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Alice Jansen: Good evening. My name is Alice Jansen, and it's a pleasure for me to welcome you to the ICANN Strategic Panel on Identifier Technology Innovation Webinar, Session 1.

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So, with that, we'll turn to Paul Mockapetris. Strategy Panel Chair.

Paul Mockapetris: Good morning, everyone. This is Paul Mockapetris. I'd like to welcome you to this presentation. We are going to spend some time reviewing some of the discussions we've had within the panel, and outside of the panel, and I think the other thing to point out is this is sort of a select subset of the ideas, in order to fit the time that we have here.

Next slide, Alice. The formal charter for this group is shown here, I'm not going read it all for you, but basically, and we use the word Identifier instead of Domain Name, or something of the like. It was intentional, because we thought that within the timeframe we are considering, probably identifiers may well get a prominent role, and we have a relationship to the existing suites of identifiers that ICANN deals with.

Next slide, please. I think I want to announce everybody that it isn't that we -- the goal of this panel is to reach the conclusions and will be done. The goal of this panel, really, is to provide inputs into the ICANN Strategic Planning process which follows up after this panel. But we will take a look at what we recommend. The other thing here is, when I said before that we were looking at developing technology or road maps, or whatever, a lot of what ICANN is going to do is it's going to, hopefully, result in other people developing some of the technology we are talking about.

ICANN is not a huge software development organization, or anything, but it can ask you, for example, to create a vision. It can ask to collect a more worldwide and technology to policy, to civil society, set of ideas and react to the ideas that we provide. So we are all technologists on the panel but, again, what we are doing is input to other processes, and we are not expecting, necessarily, that ICANN is going to actually implement things. We want good things to happen, but they are probably only going to happen at ICANN if it's something that close to its root (ph) mandate, or some other ICANN key sensibility.

That being said, ICANN does separately and jointly sponsor things, and so we have friends throughout the ISAR (ph) world, and we are hoping that, perhaps, we can catalyze some of the directions we are talking about, rather than implementing it ourselves in ICANN.

Next slide, please. The early on strategy that we used here is to try and look at the technology and look for forcing trends. We all understand, for example, that mobility is getting more and more important. And we also know that there's some problems that need to be solved.

The second part of the strategy is, I've certainly tried to steer some of the discussions away from areas that are already overrun with people trying to solve it. There's an awful lot of these issues that are part of the day-to-day work, of hundreds or even thousands of people, and they are going to be the experts. So we are going to put together, or try to put together the knowledge that they have, rather than developing it. If we don't have something new to say, you should just say, "There's experts, we were already looking at it."

Next slide, please. Given the short timeframe, which I think has been sort of counted twice, the framework that we are using for the panel, is we are going to document all that you've looked at, and what means is the panel is scheduled to produce a report at the end of the month, which will have much more detailed information about things that we look at. Identify some interesting subsets, and you're going to see a few of those things today, and create a roadmap for what we think the 10-year horizon will show about identifier in technology, especially the things that are directly relevant to ICANN. And, again, this is input to a strategic planning process, so we need to make some actionable recommendations. You can just (inaudible) an identifier survey plan.

Next slide, please. The Panelists are identified here on this list. A lot of them are also on the call, so I'm sure that they are going to correct my misstatement, and you can look at the participants' list, and if you have questions, address them directly. Obviously we have a wide range of expertise, in the panel, and I've enjoyed that, although sometimes it's been interesting to see people disagree within the panel about stuff, and I'm sure that will continue.

Next slide, please, Alice. Just for reference, these are the identifiers that ICANN currently deals with, domain main names are clearly at the forefront, but there's all of these other identifiers that are there. In fact, one of the questions that -- one of my favorite is, "How does ICANN go about publishing the information about the allocations they have made with regard to domain names? Or, with regard to identifiers, and identifying if actually I am functioning?" I guess we've also missed (ph) the time zone database, and they are doing something else, but this is just for reference. Okay.

