

JUNIPER AI-NATIVE NETWORKING PLATFORM SOLUTION BRIEF

Assure That Every Connection—Across Every Device, User, Application—Is Reliable, Measurable, And Secure With The Industry's First AI-Native Networking Platform

Challenge

From digital transformation to AI initiatives to user and device growth, networks are experiencing tremendous and ever-growing pressure. Given IT budgets and constraints related to skills availability and other factors, the combination of complexity and unpredictability of traditional networks is a growing liability.

Solution

[Juniper's AI-Native Networking Platform](#) is built from the ground up across the [AIOps](#) layer and our systems to fully harness the power of AI. From real-time fault isolation to proactive anomaly detection and self-driving corrective actions, it provides campus, branch, [data center](#), and [WAN](#) operations with next-level predictability, reliability, and security.

Benefits

- Up to **90%** fewer networking trouble tickets
- Up to **85%** reduction in networking OpEX
- Up to **50%** less time to reach networking incident resolution

In our networked world, there is a significant gap between mere connectivity and the experience of a great connection. And those gaps have real impacts. Maybe it's thousands of students unable to take a test. Or a memory patient wandering out a door during a brief outage. Or millions in lost service revenue.

Given the stakes, it's time to shift away from simply focusing on network connectivity to user experience. Juniper did exactly that in building our AI-Native Networking Platform; we started by asking the right questions with the goal of ensuring everything we do is designed to deliver the best operator and user experiences. That means flawless, personalized experiences for end users, so they are consistently and reliably connected when it matters most. And a self-running network for operators, so IT teams can focus on their most important and strategic priorities.

The Challenge

The networking "walls" have been closing in on IT leaders for some time on multiple levels. It's not just that they're expected to deliver ever-more value from their networks with the same or lower budget and scarce resources. They also face increasing network complexity related to tremendous pressure to onboard the latest technologies while shifting to multicloud and flawlessly supporting more and more devices and users. And all the while, bad actors are poking at every potential hole in the network looking for a way in.

Market forces only add to the challenges.

- **Digital transformation** pressures are reshaping networks from the data center to edge to cloud while driving exponential growth in data volumes.
- **AI is mainstream**, creating tremendous opportunity along with important questions around bias, governance, and security, in addition to entirely new networking challenges for many applications.
- **Threats are proliferating faster than ever** driving the need for zero trust safeguards.
- **Skills shortages remain a persistent challenge** as network evolution leads to the need for professionals with specialized knowledge that outpaces the current supply.
- **Sustainability is non-negotiable** as organizations enforce sustainability guardrails across IT projects.

Given the challenges and stakes, Juniper has shifted away from the traditional focus on network connectivity to address today's most pressing enterprise needs by answering hard questions.

Table 1: Hard Questions for Modern Networking

Deliver exceptional end-to-end user experience	Simplify the operator experience	Assure experiences are more secure	Ensure experiences drive value
How can we ensure that every user in every location is getting a consistent experience?	How can we get services up and running quickly (without errors)?	What if we could simply and seamlessly adopt a Zero Trust posture everywhere in the network?	What if there was a way to ensure that the network is agile enough to cost effectively support changing business requirements?
What if the network could adapt to fix issues before users even know they exist?	How can we optimize Day 2 operations and reduce firefighting to free up teams to work on strategic business problems?	What if there was a way to discover and neutralize threats to minimize their impact on the business?	Is there a way the network could meet the needs of all necessary stakeholders?

These aren't the kind of questions that can be addressed by bolting on new capabilities, AI or otherwise. They require long-term strategic foresight.

Juniper's AI-Native Networking Platform

Juniper built the industry's first AI-Native Networking Platform from the ground up to take full advantage of the promise of AI and make every connection count. Our AI-Native Networking Platform delivers the industry's only true AIOps with unparalleled assurance in a common cloud, end-to-end across the entire network. Enterprises can rely on it to significantly streamline ongoing management challenges while assuring that every connection is reliable, measurable, and secure. Or they can build highly performant and adaptive network infrastructures that are optimized for the connectivity, data volume, and speed requirements of mission-critical AI workloads.

It all started with a strategic pivot to an experience-first approach that focuses on asking the right questions (Table 1) to deliver the best experiences for both network operators and end users. The ability to deliver the right experiences is built on three fundamental pillars.

- Right data
- Right real-time responses
- Right secure infrastructure



Figure 1: The AI-Native Networking Platform uses the right data, right real-time response, and right secure infrastructure to make every experience exceptional.

Right Data

In traditional network infrastructures, green lights indicating connections are up only tell a small part of the actual story. In

reality, some users may be unable to load emails. Others may be frustrated with choppy video conferences. And the list goes on and on.

