

# Why WiFi is the Essential Foundation for Smart Home Success

A guide for Communications Service Providers



# Why smart homes require the best WiFi

People are transforming their homes into smart homes. They're adding smart devices of all kinds: from voice assistants and connected home hubs to smart thermostats, security systems, door locks, holiday lights, doorbells, appliances, and more.

With so many more networked devices in the average home, people need reliable, high-capacity WiFi more than ever. They want all of their smart devices to work and deliver their favorite services as expected, whenever they're needed. But even the most advanced smart devices won't deliver on their promises if WiFi connectivity isn't up to the job.

After all, what's the use of having multiple state-of-the-art devices—4K smart TVs, internet-connected exercise equipment, advanced gaming consoles, webcams for teleconferencing, etc.—if they can't all work in harmony?

This creates a challenge for Communications Service Providers (CSPs) that cater to these customers. Most CSPs developed their WiFi offerings in an earlier era, when home networking demands weren't as complex. That can make it hard to meet customers' expectations today.

There's another challenge too. CSPs face new competition from technology companies like Amazon, Apple, Facebook, and Google, which market their own smart home devices and services to customers. That's why CSPs must provide best-in-class Smart Home Services to their customers before competitors get there first.

This paper will explore what the trends in smart home devices and applications mean for WiFi services, and how CSPs can best meet their customers' growing expectations.





# WiFi's smart home challenges

CSPs need to find ways to meet their customers' growing smart home demands, especially with big-tech companies moving into their market space. But before they add any new smart capabilities, it's critical they make sure their WiFi is built on a rock-solid foundation that can support such services.

While WiFi isn't the only way to connect devices in a home, it's the most common. There are, however, many potential obstacles that can prevent WiFi from working as effectively as needed for smart home applications.

## PHYSICAL BARRIERS

WiFi signals can be weakened or even wholly blocked by objects or structures between a wireless router and a smart home device. These can include everything from brick or concrete walls to large mirrored surfaces, heavy doors, or even water heaters and microwaves.

## DISTANCE

The greater the distance between a traditional wireless router and a device, the weaker the WiFi connection is likely to be. A larger house, or one with several levels, is likely to experience unreliable

smart device connections. Enabled devices outside the home—whether these are lights on a garage or security cameras in the backyard—can also struggle to maintain WiFi connectivity.

## INTERFERENCE

WiFi signals in one home can also interfere with signals in neighboring homes, creating performance issues affecting a large number of residences.

## TECHNICAL ISSUES

A wide variety of technical problems can prevent WiFi from performing as well as it should in a home. With some routers, for instance, WiFi signals in the 2.4 GHz channel can bleed over into the 5 GHz channel, reducing capacity in both.