Next slide, please. I'm eager to get to the interactive part of this, but I'm going to give you a roadmap of the -- of today's topics, so to speak. One of which is to talk about the drivers for the roadmap, or what we think are the important influences that are going to play out over the next 10 days. There is new identifiers, and our experience with that. Earning routes, route is obviously one of the key things that ICANN works on.

And then what I call DNS fundamentals, or deoxification (ph), with the general issue here about, a lot of people think that your DNS design is tied down by a large number of Gordian knots that are either causing it to stop evolving, or are things that we need to figure out how to solve. So, we'll talk about that

All right. Next slide, please. I want to start here, and a lot of people are asking, why am I calling it Darwin (ph) drivers, and it's (inaudible) in the DNS. I think one of the things that almost everybody that we talk to would agree with, is that when you take a look at what's driven the evolution of DNS and what will drive the evolution of DNS over the next decade, a lot of it is not through duty, elegance, or whatever, it's just a Darwinian kind of thing. Broadly speaking, I'll try to classify those by things that are likely to cause the DNS to expand in its size or function. I guess there's several mentions to the expansion or contraction.

Let's talk about the expansion side first. Here's our organic growth, legacy-base. As much as we (inaudible) surprise attacks, but it's very hard to get DSL modems -- vendors out there to fix the codes in that box that's sitting in the closet that's 10 years old, it also is the case, that pretty much anything that competes on the planet, understands how to talk DNS and knows how to communicate.

So that's a base, and everyone is going to want to take advantage of that in installed base. The universality, I think, is one of the things that separates the DNS from other identifying systems like X.500 or whatever, in the sense that it's pretty much harder than anything that connects to the Internet or perhaps your whole network.

gTLDs (ph), there's a -- the vast variety of opinions about the utility of the new gTLDs, so I think it's pretty clear that there's going to be a huge amount of people who are going to try for innovation or just plain old marketing. And they are going to want to exploit, protect and expand their brand. People sold pet rocks, and people will, in fact -- you know, the argument that I often take a look at, is walk down the street and just see branding unfolding. Now I think that that's going to surprise us. That's just varying opinions there.

New capabilities, I think one of the things that comes to mind is DNS (inaudible), there's an awful lot of ideas that people have for expanding the use of the DNS that relies on security, and getting the DNS interface out there. It's been a while coming, and I think that there is places where that will leverage us. So that will inject growth in the DNS use.

New data. If what you do with regard to DNS database, then making more data available through the DNS, particularly if you'll admit it, it's pretty much the most real-time system that might be available, and you see something that would drive expansion.

On the other side of the ledger, interactions, to use an interface has a number of affects that probably want to drive you away from using the DNS, or its use. There's the accent on commerce, which is, say, people who have browsers want to, either (A) help you out with artificial intelligence that looks at your intent and turns it into the place that you go.

Our exploits in commerce in terms of business reasons for wanting to not use the DNS, but rather use of some those key (ph) systems that's in the past. If portable devices are the future of the internet, then probably typing domain names as you walk down the street is not where you want to do things. An audio interface might not be right. People have talked about whether or not -- one suggestion we had was to use a standard way of publishing domain names in 2D barcodes, and also developing technology to make that more easy to use.

The portable world, I think, is a challenge for direct use of domain names. One of the questions, I think, the analogies that I've heard are: (1) the DNS is like paper with regard to eBooks, in order to it's something that's just not going to be needed in the future.

Alternatively, other people believe that the DNS is something on the order of the instruction set of your CPU, and while you don't use assembly language or directly access that interface that much, except for experts, it's going to sit there and be part of the infrastructure that's not visible to the user.

Whether or not the DNS is going to be paid from the user's view, I think it's the thing where, I assume, a lot of divergence to people's opinions. Plus commercial identifiers, I had -- a child asked me the other day, "Why don't all e-mail addresses end in gmail.com?" There is also the use of the Facebook identifier and directory assistance, it's kind of one of the other things. Obviously there's an urge to have the commercial world own the space.

And lastly, sooner or later the DNS is going to be replaced by something new. My advice to people is, if they want to make something that will last for 200 years, don't invent technology. You can make music and hope you can be a Mozart. You know, this technology is all designed to be replaced, so sooner or later that will happen.

