ICANN81 | AGM – How it Works: IROS and IANA
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AMY CREAMER: So why do the IANA functions exist? Well, coordinating the Internet's unique identifier system is critical to ensure that the Internet interoperates globally. The Internet's connected devices need to use the same system of identifiers in order to basically speak the same language so that all of the systems can interoperate. The authoritative registries are used by all of the vendors, software engineers, service providers, businesses, the application developers, anyone who wants to innovate and help expand the Internet.

And so now I'm going to speak about the three core functions that I mentioned earlier. So let me talk about protocol parameters. This is probably the least visible, but they are everywhere, and we directly issue the protocol parameters. The reason why they're mostly invisible is because they're mostly limited to software developers who are using the protocol parameters because they're installed in their software code. So that's why for the everyday user, you don't really see these.

The Internet Engineering Task Force, or the IETF develops the Internet standards that define the protocol parameter system. So they do sort of all of the work and then they come to IANA. And IANA is the one who maintains those registries that they have developed the standards for. So we maintain the new registries that they create. We will put in all the new values for the registries that they send us requests for. We manage and publish all those registries online for all of the users who use that

information. And then we also work very closely with the IETF when they're developing the new standards and help them to determine what will be appropriate that will work with the IANA functions.

Now, the number resources is actually a protocol parameter registry, but we've created its own core identity for it, because this is like the IP addresses that are the unique identifiers for all devices on the Internet. It also includes autonomous system numbers, or ASNs. And these are the unique identifiers that group networks on the Internet. And so IP addresses are very important.

We allocate large blocks of IP addresses to five regional Internet registries, or RIRs, and then the RIRs in turn will delegate those to ISPs and network operators who are within their region. And then the ISPs network operators will then delegate those down to users within those regions. And when the RIRs are close to exhausting those blocks of IP addresses, or ASNs, they'll come back to IANA to get the next block. And we will allocate, based on global policies that have been determined, to determine if the RIR is correct and that they need their next block.

Now, an interesting thing to note is that in 2011, IANA delegated the last large block of IPv4. So we have no more IPv4 addresses to give out. We only have IPv6, which was developed back in 1998 when it was realized that we were going to eventually run out of IPv4. IPv6. Right now, there are no concerns about running out of IPv6, but there's been a slow adoption rate for IPv6 because it requires network operators to buy new equipment that handles IPv6. So of course that's a slow adoption rate. But that's an interesting note about IPv4. You may have read about IPv4 exhaustion in the news.

So the most visible thing that we handle is domain names. And we are managing the domain name system root zone, or the DNS, which identifies the top-level domains and we refer to those as TLDs. And so it's a hierarchical system, so we're at the root, the very top, which is the top-level domain.

And so we work with the top-level domain operators. These are the operators of things like dot- com, dot-org, and also of your country codes, such as dot-uk, dot-jp, et cetera. And the top-level domain operators, when they need to make a change to things such as their backend system, like they need to make a change to their name servers or they need to make a change to their administrative information, such as they need to change their public contact information on their delegation record so the public can get a hold of them, they come to IANA and they put in that request. And then my staff takes a look at the request and we make sure that it abides by all of the global policies. And then also we run some technical checks on it, if it's a technical change, to ensure that it, yes, this is operational, they've done it correctly. And then we will implement it into the root zone so we make sure it's not going to break and it's completely correct. And that's how we interact with the top-level domain operators.

So one of the things that we like to tell people, because there sometimes is some confusion about what kind of control IANA has, is actually we're just following the policies that the community has created. We don't interpret those policies. We simply follow them. We don't determine what can or cannot be a domain name. We follow the

policies that the community has developed on what can and cannot be a domain name. And we do not choose who can be a TLD manager.

Now, we do create registries that have been defined from policies by the community. We maintain those registries. We publish those registries for the general public to use. And we do allocate the number of resources, as I mentioned earlier.

So let me talk a little bit about governance of IANA and oversight and accountability. We have a lot of oversight of IANA to make sure that we are doing our job correctly. And in 2016 we had an event called the IANA Stewardship Transition where IANA was sort of broken off from ICANN into its own nonprofit company called Public Technical Identifiers, or PTI. And PTI is actually the company that hires all of that IANA staff. But we are an affiliate of ICANN, so ICAN is our sole member. And so what that means is that as a nonprofit, we do have our own board. It's a five-person board. Two of the board members are NomCom appointees. I mentioned that PTI hires all the IANA staff. Right now we've got about 20 staff members which are listed here, but we are under ICANN, as I mentioned, as an affiliate.

So ICANN is actually responsible for the IANA functions, but they sort of subcontract it to PTI to perform. So ICANN still has oversight of the IANA functions by having oversight of PTI's performance. ICANN also provides PTI with shared resources. So ICANN provides us with human resources, IT, legal, finance. ICANN provides all of PTI's funding. They also provide some oversight mechanisms, such as the Customer Standing Committee that oversees our performance on naming, the

IANA Naming Function Review, which reviews our naming performance every five years.

And one of the ways that they sort of, as I mentioned, subcontract the IANA functions to PTI is through three major contracts that represent the three major functions. So for naming, we have a naming contract where ICANN says, “PTI, go do the IANA naming functions for naming.” And then for protocol parameters, there's a contract between the IETF, which is the body that creates all the standards that become the protocol parameter registries between IETF and ICANN. And then ICANN has a contract between ICANN and PTI. “Say, now, PTI, you'll carry out everything for the IETF protocol parameters.” And then with numbers, it's the same thing. Between the regional Internet registries, the RIRs, and ICANN, there's a contract, and then ICANN has a contract with PTI to then go perform that work.

