

# MATTER – MAKING SMART HOMES SMARTER

MATTER IS THE KEY TO THE AUTONOMOUS HOME

## EXECUTIVE SUMMARY

Matter, a new industry standard for smart homes, promises universal product interoperability, better user experiences, and reduced friction across the consumer electronics (CE) marketplace. At its core, Matter is a universal “language” for smart home device communication using networks already available in most homes – Ethernet, Wi-Fi, and Thread. Matter makes smart homes smarter by transforming the whole home into a plug-and-play automation platform for CE products.

After three years of intensive development by some of the biggest brands in consumer electronics (Amazon, Apple, Google, and over 200 others), Matter 1.0 is now publicly available. Hundreds of products are certified or are in the certification pipeline, and Matter is now a hot topic in the global consumer electronics (CE) industry. Standards rarely generate this much excitement, so we researched Matter in detail to find out why.

## INTRODUCTION

Our report begins with a high-level description of Matter – what it is, what it isn't, and how it benefits consumers and expands markets for CE manufacturers. We also explain why so many big companies are confident enough about Matter to depreciate isolated ecosystems in favor of open connectivity. Next, we dive into Matter's architecture, software, silicon (with NXP examples), and product development process. Wrapping up, we answer some tough questions about Matter and offer some strategic recommendations for CE manufacturers.

## SMART HOMES AREN'T VERY SMART

Today, consumers use smart home technology mainly for remote control functions such as "Hey, Google, turn on the outside lights," "Alexa, lock the front door," or adjusting a thermostat with a smartphone app. Some automation platforms also allow users to set up simple schedules and "If this, then that" rules like "If the front door opens, then turn on the hall light." Although we refer to these remote control and rules-based functions as "home automation," there's very little automation – humans still directly or indirectly operate the house.

The next step in the evolution of home automation is autonomy – orchestrating residences at higher levels of abstraction. Rather than managing individual domains like lighting, HVAC, and security, humans monitor and control autonomous homes as integrated systems. While some advanced CE products already use AI and ML to automate individual products or domains, whole-home orchestration requires higher-level visibility and control across all CE products and applications. That’s impractical today because devices don’t have a universal language for communicating with one another and with home automation platforms such as Alexa, Google Home, HomeKit, and others. Without interoperability across all devices, automation platforms cannot create whole-home situational awareness or control multiple domains. Matter aims to guarantee compatibility across all CE products, and that’s why it is the key to the autonomous home.

## WHAT PROBLEM DOES MATTER SOLVE?

Matter promises to be a game-changer for the CE industry because it tackles the most significant barrier to smart home adoption: interoperability. Today, smart home products communicate only within competing "walled gardens," isolated by incompatible networks and communication protocols. These incompatibilities fragment the market into competing device ecosystems, leading to consumer frustration and high product return rates. Consequently, smart home industry growth is only a fraction of its potential, and home automation remains a niche market.

Matter's primary mission is to break down the walls of the walled garden, enabling CE products from different manufacturers to communicate with one another using standard Internet protocols over existing networks found in almost all residences. Matter-based products are secure, easy to install, and quick to develop using readily available technologies. Most importantly, because all products with the Matter logo are compatible with one another and use similar hardware and software components, the resulting economies of scale ultimately reduce device costs well below today's niche products.

## THE QUEST FOR INTEROPERABILITY

Wireless embedded gadgets have been around for over 20 years in one form or another, so why isn't everything already interoperable? In the early 2000s, multiple device connectivity technologies evolved independently to meet specific requirements for devices such as residential lighting controls, door locks, and window coverings. Applications like these require "constrained" low-power, low-cost, low-data-rate

networks with simple installation and, in most cases, mesh topology for whole-home coverage. Z-Wave, Zigbee, Lutron, Insteon, and other technologies emerged with these characteristics, each using unique radios, protocols, and security schemes. CE manufacturers built product ecosystems around these constrained networks and had no incentives to switch technologies, collaborate, or interoperate. Consequently, home automation remains a hodgepodge of networks and protocols.

In a smart home context, interoperability means that CE products communicate over the same networks using compatible messages. Thread replaces isolated device networks with a unified fabric based on Internet protocols. Matter standardizes the messages that flow over Thread, Wi-Fi, and Ethernet, providing a network-independent language for home automation.

### *THREAD – THE FIRST IP-BASED CONSUMER DEVICE NETWORK*

About ten years ago, forward-thinking product designers and developers realized that differentiation based on connectivity was limiting the growth of the smart home industry without adding any value. A consensus emerged that defragmenting smart home connectivity requires industry-wide convergence on IP-bearing networks such as Ethernet and Wi-Fi. No standard IP network existed for constrained devices, so in 2013, a group of industry-leading companies formed the Thread Group to create one.

Thread brings Wi-Fi-like IP connectivity to small, low-power devices. Introduced in 2015, Thread is now broadly deployed and in its third generation. It's probably already in your home, built into smart speakers, hubs, routers, and other devices.

