

CLIENT-TO-CLOUD ASSURANCE WITH AN AI-DRIVEN ENTERPRISE

Experience-First Networking: Benefits and Fulfillment Options

Challenge

Distributed businesses need to:

- Create secure deployment and operation of branch networks
- Handle unexpected increases in applications, users, devices, and use of cloud services
- Reduce operational burden on limited IT staff
- Understand and optimize the user experience as a revenue-impacting priority

Solution

The AI-driven Enterprise provides:

- Industry's only complete client-to-cloud, AI-driven branch solution encompassing wired, wireless and SD-WAN
- Modern, microservices cloud delivers AI-driven insights, anomaly detection and automated troubleshooting with Service Level Experiences (SLEs) for wireless, wired and WAN
- A virtual network assistant that correlates the entire network from client to cloud in natural language
- An extension of your team when deployed as a managed service
- Baked-in security across the portfolio

Benefits

- Unified cloud platform to operate and manage a complete branch solution
- Self-driving automation with AIOps for proactive insights and actions
- Superior user experiences and assurance across the wireless, wired and WAN domains
- Zero trust and threat aware, with security extended from client-to-cloud
- Simplified management with an AI-powered, full stack, comprehensive, and unified platform
- Accelerated deployments with zero-touch provisioning for all access points, switches, and SD-WAN gateways

Solution Brief



Introduction: Why Experience is the New Uptime

In today's distributed workforce, enterprise IT must deliver superior experiences to both internal and external customers. This is more critical than ever to business success, and it must be achieved with a complex network of devices, applications, and people that are under enormous pressure to perform.

There is a continued journey to the cloud with aggressive digital transformation initiatives, and a growing list of competitive solutions fighting for your market share. Organizations that can deliver the most seamless interactions are far more likely to win business than those that present disruptions in the process.

Inside your organization, employees have never been in such high demand. Companies that offer the best access to technology, positive working conditions, and generous compensation will win the war of attrition.

Recent global events have only added to the pressure on IT teams to support an environment capable of enabling these superior experiences. Distributed network environments will quickly see additions of millions of mobile devices, users, and applications. Secure access technologies will become more essential as attack surfaces continue to widen.

The Story Thus Far: How You've Already Improved Experience

In the midst of these challenges, businesses have continued to demand that their applications run fast, their work is uninterrupted, and downtime is negligible. As an IT executive, what will these changes and challenges mean to you?

To address many of these mounting pressures, you've likely made some strategic decisions. Beginning by leveraging the cloud, perhaps you moved your company to Microsoft 365 and other SaaS-based applications. You likely then made the leap into an SD-WAN architecture to help lower the management burden on your team, as well as reduce reliance on costly private circuits.

If you've already done the above, you've likely seen some improvements in performance. And you probably have a more secure network with next-gen firewalls either on-prem or in the cloud attempting to keep the perimeter secure.

Taking Experience to the Next Level

The next level in assured user (and operator) experience comes from sophisticated AIOps. In looking for the best-fit solution, here are some considerations that can guide you to success:

- How do you measure the user experience at any given moment?
- What if you could identify a disruption to the user experience in real-time and enhance it at that same moment?
- What would it mean to the business if you could shift troubleshooting operations from a historically reactionary role to one that was proactive and strategic?
- What if your IT team could reduce network related trouble-tickets by 90%?
- What if you could reduce branch site visits by 85% or more?
- What if you had an “always on” AI-driven conversational assistant to help you navigate the user interface, suggest configuration changes, and even repair issues for you?
- What if you only needed one portal to manage your entire full stack of Wired, Wireless, and WAN?

Fulfilling these aspirations with an AI-driven enterprise can ensure superior experiences for both your end users and for the team responsible for managing the network. So let's take a closer look at what it means to be an AI-driven Enterprise.

What do we Mean by AI-driven Enterprise?

An AI-driven enterprise takes all the pressures of distributed enterprises into account, and guides IT teams to the best resolutions for delivering the best experiences. These solutions can come in different packages: a fully managed service, an internal IT strategy, or a hybrid.

The AI-driven enterprise leverages the cloud and AIOps to shift the focus from managing individual elements to ensuring an optimal client-to-cloud experience. For all network domains, the AI-driven Enterprise provides the state of the art in automation, with continuous insights and recommended actions (*Figure 1*).