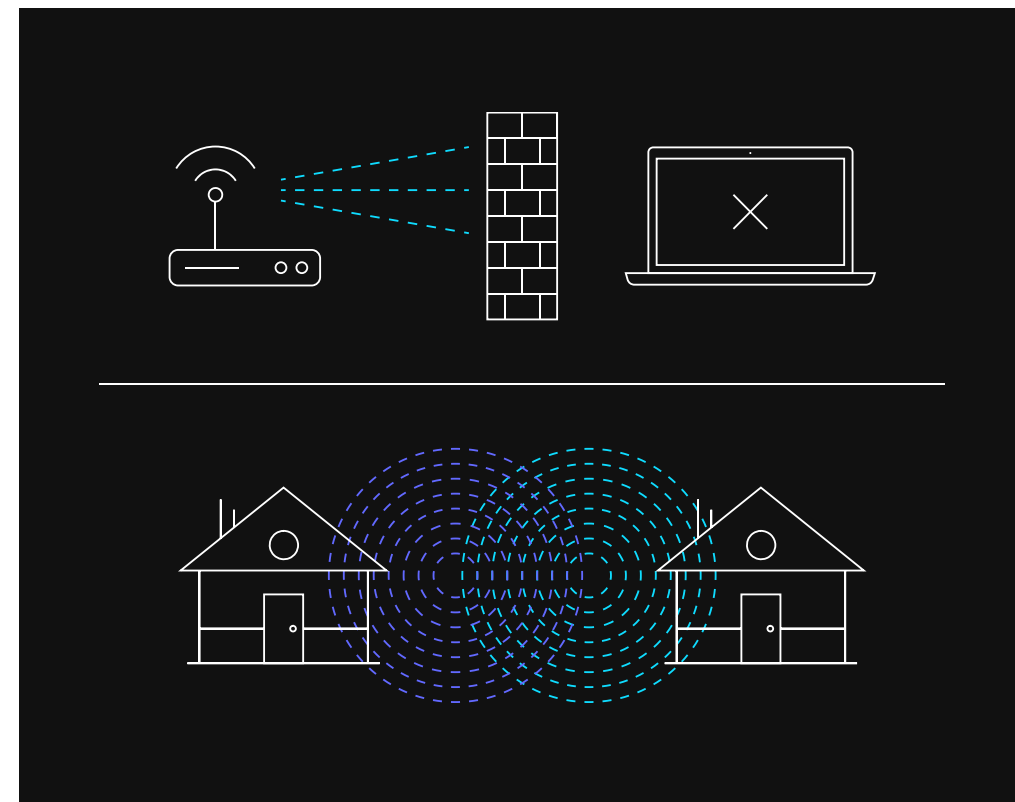
## SECURITY

Another challenge is ensuring that all connections across a smart home are secure, so no device is at risk of being hacked.

A 2019 Parks Associates<sup>1</sup> study of US broadband households found that “just over 30% of computing and entertainment device owners report experiencing loss of wireless connectivity, with home network routers identified as the most common source of the problems.” And research that same year by the UK domain registrar Nominet found that only 46 percent of adults say their home internet connection can “easily” meet their needs.<sup>2</sup>

A 2020 Total Cost of Ownership (TCO) study<sup>3</sup> by Plume reported that WiFi and internet connectivity problems account for more than half of all support issues for CSPs. Scheduling service calls and sending out trucks to resolve such issues is costly, hurting a CSP's bottom line.

Clearly, CSPs must optimize their WiFi offerings if they want to meet their customers' rising expectations



<sup>1</sup> “22% of US broadband households have a Wi-Fi network extender and 11% have a Wi-Fi mesh networking product,” 23 July 2019, Parks Associates, <https://www.parksassociates.com/blog/article/pr-07232019>

<sup>2</sup> Digital Futures: Connectivity Report, 31 July 2019, Nominet, [https://media.nominet.uk/wp-content/uploads/2019/07/Nominet\\_Digital\\_Futures\\_Connectivity\\_Infographic.pdf](https://media.nominet.uk/wp-content/uploads/2019/07/Nominet_Digital_Futures_Connectivity_Infographic.pdf)

<sup>3</sup> Total Cost of Ownership Study, 26 March 2020, Plume, <https://blog.plume.com/resources/white-papers/total-cost-of-ownership-study>

## Impact on smart home systems

WiFi problems are annoying enough when they affect home entertainment, but they become more troublesome when they affect the performance of household infrastructure, such as appliances or heating and cooling systems.

Imagine, for example, the frustration of installing smart light bulbs that keep going offline when you need them, or of not being able to cool a room in the summer because the smart ceiling fan won't connect to your home network.

And what about when WiFi problems impact critical systems related to safety, like smart security devices? Just imagine the potential for connection or security failures in devices such as smart locks. Customers who use smart home devices to safeguard their homes and families need assurance that those devices will stay online and functional no matter what.

As a recent article in Popular Science<sup>4</sup> noted, "many smart home devices are not that smart. Some may have trouble choosing the correct band, or – shockingly – some may only be compatible with the old 2.4 GHz frequency. This can cause all kinds of connection problems during the initial setup – the device is looking for a 2.4 GHz network, but the app wants to hand off the 5 GHz version your phone is connected to, causing the whole thing to fail."

