## S02E09: Creating the sustainable smart home: Why Matter matters

Sujata Neidig (00:00)

Matter gives more opportunities to companies on how they can leverage their devices to help consumers lower their carbon footprint.

Kyle Fox (00:24):
This is the Smarter World Podcast, focusing on breakthrough technologies that make our connected world better, safer, and more secure. I'm host, Kyle Fox. Each episode we introduce bright minds and their approach to a more sustainable world. We discuss the opportunities and challenges they face and how technology can change the world for the better. Today we're talking smart homes and specifically how our smart home can lead to a more sustainable home. The term smart home has become part of today's lexicon, although we've only really just started to unlock the potential of what a smart home can do. The dramatic growth of connected devices within the home is driving the need to establish a more universal protocol for smart home devices to communicate with one another regardless of the different brands and platforms they're built for. Officially launched in November of 2022, the Matter protocol was created to unify and encourage interoperability between devices and platforms.
(01:19):
Matter has opened doors to more possibilities in the smart home and how those homes can help support greater energy efficiency and management. To talk about these possibilities, I'm joined by Sujata Neidig, NXP's Director of Marketing for Wireless Connectivity. She leads NXP's standards effort for IOT connectivity. Sujata has 25 years of experience in the semiconductor industry and represents NXP on the Thread Group and Connectivity Standards Alliance's board of directors, as well as serves as Thread Group's Vice President of Marketing. If you're not aware of the Thread Group, it is a nonprofit focused on making Thread the foundation for the internet of things in homes and commercial buildings. Welcome, Sujata.

Sujata Neidig (02:03):
Thank you, Kyle. It's so great to be here and chatting with you.

Kyle Fox (02:05):
Likewise. I'm really excited about our talk today. Tell our listeners a little bit about yourself and how you came to be a Matter expert.

Sujata Neidig (02:13):
I've been with the company for a number of years working in product management, product marketing, business development type roles, and I got involved with the smart home industry by supporting customers, and that led me into the wireless connectivity world and standards and how we can break down silos and bring industries together to solve common problems that the end users' experience. And so that's how I got involved into standards and then that evolved into Matter, and it's been a really exciting time. In my opinion, it's been an inflection in the smart home industry, and having technologies converged to really drive better user experiences and wider adoption.

Kyle Fox (02:56):
You've been there from the beginning, right?

Sujata Neidig (02:57):
Yes.

Kyle Fox (02:58):
This is a very evolving industry, but it really has only been maybe in the last decade or so that this has been going and you've been there from the beginning.

Sujata Neidig (03:05):
Yes, exactly. It's been exciting.

Kyle Fox (03:07):
When I think in my mind about the last two decades, I remember in my own experience that there have been some attempts in the industry to unify device communication. Can you explain a little bit about what Matter is and how is it different from existing and maybe some prior technologies?

Sujata Neidig (03:22):
In the smart home industry, we've heard about smart home products for many years. I think consumers like ourselves have had smart devices in their homes, but it really has not fulfilled that promise of a smart home where taking control and having that become more automated to make lives easier for consumers. In the past, what we've seen is a lot of silos. So the different platform providers like Apple and Samsung and Google, they have their different systems that they use and consumers get forced into picking one platform and having to buy products that only work with that platform. And so what that does is it really reduces consumer choice and flexibility and it drives lack of interoperability, which is a huge frustration point for consumers. The last thing you want is to buy this really cool device that you take home and then you can't set it up properly to work with all of your other devices.
(04:19):
And Matter changes that. One of the biggest differences I see with Matter is that it is supported by all of the major consumer brand companies that I talk about, Amazon, Apple, Google, Samsung, SmartThings, even companies like Comcast and IKEA, they are adopting Matter. So there is a common approach to saying we want to drive the industry forward and really create more home automation, and the only way we can do that is if we work together as an industry, and I think you stated it very well. Matter is a universal protocol for smart home devices so that these devices can speak to each other in a common language across brands and across platforms so that they just work with each other.