These capabilities apply equally to in-house and Managed Service Provider (MSP) implementations which can add even greater value. AI-driven support identifies problems that operators—whether in-house or third-party—may not even know exist. This leads to faster identification and resolution, as well as lower cost.



Figure 1: The AI-driven Enterprise in Multiple Domains

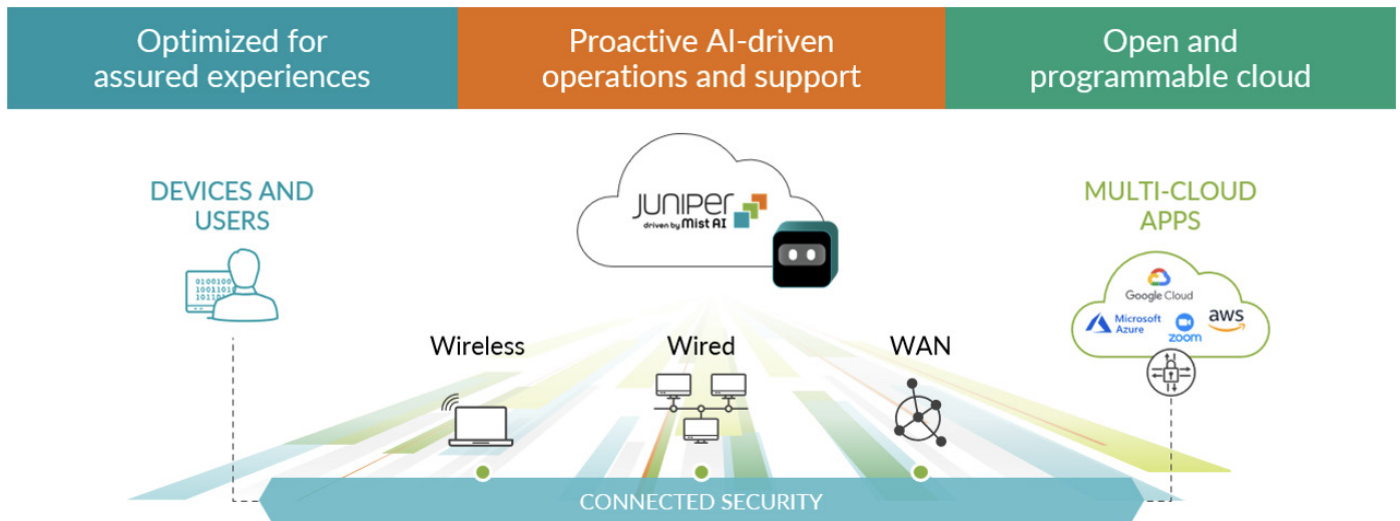


Figure 2: The AI-driven Enterprise Architecture

Essential Benefits

Juniper Networks has executed on an entirely experience-first networking vision, delivered with our AI-driven enterprise architecture. Service providers and/or in-house administrators can deliver highly differentiated, industry-recognized services across the Wired, Wireless, and WAN domains to their customers (Figure 2).

From client to cloud, the AI-driven Enterprise offers automation, insights and self-driving actions across a full stack of the wired, wireless and WAN domains. This open and programmable solution is optimized for both end users and operators. Security is designed into every domain and facet of the solution.

Better User Experiences

The AI-driven Enterprise measures user experience by reporting on characteristics such as application response time to and from the cloud. When a user connects to a wireless network, the AI-driven Enterprise correlates events in all domains (wireless, wired and WAN) to ensure the right Service Level Experience (SLE) is being delivered. This provides assurances that all individuals and devices accessing the network receive the experience they expect and need.

Power of AIOps

If a user falls below a service level, operators can take corrective actions and even predict if a service level may possibly fall below an acceptable level. Juniper provides a cloud service with an AI engine to derive user experiences from many disparate events. Choosing the right parameters and allowing the AI engine to take the correct actions enables self-driving operations. AIOps will help you deliver better experiences for your IT Operators as they manage and operate the network with ease.

Cloud Agility and Scale

The above benefits are made possible with an open and programmable cloud, designed for ease of management, agility and scale. In developing this cloud, Juniper uses the same techniques and tools as those employed by cloud titans. This results in the ability to continually collect—and act upon—thousands of user, device, network element, and application states and events.

