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Expert Talk: Your Top Wi-Fi Questions Answered – Q&A with David Coleman

Welcome to the Extreme Academy Expert Talk. Get ready for an information-packed session as we delve into the industry's top Wi-Fi questions and gain invaluable expertise from David Coleman, Extreme's renowned Wi-Fi expert.

In this exclusive free training session, you can expect to gain a comprehensive understanding of pivotal topics, including the key considerations surrounding the move towards 6 GHz and the emergence of Tri-Band Networks. We will also explore the crucial question of when customers should consider transitioning towards WPA, along with the important considerations in this process. Our experts will dive into the implementation of standard power outdoor in both the US and global contexts and take a glimpse into the future of 2.4 GHz environments.

That's not all! We'll also be delving into David's thoughts on roaming technologies and solutions, the intriguing possibilities of 5G and Wi-Fi interoperability in the future, the vital role of site surveys in Wireless LAN and Wi-Fi deployment processes, and the significance of RF visualization.

Whether you're an industry professional seeking to stay ahead of the curve or an enthusiast eager to explore the frontiers of Wi-Fi technology, this broadcast is your opportunity to gain invaluable insights and expertise from one of the industry's leading authorities.

HOST

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EXPERT

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Extreme Networks Wi-Fi Expert

Q1. So first up, 6 GHz, lots and lots of talk about 6 GHz WLAN. We wanted some guidance from you on when it should be adopted, when the time is right and really what the considerations around that move towards 6 Ghz?

Well, you know, I've actually been talking about what I call the era of 6 Ghz Wi-Fi connectivity for about 2 1/2 years now, but we're still at the very beginning of it, and it's all about the regulatory environment and being able to have this new frequency band available to us. For Wi-Fi connectivity, and I really view it as a paradigm shift because it's in some countries like North America, Canada and the United States is 1200 Mhz of frequency space, which is double what we have in Europe, which is currently about 480 Mhz, but we hope to get more in the future as well. At the end of the day, anybody that is looking to future proof their network. I believe the future of Wi-Fi actually will ride on the superhighway of 6 Ghz. So in my mind, if somebody's thinking about the refresh cycle in terms of upgrading, they need to be thinking about 6 Ghz connectivity, whether that's Wi-Fi, 6E or Wi-Fi 7.

Q2. So, building on that, David, on that 6 Ghz answer, what are some of the considerations around building and planning for Tri Band networks to include that 6 Ghz spectrum?

OK. Well, once again it I'll reiterate that it's where you are in your refresh cycle and if it's time to refresh, you absolutely should be thinking about 6 Ghz. But there's clearly some considerations. Probably the first question I get asked is can I do 1 to 1 replacements? Can I just rip down my old Wi-Fi 5 or Wi-Fi 6AP and put up an AP that has a 6 Ghz radio in it? Well, traditionally 1 to 1 replacements are not really a good idea. You know, it depends. Some customers, that is maybe their only option, but at the end of the day the 6 Ghz frequency is going to have a little bit shorter range than 5 Ghz.

Effective range has been a common denominator in the past. 6 Ghz is going to be a little bit smaller. So they need to be thinking about that. Additionally, from the client side. The clients are actually also going to have to operate at 6dB below that at which the AP's operate at least in North America, not going to have quite that problem in Europe. But where I'm getting at, it's going to be shorter range, so whenever you do a refresh, you should always design and validate. So even if you attempt to do a 1 to 1 replacement design and validate.

Now there's two other things I think they should think about too, and that is the wired integration too. As with Wi-Fi 6E, and with Wi-Fi 7, I I really think we're finally to the point where multi gig is going to be a reality. So you know traditionally a 1 Gig uplink from your AP to your switch was more than enough. Where it's been corner cases where that's been a bottleneck that's probably finally starting to change. So at the end of the day, you need to think about your wired network and infrastructure as well and upgrading that for multi gig for future proofing purposes

Secondly, the even the more important part of that conversation is PoE. So moving forward, we're putting more radios in the AP's so the days of 802.3af, are limited.

We need PoE + (25 watts), and in some cases for full functionality of an AP, you're going to need up to, 32 or more watts. So 802.3bt power. So that's a very big consideration, making sure that you have the proper power budgets and the last thing I'll say about this is 6 Ghz is an opportunity. You don't necessarily need to design and do everything that you've done with Wi-Fi before in 2.4 and 5 Ghz the exact same way. I'd like to challenge customers and partners to think out-of-the-box. Maybe it'll be more application driven. Maybe you have bandwidth intensive or mission critical applications running on the 6 Ghz band. Or you're doing things with 6 Ghz with Wi-Fi that you've never done before, so view it as an opportunity as opposed to more of the same.

