

A UNIFIED INFRASTRUCTURE FOR HEALTHCARE COMMUNICATIONS

NEC and Juniper Networks Helping Healthcare Providers Improve
Quality of Care and Lower Overall Costs

Co-produced by:

NEC

Empowered by Innovation

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Executive Summary

Healthcare providers continually strive to deliver the highest quality care, make that care easily accessible, and deliver services at the lowest reasonable cost. To accomplish these goals, innovative healthcare organizations are increasingly leveraging their IT investments. The growing trend among savvy healthcare IT executives is to leverage IT to create a business advantage by improving the quality of healthcare and the inter-communications both within and between organizations, while reducing the cost of such care.

This joint NEC and Juniper Networks® white paper presents a framework to help healthcare IT managers attain a high-performance network infrastructure, services, and application environment. This white paper also provides additional details about specific healthcare solutions from both companies that address healthcare technology needs in key areas. This paper concludes with a discussion on how NEC and Juniper are working together on a unified platform that provides healthcare organizations with best-in-class integrated voice, routing, and security services.

Introduction

For healthcare providers, the challenge to provide easily accessible, highest quality care is sometimes at odds with the challenges of containing the cost of care and maintaining the confidentiality of electronic medical records (EMR) and patient health information (PHI). For healthcare IT organizations, the challenge is to improve the quality of patient care through the use of innovative technologies, increase performance, enable reductions in patient care costs, and provide security for PHI.

NEC has partnered with Juniper Networks to offer a wide-range of communications and security solutions for healthcare that can help healthcare organizations do their job more efficiently. Our solutions offer sophisticated mobile and point-of-care voice and data communications, location tracking for people and equipment, and instant delivery of medical images and patient records, which ensures users have access to the information they need, when and where they need it, and in a cost-effective manner.

Meeting the Challenges with a Best-in-Class Solution

To overcome the challenges presented by healthcare enterprise mobility, all elements of your network must provide optimal performance, security, availability, and reliability to every member of your organization, including mobile workers. A solid network infrastructure acts as the foundation of a communications solution that enables healthcare applications like IP telephony and mobility to efficiently and reliably support all workers. Together, Juniper Networks and NEC deliver best-in-class solutions with proven performance and security that is unmatched in the industry.

The following components make up our framework for enabling high-performance access to healthcare applications:

- **Network Infrastructure Layer**—The infrastructure layer includes routing and switching products. It is important to ensure that performance, availability, and intelligence are shared and the user/application experience is preserved. Having an infrastructure with intelligence from the network perspective, application perspective, and user/endpoint perspective ensures that key application, user, and business requirements are addressed in this layer.
- **Services Layer**—The services layer provides the key services required by applications while abstracting the applications from the network infrastructure. This enables appropriate access to those services while accelerating and optimizing them. It also enhances application security through methods including encryption, intrusion prevention, and protection against denial of service (DoS) attacks. Though independent of the underlying network infrastructure, this layer seamlessly integrates with it.
- **Application Layer**—The applications layer enables the desired applications to obtain network services using standards-based interfaces or published application programming interfaces (APIs). Healthcare organizations use a number of applications that rely on infrastructure that must maintain availability, compliance to standards, security, and fast performance while increasing productivity.

