RunAs Radio

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Text Transcript of Show #053
(Transcription services provided by PWOP Productions)

Sean Siler Sets Us Straight on IPv6!
April 16, 2008

[Music]

Carl Franklin: From runasradio.com, you're listening to RunAs Radio, the Internet audio talk show for IT professionals with Richard Campbell and Greg Hughes. This is Carl Franklin, introducing show #53, with guest Sean Siler, recorded Thursday, March 27, 2008. RunAs Radio is produced each week by PWOP Productions, providing professional media and podcasting services online at pwop.com.

Richard Campbell: You're listening to RunAs Radio. I'm your host, Richard Campbell. With me as always, my friend and co-host, Greg Hughes.

Greg Hughes: Hey Richard, how are you doing? Everybody, how are things?

Richard Campbell: Things are great for me man. You know what I'm working hard on right now is all of the stuff that we're going to be doing at TechEd in the US in Orlando.

Greg Hughes: Going to be a busy week.

Richard Campbell: Yeah, the all IT week.

Greg Hughes: That's right.

Richard Campbell: So, I get to go for both weeks because I'm going to be doing .NET Rocks! for the dev week and then we're going to be doing all RunAs Radio for the IT week and I've been putting together panel discussions we're going to do on the TechEd Online Stage for both weeks.

Greg Hughes: So, people that are there can see it in person and of course recordings will be made and contents saved for posterity sake.

Richard Campbell: Yes. We'll make them into shows.

Greg Hughes: Yeah. One person that I know that we hope to have because we know that he'll be there at TechEd and hope to have on the panel is today's guest.

Richard Campbell: Absolutely. All right, Greg. Let's introduce our guest. Sean is the Program Manager responsible for IPv6 at Microsoft. He has previously managed the company's IPv6 education and outreach programs, and served as the IPv6 Technical Lead for Microsoft Federal. In each of these roles, he has been able to actively assist Microsoft's customers better understand the need for IPv6 and help them begin their own IPv6 deployments. He is a 12-year veteran of the US Navy, has owned his own company, worked in the Pentagon, and spent several years as a technical trainer. Sean is a member of the IEEE, Internet Society, and Mensa. US Navy and IEEE, it's a great interesting combination. Lots of smart folks come out of the navy.

Sean Siler: You know, it's one of the things I enjoy about it was just getting a great rounding of experience that definitely put me in the right direction. I got my head on straight when I was young.

Richard Campbell: Well, and I meet lots of folks that I've worked with over the years that came out of the military and I think it just puts a little sense of seriousness in the work that they do.

Sean Siler: Absolutely.

Richard Campbell: Especially the nuclear reactor guys. I've worked with a guy who was a nuke sub guy, worked in the back-end of the subs. He was a serious guy.

Sean Siler: It's funny that you bring that up. That's actually one of the things that I was on track to do. I started off as a nuke in the Navy.

Richard Campbell: Oh wow.

Sean Siler: I've had a very interesting and colorful career.

Greg Hughes: I have a couple of friends who have worked on, until recently actually, worked on the aircraft carrier deck on a US Navy ship and you definitely have to be on top of your game to survive that. The discipline, the military experience can be real valuable later on.

Sean Siler: Exactly. I recommend it to everybody.

Richard Campbell: And generally a good thing to support your country as well. Even though I'm a Canadian and we're a little more casual on the patriotic side of things, I think public service is something we all should be part of our lives.

Sean Siler: There you go.

Richard Campbell: But speaking of public service, IPv6, this thing has been hanging around for 15 or so years and now you're telling me we're really in trouble. I mean is this just like the oil crisis? We're perpetually being told we're running out of oil. Now, we're perpetually told we're running out of IP addresses. Didn't we put this to bed once we created NAT?

Sean Siler: It's probably the question I get most often. I get that all the time and it's a great

analogy that you draw -- there's one big difference. When you're talking about oil, we have some ideas but we don't really know how much oil is under the ground.

Richard Campbell: Right.

Sean Siler: We can go and do research and we think we know, but we don't know. When it comes to IPv4 addresses, we know exactly how many are available.