Next slide, please. One of the things that I've observed in the research world is that names and naming systems are incredibly hot. There's name-based networking, content-based networking, information-based networking, and many others. It seems like the only thing that they can agree on is what to name their field. But names are centric, and the idea here is, that rather than using addresses, what you want to do is to name the content that you want, and retrieve it that way.

So a common theme in that kind of research world is access by name and (inaudible) caching, in the infrastructure or at the edge. Many of these research efforts underway, in different continents, I'm most aware of the ones in the U.S. (inaudible), also the ones in Europe, so like, too, everyday, and Asia as well. The idea that you new names and that the domains are a higher-level language for the primitives of the network, these numbers are very popular in the research world these days.

And one of the other benefits that these systems have over the DNS is that, over 35 years of experience and a bunch of new ideas to put into the DNA (ph). It could be much cleaner, accessible or powerful, so one of the questions we are going to have to come up with it is to say, if you're aware that we evolve toward the more general systems, are they, in fact, the right idea? Because the jury is still out, as much as this (inaudible) seems to agree.

There is revolutionary ideas that's a common grievance in this world, there's a lot of people that believe that we should have self-certifying and flat names, oftentimes those (inaudible), the question of how you find them, and usually there's some kind of PKI or structure that will go into that. Recently people have been arguing that the PKI structure is exactly the same, that DNS and all wants to collect. And that it's a weakness with regards to the privacy of the system, which really needs something that's more clearly fair. I think one of the questions in the research world is, I'm even sure that you can find names without insuring that they will be found people that are just trying to sweep up all the information in the system, without a concern, frankly.

Lastly, there's user-friendly names. While we talk about how domain names may be not as nice as free text typed into the browser window, you see all of these short names. And if just having a short sometimes it's user-friendly. What does user-friendly mean? How do you guarantee that you can pass a user-friendly name from one user to another? We will talk about that a little bit later.

Next slide, please. So where is all of this roadmap stuff? What's the issue that ICANN has? I think, ICANN serves the Internet community by that administrating part of the DNA. I happen to think that the DNS is one of the most important building blocks in the present Internet, and for some future open innovation. But, as I've said before the present

DNS is limited by a number of issues. There is simple operational ones, like the packet size hasn't been (inaudible) -- the MPU hasn't really expanded the way you would like it. If we scale the packet size with the same number of orders of magnitude, three or four that we've scaled the speed of the network, then we have a lot less work to do with regards to try and figure out how to make DNS sets larger data packets go through, you know, cable modems and other user devices that were designed many, many, many years ago.

I think that there's an issue with the protocol, in other words, the difficulty in defining new formats and it's more difficult to put data into the DNS or to retrieve it selectively than we would like. There's a process issue, one of my favorite things to notice, is that the (inaudible) Working Group in the IETF, exclusively defines mechanisms and not protocols to avoid the admittedly arduous process of getting things standardized. Mechanisms are out there, they are used by millions of people and by all the operators, but they haven't been standardized into protocols.

One of the panelists in the panel who will -- I'll let him remain nameless -- oh, oh, I just said him. I asked him about the title of an Internet draft, and it seems like the Internet draft title was not exactly related to the content of the Internet draft. He said, "Oh, well, that's to get it published as an RFC." Now, one of the things that I wonder about is whether or not there's a need for a more overall architectural look at what we can do with the DNS. Right now there's no question that there's a huge amount of DNS development that's going on in the IETF, there is name, and the DNS ops (ph), and several other forming groups, and a lot of people are trying to contribute. So, it would be better to have these separately focused efforts without, or perhaps we'll need more -- perhaps I shouldn't to say without, but is there an architectural vision to unify it all?

When they're doing multi-task DNS and DNS set (ph) we need to try and think about the interactions. All these things coordinated means there's a better way. I'm going to say it's a question that I -- you know, I think that all of these different issues, lead to frustration by people that are trying to think about ways to make the DNS better.