The underlying lesson for CSPs is clear: before they can roll out new smart home offerings, they must ensure their WiFi services are smart, secure, and reliable.

## Attempted WiFi fixes

Recently, a lot of attention has been focused on ways to solve such home WiFi problems—especially because more people are now working from home and are experiencing the limitations of their home networks more acutely than ever. Plume has recently seen increases of 100% or more in time spent online at home during the work week. Load, congestion, and optimization surges have risen even more, for a combined increase of 252%.<sup>5</sup>

One solution many people try is to pay more to boost network speeds coming into their home. Others add WiFi repeaters or extenders to stretch their in-home signal's reach into places where coverage is poor. And some go with a mesh system that adds new WiFi access points wherever they're needed throughout the home.

While these solutions might help in the short term, they all come with drawbacks.

Paying more for increased internet speed, for example, may be an unnecessary expense if the main problem isn't connection speed, but rather how those connections are managed and how the WiFi signal is distributed to all the home's smart devices.

WiFi repeaters and extenders can help, but because they must connect to both the router and the home's wireless devices, they can deliver only half the bandwidth to end devices. They also aren't able to optimize signals or manage WiFi intelligently to keep traffic from overwhelming a single channel.

Mesh systems can improve whole-home WiFi signals significantly, but some options can be expensive. And each mesh node acts independently rather than in coordination with other nodes across the home network. The result: the network overall can end up performing in inconsistent or unpredictable ways. But the key drawback comes from the static nature of mesh systems: they can't "learn" and adapt to changing user behavior or demands on the network. This means they aren't able to optimize the customer's experience.

<sup>4</sup> "Your Wi-Fi and your smart home don't get along. Now what?," 27 July 2019, Popular Science, <https://www.popsci.com/smart-home-fix-guide>

<sup>5</sup> "Intelligence and insights for the smart-home industry," April 2020, Plume, <https://blog.plume.com/resources/newsletters/covid-19-quality-of-experience-qoe-is-crucial>



## Exploring Quality of Experience (QoE)

Combine the wide variety of potential WiFi issues with the inconsistent results delivered by traditional WiFi fixes, and the outcome for end users can be a less-than-ideal experience.

The traditional metric used to measure this—Quality of Service (QoS)—can't adequately capture where smart home problems lie and how to resolve them. That's why Plume uses a different metric we developed ourselves: Quality of Experience (QoE).<sup>6</sup> This takes into account a much wider range of data points to measure device happiness and, thereby, customer happiness: signal path, network performance, individual device needs, and so on.

Using QoE metrics recognizes that not every smart home device requires the same connection speeds and data streams to work effectively. For example, scrolling through social media feeds or dimming your home's smart lights requires a lot less bandwidth than video conferencing. And keeping a smart speaker connected and available puts much different demands on a home network than does streaming a full-length 4K movie.

Without some way to manage all of those devices and connections intelligently, you're more likely to encounter performance glitches if you're doing many things at the same time—say, reading tweets and asking Alexa to adjust the living-room temperature while watching Netflix on your laptop. And none of the WiFi solutions described above can ensure such glitches won't happen.

So what's the answer? How can CSPs deliver a WiFi experience that lives up to customers' expectations and doesn't end up turning their smart home experience into a frustrating one instead?

The answer can be found within Plume's suite of Smart Home Services and back-end tools, all underpinned by Adapt™, Plume's self-optimizing WiFi.



<sup>6</sup> "Yesterday's metrics fall short for today's smart homes," January 2020, Plume, <https://blog.plume.com/yesterdays-metrics-fall-short-of-todays-smart-homes>

# Adapt by Plume

Plume developed its adaptive WiFi technology with the future of smart homes in mind. With Adapt, CSPs can easily and quickly solve traditional home WiFi problems without the downsides of other solutions like repeaters or static mesh. And once they've done that, CSPs pave the way to providing their customers with a wide array of smart home offerings—while also improving customer retention, boosting business revenues, and reducing support demands and costs.

