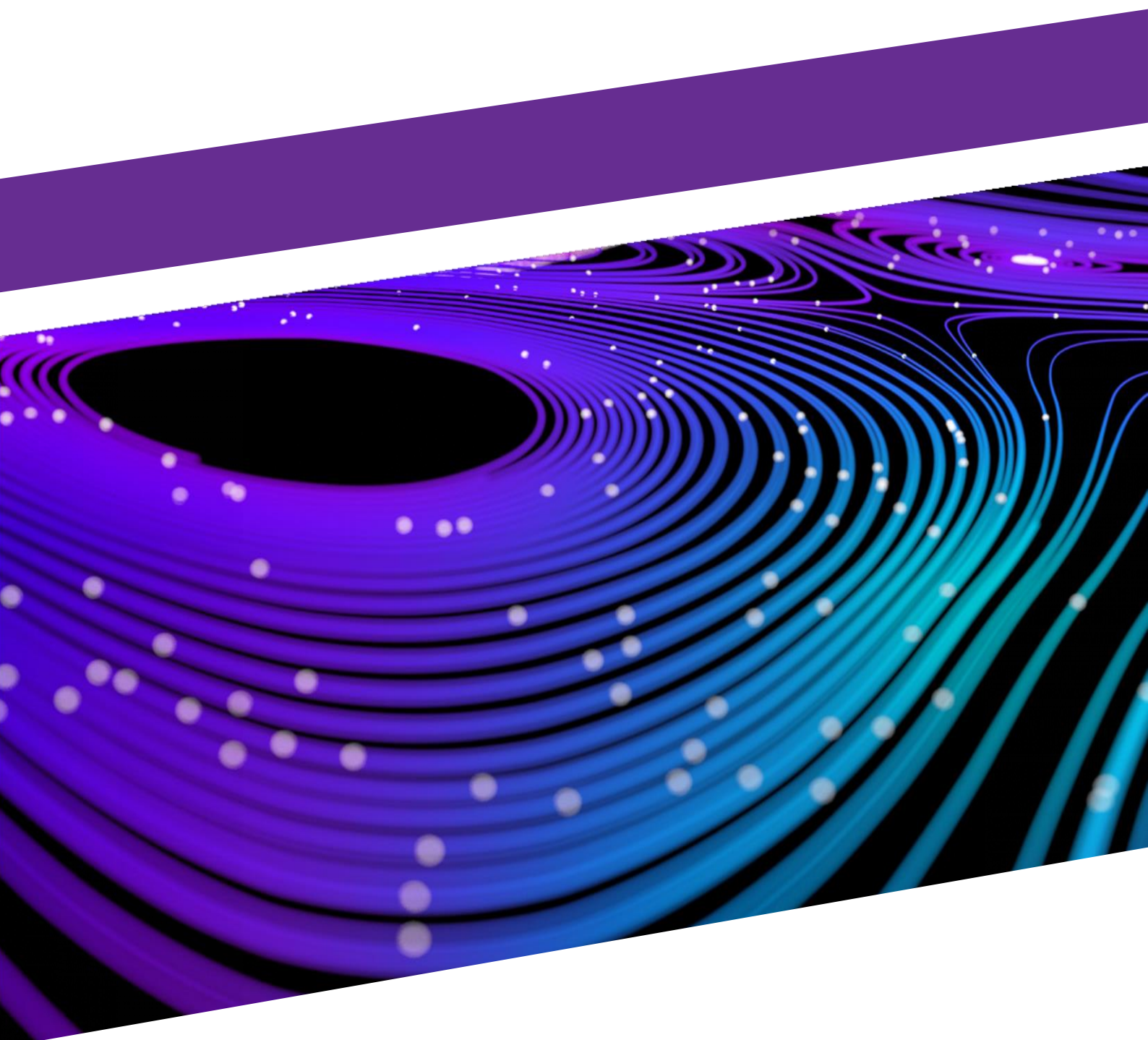




THE X-FACTORS  
OF A SUCCESSFUL CPE  
FIBER STRATEGY






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# Introduction


The ever-growing release of bandwidth-intensive content and applications has significantly challenged the quality of the home broadband experience. Key factors contributing to this challenge include:

-  **Popularity of streaming video services**
-  **VR/AR and online gaming consumed by multiple users simultaneously within the same household**
-  **Emergence of the “Hyper Connected Home” with billions of devices requiring broadband connections for the Internet of Things**

With potential speeds now reaching up to 25Gbps and beyond, fiber networks and their home gateways offer a solution to these challenges. This market is growing rapidly, with **PON equipment revenue projected to rise from \$9.3 billion in 2021 to \$13.6 billion in 2026,\*** driven by XGS-PON deployments across various regions.