### *MATTER – THE COMMON LANGUAGE FOR CONSUMER ELECTRONICS*

By design, neither Thread nor Wi-Fi provides an application layer. Your Wi-Fi network does not care what applications you use – web pages, social media, or media streaming – nor do other IP-based networks like Ethernet, 5G, or Thread. That's how Internet protocols have worked for over 40 years – carrying all kinds of information encoded using many different application protocols. However, until now, no IP-based smart home application layer existed. It is inappropriate for network standards like Thread or Wi-Fi to define higher-level protocols, so the CE industry created Matter, a standard application layer spanning multiple IP networks – Ethernet, Wi-Fi, Thread, and others.

#### **Matter's origin story**

Developing a new industry standard is almost always agonizingly slow, but Matter made surprisingly rapid progress. In 2019, a group of large CE and semiconductor companies

came together within the Zigbee Alliance (later rebranded Connectivity Standards Alliance) to address consumer device interoperability by standardizing the smart home application layer. The working group created "Project Connected Home over IP" (CHIP), later branded Matter.

The Matter working group invested an enormous amount of effort over three years – "Hundreds of thousands of person-hours," according to Tobin Richardson, CEO of the Connectivity Standards Alliance, and he's not exaggerating. Matter's primary goal is to enable smart home products from different manufacturers to exchange information using standard wireless device networks and protocols.

## INTEROPERABILITY – A CONSUMER'S POINT OF VIEW

Installing a few home automation gadgets, particularly Wi-Fi-based ones, is relatively easy for most consumers. However, installing "smarter" smart home systems with dozens of devices is frustrating because complexity expands geometrically with the number and diversity of devices.

### Your smart home

Let's say you have four active device networks, each with a unique ecosystem of devices. Each ecosystem has a hub connected to its native device cloud service. If you use three home automation platforms, there are 12 potential connections between device clouds and automation platforms, each with unique login credentials and device configurations. Maybe you also have five types of Wi-Fi devices (thermostats and other gadgets), each with a native cloud service, increasing the total number of potential control paths to 27. You may not use all these connections, but you probably use enough to make managing your smart home systems tedious and frustrating.

### Combinatorial explosion

This example of a home automation system is more extensive and diverse than most. Still, it illustrates how adding devices, device networks, and application services quickly leads to an impractical number of permutations – a combinatorial explosion of interfaces that confounds even the most knowledgeable and tenacious geeks. This messy situation frustrates consumers, lengthens sales cycles, generates support incidents, increases product returns, and stalls smart home growth.

## Matter-enabled smart homes in 2025

Fast-forwarding two or three years, here's how Matter improves consumer experiences for smart home products.

- **Shop anywhere** – Consumers buy smart home products from any retailer.
- **Just look for the logo** – Consumers know that Matter products and services work seamlessly with one another.
- **Any brand** – Consumers choose Matter devices based on features, performance, and cost.
- **Any home automation platform** – Consumers can use any Matter-compliant automation platform such as HomeKit, Alexa, or Google Home.
- **No new network infrastructure** – Homes already have Thread and Wi-Fi.
- **Local device communication** – Devices communicate securely and privately over In-home networks.
- **Easy installation** – Installing devices takes just a few seconds.

Matter simplifies buying, installing, configuring, and using smart home products, resulting in lower adoption barriers and better user experiences.

## INTEROPERABILITY – A CE INDUSTRY POINT OF VIEW

In addition to improving consumer experiences, Matter is likely to be a game-changer for the worldwide consumer electronics industry. Universal interoperability enables any CE manufacturer to build a single version of a product that works with all other Matter products. Manufacturers can use off-the-shelf silicon, reference platforms, and software rather than customized, one-off designs, decreasing development cost, risk, and time to market. The resulting defragmentation removes many barriers to smart home market growth, leading to larger production volumes and economies of scale. We expect Matter-based products to be:

- **Easier to sell** – The Matter logo simplifies consumer choices.
- **Easier to install** – Fast, single-click (or no-click) network setup means fewer support calls and product returns.
- **Higher quality** – Manufacturers invest in features and performance, not networks and protocols.
- **Less complex** – Matter-enabled silicon and open-source software reduce system development costs.

- **Faster to develop** – Focus on application development using existing high-volume, off-the-shelf platforms.
- **Easier to support** – Uniform user experience using existing networks.
- **More secure** – Security is built-in, including attestation that ensures devices are genuine and Matter-compliant.
- **Economies of scale** – Product sales increase in the defragmented smart home market.

CE product makers can now build a single Matter-based SKU that works in every smart home and connects with any home automation platform. Defragmentation is how the smart home industry can transition from niche to mass market.

### The emergence of smart home IHVs and ISVs

In addition to the CE industry benefits listed above, interoperability creates new product opportunities in the smart home supply chain by enabling manufacturers to build hardware and software components independently. This situation is analogous to how PC standardization enabled large-scale independent hardware vendors (IHVs) and independent software vendors (ISVs). Likewise, smartphones created a vast new market for apps. Removing supply chain dependencies enables multiple vendors to develop innovative devices and applications that work in any home.