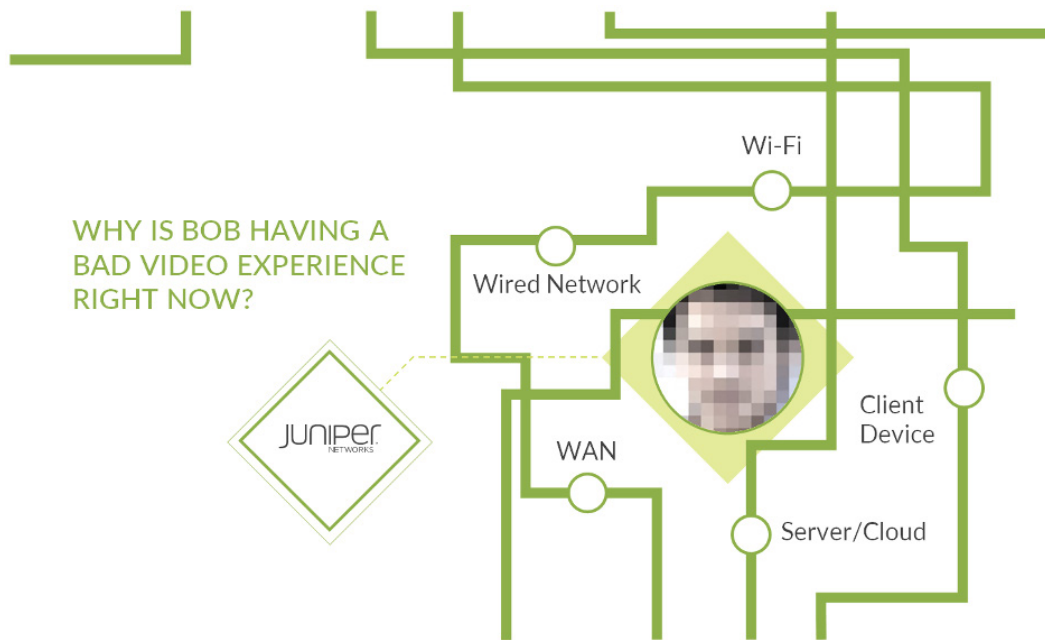


Figure 3: Many Domains Can Contribute to Poor Experience

Example: An Individual User's Video Experience

To provide an example of what the AI-driven enterprise can do, let's consider a particular user's video experience and how this might be affected by events in any of multiple domains. We'll explore possible reasons why this hypothetical user's video call has dropped (Figure 3).

A possible cause could come from the Wi-Fi access point—perhaps the user is having trouble connecting to it. Further upstream, a bad Ethernet cable on the router could be causing the issue. The video application server, housed in a cloud data center, could be yielding low performance on a virtual machine. Or there could be a problem with the user's PC, or Internet connection, or a node in the enterprise WAN.

With end-to-end service levels, event correlation, anomaly detection, and self-driving capabilities, administrators can easily isolate the domain and the failing component. In many cases, a virtual network assistant can either direct the administrator to the fix, or perform the repair. This ability to zero in on the problematic "user minute," and then correct any issues, is a game changer for IT professionals.

For another example of optimized user experience and cross-domain problem resolution, see the [Dartmouth case study](#). More case studies are listed in the Resources section below.

Juniper Mist Cloud and Services

The Juniper Mist™ AI Platform makes networking predictable, reliable and measurable with unprecedented visibility into the user experience. Mist offers customizable service levels for clients, applications, and networks, and makes proactive recommendations to assure the best user experiences.

Time-consuming manual IT tasks are replaced with AI-driven proactive automation and self-healing capabilities, lowering networking operational costs and saving substantial time and money. These analytics are processed in the [Mist AI Cloud](#), resulting in optimized user and operator experience.

The Juniper Mist Cloud uses AI and data science to analyze large amounts of rich metadata collected from [Juniper Access Points](#), [Juniper EX Series Switches](#), and [Juniper Session Smart Routers](#) to provide actionable insight insights in the wireless, wired and WAN domains. Problems are resolved more quickly, with event correlation across all domains.

The AI-driven Enterprise Portfolio

The following diagram maps Juniper products to the domains and functions of the AI-driven Enterprise.