Using AI as a solution for addressing granular network issues is a logical progression, but without the right approach it's not a slam dunk. High quality data is essential. Juniper is the industry's first technology provider to start with the right questions to arrive at the right data. These questions aim to uncover information about the user experience—along with top issues plaguing an organization's network—as opposed to basic questions about connectivity status.

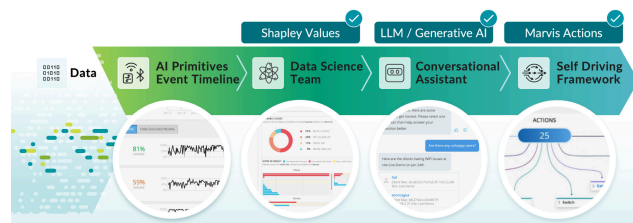


Figure 2: From data to AI Primitives and beyond. The right questions lead to gathering the right high-quality data needed to feed and train an effective AI.

Juniper has over seven years of experience developing and relying on AI and ML algorithms that deliver high-quality insights with minimal false positives. The process of getting data right starts with our organizational structure and the teams responsible for building our solutions. At Juniper, our Customer Success teams collaborate closely with our data scientists on ways to enhance network experiences. With the right insights about customers most pressing ongoing challenges, Juniper data scientists can develop AI Primitives specifically designed to inform and drive the AI toolkits. To train our algorithms, we extract real-time telemetry data from routers, switches, access points, and firewalls.

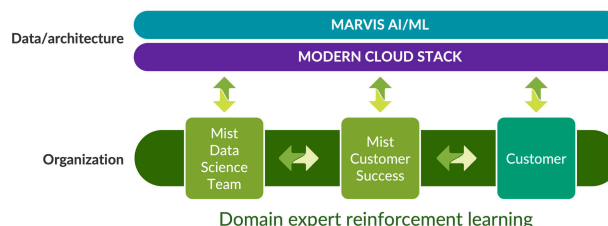


Figure 3: Our organizational structure has laid the foundation for our groundbreaking AIOps.

It's important to note that the Right Data concept extends beyond the network itself. Through continuous user experience learning, Juniper incorporates application data alongside network data, enabling the AI system to learn about the applications being used and predict potential impacts on a user's application experience based on adverse network conditions.

Right Real-Time Response

Ongoing struggles to respond to trouble tickets or to troubleshoot network issues are par for the course for networking IT teams. The AI-Native Networking frees up teams to focus on more strategic priorities by making issue detection and resolution a proactive ongoing exercise. Juniper AI models are trained based on context of anomaly detection, service levels, and event correlation, continuously improving themselves to provide IT teams with the right real-time response every time.

For example, Juniper's Mist™ AI has uncovered network issues and anomalies that have been affecting customers' networks for months. Here are several examples illustrating how Juniper helps customers achieve the right real-time response using AI:

- **Auto Radio Resources Management (RRM):** Juniper's Auto RRM leverages reinforcement learning to autonomously adjust access points' channel and power in real time to optimize Wi-Fi coverage in a specific area or an entire building.
- **Marvis® Virtual Network Assistant:** Marvis has revolutionized how network IT teams manage their networking infrastructure. Through a chat interface, IT operators can use natural language prompts and commands to troubleshoot issues and uncover underlying problems. Marvis is proactive in identifying real-time issues that affect user experiences and presents them in an easily digestible graphical user interface (GUI). IT operators can simply ask questions like, "Are there any unhappy users?" or "Troubleshoot Zoom for Kumar at noon today."
- **Marvis Minis:** Also known as "Digital Experience Twins," Minis simulate users and applications on the network. Even when users are not actively accessing the network (such as weekends or evenings), Minis continually monitor and identify configuration issues or other potential problems that could affect user experience.
- **Service Level Expectations (SLE):** At any given time, SLEs provide direct visibility into the true end-user experience across Wi-Fi, wired access, WAN, and applications. At the top level, SLEs describe exactly what the experience looks like. By double clicking, users can drill down into key details impacting the user experience. This includes correlations with other

events or issues, as well as a description of the scope of impact, or "blast radius," among other details—all in real time.