## THREE KEYS TO MATTER'S SUCCESS

At Moor Insights & Strategy, our view of Matter's future is optimistic, and here are the top three reasons we also think it's realistic:

1. **Collaboration** – Many of the most prominent names in consumer electronics, home automation platforms, semiconductors, building controls, and retail are committed to Matter and investing heavily in technical work. Big, multinational companies assigned senior-level engineers to the project – writing specs, coding software, and testing products, not just attending meetings. Matter members agree that developing interoperable products with differentiated features and functions creates far more smart home business opportunities than building walled gardens. Matter also works closely with other standards organizations, including the Thread Group and the Wi-Fi Alliance, to remain in sync as specifications evolve.
2. **Proven technologies** – Matter is an application layer on top of existing, readily available standards and technologies. Thread and other standards will add new

Matter-motivated features over the next few years, but these adaptations are enhancements, not deployment dependencies. Also, Matter leverages the Zigbee Cluster Library with its impressive collection of device definitions accumulated over 15 years of product deployments. Starting from an extensive library of device knowledge significantly improves the odds that Matter works correctly on real-world products.

3. **Maturity** – Matter shows an impressive level of maturity for a new standard. Here are some examples:
  - Matter wisely delayed releasing 1.0 for a few months to "get it right," despite some "anti-Matter" press.
  - Matter resisted the temptation to address too many devices in the first release. Limiting the scope to seven categories of high-priority devices reduced testing permutations to manageable levels.
  - Matter leaders have committed to a regular cadence of semi-annual releases. Continuous improvement is part of the Matter culture.
  - The group wants the Matter logo to "matter." The product certification program was up and running immediately after the 1.0 spec release, testing is global, and over 200 products are now certified or in the certification pipeline at the time of launch.

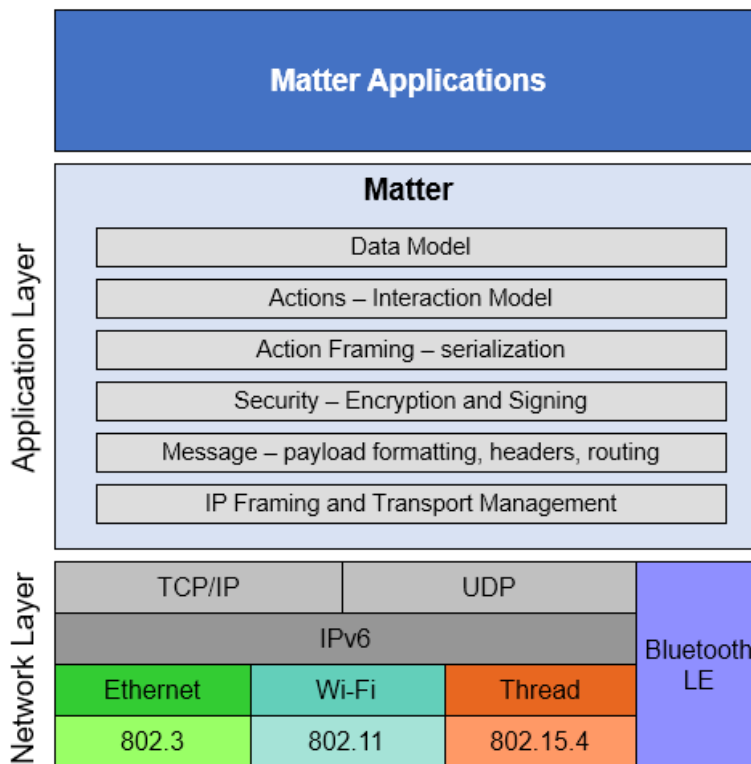
## INSIDE MATTER

Matter achieves interoperability by specifying how to use existing, widely deployed standards and networks. Matter does not create new ones. The complete 1.0 documentation, free to download [here](#), consists of a Core Specification, a Device Library Specification, and an Application Cluster Specification. Better put on a pot of coffee if you want to go through it – it's 1,347 pages of densely packed technical information. But no worries – we'll provide a quick overview in this paper.

## CORE ARCHITECTURE

At its core, Matter defines an IPv6-based communication protocol optimized for smart home applications. As shown in the stack diagram, Figure 1, Matter is an application layer sitting on top of the familiar industry-standard Internet protocol stack with Ethernet, Wi-Fi, and Thread networks. Every device in a Matter network uses a version of this stack to exchange messages with other devices. Bluetooth LE is also part of the stack, but it's used for commissioning (setup), not for data communication.

FIGURE 1: THE MATTER STACK



Source: MI&S

The Matter application layer comprises a stack of layers that requires a little explanation:

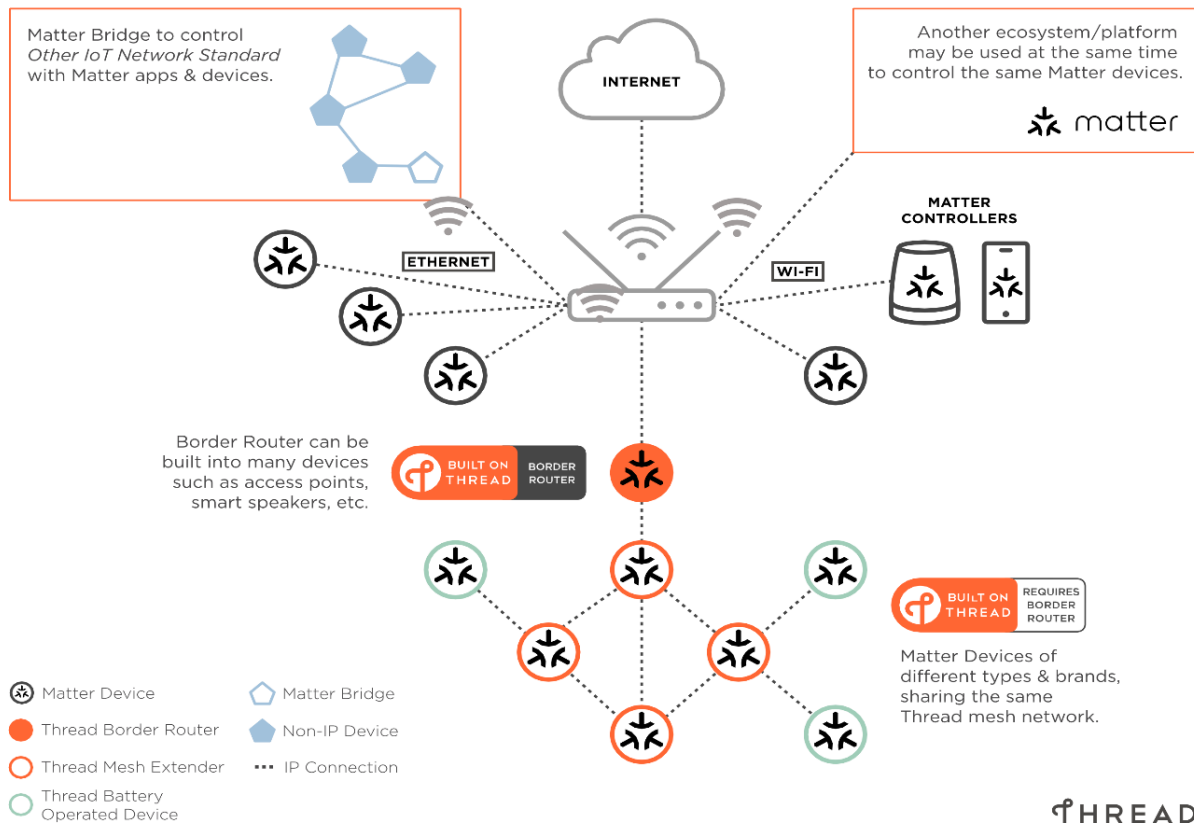
- **Data model** – Maintains the "noun and verb" data structures the application layer uses to interact with devices.
- **Actions** – Constructs the interactions defined by the data model layer, i.e., reading and writing device attributes.
- **Action framing** – Serializes interactions into prescribed binary messages encoded for network transmission.
- **Security** – Encrypts messages and appends authentication codes.
- **Message** – Constructs payload format with message properties and routing information.
- **IP framing and transport management** – Sends messages to the underlying transport protocol – TCP or Matter's Message Reliability Protocol for UDP.

Matter's architectural philosophy is to build on existing domain-independent network technologies, with domain-specific layers (i.e., data model and interaction model) at the



top of the stack. This approach simplifies adding and maintaining device definitions, interactions, and behaviors specific to the smart home domain.

**FIGURE 2: MATTER-ENABLED SMART HOME NETWORK SCHEMATIC**



Source: Thread Group

## MATTER-ENABLED SMART HOME NETWORK ARCHITECTURE

Figure 2 shows a prototypical smart home with various devices connected via Ethernet, Wi-Fi, and Thread. In addition to a Wi-Fi router, which provides Ethernet and Wi-Fi connectivity just as it does today, there are five classes of Matter and Thread products:

- **Matter controllers** – Devices like smart speakers and hubs communicate directly with all Matter devices. Controllers from different home automation platforms may coexist and connect to the same Matter devices.
- **Matter high-performance devices** – Usually connect via Wi-Fi.
- **Thread border routers** – Connect the Thread mesh device network to the home's Wi-Fi or Ethernet network. There may be multiple border routers.

- **Thread mesh extenders** – Always-on, mains-powered edge devices (e.g., light switches) help expand the Thread mesh throughout the home, routing Thread network traffic while performing control and sensing functions.
- **Low-power devices** – Small, low-power edge devices are often powered by batteries, even coin cells, and do not typically function as extenders.

Homes with legacy (non-Matter) device networks may also have two other types of components.

- **Matter bridge** – Translates between Matter protocol and a legacy device network protocol.
- **Legacy device mesh nodes** – Legacy devices connect to Matter via a bridging function, which manufacturers typically integrate into legacy device hubs.

## *SECURE DEVICE SETUP*

Setting up a network like the one pictured in Figure 2 is quick and easy. Here's an overview of a typical device setup process from a user's perspective.

- Unbox the device and plug it in.
- Use a smartphone to obtain the device's setup ID – QR code, NFC, or manual entry. The method is device-dependent.
- The rest is automatic. The device joins the user's home network, and a Matter controller associated with a home automation platform recognizes it.

Here's a little more detail about what's going on behind the scenes during device setup.