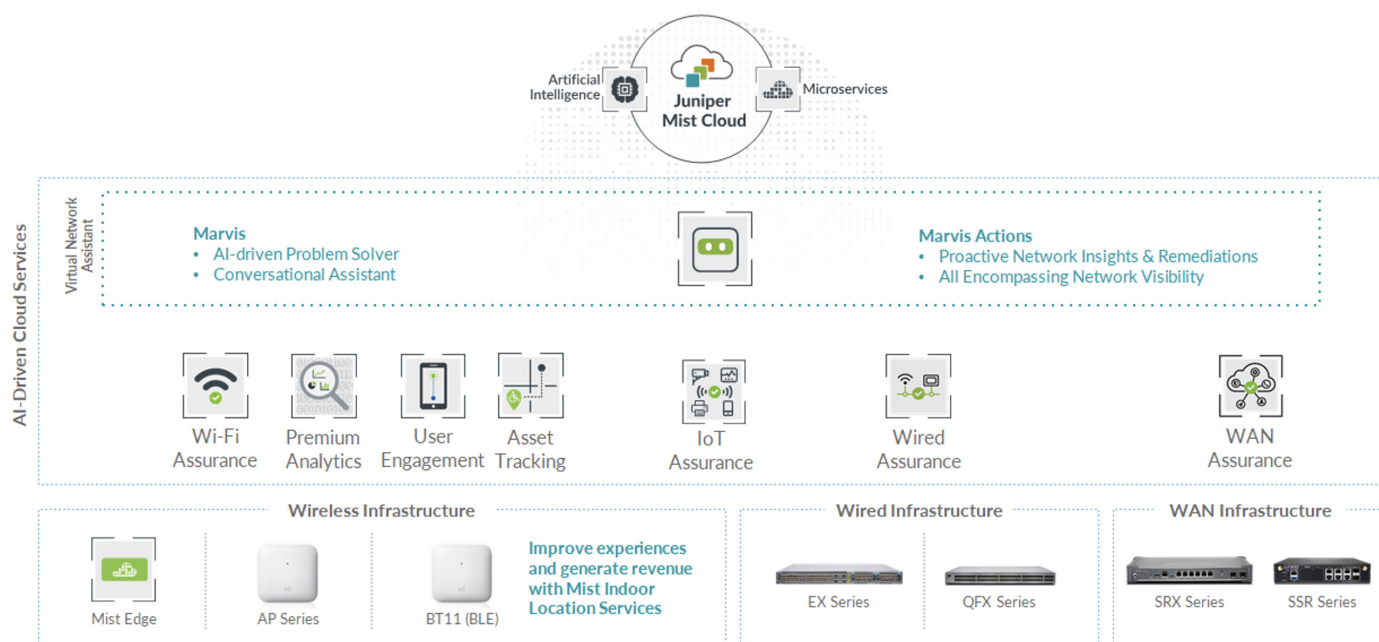


Figure 4: AI-driven Enterprise Portfolio Overview

The following sections discuss the components and attributes of the portfolio.

Benefits of Microservices Architecture

It's straightforward to add or remove new features with Mist's microservices architecture. Services scale up or down elastically when they're needed, eliminating the cost and complexity of monolithic hardware. New enhancements and bug fixes are delivered continually without network disruption. The platform is inherently resilient: a failure in one service does not impact others.

The architecture works across the distributed enterprise delivering AIOps to address any and all Quality of Experience (QoE) issues. Marvis, the platform's **Virtual Network Assistant** (VNA) and conversational AI interface solves issues anywhere in the network, providing insights and remediations for devices, users and applications. This delivers maximum scalability and performance while also bringing DevOps agility to wired, wireless, and WAN networking and location services.

Wireless Assurance

In the Wi-Fi domain, **Wireless Assurance** ensures optimal user experiences with premium analytics. The power of **Juniper Access Points** includes the ability to analyze large amounts of rich metadata collected from not only the wireless, but the wired and WAN domains as well.

Wireless Assurance is based on machine learning and driven by Mist AI. This results in actionable insights powered by machine learning that correlates events with root causes and solutions.

Wireless Assurance replaces manual troubleshooting tasks with automated wireless operations to make Wi-Fi predictable, reliable, and measurable. It provides unique visibility into user service levels.

Administrators can set up and track key wireless criteria (pre- and post-connection metrics), such as time to connect, capacity, coverage, and throughput (Figure 5).

