ICANN79 | CF – GAC Capacity Development Workshop (2 of 3)
Saturday, March 2, 2024 – 1:15 to 2:30 SJU

DAN GLUCK: Hello, and welcome to the ICANN79 GAC Capacity Development Workshop on ccTLD's Management and IP Addresses Allocations on Saturday, 2 March 2024 at 1715 UTC. Please note that this session is being recorded and is governed by the ICANN expected standards of behavior. During this session, comments and questions submitted in chat will be read aloud if put in the proper form.

Remember to state your name and the language you will speak in case you'll be speaking in a language other than English. Speak clearly and at a reasonable pace to allow for accurate interpretation, and please make sure that you mute all other devices when you are speaking. You may access all available features for this session in the Zoom toolbar. With that, I'll hand the floor over to GAC USA rep, Susan Chalmers.

SUSAN CHALMERS: Good afternoon, everybody. And thank you for joining us this afternoon. I'll take one. Thank you. So, this morning, we heard from our colleagues at IANA PTI about their role in the Internet's unique identifiers. And this afternoon, we're going to have the opportunity to connect with two different groups who do their work as the day-to-day in the administration of ccTLDs, and then we'll hear directly from regional Internet registries.

So, it's a real opportunity to be able to kind of take what you learned this morning and apply it in two different contexts, names and then numbers. But I want to just maybe, before we begin, take a minute and see if anybody had any reflections or questions from this morning's presentation.

If anybody wanted to share any insights, any outstanding burning questions that perhaps our colleagues could think about as they address you this afternoon. No? Well, okay. Well, please feel free to chime in. So, it is my pleasure to introduce you to Pablo Rodriguez, who is the Executive Vice President for (.PR). And Pablo will give us our first presentation today on a country code top-level domain. So, over to you, Pablo. Thank you.

PABLO RODRIGUEZ: Okay. So, well, thank you all. It's a pleasure and a privilege to be here with you. I'm going to try not to bore you too much discussing some elements that we use to analyze our domain name. I'm going to try to show you a timeline of what we have done. When I joined (.pr) in 2003, we developed... Next slide, please. We began to identify a number of things. So, we began by working on a number of things that had to do with the anatomy of a brand.

So, what is it that we want to do? Next slide, please. Do I have a clicker? No? Okay. So, we began discussing what are those things that characterize a brand? And then we began to apply that to our domain name.

So, next slide, please. And these are some of those characteristics. When we began to break them down, what are these elements that we have here? And we began identifying and adding to those. For example, we said, what is that personality of (.PR)? Our personality has been very proactive in terms of technology. And later on, you will see why am I saying that. And what were we doing regarding the implementation and development of other technologies that at the time were being discussed, such as the DNSSEC and the Anycast and so on?

So, here you will have an explanation, pretty much a reflection of what we were doing at the time, rather an introspection to understand where do we stand? What hurts? Where are we going? And that's what I'm talking about. What's the pain? What hurts? And we began looking at those different areas of what that pain was. Many customers came to us and said, we want to register with you. And we said, fantastic. So, we're going to give you an API. And they were, no, we need EPP. And I'm like, what? We need EPP. But I don't have EPP.

Well, I cannot register with you. And I'm like, ok, so what else do we do then? And we began looking for other opportunities. And we began identifying these different areas that were putting us at a disadvantage with the rest of the people, with the rest of our competition, with the rest of the registrars. And we began to compare ourselves with other very successful registrars. What are they doing that we're not doing? And that is a painful process, because you need to be very honest with yourself. You really need to dig in and say, yes, we have a problem. We're not doing things as standardized.

And we are not doing the things that others are doing. So, we began identifying, as I mentioned already, what caused that pain. And we touched a number of things that were causing that pain, as I already mentioned. We needed EPP. We needed to have a better WHOIS. We needed to have a number of other features within our registry that were not available at the time. And I'm talking about, again, 2003. So, we began developing many of these things. And part of what identified us, or rather characterized us, was the idea that we strongly believe in developing human capital.

So, as members of our origins began at the University of Puerto Rico, it was really important for us to begin developing human capital, identifying what are those characteristics. And that goes really deep, right? Because you need to identify what are those characteristics and those skills that a particular person has to do. So, we had a lot of learning to do very quickly, because this community was moving very quickly. And if you want to be competitive, you better start moving very quickly. There isn't much time to be philosophizing about it or playing with semantics. You really need to be on top of your game.

So, as a good professor, we began using all the knowledge that we have. And we began looking for a summatory of things that we had to do. So, when you have management, good management and administration, and when you had a distribution channel plus added values, then that is going to give you success. So, that is easy to say. That is such an elegant and beautiful equation. So, how do you do that? So, we began looking for a commercial strategy.

That was the first thing. And we began collaborating with some of you. I can see some familiar faces here with whom we began talking and we were evolving and visiting other members as well. And at that point, we said, okay, so we know that we need to be able to do registrations in bulk. We need to be able to have a very fast customer service that is capable of answering as many questions as possible, as quickly as possible in the least amount of time possible.

Also, we were trying to create a robust infrastructure, one that would not allow you to be hacked or to put in danger your customers and others. And we had some of that at our early beginning. So, we began to develop all those things and then we realized this is extremely expensive. This is extremely difficult. And this is an uphill battle for a small TLD. So, we began looking at what does literature says there. And I know, please bear with me.

I know it gets like professional, like I'm also going into professor mode here again. But what I would like you to look at is this model. We're talking about what are the criteria that you need to have in an IT group? And you need to have people who are characterized by being a strategist, by being an innovator, and by being an enabler. And that's what we call the 3D IT model. And this is found in literature in the presentation. We have some of the references there. But nevertheless, where I'm going with this is that you cannot be scared and you cannot stay behind and say, well, we cannot do it.