How Marvis Delivers the Right Real-time Response

Marvis, the first and only AI-native virtual network assistant, simplifies operations for network IT teams by enabling real-time, proactive responses to network issues. Rather than manually troubleshooting issues, IT personnel can simply ask Marvis for help or look at the Marvis Actions framework for a summary of current issues and recommended actions. Marvis features include:

- **Conversational interface:** Marvis uses natural language processing (NLP) with natural language understanding and knowledge graphs to understand user intent and goals. It contextualizes inquiries, returns specific results—and can even take actions based on user feedback.
- **Marvis Actions:** By leveraging the Mist AI engine to identify the root cause of issues across WLAN, LAN, WAN, security, and data center domains, Actions can automatically fix (self-driving) or recommends actions (driver-assist) with high efficacy.
- **Marvis Minis:** The only AI-Native Networking Digital Experience Twin, Minis proactively simulate user connections digitally to instantly validate network configurations and find/detect problems without users being present. Data from Minis is continuously fed back into the Mist AI engine, providing an additional source of insight for the best AIOps responses.
- **Anomaly detection:** Marvis adds anomaly detection to the SLE framework to enable administrators to proactively identify service-impacting events and assure rapid determination and resolution of issue root causes.
- **Data correlation:** Marvis correlates information across a large knowledge base to determine the scope and magnitude of a problem.
- **Accurate root cause analysis:** Our data science toolbox uses Bayesian inference to identify and pinpoint the highest probable causes for network issues.

Right Secure Infrastructure

From devices to operating systems to hardware to software, Juniper has the industry's most scalable infrastructure, underpinning and supporting our networking platform. Our true cloud-native, API-connected architecture is built to process massive amounts of data to enable zero trust and ensure the right responses in real time.

[Juniper Mist Cloud](#) provides the backbone for the [Juniper Mist AI](#) engine, centralizing data and AI compute with the scale and

elasticity to train AI and execute AI inference. Juniper Mist Cloud delivers updates, feature releases, bug fixes, threat patches, device support, and much more in real time with no interruption to network operations. Customers enjoy simpler operations with no need for cumbersome on-premises hardware and software additions.

The Right Secure Infrastructure also encompasses Juniper’s ability to provide the specific networking infrastructure required for AI clusters. We have a proven track record in delivering robust, high-performance, standards-based infrastructure, and we’ve committed to ensuring our Ethernet-based networks meet the demanding needs of enterprises building data centers for AI training, storage, and inference.

Solution Components

AIOps that Simplifies IT Operations

Beginning with our early leadership in wireless LAN, Juniper continues to extend AIOps to all parts of the network.

Campus and Branch

Transform campus and branch networking with the industry’s only AI-driven, cloud-native campus and branch solution proven to

deliver predictable, reliable, and measurable end-user experiences with a low TCO. The AI-native full-stack solution provides AIOps for wireless, [wired access](#) to core, [SD-WAN](#), [indoor location services](#), and network access control (NAC) for a transformative, AI-driven full-stack experience from client-to-cloud (see Figure 4). Specific use cases include:

- AI-driven full stack
- SD-WAN
- SD-branch
- Enterprise edge
- SASE
- Asset tracking
- Mobile engagement
- Wired and wireless access
- Wi-Fi access
- Wired access
- Campus fabric
- Private 5G

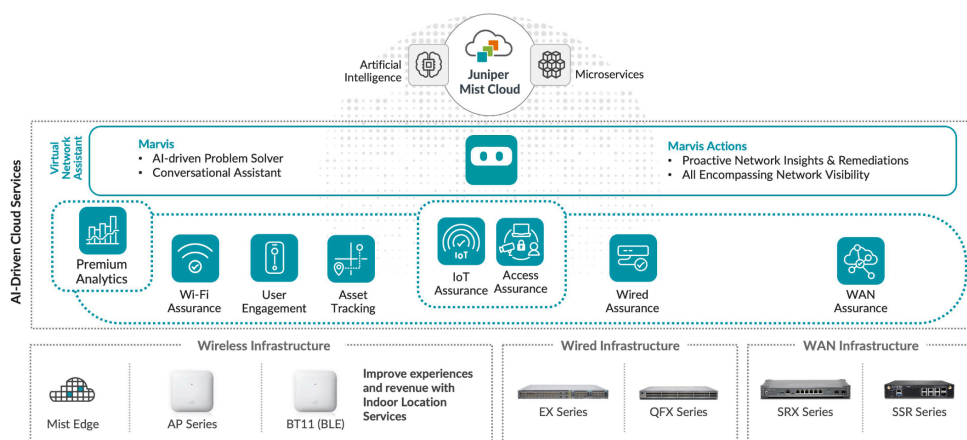


Figure 4: The Juniper AI-Native Full Stack Solution delivers comprehensive capabilities for exceptional experiences at a low TCO.

Data Center

Embrace the hybrid cloud and AI revolution with an assured, secure modern data center that empowers IT teams to scale innovation more easily and reliably. Intent-based data center automation and continuous validation from Day 0 through Day 2+ with [Juniper Apstra®](#) software and [Marvis](#) simplifies operations. Use cases include:

- Data center automation
- Data center fabric

- Data center edge and WAN gateway
- Zero trust data center
- Data center interconnect

Private Enterprise WAN Edge

Effortlessly scale automated WAN for optimal experiences, making the network itself imperceptible.