- The customer physically installs a new Matter device, typically by plugging it in or installing a battery.
- Using a smartphone app or other Matter-enabled device, the customer inputs the setup ID by scanning a QR code, NFC, or manual entry. (device-specific)
- The user places the device into commissioning mode if necessary. (device-specific)
- The app then connects with the device, typically over Bluetooth LE.
- Behind the scenes, Matter authenticates the device against Matter's Distributed Compliance Ledger and performs other security-related functions.
- After authentication, Matter sends network credentials (for Thread or Wi-Fi) over the Bluetooth LE connection.

- The device then joins the customer's network, and the smart home platform's in-home Matter controller device begins using it.

Vendors that already connect with the customer's home automation platform can pre-provision the network credentials, eliminating the "scan the QR code" step. In this case, the only manual operation is plugging the device in and turning it on. Setup cannot be easier than this.

After setup, users can connect Matter devices with other smart home platforms using the same procedure. Matter's multi-admin feature makes this possible and gives users control over which apps can access which devices.

### *DEVICE CATEGORIES*

As Matter rolls out in early 2023, customers need to know what categories of devices hit the market first. Matter benefits from 15 years of cumulative device definitions because its Device Specification and Application Cluster Specification originated as the Zigbee Cluster Library. Although Zigbee gives Matter a running start, device specs are complicated, difficult to develop, slow to test, and sometimes controversial. Matter wisely limited the initial clusters of functional domains to a few high-priority, commonly used device types. Some analysts wanted a more extensive set of devices in the first release, but we are pleased that the Matter team prioritized quality over device coverage. In the long run, it's better to get the core functionality working correctly before adding more devices. Seven device categories supported in Matter 1.0:

- Lighting and electrical controls
- Controllers and bridges
- Window coverings
- Door locks
- HVAC controls
- TVs and media devices
- Security sensors

We won't have to wait long for new devices because the Connectivity Standards Alliance plans to update Matter specifications bi-annually with new devices and features. The working group is currently addressing these new device categories:

- Cameras
- Appliances – white goods
- Energy management
- Environmental sensing and controls
- Motion and presence sensing
- Robot vacuums
- Access points
- Door and window sensors
- Safety sensors – smoke, carbon monoxide

Some device types might take longer to add than expected. For example, safety-related sensors and alarms often require additional certification. But Matter's commitment to regular updates leads us to expect steady growth in device coverage.

### *CERTIFICATION*

Standards bodies issue logos to products that meet formal certification requirements. The Matter logo on a product means it complies with Matter specifications and has passed tests by independent labs verifying interoperability with other Matter products. Certification is available only to Connectivity Standards Alliance members and performed by multiple independent [test houses](#) around the globe. Matter certification also requires proof of dependent certifications, e.g., Wi-Fi and Thread. Anyone can access the [list of certified products on csa-iot.org](#). Select Matter as the program type.