Now, within these three contracts are a series of service-level agreements that IANA has to meet to ensure that we're doing everything properly. So with the IETF, there are a series of service-level agreements. When we perform the request for protocol parameters for naming, there are actually 64 service-level agreements that we have to meet. And we report on these to the Customer Standing Committee or the CSC. And then we provide performance reporting for the numbering community on all of our IP address and ASN number allocations.

And we create reports that we publish monthly for these three areas on IANA.org that anybody can go and pull up and review, but we also meet with the three communities. So on a monthly basis we meet with the CSC to discuss the naming report with the IETF. We meet with them

about three times a year and we present them with a monthly report, but we actually talk to them three times a year about our performance. And then we've got a monthly number report. But the RIRs do an annual IANA review committee process.

Now, besides the Internet community overseeing that, IANA internally does a lot of auditing and accountability ourselves. So we hire a third-party information security auditor and we perform a SOC 2 and a SOC 3 audit. There are many audits we could choose from, but we chose the SOC 2 and 3 audit. We also do customer satisfaction surveys.

We do an annual customer satisfaction survey that we sent out to our customer base. And actually at the end of my presentation, you will all have a chance to participate in that survey because I'll present you with a QR code and you can go in there and answer our survey and be a part of one of the auditing ways that we do. And then we do a customer survey after every single request that we receive for the three main functions that we do, where we send them a little “how did we do?” survey. We do annual audits of our business processes. We follow ICANN’s project management framework, we do annual contingency and continuity plan updates, and we do regular engagement with our community, all of this to ensure that we are on track with how we are performing.

So there are a couple other singular activities that only IANA does. One is we actually run the dot-int registry. Dot-int is a very unique domain. It only has about 200 domains. And that's because of its very limited requirements about how to get a dot-int domain. The requirements changed a little bit between 1988 and 2000, but right now it is only for

an organization that was actually established by a treaty between two or more national governments. We receive a lot of applications every year, but out of all of those applications, only about two to three applicants actually qualify. And that's how sort of rigid the requirements are. And you can look up what the requirements are on IANA.org if you're interested in that.

We also run the dot-ARPA registry, but this is actually not in the domain namespace. We actually consider this to be a protocol parameter registry because it is used only for Internet infrastructure purposes, as it is prescribed by an RFC which falls under the IETF domain, I would say. So we work with the Internet Architecture Board, the IAB, and that is one of the groups under the IETF. And so we administer that with the IETF.

We also published the label generation rule sets. This was formerly known as the IDN tables. IDN stands for Internationalized Domain Names. This actually began by ICANN staff creating an informal repository of the best practices for IDN deployment. And IDNs are domain names written in your local language and script. And it soon developed into something much more formal. It now contains the definitive code points and associated eligibility rules for strings that are permitted within a TLD's policy. They are usually language-bound and script-bound. And they became mandatory for any general any gTLD which stands for Generic Top-Level Domain. So now generic top-level domains must provide us with an IDN table with their LGR repository as part of the IDN guidelines. And we also develop some SLAs around this

which we report on as well for how quickly we manage an LGR once we receive that request.

And the last unique thing that we do which is extremely important actually is the root key signing key. This is part of our root zone related functions. We manage the key-signing key, which is the trust anchor used to secure the DNS with the DNSSEC protocol. It's an audible process of performing the key-signing ceremonies to use this key conducted using members of the community as key participants. So we gather what we call trusted community representatives or TCRs to come participate in this key-signing ceremony with us. And we actually stream this key-signing ceremony online on YouTube. So you can also participate and watch this about six-hour ceremony if you choose. We record it. We have external witnesses watching every step. All the materials are published. And the reason why we do this is we want to ensure trust in the process because DNSSEC only provides security if the community trusts that the HSMs have not been compromised.

This brings me to the end of my presentation, but I want to note since I've ended on the key-signing ceremonies in DNSSEC that I don't think we have how it works on DNSSEC for this ICANN81, but I have found it useful for my own staff to send them back to past ICANN meetings where we have had how does it work on DNSSEC, on DNS, on Internet networking. We've had a lot of great sessions in past ICANN meetings where these technical concepts have been spelled out easily for laymen. And so [from] my own staff, I've got written out all these different lessons, all these different sessions from past sessions that I have found to be very useful. And I would recommend maybe going

back to past sessions and [key in] “How does it work?” And you might find some really great sessions that are very useful. And again, I learned a lot of what I know from listening to ICANN sessions in the past. So it's something that I would recommend for Fellows or NextGen. If you're interested in any of these topics that you hear from my session or from Adiel's session, there's probably something in the past that we held that went into it in detail, but again, in very easy to understand detail. So that would be one tip that I would give for Fellows or NextGen.

And so now I'd like to pass this back to Siranush.

SIRANUSH VARDANYAN: Thank you, Amy. Thank you for an interesting presentation. Is there any questions for Amy before we move to Adiel, our next presenter? Yes, please go ahead.

LILY EDINAM BOTSYOE: Thank you so much, Amy. And my name is Lily Edinam Botsyoe. I and I'm an ICANN 81 Fellow and excited to learn about IANA. You actually mentioned there's a survey for us to take, the survey for how we can engage as community. So I’m looking forward to it.

AMY CREAMER: Yes, thank you. Forgot about the last slide. So if you want to scan this QR code, go ahead and you can take our annual survey.

LILY EDINAM BOTSYOE: Right. The other question is, you also mentioned that IANA, maybe if I'm wording it correctly, had stopped the allocation of IPv4 in 2011, and it's now seeing a slow adoption of IPv6. Are there any reasons why? And if so, how is IANA maybe working around the situation with slow adoption? So that's a question.