So if we -- and the last (inaudible) I think is -- is that, you know, to some extent ICANN is, you know, as a part of the DNS, obviously in the interest of ICANN, I think the Internet community should try and preserve and enhance the asset until it's time to replace it with something else, as part of the open standards work. How are we going to do that?

There's breakthroughs from the bottlenecks, popular called deoxygenation. For those of you of you that are -- an English teacher, who is just referring to the fact that the DNS, and oftentimes people say the whole Internet protocol suite is kind of getting arthritis and is very hard to change.

Do we want DNS II? In our experience with IPD6 shows that it may be hard to create a new system in a timely manner. Perhaps only one to build an evolution to one of the research corrections that will be out there, to make it simpler to transition to that new system. And then there is questions about do we need privacy, do we need confidentiality, from the standpoint of past work, depending on the political climate, these kinds of issues were either forbidden or the (inaudible). I think Snowden puts it at the front burner for a while, because with the (inaudible) there is some new efforts forming in the IETF to do that. So, what do we need to do?

Next slide, please. I'm going to change gears here and talk a little bit about one of the ways to think about expansion is putting new data in the DNS. We are approached by some of the people that are doing this, about being the route of the (inaudible), a system that does mapping and encapsulating of identifiers. In particular, it allows you to do things with these four addresses, and these six addresses. So it allows you to have a single address for a destination which is -- I guess you could call it a locator. And actually have

it do multi-task through the Internet without the usual stuff. So you encapsulate, and then being encapsulated from the other end to provide flexibility.

Should we be making a choice? What should recommend to ICANN about, what do you need in the way of technical capability, and of course should you even consider doing this? You know, we had an issue come up here about which software. There's open software, proprietary software. First the protocol will have to be open or proprietary, this all turns out to be somewhat new because of the -- discussions at a political level, about how address mappings, which were owned by the IRRs and they would kind of take the lead.

One of the questions is going to be, the same kind of technology could be used with RFID tags, which is certainly not a number of space that are clearly in the political sphere of the address or limitations. Or at least I wouldn't think they would be.

So, how do we decide, and should we try and tie this in more uniformly, with things like the DNS which is currently listed -- well not really. The second thing I think is, should ICANN publish in the DNS? And the inspiration from this was a very long e-mail thread I got, as part of the collision process and the general ICANN operations, there's lists of labels that are restricted from publication at second-level domains, and these various other types for protected locations. If you want to use the label, Olympics, for example, that's protected.

And one of the things that ICANN does is it refers to U.N.-based publications that have listed these things. So when you go and look at the list of these things on paper, there are in several different alphabets, and it's kind of hard for somebody out there to transcribe probably English, Chinese and Arabic, and all of the other scripts. Shouldn't those lists be made available online? And, in particular, we might think about having this, that needs more real time, for example, in the collision space should be able to, perhaps, publish those in a machine-readable form and maybe even in the DNS?

Another example of this kind of thing, is people who are working in the field are -- reputation, many of them would claim that one of the most important things in figuring out whether a particular domain is trustworthy, you look it, and go, "How old is it? When was it born?" And secondly, the activity levels.

So there are people who think that ICANN should encourage that registration information to be made more rapidly available as a service to the community. And of course, all of these kinds of things would involve thinking about well, okay, if that's the move, if that's the common move on part of the bad guy, real time publication of information apps, it should be available. I've always thought that ASN mnemonics (ph) would be better than ASN numbers. There's a lot of different identifiers there, is there an opportunity?

Next slide, please, and the next topic. Hardening the route (ph). I think there's a number of opportunities here, and I think the panels looked mostly at two of them, one of which is generating the route file itself. In other words, something like a database. And then the distribution of the request. There's another whole area that's doing analytics at the root, but I'm not going to talk about that, we are aware of it. So let's talk about generating the route files.

One of the things that's been suggested is, is that we need more robust secured components. The hardware world has various forms of trusted computing. Can we deploy that in a way that makes the actual generation of the root files more reliable, more secure. Certainly with the discussion about hierarchies, and audio channels, and so forth, and so on, it may be time to reexamine some of the choices. But I think that generally sense of the panel, is that making the distribution of the root file content, more probing on the current root services, must be one of the big opportunities. So we'll talk about that.