There are many ways of doing this. And the first thing that you need to do is educate yourself. Educate yourself regarding what we're doing and why are we doing it. And although I mentioned it later, I want to

bring to your attention again that all ccTLDs are not created equal. So, what I'm talking about here necessarily doesn't work for everybody. But you could use some of this knowledge or some of these experiences to apply them to the particular experience of the ccTLD, of your regional, of your local ccTLD.

So, I do not intend to say this is the way to success, this is the best way to do things. Absolutely not. This is what worked for us. Necessarily that doesn't work for my brothers in the Dominican Republic, which is only half hour away from here, or to other people and we have discussed this with some of you who I continue to see here. So, using that 3D model, we began doing several things. And these are some of the, as I mentioned earlier, what is our personality? What characterizes us? And this is what we tried to do, was to learn as fast and as quickly as possible. And we tried to implement as fast and as quickly as possible. And what we did was to give you a little background there.

So, we were incorporated in 1989. We were delegated in 1989. And from that moment on, we began doing different things. As you can see, by 1995, Dr. Bellovin, and this is the face of the professor who discovered that there was a big problem with the DNS system back in 1990. And he kept it quiet until 1995, when he finally wrote an article about it in a discussion in a conference in Utah. And so, Dr. Bellovin talked about that, and people were still kind of skeptical.

Is that DNS stuff still real? Is that possible? Can you hack a website? So, Dan Kaminsky came about 2008, and he proved without a shred of a doubt that yes, you can steal a website away. So, by then, in 2005, IETF was already working on a solution for this. And by that time, Sweden,

that is C, and my congratulations and my respect to Sweden, they were the very first one to sign the route with the DNSSEC. Approximately nine months later, we signed the route with the DNSSEC, making us the very first ccTLD in the entire Americas who signed that registry. Even before ICANN, before .com, before .net, before .edu, we were already there.

And I understand, when you're a small TLD, you can move very agile. You're very agile. You can move very quickly. It's not the same. I mean, it's one thing to move one ship or one boat than moving an aircraft carrier. It takes a lot longer to do that. And there are many forces that may prevent you from doing that. But at the end of the day, we were able to continue to integrate technology that at the time, people were wondering. There were several solutions to the DNSSEC. And which is the right one? Which is the one that you pick? Well, thanks God, Sweden and us, we picked the right one. And it's the one that became the standard.

Further, we continue to work on different things. And this is some of what I was mentioning earlier. And by then, by 2007, we began participating in ICANN meetings in 2003. And we were the first boat that conformed the North American region. By 2007, we were celebrating the first ICANN, actually, in the Carib-Hilton. For those of you who are in the Carib-Hilton, that was the very first ICANN, ICANN29 in 2007. And we began integrating within the ICANN community, within the technical community. And we began creating a network of support that would allow us to learn, but to also exchange ideas and exchange and transfer knowledge to other ccTLDs. And that was, again, close to that personality that makes us innovators.

So, you heard about this. For those of you who were here for ICANN61 in 2018, terrible times, very difficult times. And I want to thank you all, for those of you who came, regardless of what the world was saying, that Puerto Rico was going under the water, and it was apocalypses, and we were all dying. And you came here, you joined us, and you saw that we're resilient, we're robust. Yes, many parts of the island suffered, many, many island parts of the island. But the metro area is a relatively new part of the city, is a relatively new part of Puerto Rico, and it's built to be resilient. This is not the first hurricane that we have seen. It was the very first one in 85 years.

We had not seen a cat five. We had two within less than a month. So, it proved that, yeah, we can handle it. Sometimes you struggle, but yeah, you can handle it. And so, we did. And what happens? Let me take just a moment to talk about climate change. Many people say, climate change doesn't exist. That's not sure. We're not sure if it's a cycle. I don't know what it is. But I can tell you one thing. We feel it here. We can see the oceans rising. We can see losing real estate due to the ocean increasing in altitude.

We're also experiencing extreme weather. Normally, 10 years ago, we didn't see 100-degree weather. I'm talking about 36, 37 Celsius, about 100 F. Now, summer, you can feel all the time. And we can see it changing. It's changing around the world. All of you have been experiencing changes in climate. So, it is naive to say that, I'm not sure this is happening. So, as climate change and as the CO2 increases in the atmosphere, the energy of the sun continues to be absorbed by the ocean.

The ocean becomes acidic. That's what makes it bubbly in your soda pop. And this makes it kind of acidic. That happens to the ocean too. Our coral reefs die. Temperature in the water increases. Hurricanes become each time more and more violent. More and more do we continue to see cat threes, fours, and fives more than usual, which that was not the norm. And that's what I was talking about. So, what do you do like a ccTLD? If you know this is happening, you better get on board. You better start working on solutions to protect yourself. So, look deep inside you, discuss this, because this will affect you. One way or another, this will affect your operation.

So, how can you make sure that what you are doing will help you protect the cyber real estate of your customers, but at the same time, it will help you transfer knowledge to others so that they can do the same. And this is what Hurricane Maria looked like. Look at all that. It took not only Puerto Rico, the smaller islands, Dominican Republic, Haiti. This was gigantic. I don't know if that can run. So, here we have in the lower portion of that image, you can see what Puerto Rico looked like hours after Hurricane Maria. The entire island was shut off. This is what it looked like from the International Space Station. And these pictures were taken by NASA.

And what they were looking at, they couldn't believe. But you can still see that the metro area was still lit. But the rest of the island was completely dark. Look at in comparison to the upper image before the hurricane, what it looked like. So, it was incredible. My personal experience. Hours after the hurricane finished, I turned on the radio, my battery radio, and I hear a baseball game. And I'm like, what the heck is going on? And there's a baseball game. And I can hear the

people laughing and screaming. I'm like, what is going on? Our spectrum, our radio spectrum was empty. I was capturing a baseball game from Venezuela. That's what I was listening to. I was freaking out. Who is playing baseball? How is this possible? No, it was not us. It was in Venezuela. That's what we were capturing. So, that's how bad it was.

