

# It's a Matter of Interoperability: The New Standard Makes Smart Homes Just Work

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by Ron Martino



Talk to just about anyone in the Smart Home business these days – technology providers, OEMs, ecosystem partners, independent design houses – and you’ll hear a lot of excitement. The market is hot. The necessary infrastructure is widely available, with internet access, wireless connectivity and even edge processing commonly featured in everyday homes.

Dig a little deeper though, and you’ll start to hear some frustration. As good as things are, people are hoping for something better. The conversation soon turns to obstacles and barriers, since we’re still dealing with technical complexity, a general lack of standardization and issues of interoperability and security.

## Fragmentation Is Slowing Us Down

Most of this frustration can be traced back to one thing: fragmentation. We’re seeing it within home networks and throughout the market as a whole.

Today’s network setups often involve a mix of fundamentally different wireless protocols, many of them defined before smartphones and the cloud came along and each initially created for specific purposes that have slowly expanded to cover the evolving smart home. This means that smart home devices today use different protocols which led to confusion among consumers. Getting these legacy, low-data-rate protocols, like Thread and Bluetooth® Low Energy to work alongside newer, higher-data-rate protocols, like Wi-Fi 6 and Thread, can create serious headaches, for even the most technically savvy consumer (or wireless engineer, for that matter).

At the same time, the biggest players in the consumer market – Amazon, Apple, Google and Samsung, to name a few – all have their own platforms which are incompatible with each other. All this fragmentation is hampering growth and limiting innovation. From the

consumer's point of view, it's creating overly complicated installations that are hard to control, difficult to expand and inadequately protected from hacks. And from the developer and manufacturer's standpoint, it forces the creation of many similar yet incompatible products, each designed for a particular ecosystem. There's also the added burden of having to verify compliance with each ecosystem and provide technical support within the silo of each operating environment.



Courtesy of Connectivity Standards Alliance

## **We Need a Unifying Standard**

Those of us who have been in technology for a while look at these issues of fragmentation in Smart Home and are reminded of a similar situation from computing.

Back in the day, anything you wanted to attach to your personal computer, be it a mouse, a printer or a hard drive, came with its own cable, plug and port. PCs and laptops were equipped with all kinds of serial and parallel ports, each of these interfaces required dedicated software support. Installing a new device meant dealing with drivers, multiple reboots and maybe a hardware change or upgrade.

Then the universal serial bus (USB) standard came along. All your computer needed was a single type of port for most peripherals and new devices basically configured themselves. You could buy a printer or external hard drive without having to think about physical configurations or resource conflicts. Finally, computer peripherals just worked. There are now billions of USB devices in the world, and the pain of connecting computer peripherals seems like ancient history.

That same kind of unifying standard, with its ability to simplify and inspire, is what Smart Home needs.

Enter Matter, a new standard, backed by the biggest industry players and designed specifically to address fragmentation in the Smart Home market. It's the interoperability standard we've all been waiting for.

## **Matter Meets the Need**

Matter (established in 2019 using the name Project Connected Home over IP or CHIP) is an industry-unifying, royalty-free connectivity standard created "to increase compatibility among Smart Home products, with security as a fundamental design tenet."

The project was launched by Amazon, Apple, Google, SmartThings (Samsung) and a group of board members of the Connectivity Standards Alliance (formerly known as the Zigbee Alliance). In alphabetical order, these board members included Comcast, IKEA, NXP, Resideo, Schneider Electric, Signify (Philips Lighting), Silicon Labs, Somfy and Wulian. A large group of participant companies are now involved, too.

The list of participants is part of what makes Matter so important. It brings together well-known ecosystems in the Smart Home, including personal-assistant technologies used today, along with important stakeholders from across the industry, including leaders in semiconductors, systems, software and consumer goods.

## **Connecting It All**

Officially introduced as a standard this spring, the initial version of Matter creates interoperability for three of the most widely used wireless protocols in Smart Home – Thread, Wi-Fi and Bluetooth LE. Devices that comply with this new Matter standard will be interoperable. That is, they'll deliver the same kind of "plug-and-play" experience that USB does with computer peripherals: they'll just work.