### WHAT IT DOES

Adapt uses intelligent algorithms to ensure that device connections throughout the home adapt continuously to changing conditions and user behavior. With non-stop monitoring and channel-hopping, as well as band-steering

capabilities, Adapt prevents interference with nearby networks and increases a home's networking capacity. It also optimizes traffic loads and application performance based on each device's specific requirements and QoE score.

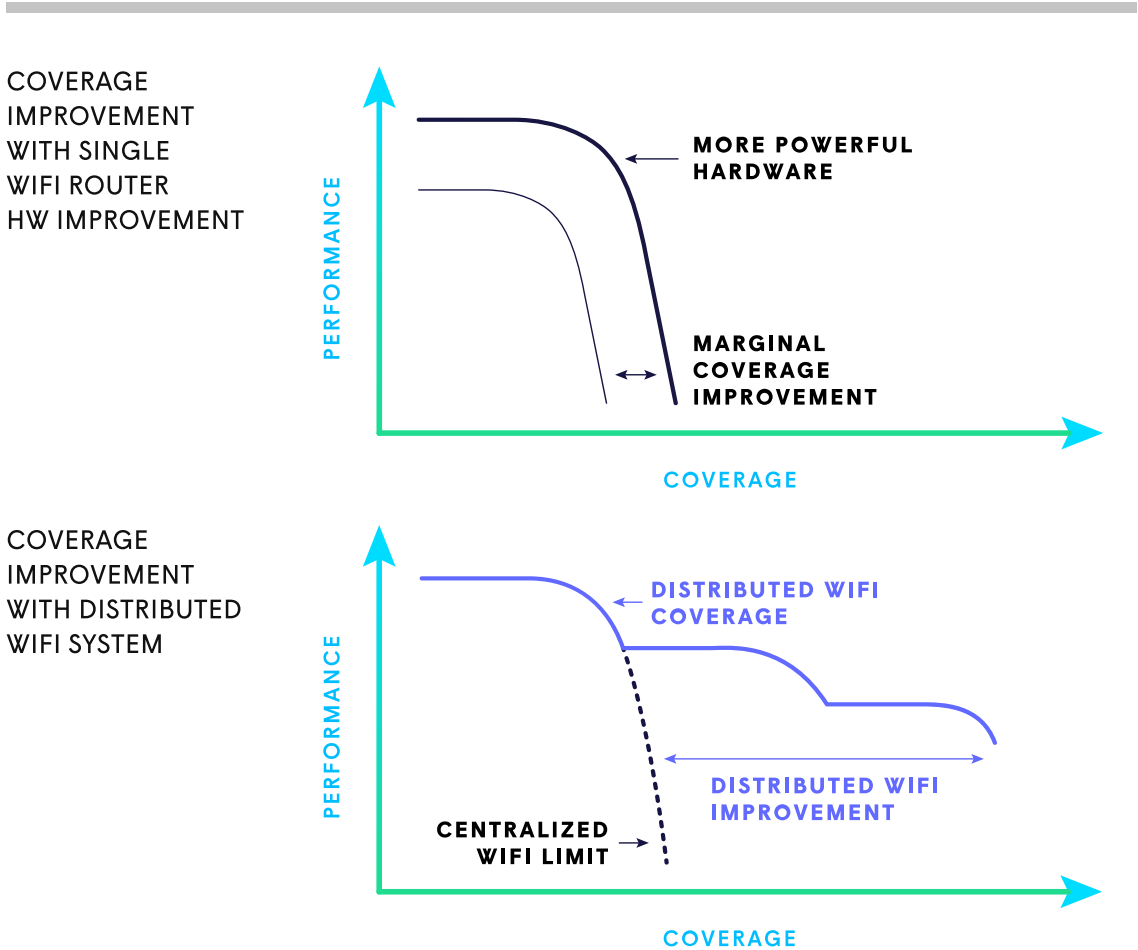
This is enabled by OpenSync™, cloud-agnostic software for delivering, curating, and managing home connectivity and entertainment services. Originally developed by Plume, OpenSync<sup>7</sup> was made open source in 2018 through a silicon-to-service framework founded by Samsung, Comcast, Bell Canada, Liberty Global, and Plume.