For me that grew up in New York, when I came out, I had never seen a hurricane before. And I came out, I wanted to experience what it looked like. And when I went outside, it felt like sandblast. So, I opened the door, went outside, my wife is screaming at me. And as soon as I felt that water for like sandblast, I ran right back. By the time we came out, when we were in the center of the hurricane, all of our trees, their tops were gone.

So, it looked like we were in winter. Dark, dark gray skies, and the trees had no leaves. So, for me, immediately I recognized, oh, we're in winter, except that the temperature is 80 degrees F, or over 27 degrees Celsius. So, over and over again, this is the type of thing that you say, yeah, that's really terrible. But do you think about that regarding your TLD? Do you think about that, your registry? Can you bring this information to your local registry, to the registry in your respective countries? Can you get that conversation going?

Before I continue to talk about that, one of the things that we have done, and one of the things that we began discussing was, in 2011, I believe, when Tokyo had the tsunami and the 9.2 earthquake, and then suddenly the tsunami, and so on, and many companies calling me and telling me, please, please, please hold my registrations. Protect my registrations. And what we did is that we renewed all of the, we looked

in our database, anything from Japan, anything from that area, we renewed for one year, immediately. Money or no money.

I assure you; I'm not going to argue with Sony or Honda or Toyota for a couple of dollars. So, they're good. They have credit with us. So, we registered, we renewed all of those domain names because it was important to protect their cyber real estate. So, when something happens in this side of the world, for those registrars that are on the opposite end of the planet, do you think about us? Do you think, oh, let me look in my database and let's see how many domain names are registered for Puerto Rico in my database?

They just had a big problem with Hurricane Maria. Maybe they need to be protected. Maybe we need to protect their cyber real estate. So, I beseech you to please think about these things. When you hear about a natural disaster in a remote area from you, well, maybe they're not that remote. Maybe they're in your database. Maybe you need to protect them. Maybe you should look for them. Maybe you should do something about it and protect them. And then we can discuss money. So, speaking about that, speaking about moving, being innovators and so on, I don't know if many of you know, but (.pr) domain names, we register domain names at $1,000 a year.

And our corporations, most of our registrations are corporate registrations. And that happens because we have a strong relationship with the US. And we have many companies that can register those prices and they don't have any problem with it. But what do you do for your locals? What would you do for the people in Puerto Rico? Well, most of the domain names in Puerto Rico, we give them away. And

what we do not give away, we have developed a new commercial strategy in which we are charging $100 for (.pr) registrations that include emails.

In addition to the domain name, it will include an email. It will include a small parking page. It will also provide you with a number of templates to create your website. And our outstanding customer service, of course, is part of that. We have continued to work very closely with the people in Puerto Rico.

And normally when they come to us, they say, I want to use one of your domain names because they're so expensive and I don't have the money. I say, well, wait a minute. Are you based in Puerto Rico? Sure, we are. And we say, of course. So, show me some evidence that you are based in Puerto Rico. We'll give you a discounted price. And guess what? If you don't have the money now, we'll give you the domain name. And in a year from now, we'll talk about it. And if your business was successful and you can afford $100, then pay me. And that's part of what we do to make sure that we can continue to help out and promote the use of internet technologies in this side of the world.

We will not prevent anyone from using that. Thank you. A couple of slides, you can move forward. Go ahead one more. One more. One more. This is what I was talking about earlier about thinking about what we were going to do. And this is what I'm talking about now. tu.pr, your.pr. And your.pr is meant for local registration, strictly local registrations, both for companies and individuals as long as they're residents of Puerto Rico.

And I'm not going to bore you with all the details and the features. But the end of what we're trying to communicate is that you need to look deep inside and start thinking about why are we here? Why were we given a top-level domain? Why are we at ccTLD? And what is it that we can do with this? How can we help my population? How can I help my international community to promote the use of internet technologies and help out people to take advantage and take advantage in control of their destiny? I want people who are not technological to be able to develop their own businesses and take advantage of that and help themselves and push themselves to better lifestyles, to better quality of life. And that's a driving force for us.

So, thank you very much for this opportunity. It's been a real privilege to be with you. I hope that this can inspire a conversation, a discussion. So, let's do that. Let's continue the discussion. Can you take me to the last slide, please? So, that people who would like to reach out, they can have my... Take me to the last one. One more, one more. This is going to be available. I'll take it. So, you can have this and we can discuss it all the way to the end. Oh, these are some of the... What you saw there, very quickly is that part of that money that we capture from our domain registrations, we reinvest in education. And just Monday and Tuesday, we had a number of high school students that were being introduced to the industry of internet networking. And this is one way we can inspire them to say, hey, I can participate in this too.

And I can make a better quality of life for me because education is the ticket out of poverty. Education is the ticket for us to develop a better world. And that's what we're after. That's what we want to promote. So, for those of you who may be interested and have other questions,

please feel free to ask questions. But if you want to continue the discussion, take a shot. Oh, that's not me. One more, please. And you can take--. That is me.

SUSAN CHALMERS: Thank you so much, Pablo. Let's give him a hand.

PABLO RODRIGUEZ: Thank you.

SUSAN CHALMERS: Thank you. We had a... I think on the agenda, time was budgeted at the very end for questions, but it seems to make more sense now to ask questions for Professor Rodriguez. If we have any. So, does anybody have any questions? Please, Ashwin, and then Christine.

ASHWIN SASONGKO: Pablo, just want to know, you see there are, like you mentioned, Puerto Rico is (.pr) and, well, Faroe Island is not FO, for example. But I'm not very good in, what you call it, in these things. But Puerto Rico is US territory. Why don't you use .us, for example? Like Faroe Island, why use .fo? Well, it is part of Denmark kingdom. Why not use .dk? Or, I forget, dk or kd, I might be wrong. Although I know both of them are in the ISO 3166. I just wonder why it is like that, actually. Thank you.

