DUBLIN – How It Works: Internet Standards Setting
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UNKNOWN SPEAKER: We'll start in about three minutes.

STEVE CONTE: All right. We're going to go ahead and get started. I want to thank you all for coming today. My name is Steve Conte. I'm the senior manager for, forget what I am manager of. Training coordination for security, stability, and resiliency and the office of the CTO. We started, we piloted this program, this how it works series last meeting in Buenos Aries, and it's about really trying to give an overview and foundational knowledge to our community to have more relevant and better dialogue throughout the week.

So I really appreciate the turn out that we have here today. We're going to be here all day. We've got four sessions coming up, and then followed with that, which is another interesting session on beginner's guide to DNSSEC. So if you guys take a look at the schedule, as many sessions that look interesting to you, please come on back.

Before I introduce Paul, we are actively seeking feedback. So at the end of this session. I'm going to be putting up a URL. It's only got maybe 10 questions on there, if you, before you pack up your laptop and go off and get stuck in other meetings, if you could just take the minute and a half to go ahead and answer those questions.

We're really looking at how to improve this series of tutorials. Looking for new material that we could build presentations and tutorials around. And so, your input to us is really important to allow us to better serve you.

So with that, I'm going to introduce Paul Hoffman. He's a recent add to ICANN, a couple of months I think, but he's been involved with IETF for over 20 years, and I'm going to pass it on to Paul because he knows what he's talking about.

PAUL HOFFMAN: Good morning. So thank you for coming, by the way. Not so many people are always interested in the IETF, although people who come to ICANN who have a technical background, or want to have a technical background, often are.

It's a pretty full set of slides. If you have a question during it, you can ask. I'm going to be watching my own clock to make sure we actually have… I'm planning for 15 minutes of questions at

the end. So if you have a question that isn't super immediate, please do write it down, because we will have time at the end, if I time it correctly, and I did yesterday.

Okay and yes, as we have a mic four doing it, because we do actually have remote participants, that's one of the nice things, and we had some questions yesterday in some of the sessions from remote participants. And then one other note before I start, if you were in Buenos Aries and you sat for this, which I hope you didn't because it's pretty much the same material.

This material was mostly written by Russ Housley. I'm giving it today because, even though Russ is here, he's in other meetings. So I did some changes on that, but you'll see Russ's name on the last slide as well because questions and such can go to him.

So with that, let's start. That was yours.

So here is a chart that ISOC, the Internet Society has prepared. You can't see the small print, in fact even if you're looking at the slides on your laptop, you can't see the small print, but basically this is an overview of the Internet ecosystem, all the parts. And as you can tell, even without being able to look at the small print, there are a whole lot of parts to the Internet ecosystem.

You're sitting on one of them, ICANN, but what we are discussing today is in fact just the part, the orange mauve colored thing

over there, which is generally called the Internet Engineering Taskforce, but there is actually three parts. One of them is the IETF itself, and that's what most of this discussion will be. One of them is the Internet Architecture Board, and I'll have definitely some slides on that, they're also separate organizations and I'll also explain more about that later.

And the third part is called the IRTF, the Internet Research Taskforce. I'm really not going to be covering that much on the Internet Research Taskforce as it's mostly of interest to researchers, especially academic researchers. It's not part of really the whole ecosystem, it doesn't have much effect on what we're doing as such.

If you're a researcher, feel free to come up and chat with me afterwards. I can talk a little bit more about the IRTF, but that's not the main area that people are interested in. Really, and so what, by the way if, when you get the slides later, if you want to see the whole Internet ecosystem, there is a URL from ISOC for this chart.

But basically what I want to emphasize here is the Internet is huge, something that you know, but different people have different control parts of the Internet. The IETF is not someone who controls the Internet, but they help to standardize how the Internet works, and that's going to be the main thing.

Just in the same way that ICANN does not control the entire DNS, it has certain role, the IETF is not controlling the technical part of the Internet. It makes certain rules. So that's basically where we're going to go. Let's start with a little bit of the why before we get into the how. Many of my slides will be how the IETF works, but let's talk about why.

So really the biggest thing that people need to understand about the IETF, and I say this because it is a little bit weird is, the IETF exists to make the network work. That may seem logical now, that someone needs to, you know, sort of coordinate that, but when the IETF started 30 years ago, or was getting formed, the pre-IETF 30 years ago, really there wasn't much of a concept that there would only be one network.

The idea of the Internet was actually quite foreign then. And so when the IETF was getting formed, the idea of a group that would work to help make one network, not a bunch of little networks, which is happened there, was actually considered to be weird. And to some extent, subversive for some people, but a lot of people said yeah, yeah, yeah, that will never happen.

You know, you guys go off and you can talk that way, but that will never happen. So making the network was a really interesting idea. So there is a longer quote here from one of the RFCs, I'll explain what RFCs are later in the discussion as well,

but the mission of the IETF is to do the things that are necessary for a network of networks to actually work.

We take that for granted now because it does work, we…

…start, in fact, a lot of people assumed that the best you could get are segregated networks with very thin pipes in between them, you know, with a lot of restrictions. And the folks who started the IETF, didn't believe that. They really did believe in an Internet that is extremely like how we are today.

So, the… I will keep coming back, so I will alternate between how the IETF works and why it does it. But for some organizations, you don't really need to know why they exist. They obviously exist money or to promote something. It's sort of important to understand that the folks who started the IETF really were ideological.

Mind you, they were nerds. I mean these were a bunch of technologists doing this, but it was with an ideological bent because the idea of a single Internet was just, you know, a lot of people said nah, never happen. And yet it has. So this is a good description, this is one of the common things you'll see on t-shirts around the IETF. We reject kings, presidents, and voting.

We believe in rough consensus and running code. This is still widely true even though this was a 25 maybe 30 year quote, but

the, we reject kings, and presidents, and voting. So kings meaning someone comes in and says, "Well, I'm an important person in some government." So you know, kings and presidents, or I own such and such, and I'm going to tell you what to do.

And you know, that happens occasionally at IETF meetings, and mostly people just laugh at them, because it's like no. We don't care about that. We care about the technology. How do you make technology work like this? Well in some organizations, make it work by having voting, and everyone has to agree, or whoever has the most money gets the votes to happen and such like that.

The IETF actually has always been fairly averse to that. And I'll talk much more about rough consensus later, but also running code is something that's very important to the IETF. You have a new idea, you come to the IETF, and you say, oh, you know, we should all do this. One way to prove that you've actually thought this through is to actually have implemented it.

Now you don't have to, in fact, sometimes the IETF goes on some ideas without an implementation, later do the implementation go, oops, that's actually not as a good idea as we thought. One of the things that I also want to emphasize

here is, when you talk about rough consensus, that's in making a decision. But there is also rough consensus that happens later.

So the IETF is one of the best organizations at admitting when we screw up. Lots of organizations won't do that. In fact, they'll throw money at trying to prevent you from noticing that they screwed up. The IETF actually revises their documents reasonably often, and that also takes rough consensus. One of the best things that happens in the IETF is when someone stands up and says, "You know, two years ago, I wrote this document and you all standardized and stuff like that, uh, no I didn't really mean that."

You know? Or now we need to revise that. And that will also take rough consensus, because some other people will have started following and made it their favorite thing. And so the IETF is very big into evolution. Without this kind of rough consensus evolution, the Internet would be much more fragile.

People would make a mistake at some point, they would solidify the mistake. You know, they would add layers to the mistake, and then everything would fall apart. The IETF is actually pretty good at looking at what has happened in the past and going like, let's try something different.

So, the bullet points here, so the RFC explains exactly what, you know, what the IETF. By the way, this is a RFC that I wrote. But

the bullet points are the important parts. Everyone is invited to participate. There is a bunch of people sitting here in front of me, you don't have to raise your hands because you're all people, but all of you can be IETF participants. And I mean that absolutely.

