



# IMPROVE PATIENT OUTCOMES AND REDUCE COSTS WITH AI-DRIVEN NETWORKING

*As a leader in AI, Juniper brings unprecedented simplicity, reliability, and security to healthcare providers*

## Challenge

The COVID-19 pandemic has accelerated the need for digital transformation that allows healthcare providers to deliver on the emerging quadruple aim of improving outcomes, patient experience, clinical experience, and cost control.

## Solution

A leader in AI for IT, Juniper extends the power of artificial intelligence across wired and wireless networks at hospitals, clinics, treatment centers, administrative offices, private data centers, and hybrid cloud environments.

## Benefits

- Delivers predictable, optimized network experiences for clinicians, administrators, and patients with AI-driven insight and customizable service levels
- Provides real-time wayfinding, proximity notifications, asset tracking, and other location-based services
- Simplifies network operations, increases network service reliability, and frees up resources for innovation
- Safeguards against rising cyber threats, protecting sensitive patient and clinical information

The COVID-19 pandemic has accelerated digital transformation for healthcare providers. When the pandemic first appeared, millions of healthcare professionals pioneered the use of telehealth and other technology to deliver care under unprecedented circumstances. Healthcare providers are imagining new ways that digital care delivery can improve patient outcomes, enhance the patient experience, boost workforce well-being, and lower the cost of care.

The need for continuing digital transformation in healthcare is urgent, and the transformation of the IT infrastructure is also necessary. Unfortunately, the complexity of traditional IT architectures prevents rapid adaptation, limits buyers' choices, and drives up operational costs. To accelerate the value of digital health, providers need flexible networks that are simpler and more affordable. They need networks that will deliver optimized network experiences for users and devices, uncompromising reliability, and built-in security.

## The Challenge

As healthcare providers accelerate value-based care and business transformation, the foundational IT infrastructure needs to be resilient, adaptable, and efficient. Healthcare providers should:

- **Envision remote work as a long-term strategy.** COVID-19 forced many healthcare professionals to work from home—with remarkable success. Primary care visits, mental health services, and even physical therapy are now conducted via telehealth. Radiologists, cardiologists, and oncologists read diagnostic images remotely and collaborate virtually. Medical assistants work from home to schedule patients, and billers ensure that payment for services is received. Whether on the front lines of care or in administration, the ability to work remotely enhances worker safety, makes more flexible use of resources, and enhances productivity. But effectively sustaining remote work requires a secure, reliable connection to key applications and data from home.
- **Reimagine healthcare delivery from acute to primary care.** Clinicians expect easy access to their data and applications anytime, anywhere. Digital workflow tools can reduce the administrative burden and free up clinicians. Engaging and empowering patients with mobile apps, health portals, and wearables to continuously monitor health conditions can improve outcomes



and their experiences. Patient monitoring, from smart beds to cardiac monitors to infusion pumps, enables more responsive and efficient delivery of care in hospitals and treatment centers. Robots deliver medications and specimens, freeing up human staff.

As more hospitals look for ways to minimize inpatient services, their physical space may transform. At the height of the pandemic, parking lots were quickly converted for triage, and longer term, clinical or administrative space may be repurposed as well. With physical changes and new digital dynamics, a hospital's campus network must be flexible as well as fast and reliable to support anywhere, anytime application access, easy collaboration, and the use of connected medical and IoT devices.

- **Leverage private and public cloud resources as needed.** Data analytics, Software as a Service (SaaS) applications, and cloud services are essential elements in the transformation of care models. Data volumes are growing rapidly, as AI and analytics play a vital role in care delivery and operational efficiency. A hybrid cloud environment enables providers to retain both the control of a private data center and the flexibility of public cloud services. But aging enterprise data centers won't keep pace. IT needs a modern data center that can deliver applications and services across both private and public clouds quickly, efficiently, and securely.
- **Protect data at the highest levels.** Data privacy is always top of mind in healthcare. But today, providers must be extra vigilant about cybersecurity. Ransomware has been particularly vexing. Clinical research and patient data are extremely valuable prizes. As more clinicians, administrators, and patients access applications and data from more places and more devices, risk increases. Remote workers are using home Internet connections and maybe even personal devices that lack the same level of security as IT-managed networks and devices. Smart medical devices often don't come with built-in security. IT needs a network that can detect and stop threats before disruptions occur.
- **Modernize the enterprise WAN.** The enterprise network connecting hospitals, clinics, medical business offices, and other facilities must become simpler, more flexible, and more scalable. Traditional WANs are simply too brittle to adapt to the demands of digital healthcare and the shift to the cloud. Limited visibility makes WAN outages difficult to troubleshoot. Manual configuration is commonplace. Instead, AI-driven network operations can be used to improve user experiences from branch offices to the hospital, automate network operations, and lower costs.