Richard Campbell: So, it's not like we're mining for more addresses.

Sean Siler: We're trying to. We're trying to make more, but it's just not working very well. If you stick the entire IPv4 address space and you split it up into /8 allocations, so that means there are 16 million in each /8 allocation, there's only a grand total of 255 of those. If you look at how many of those allocations are given out every year, we've been averaging since 2003 about 12 allocations of /8 per year and we're down now to about 43 I think the number is right now. So, it doesn't take a real math genius to figure out at 12 per year on average and 43 or so left we're definitely on a downward slope. Now, you're right. We've been hearing about this for a long time and a lot of people say NAT fixes everything. Well, you know, when NAT came out and Spider came out, this is back in 1993, 1994, and when IPng first popped up, the original name of IPv6, that was all because originally we were allocating like 20 allocations per year and people got freaked out. At that kind of a downward slope, we were going to run out of IP addresses by like 1997.

Richard Campbell: Right.

Greg Hughes: Right.

Richard Campbell: And before the class list behavior came in, these were the class A's, class B's, class C's, right?

Sean Siler: Exactly. Exactly correct. So, NAT and Spider immediately went into effect in 1993, 1994 and it definitely, you know, it's smoothed out that glide slope and it made sure that our addresses lasted a lot longer. We obviously didn't run out in 1997 and we're still here in 2008 and we're doing okay, but the problem is, because it worked well and it's Band-Aided things along for a while, people have been hearing about this since 1997 and so now they think there's no crisis at all.

Richard Campbell: Right.

Greg Hughes: Sort of a *boy who cried wolf*.

Sean Siler: Exactly. It's a finite amount of addresses and we're going to run out at some point. I'm not going to give you a prediction. I'm not a prognosticator, but they're definitely going to run out.

Richard Campbell: Well, I was just reading on the IANA site and they are the guys who allocate out the address. They are now saying May of 2010.

Sean Siler: That's the date that I have heard as well.

Richard Campbell: Okay. I mean that's pretty exacting, but like you say, when you're talking in terms of the rate that /8s are being consumed, this is why we're going to run out of addresses. There are every day new IPs get allocated out.

Sean Siler: Exactly. People say NAT fixes everything. We don't need IPv6 because we have NAT and I agree that NAT certainly has helped the problem, but even with the NATs that we currently have in place, we're still allocating all of these IPv4 addresses every single year. So, it's not fixing the problem. It's simply delaying and pushing it off some.

Greg Hughes: Hence, 2010.

Sean Siler: You're right, 2010, exactly.

Richard Campbell: So, irrespective of as much as we may care or not care, the IETF is moving ahead, right?

Sean Siler: Absolutely correct.

Richard Campbell: IPv6 is happening.

Sean Siler: It is happening. We now have it on the DNS route servers in fact. We have Quad A enabled on DNS route.

Richard Campbell: Yeah, that's right. We've made a major step forward this year.

Sean Siler: Yup, just a couple of months ago.

Richard Campbell: I was reading also that there was some conference where they turned off IPv4. Everybody had to use IPv6 to be able to get on the wireless.

Sean Siler: It just happened last week as a matter of fact over in Philadelphia.

Richard Campbell: That's really cool. I mean it's obviously serious moves and Microsoft is making some moves as well. I guess Vista and 2008 are both shipping with the IPv6 stack.

Sean Siler: Absolutely. Not only shipping with the stack, but with v6 enabled and preferred by default. So, that's actually, you know, if you've got two Windows Vista machines sitting side by side in your network, even though you might not be aware of it, they're going to be using v6 to talk to each other. Why? Because v6 is preferred.

Richard Campbell: Now, I just had this experience. I was setting up a set of demo servers for a conference in another month or so, all 2008 boxes, and I gave them all names but I hadn't taken the time to go in and actually make some DNS entries for them. So, I knew their names weren't going to be recognized so I was prepared to just edit the host file. I mean spot the IPv4 geek here, right? So, while I get distracted, I haven't done the hosting, I'm working on other stuff. I come back and I think I thought I'd already done it, so I just tried to ping the name and it worked.