It's not just like you're invited to participate, but the barrier to entry into the IETF is approximately as low as it can be, namely if you can subscribe to a mailing list, you're an IETF participant. Even if you never say anything, the fact that you're reading what's going on literally makes you an IETF participant.

There is no membership in the IETF. You cannot become a member of the IETF. You can be a participant, and some participants spend 99% of their time reading documents, they're a little bit afraid of saying anything because what if they make a mistake and such like that.

There are plenty of participants who talk all of the time. There is a wide range, but it's important to understand that because there is almost no barrier to being a participant, it's going to be an extremely wide community. It's certainly wide internationally, and that's been true since day one.

At the first IETF meeting, there were, even though a lot of people come from the United States, that's where the hotbed of Internet technology comes from, it has always been

international. It's not like there was a US organization that five years into it said oh it better reach out. There has been very active participation from Europeans and Asians since day one.

Partially because it started off with a bunch of researchers, and researchers in general, especially computer scientists, are a more international bunch. But in addition, because this was about the Internet, connecting networks, one of the most interesting research topics in the '80s was, well, if you hop over an ocean, how does that work? You know?

Aren't there going to be latency problems and such like that? So it has always been an international organization. One of the other things that sort of freaks people out is that if you join the IETF, if you start becoming, you know, active in it, you are doing it as an individual, even though you come from a company or an organization or a government or whatever. If you stand up and say, hi, I'm from…

Most people won't even listen. They care about you. They care about your previous contributions. If you've had good previous contributions, you'll get listened to more than if you've had dumb ones. But the company you work for has a little bit of relevance, but almost none. And one of the ways that we see this often in the IETF is, some companies have literally dozens of

people who are active in the IETF, such as Cisco, the large router vendor.

And you will sit in a meeting where someone makes a proposal, maybe even someone from Cisco makes a proposal, and other people from Cisco are like, no, no, no. This is all wrong. So it's not like there is a Cisco voice or a United States government voice, or whatever. Some people expect there to be, because that's what we're used to in our normal life, and the IETF that just gets blown apart.

You really are there as you. So the other thing that's… So a lot of people don't actually understand that ICANN sort of came out of the IETF. It's not like it split off of the IETF, but ICANN itself, the people who got ICANN formed were mostly IETF people. So a lot of the things that ICANN does, like having three meetings a year, running participation and such, follow what the IETF was doing.

So there is a lot of remote participation in the IETF. One thing to… So now we're being recorded. Do I need to say all of that other stuff again? No, no, no.

So let's talk a little bit about rough consensus because this is sort of the second weird thing that the IETF does. Imagine if you had started an organization where there is actually no formal membership, anyone can be in.

You know, really it's who is on a mailing list. You can't even tell who is reading the mail and such like that. And you see said let's have a vote. How are you going to count votes? You don't even know who is, you know, you don't even know who is participating. And so, the IETF, as a reaction to this, is like great. We're not going to vote. We're going to base this all on rough consensus.

And remember I had that before. You know, we believe in rough consensus and running code. The nice thing about rough consensus is, it absolutely does not require unanimity, but it also doesn't even require a majority. In some IETF working groups, some of the work that is being done is really minute and boring to most of the people in the room.

So, when that work is done, all you need is somebody saying, who is, you know, do we have rough consensus that this is probably good enough? People don't all have to say yes I've read it and such like that, because let's face it, more people are lying when you ask those kinds of questions.

The people who come up and say I've read it and I like it, or I've read it and I don't like it, I have these issues, that's how you get rough consensus. It's really not counting. And in this process, you obviously will have disputes. You know, we're a bunch of

engineers. We're going to have very strong opinions about very minute things.

But you solve that through discussion, not through voting, not through corrosion. And if you're interested in this idea, because I know some folks here are probably from the public policy arena or just the social arena, the last RFC and I'll explain how to look at RFCs is actually how a description of how we do rough consensus.

It's really interesting, and I say interesting in the sense of it's not what most people are familiar with in their day to day lives. Certainly not most organizations that we work in. so this is a bit of a recap on where we come from, so there is two things. There is our process for getting there, but there is also the fact that what the IETF produces are open standards.

And you know, we hear about open this, open source software and such, IETF was really one of the first ones to actually use the word open and mean it. Like in the mid-80s even. So open standards means a couple of things. One is that they were produced openly. Anyone could have participated in creating that standard. The other is that let's say that you're talking about standard that already exists, such as the DNS.

Any one has access to the technical standards of he DNS. They're copyrighted, but they are freely distributed. RFCs are

one of the most widely distributed publications in the world. People reproduce them all of the time, some people do translations. So it's very easy to get access to it, but the other thing that makes it open is, no one is forced to use them.

So again, the IETF is not the Internet police. If you want to do something different on your network, you can. There is no one who says you can't do that. Now, you might not be able to connect to the Internet, because the Internet is this network that sort of agreed on all of these things, but if you want to take one of the IETF's standards and bollox it up completely for your own network, go have a party.

That's just fine. And the advantage of this, you know, one of the radical things with this is, as an open standard is, if you do that you may discover something that's really a lot better than what we're doing currently, and you can come back with data and say, hey you know what? That thing that you're doing, I'm doing it this way and look at these results.

And then maybe we will in fact take it up and move it forwards. So now let's talk a little about how this happens. Remember that I said that anyone could participate in the IETF. And literally, you become an IETF participant by being on a mailing list. You don't have to show up for meetings or anything like that. You can, but you don't have to.

Anyone can actually produce the documents that the IETF publishes. And I do mean anybody. We get some pretty random starts sometimes. All IETF RFCs start their life as an Internet draft, which most people just call drafts.

The second bullet says you don't have to go to meetings. That is extremely true. Some of the most popular standards in the IETF were run by people who have never shown up to an IETF meeting. Some of them, some of the standards started by somebody, ah, I'm never going to really be in the IETF, but I think this is a good idea. And other people who were active in the IETF took the idea and ran with it.

Again, it's a very open system, so you can start something and you don't have to follow it through. You can be the person who finishes all of this. So, but to write an Internet draft, you sort of follow a certain follow up and then you go to a website and you say, here is my new Internet draft, and you have published an Internet draft.

Now the flipside of this is some people think that Internet drafts are these important things, when in fact a lot of them are just barely formed ideas. And I've written some Internet drafts that turned out to be like really, really terrible ideas, but fortunately, I published it. Somebody looked at it and said, no, no, this is all wrong, and you just let it go.

You don't have to remove it or anything. In fact, one of the nice things about Internet drafts is you can look at old ones, you can see old bad ideas. That's really, really useful because if someone has the same bad idea five years from now, someone will say, oh no, Paul already thought of that, and here are the arguments against it. It saves a lot of time.

But really, if you are interested in doing this, if you are interested in technical participation, not only can you be in the IETF reading these things, you can be writing them. And I really mean that. You know, you don't pay a cent to publish an Internet draft.

The document format that is used by Internet drafts and RFCs is antique. It's the same document format that we've been using since the 80s. So it looks really good on line printers. Some of you might be old enough to know what line printers look like. We're going to be changing that in the coming years, although we could have done it before now.

So the advantage of having it in the old formats is you can actually read the old RFCs. You can read RFC 1. Some of you are also in other standards development organizations. You know, like some of them have adopted like Microsoft Word as a format and such like that, and you've discovered you can't actually read

the old documents because it was like a crappy version of Word or whatever.

IETF documents everyone can read. And it's not like they were so brilliant because they were so simple. We will be having more modern looking documents within a year or so, and I've been active on that project, but the nice thing is, you go to the RFC repository, you can find, you can read all of the standards and they're very easy to read, other than the technical content.

And so once an Internet draft… I'll go through, in a couple of slides, how Internet drafts progressed, but the end result… So as I said, Internet drafts keep getting revised. Once something is published as a RFC, it is no longer revised. You might revise the RFC, you might have a different idea, but the old RFC will stay around.