Kyle Fox (05:03):
These really large companies driving large ecosystems, I like how you described that. It's a Samsung ecosystem, a Google ecosystem, that they're actually committed to saying, "Yeah, we got to be able to communicate together." But what kind of blew my mind is you use the company IKEA in this. When I think of high-tech, I think Google and there's phones and that sort of thing and devices, but even IKEA?

Sujata Neidig (05:24):
Yes, exactly. Companies like IKEA, there's another brand called Aqara that's fairly new in the US but has been around for decades and providing smart home solutions, and they provide all the different aspects from sensors to door locks and hubs and lighting, but they've also adopted Matter; even though they create all the devices themselves, they want users to be able to control these devices through whatever platform they choose and to potentially augment them with other types of smart devices from different brands that maybe they don't provide themselves.

Kyle Fox (05:59):
So the picture in my head is that the industry is doing this right. People throw out the term coopetition, certainly standards are a way to level that playing field so we can all communicate together, but it really looks like Matter has become the way to go with this.

Sujata Neidig (06:12):
In millions of homes today, Matter is already enabled because apps that run on Google phones and iPhones have support for Matter. All of the major smart home speakers, the Echo device, HomePod, they support Matter. So people already have Matter in their homes today, and that's another unique capability of Matter is that consumers will be able to adopt Matter devices into their homes at a much faster pace than previously they've been able to.

Kyle Fox (06:45):
And that seems to be so critical, right? It's not like, "Hey, we've got the new standard, we've got the new thing. Now you've got to go replace everything." What you're describing is integrating into your existing tech within your home.

Sujata Neidig (06:54):
Exactly. I think when people hear the word standard, sometimes there's a perception that standards are all about building technology from the ground up, building it all from scratch. But Matter is different because Matter is using existing technologies where it makes sense. For example, it's built on ... Internet protocol is what runs the entire internet globally and then any kind of app can run on top of it. And so that's the same baseline foundation technology that Matter uses and Matter also builds in this capability that they call bridging. So Matter and the Connectivity Standards Alliance, which is the organization that owns Matter, the member companies realize that there are already millions of smart home devices in people's homes today and we don't want to obsolete what's already deployed or cause people to have to throw them away and replace them because that goes against all of the sustainability efforts that companies are investing in. So with Matter bridging, you can do a software update to a hub in your home and have it support the non-Matter devices by bridging them into the Matter network.

Kyle Fox (08:07):
Incredible. So they really thought this out. It was not only I want to be able to use it in devices we're now deploying today and moving forward, but we recognize that there's a whole bunch of stuff out there and you can actually bridge in those legacy devices and get the benefits, right? Is that what you're saying?

Sujata Neidig (08:22):

Exactly. And I think Matter is really driven from a market-based approach. So Matter gets defined what device types, what are those capabilities, how is it implemented is based off of defining first what the use cases are, what are the problem statements that the users experience? And then taking that and looking at, okay, how do we address these requirements and these challenges? And so I think that's another difference in how Matter has evolved as a standard that maybe some of the more traditional standards people may be familiar with in the past.

Kyle Fox (08:55):
I'd like to expand a little bit more into some details there. So we talk about these devices coming in and legacy devices, new devices, they're communicating. I loved how you said IP protocol. We're using well-known tried and true ways of getting this information back and forth and I'm curious, when Matter was first introduced, what comes to my head is that security of all these devices all connected together, that kind of had to have been at least mostly top of mind, if not one of the most important use cases for the protocol and it sounds like it'd be quite challenging to bring everything together. What is different about Matter and how it implements security to keep these devices secure?