Sean Siler: It works.

Richard Campbell: But when I pinged the name, the address it resolved to was an IPv6 address.

Sean Siler: There you go.

Greg Hughes: That weird wonky looking thing.

Sean Siler: It is. It's very strange the first couple of times you see them, but you just hit on one of the first real benefits I'd like to talk about with v6 and that is that it auto-magically happens. You plug in your boxes and the machines that are on the same link, they automatically can just find each other and can communicate. You don't have to have a DNS box. You don't have to register. You don't have to do anything else. They can just finally communicate with link local addresses, so it's amazing.

Richard Campbell: I mean one of the best ways I've heard this described is IPv4, which is old, I think this spec was originally written in 1981.

Sean Siler: Actually a little bit earlier. I just saw a presentation with Vint Cerf and he was saying they were actually beginning the work on it in like 1977.

Richard Campbell: Wow. So, so many of the features that we take for granted today like DNS and DHCP and so forth came after the IPv4 spec.

Sean Siler: Right, exactly. That's the thing. I don't want anybody to think that anybody is trying to bash IPv4. It's a great protocol. It's done a terrific job of getting it here. You like it, everyone likes v4. It's not bad. It's just that we hit time to move on. We're in a space constraint here and it's time to get the next level of services that we need to support the applications and the things that we want to do. We need to make sure that our network can support that with a new level of next generation services that are built into the network stack. Let's face it. What is IPv4? At its very basic layer, it's all about just pushing packets. It's a dumb packet pushing protocol. There's nothing else that's really built into it. It's all designed to just push little frames across the network and that's it. Everything else has been added on over the years and that's what v6 kind of changes.

Greg Hughes: So, let's talk about IPv6 and what's substantially different. When you say IPv4 and then next to that IPv6, it sounds to the casual observer as if they're merely very similar and maybe it's just an incremental changes in IPv6, but what are the real substantial differences?

Sean Siler: Well, that's both true and false. They are very similar and they are very different. IPv6 is obviously the upgraded next generation version of IPv4. We moved from a 32-bit address space to a 128-bit address space. As most people have heard, what that means is we get incrementally larger amounts of addresses. Every time you add an extra bit onto the address space, it doubles the address size.

Greg Hughes: Right. So, we're not just talking about four times the size or so. We're talking about a much larger…

Sean Siler: Exactly. You know, I once tried -- I tried to figure out, you know, I'm a presenter, I'm a visual person so I want to be able to say if IPv4 is this big, holding my fingers close together, then IPv6 is this big holding my hand way up off the floor, but I couldn't really come up with the correct scale. It was really always too large. So, my wife who's kind of an old school geek, she said, "Listen, once you try shrinking the entire IPv4 address space down to the size of like an atomic nuclei and then figure out how large IPv6 is compared to that." I said, "Hey, that sounds pretty good." So, I actually sat down and did the math. If the v4 address space is the size of one atomic nuclei, if you took a chain of those and put them together to equal a v6 address space, you'd have to travel at the speed of light for one month to get to the end of that address chain.

Greg Hughes: Wow.

Richard Campbell: A light month.

Sean Siler: Yeah, a light month.

Greg Hughes: And that is amazing.

Sean Siler: It is.

Greg Hughes: So, at the current rate, we'll run out of addresses by 2020…

Sean Siler: Exactly and I'm not trying to say this is going to last forever. I don't think anyone is saying that v6 will last forever, but it's designed to last for the foreseeable future, but I mean that's one of the changes. It is the larger address space. That's not, by any means, that's not everything. Things like having IPsec available, built into the protocol is a good thing. It doesn't mean you have to use it, but it means that like we, Microsoft, have to support that. We have to make sure that our operating system will support IPsec. That's really good for interoperability to make sure that everyone will support IPsec.

Richard Campbell: Everybody's going to support IPsec.

Greg Hughes: Right.

Richard Campbell: The other one that really excited me was multi-casting actually working.