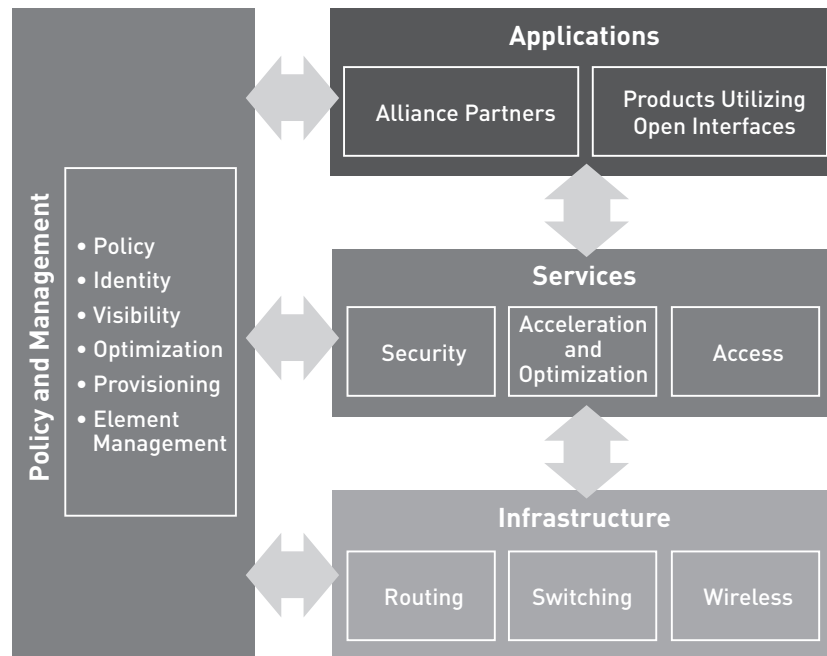


Figure 1: Framework for enabling high-performance access to healthcare applications

Performance

Many high-performance healthcare organizations are embarking upon new architecture approaches to applications like service-oriented architecture (SOA). This loosely coupled, open standards architecture ensures vendor independence while delivering promises of the new architectural evolution in healthcare applications. However, these applications can pose increasing demands on the network environment. Many current healthcare IT initiatives like data center consolidation, server centralization, and SOA combine with the increasing mobility of employees and the growing numbers of branch offices to increase the demand for more network bandwidth and better network performance. Furthermore, the growing practice of making applications available over the Internet to partners, suppliers, etc. increases security risks for healthcare organizations and requires higher performance. New collaboration tools like unified communications and voice over IP (VoIP) are driving network performance requirements across all locations of the network.

For example, when healthcare providers use an IP telephony solution, its converged voice and data networks must be capable of delivering consistent VoIP quality for both the mobile and desktop phone users. The combination of Juniper Networks SSG Series Secure Services Gateways and security platforms with NEC's IP telephony products and applications provides a secure end-to-end IP solution for both voice and data. This secure infrastructure prioritizes voice on the converged voice and data network to ensure voice quality and guard against packet loss, jitter, and latency.

Security

The services layer implements three subcomponents that provide a layered security approach:

- Application services provide availability, performance, DoS mitigation, intrusion prevention, antispyware/virus/spyware, URL/content filtering, visibility, and application acceleration (MAPI, CIFS, HTTP, HTTPS, etc.)
- User services include access, authentication, granular access to resources, endpoint integrity-host check, visibility, user experience (ease of access, consistent performance, etc.)
- Network services include high availability (HA)/resiliency, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), security/encryption (encrypting/de-encrypting application traffic), IPsec (encryption/null-encryption), SSL, VLAN/Security Zone (segmentation), logging, etc.

Juniper Networks has purpose-built appliances that allow healthcare organizations to implement overlay services from NEC on top of existing infrastructure such as:

- Integrated high-performance firewall/VPN appliances with intrusion prevention
- Intrusion prevention systems
- Secure remote SSL VPN remote access
- WAN acceleration and optimization
- Data center acceleration and load balancing

Availability and Reliability

An open, standards-based framework that addresses healthcare application requirements while providing a flexible, highly resilient network infrastructure offers the best foundation for healthcare business, since it is adaptable and can better reflect your agenda.

Wireless security products provided by NEC and Juniper can improve staff mobility and are available either on or off campus. Hospital staff can securely use their mobile devices – including the state-of-the-art NEC Mobile Client – to communicate while moving from unit to unit or building to building.