Sujata Neidig (09:35):
That's a really interesting point because I think what we have seen in the last, maybe five to seven years, is a much higher awareness from consumers about the security of the data that smart devices uses, and in the past, the technologies and standards and devices that companies brought to market were really consumer driven mentality around it has to be lowest cost and so security was an afterthought. What we within Matter and NXP with our strong depth of expertise in security and the impact that lack of security can have has really mobilized the industry to think about security upfront. So Matter really did do that. It was pretty much a key design tenant for Matter to be developed on how do we make devices secure and consumers comfortable that they are secure? So what I can tell you is that what Matter did to define security for devices is very unique than previous wireless connectivity protocols is that Matter requires a device to go through an attestation process before it joins a Matter network.
(10:48):
The user will bring home a new device and pull up their phone and scan the QR code to onboard that device to the local network. When it does that, the device has to prove that it is what it says it is, so that it is a light bulb from company Bulby, let's say. It also has to prove that it is Matter compatible so that it has to prove it has a Matter certification. Matter does this through a process that they call attestation, and so there's a device attestation certificate that needs to be embedded in every Matter device to prove that identity and that it is a Matter certified device.

Kyle Fox (11:28):
It's also powerful that when you have to go through the product definition, if you're going to deploy something that's Matter enabled, the security, it's not an afterthought. It's not a what we'll do it at the end. It's at the very beginning. It's embedded in the actual standard itself and what actually has to happen to the device. As a homeowner and a high-tech user myself, that gives me a good feeling, right?

Sujata Neidig (11:47):

It doesn't stop at the onboarding. So once a Matter device is on the network, all data transmissions are encrypted because its IP, devices can transfer data from one device to another directly, so it doesn't go through any kind of a gateway that's doing translation function. So it's not unpacking the data packets and then figuring out where it needs to go and repacking it and sending it. So that also provides another level of security from a communication perspective.

Kyle Fox (12:16):
It keeps it local. You just change the paradigm. In my head I was like, they communicate and then the data goes up to a server somewhere, it gets played around with, comes back down, but that's not what's going on. It's staying local to that home. That makes a lot of sense because if I had a sensor in my home that's trying to turn on lights and air conditioning that has to be monitored, I don't want that data to be going up into a server somewhere.

Sujata Neidig (12:36):
Yeah, you hit the nail on the head. That word local network. Matter is a local network and that is critical not just to security but also for response times or latency. It provides more reliability so that you can use your devices even if internet goes down and that's what you need when you're doing home automation. The last thing you want is to not be able to turn on your smart light through your phone just because the internet is down.

Kyle Fox (13:04):
I hadn't considered that. I don't want to worry about somebody else's server as to whether or not I can turn on a light bulb. Yeah. We've talked about the infrastructure and it sounds like it's been really well-designed, really well thought up from the beginning, and I wonder if we can wade into some of those use cases that we've been teasing about here, the cool stuff. What does Matter enable that people can use? Maybe we can start with what type of application devices Matter is targeted for in a little more detail.

Sujata Neidig (13:28):
Matter is targeted for all kinds of smart home devices, but of course there's a number of them, so Matter can't support them all at the same time. So Matter was launched, like you said, a year ago with a set number of device types, but Matter is an evolving standard, so every once or twice a year there's an update to the Matter standard to either improve on some of the features or how developers use and implement Matter or to add new device types. So today there's sensors, window shades, thermostats, HVAC controls, lighting. Those are all different types of applications that are supported by Matter already as we speak. Other types of applications or device types that Matter is looking to support are things like air purifiers or air quality sensors, water leakage sensors, energy management.
(14:20):
Once you have interoperability between devices, that can open up a lot of opportunity on how to better manage energy between all these devices in your smart home. For example, if it's peak hours, maybe you don't want to have your washing machine cycle going at full speed. Maybe it pauses it until the load is lowered and then it reengages. And there's all these different use cases for energy management that can be supported once you have a common language like Matter for all the devices to speak to each other with.

Kyle Fox (14:53):
Energy management, kind of top of mind for a lot of people around the world. When I think about the way you're describing that a smart home can make it easier for consumers to manage, reduce their energy usage, and that's what I want to unpack. It means to me that the home could participate in being more sustainable to the ecosystem. So we talked about security attacks and protection against that, Matter also addresses that sustainability aspect of the smart home. Can you expand a little bit more on that? How is that going to work? You mentioned appliances talking to each other. How does that work in the energy side?