Sean Siler: I'll tell you. The amount -- I always knew about multi-casting. I'm an old IPv4 geek myself. I've always known about multi-casting. We've talked about it and how often does it really get used in IPv4 network?

Richard Campbell: How about never?

Greg Hughes: Almost never.

Sean Siler: Exactly. I mean there are a couple of things they use it, but it's pretty sparse. In v6, it's used everywhere. There's no actual broadcast in IPv6. Nothing sends out packets to everyone. Instead, everything is a multi-cast. You want to go out to grab an address from a DHCP server, that's a multi-cast to a well-known multi-cast address of DHCP server. So, everything becomes multi-cast. It's used for darn near everything, much more efficient use of a network.

Richard Campbell: That to me is very exciting. Of course, there's obviously some challenges around this. We could pound on the protocol itself I think for a full half-hour, but I really wanted to start talking about some implementation stuff.

Sean Siler: Sure.

Richard Campbell: What do we need to -- I mean obviously now we're starting to get machines that have the stack and I expect that sooner or later we'll get maybe SP3 will include the stack for XP and we're going to get a few more machines that support IPv6, but what else has to happen?

Sean Siler: One thing I do want to clarify, XP actually does have the stack. There was a weird little release cycle there. When Windows XP initially shipped, it did not have the IPv6 stack. We came up with something called the scalable networking pack for Windows XP right around the Service Pack one time frame. Once we got to Service Pack 2, that was integrated into the Service Pack. So, as long as you've got XP Service Pack 2, which almost everyone on the planet does or at least should by now, then you've got IPv6 built into the OS. It's not turned on. It's not by default. It's not quite as clean as it is in Vista. We haven't gone in and changed any of the GUIs or anything like that, but it's there. You can turn it on and use it if you need to right now today.

Richard Campbell: And maybe we should just get this off the table or certainly get your position on it. Folks are saying we should be turning IPv6 off on Vista and Windows 2008 until it's time to start using it.

Sean Siler: Absolutely. I hear this all the time. If you go out on the Internet and you do a search for IPv6 and connection or IPv6 slow, you'll see 5000 people saying, "Oh, I can't access my printer," and 10 people will say, "Turn off IPv6 and try it again," or "My tires are going flat on my car. I'll turn off IPv6."

Greg Hughes: Right.

Sean Siler: It's the general answer for everything. I certainly understand from a security standpoint that in managed organizations, there's this longstanding notion of if you're not using it, you should disable it.

Richard Campbell: Right.

Sean Siler: And I get that. At least that one makes sense, but one of the myths that I definitely wanted to sell, people say, "Oh, well. If I'm going out on the Internet, IPv6 slows down my Internet browsing."

Greg Hughes: Yeah, I've heard that too.

Sean Siler: And that's absolutely, positively not true. I will stake my reputation on that. The reason for that is if I'm a home user, I'm sitting there at my house and I'm going out to browse the Internet, your Internet service provider unless you're in a foreign country, if you're overseas, it might be different, but here in the US, you're not getting an IPv6 address.

Richard Campbell: Right.

Sean Siler: From your ISP. Since you're not, the only thing that's enabled in IPv6 is that link local address we talked about before.

Greg Hughes: Right.

Sean Siler: So, you could use that to talk to other machines on your network, but you can't translate that into any sort of a connection to go out to the Internet. So, every time you go out to Amazon or Facebook or whatever, Microsoft.com, you will never ever, ever, ever try to use IPv6 to connect to those sites. Why? Because you don't have an IPv6 address with which to connect to them, so it's totally contained to your link, your in-home network. I get that people want to turn off stuff for security reasons. We really don't think it's necessary. We've gone through a full security sweep on IPv6 and have run no problems. We think that you'll actually cause more issues trying to go in and turn it off and back on. So, we recommend out of the box leave it on for everybody, but at least it's a logical argument saying we want to disable it because of security reasons because we're not using it, that sort of thing, but again we don't recommend it. We say, unless it's a specific thing you're trying to address, just leave it enabled, absolutely.

Richard Campbell: So, how are we going to deploy IPv6? Is this going to be a great switchover day where everybody is going to turn on IPv6 and that's what we're going to be working under?