While clinicians often stay within the confines of the campus, emergency healthcare workers must respond to situations both inside and outside the facility. They must remain in constant contact and have the ability to reliably access critical information from the hospital network. NEC and Juniper provide reliable, secure access to the network with the clinical applications and electronic patient data. Our infrastructure products ensure remote staff can always access data as if they are in the physical office.

Healthcare Solutions

NEC and Juniper Networks have partnered to help deliver infrastructure, services, and application solutions that enable healthcare providers to deliver the highest quality care, make that care easily accessible, and deliver services at the lowest reasonable cost. The following paragraphs provide additional details into these solutions.

Infrastructure Layer Solutions

Juniper Networks provides solutions for incrementally enhancing IP network and security infrastructures. Our solutions help healthcare organizations protect patient data and cost-effectively provide timely delivery of secure applications where needed to support medical treatment, patient services, and business operations.

Juniper's network infrastructure solutions help high-performance healthcare organizations meet their performance and availability metrics with new levels of security, availability, performance, and operational simplicity. Juniper's routing and switching platforms are designed to connect real-time, critical applications and services to users in branch and regional offices, central sites, and data centers. Juniper Networks Junos® operating system with enhanced services, which is part of every Juniper routing and switching platform, ensures high availability under adverse conditions and offers protection while under attack. You can also simplify your network operations with Juniper routing and switching platforms.

NEC's UNIVERGE QX series of switches provides flexible, manageable solutions designed for converged networks in mid-size companies and enterprises. The series offers the security, performance, flexibility, and high quality of voice and data required by today's business users.

Juniper Routing Solutions

- Juniper Networks M Series Multiservice Edge Routers combine best-in-class IP/MPLS capabilities with unmatched reliability, scalability, security, and service richness. Enterprises can support new applications and services while managing costs and improving employee responsiveness.
- Juniper Networks J Series Services Routers are extensible, flexible, voice-ready platforms that connect branch and regional offices to enterprise resources. They provide all the security and routing features branch offices need in a single, easy-to-use package.

Juniper Switching Solutions

- Juniper Networks EX Series Ethernet Switches deliver an innovative alternative to the cost and complexity of maintaining legacy switched networks. Designed specifically for high-performance businesses, the EX Series helps enterprises and public-sector organizations lower their total cost of network ownership through a single operating system, a common management framework, and decreased space, power, and cooling requirements.

NEC Switching Solutions

- The QX series offers high-performance, high availability network switching hardware for access, aggregation, distribution, and core applications. They can be either standalone, stackable, or chassis-based switches to meet the specific requirements of the network infrastructure. They provide a scalable solution to operate the wide range of applications and services for the facility.

Service and Application Layer Solutions

NEC and Juniper Networks offer several solutions to keep you both secure and in compliance with the Health Insurance Portability and Accountability Act (HIPAA) security standards. A selection of these solutions follows.

NEC Patient Privacy and Network Protection

NEC's Patient Privacy and Network Protection solutions enable healthcare facilities to comply with the HIPAA and avoid survey deficiencies, fines, and penalties. This solution helps maintain and monitor compliance with HIPAA, provides secure and efficient exchange of patient information, and enhances IT department effectiveness in line with HIPAA best practices.

NEC Facility Safety and Security Solutions

NEC's Facility Safety and Security solutions enable healthcare organizations to tighten their response to critical situations and ensure communications continuity.

- **Emergency Response**—NEC's emergency response solutions ensure staff, patient, and public safety while strengthening threat response and business continuity: 911 call management applications interface with emergency 9-1-1 calls as they are routed to the local public safety answering point (PSAP) while wireless LAN supports voice and data devices anywhere on the medical campus. WLAN Location ID physically locates end users on the WLAN network and emergency conference interconnects a response team.
- **Facility Safety**—NEC's facility safety solutions provide tools for premise security and threat response. A voicemail feature records malicious phone calls, enhanced barge-in silently monitors phone calls, and emergency monitor screens and traps malicious calls.