AMY CREAMER: Sure. So we simply exhausted IPv4. There are simply no more large blocks for us to give out. But of the regional Internet registries, many of them still have some remaining IPv4, so they're able to still allocate some to their regions. It's just that IANA doesn't have any more large blocks. We believe that this slow adoption rate simply has to do with network equipment. You need to replace your network equipment with those that can handle IPv6. So that just has to do with replacement. And there are monetary reasons for the slow adoption. As long as the RIR still has some IPv4, I think that IPv6 will still be slowly adopted. But at some point, there will be a reality that you're going to have to move over to IPv6. And so that will hit at some point. But luckily, once you do move over to IPv6, we do not see any exhaustion rate in the near future because it is just so, so, so, so, so much larger than IPv4. But that's what we see as the reason behind the slow adoption.

SIRANUSH VARDANYAN: And I think Adiel has some additions to this.

AMY CREAMER: Yes. I'm sorry, I should refer to Adiel.

ADIEL AKPLOGAN: No, it's fine. So I think the other thing about IPv4 and IPv6 is that as Amy mentioned, IANA cannot allocate to the RIRs anymore. On the RIRs, some of them still have … But what has really happened is that since the [exhaustion of the central pool], a market has developed around IPv4. So operators used to go to those market of people who got IP addresses from RIRs and try to trade them on the market, which allows some operators to continue to work on IPv4. Although that being said, the IPv6's adoption at the core of the network has gradually evolved since then. So since people can still go to the market and get IP addresses, even at a very higher cost, they are still, you know, trying to use it. But that pool is also exhausting, slowly making the price going high. That will push people to use IPv6s more and more and more.

So the adoption is slow and I think it has been anticipated at some level that it's going to be a very slow curve going up. Training and capacity building is one of the core areas as well to help operators to pick up on IPv6.

SIRANUSH VARDANYAN: You have mentioned actually about this, but there is a question from Saba Tiku, who is an ICANN 81 virtual Fellow. He participates virtually for this meeting. So he's asking, is there any engagement opportunities within IANA for the ICANN Fellows, especially for those from the technical community to be engaged? So any opportunity within IANA? And then we will talk about it from technical perspective.

AMY CREAMER: Yes. Well, we're holding a session IANA in 2030 on Monday, in the afternoon, and we're going to be doing a lot of discussion about IANA in the future, so I'd like to invite all of the Fellows to that. It's going to be an open discussion about where we're headed. So I think that will be a great opportunity to engage with us and ask more questions. I'm not what other sort of … I think that's a great engagement point.

SIRANUSH VARDANYAN: Thank you, Emmy. Any—yeah, I see the questions over here. Please go ahead.

OLUBUSAYO BALOGUN: Thank you so much for the presentation. My name is Busayo. I'm from Nigeria. ICANN81 Fellow. So during your presentation you mentioned the fact that IANA broke off from ICANN on the PTI. So it's sort of like a separate body now. I'm just curious, is there any reason why, considering the fact that I would assume that the functions that IANA does actually touches on ICANN's mission? I'm just curious. Thank you.

AMY CREAMER: There were a lot of reasons why, but one of it is that the community felt that the IANA functions needed to be … It was an oversight mechanism to ensure that the IANA functions were kept separate. So if anything were to occur and the company was unable to handle the IANA functions capably, it would be able to move the IANA functions swiftly out to another source if needed. So it was another protection mechanism for the IANA functions to ensure that they were

independent. It was adding independence to it. So it was another governance mechanism to ensure its own independence.

SIRANUSH VARDANYAN: Thank you. Emmanuel, please go ahead.

EMMANUEL ORUK: Thank you. Emmanuel Oruk, ICANN 81 Fellow from Uganda My question is simple. Why is the adoption rate very slow? And one thing I would love to understand is the accessibility. What is IANA doing to make the accessibility for some of these technological devices to access IPv6 or the challenges?

AMY CREAMER: I'm actually going to throw that to Adiel.

ADIEL AKPLOGAN: Okay. Accessibility. I think you mean accessing IPv6 addresses. IANA does not allocate IP addresses directly to end users or even operators. It does that through the regional Internet registry. And the Internet registries right now have enough IPv6 to allow operators who have what they want and what they need to run their network and provide IPv6 to end users.

What is happening is that the transition from their normal infrastructure using IPv4 to IPv6 only quote-unquote is slow. But you may be surprised (and I've been trying that several times) that the ISP will provide you IPv6 without you knowing, because the IP address that you use to

access the Internet is provided to you when you connect to your ISP through the [HCP]. Right? In that process you got IPv4 and IPv6 because both protocols are being run in parallel in most of the network.

So what you can do is to check every time you connect to see if you got an IPv6 on your device or not. But it is not an IANA function. It is the RIR plus your direct network operators.

SIRANUSH VARDANYAN: Thank you, Adiel. Abdulrahman, yes, Please go ahead and.

ABDULRAHMAN ABOTALEB: Yeah, thank you. My name is Abdrahman Abotaleb from ISOC, the Yemen chapter and an ICANN 81 Fellow. Actually we have been through this kind of discussion with our technical community in our community, especially the Internet Service providers and [ESN] operators. And they mentioned the concerns about the security of IP version 6. It's not only about upgrading the equipment or financial needs. So how can you and IANA help this community to address and tackle these kind of challenges, especially in regard of security? Thank you.