A different access for generating the root file is, are there ways to avoid some of the current political issues there, and we'll talk about that in the future. With regard to distributing the root files, the general idea that's out there, is what we want to do is to distribute a fine copy of the root to anybody that wants it. At that point, and assuming there is an appropriate update mechanism, that entity no longer has to rely upon being able to access the root server. Sometimes that should bring it inside the perimeter. Others were that people would theorized that what they wanted was a sign, root zone, that only had IPD6 in order to do various experiments, which is the request coming out of China.

We have a specific proposal from Paul Vixie that basically says, "Oh, what we should do is have a way to distribute the time copy of the root, and have standards to a particular time, and (inaudible) addresses, and have everybody just try those addresses and let you distribute copies all the way from high levels of the current architecture, all the way down to local machines. We are not going to talk about the details of that idea, there's a bunch of other ones, and this has actually kind of in line with a bunch of the research corrections which talk about, "Well, the data should just be signed," and how you get it then becomes issue.

Next slide, please. Usually one of my favorites is shared zone control, and the issue here is, can we imagine a sort of workflow language, if you will, that allows multiple parties different rights to change the contents of the same zone. So for the root, the general idea would be, can we imagine a way to do that routine maintenance operations on particular top level domain, the request didn't happen by those top level domain owners. And then avoid the whole issue about a single authority being able to run the root.

So we are already seeing some of these ideas out here, for example, coordination of (inaudible), there's two DNS ops mechanisms, not protocols, that are being proposed to allow coordination of DNS text (inaudible), but if we are going to have that mechanism shouldn't we think about expanding it and generalizing it so that it could be used to coordinate anything. For example, four in the resource address information. Or, again, with routine maintenance. And then, another generalization is going to be control over it, which is to say, perhaps you're allowed a PLD somehow gets the ability to change this information in DNS -- in the root zone so more than other ones, and if there are single authority that can stop it, then perhaps you have majority and voted.

So I think the real question here is, how many of these capabilities might you add to get the maximum utility out of the work that you're putting into the idea. And obviously there's going to be things like, and sort of delay in order to humans time in the loop to adjust.

Next slide, please. And come on (inaudible). Today what happens is, if there's a bunch of requests will come in to ICANN. ICANN gets the business or objects, that's why a business gets automated processing as well as human -- it gets approved by the Department of Commerce, first and actually publishes it. So then actually people talk about how the U.S. Government is the sole authority over it, but in reality there's several things -- several entities we are in series with updates to the root. If we want to have an automatic process, what should that look like?

Next slide, please. So, you have a bunch of battles, the gTLD grades request for a change in journal, others see gTLDs, perhaps vote yes or no, and you have rules on your voter (inaudible), so from a majority of sense, change takes place after two hours. In other words, again, some places you're going to have some delay, so that human monitoring is even possible. And if people are too lazy to vote and let things change regardless. You can imagine intimate ways to add particular details to this mechanism.

But I think it's one of the ideas that if we manage to figure out how to solve, the first 90% of this problem, this mechanism could be useful in a variety of ways, including solving

the political problems of the group, so I've coordinating a lot of other data around the Internet.

Next slide. Now critics would claim that, "Well, this whole business about a distributor algorithm, what happens if they get different results and so forth?" Certainly a question that as to be addressed, but if you don't want to have a single authority and distributed generation of truth it what has to happen.

What cues to use? There's a proposal now already to say, "Well, we just need to deal with that multiple DNS signature around the data, and then you could vote on all of them, so that would mean I guess that instead of having one set of signatures, you'd have to have at least three, so that you can break the tie and (inaudible). Maybe that's the right place to do it.

What protocols to use? You could think about doing this perhaps a DNS data, you could think about doing it (inaudible) EPPs. There are other things, when I talk about the shared zones and truly I haven't really tried to talk about the low-level mechanism, what's the right choice there. And again, last issue, I think the most significant is: what are the perimeters that you need? (Inaudible) have voting. Do you want to have a delay in order to allow people to be in the loop? How is workflow designed? And with any quick graphic system, you have to figure out, well, if it goes wrong, how to hit the reset button? And one of the things that, when I think about this, is reconciling the fact that you have a reset button, and reconciling, the fact that there's no single control point where it's difficult to reconcile.

