

# ACCELERATING NETWORK TRANSFORMATION FOR DIGITAL HEALTHCARE WITH AI-DRIVEN SD-WAN

## Overview

As hospitals and healthcare systems migrate IT systems and applications to the cloud, they are introducing digital healthcare solutions to improve quality of care, boost patient outcomes, and improve business performance. The cloud offers many advantages but also fundamentally reshapes network traffic flows, introducing a variety of security, availability, and service quality challenges for healthcare network planners and system architects to resolve.

## Digital Healthcare Applications

- **Cloud applications and services**—on-demand clinical, financial, scheduling, registration, billing, and office productivity solutions
- **Electronic records and digital healthcare solutions**—EHR/EMR, PACS/VNA, EPCS, care provider kiosks, and mobile devices
- **IoT systems**—remote patient monitoring, equipment tracking, pharmacy inventory control, hygiene monitoring
- **AI in medicine** and machine learning to uncover medical data, automate routine tasks, monitor wearable devices, and improve patient healthcare outcomes and experiences.
- **Telehealth**—remote consultations, team video collaboration, telemedicine
- **Smart facilities**—automated HVAC, lighting, alarms, video surveillance and security, digital signage, wayfinding apps, and public kiosks

## Business Challenges

### Security and Compliance

In the digital era, healthcare applications are often hosted on public clouds, and protected health information (PHI) is often transmitted via public Internet connections, over which the IT organization has little visibility and control. Bad actors can exploit public data networks to steal electronic health records or disrupt critical IT systems and services. By implementing cloud-centric network security solutions, healthcare organizations can protect data in transit, defend infrastructure against denial-of- service (DoS) attacks, and ensure compliance with HIPAA and other data privacy regulations across the globe.

### Network Availability

Cloud applications and digital solutions are the lifeblood of today's healthcare organizations. Network connectivity failures can disrupt care, hinder clinician productivity, and reduce patient trust, tarnishing a hospital's reputation. Healthcare systems can avoid disruptions and improve patient satisfaction by ensuring continuous access to critical applications in the event of WAN link failures or ISP outages.

### Quality of Experience

Today’s healthcare organizations leverage a variety of clinician-facing and patient-facing applications with distinct service characteristics and quality-of-service (QoS) requirements. Poor service quality can degrade user experiences and stall digital transformation initiatives. By intelligently managing and controlling traffic—ensuring the right service-level agreement (SLA) for the right application at the right time—healthcare systems can optimize patient and clinician experiences and accelerate the adoption of new technology. Additionally, AIOps can aid in pinpointing root cause issues that may impact user experience and either self-correct or alert IT operators before the user feels the impact.

### Expansion and Consolidation

Keeping pace with change is a significant challenge for healthcare network planners. Hospitals and healthcare systems are continuously extending services to new locations and merging with other hospital systems to improve business results.

Turning up new sites and integrating disparate networks can be a manually intensive, error-prone, and time-consuming proposition using conventional networking solutions. Healthcare organizations can increase business agility by eliminating outmoded routing protocols and avoiding inefficient network configuration and provisioning methodologies that hinder the pace of transformation. They can also reduce complexities and mean time to value by consolidating deployment and management operations to a single platform and utilizing AI and automation.

### Cost Containment

Healthcare IT executives are under constant pressure to cut costs in today’s hypercompetitive market. By migrating services

to the cloud, utilizing AI and automation, and eliminating networking expenses and complexities, healthcare organizations can reduce TCO, improve business performance, gain competitive advantage in today’s fast growing virtual care and clinical mobility, as well as free up IT budget and staff to focus on innovation and differentiation.

### Juniper AI-Driven SD-WAN Solution

The Juniper AI-driven SD-WAN solution, powered by the Juniper Session Smart™ Router and Mist AI, is an advanced, service-centric networking solution that takes the software-defined WAN to a whole new level. Ideal for next-generation healthcare networks, the solution intelligently polices and manages traffic at the edge for ultimate performance, economics, and control. The solution leverages a tunnel-free architecture that eliminates the inherent inefficiencies and cost constraints of traditional wide-area networking products and legacy SD-WAN solutions and meets stringent healthcare industry security, availability, and performance requirements. AI-driven SD-WAN helps healthcare organizations accelerate cloud migration initiatives and gain a competitive edge, while minimizing disruption and risk.

### Juniper Mist WAN Assurance

Juniper Mist WAN Assurance is a cloud service that brings AI-powered automation and service levels to the Juniper AI-driven SD-WAN solution. WAN Assurance simplifies day two operations with insights, proactive anomaly detection and remediation, and automated troubleshooting. The resultant AIOps allows administrators to understand and improve their users’ experience across the SD-WAN. Watch this short explainer video to see WAN Assurance in Action.