ADIEL AKPLOGAN: I don't know which specific aspect of security they are talking about. What I know from my experience in network operation is that IPv6 adds another layer of management to the network in general. So when you are running one protocol and you have to add another protocol which is not backward compatible, you are running kind of two separate networks on the same physical layer. Right? And you have to maintain

the security rule and the security practice for both protocol. That adds a cost which can create some security flaw.

But in terms of protocol itself, IPv6 and IPv4 has the same structure. So intrinsically there is no security flaw in IPv6. The security flaw may come from the additional layer of resources that need to manage the IPv6 thing.

So at ICANN we have some outreach activities that goes on. But more specifically, I will really encourage you all when you go back to your region to look at what your regional Internet registries are doing. They all provide very intensive, detailed IPv6 training, transition, security certification, all of that. They have it and they are more active in the forefront promoting IPv6, providing the resources that need it. And ICANN does not get involved in that at that level because IANA allocates to the regional registry, and the regional registry has the responsibility in their region to provide the information.

So [the RIRs are] more at the forefront. We provide general information, and I will talk about that research and what we see. We publish them at the global level and let the RIR do the groundwork.

SIRANUSH VARDANYAN: Thank you. And I think we will move forward now with Adiel to continue the technical part of the presentation of the session today. And then we'll come back with more questions after it. So, Dana, I've noted your hand, and Mayssam's here. Yeah, thank you.

I would like to introduce Adiel, who is from our OCTO team, and he will explain to us what is IROS, which, as a topic, as an abbreviation, is mentioned today, and what is the technical team is doing in ICANN to keep the Internet a secure space for all of us to be. So, Adiel, the floor is yours. It's my pleasure having you as a presenter for the newcomers.

ADIEL AKPLOGAN: Thank you Siranush. And happy to be here. Always happy to interact with the Fellows at ICANN. The technical function of ICANN is not something that is always visible at ICANN meetings. So it gives us the opportunity to exchange with you and tell you a bit of what ICANN is doing in that area.

So IROS is a department within ICANN that includes both the IANA function and the Office of the CTO. So the two big departments are bundled into what we call IROS, which is the Identifier, Research, Operation and Security function.

Next slide please.

SIRANUSH VARDANYAN: You have the clicker.

ADIEL AKPLOGAN: Oh, thank you. So, as I mentioned, the Office of the CTO is kind of the technical outreach and research arm of ICANN in general. Its main goal and objective is to collect enough data to do research and write papers and reports around those data when it's touched on the Internet

identifier system security and DNS particularly. It's also very active doing outreach around that work to make sure that the community in general is aware and equipped with data and information that helps them develop policies that are meaningful.

So I'm going to talk with you about the second part of IROS, which is the Office of the CTO. The OCTO function has four key areas. The first one is the operation area, which is mostly the department that helps the full IROS, I must say, to interact with other departments within ICANN to help us organize events, like the ICANN DNS Symposium, liaise with the registry operators with their regular registry operator workshop, and also help us in term of budgeting, planning, and so on and so forth. So it is more the operational arm of IROS.

Then we have the Technical Engagement, which is my department. And the technical engagement responsibilities mainly is to help ICANN have a more, I'll say, coherent approach in terms of technical engagement. When we talk about technical engagement, that means developing partnerships with technical organizations, working closely with technical bodies that are part of the Internet governance ecosystem, like the RIR, ISOC, and the IETF, but also supporting the whole OCTO and IROS team in terms of making sure that the work that they do is known by the community. And you will see a little bit later that that's the only function that is regional: to make sure that our outreach is more close to the community.

The third group is the Security and Stability and Resiliency Research Team. And I think Samaneh is here. That department is led by Samaneh. Yeah, Samaneh is at the back. And so Samaneh's team looks

at the different elements that contribute to and support the security, resiliency and stability of the Internet identifier system. They do a lot of research that they publish in different papers and also provide data to the community so that they know where we stand in terms of DNS resiliency.

The last is another research group. The scope of the second research group is more wider. They look at the Internet identifier system more globally: what is the impact of their evolution on the security and stability, how the evolution impacts ICANN policy development process, what is the emerging identifier system that may impact ICANN function? So roughly they look at the wellbeing of the DNS ecosystem.

So those are the four groups. And I will try to dig a little bit into those groups in the following slide.

So the technical engagement group, as I mentioned, develops sustainable relationships with other technical organizations, particularly those who share the same vision as ICANN, building relationship, developing them, and making sure that relationships that we have with those technical organizations benefits ICANN as an organization, but the community as well.

We are very much involved in capacity building as well. And that led us to launch few months back the KINDNS Initiative. You may have heard about it, which is an initiative to promote DNS operational best practices. It is led by the community but facilitated by us. You can read more on the website. And it provides a very simple and detailed

framework for operators who want to implement and ensure the world that they are they are adhering to best practices.

So of the two main areas of what we do, the first one is capacity building, as I mentioned, and outreach training. Our training catalog is published on the ICANN website. We have 16 different modules in that training that goes from DNS 101 to DNSSEC Advanced and DNS Abuse, RDAP, WHOIS, Universal Acceptance and different areas.

And the second arm of what we do is the global engagement, supporting the dissemination of what ICANN does, supporting the community. And actually somebody was asking about the DNS training. We are currently running in parallel to this session a DNSSEC advanced training with the ISPCP. So we work with the ICANN constituency as well to try to address some of their needs in terms of capacity building so that they can use the knowledge in the policy development process.

My team is also very much involved in the Africa region for instance with the CDA which is the Coalition for Digital Africa. And that is also an initiative that has a lot of capacity development and capacity building aspects that we run.