So for example, SMTP, the way that we send email around, the original SMTP RFCs, you can still go read, but there are also newer ones that obsolete the old ones. So you can… This slide sort of shows you how many RFCs are getting published year by year, and the two arrows there are just sort of for, to give you a historical perspective.

You'll notice that a whole bunch of RFCs were published actually before the IETF even existed. The RFC series is not part of the IETF. It's a standalone series that was begin by researchers, very

early on in networking, as a way of publishing their stuff. The IETF came around about in 1985, but you'll notice there is a whole bunch of RFCs published to the left of that.

ICANN came around about 12, 13 years after that, and you can see that the number of RFCs per year keeps going up. Now, this is the total number of RFCs for everything. Remember, the IETF covers a huge amount of technologies that you are not familiar with, and I say that with assurance because the smartest people in the IETF are not familiar with all of the technologies that the IETF does.

It goes down from layer two all the way up to layer seven, there is policy RFCs, things like that. We're starting to see a bit of a downturn now, which I think is good. We don't need to publish everything that we think of. So let me show you a bit of, some example of the RFCs.

As I said earlier, RFCs are not just from the IETF. The IAB which I'll describe in a bit, also has some. So RFC 1034 and 1035 is the description of the DNS, of domain names. I think most people are here for the DNS part of ICANN, so those are, those are really, really old, but you know what?

They're still the standard. You can go read them, you can find mistakes in them, such like that. RFC 1591, which came many years later, described the DNS as a system, how we have this

hierarchy. Not just the little technical details of how things work, but the hierarchy. A few years later, the IAB realized that…

For those of you who have been around maybe 20, 25 years in this field, you will remember that some people said oh we don't need to have one root. We can have separate roots, which of course is a completely stupid idea if you think about it, because then there will be a lot of contention. And the IAB said, no. So that's a policy document saying, this is why you want to have exactly one root. Some of you are concerned with WHOIS, you know, and so you can see the WHOIS spec is also quite old.

DNSSEC came a few years later. Those documents, if you are security people, definitely try to read them. They are long, they are very, very difficult to read, and they are the absolute minimum that needs to be said in order to protect DNS the way that we protect it. Internationalized domain names. So here is an example, the RFCs 5890 through 5895, that's actually the second round on internationalized domain names.

The first round was approximately RFC 39 something, something. When the IETF first developed internationalized domain names in 2003, we came up with a specification that still worked pretty well, but it had, once it was out and operational, people discovered that it wasn't exactly what we wanted.

So six or seven years later, they published new ones. So the old RFCs are still around, but for example, ICANN follows the newer ones. So these are called IDNA 2008. And these are near and dear to me, because I'm actually the coauthor on many of the original ones on some of these.

So if you're interested in the internationalized domain names, come and talk to me because I love them, but this is an example of how you can still go back and see the original specs. Many standards organizations, hide their original specs that they are no longer doing.

For example, the ITU. If you go and look for old ITU specs for things that they have revised, you literally cannot buy them. And since they have very restrictive copyrights, if you find copies of them, you're not supposed to distribute them. IETF is completely the opposite. You want to see our old mistakes? No problem.

A couple of other things, I can sort of skip over… Actually the last one, let me just make a point, we keep talking about DNS and ICANN-ish things, http, the web, the thing that drives the web, http one was standardized in 1996 or 97 or so. Http two was standardized this year. That's a pretty long time for such an important change, but what's important here is lots of people

are still running http one, even though the new cool spec is out now.

You can still not only find the old spec, you can actually have both of them working at the same time. It took a really long time for people to say, this is important. I mean they knew it was important, and here is the exact set of changes we want, but now we have http two, and some of you may have noticed that because the web is running faster already.

Actually this is sort of a repeat of what I showed you before. It's a recap of earlier slides. The most important part here is that last line, rough consensus and running code. Rough consensus is really, really important because we're not a membership organization.

That is, we're a participation organization, I'm saying IETF here, any one can participate. So as you are here at ICANN, you will notice that in some parts of ICANN, there is a… Decisions are made by a restricted group of people, and in other parts it's completely open. That's following the old IETF spec.

So here we have, just to show that as the Internet got more popular, so did going to IETF meetings. At our height, which was just before the first dot com crash in 2001 about 2800 attendees. Now compare that to ICANN, which started right around then.

Remember you saw for those of you who went to the welcome this morning, you saw that sort of chart going up of ICANN.

The IETF now has pretty much at steady state about 1200 people per meeting. And again, it meets three times a year, like ICANN sort of copied the IETF meets in different parts of the world, although the IETF tends not to go as far as afield as ICANN does. We mostly meet in places where there are a fair number of engineers, because people, it's harder to get to an IETF meeting for many people.

They're paying for their own travel more and such like that, so we tend to meet in larger cities but IETF meetings are actually smaller than ICANN meetings. And part of that is because IETF meetings have very, very little politics and process going on. It's really technical people. Many people coming to an IETF meeting will come for meetings like two or three meetings throughout the week.

That's all they care about. That's the one topic that they care about, but they care passionately. Other people go for, they have spread themselves out more. But right now, I would say it's likely we will stay at this level, no one wants more people to come to the IETF meetings. No one wants fewer people to come to the IETF meetings either.

The IETF is not one of these organizations that says, oh look how important we are because we've got so many people. The only way to judge whether the IETF is doing its job is, is the Internet still working, and is it working a little bit better than it did five years ago? The answer to both of those is yes, the IETF is succeeding.

If the answers are no, then the IETF is failing, but in fact, if you look at sort of five year periods, the IETF has actually kept the Internet working pretty darn well. I mean, they invented the Internet, but in fact, the Internet has not fallen apart. This is a good thing.

So I was just talking… Actually, hang on.

I was just talking about the work that the IETF does, and again, any of you can be IETF participants and you can bring work to the IETF. Now that doesn't mean the IETF wants to hear every one of your ideas for new work. Because lots of people have really good ideas. I mean, some of you wake up in the middle of the night with this brilliant idea and that you want other people to do.

Well, if you can't get other people to do it, don't bring it to the IETF, because the IETF works on consensus. It's not a place for a single person to push a single idea. So the IETF works best when the ideas that come in are specific enough for a group of people

to identify their interest in it, but not so general that it's going to take a bazillion people many years to standardize it.

So there is sort of a sweet spot in there. If it's a very, very narrow idea that one person can do, one person should do it. If it's a, you know what we should do? And it's this big picture, the IETF actually does very poorly at that, because sometimes people do get interested and try to do all of that, but then we never finish.

So the sweet spot is, I see something on the Internet, I see a way to expand it or to add some new features, and I think people are going to want to help me. That's where the IETF works very well. So scope is well defined and understood.

There also, you also have to know when the work is done. And again, if you take something too big, the work is never going to be done. You're here at an ICANN meeting, you've seen some of the projects here that will never finish. The IETF has had some projects that will never finish, and those usually turn out bad. They start off good, but then they turn out bad.

Engineers don't have as good as an attention span as you would want them to have. You know, three or four years and they're off to something else. And the last bullet is very important. Bringing something to the IETF is really just your interest is not going to make you happy, because people will start telling you to go away after a while.

Not because it's a bad idea. People are perfectly happy in the IETF to say, that's a great idea. No one is interested, go away. You have to find something that you will have other people interested. I mean, if you have a really bad idea, they will definitely tell you to go away early. But many people come away from IETF participation dissatisfied because people were saying, yeah, yeah, that's great, but we don't want to help.

So unless you have something that a lot of people will be participating in, it's not all that useful. Actually here, let me go back just for a moment and do the sort of the flip side of this slide, which is when the IETF does a really bad job. And we have, by the way. The IETF has put out some standards that were overblown.