To accelerate deployment, many providers offer end-to-end solutions, ensuring interoperability and quick service launches. However, this can stifle innovation by limiting operators' options. In response, CPE vendors are engaging in a price war, offering cheaper gateways and claiming interoperability with head-end equipment by following BBF247 and TR255 standards. These standards, however, do not cover all issues, leading to increased costs and delayed time to market. Innovation rarely aligns with a price war.

As gigabit speeds become the norm, users expect more than just speed. Operators, having invested heavily in new networks, want to grow their subscriber base and avoid churn. They need assurance that their CPE can meet new user expectations. This is the peace of mind Vantiva offers as a leader in Fiber CPE for the home.



**This peace of mind stems from several X-factors that make fiber gateways robust, reliable, and future-proof. The next chapters will explain these X-factors and their importance in operators' return on investment.**

# X-FACTOR #1: Interoperability

**Interoperability between head-end and CPE is crucial for accelerating deployment and ensuring smooth service launches.** It allows operators to choose from multiple vendors — benefiting from market competitiveness, cost savings, and growth opportunities.

In fact, world-class OLT/ONT interoperability is the most complex issue in fiber deployments, as there is no standardized certification to ensure OMCI implementation and compatibility between OLTs and ONTs. To ensure compliance of our products with interoperability standards, Vantiva runs a state-of-the-art fiber lab that continuously integrates with the latest OLT solutions. For operators, this means they can ensure the fastest and most cost-effective deployment with the best quality of service.

**Vantiva has built a comprehensive testing process based on an extensive list of OLT models, firmware, and patch versions.** A dedicated team of Vantiva experts also performs tests at the customer's lab to ensure perfect integration with their service network. This approach allows for maximum flexibility and responsiveness, as interoperability is evaluated live, and software deployment can be immediately launched with the highest level of confidence.

## INTRODUCING VANTIVA'S FIBER INTERLOP LAB




A portable solution that can be installed in a Customer's premises

**A unique test suite server generating additional test cases to the BBF255 and TR147 standards to target 100% interoperability**



In testing sessions conducted at customer premises in three countries spanning North America, South America, and Europe, Vantiva test cases achieved a 100% success rate compared to 70-80% for competitors.

With interoperability, Vantiva also offers easier, faster deployment and the elimination of bottlenecks, regardless of the vendor combination chosen, with no restrictions. Successful deployments reduce error rates and lower operating expenses over time.



**When inevitable vendor software changes occur, Vantiva enables operators to verify interoperability within the hour, beating the normal test cycle by up to two weeks.**

Vantiva is equipped with the expertise and in-depth knowledge to handle any challenge, including the different approaches to interoperability taken by vendors and their various configurations and software capability requirements. The processes and testing we use to maximize security effectively minimize costly backend attacks and ensure future-proofed solutions for the home.

Overall, the interoperability provided by Vantiva gives operators maximum flexibility and the ability to deliver the highest quality of uninterrupted service, with a level of confidence – and peace of mind – unmatched in the industry.



# X-FACTOR #2: Open software platforms

Today, operators are shifting from access-centric offers (more bandwidth, faster Wi-Fi®) to more user-centric scenarios. The key question every software stack should address is: What additional services can be offered to customers, and how can these services be made available in an easy, reliable, and efficient way? The software solution should evolve to support these scenarios, including the addition of new applications for both end-user services and OPEX optimization.

With this in mind, **Vantiva has developed a unique gateway software solution called HOMEWARE that greatly simplifies and accelerates the transformation from hardware and technology into viable solutions.** We have achieved this by designing HOMEWARE to be open from the ground up, **highly modular, flexible, and hardware agnostic.**

Vantiva HOMEWARE for fiber gateways leverages OpenWrt open-source software and SoC vendor software for the lower layers and is enriched by Vantiva to create a scalable software stack. HOMEWARE's main benefits include:



HOMEWARE



## Open

- Tap into rich software ecosystems and extensive partner networks to build the applications and services of tomorrow, using a familiar Software Development Kit (SDK) based on OpenWrt and development boards.