So as I mentioned, it is a regional team. We cover the five regions of ICANN. North America is led by David Huberman. He's not here. Latin America by Nicolas. Yazid led the Africa region engagement and he is here and actually delivering the capacity building activity this morning with Ulrich. Ulrich is from Europe and covers Europe widely including Russia and all the other countries. And Champika cover the Asia-Pacific region.

The next is then the Security, Stability and Resiliency Research Team led by Samaneh as I mentioned. Basically they supports ICANN contractual and [professional] commitments to ensure that the DNS and the identifier system are securely run. They are more focused on the topmost part of the DNS system, so at the registry TLD level. They provide data and information in papers that help us understand what are the types of research that can be done in that area. They carry on research in those areas of security, stability and resiliency of the DNS. They run a certain number of tools as well that help collect data, analyze them and publish the finding of those analyses.

They are also very much involved in cybersecurity discussion globally. They participate in those meetings. They build partnerships with organizations like APWG to understand what is going on in those communities and provide input and also learn from what they are saying in terms of feedback.

On some of the activities that they are reporting right now, there is going to be an interesting session on Wednesday on DNS Metrica, which is a new tool that the DNS research team, the SSR specifically research team, is working on. You will hear more about that. It is kind of an evolution of DAAR, if you know DAAR. They are also working on another project which is informal, which is INFERMAL, to be precise, which is another way of reporting and collecting threat information related to domain name security. They publish several papers as I mentioned before and those papers are publicly available. You can go read them. If you want to see more about the different departments, you go to ICANN.org/OCTO. You will see the landing page and then you will see

the different departments and go read more about it. So these are some of the paper that they that they wrote and they published not only on ICANN website but also in some research areas. They are accepted because they follow the proper research process and are accepted within the research community in general.

The [NAS], which is the research team that I mentioned before, is led by Matt Larson. He is not here today, but this team looks at the DNS more widely and not only the domain name aspect of the DNS but also the IP address. So they look at the unique identifier system more holistically and provide data and information to the community. So their main goal is to provide trusted and verifiable information to the community in their process, in developing policy, but also in securing the overall ecosystem in general. They engage in different kind of measurement activities and look at the impact of the usage of the unique identifier on the overall security and stability of the Internet. They participate as well in different forums that talk and touch on cybersecurity or touch on the impact of the DNS or the evolution of the DNS on the security in general. They perform a lot of studies that they publish in papers. One area that you will see on the OCTO website as well is the OCTO series of papers where a lot of the research provided or done by this team are published there.

They analyze the root server traffic. And one project that is also very relevant to this community is the NCAP project. That project particularly studies the impact of name collision on the Internet in general. And in the wake of the New gTLD Program, that is a very important study because we see now and then a name that collides

because they are using private environment, the [leak] on the public, and the new gTLD that is going to be assigned may collide with them. So that study helps us understand what caused name collision in general, how can we mitigate them and give the community enough information to be able to decide what the ICANN Board or what the community should do in case there is a name that is potentially going to collide with another TLD that we see in route traffic and so on.

One thing that the OCTO team also does is to represent ICANN as an observer in some of the advisory group like RSAC and SSAC. So the research team led by Matt represents OCTO in SSAC where they provide RSSAC and SSAC as well where they provide inputs when and where needed on those.

Some of the projects run by Matt's teams are the ITHI. You may have heard about ITHI, which is the Internet Health Indicators Project. We collect a series of data that analyzes and gives the states of the health of the Internet, quote-unquote, by looking at what we see. How much are they impacting the security and stability of the Internet? How are they impacting the overall health of the identifier system in general? The outcome of that work is also published on the ICANN website, on ICANN.org/ITHI. You can see all the different indicators that are published there.

They do a lot of thematic research as well and work related to the DNSSEC. For instance, the K rollover process, the public key rollover process, happened few years ago at the root level and the next one that is coming is led by that department as well.

The DNS error reporting is a new advancement to the DNS protocol that is being standardized to allow DNS server to be more I would say detailed in the way they report operational errors.

So these are some of the documents published by OCTO. They are freely available. They are reviewed regularly as well, taking into consideration feedback and evolution in those different fields. But these just a few of them but I think we are now at around 40 different documents published in the document series. So I will encourage you if you have interest in those technical areas to go and look at those documents. And we are here throughout the week, and if you want to discuss any of them, we'll be more than happy to engage on them.

Where can our work be found? Through blogs. I'll give you the link to the main OCTO page. You can see them there and you can also follow the ICANNTech handle on Twitter. Most of the other information is published directly through ICANN social media platforms or accounts, and specifically they are retweeted and relayed by the ICANNTech information.

So I think that is it for OCTO. If you have any questions, we'll be more than happy to.

SIRANUSH VARDANYAN: Thank you. Adiel. Yes, I assume there are some questions here, and, Dana, we'll start with you.

DANA CRAMER: Thank you. Thank you. Dana Cramer, ICANN Fellow and PhD candidate from Canada. I think this is more towards [Amy's] presentation prior, but I was wondering if IANA does any global environmental scanning of proposals to Internet governance which might touch on your work. I'm specifically interested in IPv6+ submissions at the ITU and its rollout in the Asia-Pacific and African regions. Is there a specific listserv, like something similar to the WSIS 20 one which ICANN has, that IANA might have for following such environmental scans or whatnot, just for following conversations?

AMY CREAMER: That would really fall under ICANN work, not IANA. IANA is just processing. We don't do sort of that global policy, global research work. We're not into research. We're just processing the core functions and the requests that come to us.

Adiel, do you want to add to that?