- **Empower IT teams to innovate.** Improving clinical outcomes while lowering operational costs seems contradictory. Empowering clinical, business, and IT leaders to deliver transformation means that IT needs to be liberated from routine infrastructure operations work, freeing up resources for innovation. By automating network operations, IT teams can improve service delivery while reducing costs.

## The Juniper Networks AI-Driven Healthcare Network Solution

Juniper's AI-driven healthcare network architecture enables the delivery of reliable, secure, and flexible networking for hospitals, clinics, labs, medical business offices, and administrative locations as well as data center and cloud instances.

### Features and Benefits

Healthcare providers around the world put their trust in Juniper Networks to:

- **Deliver optimized and personalized network experiences everywhere.** With a Juniper campus network driven by Mist AI™, IT can deliver exceptional performance, reliability, and scalability across wired and wireless networks. With a microservices cloud architecture, integrated AI engine, and a virtual assistant, healthcare providers can deliver highly intelligent, predictable network service experiences for patients, guests, and employees.

In addition to delivering the best Wi-Fi range and performance, the Juniper® Series of High-Performance Access Points has a dynamic vBLE 16 element antenna array for the industry's most accurate and scalable location services. This allows providers to deliver real-time wayfinding, proximity notifications, and asset tracking directly from the access point rather than overlaying networks or technologies. Providers can now easily locate critical staff, at-risk patients, and essential medical equipment to elevate patient safety and support streamlined clinical operations and workflow.

Network operations are simplified with Mist AI. Juniper Mist™ Wi-Fi Assurance and Juniper Mist Wired Assurance replace manual troubleshooting with automated operations. The Marvis Virtual Network Assistant provides AI-assisted troubleshooting and network performance analysis through an intuitive conversational interface, empowering IT teams from the service desk to engineering to speed problem resolution.

Juniper Networks® EX Series Ethernet Switches deliver the highest level of performance and reliability for medical campus and branch networks, whether for the core, aggregation, or access layers. Juniper's building-block

approach to switching enables easy scalability to meet growing digital demands and protect investments.

As IT continues to support clinicians, administrators, and other staff working remotely, each can be assured of a better, more secure work experience with Juniper Mist Edge. Juniper Mist Edge securely extends the corporate network, empowering staff to work from home while protecting against at-home security risks.

- **Deliver applications and workloads from data centers and public clouds.** With Juniper as the foundation of the data center network, IT can deliver applications and services where and when needed. Whether for telehealth visits, accessing patient health records, reading diagnostic images, vital patient monitoring, or administrative functions, applications are predictable and responsive.

With Juniper data center switches, IT can create a single IP network fabric that seamlessly connects and secures workloads across both enterprise data centers and public cloud instances. Juniper Networks QFX Series Switches provide a building block approach for the data center fabric, minimizing complexity and cost while maximizing flexibility. Using QFX Series Switches as the underlay network and Ethernet VPN–Virtual Extensible LAN (EVPN-VXLAN) for the overlay network creates a single IP fabric with efficient Layer 2/Layer 3 connectivity, simplicity, and agility.

- **Build a threat-aware network to detect and stop threats faster.** Juniper Connected Security uniquely safeguards healthcare organizations, unifying all network elements into a threat-aware network. Juniper’s built-in defenses automatically protect users, devices, applications, and data across the healthcare system. Security policies are dynamically enforced at every point of connection.

Comprehensive protection begins with Juniper Networks SRX Series Services Gateways, high-performance, next-generation firewalls delivered on the industry’s most scalable and resilient platform. Critical applications operate

safely, while advanced threats are detected and blocked. With clear visibility into threats and centralized, automated control over access and enforcement policies, healthcare organizations are protected from end to end and from top to bottom.

- **Adapt the enterprise WAN for the demands of digital healthcare.** Proven at the largest service providers and many healthcare provider environments, Juniper routing technology is ideal for the life-critical business of healthcare. Juniper Networks MX Series Universal Routing Platforms enable high-performance, reliable, and scalable connections among a provider’s hospitals, treatment centers, offices, data centers, and cloud instances with built-in security. Mist AI simplifies network operations while the MX Series routers deliver industry-leading system capacity, density, security, and performance.

AI-driven operations enable IT to measure and drive user experiences across the enterprise WAN, all the way to workers in clinical locations and offices. Juniper’s SD-WAN solution to connect branch offices, combined with AI-driven operations, can further improve user experiences, automate operations, and lower costs.