Sujata Neidig (15:22):
There's already things that people are aware of today with your smart thermostat. If you have a Nest thermostat, you get a message saying peak usage, we're going to lower your temperature or raise your temperature if it's hot outside to use less energy. Now the user always has control to override that, but there is that information being given to the consumer. So if you take that a step further and have it be defined that there are parameters about energy usage that are built into the standard to collect that information or have that information made available to other devices, then there's a lot of things that can be done from automation so that the user doesn't have to think about everything themselves. It can prompt them and say, "Hey, water heater is on right now. Maybe we should put the dryer in tumble mode while the water heater gets to temperature to save energy."
(16:13):
And if you can give the user those data points on what systems in their home are using the most energy, then they can make better decisions on how they want to have their smart home be operated and how to manage that smart home.

Kyle Fox (16:28):
I'm starting to see the picture, you were talking about putting that dryer that consumes a lot of energy into a certain state or perhaps a delay when it does, but what if it's a smart home that has a giant solar panel ray on its roof? The user may actually be more sustainable to run the drier in the middle of the day when the sun's up and it's getting the most free energy coming from the sun and not tapping the grid at all. If you can hook in these devices so that something understands what a dryer is and what parameters it does, then it could actually make that decision and let the user decide how they want to manage their overall energy consumption.

Sujata Neidig (17:03):
And Matter enables that. I'm not saying that Matter is doing all the energy management, but Matter gives more opportunities to companies on how they can leverage their devices to help consumers lower their carbon footprint. Another aspect, a little bit different twist, but like we talked about, Matter is also a local network, so it enables a lot more things to be done locally without having to go through a server to the cloud. So that also from a system level has a lower energy impact, lower carbon footprint and helps manage just overall system energy usage.

Kyle Fox (17:37):
That makes sense. And what keeps popping in my head now is that it's also money management. If I can come in with these devices and say, "I actually can reduce my energy cost," that's got to be important, right?

Sujata Neidig (17:48):
Absolutely. And Matter will make it so that information is available. So device manufacturers can show consumers data about how much energy and then what that translates into, the cost of the energy that they're using. And the cost of energy has risen globally and consumers are more and more aware of their costs and so they're not motivated by just the carbon footprint and sustainability. They are definitely motivated to reduce their overall costs and Matter does help enable that type of way of consumers to see where their cost is going with their utility bills.

Kyle Fox (18:27):
I wanted to switch a little bit off the use cases and just talk about what does it take to build and deploy a Matter device.

Sujata Neidig (18:33):
I have been in this semiconductor software industry for quite a while, so we know how complex it is for our customers to take technologies and capabilities and build an end product, deploy it, and be able to maintain and operate that and make sure it's functional for years for their consumer. So that's what we do. We try to take that complexity out for our customers and help enable them to build innovative products. So Matter is no different. Matter can be complex because it covers a range of devices and it's about connecting these devices to other devices that a company may not own. It could be from another brand. So when we talk to companies in the industry that want to build Matter devices, there's a few things that we like to walk them through. First of all is what is the complexity of the device that they're building?
(19:25):
Is it a simple sensor that's doing very limited function and then goes into sleep mode for most of the time? Or is it something like a thermostat that is also in sleep mode most of the time, but when the user comes up to it, there's a nicer user interface or it could be an access point in the home that's very complex in managing ethernet, Wi-Fi, maybe 15.4 networks. So really understanding the complexity of the device that you're building will drive them towards then what is the architecture of the system that they need to design. So wireless connectivity is a piece of it. Processing or computing and security is a piece of that. And so building off of all that, we guide them to show them if it's a simple sensor, you are going to want optimized for power consumption, cost and footprint.
(20:17):
If it's something that's in a gateway, it needs to have a lot of processing capabilities and be able to manage a lot of different networks. So we talk about standalone architecture and hosted architecture. A standalone architecture would be something that is a single chip design that the wireless connectivity and the application processing requirements and security requirement all managed within a single MCU. But for more complex systems, you'll pair the wireless connectivity chip with a host processor and it could be an MCU like our i.MX RT devices, or it could be a Linux-based MPU like our i.MX apps processors. So that's all of the components it takes to build the system, the connectivity, the processing, and the security. So once they understand what architecture they need, then that helps guide them in the components they need to select, and then they go into their prototyping and development and debug phase, and companies like NXP, we provide all of that hardware and software and enablement to help customers develop their code or their application.
(21:26):