PABLO RODRIGUEZ: Thank you for the question. And that is a question that many people ask when they approach me. As long as a territory has an entry in the ISO 3166-1, as you mentioned, you get a TLD. The explanation is a little bit more complicated than that. We can discuss it offline. But the truth is that there are many territories. For example, Montserrat is .ms, Martinique is .mq, and they're both related to France. So, these are territories, which one?

UNKWON SPEAKER: Montserrat is UK. It's Guadeloupe and Martinique, maybe. Guadeloupe and Martinique are France.

PABLO RODRIGUEZ: Oh. So, you have a number of them that will have those TLDs. And once they're granted, then you can help out those particular regions. If there are changes in that relationship, then those TLDs will either disappear or be used for something else. Thank you.

SUSAN CHALMERS: Very good question. And Christine, over to you.

CHRISTINE ARIDA: Okay. This is Christine Arida for the Record. So, my question is about the subdomain that you mentioned is for the local purpose. I think it was tu.pr?

PABLO RODRIGUEZ: That is the name of a company that we created. Tu means yours, your.pr. And that company is selling the same domain names at a lower price, discounted price for the local people.

CHRISTINE ARIDA: Okay, but my question is, do you have some more restrictive policy for the domain in terms that you need paperwork because you mentioned that you need to prove somehow and has it been successful versus more liberal, maybe other registrations under the .pr? I mean, if I would just choose the less expensive domain despite the fact that I must provide more paperwork?

PABLO RODRIGUEZ: No, look, we make it very easy for the people to get that registration. We normally are asking for, let me show me your phone bill, show me your water bill or something like that, or your electricity bill. The truth is that many people, as much as we have done, as many times as ICANN has come to Puerto Rico, many people don't know who ICANN is, many people don't know who (.pr) is, many people don't know that there are other domain names beyond .com) and that is, in many countries, .com is a real competition to the ccTLD.

So, what can we do to do that? I mean, even at my discounted prices, I'm 10 times more expensive than at that .com. But so, the question is, why are you so expensive and why should I buy from you? And when I show you those last slides with the kids and all that, that's why, because I do that. Because the money that we get, we spend in Puerto Rico and

we'll help out an important initiative such as education, socioeconomic development.

We help out in just about anything, NGOs, not-for-profit organizations. We give away so many domain names. Some people ask me, how many domain names do you have? And I was like, man, about 10,000. How many of them are free? Many of them are free and we're giving them away. So, we use that money to help out our community. Thank you for the question.

SUSAN CHALMERS: I know there are a lot of GAC representatives here who either work directly within the registries or work with their ccTLD registries. So, I'm sure you have a lot more questions than we have time for. Sorry? Oh, so first we'll go to our colleague T. Santosh and then to the question in Zoom.

T. SANTOSH: Thank you, Susan. This is T. Santosh for the record. And thanks, Pablo, Dr. Pablo, for the nice presentation. So, my question, not specific for (.pr), but also for all the ccTLD. As Dr. has mentioned that (.pr) is DNSSEC Sign. What about the second level and third level? Why the DNSSEC Sign is not happening at the second level and third level? Don't the users of the specific country need protection from various DNS Abuse? Thank you.

PABLO RODRIGUEZ: I'm going to try to answer that question as humble as possible because I am not a technical person. Nevertheless, all of our zones are protected with DNSSEC. Not only that (.pr), but .com, .net, .org, .name, .pro, .biz, and most recently .cop, .pr, .edu, .pr as well. So, no, we work very closely with the, we use a backend operator, a backend provider, and we make sure that we use the top-of-the-line technology.

One of the things that we did as a ccTLD, as you know, ccTLDs, most of us have an MOU, a Memorandum of Understanding with ICANN. I am not forced to do anything unlike other TLDs who are under contract with ICANN. Nevertheless, (.pr) voluntarily. (.pr) voluntarily ask to observe the same guides, the same guidance as under contract TLDs. So, we observe exactly the same standards, we follow the same standards, precisely because we provide a sense of standard to our customers, to our registrars, but also, we provide a sense of security. Because if there are two manufacturers selling cars and one is not forced to put brakes in it, and the other one does, why would you want to buy a car without brakes.

So, why would I want to take advantage of the fact that I have an MOU that doesn't force me to do certain things, but it is in the best interest of my customers, and it is in the best interest of my company to follow the best standards so that I can protect my customers as good as it possibly can. Thank you.

SUSAN CHALMERS: And our question on Zoom. Gulten. Oh, Gulten, over to you.

GULTEN TEPE: Thank you, Susan. We received a question from Dominican Republic. Does the (.pr) work with cybersecurity strategy and at Puerto Rican level? Second question follows as, what other main issues do you work in terms of education of the policy makers at the digital sector in Puerto Rico? Thank you, Amparo.

PABLO RODRIGUEZ: Thank you for the question. Thank you, and a big hug to our brother in the Dominican Republic. So, we're doing a number of things. Without a doubt, we're strongly working in the digital sector in order to, we're working closely with the Department of Education, and we are developing a number of strategies to help our students at a high school level to develop skills that will allow them to incur into the labor market. That is one thing.

We are also inspiring and instigating students to continue their education with a number of programs that have to do from robotics to programming, artificial intelligence and so on. At the same time, we continue to ensure that our TLD is at the top of its game in terms of cybersecurity. As you may know, there are so many attacks and there are so many threats out there that you cannot feel secure or feel that you have accomplished the pinnacle of your technological knowledge. So, we have to be on top of our game all the time. I hope that I've answered your question, but if it's not, please reach out.

SUSAN CHALMERS: Well, there are two Ns in ICANN, so I was thinking we might move on to the second N, but I'm sorry, there was one more question here.

UNKNOWN SPEAKER: Just another question, just to finalize. Thanks, Dr. Pablo, for the presentation. I really, it was the first time I thought about how the natural disaster can influence our operations. And I would like to ask you if, using that insight that you shared with us, if you are keeping tabs on the original countries of the registrants and registrars so that you can contact them in case there's a natural disaster in Japan or Indonesia. So, in other parts of the world that may be your clients or your registrars.