## Secure

- HOMEWARE is a software solution designed with security in mind right from the start and all the way through the development and validation stages.
- HOMEWARE delivers peace of mind by monitoring the security of existing deployments as an after-sales service.



## App Ready

- Deploy new services in a modular way to existing firmware using Life Cycle Management, enabling new ARPU creation and a differentiated offer.
- Run the applications in a protected execution environment, without any impact on the core applications of the gateway, improving stability in complex configurations.
- Deploy new services on existing products, without expensive and time-consuming upgrades.



### Interoperable

- Guarantee the best interoperability in all network functions and with all major players on the market (e.g. ACS with TR-69 and USP, IMS, OMA-DM, OMCI, etc.).
- Gain full flexibility with HOMEWARE's support of multiple configurations to deploy the same software in heterogeneous networks and to link it to components from various vendors.

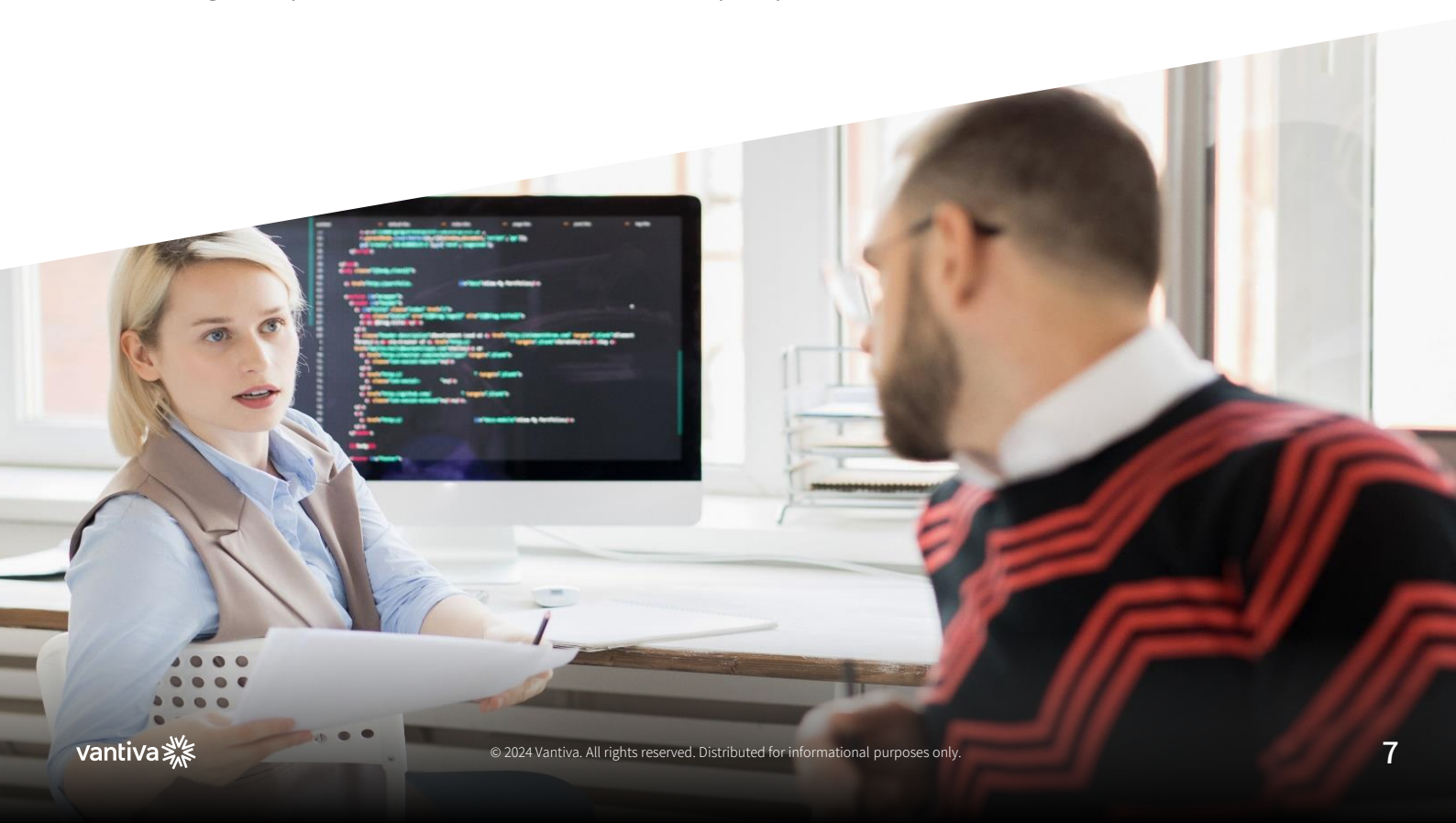


### Portable

- Choose the right hardware for the job, not the right job for the hardware, to become more cost-effective.
- Provide the same experience across multiple access technologies and hardware vendors to streamline the portfolio.

HOMEWARE also includes all software features and capabilities that a service provider expects from a quality broadband gateway, and even more, as new features are regularly added. Vantiva partners with major software players to offer pre-integrated services in Home Automation, Security, Parental Control, Voice Command Services, Video Distribution, and more.

HOMEWARE offers a proven solution with a global footprint, supporting customers worldwide. The development team consists of over 200 software engineers located in Europe (Antwerp), Asia (Chennai, Shenzhen, Bangalore and Beijing), and the Americas (Atlanta). **HOMEWARE has been deployed with over 10 million gateways in more than 50 customers, from Sydney to São Paulo.**



# X-FACTOR #3: Security

Security has always been a priority for CPE vendors, service providers, and consumers. Personal data privacy and access to home network devices must always be protected against piracy and network attacks.

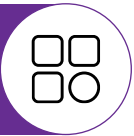
As the industry advances, making fiber gateways the epicenter of service delivery, **these devices must implement a high level of security to protect a complex ecosystem** — ranging from broadband and wireless connectivity to entertainment and IoT services.



## SECURING THE HOME GATEWAY

Vantiva fiber gateways embed a bootloader that verifies all data read from flash into RAM before it is allowed to execute or be used in trusted operations. This verify-in-RAM process is our current “maximum security” solution, but our security measures are much broader.

Our fiber gateways are built with an overall software architecture that includes an end-to-end security mechanism by design, covering everything from bootup, firmware upgrades, and gateway configuration to the installation of applications via lifecycle management.