Sean Siler: We did that once on the Internet. I don't think it's going to happen again.

Richard Campbell: Are you talking about the 675 to IPv4 transition?

Sean Siler: Yeah, the NCP. I don't think that we're ever going to have an opportunity to make that sort of modification to switch again. Now, this is going to be a slow and steady rollout. Right now, we're in an ocean of IPv4 with some dots of IPv6 here and there. Slowly, over time, organizations are going to enable IPv6 and so we're going to have these islands of v6 and as more time goes by, as v4 addresses become scarce, we're going to see these islands start to grow and eventually we'll have probably equal amounts of v4 and v6 until finally we have an ocean of v6 and little islands of v4. No, it's not going to happen overnight. It's not going to be a quick cutover, but it's just a slow, gradual phase out of v4.

Richard Campbell: So, I'm thinking that the average corporation running in a NAT-ted environment, which seems to be fairly common could be doing all IPv6 internal to the NAT.

Sean Siler: Absolutely.

Richard Campbell: Don't I have to upgrade my switches? Don't I have to upgrade my NAT router?

Sean Siler: Well, it depends on how they want to set it up. This is where we start getting into some architectural discussions that could last for days. There are many different ways to do IPv6. There are things like NAT-PT. Sometimes those are appropriate, sometimes not, but you could do IPv6 behind one of these with a v4 island out front. You could do v4 behind with v6 out front. You could just keep v6 internally and set up a router using something like ISATAP and once you set up something like ISATAP or 624 even, that would then allow you to do a translation and tunnel that technology out to the Internet.

Richard Campbell: So, ISATAP is software or it will be a piece of hardware that will translate between IPv6 and IPv4?

Sean Siler: ISATAP is an RFC and same with 624. These are protocols that will run and they service -- Cisco has a hardware box. You can get it to run on one of their routers or switches. You can also set up a Windows server to provide the same functionality, but it will simply take that v6 data from inside of your network, encapsulated effectively with a v4 header and then punch it out on the v4 Internet and send over to your destination point. So, this is a great way… we like ISATAP quite a bit internally at Microsoft and the main reason is because one of the big complaints about v6 is it's going to cost $100 trillion to upgrade my infrastructure, people think, to support IPv6 and because of that, we're not going to touch it. You could set up your ISATAP server somewhere in your network and with that one ISATAP server setup, then inside of your network you could deploy IPv6. You could do one, you could do many depending on what your hardware configuration is, but this allows you to actually roll out IPv6 in a phased deployment one subnet at a time, one location at a time, however you want to do it, but without upgrading your hardware. So, it's IPv6 now, infrastructure later. It's not designed forever. I mean it's not going to keep you from operating your hardware for 20 years, but it allows you to get the benefits of your IPv6 services and applications today without having to spend a whole lot of money on extensive infrastructure upgrade.

Richard Campbell: So, I'm just trying to envision this in a typical midsize business setup perhaps they're using ISA server, Microsoft's ISA server, as the gateway to the Internet. You'd be running ISATAP on there and then start switching your

machines. Well, they had both stacks running. Won't they just naturally prefer IPv6 once they can get out?

Sean Siler: It depends on, again, where they're located at and what kind -- once you have that ISATAP server set up, your ISATAP server would then be broadcasting an ISATAP address to the machine and if you had v6 connectivity directed to that machine, then, yes, they would be preferring v6, but if the machine inside of your network, if you want broadcasting RAs, these router advertisements…

Richard Campbell: Right.

Sean Siler: Leave the machine to your network's native v6 addresses. The ISATAP address would be all that they had and thus they'd be using the ISATAP address, they connect back to the ISATAP server.

Richard Campbell: Okay. What about stuff like DHCP and DNS and so forth? Don't I have to set up IPv6 versions of all of that?