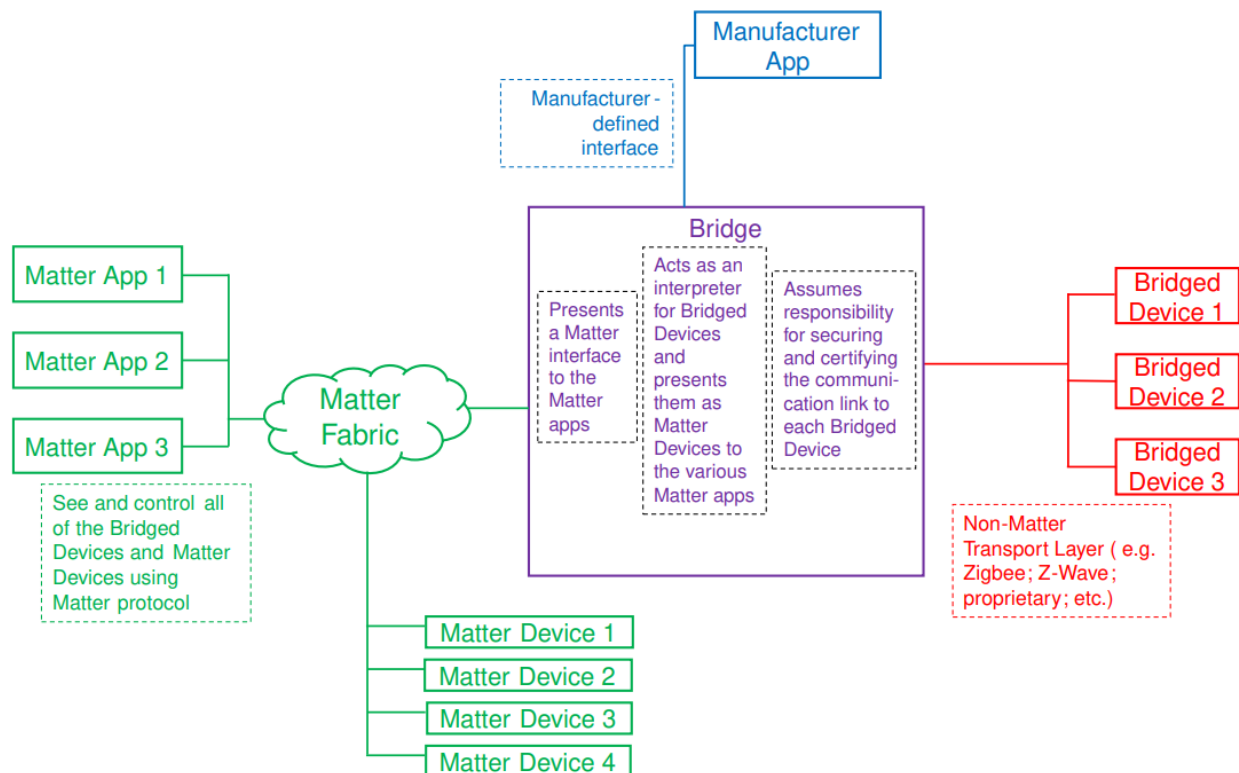
### *LEGACY DEVICES – MATTER BRIDGING*

Smart home enthusiasts with one or more non-Matter device ecosystems expect to continue using existing devices while gradually adopting Matter. Legacy support can be a significant barrier for early adopters, and Matter cannot afford to alienate them.

The Matter specification includes a "bridge" capability, shown in Figure 3, that enables manufacturers to build devices that translate between the Matter protocol and legacy device protocols. Bridges speak Matter on one side and legacy, e.g., Zigbee or Z-Wave, on the other. As shown in the diagram, a Matter bridge can simultaneously support existing manufacturer-specific applications if the bridge has legacy protocol support.

Many features and functions are easy to translate – turning lights on or off, for instance. However, specialized device capabilities are often difficult (or impossible) to map onto the interoperable Matter model, so protocol translation is often incomplete. Bridge developers may choose to expose unique features to the Matter ecosystem using manufacturer-specific clusters and device types, even though this approach can create compatibility issues. We expect Zigbee bridges to be easier to build and more comprehensive than other ecosystems because Matter leveraged Zigbee's cluster and device specifications – there's less translation going on.

FIGURE 3: MATTER BRIDGING



Source: Connectivity Standards Alliance, Matter Specification Version 1.0

## NON-RESIDENTIAL APPLICATIONS

As a smart home standard, Matter does not directly address other product domains such as commercial buildings, retail, manufacturing, health care, and agriculture. However, Matter Version 1.0 products might be appropriate for some commercial applications with residential-like characteristics. For example, Matter is a good fit for lighting and HVAC controls in small businesses with residential device types and deployment scales. However, most commercial applications are beyond Matter's scope, at least for now.

We see Matter's scope potentially expanding into commercial applications because that's what happened for Wi-Fi and Thread. In the early days of Wi-Fi, many enterprises dismissed the technology as inappropriate for commercial use, mainly because of weak security. After the Wi-Fi Alliance addressed security in 2003 with WPA, Wi-Fi quickly became ubiquitous in commercial environments. Likewise, Thread has partnerships with KNX and DALI to address commercial building automation, smart lighting, and other

applications. We think Matter is on a similar trajectory, possibly adding enterprise features such as these:

- Large-scale device networks
- Fleet management – bulk device deployment, monitoring, maintenance
- Higher security
- Industrial device categories
- Industrial device networks
- New regulatory certification dependencies

We expect the Connectivity Standards Alliance to continue its sharp focus on smart home applications as Matter adoption accelerates. However, the same market forces that compelled enterprises to adopt Wi-Fi motivate business customers to consider deploying Matter into non-residential verticals.

## NXP LEADERSHIP: SILICON AND SOFTWARE

For over 10 years, NXP has championed the technologies that make Matter possible. In 2012, Freescale Semiconductor was one of the founders of The Thread Group. Since merging with Freescale in 2015, NXP has remained one of Thread's principal contributors. Recognizing the need for a universal, IP-based smart home application layer, NPX joined other big companies in 2019 to create "Project Connected Home over IP" (CHIP), later renamed Matter. Today, NXP's Matter product portfolio reflects a consistent industry leadership strategy based on open standards.

Complex chips from NXP and other suppliers bring Matter to life by enabling embedded connected products that "disappear into the world all around us."<sup>1</sup> For smart home technologies to "disappear," embedded devices must be small, low-power (often battery-powered), secure, wireless, and capable of running IP network stacks and application software. Platforms must also be inexpensive, fitting into existing consumer product categories without dramatically increasing prices. The days of the \$70 smart light switch are ending.

Matter chips need these four characteristics:

- **Matter enablement** – SoCs with on-chip wireless networks, security, "physical world" interfaces, and sufficient processing power, memory, and flash

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<sup>1</sup> Mark Weiser – "The computer for the 21st century" – Scientific American, September 1991

- **Embeddable** – Small, low-power platforms, easy to integrate into everything in the home
- **Secure** – Security subsystems to simplify Matter development and Thread product certification – designed-in, not added-on
- **Complete solutions** – Silicon, development boards, and Matter-based software packages that run "right out of the box"

Let's dig into NXP's Matter-enabled portfolio, find out how the chips fit into real-world smart home products and provide an overview of the the development process.

Figure 4 lists NXP's Matter silicon portfolio and illustrates how the chips map onto each of the five Matter device categories defined in the "Matter-enabled smart home architecture" section on page 10.