## SECURING GATEWAY APPLICATIONS

Our fiber gateways can run several applications that enable new customer services in areas such as data analytics, home automation, roaming, and more. These applications can be provided by third-party companies or by the operator and typically require regular updates, independent of the firmware itself. Therefore, a high level of security must be implemented to protect the core firmware from these applications, ensuring the core functionality of the fiber gateway is not affected and service continuity is maintained.



## SECURING THE HOME NETWORK

The firmware on the fiber gateway includes a fully configurable firewall, protecting the home network, devices, and their content from unauthorized remote access.



Another layer of security is provided by our HERO partner CUJO AI, available as an optional software offering. This multi-solution, AI-driven software analyzes vast amounts of network data and uses proprietary machine learning algorithms to detect and block:

- Attempts to access undesirable or illegal content
- Malicious actors and threats to all devices connected to the network
- Attempts to track online activity
- Malicious activity invisible to customers but representing operational threats or service abuse

## A SECURITY-FOCUSED DEVELOPMENT PROCESS

Vantiva embraces a rigorous three-step security check during its development process to reduce the risk of vulnerabilities:

- **During development:** Every code contribution is verified overnight for security breaches, and developers are automatically notified.
- **During validation, before customer acceptance:** The complete code is validated by a dedicated security team through both open box (code review) and closed box (penetration testing) methods.
- **Post-delivery:** A dedicated team continuously tracks software components and technologies used in the products, checking for security vulnerabilities. At regular intervals, products are validated by independent third-party security labs.

**In addition, Vantiva has received ISO 27001 certification in both cryptographic key production/distribution and associated incident response service.** These are two critical operational categories for network service providers (NSPs) worldwide, who have become much more demanding about including stringent security requirements in their requests for proposals for fiber gateways.

Technology providers that are not ISO 27001 certified must prove their compliance separately with the security auditors of each NSP, introducing significant time, cost, and risk into the process. ISO 27001 certification is a strong signal that Vantiva is committed to security and privacy over the long term. This certification makes it easier for NSPs to verify — through trusted third parties — that compliance is in place, accelerating the time-to-market of new revenue-generating offerings in a risk-adjusted manner.