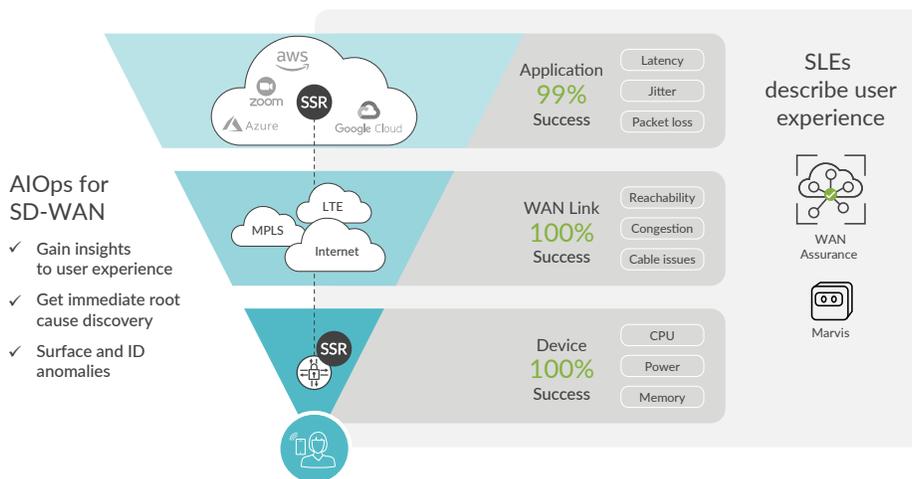


Figure 1: WAN Assurance Delivers Service Level Experiences for Users

## Safeguard Protected Health Information and Improve Regulatory Compliance

Juniper's pioneering Secure Vector Routing, the technology behind the Session Smart Router, provides strong security and hyper-segmentation without the overhead of traditional encryption protocols like IPsec. Deny-all (zero trust) routing, URL filtering, L3/L4 denial-of-service (DoS)/distributed DoS (DDoS) protection, payload encryption, and Network Address Translation (NAT) and VPN functionality protect applications and infrastructure against data loss and malicious attacks, mitigating risk, while ensuring compliance with data privacy mandates like HIPAA, HITECH, and GDPR.

## Streamline Cloud Migration Initiatives and M&A Projects

Specifically designed for contemporary decentralized IT architectures, the AI-driven SD-WAN solution supports a variety of traffic steering and quality-of-service (QoS) functions, as well as session-aware routing capabilities at the network edge to avoid backhauling, minimize latency, and ensure high performance and service quality for cloud apps and services. The solution provides continuous connectivity for critical healthcare applications without requiring expensive hot-standby tunnels like conventional wide-area networking products or legacy SD-WAN solutions. In the event of a link failure or ISP outage, the solution seamlessly redirects traffic over an alternative path without disrupting sessions or impairing application performance. And AI-driven SD-WAN's service-centric routing allows healthcare organizations to migrate workloads to the cloud or integrate networks after mergers and acquisitions without disrupting services or making complicated router configuration changes.

## Increase Patient and Clinician Satisfaction with Quality Experiences

The AI-driven SD-WAN solution ensures high service quality and superior user experiences for telemedicine applications, interactive kiosks, m-health, clinician apps, and other digital solutions while adhering to HIPAA regulations. Administrators can prioritize and route traffic based on application requirements to optimize quality of experience and improve user satisfaction (for example, to prioritize delay-sensitive data flows to minimize latency and packet loss). And unlike competitive solutions that encapsulate all data flows into a single overlay tunnel, the solution's tunnel-free architecture gives administrators full visibility into individual data flows, so they can efficiently monitor end-to-end sessions, track KPIs, and troubleshoot problems.

Furthermore, WAN Assurance provides IT users with WAN health metrics to determine if users are having a good experience, and if not, identifies root causes at the device, link, and application level. Marvis, the virtual networking assistant, also provides complete insights, correlation, and actions for IT users to find and remediate issues faster than ever before.

## Turn Up Hospitals, Clinics, and Medical Offices—Quickly and Cost-Effectively

The AI-driven SD-WAN solution is a fully software-based solution that can run on the Mist Cloud, or on commercial off-the-shelf (COTS) servers and popular hypervisors for ultimate economics, simplicity, and choice. Zero-touch provisioning, claim codes, and advanced templating tools enable plug-and-play installation at remote sites, allowing IT organizations to turn up hundreds of locations per day. Single-pane-of-glass, centralized management simplifies ongoing administration at unstaffed sites, and makes it easy to institute uniform policies across clouds and locations. From the Mist Cloud, IT operators can configure, deploy, and manage their full stack network (wired, wireless, and WAN) all from one platform. [Watch](#) this demo to see how easy it is to configure, deploy and operate a full stack network with Juniper Mist AI and Cloud.