Q3. What are some of the considerations and the planning and really when should customers be looking to move towards WPA3?

Well, it's interesting that you asked that because 6 Ghz in itself is actually going to drive wider adoption of WPA3 because it's mandated for 6 Ghz connectivity. There is no WPA2 in 6 Ghz and you always want to strive to have the best and strongest security when it comes to wireless or wired networking, so it's been a mandate for WPA3 for 6 Ghz. What does that mean though for the legacy bands? That's where the question gets a little tricky because WPA3 has actually been around for about four years now, but it hasn't been widely adopted in the 2.4 or 5 bands, simply because a lot of the legacy drivers had connectivity problems. That's changing. If you're using WPA3 Enterprise with what is called transition modes on the legacy bands, that's a fancy word or phrase for backwards compatibility, so being able on a single SSID to support WPA2 and WPA3 at the same time on the legacy band works pretty good on enterprise with 802.1 X connectivity, as a matter of fact, statistically, we're seeing that well over 95% of clients will connect with no problem if you enable the backward compatibility capabilities. So if they're newer clients, they'll connect with WPA3, older clients will connect with WPA2.

Now it's a little bit different when you start talking about WPA3 personal and turning on the transition modes for WPA2 personal, it's two completely different protocols you're talking about. The user experience is the same, it's just they're typing in a pass phrase but you're talking about one protocol that uses PSK and another one that uses something called SAE, Secure Authentication of Equals. Because of that, we've seen some issues with connectivity and on the backwards connectivity, so I'm not really prepared to give the guidance to use those transition modes right now on the legacy bands. But if you're using personal on 6Ghz, you have to because there is no WPA2. With time, we hope that as we move forward, you'll use WPA3 on all three bands and over time phase out WPA2.

The last thing I should bring up is open networks. Open networks have traditionally been used a lot for guest networks. Not really a good idea because at the end of the day you have an unencrypted network and you have no authentication. There is an answer for that. It's called enhanced open. Enhanced open is half of the equation, it's. Encryption but no authentication, so that's starting to grow. It's also supported on 6 Ghz and it's supported on the legacy bands, with transition modes as well. You know, some customers may want to use that, although I'm still kind of a big believer in our PPPSK solution, which is a WPA2 solution, but currently that's at more of a 2.4 and 5 Ghz solution. Just to summarize all this, WPA3 is growing. It's mandated in 6 Ghz and the adoption is growing quite fast now in 2.4 and 5.

Q4: Thanks, David. That's great. So back on the 6 Ghz topic, when will standard power outdoor be available on the 6 Ghz spectrum, both in the US and globally?

OK, well 6 Ghz so far has been an indoor only play with what is called low power indoors, (LPI), in the United States, Canada, as well as other portions of the world globally that have adopted it so far.

What is imminent right now in North America is what is called the availability of standard power that you just mentioned, which will be used outdoors. But believe it or not, can also be used indoors. I'll circle back to that. Standard power means a couple of things. Number one, you'll have higher power than LPI. Number 2 you can use, at least in North America, you can use weatherized devices, and you can also use detachable antenna. Initially it will be an outdoor play, for example, in Extreme customers that are stadiums, but also in other verticals as well.

But I do believe it will also be an indoor play as well, there might be some verticals that might want to use detachable external antennas, that are directional indoors, like in manufacturing for example.

Q5. So, what are the obstacles for implementing standard power globally and in the US?

It's interesting you ask that because the it's not really an obstacle, it's more of a technology challenge and that's something called automated frequency coordination, (AFC), which is something we've never used in Wi-Fi before. So right now, there are existing incumbents that transmit in 6 Ghz already like fixed satellite services and we are not allowed to interfere with them. So, to operate a standard power AP, whether it's outdoors or indoors, we basically have to ask permission first so that we don't interfere with the incumbents.

So, what an AP will do is it will contact what is called an AFC service provider and say I want to use this channel and this power level, can I do it? Then that AFC provider will check a known regulatory database and if that app is not going to interfere with anybody, it will say yeah, go ahead, use that Channel or if it's potentially interfering with an incumbent will say no, you need to lower your power and maybe change to a different channel.

So, it's kind of a. A proactive way of making sure that we don't interfere with the existing transmitters that are out there in 6 Ghz. This is about to happen very shortly in the United States, it's imminent.