- **Harness network automation to increase IT efficiency.** IT is typically called upon to do more with less. With Juniper, healthcare IT teams can leverage automation to deploy, change, and manage networks. With Juniper’s network automation tools, IT can drive intent-based operations across the network and services life cycle, reducing the time it takes to perform common operating tasks and minimizing process-related errors. Network automation empowers the IT team to do more with the resources it has while also engaging in more satisfying work.

## Solution Components

Healthcare providers have trusted and deployed Juniper solutions as major building blocks of their networks.

Solution Domain	Summary	Description
<b>Campus Wired and Wireless Access</b>		
<b>Juniper Mist cloud services</b>	Pioneers AI for IT with the only AI-driven platform for wired and wireless networks.	Mist cloud services are built on a modern microservices cloud which enables elastic scale, 100% API-based programmability, and operational simplicity. Juniper Mist™ delivers advanced wired and wireless user experiences unavailable with legacy network solutions.
<b>Juniper Series of High-Performance Access Points</b>	Provides enterprise-grade Wi-Fi, Bluetooth LE, and IoT connectivity.	Juniper Series of High-Performance Access Points work in conjunction with Juniper Mist cloud services to collect and analyze metadata in near real time from all wire-less clients. This enables rapid problem detection and root cause identification with predictive recommendations and proactive correction. Organizations can choose from a growing portfolio of access points for indoor and outdoor use.

Solution Domain	Summary	Description
<b>Juniper Mist Wi-Fi Assurance</b>	Replaces manual troubleshooting tasks with automated wireless operations.	Juniper Mist Wi-Fi Assurance makes Wi-Fi predictable, reliable, and measurable with unique visibility into user service levels. Dynamic packet capture and proactive root cause identification speed troubleshooting even for IT generalists.
<b>Juniper Mist Wired Assurance</b>	Enables simpler operations, streamlined troubleshooting, and better visibility into the experiences for connected devices.	Juniper Mist Wired Assurance onboards, provisions, manages, and troubleshoots EX Series switches, leveraging rich Junos® Operating System telemetry to deliver AI-powered automation and service levels. IT gains clear visibility into wired service levels and speeds troubleshooting with proactive root cause identification and automated actions.
<b>Marvis Virtual Network Assistant</b>	Simplifies everyday troubleshooting with self-driving actions and network performance analysis and real-time answers.	The AI-powered Marvis Virtual Network Assistant automatically fixes problems before users know they exist. IT can understand issues faster and get more done with its conversational interface driven by Mist AI. IT can turn insight into actions with automatic fixes or recommended actions for simplified troubleshooting.
<b>EX Series Ethernet Switches</b>	Provides carrier-grade switches for campus core, aggregation, and access switching.	The Juniper Networks EX9200 line of Ethernet Switches is ideal for high-density campus core environments, while the EX4600 line of Ethernet Switches delivers 100GbE aggregation for campus deployments. A broad portfolio of EX Series access switches is available, including the EX4300 Ethernet Switch, which is ideal for connecting IP phones, wireless access points, and surveillance cameras.
<b>Remote Workers</b>		
<b>Secure remote workforce</b>	Extends the AI-driven enterprise to home.	Juniper's Secure Remote Workforce solution, composed of Juniper Mist Wi-Fi Assurance, Juniper Mist Edge, and SRX Series branch firewalls, empowers clinicians, administrators, and other staff to work remotely more effectively and gives IT visibility into at-home network user experiences.
<b>Data Center</b>		
<b>QFX Series Switches</b>	Secures and automates the data center network.	QFX Series Switches create a strong underlay foundation for flexible and high-performance network fabrics and improve network reliability and agility. QFX Series Switches provide a building block approach for a spine-and-leaf IP fabric architecture with flexible deployment as spine-and-core aggregation, end-of-row, and top-of-rack switches.
<b>Contrail® Enterprise Multicloud</b>	Realizes the full advantage of hybrid cloud with the ability to run any workload on any cloud and on any deployment.	Contrail Enterprise Multicloud allows IT to manage multivendor resources as a single, cohesive infrastructure. IT can manage overlay and underlay networks and the compute environment and centrally orchestrate policies, including microsegmentation, to meet stringent privacy and security requirements.
<b>Connected Security</b>		
<b>SRX Series Services Gateways</b>	Provides comprehensive threat protection and advanced defenses against known and unknown threats.	SRX Series firewalls are built for maximum scale, availability, and performance. IT can choose from a broad range of physical and virtual SRX Series devices, from all-in-one firewalls for the campus and branch office to highly scalable enterprise and data center firewalls.
<b>Juniper Advanced Threat Prevention</b>	Finds and blocks both known and unknown cyberthreats.	Juniper Advanced Threat Prevention improves security team response times by automatically discovering threats. Using SecIntel, Juniper's security intelligence feed, along with dynamic malware analysis and machine learning, Juniper Advanced Threat Prevention discovers zero-day threats and enforces protection mechanisms at all points of connection.
<b>Junos Space® Security Director with Policy Enforcer</b>	Delivers scalable, responsive, and automated security management.	Junos Space Security Director gives IT teams insight into threats, compromised devices, and risky applications through an intuitive centralized interface. A user intent policy framework allows policies to dynamically adapt to changing threat conditions. Policies are enforced everywhere, with any physical or virtual machine acting as an enforcement point, including Juniper switches, firewalls, and routers, as well as third-party infrastructure and cloud platforms.
<b>Enterprise WAN and SD-WAN</b>		
<b>MX Series Universal Routing Platforms</b>	Unifies operations across the WAN.	MX Series routers simplify and integrate network operations across private data center and public cloud resources. MX Series routers provide flexible, simplified connectivity for site-to-site, data center interconnect, and cloud services deployments. MX Series routers also reduce WAN latency to deliver improved cloud application performance for end users.
<b>Juniper SD-WAN Driven by Mist AI</b>	Simplifies and secures branch offices.	The Juniper SD-WAN Driven by Mist AI solution delivers smart, automated routing to connect branches with application performance that aligns with business policies. User experiences are enriched across the WAN with AI-driven insight, automation, and action. Intelligent traffic handling increases application performance at a lower cost. Juniper SD-WAN also increases network availability, quality, and capacity for clinics, medical offices, and other distributed locations.
<b>Juniper Mist WAN Assurance</b>	Enables simpler operations, better visibility into end-user experiences, and shorter mean time to repair (MTTR).	Juniper Mist WAN Assurance provides visibility into the WAN user experience with application-based context. AI-driven insight, automation, and self-driving actions can be applied across campus and branch networks and the enterprise WAN.