**FIGURE 4: NXP SILICON FOR MATTER AND THREAD**

Architecture	Platform	Functions	Chip count	App host Arm® Cortex® ...	Ether-net	Wi-Fi	Thread	Blue-tooth LE	Matter Device Categories			
									Matter Controllers	Thread Border Routers	High Performance	Thread Mesh Extenders
MPU (Linux) 2 chips	i.MX 8M Mini	MPU (Linux)	2	A53	✓				Matter Controllers Ethernet, Wi-Fi, Thread	Thread Border Routers Ethernet, Wi-Fi, Thread	High Performance Wi-Fi	Thread Mesh Extenders Mains Powered Thread
	IW612	Wireless - Tri-radio				✓	✓	✓				
	K32W	Wireless - Thread					✓	✓				
MCU (RTOS) "Crossover" 2 chips	W8987	Wireless - Wi-Fi				✓		✓				
	i.MX RT	MCU (RTOS)	2	M7	✓							
	K32W	Wireless - Thread					✓	✓				
MCU (RTOS) Single-chip	IW416	Wireless - Wi-Fi				✓		✓				
	RW612	MCU + Tri-radio	1	M33		✓	✓	✓			Low Power Thread	
	K32W148	MCU + Thread	1	M33			✓	✓				
	K32W	MCU + Thread	1	M4			✓	✓				
	MW320	MCU + Wi-Fi	1	M4		✓		✓				

Source: Moor Insights & Strategy and NXP

At the top of Figure 4 are high-performance Matter platforms. Developers combine the i.MX 8M Mini microprocessor (MPU) with various wireless chips, depending on the type of Thread application and the product price target. Two-chip wireless flexibility extends down to the next lower performance option – the i.MX RT “crossover” microcontroller (MCU). Crossover MCUs offer MPU-class performance for lower-power, lower-cost products. NXP also offers four single-chip Matter platforms with various performance and wireless options for applications requiring minimum power, size, and cost.

NXP's industry-leading Tri-radio technology, developed for Matter applications, offers fully integrated Wi-Fi, Thread, and Bluetooth LE as two-chip and single-chip configurations. The IW612 tri-radio chip, combined with the i.MX 8M Mini MPU is a complete platform for Matter Controllers and other high-performance applications. For

lower-power, lower-cost products such as Thread border routers, NXP recently announced the single-chip, tri-radio RW612. Tri-radio simplifies and accelerates wireless platform development with integrated hardware and software, pre-engineered radio coexistence logic, and rapid regulatory certification.

NXP helped define the Matter security specification and is one of the first semiconductor companies to offer Matter-certified platforms with all the silicon, software, reference designs, and services customers need to build and deploy secure products.

NXP offers customers a full range of security technologies. For example, NXP is a Matter Product Attestation Authority capable of issuing product attestation certificates for Matter products.

Also, NXP can pre-inject credentials into embedded secure elements and authenticators, deliver the credentials securely over-the-air (OTA), and assist with certificate deployment and provisioning via EdgeLock 2GO services. For CE manufacturers, NXP's pre-certified platforms and services accelerate development, simplify certification, streamline deployment, reduce the need for in-house security expertise, and limit administrative overhead.

## FAQ

Matter is a paradigm shift, not an incremental development. Interoperable Matter products level the playing field for the smart home value chain, from silicon to end users. This fundamental change dramatically improves user experiences, expands the home automation market, and jumpstarts new business opportunities. It also raises many tough questions. In this section, we answer some of them.

### CONSUMER QUESTIONS:

#### **1. *When can I start buying Matter products?***

Moor Insights & Strategy recommends getting started with Matter now because standards-based multivendor interoperability rapidly displaces competing ecosystems. We've seen similar things happen in the CE industry many times – Wi-Fi, Bluetooth, USB, and HDMI, to name a few.

Starting now, consumers should choose Matter-based products over alternatives with similar functionality. However, new technologies always have a few rough edges, and early products have limited functionality, so “whole home” automation



isn't practical for most consumers until Matter product coverage improves over the next year or two.

## **2. *How do I get my home ready for Matter?***

Your home might already be Matter-ready. Matter needs at least one Thread border router and a Matter controller. Many smart speakers, hubs, media devices, and other products from Amazon, Apple, Google, and other companies already have one or both of these features built-in, or will get Matter in a future software update, so check your product documentation.

## **3. *Can customers use existing legacy device ecosystems with Matter?***

Yes. There are two ways to do this – coexistence and bridging.

Coexistence means continue using what you already have as you add Matter devices. Home automation platforms like Alexa, HomeKit, and Google Home can use legacy ecosystems and Matter simultaneously, giving the appearance of a unified set of devices. However, coordinating actions across multiple ecosystems is often tricky – and sometimes impossible.

Bridging is a better approach, and it's included in the Matter specification. A Matter bridge is a hub that connects simultaneously to your home IP network and a legacy ecosystem using its native radio and protocols. The bridge translates Matter messages into the appropriate protocol for the legacy system and vice-versa. We expect to see bridges for Zigbee, Z-Wave, and other ecosystems in early 2023.

## **4. *What devices does Matter support?***

Please refer to this paper's "Device categories" section on page 13 to see the lists of devices Matter supports now and in future releases. We expect these lists to grow steadily over the next few years.