Next slide, please. Getting back to the basic issue about, if you take a look at the DNS protocol from top to bottom, what is it that you need -- what is it that you can -- where could you make improvements? How do you break someone who has very difficult problems? You know, in the current abstract database, which I mean is -- which I mean the sort of main (inaudible) record structure, matching rules and zone rules.

What can you do to extend that? I think for about 25 years people have said, "Why can't we publish the syntax for resource records inside of the DNS, and then we will want to add a new syntax, you don't have to. Other people have said, this whole idea is obsolete, there will be no relevant resource records created anymore, and what we are going to do is by putting text records down on the special labels under the label that actually has the data. And sometimes we make this resource record type be the next level of labels, in the domain name system. And perhaps what we should is just formalize that.

Query and other operations, there's a bunch of work that I'm familiar with that is -- that I'm not really familiar with but I've seen the original ideas that say, one of the problems with the DNS is there is no synchronic (ph) interface for programs, and no particular interface, but allows easy integration of DNS sets.

There are some slides out there by Paul Hoffman, whose work is going at Verisign and some other partners, and they're looking to get more data to understand that. Certainly, the get host by name, and the interfaces that are out there, are unsatisfactory, but it's unsatisfactory to some for divided reasons. I think one of the Panelists, Geoff Huston -- tried putting Geoff Huston into a variety of browsers and found that there was absolutely zero consistency between the search paths that were used.

If we have an inconsistent user interface for domain names, can we expect users to have the maximum functionality. I think not. There isn't anything you can do about it, so that may be the more difficult question. I think the replication issue is important. I think we need to think about it, both from the standpoint of the roots, and from the standpoint of best practices for organizations. What I mean by that, is the past few -- example is: once upon a time the guy at the top level with domain detected that the State of California had two computers with pornography in them. I should add, out of the hundreds and



thousands of computers that they have, and the delegated Ca.Gov, which created lots of problems inside the State of California.

Things like organizations and certainly California has learned its lesson, is that they want to be able to be self-sufficient, so by implications for the way they take -- move their security as well as the way that they replicate their data.

Should we be thinking about making both more obvious? There's lots of people who have thought about these different issues. Another question that comes up is things like: in the future is there anything to do other by sending DNS queries and responses in HTTPS, because that's the only way you get universal reachability.

How do you break these really enough? And I think, lastly, the real question is, how do you make the effort worth doing? The DNS is littered with people who have added new resource record types because they thought it was interesting to put that data in the DNS, but that data doesn't get maintained unless it delivers some particular value. We can opine upon how do we want to extend the DNS, but how do we make the extensions that we propose, sufficiently interesting? And I think that's none of the issues that has to be addressed.

Next slide, please, and this is the last slide. Let me give you an example of some of the recommendations that we are discussing. These are -- they're under consideration but, for example, ICANN should publish more timely data for reserved labels and (inaudible).

Is there a way to try and get together a group of people and do a study about how to break all the Gordian knots that currently share the DNS? No. Obviously it's going to take some time, 2020 just happens to be a catchy year, but is it worthwhile to try and figure out how motivate such a thing to happen? I think it's time to think about prototype, and in other words, just realities. We message (inaudible) on publication on shared zone domain control. We haven't talked about the whole collision issue, but I think one of the things to do is to think about actually handling some of the procedures that people talk about, but in a lab environment. (Inaudible) these fire drills but, you know, trying out some of the procedures in advance in the deployment.

These obviously, say, in different time zones -- not time zones, but different timeframes. But these are examples of some of the recommendations and they are close, I think, to being actionable which, again, is our goal.

So I've talked long enough, I'd like to open this up and to get feedback from constituents out there. So, Alice, you have the call?