Cloud-native Enables AI-Native

Juniper Mist Cloud uses a modern microservices-based design to bring unparalleled agility, scale, resiliency. This makes it easy to add or remove new features, implement new enhancements, and deliver bug fixes almost weekly without network disruption. Services scale up or down elastically when they're needed, eliminating the cost and complexity of monolithic hardware. Plus, Juniper Mist Cloud is inherently resilient as the failure of one service does not impact others.

Network Infrastructure That Powers AI

[Juniper's AI Data Center solution](#) is the quickest and easiest way to deliver high performing and scalable networks for AI training and inference. With unique intent-based operations, an AI-native virtual network assistant, and Juniper validated designs, Juniper takes much of the complexity out of AI Data Center networking design, deployment, and troubleshooting, allowing enterprises to do more with fewer IT resources.

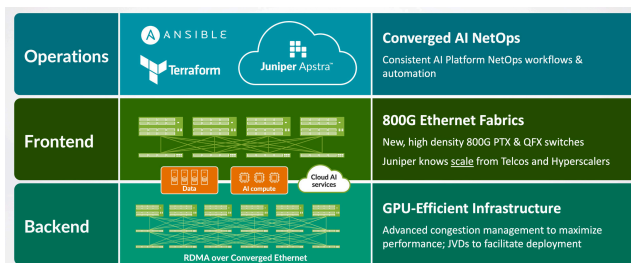


Figure 5: Juniper's AI Data Center Solution delivers unsurpassed flexibility, avoiding vendor lock-in with silicon diversity, multivendor switch management, and a commitment to open, standards-based Ethernet fabrics.

Operations-First Approach

Apstra enables intent-based networking across multivendor environments, with templated blueprints, continuous validation, and proactive troubleshooting. It also integrates with the Marvis Virtual Network Assistant, which provides AI-driven analytics and insights for data center operations.

Open, AI-Optimized Ethernet

[Juniper Networks® QFX Series Switches](#) and [PTX Series Routers](#) deliver high-bandwidth, lossless, low-latency, and scalable connectivity over Ethernet, which is the preferred technology for AI data center networking. Ethernet leverages the vast ecosystem of vendors and standards, driving down costs and accelerating innovation.

End-to-End Solutions

PTX Series Routers provide high-density 800GbE platforms for spine and super spine architectures, supporting thousands of GPUs

at the highest speeds. Juniper also offers validated designs for AI clusters of different sizes and configurations, as well as comprehensive security solutions and integrations with third-party vendors.

Beyond the Network, an AI Ecosystem

To extend assurance beyond the network to applications and services, Juniper uses an open API ecosystem. It all started with joining Zoom data and network data and using our continuous user experience learning process to get to the bottom of what causes poor Zoom experiences (see Figure 6). We used the learnings to help address the issues before users even connect, effectively extending end-to-end assurance beyond the network to applications and services.

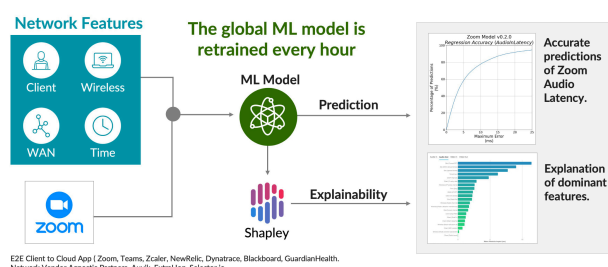


Figure 6: Juniper is using its continuous user experience learning process to extend assurance beyond the network through an API ecosystem.

AI-Native Is Naturally Sustainable

AI-Native and sustainability initiatives go hand in hand. By enabling fast and remote troubleshooting, AIOps helps organizations reduce carbon-heavy site visits by up to [85%](#). Moreover, Juniper networking infrastructure is designed with an eye on the future; we prioritize power efficiency and modular designs that simplify repairs and reduce e-waste while extending product lifetime. And we ship our products in sustainable-minded packaging designed to reduce waste and shipping emissions.

It's Time to Make Every Connection Count

Juniper laid the foundation for the AI-Native Networking Platform years ago when we had the foresight to build products in a way that allows us to extract rich network data. By using our data to answer questions about how to consistently deliver better operator and end-user experiences, and building the capabilities that allow us to do that into our DNA, we've set a new benchmark for the industry. And we're not planning to rest on our laurels. Enterprises looking to deliver exceptional end-to-end user experiences while simplifying networking challenges and assuring security need look no further than Juniper to make every connection count today and tomorrow.

Next Steps

Learn more about the Juniper [AI-Native Networking Platform](#).

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA **Phone:**
888.JUNIPER (888.586.4737)
or +1.408.745.2000
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands **Phone:**
+31.0.207.125.700