertise in ICANN operations as well as ICANN's capacity to communicate on technical issues;
- The specific issue of Internationalized Domain Name (IDN) variants, the need for these to be defined, supported in the TMCH, and for the role of the IDN integration panel to be recognized;
- Possible Resource Public Key Infrastructure (RPKI) key management; and,
- The need for more data and measurement to inform technical discussions.

THE TECHNICAL CHALLENGES FACING THE DNS AS A WHOLE:

- Name collisions with alternative spaces;
- IDN support in software;
- DNS amplification attacks;
- DNSSEC Root Key Signing Key (KSK) roll over; and,
- Root zone installations.

ICANN'S ROLE IN THE ADOPTION OF IPV6:

- Helping with IPv6 co-operation and communication both within the technical community and with the wider business community that makes investment decisions, to raise awareness about the need for IPv6 to ensure the scalability of business operations;
- Exploring areas for synergy or complementarity on IPv6 between ICANN and ISOC.

PROTECTING THE ROOT SYSTEM AGAINST DDOS ATTACKS:

- The importance of requiring DNSSEC support in the registrar accreditation agreement (RAA)

TECHNICAL CONSIDERATION FOR THE IANA STEWARDSHIP TRANSITION:

- The need for technical experts to help ICANN conduct a properly thought-out risk analysis on the technical issues involved with the IANA Functions transition;
- The sensitivity of Verisign's role as the root zone maintainer; and,
- The careful co-operation needed on topics such as the IETF's reservation of special-use domains.

1. Technical challenges facing ICANN as an organization

Operational technical competence

Ram Mohan opened the discussion by stating that many technical representatives would like to see more technical competence in the operational part of ICANN's activities. **Ray Plzak** echoed Ram Mohan's comments, stating that is his view ICANN's main technical challenge was its capacity to understand technical challenges. He put forward that in his view the model whereby ICANN commissions studies to understand technical challenges is not optimal. **Paul Wilson** pointed to the difficulty of answering this question without knowing how ICANN and its prerogative would evolve. He said that while ICANN probably needed to bring on technical expertise at all levels, the largest challenge in his view pertained to communications, which could not be trivialized.

IDN variants and RPKI

David Conrad brought up the specific topics of IDN variants and RPKI key management as key technical challenges for ICANN. For IDN variants, he pointed out the lack of a consistent definition or interpretation of the issue, although ICANN is planning to deploy variants. He also mentioned the calls by the Internet Architecture Board (IAB) for ICANN to hold the RPKI key and the need to consider the associated technical challenges.

Patrik Fältström further elaborated on the issue of IDN variants, stating that although ICANN has been discussing variants for many years, no definition of variants had yet been retained. He pointed out that although there had been progress, the Trademark Clearinghouse (TMCH) still did not support variants. He emphasized the difficulty and cost of registering names in the TMCH and remaining issues related to equivalence and matching characters for non-ASCII characters. He further noted that while the integration panel was designated as the place for these decisions to be made, he still saw uncertainty among actors and questioning of the panel.

Sébastien Bachollet pointed out that for ccTLD registries, one of the problems with IDNs was that while users can use IDNs in the DNS and on the web, a number of applications such as some email systems still do not support IDNs.

Need for data and measurement

Sébastien Bachollet brought up the topic of gathering data at the technical level to inform technical debates. He recalled that the intent at the launch of the first new gTLD round in 2000 and then in 2004 included having test-beds to observe and glean data from. **Jay Daley** pointed out the remarkable amount of data and research that goes into SSAC reports, and emphasized the need for ICANN to have access to more shared data in order to answer some important technical questions. He cited the ongoing public debates with data on DNS collisions. **Wilfried Woeber** mentioned the gNSO's Data & Metrics for Policy Making Working Group. **Dan York** pointed out that while ICANN had been measuring protocol adoption (IPv6, DNSSEC) by TLDs, there was a need to measure adoption within gTLDs. He further pointed out that ICANN's Centralized Zone Data Service (CZDS) provided metrics on adoption of domains for all the new gTLDs.

2. What in your view are the main technical challenges facing the DNS as a whole?

Patrick Fältström emphasized the challenge of namespace collisions. **Warren Kumari** said that in his view, name collisions both within the DNS and with alternative namepaces, the need for co-operation on DNS amplification and Root key rollover were key challenges facing the DNS. He also asked what should be the technical community's recourse in case of a malfunction of one of the root zone server. Mentioning the 13 installations (letters) currently serving the root zone, he suggested the possibility of increasing this number in the future and of considering a more distributed model for the root zone, although he recognized the very sensitive nature of this idea.

Wendy Seltzer added that in addition to the comments made by Warren Kumari on privacy, there were issues whereby web security models interacted with the public suffix list and treatment of delegation in new domains. She suggested that helping organizational collaboration and providing support for standards were key challenges facing the DNS.