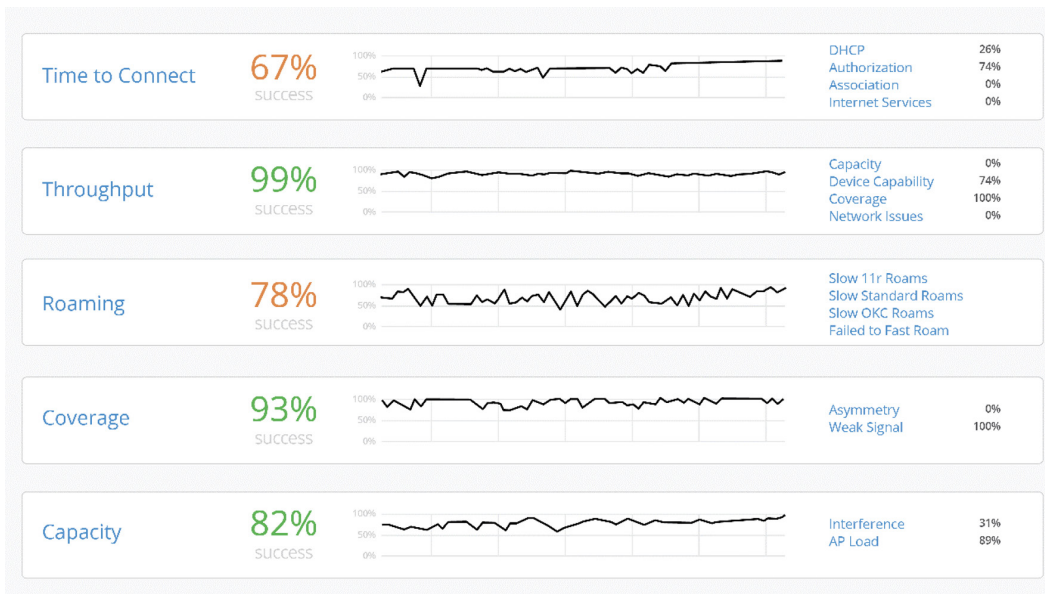


Figure 5: Actionable Analytics from Mist Wi-Fi Assurance

For more information, see the [Mist Wi-Fi Assurance page](#) and the [Juniper Mist Wi-Fi Assurance Overview](#).

Wired Assurance

Wired Assurance delivers unparalleled user experiences for campus switching with simpler operations, shorter mean time to repair, and better visibility into connected devices. This brings cloud management and Mist AI to campus fabrics.

With Wired Assurance, Juniper EX and Juniper QFX Series Ethernet Switches provide rich telemetry to the Juniper Mist

Cloud, which streamlines deployment and management of your campus fabric. Wired Assurance provides metrics for throughput, successful connections and switch health (Figure 6).

This helps IT teams reduce mean time to repair (MTTR) and deliver a new generation of experience-first networking.

For more information, see the [Mist Wired Assurance page](#) and the [Mist Wired Assurance data sheet](#).