You know, that tried to do too much. And when you actually tried to implement them, was really good. The other thing where we, the IETF has done a bad job is assuming that people on the Internet are going to want this feature, without having looked a whole lot. So we do a lot of things sometimes prematurely. The nice thing about the IETF is nobody has to implement our standards.

And so when we do things badly, and no one implements them, that's great. That's better than if we do something badly, a lot of people implement it. So that sort of that hard edge, and that's

why rough consensus is actually so important in the IETF is that you will get to a place, oops.

Oh, this is another, this is where we are most successful. The IETF also works, the bottom part here is so of important, with other SGOs, sometimes well and sometimes not. So there is plenty of other standards organizations out in the world. There is the W3C, IEEE, ITU, there is a bazillion of them. Sometimes they come to the IETF and say, "Hi, we've worked on this, we want you to work on this as well."

And if it's interesting, that's great. If it's not interesting, a lot of these people get a little bit offended when we go no, not interested. Because they just spent a whole lot of money developing this. And the IETF, as you'll see in a couple of slides, doesn't spend any money on this. This is all volunteer. There are some examples where we've worked very well.

The W3C recently finished something called Web RTC, or RTC Web, they ended up having two names. That they worked with the IETF. The W3C does a lot of intense web technologies, but has hard time getting things like out in the world, IETF certainly helped on things like the security parts and such like that.

So now many of you who have either Chrome or Firefox browsers, you've noticed over the last year they all have now these things where you can all of the sudden do the equivalent

of Skype in your browser. That was from this. That was from this, the work that W3C and the IETF did together.

So we do sometimes work well with other SGOs, but sometimes other SGOs expect us to do their work for them. And as you can imagine for a volunteer organization, we can be very rude and saying no, no, no, we're not going to do that.

So let's talk a little about the, how it is structured, partially because I've been fairly vague until now. And also, this is another point where it gets a little bit weird. We have no members. The IETF has that many members. A lot of people show up to meetings, but you do not have to show up to a meeting to be an effective participant in the IETF. There are plenty of people who in fact have gotten standards published, who have never shown up to a meeting, showed up to one meeting because it was close to their house, something like that.

But it is not at all required that you do that. So the structure of the IETF is a little bit funny because you know, it's very bottom up, but the bottom is a sort of unmeasurable size. In the IETF, things are done in working groups. Not everything by the way. You can have an individual idea that sales through the IETF with no working group, but there are about 120 working groups, where most of the work gets done. So if you come to the IETF

with an idea that fits well within one of the existing working groups, you'll probably be pushed over towards that.

And that's very handy because 120 different working groups, you can imagine that there are lots of things that people don't know. And they don't care about. But they care about the stuff in their working groups. So I might be active in five, some people are active in 10 or 20. The working groups are all parts of areas, and I actually will cover the areas in a bit.

Above the areas is the IESG, which I'll also cover. And so that's sort of the triangle of participants, working groups, areas, IESG. The IAB is off to the side, I have a couple of slides on that. But again, remember, the bottom of that triangle is an amorphous group of people no one can really measure.

And again, part of that comes from the fact that some of the best participation in IETF is people just reading mailing lists, saying nothing, maybe once a year, but that one thing actually is the thing that everyone who has been working on this for too long didn't realize. That's really, really valuable.

This picture doesn't tell you much other than the fact that the IESG is sort of over these areas, and the working group is in the area. The most important part of this picture is, you'll notice that there are no connections between all of that other stuff in

the middle. So it's not like just a monolithic organization and this department is doing this or that.

The IAB is not actually part of the IETF. The Internet Society who provides a lot of the funding for the IETF is floating over there. The RFC editor are people who publish those RFCs is not part of the IETF. So the important thing, and there is IANA, by the way for those of you who were here for the IANA week. IANA is used by the IETF, but it's certainly not part of the IETF.

It originated from the IETF, but none of those are actually formerly part of the IETF. So let's talk, layer nine is important. Let's talk a little bit about funding. The IETF doesn't, you know, there are no dues, there is no membership. People pay to come to some of the meetings. It doesn't cost that much.

So you probably notice here your registration cost for ICANN zero, that's pretty radical. IETF meetings is about $700 to go to, which is actually still very low if you compare it to lots of other things. The rest of the money comes from ISOC, the Internet Society. If you're not familiar with ISOC, please become familiar with ISOC. It is the greatest organization in the world.

It is one of the reasons that the Internet is not just technical these days. ISOC was formed in 1994, I want to say, and basically it started up because the US government had been funding the IETF work, and then somebody decided to stop

funding the IETF work, and they're like well, and that was just before the Internet was about to take off.

So ISOC was formed as a nonprofit, it's a normal NGO, lots of companies contributed. There is a million individual members that have got chapters everywhere. And so one of ISOC's… ISOC's mission is to make the Internet work for everybody, and in order for that to happen the Internet needs to exist and work, and so that's why the ISOC funds the IETF.

This is my only slide on ISOC. Like I said, if you're not familiar with ISOC, in fact, I think they have a booth downstairs maybe, or if not, there is certainly some ISOC people around. Get to know ISOC. It costs zero dollars to join ISOC, although they certainly like contribution. Great people. And they are the reason that the IETF continues to exist.

The Internet Architecture Board is off to the side from the IETF. It's sort of considered to be an adjunct. Instead of looking at how, you know, what standards are needed and such like that, the IAB looks at the big picture. What should we be thinking about for the next five years?

They also do some very important things. Remember I said before the IETF works with a lot of other standards organizations. And most standards organizations freak out when they look at the IETF because they say, well we want to

talk to the president. It's like, we don't have a president. Well, let's talk to your Board of Directors. Well, we don't have a Board of Directors.

So they want to have liaison relationship with somebody. So the IAB takes on the liaison and stuff, which is bless them for doing that. I mean, it's really funny when you read these letters from some of these standards organizations, you know, it's this whole formal thing and they're asking for one little thing and the IAB writes back, you know, three paragraph message that looks like it's really important it says, yes.

So, two things that the IAB also does that's very important, that is important for the whole structure of how the IETF works is one, they are the ones who deal with ICANN about the IANA. So the IANA, and I want go into a lot of IANA history, you'll probably be hearing that plenty this week.

IANA started well before the IETF existed. And even after the IETF had started up there was an IETF, fairly close relationship with IANA. So I'll have some slides on it later, but currently, and this has been true for the last 15 years, is that ICANN is providing the IANA function. And one of the very important parts of the IANA function is what the IETF uses.

And so the IETF has a SLA with ICANN for IANA, and the IAB takes care of that. The other thing that the IAB does, which is very

important, is that they are the overseers of the IFC series. Now, they are very, very loose overseers. They don't say publish this, don't publish this. Pretty much the RFC series runs very well by itself. Millions, or hundreds of documents are published.

You might have seen in the slide this morning, already this year, 275 new RFCs. But you want some sort of continuity there, and that's what the IAB offers.

So let's talk a little bit… The next three sides are going to be about the actual sort of internal structure. The IETF is split into seven areas: application and real time. Applications are like web, the kinds of things you might actually as an end user interact with, Internet which is the lower layer, the way things are addressed.

And actually if you stay for the session two for today, we'll talk about addressing and such like that. Operations and management. So the IETF doesn't get to tell any operator what to do, but many times especially after over the years, operators will have discovered that there are best practices for operating Internet services, and so the operations and management areas are very good for that.

Also measurement. You want to know how much is flowing through and such, and you want to agree with people on how to count. So those are the standards that come out of operation

management, routing you want the package to work the right way. And that's actually terribly complicated stuff that I do not understand at all.

When I start looking at routing my ears bleed. Security, which is actually quite important. That's an area that I've been very involved in, in the last 20 years. You might have a normal protocol that has no security, how do you add security to it? Or, how do you start the protocol with adequate security?

You hear a lot about privacy these days, and how we should be encrypting this or that. The IETF has always been a leader in saying encryption should be there from day one. Encryption is important, authentication is important, and here is how to do it in a way that everyone can agree on.