By communicating intelligently with every Plume pod or OpenSync-enabled access point (AP) in the home, Adapt ensures that every node works as efficiently as possible. And it directs each device in the home network to the appropriate pod or AP for the optimal route topology.

In this way, Adapt ensures the high performance of connections and devices throughout the home, no matter when those connections are needed and no matter where those devices are located.

### HOW IT WORKS

Rather than delivering home connectivity through a single router, Adapt provides distributed coverage via a variety of access points placed around the home. This enables each AP to be optimally placed, resulting in the overall network being able to reach every device, no matter where they are and no matter what the home's size.



<sup>7</sup> OpenSync, <https://www.opensync.io>



In addition to being smaller and lower-power than a traditional router, each node helps reduce the distance that WiFi signals must travel to communicate with, and manage, devices effectively. This means no dead zones and fewer problems with degraded signals.

And because Adapt is delivered through the Plume Cloud, software updates and security patches are fast and can take place seamlessly, whenever they're needed. This also makes it easy to quickly add or update the Smart Home Services that customers get through their CSP.

## Advantages over other WiFi systems

What are the advantages of Plume's approach compared to other would-be solutions to WiFi problems? There are many.

### INTELLIGENCE

Adapt and subsequent nodes are all managed through a cloud-based system that uses AI, data analytics, and optimization algorithms to keep home networks as fast, secure, and efficient as possible.

### ADAPTABILITY

Plume's system continuously monitors a home's network and connections for changing conditions and demands, and adjusts accordingly to keep

devices online and performing as they should. This reduces problems with interference, overloaded channels, latency, and other issues.

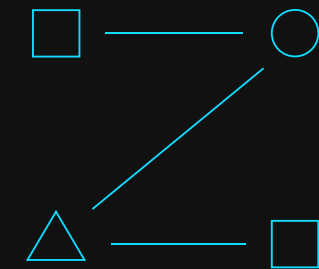
### FLEXIBILITY

Because Adapt makes smart home management simple via the Plume Cloud, CSPs can quickly and easily roll out new services to meet evolving customer demands. In fact, customers can easily install, add, and manage services on their own, without the need for a support technician to visit their home, meaning time-to-profit on the additional service is minimized. This provides an especially compelling advantage in an increasingly competitive marketplace for smart home products and services.

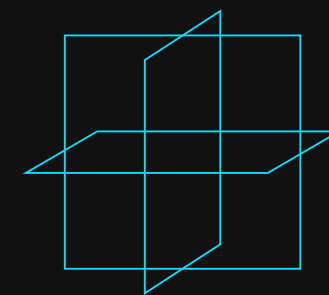
WiFi repeaters and extenders can't match any of these capabilities. Even advanced mesh systems don't provide these levels of intelligence and cloud-based control.

## What this means

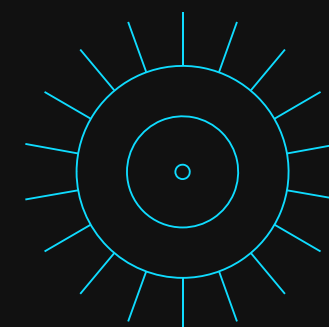
For subscribers, this means more reliable and more secure performance of their smart home devices and applications, and easy delivery of new services without having to wait for a technician to visit. That also means a better user experience overall, as well as greater satisfaction with their CSPs.