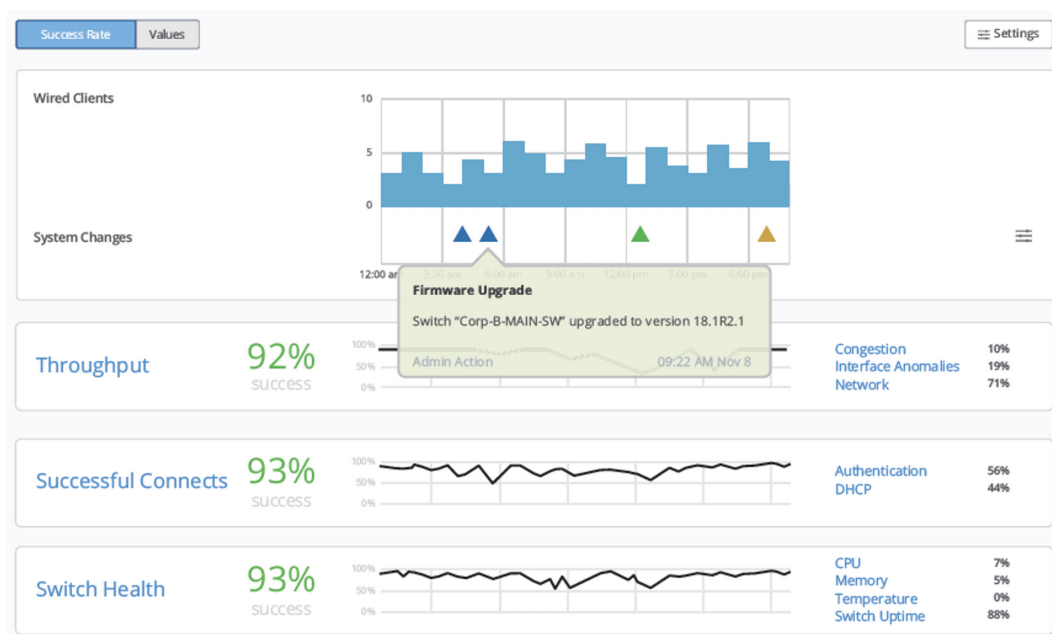


Figure 6: Wired Assurance Service-Level Experiences

WAN Assurance

AI-driven SD-WAN provides **Juniper Mist WAN Assurance**, a cloud service that brings AI-powered automation and service levels to the SD-WAN solution. Driven by the power of **Mist AI** and **Marvis Virtual Network Assistant**, WAN Assurance

supports zero-touch provisioning (ZTP) for plug-and-play installation at remote sites with minimal or no IT expertise required.

The resultant AIOps ensures that customers can understand and improve their users' experience across the SD-WAN (Figure 7).

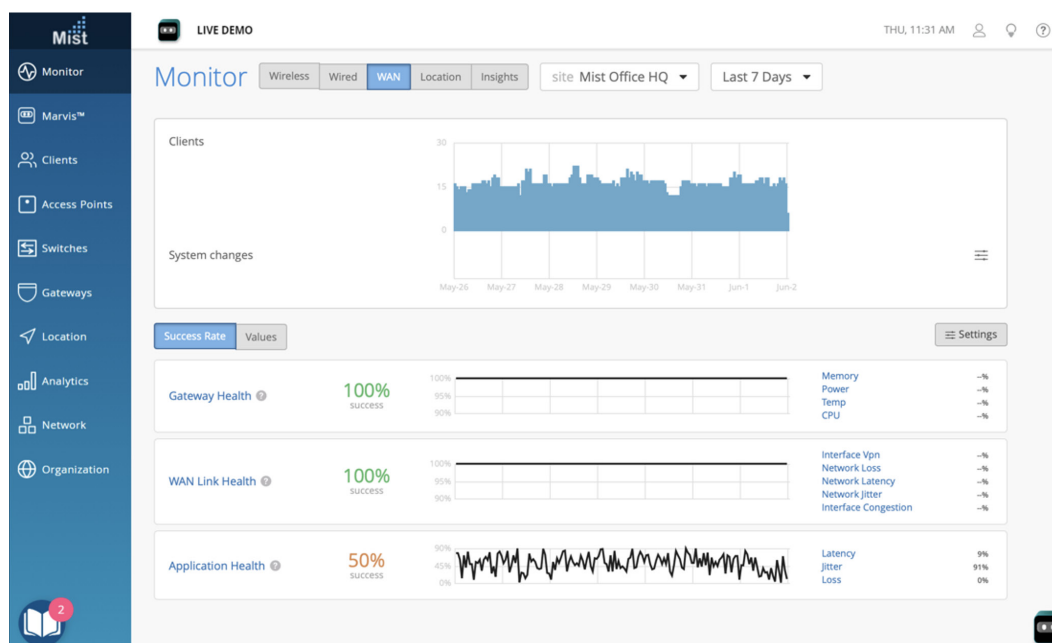


Figure 7: WAN Assurance Delivers Service Level Experiences

The analytics for WAN Assurance are driven by the AI-driven SD-WAN, which offers a flexible, application-aware network fabric that meets stringent enterprise performance, security, and availability requirements.

AI-driven SD-WAN intelligently connects all branch offices (including home microbranches) to locations where all your most critical business assets are held—your data center or local cloud, a public cloud, or cloud services (Figure 8).



Figure 8: AI-driven SD-WAN Supports any Business Type

AI-driven SD-WAN's deny-by-default approach to session access provides zero-trust security. Many other security features are built into the AI-driven SD-WAN (Figure 9).



Figure 9: Secure SD-WAN with Zero Trust

The **Session Smart Routers(SSRs)** in AI-driven SD-WAN provide a tunnel-free, low overhead architecture that collects session and application data. AI-driven SD-WAN reduces bandwidth consumption by 30% or more compared to alternative networking platforms. Deployments report a 75% reduction in infrastructure costs and a 50% reduction in bandwidth, with support costs and mean time to repair (MTTR) reductions of 40%. The largest scale deployment of SSR is 10,000+ sites in an SD-WAN installation.