Us helping our partners get products to market, I think, also the standards bodies like Connectivity Standards Alliance is a great source of support from product manufacturers. Matter is an open source project, so the software or the SDK is in an open source GitHub repo, and if you're a member of CSA, then there's a lot of collaboration that happens between member companies and a lot of sharing of best practices or how different companies have addressed different challenges or lessons learned. So that's another way that companies can get support.

Kyle Fox (21:59):
Thank you for describing that. What occurred to me is that it's not like this fundamentally different way to go and build something. There are things you have to do at the beginning to make sure that you're Matter ready, but we're not talking about a fundamental difference to the high-tech industry to actually deploy these devices. So it's not a barrier is my point.

Sujata Neidig (22:16):
It's not a barrier. I think what it does is that companies really have to reevaluate what their business models are and how they differentiate and where they innovate because Matter will open up more opportunities for them while it also, like you said earlier, creates kind of a level playing field. But I see that as a good thing because it's level playing field for the foundational element like the plumbing. And now you can invest your engineering resources on how you're going to innovate for the user experience on how they interact with your devices to be more comfortable or be more energy efficient in their home or be more secure.

Kyle Fox (22:51):
That treadmill of change and innovation and movement that the whole high-tech industry is based on is what you're describing that gets it moving forward so they don't have to worry about the foundation.

Sujata Neidig (23:01):
For product manufacturers, their market TAM is now exponentially larger because it's, like I said earlier, a Matter is supported by all of these major brands. And so if you're a product developer making a door lock, your door lock, you can make one SKU that will work with Google, Amazon, Apple, SmartThings, and that opens up a market for you with a single investment. You also said about scalability and platform. You can take a platform approach to how you implement Matter and scale it from a standalone to a hosted and just changing some key components, but not changing the overall implementation of Matter. So that's a way that we can help customers really build out a Matter portfolio more quickly and get to market.

Kyle Fox (23:46):
Thank you so much for sharing all this. We've unpacked a lot of cool stuff in a very short period of time. Before we close, on our podcast we usually ask a guest how they envision a greener more sustainable world 50 years from now. But for this episode, I want to do something a little different. I'm going to take a little departure from that question and what I want to do is rephrase it a bit. I want to ask you what exciting stuff is happening with Matter that will enable a greener world in that future?

Sujata Neidig (24:11):

I really think that having a greener world is something that is top of mind of so many people, and I know me personally, I've invested a lot of my personal energy into how can me and my family live in a smarter, more energy efficient way. So I find it very exciting that Matter is a technology that is enabling new ways for the industry to address sustainability. And so I think looking ahead, Matter is rolling out a lot of the basic device types and the basic capabilities. There's so much opportunity to build on that and really not just define maybe different device types, but also how to interact those different devices to create a more autonomous way for smart homes to be energy efficient or more sustainable so that the home truly is smart and not full of smart devices. So to me, this whole concept of autonomous operation with user consent is something that I'm really excited and looking forward to because I think that is a way that people can make more of a meaningful impact.

Kyle Fox (25:17):
Thank you for sharing that. You've given me a glimpse of that future world through your eyes, and it sounds like a wonderful future, and I want to participate in it. We've come to the end of our podcast and it's been an absolute delight having you on. This is a meaty subject and I'd love to have you back next year so we can see how things have progressed. But I want to thank you for your time and being on here with us today.

Sujata Neidig (25:37):
Thank you, Kyle. It has been fantastic to catch up with you and talk about something that I'm passionate about and that is making an impact in the industry.

Kyle Fox (25:46):
Thanks for listening and we'll see you on the next one.