Solution Domain	Summary	Description
<b>Automation and Network Management</b>		
<b>Juniper Sky™ Enterprise</b>	Enables simple and intuitive cloud network management.	Ideal for small and midsize providers, IT staff can use Juniper Sky Enterprise to centrally manage and orchestrate network devices and services through a single pane of glass.
<b>Junos Space Network Management Platform</b>	Simplifies and automates switching, routing, and security management.	Ideal for larger providers, Junos Space enables IT staff to scale operations, reduce complexity, and deliver new applications and services quickly. Applications include Security Director and Network Director.
<b>Automation</b>	Builds simplicity into your network for speed, agility, and resilience.	The Junos OS automation framework accelerates service delivery and reduces manual configuration work. IT gains clear visibility into application and network performance, with service-level agreements (SLAs) for different departments with minimal effort.
<b>Services</b>		
<b>Professional Services</b>	Offers global services designed to meet business goals.	Juniper Professional Services lets you leverage advisory services, network optimization, and implementation services to speed time-to-value.
<b>Maintenance Services</b>	Provides mission-critical support services that reduce OpEx and keep the network running smoothly.	A range of maintenance services help keep your network running reliably, reduce network risk, decrease operational costs, and protect your network investment.

## Summary—With Juniper, Your Network Works for You

COVID-19 is a moment of opportunity to accelerate much-needed changes in healthcare. While technology has never been more critical to healthcare delivery, IT has also never been more complex. The growth of users, applications, mobile and IoT devices, and locations relying on digital health systems will quickly become unsustainable if healthcare providers continue down the same network path.

That’s why Juniper is leading the way with AI-driven networking. Juniper uses AI-driven insight, automation, and actions so healthcare providers can deliver unique engagement and optimal experiences to patients, guests, and staff. Juniper brings unprecedented simplicity, reliability, and security to the healthcare enterprise. Juniper is helping healthcare organizations transform their networks with AI—from wired and wireless access at medical campus and branch locations to data centers and cloud environments—so IT teams can stay focused on strategic objectives that improve health outcomes, patient and clinical experiences, and cost control.

## Next Steps

Juniper empowers IT leaders in healthcare to deliver the best network user experiences to clinicians and staff, simplify network operations, and stay ahead of threats. Learn more about Juniper Healthcare IT Networking at <https://www.juniper.net/healthcare> or contact your Juniper account manager or solutions provider.

## 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.



Driven by Experience™

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