Because if you don't agree on how encryption happens, you will have no interoperability. IAB has been very good at pushing that. A transport is basically… One of the most important parts of transport is how congestion happens and how to avoid it. So you're all familiar with, actually here in your hotel, you'll notice that everything is working fine over your Internet connection over the Wi-Fi, and then just at the time when everyone starts streaming your video it goes to hell.

That's not because the pipe is getting full, but it's because people are trying to get into the pipe. So for example, those of

you who drive on freeways, you'll notice that when it goes from four lanes to three, people become stupid, and they don't know how to like merge in a polite fashion.

Everything they learned in kindergarten about sharing goes out the window. That's congestion control. And so that's very, very important because of course, on the Internet, everyone wants their video to be up first in such like that. So that's a lot of what transport does these days, extremely important stuff especially as the Internet expands out to countries and regions that have less connectivity, transport and congestion becomes much, much more important.

General area, I'll mention a little bit later, but it actually isn't that important for this slide. So, the area directors are all part of the ISG, which I'll explain on the next slide, but each area has two or three area directors. So an area director has multiple responsibilities.

Of course, they're responsible for their area. So they are subject matter experts in their area. But they're also leaders because it's a volunteer organization, with this bottom strata that you can't measure, you need to have somebody who is flexible enough to figure out how to get these people to actually do work.

You also have to be able to tell these people their work is done, because I'm sure most of you have seen this either in your companies or other organizations you're in, you're working on something, you get done what you were supposed to get done, and you still have all of this energy, and you want to keep doing it.

And the work that you do from that point on actually gets sort of worse and worse, but you don't know when to stop. You need some adult supervision to tell you when to stop, that's what area directors do a lot. I mean they form working groups, they come up with new ideas.

Someone comes in with an idea for a working group, that's great. But they also have to say, no, you know, because the IETF is a volunteer organization, you don't want people wasting their time doing bad work. So at the point where they start doing bad work, we want the area director or the working group chairs, but working group chairs have the same problem you have about, oh this is exciting.

And look, to tell you to stop doing that. So the area directors, oops.

Are all part of the IASG, which is again, that was that sort of top of the pyramid. Now, again, I'm describing a pyramid, I'm saying top down, area directors are all part of the IASG, they deal with

the process. Two things really interesting here. One is, every standard that goes through the IETF, and I have a chart in a moment about how that happens, at the end is reviewed by the IASG.

It is reviewed by everyone in the IASG. So when I write a security document that is about to become a RFC, all of the area directors have read it. Even ones who mostly care about congestion, or the ones who mostly care about routing. They all read it. So it is heavily reviewed. That's very, very important that you've got good people who are not only good at organizing their areas, but understanding how it all fits together.

The other thing that's important to understand about the ISAG, and you know the next layer down, that the area directors, is that they're also volunteers. The IETF pay, since there are no members paying any dues, they're not paying anybody.

So now, being an area director is about a 60% commitment, 60 or 70% commitment, and these people do also need to eat and have families and such like that. So most of these, almost all of these people actually are paid by their companies to do this for two, or four, or six years, but they are not being paid by the IETF to do this.

They are selected by a nominations committee, I'll cover that in a moment. But they are, in fact, volunteers. Which is sort of an

odd thing if you think about the area director who really cares a lot about this one area, also has to care about the whole Internet. You get a select number of people doing that, who really want to participate in the whole thing, but that's why the Internet works.

That's why the Internet isn't a bunch of little ideas that sort of vaguely hang together. It's because the ISAG as a group, has reviewed everything. So let me step back for a moment. Now let's drop back to the middle of the chart, the working groups.

Every working group starts with a charter, and as your familiar with from your own world. I'm sure that when you have to put together a charter, it's something you already know what you're going to do. You sort of make up a lot of words, and it's not really like organic, but it's the area director's responsibility to make sure that you actually are following the charter, the charter is updated when you start getting all of these new ideas.

And to make sure that the working group has enough people in it who are going to do the work, because again, this is volunteer. A working group that has existed for a few years, people might start stop having interest. They might start losing interest, and yet the working group still has work to do. How do you do that?

Now, the nice thing is, because the IETF has, you know, that working groups last for just as long as they last, if I have inspired

any of you to become IETF participants. Now you would come into maybe one of the, one or a few of the 120 existing working groups, and all of the sudden there is a little bit of new energy, that hopefully that matches the old energy that is leaving and such like that.

Each working group has generally two chairs, and their job is to keep it on track, and also to keep the energy up. And to make sure that they aren't doing stupid things. That's a tough job, they are certainly volunteers. Being a working group chair is probably a five or 10% time commitment. Depends on the working group. Some working groups take very little, some are very, very active.

Like remember I talked about the web RTC stuff which you can now open up and use in your browser, those working groups are working really, really hard on that for years, but the result is, you can open up your browser and talk to other people without having to download anyone else's software and such like that.

So working groups themselves are actually quite important for this. The working group is in the middle of that bottom up thing, but it is also still sort of a bottom up idea in the sense that anyone can get a working group formed. If you can write a reasonable charter, that has 5 or 10 other people going, yeah, yeah, I would do that, a working group gets formed. You don't

pay any money to do it, you don't have to have it elected, you know, it just happens.

So, let's talk a little bit about how things are done. I hope that you can see the green line that sort of goes through there. So working group or doc, you know, let's say working group is done with, they've looked at a draft, they've revised it a few times, they think they're done, or an individual.

So remember I said before, not everything has to come through a working group. You can actually have an individual document that starts the process right there. You have to have a sponsoring AD. So for every working group, every working group has an AD. But let's say an individual document that has gotten a little bit of discussion from some people, and you can find an AD who says, yeah, that's good enough. We don't need a working group for this, we move it forwards.

It goes to IETF community review. At that, and every document becomes an IETF RFC, has to go through the IETF community review. So some people participate in the IETF, without ever even being in a working group. They just look at the list where the IETF, the last call is happening, and they read documents in that last call. Some people do it just so they can correct grammar, that's sort of a weird thing to do, but there are some people who like to do that.

But other people will look at that and they'll say, oh, I've been seeing a couple of things on that topic. They'll go and study the topic, then they'll look at the document again, and oftentimes people we've never heard from, had no participation in the development of the document, will come out with something really interesting to say in the IETF community review. That's one of the reasons we do it.

Now, 90% of documents go through IETF community review with absolutely no comments whatsoever, but that last 10% is really, really important, because sometimes we will get somebody who is active in the IETF in their area, or we have never heard of, who will say, hey, this paragraph over here says that this is required, but that can't exist.

And everyone is like, oh, right. We'll get back to you on that, and then it goes back up the other way and it goes back to the working group. So a number of times, because the IETF is an open organization, that kind of thing, people are just looking at that last step. Now that's not really the last step, because then it goes to the ISG, and sometimes ISG members will notice something wrong, or say, this is unclear or whatever.

But these two steps, the community review and the ISG, is the reason that IETF standards are as good as they are, because you can imagine how bad they could be if no one is really reviewing

it, only experts were reviewing them. People, you know, you couldn't read them and such like that, and then it goes to the RFC publisher for publication.

So, if I have inspired you at all to become active in the IETF, you could be up here in the working group, but you could even just be down here in community review. It's actually a really interesting way to figure out what's coming down the line.

Actually, I think I can skip over this one. It's not so interesting. Basically, yes, you have to identify a need before you do something, developing a draft. I think I've pretty much covered this fairly well.

So let's talk about this a little bit, which is that the, that review that I was talking about here, it is actually a formal review. So in working groups, there is almost always a last call, it's optional, but pretty much every working group has last calls. That is a time where it could be that a document looks just fine, but no one cares.

You know, it really turned out to the be two authors who cared about it the most. That document likely to die, not to be moved forwards. So remember I was talking about rough consensus? Part of rough consensus involves actually having enough people who have said, I've read this document, and I actually think it should move forwards.