David Conrad widened the topic to that of the ***ossification of the DNS*** itself, whereby it is increasingly difficult to make changes to the DNS protocols, in addition to which suboptimal DNS implementations lead to DNS cache poisoning. He also pointed to ongoing questions on whether and how ICANN was to do DNSSEC root KSK rollover and IPv6 and stressed the significant risk for the DNS infrastructure posed by compromised Customer Premise Devices (CPEs) that undermine the trust model.

Lars Liman reminded participants that the new gTLD program was reshaping the DNS tree and its hierarchy and that this would impact operations. Second, he pointed out that the DNS is being used for various directory service needs; in his view one of the biggest challenges is the putting directory services on the Internet, without necessarily doing so exclusively in the DNS. To a query by **Steve Crocker** on whether the concern related to the health of DNS, or to the DNS being a poor technical choice for directory services, **Lars Liman** shared his belief that the DNS lacks several essential properties that are important for Directory services.

Paul Mockapetris pointed to the need to assess the timelines of some of the Internet and DNS' technical issues, and to identify their possible scale, like with Network Address Translation (NAT) issues.

3. Should ICANN play a more active role in the adoption of IPv6, and if so which role?

Helping to reach decision makers

Filiz Yilmaz reminded participants that the RIPE program committee was very involved with IPv6 adoption. She believed that the conversation and dialogue within the technical community was evolving and that there was a need to facilitate communication between the technical community and decision-making management layer within organizations, *i.e.* those responsible for the financial part. She further specified that it was difficult for the technical community to pass its message through to the CFO and CEO's ears and that in her view ICANN could play a facilitation or awareness-building role.

Co-operation and coordination within the ICANN community

Steve Crocker reminded participants that ICANN was IPv6-capable in many of its forward-facing systems.[1] Participants agreed that ensuring IPv6 availability for its own systems was key. ICANN had

[1] This meeting helped bring focus to the area of IPv6 support and helped ICANN to realize that not all of its forward-facing systems supported IPv6.

also mandated IPv6 support in the registrar accreditation agreement (RAA), which **Dan York** thought was positively influencing IPv6 take-up.

Dan York said that Web interfaces were an important area in which ICANN could help with the registrar and registry communities. He thought that ICANN could help IPv6 communication efforts by working with RIRs IPv6 adoption programs, domain name registries and registrars. **Paul Wilson** thought that ICANN, consistent with its mandate, played an important role in ensuring that registries and registrars support IPv6. **Paul Wilson** also mentioned the Internet Society's Deployment 360 program, and that it may be worth investigating areas of possible synergy between ICANN and ISOC.

To a question by **Daniel Migault** on IPv6 support by the root servers, **Martin Levy** stated that 174 out of the 176 gTLDs supported IPv6, with only two lacking IPv6 glue (.MIL and .COOP).

Financial support for IPv6 promotion

There was a discussion on the merits of extending some financial support to help promote IPv6. **David Conrad** said that he thought ICANN could encourage IPv6 and BCP 38 adoption, he ventured that perhaps ICANN could consider expending similar amount of resources as it is spending in promoting new TLDs. **Ray Plzak** agreed that ICANN could usefully allocate financial resources to existing RIR IPv6 outreach programs that he believes are effective and well tested. **Paul Wilson** noted that the RIRs were reaching out to ISPs, but did not think that additional resources are needed.

IPv6 and the mobile world

Howard Benn shared his view from the world of mobile devices. He said that the mobile community had using IPv6 in their networks for a long time. He mentioned the dynamic changes in the mobile world wherein over a billion smartphones and billions of machine-type devices connected to the Internet would require individual names, which **Paul Wilson** thought referred to numbers rather than names. He mentioned the important work of stardard bodies like 1M2M in defining machine-to-machine (M-to-M) architecture. **Francisco da Silva** underlined the need for dual stack (IPv4 and IPv6) support, and mentioned a new technical Committee on Cybersecurity at ETSI that would start to look at security in basic M-to-M communications.

4. From a systematic perspective, how much protection does the root system as a whole have against DDoS attacks?

Bill Manning put forward that ICANN, as one of the root servers, should deploy all possible methods to mitigate UDP floods, but that the Internet as a whole was not well protected against UDP floods. He mentioned ongoing technical discussions on the merits of moving away from UDP to TCP.

Steve Crocker mentioned the need for more data about DNS over TCP and that privacy concerns may reinforce the importance of not just this issue but of encryption more widely. **Warren Kumari** said that he thought pervasive monitoring made encrypting DNS communications more necessary. He pointed to early stage work within the IETF on building an encrypted version of the DNS, stressing what a large-scale architectural change this would be and the work that it would require from ICANN participants, although it was still early in the process.

Wendy Seltzer said that in addition to the comments on privacy, security issues relating to the treatment of delegation in new domains were also arising. She ventured that ICANN may consider provide organizational support for new standards work.

5. Technical considerations for the IANA stewardship transition

In view of the transition of US Government's stewardship of the IANA functions, **Warren Kumari** asked what would happen in a hypothetical scenario in which the IETF wanted to reserve .FOO while ICANN wanted to delegate the same TLD .FOO. He also asked what changes should be anticipated in the IETF's use of the IANA functions for all the protocol registries and the review of all the "IANA considerations" in proposed RFCs. He said that there is collision with the DNS namespace and DNS-like names used in a DNS context. He insisted that there would need to be careful coordination on the process whereby IETF has in the past reserved a .local label for mDNS, with RFC 6761 on special-use domain names.