## **5. *Can I control my home with multiple automation platforms like Google Home, Alexa, and HomeKit?***

Yes. Device-to-platform interoperability is a primary goal for Matter. Consumers can install devices using any home automation platform, and other platforms can recognize and use those devices. However, using more than one automation

platform to set up new Thread devices might result in multiple Thread mesh networks if those platforms can't share Thread network credentials. Although multiple meshes might reduce Thread network coverage, devices on different meshes can still communicate with all Thread devices because the border routers for each mesh connect to the home's IPv6 backbone over Wi-Fi or Ethernet.

Removing this limitation requires home automation platforms to share Thread network credentials during device setup. This process is not part of Matter 1.0, but Google, Amazon, Apple, and other smart home platforms have credential-sharing workarounds (or are working on them).

## **6. *Are Matter products secure?***

Yes, Matter is much more secure than most legacy device ecosystems. However, no device connected to a network is ever entirely secure. Matter's architects minimized risk by using industry-standard security technologies, including many of the same ones that secure e-commerce transactions. Also, Matter specifies attestation protocols that prove connected devices are authentic and properly certified. Matter has been through extensive security testing, so major security surprises are unlikely. And it's already running in millions of installed devices, so we are off to a good start.

Matter security depends on hardware features such as crypto blocks, random number generators, secure key storage, secure bootstrap, and many other functions. NXP's Matter platforms have these security features built-in, with extensive software support.

## **7. *Why did Matter take so long to emerge?***

Three years is a short time for a new standard to go from whiteboard discussions to shipping products. Matter has two prerequisites: an IP-bearing device network and a universal CE application layer.

Thread, the first industry-standard IP-bearing device network, has been available since 2015. Now in its third release, it has grown more capable and stable over the past seven years. It does not, and should not, include an application layer.

The Connectivity Standards Alliance set up Project CHIP (Connected Home over IP) in 2019, later branded as Matter, to create a smart home application layer.

Although CHIP could have started in 2015 when Thread became available, it took a while for a large group of the world's biggest CE companies to prioritize the benefits of industry-wide interoperability over "walled gardens."

## SUPPLIER QUESTIONS:

### **1. Will Matter products be too expensive?**

No. Device makers frequently ask this question because margins on small devices are razor thin, and Matter requires more memory, flash, and security features. However, five factors combine to reduce the cost of Matter products, eventually below the cost of existing full-stack alternatives.

- Matter-enabled silicon – NXP and other silicon suppliers offer functionally complete Matter platforms with minimal off-chip components for low development cost, fast certification, and quick time-to-market.
- Software included – NXP and other silicon suppliers offer complete solutions – chips, development boards, software, and services – that accelerate development while improving product quality and security.
- Economies of scale – Product TAMs increase because Matter products address the entire smart home market rather than ecosystem-specific subsets. It's more efficient to build identical products at a larger scale.
- No device-specific services – OEMs no longer need to build and operate unique device cloud services.
- Lower support costs – Matter devices simplify product setup and use, reducing support calls and product returns.

### **2. Does Matter commoditize Smart Home devices?**

No. Matter shifts development focus from undifferentiated device networking to features and functions that improve product usefulness, usability, performance, reliability, and security. Interoperability also creates new business opportunities by enabling interoperable hardware and software from multiple suppliers, like IHVs and ISVs in the PC industry and smartphone app stores.

### **3. How does Matter help competing device companies differentiate products?**

Matter standardizes the baseline functionality for device communication without limiting higher-level differentiation opportunities. For instance, Matter supports Manufacturer Extensions that may be unique to a specific vendor. A Matter-

enabled smart plug must support mandatory functions like on/off and device setup but may also support extended capabilities such as monitoring energy use. This approach allows product innovation while also guaranteeing predictable multivendor interoperability.

#### **4. Can Matter address industrial (commercial) segments?**

The official answer is "Matter is for residential applications." Commercial applications require features not currently in the Matter spec, such as bulk provisioning, large-scale device fleets, and support for additional device categories. However, many small businesses already utilize smart home technologies. In many of these cases, Matter is a good fit as-is.

## THE MATTER EFFECT

Matter promises universal CE connectivity, ushering in a new era where the entire home is a platform for plug-and-play products and services that are easy to buy, install, and use – and less expensive. In this new world, the smart home marketplace transitions from technology-driven to consumer-driven<sup>2</sup>, from early adopter to mainstream, and from slow growth to rapid growth. Consumers can expect the first wave of Matter products in early 2023, with product availability accelerating over the next few years.

CE product manufacturers should plan for Matter integration starting now, changing product strategies in four ways:

1. Use off-the-shelf platforms – silicon and software.  
Application development adds value, but systems engineering does not.
2. Stay in your lane.  
Design interoperable products that play nicely with other devices and platforms. Matter makes product-specific, end-to-end smart home ecosystems obsolete.
3. Recognize home automation as a mass market opportunity.  
All homeowners are potential customers, not just enthusiasts.
4. Raise user experiences to the next level.  
Enable users to orchestrate the whole home, not just control individual devices and subsystems.

Welcome to the autonomous home!

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<sup>2</sup> Donald A. Norman – *The Invisible Computer* – 1998

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