ADIEL AKPLOGAN: Yeah, I mean, I think that goes back to the question that was asked before. IANA is a function that is followed by ICANN still. Although PTI exists, IANA is part of ICANN. So ICANN does that kind of scanning through different initiatives like the WSIS+20 initiative. The work that is done there also has in mind what is happening at IANA. So it has in mind the function or the mission of ICANN that include IANA function. So we usually look at what is happening at the ITU, for instance, bring it back inside, analyze them, do look at what is happening and look at what impact it may have on IANA or on the community in general.

So that function happens within ICANN, but it take into consideration the IANA function. I don't know if that answers your question. So what is happening at the WSIS+20 does not forget that ICANN also is in charge of the IANA function and looks at the new resolution and analyzes them, taking into consideration that technical mission of ICANN in general.

DANA CRAMER: Thank you very much to both of you.

SIRANUSH VARDANYAN: If I can request those who are asking questions and our presenters to speak with the allowed pace for our interpreters, because if you speak quickly, they cannot properly interpret everything you say.

Mayssam, your turn, please.

MAYSSAM SABRA: Yes, thank you. So, if I understood correctly from your IANA presentations, IANA's primary mission or role is to establish and maintain official databases that track specific types of information that are related to Internet standards and the protocols. So my question is, if an entity is running or operating a top-level domain name, is it mandatory for this entity to work with IANA to create those lists or databases?

AMY CREAMER: I'm sorry, can you repeat the end of your question? I didn't quite catch it. What are you asking?

MAYSSAM SABRA: So if a TLD registry is operating a top-level domain name, is it mandatory for this registry to require to request for IANA to create the official lists of database for this specific type of information related to Internet standards and protocols?

AMY CREAMER: Official list? So the top-level domain managers run their own registry. If it's a generic top-level domain, there are some rules, and I would say they sign a contract with ICANN, and there's some certain rules and stipulations they must follow. If it's a country-code top-level domain, then they wholly run it on their own and there are no contracts between a country-code top-level domain and IANA. There are a few global policies that they must follow, but how they run their registry is up to that country-code top-level domain manager. So when it comes to their registry and their database and their registrants, that is not something that IANA has any insight into. Am I answering your question? I think I've missed it a little bit.

MAYSSAM SABRA: No, it's clear. Thank you. You mentioned also in the presentation something about dot-int, that you receive requests from dot-int, but I'm not sure if I understood correctly. Have you said that not every request is accepted?

AMY CREAMER: Right, yes.

MAYSSAM SABRA: And what are the criteria that IANA uses to do so?

AMY CREAMER: The main criteria is that the organization itself has to have been created by a treaty between two or more national governments, but that the other requirements are also that that organization that was created has to have its own international legal personality. And meeting the first one is usually fairly clear about whether or not they met the. The second one, having its own international legal personality, is one that we had to dive a little bit deeper into. But we still, even though the first one is fairly clear, get a lot of applications where they clearly have been created on their own and then they just tacked on a treaty a lot later or things like that.

So there are very few organizations that were actually created by a treaty between two or more governments. And so that's why very few organizations make that. And this dot-int top-level domain was established way, way back when dot-com and dot-org were first established in an RFC, which is a document produced by the IETF (RFC 1591) that is basically one of the key reference documents. It's almost like a policy, but it's not technically a policy that IANA follows, making sure that any top top-level domain manager meets anything that is set out in RFC 1591. So it was one of the sort of original documents set then.

SIRANUSH VARDANYAN: Thank you, Amy. Gustavo?

GUSTAVO ORTEGA: Yes, thank you. Gustavo Ortega, Cybersecurity Researcher, Georgia Tech Institute. So as one question, in regard of the SSR key functions, you mentioned that you perform research—

SIRANUSH VARDANYAN: Gustavo? Sorry, slow down please. Our interpreters need time.

GUSTAVO ORTEGA: Oh, absolutely. You are performing research in the arena of DNS abuse prediction using machine learning. So two parts in my question. So number one, who are the primary consumers of this research? And the second part would be, do you work with any justice departments or law enforcement agencies to take advantage of these reserves so that they can proactively take advantage of these and make actions in order to enforce the law regarding abuses? Thank you.

ADIEL AKPLOGAN: So as I mentioned, the main consumer of the work that the research team does is the community. Most of the work are published and available and used by anyone that uses it. The target primarily for us is the ICANN community, of course looking at this through the eyes of the ICANN mission. But once the outcome is published and available, they are available for everyone, and everyone can use them in their local legislation, policy development or [ICANN]. But the target is not specifically to work with any government, any justice department, for this. It is public knowledge that can be used.

SIRANUSH VARDANYAN: Yes, please, you go ahead and then ..

IDA PADIKUOR NA-TEI: Okay, so thank you Adiel and Amy for the presentation. My name is Ida Padikuor Na-Tei. I'm from Ghana and I'm an ICANN Fellow. My question is similar to what [Sabra] asked from the virtual meet. In Amy's presentation under accountability, you spoke about regular engagement. So I wanted to know, beyond ICANN general meetings, do you have other ways, virtual meetings, virtual ways that you engage with the community? And what is your definition of community? Is it just anybody who is interested in IANA or the technical community, your staff, your customer base? Yeah, what's the definition and how else can we engage with IANA? Thank you.

AMY CREAMER: Thank you for the question. So yes, there are many different levels of engagement. So on the definition of community, there are very many levels to it. Our core customers are the number community, which are the RIRS, and protocol parameters is the IETF, and in naming it's the top-level domain managers, both gTLDs and ccTLD top-level domain managers. Those are the people that we're working with on a day-to-day basis. And so we go and attend conferences, ICANN meetings, IETF meetings, RIR meetings. We're attending those conferences all year long so that we make sure we meet our core customer base. We will do one-on-one meetings with them, virtual meetings with them, but that's our core base.