Sean Siler: You do. Again, that's kind of a double-edged sword. DHCP v6 is a brand new version of DHCP. It does support IPv6, but I mean it also supports IPv4. So, if you set up a DHCP server that happens to be a DHCP v6 server, and that by the way is built into Windows Server 2008, then, sure, you can hand out addresses to v6 clients, you can hand out addresses to v4 clients and you're done with one box. If you've only got a standard DHCP v4 server, then you cannot use DHCP to allocate addresses to v6 clients.

Richard Campbell: That makes sense to me, so if I move over my DNS and DHCP services to Windows 2008, I expect I would automatically get the IPv6 features as well unless I specifically turn them off.

Sean Siler: That's correct.

Richard Campbell: That's still not going to cause your machines to use IPv6 to go to the Internet unless there's an ISATAP server out there to bridge the way.

Sean Siler: Either an ISATAP server or unless you set up these router advertisements to give native v6 addresses, exactly. Again, that's another one of those pieces of confusion. Some people believe that since Vista has v6 enabled by default, then in the Enterprise, they think that that means that everyone is going to be using v6 in the Enterprise to go out to the Internet and, again, unless you specifically set that up with something like ISATAP or a v6 native address, they're not going to be using those things. So, the administrator has control.

Richard Campbell: I cited the idea of running ISATAP on an ISA server. Would that be a typical scenario? Where would you normally put ISATAP?

Sean Siler: Every organization is going to be a little bit different. I don't think it would necessarily go on the ISA server. Actually, right now we've got a little bit of a problem with ISA Server. It's running a little bit behind.

Richard Campbell: Oh, that's right. There isn't a 2008 version of it yet because...

Sean Siler: Exactly.

Richard Campbell: A variety of reasons.

Sean Siler: Exactly. As soon as the 2008 version comes out, then we should be good to go there. So, for right now, it's actually going to be on -- ISATAP would be on a separate box, but you could also put it on the hardware as well.

Richard Campbell: I got to imagine at some -- well, you already said there's a version of Cisco IOS that does this. I'm sure there's some Cisco boxes I could buy that would be able to do that. I guess my question is what other hardware infrastructure is ultimately going to be upgraded? This also walks into when are ISPs going to start offering me IPv6 addresses?

Sean Siler: In terms of what needs to be upgraded, basically, anything that runs the layer 3 needs to be at least be looked at to see if it supports v6 or if it needs to be upgraded.

Richard Campbell: So, that includes switches.

Sean Siler: It does include switches, layer 3 switches. If it's a straight layer 2 switch, then you're okay.

Richard Campbell: Right.

Sean Siler: If it's a layer 3 switch, obviously… The good news is most manufacturers, because v6 is a concept that's been around so long, almost all hardware at layer 3 supports v6 today. Now, it might not do everything that you wanted to do. It might not be every configuration. You might need to do some memory upgrade, but in terms of just passing of v6 packet, almost all of them will do it. So, a lot of times it is kind of a question of do I need to upgrade everything in my infrastructure. It's a question of what do I need to tweak in my infrastructure.

Richard Campbell: Right.

Sean Siler: So, it's not as bad as some people believe.

Richard Campbell: Right. It's not $100 trillion?

Sean Siler: Let's sure hope not. You know, in reality, most people believe that it's not going to be the hardware at all that's going to take the lion share of the budget. It's actually going to be training. Just like you and I, old school v4 guys, when we learned v4, somebody threw a book at us and we read it over, you know, a weekend or a couple of weeks and we sort of got it. Now that we've got it, a lot of people think, "I'll do the same thing with v6. I got v4 down cold, I'll pick up a v6 book and I'll read through it and I'll have it." It doesn't really work like that. V6 is a little more challenging. In order to get the nuanced understanding of exactly what's going on with v6 under the covers, you really have to work with it for a while. Although on the surface it looks and feels a lot like v4, the actual nuts and bolts of it, the way things happen in order to learn it enough to troubleshoot it, you really have to work with v6 for a while and that's why I'm recommending to everyone, set up a test lab now even if it's at your house, I don't care, but start playing with v6 now just so you can see one of those weird, funky, IPv6 addresses and understand how to start troubleshooting it. The companies who are saying, "We don't think that v6 is a problem. We've got NAT so we're not going to touch it until 2010," well, when it comes to 2010 and now they have to deploy it, if nobody's seen it before, they're going to have a problem because they don't know what to do with it. It's going to be very unique to them and a steep learning curve.