Now your original question was, what about the rest of the world? We'll see. You know, I mean, honestly, there's a whole drive to what it's called spectrum harmonization. I think one of the first things we really need to happen right here, for example, in Europe, we need there's only 480 Mhz of frequency space dedicated for LPI power and indoor use. Well, we need all 1200. So worldwide, ideally, we want to have 1200 Mhz of frequency space available for everybody then when you start talking about standard power, it's not as much frequency space and it's a different set of rules. Then you add in the whole automated frequency coordination that's going to be different per region and different per country. It's going to take some time in some regions, it's taking it longer than we thought it would in the United States, so I can't really make predictions because we're talking about government here. I think we'll get there eventually, but it could be a couple of years.

Q6. So let's move on to backwards, I suppose and to some extent and look at think about 2.4 Ghz. I've had some personal experience recently with IoT devices on 2.4 Ghz in environments where there was no 2.4 Ghz available for example. So I know there's some considerations here. What are your thoughts on 2.4 Ghz in the future? Can this be disabled? How long is that environment going to last?

Well, at the end of the day, Wi-Fi was designed where it could actually operate on any frequency. It started out on 2.4. Then we had 5 Ghz and now we're moving into the era of 6 Ghz connectivity and we will, I think in the future see Wi-Fi operate in higher frequencies and lower frequencies, in the future. But specifically to your question about 2.4, well, that's where Wi-Fi got started. You know, you know, 25 plus years ago and whopping 3 channels. Look, you know, sometimes 2.4 Ghz is referred to as a junk band. I think it's more of a best effort band in the enterprise. You would not want to be running your enterprise applications anymore on the 2.4 band. Can you turn it off? We've had customers who have effectively done that where they've completely disabled 2.4 Ghz, but that's if they can mandate the client population, and very often that is not feasible because somebody might be bringing in some old legacy device that still supports only 2.4, or they still have, as you said, Io T devices that well, they have cheap 2.4 radios in them. So it's kind of hard to just completely get rid of the 2.4 band, and I'm not sure if it was really designed to be got rid of. But I guess the bigger thing is 5 Ghz is where we build a foundation of enterprise connectivity on in the last 10 years, 6 Ghz is our next opportunity, but 2.4 Ghz is still there for legacy equipment that you might still have around and for IT devices that simply don't have the more advanced radios in them.

Q7. Shifting gears a little bit, David, how about we talk about roaming technologies. We hear lots of talk about different roaming solutions open roaming comes up in conversation I think quite a bit recently I know we're part of that consortia. What are your thoughts around roaming technologies and solutions?

Well, first of all, that's roaming's at the heart of Wi-Fi. I mean, so why has our culture even adopted Wi-Fi and embraced Wi-Fi over the last 25 years. Well, it's mobility, right? You don't have to walk around with an Ethernet cord behind you everywhere you go. Now you're free to go throughout your house or your workplace or wherever you're at, and have that the seamless, frictionless and secure wireless connectivity and that's why we've really embraced it as a society now, roaming can sometimes be tricky with Wi-Fi and over the years, in the early days of Wi-Fi, it wasn't that great, to be honest with you. But over the years, it's got better.

Specifically in the last 10 years or so, we've really implemented a lot of 802.11k and 802.11v mechanisms, where clients and AP's are communicating, sharing information with each other about how to effectively roam to the next hop and a two way conversation.

Additionally, it gets even more complex when you start talking about layer three roaming. If you roam across layer 3 boundaries and that's where 802.11r comes into place and that is supported and can work if done properly.

So now that being said, we're always looking to improving roaming and I think what you'll see in the future will be the various alliances in the IEEE try to figure out what. How can we make that roaming and seamless and secure experience be completely faster with latency of well under 20 milliseconds has always been the goal. In other words, a great user experience so that once again the end user doesn't even know you're roaming, but has that capability, so, there's always room for improvement.

Now, you didn't mention one other thing and that is Open roaming. That's more of a kind of a federated alliance of companies that for secure and seamless 802.1X access for public networks, I think government or public areas, stadiums, Extreme Networks, part of the the whole Open roaming initiative. Especially we're seeing a lot of implementation and growth on that side in Europe and it's starting to find its way and growing in North America. So think of think of it this way, you connect to a public network using 802.1 X connectivity. WPA2 or WPA3 you connect and then when you go to a some completely different network somewhere else you connect and you don't have to enter in credentials or a captive web portal and that's the goal to make it a happy user experience. Does anybody like captive web portals when you log into a captive web portal, you like that experience? Never. That's what Open roam is all about. It's just to make it so wherever you go, you get on it's fast and it's secure. A long way to go but we do believe in it, it is growing globally.