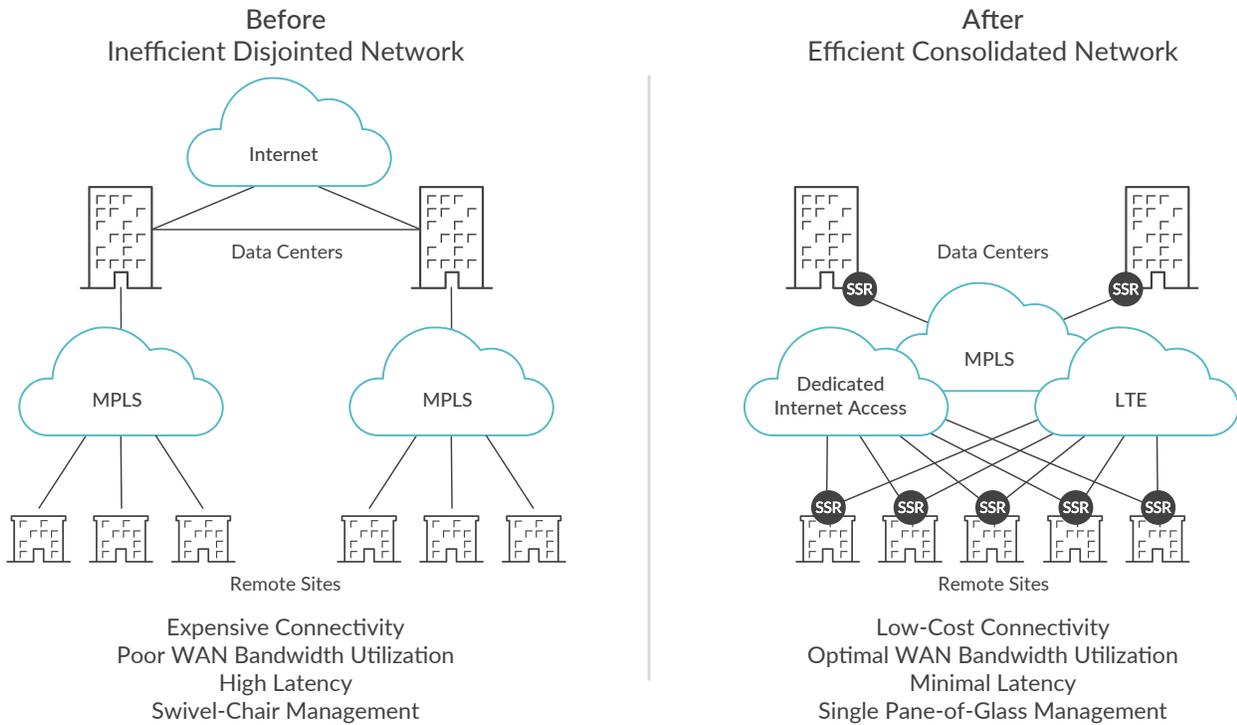


Figure 2: Hospital Network before and after implementing AI-driven SD-WAN

## Nationwide Healthcare System Slashes Network Cost and Complexity with AI-driven SD-WAN

A major U.S. hospital operator with 15,000+ licensed beds uses the AI-driven SD-WAN solution as the foundation for its next-generation nationwide network. AI-driven SD-WAN eliminates cost and complexity, helping this healthcare system efficiently consolidate and manage several distinct networks that had been cobbled together through mergers and acquisitions.

The solution intelligently manages and controls traffic at the edge, providing agile, secure, and reliable connectivity for more than 700 remote sites over cost-effective dedicated Internet access and LTE links.

Redundant uplinks and fast failover capabilities ensure continuous availability in the event of ISP or link failures. A tunnel-free architecture minimizes protocol overhead and bandwidth consumption, and enables detailed visibility into end-to-end traffic flows. Granular QoS controls and application-aware routing ensure high service quality for delay-sensitive, bandwidth-intensive data flows like unified communications and collaboration traffic. Tight integration with a cloud-based security offering provides secure access to external applications and services. And unified administration, auto-device discovery, and zero-touch provisioning (ZTP) streamline remote site deployment and management.

## For More Information

To find out more about how Juniper AI-driven SD-WAN can benefit your business, contact your Juniper representative and visit [www.juniper.net/us/en/solutions/sd-wan](http://www.juniper.net/us/en/solutions/sd-wan)

## About Juniper Networks

Juniper Networks is 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. Additional information can be found at Juniper Networks ([www.juniper.net](http://www.juniper.net)) or connect with Juniper on [Twitter](#), [LinkedIn](#) and [Facebook](#).

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