PABLO RODRIGUEZ: Let me see if I understood correctly. So, you're saying that you were asking that, not sure if you ask if we contact our customers in whatever parts of the world, we did not. As soon as we saw that there was a problem in Japan, we felt that it was necessary. They were experiencing so many difficulties.

There was no way that they were able to pay, make any economical transactions to pay for the registration. So, being that these are major companies and that they don't have any financial problems, immediately we renewed their domain names. But that was a risk that we took. And we know that we were not going to have any problems with them, but we need to think about these things and try to find ways in which we can do it. Thank you, but you can reach out to me and we can discuss it further. Thank you.

UNKNOWN SPEAKER: Thank you.

SUSAN CHALMERS: Well, thank you so much. And now we're going to move into the second part of our presentation for the afternoon session. We will hear about regional internet registries. This morning, Kim Davies told us about the role that IANA plays in allocating the numbers to the RIRs. And so now we're going to hear about further allocation in the role of the RIRs. Very pleased to introduce Hans Petter Holen, who is the CEO of RIPE NCC, and our colleague, Michael Obuela, who is with ARIN, which is the regional internet registry for the American region. So, over to you. Thank you.

HANS PETTER HOLEN: Thank you very much. And let's see how this works now. If I stand here, I can see my slides and look you in the eyes. And then how do I switch the slides? I just do like this. So, I'll briefly take you to how the RIR system works. Then what's the numbers of resources are, how routing works in the internet, and then what's happened with the number of resources since we ran out of IP before our addresses. And then briefly at the end, cybersecurity, how we secure the routing system.

So, what's an RIR? So, we are a regional internet registry, and we manage the allocation and registration of internet number resources in a particular region in the world and maintain a unique registry for IP numbers. And if you go to the next slide, you will see a map of the world and how the world has been divided into regional internet registries. First came RIPE NCC in 1992 and APNIC in 1993, and then ARIN was

established a bit later. Now, following this, the LACNIC registry was then established, and then AfriNIC in 2002 and 2005. So, we now have five regional internet registries.

The policy shaping this, establishing a new RIR says that the area should be continental in size. So, we've kind of now more or less covered all the continents here. And going to the next slide, the core functions of an RIR is to manage and distribute the internet number resources, and then to maintain a registry of who has the right to use these numbers in the internet. Now, the value that we offer to our members, to the ISPs, to the internet, is to guarantee uniqueness.

We want to make sure that only one end user computer ultimately uses the same IP address so that traffic gets to the right place. But we also support our communities, our members, in capacity building, bringing them together in order to shape internet in their regions and globally. So, then moving on to the next slide, the RIRs are independent, very self-governed. Now, each RIR is within a country, so we're subject to the laws and regulations of that particular country, but the policies that we operate under, they are set by the community.

So, we're not for profit, we are 100% funded by our members, and there is a fee for the services we provide, not for the numbers. And our members, they are typical, the internet providers. So, an internet provider can either be a large telco, as you know them, but it can also be a much smaller provider, or a hosting provider, or even a large corporation that provides services internally for their business. And even governments, academia, and others.

So, going on to the next slide, the number resource organization, the RIRs individually has governance structure with members, but together we have signed an MOU to act collectively on some issues where we have then established a number resource organization. And really this is to coordinate joint activities between the RIRs. And we want to be a flagship and a global leader to collaborate in the internet number resource management for a stable and secure internet. So, the next slide then shows the legal framework here. It's an MOU established between us, and we have recently updated that with some more additions. If you're interested in that, you can find that on our website.

So, going to the next slide. The number resource organization has an executive committee. So, this year's chair is Oscar Robles. He's the CEO of LACNIC. He was unfortunately not be able to be here at this meeting. John Curran, the vice chair and secretary is from ARIN. He is coming in Sunday night. So, if you want to talk to him, he will be here on Monday and through the week. I'm Hans Petter Holen, as you know by now from the RIPE NCC, and my role on the board is to be the treasurer. And then Paul Wilson from APNIC. And then as you can see here from AFRINIC, the seat is vacant because they don't have a CEO at the moment.

Now, of course, once they appoint a CEO again, they're more than welcome back around the table. We also have a permanent secretariat hosted by APNIC. An executive secretary, German Valdez, based in Australia, and Laueana Pavon, based in the LACNIC region. We've also recently hired our first program manager to coordinate one of our most important cybersecurity projects, the RPKI system that I'll talk about later. So, we now have a program manager coordinating that between the RIRs. Going to the next slide.

We also publish statistics. So, if you, your governments, needs to know facts about how the numbering system works, you can file compiled reports comparing this between the regions on our websites. We also have a policy overview comparing this between the regions on our websites. Of course, you can find the detailed and authoritative statistics for the region on each RIR site.

So, looking at how the numbers community works in the ASO structure, I've talked now about the individual RIRs that you see on the left side, and together we form the address supporting organization that has an address council and an executive council. And we participate as the ASO in the ICANN structure just as the other supporting organizations. But our policy processes, they're not here. They are in the regional meetings. Each of the RIRs holds on average, more than two regional meetings a year. In RIPE NCC, we're planning a meeting in Krakow later this year. APNIC just had one of their meetings. ARIN will have a meeting in Barbados, I think, and LACNIC will have a meeting in, I think it's Panama, before the summer. And then there is another cycle in the autumn. In these meetings, we typically bring together 500 to 800 people to discuss policy and technical coordination in the regions.

We also do smaller regional meetings with two, 300 people. So, it's an extensive outreach and bringing the community together in order to shape the policies and coordinate. Going to the next slide. I mentioned the address council, and you can see here the names of the different council members from the different regions. I think in the room here, I've seen the two representatives from the RIPE region, and I believe there are ASO meetings all of next week. So, I think most of them will show up later. As you can see here again, the AFRINIC seats are vacant

because there is currently no board with the quorum at AFRINIC. So, they have not been able to appoint members when the terms have expired.