If no one has read the document because it was too narrow, or too hard to understand in a working group, it will die right there. The area director then looks it over, and then there is the IETF wide last call. And again, you don't have to have participation in the IETF wide last call, 90% of them don't, but that is an opportunity, the IETF last call is an opportunity for people with other areas of expertise to comment and say, "Yeah, that was sort of a good idea, if you ignore this whole other thing the IETF is doing, but if you don't ignore this whole other thing the IETF was doing, it actually relates this way. You need to go back and integrate better."

And then it goes through the rest of the process.

Little bit on the nominations committee, just because you guys know that ICANN has a nominations committee up. The way that all that IETF leadership is selected is by this nominations committee. A big difference between the IETF, the NomCom and the IETF and the NomCom in ICANN, in ICANN the nominations committee is selected by people who, you know, by the various subgroups, ccNSO, things like that. In the IETF, the nominations committee is selected at random, and I mean that literally.

You have to have gone to two or three, three of the last five meetings, so that you know the people and such. But so the IETF nominations committee is about 10 people, and maybe 100

or 150 people volunteer to do it. They aren't selected. No one says, oh this would be a good person for the NomCom or whatever. Their names are put on a list, and a random number is chosen, and they pick 10 of them randomly.

So that, again, is something that sort of differentiates the IETF. What that means is, that the nominations committee within the IETF is really, really representative of the community. I think the ICANN nominations committee has some good representation because it's coming from some things. But the IETF one, you're guaranteed it's going to be representative, because you were chosen by a random number.

They choose all of the leadership. So the area directors and the IAB membership is a two year, you know, you get appointed for two years. Generally, area directors will volunteer to do a second time and maybe a third, so it turns into a four or six years. But quite frankly, if after two years of you being an area director, if you have not done a very good job, the NomCom, you know two years later, will throw you off.

And that actually happens a reasonable amount of time. Not so much. It's not like that it's a super hard test or anything, but in fact, we have area directors who come on and generally the reason they get thrown off the IASG is because they haven't been as general enough. That they are spending all of the time

on their area, not helping the whole IETF and therefore the whole Internet.

And the last bit is that there is confirmation of the NomCom stuff, but that's just… Rarely does a confirmation reverse anything. that sort of an insanity check just to make sure a NomCom, which was chosen by random numbers, don't go crazy. So let's spend the last few minutes before I take questions, and I will absolutely have time for questions, talking about where the IETF and ICANN have a reasonable amount of overlap.

As I said earlier, IANA proceeded even the IETF, but as the IETF is making these protocols, a lot of protocols have parameters that you want have everybody agree on the numbers. And so those are registered somewhere. They're written up in the RFCs, but you can't expect everyone to find all of the RFCs on a certain topic. You want to have the parameters registered somewhere, and that is IANA.

When IANA started originally, it was also considered an extremely weird thing, because most people only registered parameters in documents that were copyrighted that no one could see or you had to pay money to get. IANA registry completely open. IANA does things other than the protocol parameter registry, such as running the top of the DNS route,

which used to be considered a parameter before it got terribly important.

But so for the last, almost exactly 15 years that ICANN has existed, since ICANN pays for IANA as part of, you know, ICANN existing is somewhat based on IANA existing, the function between, the agreement between ICANN and the IETF has covered this. Now I want to point out that this says for 15 years that this has happened. For 20 years before that 15 years, IANA still existed.

It was mostly one person or one person and an assistant, who was doing it on various contracts, on federal government contracts, on educational contracts. So we're really only talking about the formal IANA since ICANN started here. So once there was an agreement between IETF and ICANN, and this happened as ICANN was formed. It's not like ICANN was formed and then this was figured out.

There was this agreement. And the IETF has figured out over time, oh we want to have certain service level agreements, so that when we say please put this new parameter in, that it will happen within a couple of days, or such like that. And so those have sort of changed a little bit over time, but there has always been full agreement between ICANN and the IETF about service level agreement and both parties are pretty happy today.

So here is a little bit of example of why you even need to have protocol parameters. So for example, sometimes when you type in something in your browser, you'll get back something that says 404, meaning page not found, that's actually a protocol parameter. In the http spec, it says 404 means page not found. 403 means forbidden, meaning the page doesn't exist but you don't get there and such.

So someone, you know, between all of the browsers and all of the web service, someone has to agree that 404 means this and such. So that's, and you can actually look in the parameter registry at IANA for http return status, so that's just one of more than 2,000 registries in the IANA set.

This one is picked to, attention is paid to this one much more than any of the other ones, but for example, also, for those of you that know about DNSSEC, there are multiple algorithms that you can use to sign your zone in DNSSEC. You don't all have to agree on one. So again, that is, you need to be able to identify, I have signed my zone with this algorithm.

That's a certain number, and that is another IANA protocol registry. So, because some people, I think, aggressively misunderstand the relationship, let's make it real clear, the IETF sets the policy for what's in the registry, that is, it's not IANA saying that we want the registry to look like this, it's the IETF

saying, we need a registry that looks like this, that will have entries go in this way either like a new RFC comes out, or something like that.

IANA is responsible for the implementation, and for meeting the service level agreement. The IAB gives oversight to that relationship, although not a heck of a lot of oversight. It's doing a lot more oversight right now as we're talking about doing the transition. But basically the IETF says what the registries will look like, and IANA says yes. And that has not been a problem.

And that was not a problem even before ICANN took over IANA. The person who was running the registries, John [Postel], pretty much said the same thing was, John was an expert on a zillion things, but not everything. And so when someone said we need a registry for this thing that you don't understand, his answer was just yes.

So really, it's important to understand, this has been going on for 35 years, and it has worked just fine. The last thing we want to do is mess it up. So, I don't really want to do this slide because I'm more of a technical person, but I sort of have to.

You'll notice there is only three bullet points here, and you're, some of you are going to spend much of your week with much more than three bullet points on this, great. I don't want to cover that much, but basically ICANN has a contract with the

United States NTIA about IANA, and then, you know, in March of last year, NTIA said, yeah, they want to get out of it, which makes perfect sense because the last thing we want is some government organization having to pay that kind of attention to that kind of registry, which if they did the wrong thing, could really make it harder for us to do things [inaudible] on the Internet.

And so they ask for a transition proposal, and that's one of the reasons many of you are here this week. So, the big picture is that NTIA has had some say all along, but hasn't really participated that much, and that's a good thing, right? NTIA would not be actually having that much value to something like these protocol parameters.

So after NTIA asked for this, this is the way that the IETF sort of handled it. There was initially, you know, there are MOUs in the SLA, then there was a working group… Remember I said that there was a general area, that last area that I didn't mention much? The general area pretty much exists just to deal with policy stuff. So fortunately they don't have many working groups because the last thing you want is engineers doing all of your policy.

Again, we have a short attention span and we're very opinionated. But so, there was a working group called IANA plan

that was setup with a lot of short attention span, very opinionated people. The did their work. They came up with what they though the transition strategy should be. And remember I said, every proposal that is blessed by the IETF has to go through community review. So it did go through community review in November of last year, give or take.

And so there was the same last call as there was for this little weeny protocol thing over here, at the same time, there was this giant thing for the IANA plan. The community ended up agreeing on it, the ISG had to approve. The ISG did approve, but it followed… So I'm saying here is, even though this was a weird policy thing, it followed the same procedure we do for everything.

And then, so in January or so, the ICG was formed. There is other input to the ICG, but this followed the normal IETF process. Now, the dates of when this is all going to finish, is likely to change, and hopefully this week, this all gets done. I would love to see this be the Dublin plan. I dream a lot, but it could happen.

And that would go to the NTIA. The NTIA has worked very well with the IETF. The NTIA is part of the same, part of the US government that a lot of the other technical standards work is

done, so NTIA calls in a group called NIST, the National Institute for Standards and Technology. They worked together well.