We are also often asked to speak at other conferences that maybe are not set up by our core base, but just to do some general education. And we will either do that directly ourselves or sometimes we will pair up with our GSE colleagues. You met many of the VPs from GSE at in the session prior to this. So we will work with whatever region that request came in from and, if we can't attend ourselves, work with GSE to perhaps present our material.

But we do want to reach beyond just our core customer base. We would like to be able to educate just people who are interested in what we do. For example, last month, GSE arranged a webinar to speak to academics within a university at Turkey, and I attended that webinar and spoke about IANA functions. So that were just people who wanted to know about how ICANN and IANA fit within the Internet ecosystem. So we are definitely looking for ways to engage beyond our core customer base.

GSE though usually is one of the touch points for reaching through to us because as you saw, our staff is smaller and so GSC is one of the one of the key ways to reach out to, and then they will arrange for whoever is best to do that topic. They'll talk to OCTO. They'll talk to IANA. So that's a good key point.

But you're also open to come directly to someone like myself or another. You can meet some other IANA staff who are here. I mentioned the IANA in 2030 session on Monday. There'll be more staff there. So we are looking for new ways to talk to whoever is interested in learning more about what we do. And I hope I answered your question.

SIRANUSH VARDANYAN: Thank you. Nojus, please go ahead.

NOJUS SAAD: Thank you so much, Siranush. Very happy to see you again today. Good morning. I'm Dr. Nojus Saad, ICANN 73 and 77 Fellow coming from Iraq. So given the rise of decentralized Internet trends, I'm curious to know how does IANA foresee this rise of decentralized domain name systems, particularly blockchain-based DNS like ENS for Ethereum or Handshake, impacting its current roles and functions? Do you think that there are more opportunities or risks present for the traditional DNS that is managed by IANA? Thank you.

ADIEL AKPLOGAN: Yeah, thank you for the question. There is going to be a How it Works session tomorrow (I will really encourage you to join) on blockchain and a decentralized naming system based on blockchain. It's going to answer some of the questions. We have also recently published two documents that explain, one, blockchain technology in general and one specifically on a naming system based on blockchain. We see the blockchain naming system as something that is completely parallel to the DNS because the primary goal of blockchain naming system is identifying the use of blockchain technology [either] for financial reasons (so identifying like wallets for instance), which is different from identifier that we use on the Internet in general and that ICANN has at its core of missions.

What we do though is that we watch this environment very carefully to see what is happening and particularly see when and where it may impact the stability and security of the DNS in general.

So that is going to be explained tomorrow. But there is another session during the week which we which is the emerging identifier technology session which will be more open with some of the players in the naming in the blockchain naming system to discuss our finding and answer some of the questions. So if you are interested, I will really encourage you to join those sessions as well.

SIRANUSH VARDANYAN: Thank you. Whom did I miss who wanted to ask a question? Lily, go ahead.

LILY BOTSYOE: Thank you so much. So I want to know how … I'm also a PhD student in IT and my interest is in privacy, and you mentioned the SSR Research Lab. So I'm just looking for how we can be a part of it. And that's the first one.

The second question again is when I was in NextGen (this was last year) when I did a presentation on cybersecurity, I think the general sentiment that came out was ICANN usually wouldn't do a lot of cybersecurity because it's content-level. So I want you to describe cybersecurity from the standpoint of ICANN and what ICANN really is interested in when it comes to cybersecurity. Thank you.

ADIEL AKPLOGAN: Thank you. And you are lucky Samaneh is here. I will really encourage you to talk with her at the end of the session to see what kind of synergy can be built with any researchers that are interested in any of the topic that they are working on when it comes to cybersecurity.

By default, today, general discussion around cybersecurity really is around the content side, you know, the misuse of the Internet for cybersecurity. But for us, it's more at the infrastructure level. Always the Internet infrastructure and the unique identifier system are use of misuse to commit sometimes cybersecurity attacks or something like that. So we look at it from those perspectives specifically. So it's more technical, it's more infrastructural level, and it's more about how those unique identifier system are used to commit some misuse online.

SIRANUSH VARDANYAN: Thank you. Any last opportunity to ask a question, one or two? Yes please, Doel?

DOEL TORRES: Hello. Doel Torres, ICANN81 Fellow. As far as I know, Metrica will work initially for gTLDs, but I want to know if in the future there are any chances that Metrica will work for ccTLDs too.

ADIEL AKPLOGAN: Samaneh?

SAMANEH TAJALIZADEH: Thank you. So about ICANN Domain Metrica, there is a session on Wednesday at 1:50 where the project is going to be introduced and there are going to be more details on it. But the short answer to your question is yes. At the moment in the initial release to the community, it will be only for gTLDs. We still need to have discussions with the ccTLDs to see how, and we are going to include them and how we are going to transmigrate them from DAAR to Metrica, those that were volunteering and those that want to volunteer now. And we will be expecting to add them after those discussions which will happen in the ICANN meeting. Thank you.

ADIEL AKPLOGAN: One of the challenges I think for the ccTLD is also the accessibility of the data, right? It's more easy for the gTLDs to have access to those data and do this kind of study and measurement. But for the ccTLD, the process is a bit different and needs more direct engagement and participation of the willing ccTLD to do that. But that is going to be part of the discussion that is going to happen with the community, I guess.

SIRANUSH VARDANYAN: Oyinkan, go ahead please.