Moving to the next slide. So, to summarize this, because I've now talked about both the ASO and NRO, so you may be a bit confused about that. ASO, Address Supporting Organization, is part of the ICANN structure mentioned in the bylaws. The NRO, the Number Resource Organization, is serving as the coordinating mechanism of the RIRs and serves as the address supporting organization. So, for many practical purposes, they're the same.

The address council, which is filled by the NRO Numbers Council, the same people. In terms of the ICANN structure, it oversees global policy development process for a number of resources. It appoints ICANN board members and advise the ICANN board. And then we have the NRO Executive Council that represents the NRO in all other matters. Really simple and yes, you're laughing. I've only been with the RIPE NCC for four years, so this predates me. Going into the internet number resources. So, going to the next slide. An IP address.

If you use the internet, you are not used to seeing the IP addresses at all because you use domain names. So, here's a technical explanation on how these are working. So, I won't go into the details on that, so just skipping to the next slide. There is another element of numbers, which is called the AS number, the Autonomous System Numbers. That's a number for, you can say, each network or each ISP that kind of groups together the routing policies for how routing will work for those addresses associated with that entity. So, that's the two elements of

numbers that we allocate. And the end users don't see this at all. I mean, this is for the IT departments to set up in their own networks.

In the servers or that you get assigned to your computers. Going to the next slide. IP addresses are not domain names. So, since numbers are complicated to use, the domain name system was developed, and that's most of what ICANN is all about. When I was at my first ICANN meeting in year 2000, I was asked, what are you doing? And I said, I'm part of the ASO doing IP addresses. And then the person that spoke to me said, oh, IP, intellectual property. No, I'm not doing intellectual property.

So, the domain name system translates from a name into the number so the users don't have to think about that. And if a service moves from one provider to another, they have to change their IP address, but they can keep the name. So, the naming, the DNS, is really to make it completely transparent for the users where in the network the resources are. I mentioned the policy process. So, each regional internet registry develops policies for their region. So, anybody participating in the policy process, and that's all the members or anyone else interested in IP addressing policies, can propose changes and there is a defined process in each region on how to reach this.

There is an impact assessment by the RIR and there is an endorsement in the end. In some regions like the RIPE NCC, it's a complete separation between the policy making by the community and the execution on the RIPE NCC. In the other regions, the policies are formally endorsed by the board in the end. So, we have slightly different flavors on that, but in all of the regions, anybody who is interested in policy development

can participate in these processes. Going to the next slide. It was mentioned that IANA was here this morning and talked about how IANA distributes IP addresses to the RIRs. So, that happens through global policies.

So, in order to make a global policy, that needs to be proposed in all five regions and go through the policy process in all five regions and then the address council checks that the process was followed and then it's forwarded to the ICANN board for endorsement. And we then have global policies for IPv4, IPv6, and ASNs. So, the global policies do not tell the regions, the RIRs, how to operate. They're only for how IANA allocates addresses to the RIRs.

So, in each RIR, there is the regional policy process that specifies how the RIR assigns the addresses. And there are regional differences because there are differences in the stage of development in the different regions and maybe even also different business structured. You can see that, for instance, in the ARIN region, there are two large countries like the US and Canada and some smaller ones and in the US, there are maybe fewer bigger players than in Europe where there are lots of more countries with big players within each country.

So, how the market works is different in the different regions and therefore there may be small differences in how the policies are. So, they're adapted to local needs and made in a bottom-up manner. Moving to the next slide, routing. So, now I've talked about numbers and how they are distributed. Now, the challenge then for a computer is that you want to send the packets to a website like IANA. org and how

will that packet reach that destination? So, going to the next slide, networks are interconnected.

The internet is a collection of networks that connect together. So, in order to exchange information about which addresses is in my networks, I use a routing protocol called BGP, Border Gateway Protocol, and tell my neighbors which addresses they can send to me. And then my neighbors tell that to their neighbors and so on. The routing structure, that's decided by each ISP individually. So, different competitors can decide on who they connect to, who they buy transit from, or build their own global network if they want to do that. Back in the 90s, it was only the multinational telcos that had the capacity to build a multinational or an international network.

Looking at today, you will see that the big content providers like the Googles and Facebooks, they build their own global fiber structure in order to distribute their content. So, the way traffic is moved around, that's entirely up to the decision of the internet providers, which are the members of the RIRs. Going to the next slide, you've heard about running out of IPv4 addresses. I think one of the things that Vint Cerf has said on stage many times that he regretted is the choice of the size of the IP addresses. But this was discovered in the 90s and there was developed a new version.

So, if you go to the next slide, please. After we ran out of IP addresses back in 2011, so that's more than 10 years ago, then IANA did not have any more addresses to allocate to the RIRs. And then later, each RIR, if you go to the next slide, ran out of addresses. So, today, AFRINIC has some address-based list and APNIC has some address-based list, while

ARIN, LACNIC and RIPE NCC do not have any more addresses to distribute. So, for the RIPE NCC, for instance, this means that there is a waiting list. So, if one of our members closes business and returns to address-based, we put it on a waiting list and then we can allocate it to our members that are waiting for addresses. But this is kind of like, you can say, the dust, the small grains remains of address-based. Going to the next slide.

What was then prescribed solution to this was to move to IPv6. Now, that's a significant technical upgrade and there has been significant development done globally, both by technology vendors and ISPs to implement this. And it is steadily increasing. We're seeing an increased number of requests for IPv6 addresses from our members, but there is still high demand for IPv4. And that is a very complex problem because many universities still only teach IPv4 in their curriculum, unfortunately, and many vendors only have the default, the first chapter in their manual is how to set up IPv4 and so on.