And this has been an active participant in the IETF for at least 25 years. I mean, they certainly were active in 1990. So maybe even more. So these people who know the IETF fairly well, and I've worked with NIST on some of the security stuff, for example. So it's not just on policy, you know NIST people in fact do technical work as well, which is, you know, that's the T in NIST.

So it's also the T in the IETF. So, this is actually sort of a historical slide, because IANA plan has already done its work, and it moved through the IETF process. So that's why most of the verbs here in the past tense, I won't spend a lot of time here. So, the IANA plan working group still exists, fortunately they're not doing anything.

They're waiting for whatever the last plan comes out is, and they will re-review it, but they aren't actively trying to do anything right now, and that's a good thing. Because they should be doing technical work, right? You know, the last thing we want is all of these engineers spending all of this time on policy work, which is not something that we're necessarily good at.

So, what the IETF cares most about, but not exclusively about, is the protocol parameter registry. So, the IANA plan working group, you know, had a proposal, the government is going to

have little or no role in it. That's, if you want to look at the Internet, draft the final Internet draft that came up, it's there.

Now the IETF also cares about other parts of ICANN, just to be clear, even though we're talking about NTIA and transition, and NTIA and transition. The domain name system is really, really, really important to the Internet. And the IETF actively is working on improvements to the DNS and such like that.

However, that has not been at all the focus because the, you know, the ownership of the root is moving along just fine, but the protocol parameter registry is very, very important in that, if the protocol parameter registry goes bad, we're going to have a lot of problems with more things. So, this is a summary slide. I've got one more slide with a little movie at the end, and I actually hit the time right, so I hope some of you have been storing up your questions.

Thank you for not interrupting, because I think we're hitting the time exactly right. And so we do have plenty of time for questions. So the Internet works, I mean, the Internet exists for many reasons. One because there is all of this stuff out there that people are making money on. But the reason it is the Internet, the reason that it works together, the reason it's not a bunch of individual networks, is because of IETF standards.

Lots of people, early on, wanted there to be no Internet. They wanted individual networks that didn't work very well together, because they could make more money by doing that. The IETF was a fairly radical idea that worked. I mean, we have the Internet now. If I was giving this talk 10 years ago, I would still say the same thing.

If I was giving this talk 15 years ago, there were still people that thought they could have little individual networks. And they were ignoring the fact that the IETF open standards were already winning. The open standards process is extremely important. We would have not gotten here, anywhere where we are today with a closed process. And if you look at some of the other standards, development organizations that are very closed, and you mentioned…

Let's say you follow one of them, and you mentioned somebody else in the room, they would not have heard of them. Most people have heard of the IETF, not because they would be participants, but because they've heard of the result. And so, the result is, one Internet. That was always the goal, and that's what we got. And we got there with open standards, and we got there through the IETF.

So, that's a sticker that a lot of us have. I'm going to show you, it's a two minute video that ISOC put together.

It really is just two minutes. It's actually sort of a cute video.

Cool. So it was two minutes, and now we'll go back because we have one last slide, which is questions. So again, I'm Paul Hoffman in case you weren't here for the first slide. We have about 15 minutes for questions and answers, or discussion. Russ Housely who was the one who gave the presentation before, lots of these are his slides, you might see him around here, he's happy to take questions as well.

Also, if we don't have enough time for questions now, or if it goes on, or you see me during the week, feel free to grab me, always happy to talk about it. So, Steve will walk around with a mic if you have any questions at all, please raise your hand.

STEVE CONTE: No questions? This is a room full of people. There we go.

PAUL HOFFMAN: And I saw one up here too.

And please speak into the mic, because remember we do have some remote folks.

UNKNOWN SPEAKER: Okay. Thank you very much for your explanation. If it is possible to know, how many people from the [IETF] works in providing companies?

PAUL HOFFMAN: Provider companies?

UNKNOWN SPEAKER: How many people from Google, from… In order to know the influence of this company's over the…

PAUL HOFFMAN: Yes and no. Yes, you can easily see how many of them are coming to IETF meetings, because when, just like here in the ICANN registration page, it says who you are and your affiliation. It says that on the IETF registration pages as well. So you cn go through and see that. No if you're looking at the mailing list, because many people, including myself, will use addresses that aren't affiliated with our provider. You know, with who we are employed by.

So, and in fact, as Steve said, I just started at ICANN three months ago. I still use my old address for a lot of my IETF stuff. So I sometimes have to remind people when they go like, oh are you still doing…? Like no, I'm at ICANN. They're like…

So, no there isn't really that much of a match. To sort of generally answer your question, for example, Google has a couple of dozen people active in the IETF, Facebook has one or maybe two. So two organizations that we think of sort of similarly, very, very different amount of participation.

You had mentioned service providers. Many of the large service providers are very active in the IETF. Many, many people coming, especially being active in the operations area. Many of their competitors are not active at all. They're sort of riding on the coattails and all of the work of their competitors. So it's widely dispersed, and it's very hard to tell. So yeah.

UNKNOWN SPEAKER: I just had a quick question around achieving rough consensus. You sort of talked a bit about it, so I'm keen to know more about that.

PAUL HOFFMAN: So, one of the… Rough consensus happens over time. It's not just when you would vote, and we all of the sudden switch into rough consensus mode. So for example, yeah. Let me give a real example that's in the DNS area. Somebody presented a proposal to the DNS operations working group a year ago saying, here is a problem and here is a solution.

And the working group agreed that the problem was correct and the solution was crap. And so that document continued to move, but with a change. Now the author was not happy. It wasn't me, but it could have been me. The author was not happy with the second part, because they thought up this really cool thing.

But the rough consensus part of, that author knew that document would not proceed. That the problem would go unsolved if he dug in his heels. So there was rough consensus there. Then at the time of, that the working group was finished with it, and so there was a working group last call, somebody brought up an issue that actually, they hadn't brought up before, that actually sort of changed not the whole solution, but a fairly important part of the solution.

That took another almost two months to grind through that, but again, the reason why it moved forwards, was there wasn't an up and down vote. That it was this rough consensus thing. Once it got out of the working group, it just went through the IETF and, you know, no one else paid any attention to it.

But so, rough consensus is actually an over time issue. It's not just a when you might vote. It does come up when you might vote sometimes, not as much in the DNS space as in some of the others, and different working groups do it differently. Again, it's

all volunteer so you can imagine there is a wide range of quality of working group chairs.

For example, I am known as sort of a rough and tumble working group chair. I'm sort of demanded and such like that. Other working group chairs are much more lassie fair. They let the working group do more work, and I'm not saying my way is right and there is wrong, but in my working groups, I demand rough consensus from the get go.

Other ones, it comes in a little bit later. Does that make sense? Please.

JASON HINES: Hi. I'm Jason Hines. I was wondering if you could go a little deeper in explaining something about the RFC editor, and I was wondering if it's a funded position. I think historically, John [Postel] did it, and maybe Joyce Reynolds…

Right. So I was wondering what the status now, and you could take me through the timeline…

PAUL HOFFMAN: Good question. So, and remember I had said that the RFC is outside of the IETF. But IETF documents are more than 90% of the RFC series. So as you said, historically, it was John. John

who was also IANA, John who was this, and John who was that. Super John. Right away the time, and John was leading the RFC series at the time that he died in 1998.

After that, the RFC series… And John was funded, like I said, by various things. He was a researcher. So he had some academic funding, some government funding, blah, blah, blah. ISOC stepped in and said, look, the RFC series is usually really important. And so ISOC started funding the RFC series. Now you mentioned Joyce Reynolds. Joyce continued to do that for a bit, but then it became a formal contract.

So every five years, the contract for who is going to be the RFC series editor, it's a group of maybe five people or so, comes up for renewal. In fact, I forget if it's up for renewal this year or if it was last year, but I think we're at about the five year mark.