David Conrad stated that the transition of the stewardship of the IANA functions would have some technical implications given that NTIA was part of the root management. With NTIA no longer directly involved, he mentioned that addressing Verisign's role in root zone management was very sensitive given the need to maintain operational stability. He brought up the possibility of KSK and ZSK management without Verisign in the root zone maintainer role. **Steve Crocker** shared his personal view that he would like to see changes that were as minimal as possible.

Jay Daley said that ICANN needed technical experts to help it conduct a properly thought out risk analysis. **Patrick Fältström** announced that SSAC had decided to set-up a working party to look at principles for globalization.

6. Discussion about technical co-operation and coordination and the TEG / TLG

Participants agreed on the importance of detailed and explicit co-operation, put forward by **Francisco da Silva** and **Wendy Seltzer**. **Sébastien Bachollet** and **Francisco da Silva** agreed on the importance of coordination with the objective of ensuring positive user experiences and improving security and privacy.

Daniel Migault emphasized the need for end-to-end adoption of protocols like DNSSEC. In his view, the IETF and ICANN each own a part of the ecosystem and an important role for ICANN is to identify the missing boxes. Mentioning that most of the topics discussed in this technical experts group meeting had also been discussed in the IETF, Mr Migault asked whether it would make sense to present some of the IETF's work during ICANN meetings. **Steve Crocker** responded positively and **Elise Gerich** said that Jari and Michelle Cotton from ICANN's IANA department had been working on this.

Reinhard Scholl stated that for the ITU, network spoofing is a topic of concern and that the ITU will organize a workshop in June focusing on caller ID spoofing. He mentioned that the ITU also has a capacity building program with RIRs on IPv6.

Steve Crocker asked participants for their thoughts on a good time to hold the technical experts group meeting at the next ICANN meeting. Multiple attendees responded that the current slot on Wednesday afternoons was a good time. There was some discussion of the Technical Liaison Group (TLG) text in ICANN's bylaws that states that "the TLG shall not have officers or hold meetings, nor shall it provide policy advice to the Board as a committee," to which Steve Crocker specified that this was not a meeting of the TLG, but of technical experts.

Appendix I: Participants (sorted by last name)

First Name	Last Name	Organization
Francisco	Arias	ICANN Staff
Sébastien	Bachollet	ICANN Board
Howard	Benn	ETSI / Motorola
Marc	Blanchet	IAB
Rock	Chantigny	CIRA
David	Conrad	Virtualized, LLC.
John	Crain	ICANN Staff
Steve	Crocker	ICANN Board
Francisco	da Silva	ETSI / Huawei
Jay	Daley	InternetNZ
Daniel	Dardailler	TLG / W3C
Paul	Ebersman	Comcast
Patrik	Fältström	SSAC / Netnod (remote)
Tomohiro	Fujisaki	ASO / APNIC
Jim	Galvin	SSAC / Afilias
Elise	Gerich	ICANN Staff
Bill	Graham	ICANN Board
Chris	Grundemann	Internet Society
Cathy	Handley	ARIN
Anne-Rachel	Inne	AfriNIC
Patrick	Jones	ICANN Staff
Mark	Kosters	ARIN
Warren	Kumari	TLG / IETF / Google
Jacques	Latour	CIRA
Bruno	Lanvin	ICANN Board
Louis	Lee	ASO / Equinix
Fabio	Leite	TLG / ITU - T
Martin	Levy	ASO / CloudFlare
Lars-Johan	Liman	RSSAC / NetNod
Bill	Manning	RSSAC / ISI
Daniel	Migault	TLG / IETF
Margie	Milam	ICANN Staff
Paul	Mockapetris	ICANN Staff
Ram	Mohan	ICANN Board
Seun	Ojedeji	ASO / AfriNIC

Izumi	Okutani	JPNIC
Karine	Perset	ICANN Staff
Ray	Plzak	ICANN Board
Ashwin	Rangan	ICANN Staff
Kaveh	Ranjbar	RIPE NCC
Barbara	Roseman	ICANN Staff
Reinhart	Scholl	TLG / ITU - T
Jorg	Schweiger	DENIC
Wendy	Seltzer	TLG / W3C (remote)
Steve	Sheng	ICANN Staff
Tripti	Sinha	RSSAC / University of Maryland
Jonne	Soininen	ICANN Board / IETF
Theresa	Swinehart	ICANN Staff
Bruce	Tonkin	ICANN Board
Duane	Wessels	RSSAC / Verisign
Paul	Wilson	ASO / APNIC
Wilfried	Woeber	ASO
Suzanne	Woolf	ICANN Board
Kuo-Wei	Wu	ICANN Board
Filiz	Yilmaz	ASO / RIPE NCC
Dan	York	Internet Society