OYINKAN ADEBIMPE: Oyinkan Adebimpe, ICANN81 Fellow From Madagascar. I have a question regarding the IANA function. The IANA is following policy but does not create or interpret policy. So from where are you getting the

policy? How's the handover? If there's any change or any update of those policies, how are you managing it? Thank you.

AMY CREAMER: Thank you. That's a great question. So a couple things. One is, when it comes to how we handle ccTLD policy, that's the country- code top-level domain policy. The ccNSO, which is the group that forms policies for ccTLDs, wrote a framework of interpretation of RFC 1591. So I would call it sort of a guideline for how IANA should interpret RFC 1591, which is the RFC that is sort of the founding document which I mentioned earlier for top-level domains. And it's pretty clear and precise. And so we follow that document so that we don't have to make our own interpretation.

We also participate as observers in all of the policy development work that is going on that will touch on the IANA functions. There's been a lot of current activity actually in the ccTLD space under the ccNSO that we've been involved in. And so we're able to ask questions along the way to ensure that their final document has answered our questions and is clear. And that's been really useful, so that, as I said, the final document is something that, you know, is much more black and white for IANA than maybe previous documents have been.

And it's the same thing really on the GNSO side, which is the generic top-level domain ICANN group that produces their policies for gTLDs. So that's been very, very useful in the last many years of ensuring that future policies have more clarity.

So I would say the policy development process has come a long way from its beginnings, helping ensure that ICANN and DIANA understands the finished product. Did you want anything, Adiel?

ADIEL AKPLOGAN: Yeah, I think the main concepts here is that the policies that IANA used are developed by the community. They are bottom-up. The community develops them, makes them available for ICANN, or they're approved and then IANA implements them. But in the process, as she explained, IANA also contributes. When there is a need for clarification, they ask back the community, and the community tries to clarify and give them guidance. And this applies not only to the TLD area but to IP addresses as well. The number community has a process by which they develop global policy that IANA will use to allocate IP addresses to regional registries, and those policies are developed by their specific community, ratified, and then IANA will implement them.

So it is an ongoing process that that it regularly revisits and if there is an update, the community will update where it is needed for IANA to implement.

SIRANUSH VARDANYAN: There is a question from an online participant, and if I can read it aloud, the question is from Shruti Shreya. "I have always found that we can best understand the institution by unpacking what is the biggest challenge that they face in their work. Requesting our presenters to highlight one of the key challenges that they face in fulfilling their functions at IANA. Thank you." She is a NextGen Fellow. She's a

NextGen participant, a NextGen Fellow. Thank you. So probably the question to both of you is, what is the major challenge while you do your job? Amy?

AMY CREAMER: I would say for us it's still educating. When we work with our top-level domain managers, there are many layers of policies and still educating this large pool of top-level domain managers and their workers on it so that they understand all of these policies because we know them inside out, but why would they? And in getting those messages through, we're just the administrators but we have to find a better way of clarifying things so that they understand in advance. And as you're going to find out in the next week, it's very complex. ICANN is very, very complex. And it's just as difficult for employees and staff who are coming on to a new TLD. They've got to learn all this as well. And then they submit a request to IANA, and, you know, they're up against a wall of all of these policies and requirements. So how can we make learning for our customer base simpler and communication as simple as possible? So that's one of the, you know, challenges that we have.

SIRANUSH VARDANYAN: Adiel, if you can also help.

ADIEL AKPLOGAN: Yeah, I think the knowledge and understanding what the Internet is one of the challenges, particularly from the technical perspective. We always tell people that the Internet is not only Facebook, Twitter and so

on, but for us the Internet is more deeper than that. And understanding the difference between the usage of the Internet and the infrastructure, making sure that understanding goes down, particularly in this time of where government and different stakeholders are more and more interested in the Internet and more and more interested in protecting their citizens, it is important for us to decouple and help them understand what is the content side and how the technical or the infrastructure side connect and why it is important to be careful, regulating or trying to touch things that may have detrimental impact on the infrastructure side. So translating that technical message in the way that can be easily understandable, easily digested, by all the communities is one of the challenges we see from the technical perspective. So capacity building, you know, awareness, outreach is one area of the challenges we are seeing.

The second challenge is the very fast paced evolution of the technology is evolving very, very, very fast. And for we at ICANN particularly the IANA function but more generally, our technical mission is to make sure that we follow what is happening everywhere, being able to anticipate potential risk or impact on the stability, resiliency and security of the of the DNS continuously. Somebody talked about blockchain technology. We have been organizing an emerging technology session at ICANN for the past seven years, and every time, the topic that comes is blockchain. So it is an example of something that we have been following, trying to understand, trying to see how it will impact what we are doing. But there are other plenty of technologies out there that we have. So that scanning of the environment and having a more proactive approach to

the impact of the evolution of the technology in general on the stability of the DNS is another challenge for us.

SIRANUSH VARDANYAN: Thank you Adiel. And I would like to thank Amy and Adiel for being here with us and for doing this great presentation.

Adiel has mentioned that one of the challenges is outreach. We are looking at you as ambassadors. So you are here getting this opportunity to learn and you are becoming the ambassadors back in your regions. So wherever you have this opportunity and go back, give this back to your region. This is the way how we can collaborate as well, one of the key collaboration aspects for us to think about.

With that, thank you very much. And just to let you know, all the presentations from all the sessions starting from now are uploaded in the meeting website under each session details, so don't look for them anywhere else. Don't expect me to send them to you. They are on the meeting website. So if you need to download, feel free to take it from there. And with that, the meeting is adjourned. Thank you very much.

ADIEL AKPLOGAN: Siranush, thank you.

SIRANUSH VARDANYAN: See you after the break at 1:15.

[END OF TRANSCRIPTION]