- ISO 27001 at company level
- Integrated home network security apps
- Software development including 3 security layers



# X-FACTOR #4: Wi-Fi® performance

Fiber networks bring unprecedented speeds to the home via the main gateway, but **this can become irrelevant if that fast broadband cannot be effectively distributed to every device and user in the home.** This is where excellent Wi-Fi® performance of the fiber gateway is crucial.

## Redefining Home Wireless Connectivity

At Vantiva, we are dedicated to seamless home connectivity. Our Wi-Fi XL solution optimizes home connectivity with advanced hardware and intelligent software integration, ensuring a first-class mesh experience across various chipsets and operating systems like RDK, HOMEWARE/OpenWRT, and prpl. This flexibility allows Network Service Providers (NSPs) to deliver consistent, high-quality wireless experiences to their customers.

## At the Root of Wi-Fi XL : Mastery in Antenna Design

Wi-Fi XL benefits from our extensive antenna design expertise, which includes in-house testing and design. Our engineers overcome challenges like limited space, thermal control, and radiation diversity to create efficient Wi-Fi antennas for robust connections. The Vantiva Antenna Lab invests in state-of-the-art testing to ensure optimal performance, delivering high-quality products that meet cost and performance demands.

## Pre-Integration of 3rd-Party Mesh Software

Wi-Fi XL pre-integrates leading 3rd-party Mesh solutions, enhancing user experience and reducing support costs for operators. This integration offers NSPs a reliable source for deploying innovative Mesh software, ensuring they stay ahead of the curve. The synergy between Vantiva's robust hardware and advanced software guarantees optimized performance and enhanced interoperability with any connected device.



# What Wi-Fi XL Means

## Operators

## Subscribers

### Advanced Wi-Fi 7 CPE, Home Gateways & Extenders

Superior wireless performance and coverage, reducing support calls

Whole home wireless coverage with high-quality Wi-Fi, eliminating dead spots and providing gigabit speeds

### Universal Compatibility with Chipsets and Operating Systems

Flexibility in hardware and software choices, streamlined deployment

Provides a consistent experience across different equipment combinations

### 3<sup>rd</sup>-Party Mesh Software Solutions

Ensures interoperability and compliance with standards. Extends performance beyond standards to reinforce consumers' loyalty and satisfaction

"Plug & play" integration of different devices into the home network

### Pre-Integration/Certification of Software Mesh Solutions on Vantiva CPE

Trusted reference design, with pre-integration and certification of innovative Mesh components for accelerated market deployments

Privileged access to the most reliable and enhanced connectivity solutions in the market

### Sophisticated Wi-Fi Management Tools

Support from mobile app integration offers NSPs data analytics and insights into network performance and consumer behaviors, facilitating optimized service delivery

Personalized services and an improved user experience with mobile app facilitating installation, daily use and management of connected devices

### High-Performance Antenna Design

Ensures robust and reliable connections, overcoming CPE design challenges such as limited space, thermal control, and interference