Richard Campbell: And you're talking about Internet connections being down, internal networking connections being down, like stuff that you can't wait a week for training to figure out.

Sean Siler: Exactly and, again, too, that's why we also -- number one, we try at Microsoft not to use the word migration. We don't believe that anybody right now should be migrating to IPv6. Instead, we believe you should be deploying IPv6. Migration implies turning off.

Richard Campbell: And IPv4 isn't going to suddenly stop working in 2010.

Sean Siler: You got that right. The day that we run out of IPv4 addresses, it's not a big deal. I mean that doesn't mean it's the end of the Internet. That doesn't mean that anything bad is going to happen. It just means that the next organization that goes to request an IPv4 address isn't going to be able to get one, but the Internet as a whole continues to function as it did, but from there on out, we start having problems with new organizations coming online and new ISPs trying to get IPs to their customers and things like that.

Richard Campbell: And I could see that they will start being pressured for folks to give up their IPv4 address, just like when we switched over to classless and folks that were holding on to A's and B's were cut down to /24s and /22s and things like that.

Sean Siler: Well, you know, that's the topic of much debate right now. There's a raging, and I said that with a capital R and in bold type, raging debate in the Internet community from people saying, you know, "Look at the number of organizations that have a full /8," the old class A, "assigned to them that done really need it. These organizations should be forced to allocate, give up that /8…"

Greg Hughes: Give it back.

Sean Siler: Back to IANA or the other school of thought is there should be some sort of a financial incentive to make it worthwhile for these organizations to sell back their unused IP addresses to IANA.

Richard Campbell: And largely, these are companies that were like the early, early guys on the Internet, folks like Hewlett-Packard and Stanford University, that they were there, they were part of the IPv4 transition for example.

Sean Siler: Exactly and when they got those addresses, since they were the early adopters, these really weren't, you know, leased addresses, they were given, they were granted, they own these addresses.

Richard Campbell: Sure, but that's pretty much before the era of the ISP.

Sean Siler: Exactly, exactly correct, but so a lot of people believe if these companies were to somehow give back their unused allocations, their unused IPs, that we would then no longer have a need for IPv6 because we would have plenty of addresses put back into the pool. I just want to take a moment to discuss this to say that most people who look at this from a big picture view say that while that sounds really enticing, in reality there's not a whole lot of ways to make this work. Number one, what organization, what IT manager is going to go to the CIO and say, "Hey, we want to renumber all of the IPs, all of our subnets inside of our network to get a couple of thousand dollars or $10,000." There are too many other pressures going on inside of their organization. No one can force them to give them up. I mean they own them, so legally there's not a whole lot that can be done, but even if, let's say that miracle of all miracles, let's say that 20 /8s came back, I mean

that's a huge number of addresses. We're allocating 12 per year, so 20 would give us an extra, what? Two years.

Richard Campbell: Right.

Greg Hughes: Right.

Sean Siler: We're not talking about lasting forever. These addresses are going away at a pretty prodigious rate. So, like it or not, v6 is coming and we have to get ready for it.

Richard Campbell: Gentlemen, another half-hour has disappeared.

Greg Hughes: It sure has, Sean. I know that www.microsoft.com/ipv6 is a quick redirect way to get information at Microsoft and I should point out that there is a link on that page to the IPv6 blog that you write, which is a great resource of a lot more extended information. So, anybody who wants to know more about what Sean is thinking about, that's probably the place to go.

Sean Siler: Absolutely and I try to put up anytime I hear something that's going around the Internet that doesn't sound quite right. I do a little debunking there on the blog. Feel free to give me any feedback there as well.

Richard Campbell: All right, gentlemen. I guess we're going to have to call it a wrap. Sean Siler, thanks so much for talking to us about IPv6.

Greg Hughes: Thanks Sean.

Sean Siler: No problem. Thank you for your time.

Richard Campbell: And we'll see you next week on RunAs Radio.