Alice Jansen: Thank you very much, Paul. We will now open the floor, and ask that the lines be unmuted. We will refer to the hands raised in the Adobe Connect Room to create a queue. If you're not speaking, please mute your lines to avoid echo. You may do so by pressing \*6, and to unmute press \*7. If you're in the queue, please make sure that your computer speakers are muted before speaking, to avoid echo. Thank you, for your cooperation.

Operator, could you please unmute the lines?

Operator: Listen-only mode is now off.

Alice Jansen: Thank you very much, Paul, before we start, there's a question from John Demco in the chat room. "Are SMB sign marker from sign -- marked data files in scope?" Something you've showed there.

Paul Mockapetris: We haven't discussed that. John, do you have some recommendations for us?

Alice Jansen: John is actually responding in the chat, here.

Paul Mockapetris: Yeah. But anyway, I think it is -- the short answer is, is that's not something we are doing -- we've talked about a lot. I think one of the things I want to just say, is that the search base here has been fairly huge, and I'm sure that there is a bunch of things that we should have considered, or that we haven't discussed today, for example. And I'd encourage people to bring forth these things to the panel. There's a public mailing list, and Lord knows, my inbox is always open.

I mean, another example of saying too, is that people say, "Well why don't we just take the Namecoin approach?"

Alice Jansen: Paul, there is a comment from Avri in the chat room. "You may have spoken of a -- I had a sound problem for a bit -- are you considering the possibility of delving on what you or I suggest with multiple forms of authority in Schema; if IANA being the actual point where all would meet?"

Paul Mockapetris: I think we've touched on that a little bit, not directly. Elise, what's the IANA view on this?

Elise Gerich: Hi. I had to un-mute myself. So basically the scheme of IANA being the actual point where all routes (ph) meet, we take our direction from the policy organizations, and so it will have to do with what the various organizations, such as the IETF, the RIRs, the ccNSO, the GNSO, the (inaudible) at the side, is the appropriate role for us. We do have MOUs with the IETF and with the NRO. And we have undertaken to become the registry, I guess, of record for certain identifiers.

Avri, did you want to follow up, or is that sufficient?

Avri Doria: This is Avri, trying to speak. Oh, I can. Let me shut off speaker. Yeah, I mean, basically what I was looking at is one of the issues that we've had when people have been discussing things, is the problem of a single authority point. And I understand you talked about ways within the DNS as sort of traditionally conceived, of having multiple authority, or sharing authority, as I were, by various means. There's also within -- I know I've used it within -- for DTN naming, for example, and identifiers.

The ability to have more than one route and one scheme as long as it's all pointing to the same address scheme, and it's just different naming schemes, and an addressing scheme. I'm just wondering whether that possibility of sort of enriching the Internet with multiple authorities/gamers, that would, following the IETF and everybody else's rules for how you get something accepted into being IANA registry held. That basically allowed that kind of multiplicity . Thanks.

Alice Jansen: Okay. Thanks, Avri. Geoff, I see you typed a response also to Avri. Do you want to say something? Geoff Huston, Panelist.

Geoff Huston: Yes. Thanks, Alice. Geoff Huston here. Yes. Avri, I do note that the IETF in one of its working groups on URI sort of came across this, and instructed IANA to open up a registry on URI schemes. And I gave the URL for that. You'll notice that the scheme-naming system is flat, and it's basically first come, first serve, and it currently works on what the IETF call expert review. So in that sense, you know, if you tried to scale the schemes into orders of millions or billions you'd have a hard time. But then, again, this is a case where the identity space at this stage is probably appropriate for the size of the identity scope, the number of schemes we have appears to number, I think, sub-100 or so.

And at that stage a flat name space with basically first come, first served, through published RFC, appears appropriate. You know, it's not a case of trying to design one solution for all forms of identity systems, but it is a case of trying to understand that in multiple different identity systems, the issue of registration and maintenance and

administration of those identity systems, will vary according to its scope and nature of use.

So, in looking at URI schemes I'm not sure that I could advocate any particular difference in the way that they are being treated from what we do today, but maybe you have some ideas in that space. Thank you.

Alice Jansen: I see we have Avri typing in the chat room. Are there any questions or comments? Avri's response is the following, "I have thought about it some, but ideas are so much (inaudible) up others not for such a call."