So, you kind of need more knowledge than what's easily available to build IPv6. But it is possible to build large-scale networks on IPv6 and we have more material on that in our session tomorrow. So, one thing that we're then seeing in the IPv4 space is that due to this, there are an increased fraudulent request for IPv4 addresses. So, if a company has been dormant for years, for instance, it may be somebody that tries to submit fraudulent papers, so basically committing a crime by submitting fraudulent documents and we then routinely report that to the police.

And there has been a couple of high-profile cases now where people have also been convicted for that fraud, so this is something we take seriously. But this is kind of not handled by our policy processes, this is real-world attempts to gain resources that you don't have the right to do. So, the only way to get out of this problem with IPv4 is really to move to IPv6. So, going to the next slide, the IPv6 deployment has been slow, but we are seeing an uptake from 34% to 39% globally. And the interesting thing here is really if you go into some of the interesting deployment cases, I think, for instance, India has a very high success rate here because the mobile providers there figured out that it's actually the only way to build a scalable mobile network is to go IPv6 native and then add translation capabilities down to IPv4.

So, I hear a lot of people saying but it's not possible to build IPv6 large-scale. It is indeed, but it needs to be thought well through and designed from the beginning. So, if somebody is going into a new market, then this is definitely a possibility. Moving on to the next slide, you can see here just some statistics on the space currently allocated. I won't go into that in detail, so you can skip quickly to the next one as well. And you can also see here that there is some variation of members having or not having IPv6 addresses.

So, there is still work to be done in making sure that everybody not only has it, but also uses it. Going to the next slide, the thing that's happened when there is a scarcity of a resource, any resource, like in this case IPv4 addresses, is that there will be a secondary market. And the communities discussed what to do with this. We could take a strict approach in saying that, sorry, you have to return the resources. What

would happen then would be that we would not have an accurate registry because people would still trade those rights.

They may just set up a shell company and sell off the company and there would be little, including the contract with the right to registration, and there would be little that we could do with that. So, therefore, there have been policies developed in order to do transfers, both through mergers and acquisitions but also policy transfers, where there may or may not be a monetary value of exchange of money for these resources. We have more details about that for our session tomorrow. The only role for the RIRs here is to ensure accurate registry. We are not part of the transactions per se.

That's a contractual agreement between two parties that exchanges this. Moving on to the next slide, you can see some statistics here on the inter-RIR transfers, and you will see here also that there are many more transfers in the RIPE NCC region, which is Europe, Middle East and Central Asia. So, it's a large region, it's more than 60, 70 different countries, and it's more fragmented than, for instance, ARIN and APNIC region, therefore we see a much larger number of transfers there, and also the policies may be stricter in the other regions to facilitate the transfers. Moving on to the next slide, yeah, and there are some more details here, and we have that slide for tomorrow as well, when we can have a more in-depth conversation on this.

So, moving on then, I mentioned cyber security in the beginning, and this is a question that we always get, or I always get when I present for governments or others, what do we do in order to ensure the stability of the system? And in many countries, there are cyber security

regulations. In the EU, there is the so-called NIS2 directive, the RIPE NCC is not directly subject to that, but in SPIRT, we are covered by, we may be regulated in that space, but we don't think that is something that is good, that just one country tried to regulate an RIR in this area. Therefore, going to the next slide, it's important for us to develop together with the community, the technical vendors, a system or a protocol that establishes a level of trust so that you know that the routing information that I talked about earlier is accurate.

So, the RPKI system gives the network operator a method to make better judgments, because they can check digitally signed statements on whether these addresses should be routed to this particular ISP. So, looking at the next slide, you can see a graphical impact on this, an ISP creates an authorized statement for a prefix, these addresses should be routed here, and then they can sign that with the private key, so it can be verified with the public key that this announcement is correct and that can be compared with what's in the routing system. And this is really important that we get deployed and we have had campaigns in the regions and capacity building in order to make sure that the ISPs implement this system.

What's missing now is really to get all the end users, the big corporations, the small companies to request this as a feature from their ISPs. It's nothing the end users have to do, it's for the ISPs and the internet providers to implement this. And then I go to the next slide, which I believe is just statistics on the deployment here, so that's just for your reference. And then to the last one, here is an overview of all our websites and where you can find more information about all the RIRs. And that I think is the last slide and then opening for questions,

which I still think we would have five minutes for before we're at the end of the session.

SUSAN CHALMERS: Thank you so much, Hans Petter. Let's give him a hand, please. So, now it's time for questions. I have one myself, but we can kick off. Let's see. Our colleague from Niger.

KAMMIRI SOUROUMPO: Hello, Kammiri Souroumpo for Niger. Thank you very much for the qualitative presentation. My question pertains to IPv4 on the global scale. Can the RIR sell IP resources that do not belong to the geographical area? Thank you.

HANS PETTER HOLEN: I'm waiting for the translation. So, if I understand the question correctly, can we serve members outside our region? So, some of the RIRs have a strict regional requirement for membership, but RIPE NCC accepts members from all over the world. There was a part of the question that can we sell IP addresses and none of us sells IP addresses. We maintain a registry and we distribute IP addresses so you get a right to registration, but we do not per se sell at market value. If you want to buy IP addresses, you have to go to the market and find a seller that's independent of the RIRs.

SUSAN CHALMERS: Is that responsive?

KAMMIRI SOUROUMPO: Yes.

SUSAN CHALMERS: Thank you. Christine and then Ashwin.

CHRISTINE ARIDA: Yes, Christine Arida from Egypt for the record. So, my question is the policies that are made within the RIRs which are like how to distribute IP addresses, how to handle the depletion and all those things. Obviously, they're different from one RIR to the other. Is there some harmonization that happens within the NRO, ASO and is there some mechanism within the ICANN community for those policies to be discussed and to be looked at?