And so it's a professional organization. There is also someone who is called the RFC editor, who doesn't work with them, they sort of oversee that, and she's on a two year, contract for every two years or so. So certainly ISOC has always believed that the RFC series is very, very important, and I don't think that there is any question about the long term funding of it, even though you saw those numbers going still way up.

I believe that our C series will be [inaudible]. I mean, again, the nice thing is that if the RFC series ended today, we still have no

problem with everyone finding the RFC series. You know, it's around, there is a zillion copies everywhere. Does that answer your question? Okay great.

Before we get the next question, I'll just pretend I'm Steve. So we would love feedback. Some people like the way I give presentations, some don't. Please go here, and it's a fairly short things. Yes, please.

UNKNOWN SPEAKER: My name is [inaudible] and I'm from [inaudible]. Thank you very much for helping me to gain some understanding of this organization. It has always been sort of a mystery…

PAUL HOFFMAN: Oh, it still is.

UNKNOWN SPEAKER: But I have one question. You speak about one Internet, a global Internet. Then from the media, we hear that certain countries like Russia, China, some Arabic states, etc. are thinking about having their own Internet. How does this work together?

PAULL HOFFMAN: It doesn't work together. Those are mostly reporters who haven't heard my talk about one Internet. Or more seriously,

those are reporters who have not talked to ISOC, because ISOC does a wonderful job of educating journalists about what the Internet is and is not. So when someone says, and I won't, I'll make up a country name, Freedonia, he laughed. Do you recognize Feedonia?

Very good. From the Marx Brothers. The Freedonia decides that they want their own Internet. What they generally means is, they want to censor some of the content on the Internet. They want to use all of the Internet standards to make it work, they still want to use web browsers, they still want to use the DNS, but they want to censor some of the content.

Now, some of that censorship will even effect here in ICANN because a name has content. Right? You know, names are incredibly important to people. And they have a content value. So if you think of an organization that has a name of, you know, a domain name, that describes the organization, but that organization would be banned in a certain country, the name itself is somewhat inflammatory. So when they say they want their own Internet, what they mean is, they want to use our Internet, but they want to scrub off certain parts.

They rarely want to add their own, but they want to scrub off certain parts, but they want to use the same technical Internet. And this has been true, by the way, this is not a new problem.

And in fact, quite frankly, a country called the United States, sort of wanted to do this quite a while ago, when they wanted to say that no one could encrypt things, or that if you encrypted things, you had to use a key that the United States could get at.

And the IETF stood up to that and said, wow that's a really terrible idea, because if you have the key, and you lose it, and some criminals get it, or some other country who you don't like at the time, so this would be '97. I won't list the ones that the United States didn't like in '97. But then you have not only messed it up for yourself, you've messed it up for all of us.

So, by the way, the IETF sometimes has a sense of humor. So the RFC that said that this is a really bad idea, was RFC number 1984. The RFC editor sort of had to bump the numbers a little bit to make that work, but it was very cool. But so when people say, we have our own Internet, what they really are talking about is content, it's almost never the technology.

They still want all of the technology that we developed for them, right? You know, that's a little free ride for them, but no, no. You can't have that content. I have compassion for people who want to limit content. I also have compassion for people who don't want to limit content. I have very little compassion for people who have spent so little time understanding the Internet that they say, we're going to have our own Internet, when what they

really mean is, we just want to scrape off the parts that we don't like.

Because that's not a correct statement. And again, speaking of the technology, it's technically wrong to say we're going to have our own Internet. Some of them might create some of their own standards because they think it's important, and they almost always back off. So a couple of the countries you mentioned, which I won't repeat the names of, have come up with their own standards for cryptography, because it's their country standards for cryptography.

And pretty much no one else has adopted them because they're not as good as the other ones.

STEVE CONTE: I just want to add to that too. There is a danger to having more than one Internet to, beyond what Paul just said. It really highlights the importance of the function of IANA, in them holding the protocol registries of unique identifiers, and that as if, you know, we describe the separate network that Paul just said, but yet they still try to have hooks into the general widely accepted Internet.

And let's say want to use the IP range, Internet Protocol range, that is used by an organization that's called Facebook. And…

PAUL HOFFMAN: But they think that it's their Internet so they get to do the numbers…

STEVE CONTE: They're going to make it up. So they're going to use these arbitrary numbers, these IP numbers that are already globally allocated to somebody else, and that causes these islands of routing mis-functions that are going to… We have seen it accidently happen on the global Internet a couple of times over the past couple of years, where an organization, or a country, or a policy making body, regulatory body…

PAUL HOFFMAN: Or some dumb company.

STEVE CONTE: Yeah. Has decided to do something, and they put in wrong filters, or wrong IP addresses, and suddenly the global routing table has a significant impact on that, and we've lost connectivity to entire countries and vice versa. So they've, and a country has impacted the global Internet before.

Routing is an easy example of that, but that is why we have within the IANA over 2,000 registries of unique identifiers

because of the keyword unique. They need to be something special in order for a protocol to run, which then allows the Internet to run.

PAUL HOFFMAN: And just as a follow on for that, one really means one. One thing that the IETF has always come up with is, when they say one, they know the difference between zero and more than one. So please.

UNKNOWN SPEAKER: Hello. My name is [inaudible], I'm from [inaudible]. First ICANN meeting. First Fellow. And my question might be, it's a basic question. But I don't know how… So if someone [inaudible], for example, adding security to some servers, and his proposal accepted. So I can't imagine how the other process, how it's being implemented on, you know? You got my question?

PAUL HOFFMAN: Yeah. So, there is a difference between proposing to add security, for example, to a set of servers, and proposing a new kind of security. So if the proposal is to add known kinds of security to existing things, that doesn't go through the IETF. The IETF doesn't, you know, allow or disallow. But if it's a new kind

of security, and for example, in the DNS, up until six or seven years ago, there was no security at all.

And someone said, you know what? We really need to have authentication security in the DNS, no one has to use it. And in fact, as many of you know here, many people aren't using DNS security, but that was a new kind of security, that's the kind of thing that comes through the IETF.

But once the IETF has finished their work, and said, okay, if you're going to do this kind of authentication, this is the way to do it, no one is forced to do it. Of course, everyone in the IETF thinks, oh, everyone is going to want to do this and such, and we're usually wrong. It's a long tail. But at that point, anyone can choose to use it or not. There is nobody forcing anyone to, and there is no one preventing within the IETF.

Now some governments, in fact, do prevent people from doing DNS security, or from doing it correctly. And that's fine. You know, that is that government's prerogative.

STEVE CONTE: Paul, we have a question from online, and I'm going to call this as the last question, because we are out of time.

PAUL HOFFMAN: Okay, very good. So before we get to that, don't forget to do this.

STEVE CONTE: The question is from [inaudible]. The question is, "Do you see any clear distinction in terms of technology area," and in parenthesis, "Maybe in terms of working groups, where participation comes from developing countries slash developed countries, does area of focus research differ?"

PAUL HOFFMAN: Good question that I don't have a good answer for it. I would say that I see more people from developing countries getting active more in the operations area, because especially as developing countries notice how much further behind they are then developed countries. That's not usually in the technologies available to them, it's how well it gets implemented.

So in the operations area, you will see more people from developing countries, but also in transport. Again, the congestion problem. Because if you have smaller pipes, your pipes are going to be congested sooner than for the larger pipes, and so I would yeah. I would say in transport, and in operations, you would see more from people in developing countries who have already seen the problems that are coming up. Okay?

STEVE CONTE: Great. Paul, thank you very much for your time today. All of you, thank you for attending today. We are going to take a short 10 or 15 minute break, 10 minute break to get setup for the next session which is Internet Networking, which feeds back into unique identifiers and things like that.

Interesting session, of course all of our sessions are interesting, so come and join them all. And we look forward to seeing you guys in the next session. Thanks.

[END OF TRANSCRIPTION]