Rick Boivie: Hi. This is Rick Boivie. I'm wondering if anybody on the call has any thoughts regarding any additional identifiers that we want to be considering.

Unidentified Participant: (Inaudible).

Paul Mockapetris: Hi, Rick. Paul here. One of the things that I've always found interesting although difficult to work on is the RFID tag space. You know, this is a numbering space that's mostly controlled by EPC Global, and there was an effort a while ago to standardize on, sort of, 96 bit RFID tags, and to allocate the numbering space much as you would allocate subnets and so forth. And pull all that data in new DNS.

But something strange happened on the way to standardization and EPC Global, where the original scheme designed by some people at MIT, got changed into a sort of fixed hierarchy scheme, and in a standard process, because basically the position of EPC Global at the time was that this whole subnetting idea would never work, and it was too complicated. But I think, you know, there's -- and there was also a question about whether or not you can think about ways to use the existing protocols to do the security for that, there's a project called WINGS that involves at least French, German, and who else, I think it's -- maybe Dutch people trying to figure out a better way to advance the hierarchy.

Unidentified Participant: Mm-hmm.

Alice Jansen: Geoff, your hand is up in the Adobe Connect Room. Do you wish to speak?

Geoff Huston: Yes. Thanks for that. Yes, Rick. I've been thinking about this myself, and I must admit, the one-name system that I see today that appears to be fundamentally different from all of the others, is the Namecoin space. If you think about it from a sort of -- a sufficiently abstract point of view, most of the identity schema we used are a bunch of criteria and an administrative entity. And what happens is, (inaudible) come along with their favorite request from the instance of that identity, and some organization or function applies the criteria, and in effect, out pops and answer. And whether it's an application inside the DNS, whether it's for an iTripoli MAC address. Whether it's even for an ISBN periodical number, the processes are very sort of isomorphic in that respect.

That you have this kind of pool of possibilities, a set of criteria, and an application process and an answer. The Namecoin space is -- appears to me to be fundamentally different. That it doesn't actually require anything central there, it's just an algorithm, that if you mine away at it long and hard enough out pops a number, and there's no particular need to go to any central body and get an approval, it's just a number. And that, I think, has been of interest to many folk in the research space of identities because it certainly appears to be one of the more novel ideas we've had about identities for some decades.

And whether that's going to light fires, or die a death, I don't know. But it seems to me from that perspective, to be, perhaps, one of the few spaces which is fundamentally quite different from a lot of the others. There are also some kind of strange name spaces that relied on popular acceptance. Anyone who lives through the Usenet (ph) name wars,

would have seen this idea that someone proposes a name, and either Folk Art acquiesced and the name of the newsgroup gets accepted, or it creates this sort of responses of cancellations and debates and alternatives, and so on.

Where, the name Criteria, a sort of ill-defined and belonged to a group that maybe the sort of demise and the importance of Usenet also points to some problems in the way that name space is being administered. But, you know, certainly there are other identify spaces, and other means of managing those spaces than the sort of simple model of a registration agency, a bunch of criteria, applicants and outcomes. Thanks.

Paul Mockapetris:

Mm-hmm.

Alice Jansen:

Paul, I do not see any further questions or comments in the Adobe Connect Room. Do you have any closing thoughts you wish to share with the attendees?

Paul Mockapetris:

Sure. I'd like to thank the attendees for taking the time to listen to us. I think there's a lot of other issues here that we had to try and size this to a time slot. I'm encouraged if any feedback or suggestions, to the panel in general, and Alice has given you the contact information. Will I be (Inaudible phrase) --

So, I thank you for your attention. And I guess it's time to close up.

Alice Jansen:

Thank you, Paul. And if there are no further questions in the chat room from attendees, I believe this concludes the webinar. Thank you very much for participating in this webinar. The recording, slides and transcripts will be made available shortly on the webinar page. You may also reach the Panel at [itipanel@icann.org](mailto:itipanel@icann.org), should there be any written input you wish to submit. Please note that all input is publicly available.

Thank you, for your attention and interest.