Reliable and strong Wi-Fi signals throughout the home

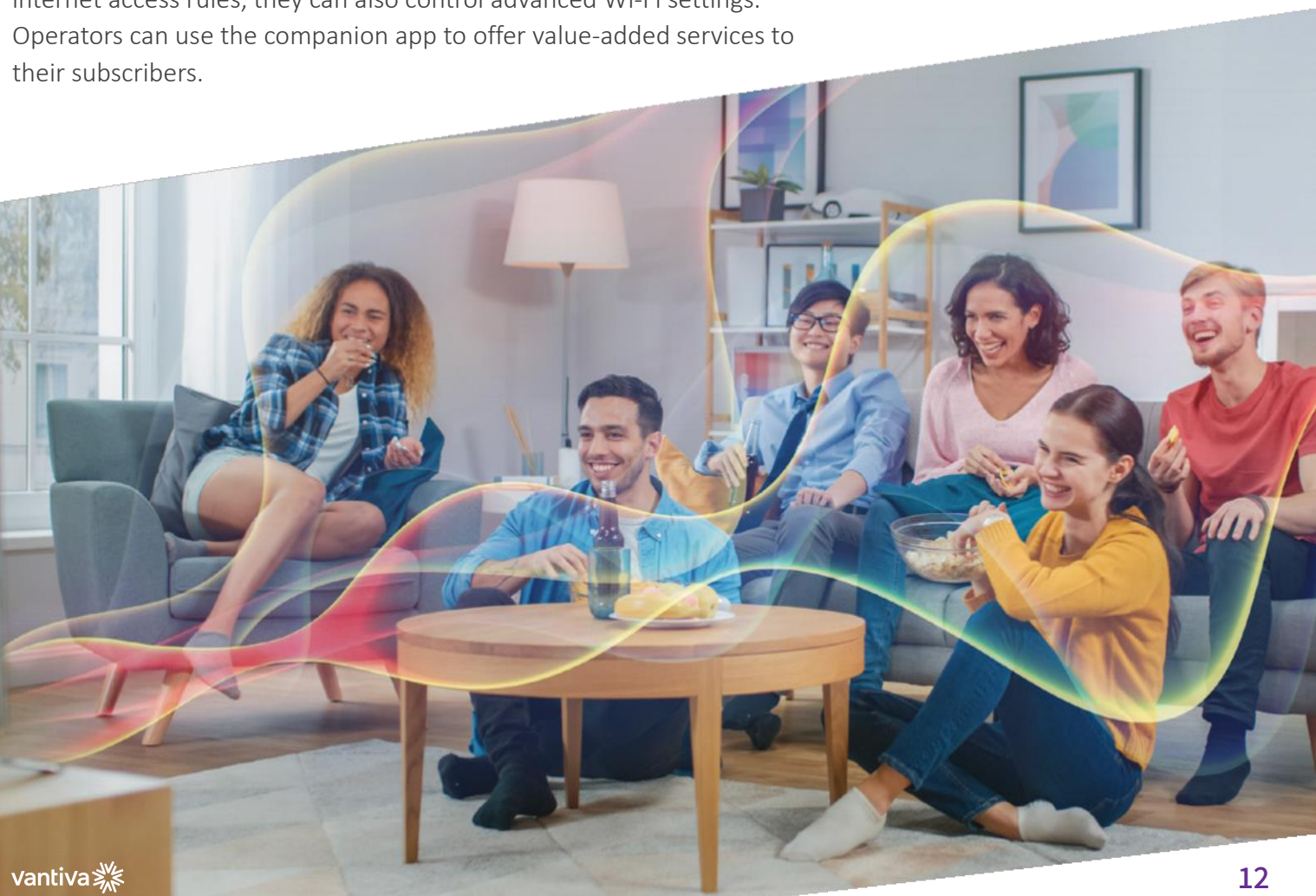
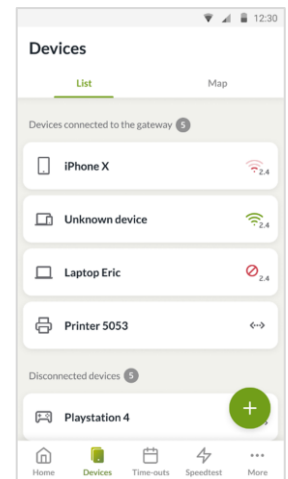
# X-FACTOR #5: Companion app



Nowadays, a good internet connection at home is not a privilege but an essential need. Users are aware of this and seek reliable signal strength, wide coverage, and powerful bandwidth in their Wi-Fi home networks. Moreover, **Wi-Fi usage is no longer an invisible user touchpoint.** Connecting multiple devices, sharing a network with other members or guests, parental controls or timeout rules, security concerns, and performance tests are all use cases that make up an NSP's home network offering.

To facilitate this, Vantiva provides the **NaviGate Companion™ app**, which enables end users to monitor and manage their home Wi-Fi network. Since it is cloud-based, end users can use the companion app in real-time — from anywhere.

Not only can they gain visibility into connected devices and define internet access rules, they can also control advanced Wi-Fi settings. Operators can use the companion app to offer value-added services to their subscribers.