Q8. So how about 5G today? Lots to talk about 5G. How do you see 5G and Wi-Fi interoperating and interrelating in the future?

Honestly, I get asked that question a lot of different ways and a lot of times I hear a lot of hype that 5G is going to replace Wi-Fi, and that's just nonsense. We view them as technologies that are cooperative, not necessarily competitive.

It's a complex conversation because when you're talking about 5G, there's multiple kinds of 5G. Is it the public macro 5G that you're used to that on your smartphones or you're just connecting to your service provider, or is it the probably typically this in this conversation we're talking about private 5G where you own your own 5G network for your enterprise, and so when you're talking about Wi-Fi versus private 5G, that's where the conversation usually goes.

All the analysts predicted that private 5G was just going to go crazy very, very fast. Well, it hasn't really quite panned out that way. It's been a little bit more of a niche where we're seeing in some verticals, some success with it, like industrial and manufacturing, and I don't want you to think that I'm throwing private 5G under the bus. We view that there's a place for it. It just hasn't quite grown at the rate that all the analysts thought it would be, and it certainly hasn't hurt enterprise Wi-Fi. As a matter of fact, if you look at the trajectory, if you see private 5G going like in this hockey stick, Wi-Fi is the even bigger hockey stick, or they're parallel with each other, so you're not seeing private 5G like that and WiFi go down, it's more like this. In other words, they might be competitive in a very, very small space, but if we do have customers that might end up adopting private 5G for whatever reason, they're still going to use Wi-Fi too, and then eventually, maybe they'll actually be some convergence, but when I hear some people say things like, you know, private 5G is going to replace Wi-Fi, that's just crazy talk.

At the end of the day, there's also other wireless technologies too that you use in your enterprise. There's all the IoT wireless technologies. There's Bluetooth, and there's more on the way. Zigbee and Thread and others. So, and let's not forget about wired networks too. Look, you know, wireless networking provides typically 70 to 75% of the data that enters into your corporate network comes over Wi-Fi and the number goes up even more if you add other wireless technologies to that but there's still copper. So there's always wire somewhere you're plugging, that AP has an Ethernet cable connected to it so at the end of the day, there's connectivity, a lot of different ways and it's all about how you can manage them all and converge them all under one platform.

Q9. So clearly technology is moving on at a fast pace here. The Access point technology, wireless LAN technology in general moving at a fast pace and the capabilities are forever increasing and enhancing. How does that affect the need for site surveys? Is that something that's still needed? Is a site survey still an important part of the Wireless LAN and Wi-Fi deployment process?

A: Absolutely. You know, over the years, Wi-Fi has gotten better and better and better, but it's also got more complex and RF bounces around. It's not in a bounded medium like a copper cable Ethernet cable. Every environment is different. Which is why you need site surveys, which is I don't even like necessarily the word site surveys. I like to think of it really as a 2 part process, a predictive model where you're designing and based on your floor plans and the wall materials and things like that and as well as your customer needs what their requirements are. After you've established the customer requirements and what the Wi-Fi network is supposed to be used for, you can design a predictive model to meet all your coverage and capacity and mobility needs.

So that's the first part. OK, establish what the Wi-Fi networks for customer requirements and then develop that model using all kinds of predictive tools that are out there. Like Ekahau or Hamina and multiple other third party tools and then just as important is the validation. So post deployment is probably more what a site survey has become and that is validating your model and making sure that you have the proper coverage that you're meeting your bandwidth needs and your mobility needs and doing that on site validation, post deployment, which is very, very critical and making a few tweaks if necessary.

Q10. OK, great. Interesting. That makes that makes that makes a lot of sense. And I think you just hinted at this side of things as well. How do you visualize that in runs? It feels like the visualization of that is very important both for the that validation and the tweaks and also for the ongoing management.

A: Yeah. So you know all the predictive tools as well as the post management tools like ExtremeCloud IQ, all use some sort of RF visualization of heat maps. If you think about it, maps in general have been used in all kinds of software platforms. So think about Google Maps or even Apple Maps. I promise you, you use those daily for your commute and how you get around or think about using an Uber or a Lyft. You're using maps in software. Those software programs as well daily, OK, same thing in networking and networking management. There's always been topology maps. RF maps are a little bit different and they're heat maps that can show proper coverage and capabilities, but they are built in to the predictive tools that I mentioned and just as important as post deployment and whatever RF monitoring platform you have, be it via the cloud or on Prem or whatever. Having the ability to visualize your RF environment is very, very important and I think we're starting to see some advances in next generation technologies and how we can visualize RF in the future.

Notes:

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