For more information on WAN Assurance in action, see this [short explainer video](#). Details on the solution can be found in the AI-driven [SD-WAN solution brief](#).

The AI-driven Enterprise as a Managed Service

Juniper's AI-driven Enterprise technology has been deployed for years, but the question for many enterprises is how to bring it on board. Using a Managed Service Provider (MSP) to deliver and maintain the solution is often the ideal way to consume an AIOps solution.

The market landscape is evolving, and there are many choices for consuming managed services. Juniper's strong service provider partnerships ensures success for many different delivery vehicles.

An Evolving Market Landscape

With many IT teams understaffed and looking for resources, it is natural that many customers will desire outside resources. This is why 73% of enterprises have their SD-WANs hosted by MSPs and that number is expected to grow through 2023.¹ Similarly, the near-term future for cloud managed Wi-Fi will see growth of 21% for the next couple of years.²

¹Source: [Enterprise Strategy Group](#)

²Source: [Omdia](#) Cloud-Managed Networking, July 2020.

Pros and Cons of Service Options

Table 1 shows variations on service levels and the pros and cons for an enterprise to consider each one.

Table 1: Comparison of “Do it Yourself” with Fully Managed and Co-Managed Options

	DIY	Fully Managed Service	Co-Managed
Definitions	Customer manages solution from installation to administration.	MSP manages solution and customer is completely hands off.	Solution designed and managed by both the customer and the MSP.
Pros	Customer has autonomy and control over all aspects of the solution and can build in-house IT skill sets.	Time and cost savings as IT resources are supplied as needed. Greater assurance of necessary knowledge and experience. Integration with other network and cloud services. Ensured stability of the solution.	Potentially provides greater flexibility. Customer may have limited time to deploy or maintain a new WAN, or they may benefit from an accelerated deployment and a co-managed solution. MSP can handle connectivity while customer controls policies.
Cons	Unexpected costs and lack of in-house expertise. Difficulty in cloud integration.	Customer may lose control over aspects of the solution. They may have configuration needs not supported by the MSP.	May incur overhead aligning business and technical goals between customer and MSP.

Juniper’s Strengths with Managed Services

By working with an MSP that partners with Juniper, the life of IT support in a changing world can be greatly simplified. All of the solution benefits apply equally well when delivered as managed services:

- A broad end-to-end portfolio in wireless, wired, and WAN/SD-WAN networking
- Optimized operations with Integrated AIOps for faster root cause analysis, event correlations, and self-correcting actions (through natural language conversations)

- Better SLAs through complete visibility and control, as well as better application performance and security
- Lowers the cost of managing a customer’s network as your team can leverage AIOps to accelerate problem resolution and solve most problems without a truck roll

Figure 10 shows the strength of Juniper’s relationships with service providers supporting enterprises.

Juniper is deeply invested in the success of service provider channels, and has Tier 1 references in many vertical industries. You can be assured that the Juniper partner you select has access to the full assortment of resources to ensure your success.