# X-FACTOR #6: Sustainability

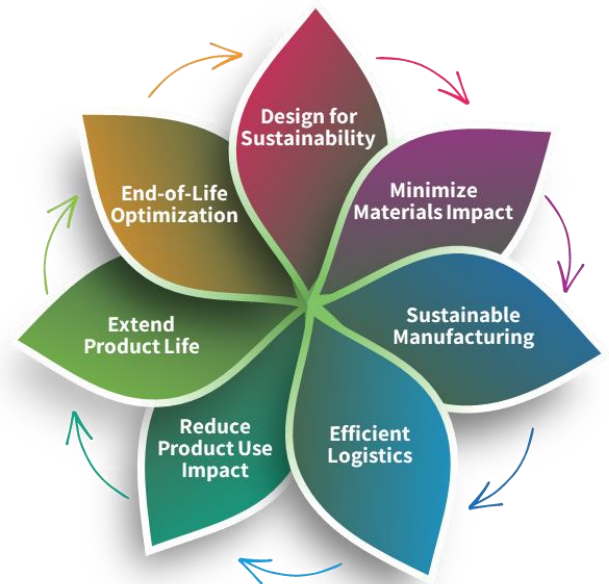
**At Vantiva, we actively pursue solutions that minimize the environmental impact.** One of our initiatives involves using recycled plastic in our fiber gateway casings, reducing the production of new plastics and combating the global pollution crisis. For nearly two decades, Vantiva has also been at the forefront of voluntary agreements on power consumption. Our investment in research and development allows us to create fiber gateways that use less energy without compromising performance.

Our contribution to a sustainable future is further demonstrated by producing smaller devices, which minimize transport impact by improving container filling methods and reducing carbon emissions through more efficient shipments.

Furthermore, we have embraced the principles of the circular economy in our product design process by creating products with end-of-life in mind and maximizing material reuse. For instance, we aim to enhance product disassembly and recyclability, enabling the reuse of materials in new products.

For all these efforts and more, **Vantiva has been awarded the prestigious Platinum Medal by EcoVadis**, one of the world's leading CSR rating agencies, **placing us among the top 1% of companies** in the communications equipment manufacturing sector.

**This remarkable recognition reflects our dedication to sustainable practices across all assessed categories.**





# Conclusion

The ability to deliver Gigabit speeds to the home is the new "normal," with more equipment selection options for operators and more choices in delivery methods for customers. Operators will need to compete on features beyond speed.

**Vantiva can bring peace of mind to both operators and customers through the capabilities embedded in our fiber devices:**

- **Interoperability** with multiple OLTs at product launch and beyond
- **Open SDKs** that enable both local third-party application software integration and cloud software applications
- **Product security** at the device level and for customers' networking activity
- **Whole home Wi-Fi** performance with Vantiva's attention to hardware design and the Wi-Fi delivery ecosystem
- **Companion application** to facilitate the setup and management of the gateway
- **Sustainable products** that reduce the global impact



# About Vantiva

Vantiva is a trusted source for broadband devices across the globe, delivering seamless connectivity to every corner of the home — and an unparalleled user experience. When you choose Vantiva, you are purchasing more than just a product. You are receiving the promise of exemplary service quality synonymous with our brand.

**Supply chain resilience** — With flex-manufacturing, diversified sourcing, advanced supply chain mapping, and a comprehensive visibility platform, we deliver reliable logistic excellence through proactively managed supply chain events and real-time predictive insights.

**Reliable partner ecosystem** — Vantiva works in collaboration with trusted partners to mitigate risks and establish mutually beneficial long-term agreements to ensure excellence across supply and production planning.

**End-to-end expertise** — With a concentrated focus on supply resilience, agile demand and supply planning, rapid crisis management, and strategic proximity to suppliers and factories, our experts are able to deliver maximum efficiency, end-to-end.

**Global manufacturing** — Our intentional manufacturing expansion across the globe helps prevent production disruptions, giving us the capacity to deliver 100k CPE a day within our manufacturing network.

**A commitment to sustainability** — The global demand for sustainable products grows ever stronger. Vantiva is dedicated to this cause, creating greener products that help reduce the carbon footprint. To achieve this, we've adopted eco-friendly practices across several key areas of our production process:

- Devices
- Packaging
- Sustainable ecosystem
- Transport
- Reverse logistics
- Power savings
- Eco-housing

We strive to engineer compact products with simplified electrical architectures to reduce power consumption and minimize our environmental impact.

**Let Vantiva help you stay ahead of the competition.**

**vantiva**   
Pushing the edge