HANS PETTER HOLEN: So, on harmonization, when the IP version 6 policy was created, it was the same text in all the regions. Over the time that has changed based on different needs in different regions, but it's not really big changes. They're roughly the same in nature. Now, for IPv4, yes, the policy started off pretty similar in RIPE, APNIC and ARIN and then later on LACNIC and AFRINIC started off with not a copy of but starting with the same point there, but they have deviated.

In the RIPE NCC region today, there are no more addresses to be allocated, therefore the policies on the allocation of IP addresses are only for the vacant list, while in AFRINIC they still have addresses and

can allocate them as we used to do in the RIPE NCC 15, 20 years ago. So, that's why there are differences and we can't really harmonize that because it's different. There is no space to discuss the policies at the ICANN meetings because the number of people is not coming here.

So, the community, like the last RIPE meeting was 800 people, there is no way to fly those into an ICANN meeting to discuss that here as well. So, that's discussed in the regions. Now, of course, there are people that participate in all the meetings or several of the meetings that are bringing proposals from one region to another to harmonize that, but that's more an informal process. But bottom-up kind of means that the communities have the power to make different policies.

SUSAN CHALMERS: Thank you. I believe we have a question in the Zoom room. Gulten, is that correct?

GULTEN TEPE: Thank you, Susan. We received a question from Russian delegation that follows as, how do global providers with networks on different continents interact with IRRs? How carefully is the use of IP addresses from one IRR in different IRR zone? Thank you, Slava.

HANS PETTER HOLEN: So, this varies a bit with the policies in the different regions, but for the RIPE region, for instance, you can get resources from the RIPE NCC that you can use all over the world. If you decide to do so. Back in the 90s, some providers got an address block from one of the RIRs and decided

to build a global network with that, while others, and I think that's the most common case, they are members of all the five RIRs and get addresses for their regional network regionally.

And over time, there has been in this market mergers and acquisitions. So, whenever somebody tried to design something 30 years ago, that's very different today. So, most of the global providers have addresses from multiple RIRs and use them, but there are RIR transfer procedures so that addresses can be transferred from one RIR to another. So, there really is possible to move the usage of addresses from one region to another within these policies.

SUSAN CHALMERS: We're running out of time, but we can squeeze in a few more questions. I'd just like to go to our colleague. We have a question from the Netherlands, and then Indonesia, and then our colleague from Bangladesh. Oh, yeah. Can we maybe take them together? That's the guidance I'm getting on best practice at the end of a session. Marco, please, go ahead.

MARCO HOGEWONING: Thank you, Susan. And yes, that's not really a question, but shameless plug. Thank you for all the information. There's a lot more to talk about tomorrow in the session, so I hope people will return. But to ask a question, and I don't know if we have time, but if I need IPv6 addresses in my country, what would be the very basic next step?

ASHWIN SASONGKO: Thank you. I just want to know, actually from Indonesia for the record, what is the ASO policies for a country to use IP address from another country by using VPN, for example? What is the policy, because it is possible technically, but what is the policy of ASO for quote-unquote restricting that or allowing that? Thank you.

DR SHAMSUZZOHA: Thank you. This is from Bangladesh. I'm just curious about the secondary market for IP addresses and from the government, our concern is about who is the accurate data in the WHOIS registry, so when the IRRs, they have their members, they have a very strict policy of updating the WHOIS database, but if that is traded in a secondary market, so how effectively the IRRs can actually monitor, because that part is very complex, the accuracy in the WHOIS database. Thank you.

HANS PETTER HOLEN: So, everybody, and I can't remember all three of them now, so I'm not sure this was a good idea, actually, so I'll go them in the back. I'll take the last one first, because I can remember that. If you are going out to the market to buy IP addresses, you're buying a right to registration, so you want to make sure that the registry is updated. So, there is standard contracts that you use in order to make sure that the registry is updated.

So, you make a contract with another party on a standard template that you send to the registry, and the registry is updated, so we ensure that it's accurate. So, that's the simple answer to that. This is basic contract law, not technology. The second last question, I think, was about use

of whether there is ASO policies for the use of IP addresses in the countries, and there are not. The policies, the global policies, are just for how IANA allocates addresses to the RIRs.

Each of the RIRs allocates addresses to the members, not to countries. So, a member has a legal address in the country, so we have a contract with a legal entity in a country. So, you may think that the addresses are used in that country, but for instance, with Telenor, a Norwegian international company, I know that their backbone is joint between Norway, Sweden, and Denmark, the same for Telia, so you can't really see from the outside which country the addresses are used in. Now, they are registering that in the database, so you can add country attributes to the different sort of address blocks that they use, but from my perspective, from the RIR perspective, we have a member in a country, and where they use the IP addresses, that's actually up to them.

Now, there are commercial geolocation services with a lot of problems towards tracking and figuring out where users are, but as you mentioned, there are also VPN services, so if I want to watch Norwegian TV while I'm here, I'll use a VPN service, so the national broadcaster thinks I'm in Norway, so I can circumvent the rights things there. And then the first question, if I remember correctly, was that if the Netherlands wants IP addresses, what should they do? Well, Marco used to work at the RIPE NCC before he joined the Dutch government, so he knows this, but no, he's not. But if a country wants IP addresses, well, you can talk to Constanze, who has made from Germany, who is also on the ASO, the German government has made an extensive plan for how they use IPv6 within the government.

So, that means that the German government has become a member and then got IP addresses for the RIPE NCC for that purpose. Now, any business in Germany is becoming a member directly from the RIPE NCC and then getting addresses separately. And in some countries, the government really sort of believes in free market and then lets any government entity sign a contract with any provider and don't have a common IP addressing structure for their company. So, there are many ways to do that, but the simple thing, become a member and get addresses from your local RIR.

SUSAN CHALMERS: Well, thank you so much. Thank you to our presenters, to Pablo Rodriguez and Hans Petter Holen for sharing their time and expertise. And thank you to our interpreters for the extra minutes they gave us. And now it's time for a break and we'll see you after the break. Thank you.

[END OF TRANSCRIPTION]