Matter is royalty-free to use and will launch with an open-source software implementation and a strong certification program to ensure interoperability and compatibility. A quick look at the details reveals the four key elements that set Matter apart: IP-based operation, clear device definitions, an emphasis on security and a focus on simplicity and reliability.

## **IP-Based Operation**

Matter uses internet protocol (IP) as the basis for connectivity. IP is what makes the present-day internet possible, and it's a logical choice for connected homes, too. Standardizing on IP lets Matter use existing IP-based networks—Ethernet, Wi-Fi and Thread—to connect devices together without needing dedicated translators. Using IPv6, Matter is able to support multiple network interfaces at the network layer with no higher

layer software needed. It also makes it easier to build devices that are compatible with smart home and voice services and enables communication across smart home devices, mobile apps and cloud services.

## **Standard Device Definitions**

Matter defines a universal framework and model for developers to follow, with clear definitions of what a device is and all the parameters needed to control it. Think of it as a universal language that all devices use to “speak” to each other. This creates uniformity in products from different brands to communicate with each other.

## **Enhanced Security**

By standardizing on IP, Matter provides a solid foundation for security, with market-proven algorithms and infrastructure for routing, switching and firewalling, as well as end-to-end security and privacy when devices communicate with other devices, apps and services. Matter uses a layered approach to security with device attestation to ensure authenticity when commissioning a device to the Matter network, protecting all messages on the network and providing for secure over-the-air firmware updates.

## **Simple and Reliable**

Matter is focused on providing seamless experiences to consumers by removing the complexity in selecting smart home products and delivering a flexible and simple set-up process. Matter also provides consistent and responsive local connectivity that will still work even if the internet is down. Moreover, communication is faster since messages never need to leave the network which also means its more secure, as local traffic is never sent over the internet.



The seamless and interoperable smart home

## Better for Everyone

Matter is a dramatic step forward for Smart Home. Widespread industry backing gives it the critical mass needed to transform how we develop, market and use Smart Home solutions.

Device manufacturers will be able to focus on innovation, since integration with Amazon, Apple, Google and other ecosystems will be much easier. Developers can also choose the best network protocol for their application—be it high-bandwidth or low-power—and focus and focus on their own device innovation. There's just one application layer to deal with, instead of half a dozen, so product manufacturers can create one platform to deploy across all major ecosystems. Also, standardized technologies can quickly expand beyond the smart home market to commercial building and industrial segments.

Consumers will have better experiences when selecting, installing and using Smart Home products, and they'll no longer need to invest in things like dedicated hubs, gateways, translators or proxies to connect everything together. Existing home networks will accept new devices more readily, making it easier to take advantage of new features as they become available.

## The NXP Perspective

At NXP, we have always been strong supporters of standardization, certification and open-source initiatives. We are one of the few semiconductor companies involved with

Matter with a wide portfolio of IoT technologies, and we firmly believe our expertise and solutions will bring significant value to Smart Home and, more broadly, the Internet of Things.

Matter focuses on the same thing as NXP - connecting a smarter world through compatibility, connectivity and security. Our Smart Home portfolio supports the most widely used connectivity protocols (Wi-Fi, Thread, Bluetooth LE, NFC). We're known for our comprehensive, multi-layered security solutions (secure elements, secure enclaves, network management) and recognized for our high-performance scalable processing platforms that enable compelling features like graphics, video streaming, network management and more. We complement our hardware portfolio with software and services to deliver production quality connectivity stacks along with embedded software solutions and provisioning services for IoT security. With our deep experience, we provide an optimized and integrated software architecture that developers can use to more quickly bring a range of smart home devices to market.

## **The NXP Difference**

Being able to provide all the necessary connectivity, security, processing and software components needed to enable Matter devices, NXP has a clear edge in accelerating its adoption. Stay tuned for some exciting announcements at CES next month and be on the lookout for our next blog post, which will explore the many options and solutions for connecting Matter devices.

NXP and Matter are simplifying the development of Smart Home together.



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Ron Martino is executive vice president and general manager of Edge Processing for NXP Semiconductors. In this role, he is responsible for driving embedded compute leadership for edge processing in industrial, IoT and networking markets. Ron is an established leader with over 30 years of experience in the microelectronics business focused on automotive electronics, embedded processing applications, high performance computing applications and semiconductor research and development.