**Adaptability**  
Self-optimizing



**Flexibility**  
Fast, easy management



**Intelligence**  
Cloud-based AI

Meanwhile, CSPs benefit from having a better, easier way to provide customers with reliable WiFi—and other Smart Home Services on top of that. The results, according to Plume research<sup>8</sup>, are a reduction in customer churn of up to 30% and an average increase in per-customer revenue of up to \$15 per month. CSPs also see a significant reduction in their support costs, with as much as 67% fewer truck rolls and 51% fewer support calls.

By deploying Plume, CSPs gain access to three separate front- and back-end suites:

With HomePass™, CSPs are able to quickly and easily deliver a wide range of award-winning Smart Home Services to their customers. The HomePass suite, which includes Adapt™, Control™, Guard™ and Sense™, leverages OpenSync and is managed by the Plume Cloud, a data- and AI-driven cloud controller currently running the largest software-defined network in the world. All HomePass services are managed via the HomePass app, available for both Android and iOS.

Haystack™ is a comprehensive back-end monitoring solution catered to Support, Engineering, and Operations teams. The Frontline application provides insights for

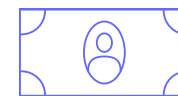
Tier-1, -2, and -3 Support and Engineering personnel, coupled with Panorama dashboards to monitor the operational aggregate health of the network. Signal, a predictive analytics system, pinpoints unhappy customers and proactively generates outbound customer care contact to reduce calls and increase customer satisfaction, an industry first.

Finally, with Harvest™, customer device trends, usage behavior, and application patterns are captured with the ability to create and filter cohorts of your customer base. Network analytics help to drive marketing, promotional, and product decisions to take advantage of network trends and customer purchasing decisions.

All of this allows CSPs to serve their customers more quickly and proactively, building goodwill and loyalty while reducing churn. Plume's TCO research has found that the ability to add such new Smart Home Services on top of existing broadband offerings can increase the lifetime value of a customer by 70%. Coupled with Plume's data insights, support tools, and more, CSPs can also reduce their operating costs by up to 22.4%.



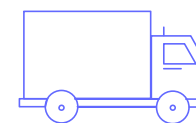
Churn reduced  
up to:  
**30% ↓**



ARPU increased  
by up to:  
**\$15 ↑**



Support calls  
reduced by up to:  
**51% ↓**



Truck roll rates (TRR)  
reduced by up to:  
**67% ↓**

## SEAMLESS SERVICE, EVEN WITH SOCIAL DISTANCING

With many people staying at home and limiting social interactions during the COVID-19 pandemic, it's more important than ever for businesses to be able to offer their customers online and self-service options. Plume makes this possible for CSPs. Plume also enables contactless service in partnership with hardware suppliers that can ship Plume pods directly to customers' homes.

HomePass can be self-installed by the subscriber in seconds via the mobile app. And for issues that require more help, Plume's cloud-based support tools make it possible for CSPs to resolve problems proactively and remotely. This means customers get the results they want without having a technician enter their home. It also means they don't have to wait hours or days for a service request to be handled, which is more important than ever when so many people are working or taking classes from home.

*"Our customers really appreciate the super-simple, app-based approach to installing Plume on their own," said **Brian Olson, General Manager at i3 Broadband**. "This is particularly important at a time when we're doing our part to limit the need for technicians to enter the subscriber's home."*

<sup>8</sup> Total Cost of Ownership Study, 26 March 2020, Plume, <https://blog.plume.com/resources/white-papers/total-cost-of-ownership-study>



# Conclusion

With Plume, WiFi becomes more than just a commodity for CSPs. Instead, it becomes the platform to build a new bundle focused on the smart home. Essentially, CSPs can provide their customers with a smart home operating system—the foundation being fast, secure, and optimized WiFi connectivity to enable the continuous delivery of new Smart Home Services as they hit the market.

**To learn more about Plume, or to schedule a demo, visit our [website](#) or [contact us](#) today.**