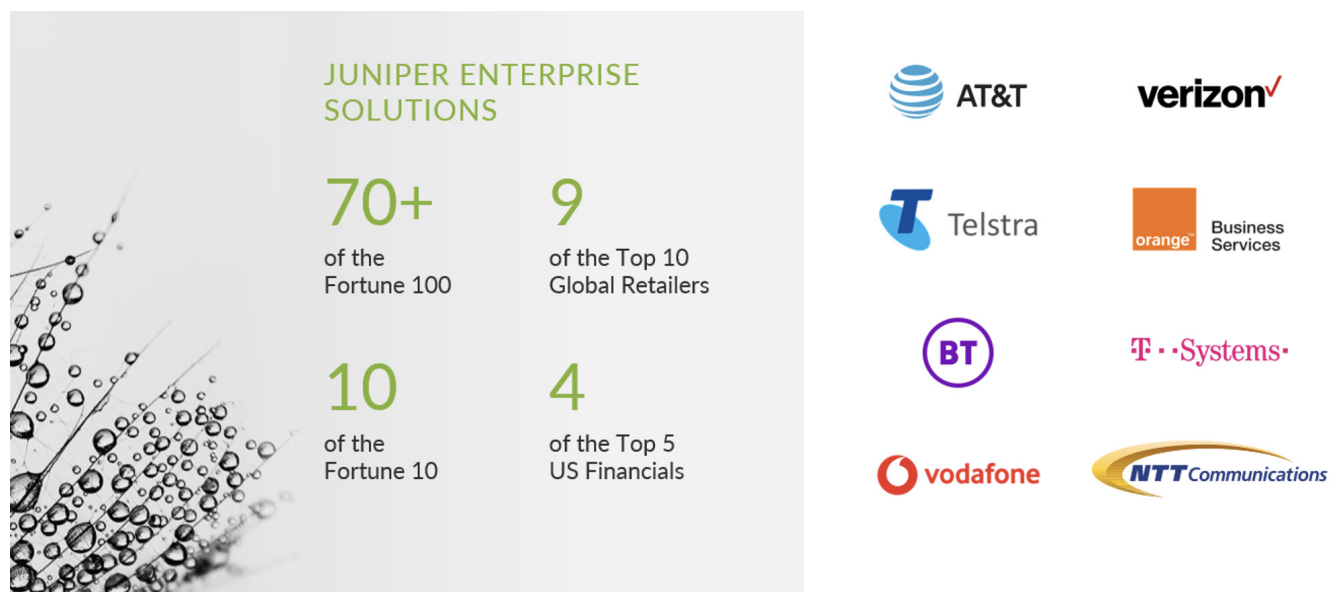


Figure 10: Strong Partner Momentum with Juniper Solutions

Conclusion: Transforming the Economics of Networking

Enterprises must continue to modernize their WAN architectures to support AIOps and the cloud-based applications and services of today and tomorrow. It is no longer sufficient to solely focus on the performance of the end users on the network: a similar focus must be dedicated to the experience of every user. Further, experiences for the operations team must also be taken into account.

Traditional networking products and legacy SD-WAN solutions, designed to support conventional enterprise IT architectures and traffic flows, are too costly and complicated. They don't meet the need for an evolving digital era.

Juniper has created industry-leading technology across the full stack of Wired, Wireless, and WAN to support this effort. An AI-driven Enterprise solution, whether deployed in-house or managed by an MSP, simplifies secure service delivery while guaranteeing optimal user experiences.

AIOps transforms networking economics for enterprises and service providers alike. Full visibility and granular control with client-to-cloud AIOps over all network domains, users, and applications ensures superior service level experiences (SLEs) and agreements (SLAs).

Juniper's AI-driven Enterprise delivers huge scale, uninterrupted voice and video, and faster application performance. This means assurances of high quality user experiences from client to cloud without the higher cost and lower performance of legacy network architectures.

This position is well supported by leading industry analysts who communicate regularly with customers in all verticals, and vendors held accountable to their word. For instance, Juniper is a Leader in the [Gartner Magic Quadrant for Wired and Wireless Networking 2021](#) report, leading on both the *Completeness of Vision* and *Ability to Execute* axes.

Related Resources

The following resources provide additional perspective and details on the AI-driven Enterprise.

Web Pages

- [AI-driven SD-WAN](#)
- [Mist Wi-Fi Assurance](#)
- [Mist Wired Assurance](#)
- [Session Smart Router](#)
- [Mist AI and Cloud](#)
- [Marvis Virtual Network Assistant](#)

Analyst Reports

- [Gartner Magic Quadrant for Wired and Wireless Networking 2021](#)

Solution Briefs

- [Enabling the AI Driven Enterprise](#)
- [AI-driven SD-WAN Accelerates Digital Transformation](#)
- [Creating Business-Driven Networks with SD-WAN as a Managed Service](#)
- [The AI-Driven Campus Architecture](#)

Data Sheets

- [Marvis Virtual Network Assistant](#)
- [Mist Wi-Fi Assurance](#)
- [Mist Wired Assurance](#)
- [Mist WAN Assurance](#)

Case Studies

- [Dartmouth College](#)
- [Ossur](#)
- [The Gap](#)

Videos

- [Experience First Networking for MSP](#) (Dec 2021)
- [AI-driven Campus Fabric](#) (Sep 2021)
- [Mist AI Journey](#) (Sep 2021)
- [Leveraging AI for WAN](#) (Oct 2021)
- [Mist Wireless – Full Mist Demo](#) (Spring 2021)
- [Mist Marvis Innovations](#) (July 2021)
- [WAN Assurance Demo](#) (Dec 2021)

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.



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