Juniper Networks Layered Security Solutions

There are several IT initiatives within the healthcare sector that Juniper actively supports. For those who deploy them, these initiatives are considered best practices to ensure the quality, safety, and authorized availability of vital healthcare information and services. Some of these initiatives include:

- **Secure WLAN Access**—Many healthcare providers are turning to Juniper Networks Odyssey Access Client for 802.1X access control as they secure their WLAN environment. This solution provides device access to a wireless LAN port and prevents access to the wireless LAN if authentication fails.
- **Secure Remote Access**—Physician, patient, and additional partner portals are easy to create, deploy, and support with Juniper Networks SA Series SSL VPN Appliances. Enhanced security is provided through access controls based on the user and device access to the network. HIPAA requirements can be enforced with specific access rights to patient health information.
- **Integrated Firewalls**—Modern firewalls are migrating to include unified threat management (UTM) capabilities such as antivirus, antispam, URL filtering, and intrusion detection and prevention (IDP). Juniper firewalls have been designed for full utilization of the integrated UTM capabilities without a significant degradation in performance. Juniper Networks IDP Series Intrusion Detection and Prevention Appliances provide the most comprehensive IDP solution with eight different methods of detection.
- **Network Access Control**—Network access control is an emerging IT solution category and an ideal solution for providing network access control for EMR and PHI. Juniper Networks Unified Access Control provides coordinated network access and dynamic policy to firewalls acting as Infranet enforcers on the network. UAC can grant policy-based access to EMRs and PHI on a per-user or per-device basis.

- **Coordinated Threat Management**—Juniper Networks STRM Series Security Threat Response Managers deliver centralized log and event management, correlation, reporting, and network behavior anomaly detection.
- **Centralized Management**—Juniper Networks NetScreen Series Security Systems deliver centralized network security command and control.

Juniper Application Acceleration Solutions

Juniper's best-in-class application acceleration solutions improve business application performance for healthcare users, while maintaining reliability, security, and availability. Licensing options allow you to manage your network investment, choose the features you need, and upgrade as needed. For users working from distant locations, these solutions dramatically improve application response times across the WAN. You can even dynamically prioritize certain application traffic depending on the needs of the user or your business. Plus, using network resources more efficiently reduces your expenses. Juniper's application acceleration solutions accelerate the broadest set of operational software, support large scale deployments, and provide unmatched visibility and management.

Collaboration Application Solutions

NEC provides the innovative software, applications, development tools, and services that a healthcare facility needs to provide an excellent standard of care. NEC's network convergence experience helps deliver onsite and tele-healthcare through media-rich voice, data, video, and imaging solutions over a single, high-performance network. Below are a few of the key services enabled by NEC.

NEC's Digital Information Review

NEC's Digital Information Review solutions facilitate access and analysis of diagnostic imaging files and other electronic patient information. These solutions include:

- Flat-panel display monitors designed for medical environments that display exam room schedules
- Display monitors to present digitized diagnostic images, patient chart data, and other text, data, or video information

NEC's Telehealth Communications

NEC's Telehealth Communications solutions support community healthcare outreach. Included in these solutions are:

- Telemedicine stations that facilitate peer review with video-based patient exams
- Video conferencing applications that can distribute multimedia communications to mobile or remote clinics while supporting document sharing and review
- High availability servers to deliver always-on media-rich communications across networks
- Secure VPN applications that offer remote clinicians secure access to protected patient data

NEC's Hospital Digital Messaging

NEC's Hospital Digital Messaging solutions present public messages on easy-to-update digital billboards. They include:

- Wireless LAN infrastructure that delivers flexible digital message placement to display monitors over the wireless network
- Centrally located video controllers to control and manage digital messaging content
- Digital messaging software to help you create visually enticing 4-D messaging
- Wireless LAN design services to ensure effective WLAN implementation
- WLAN security assessment services to ensure HIPAA compliance and network protection

Mobility Solutions

Juniper Networks and NEC have combined industry leading network infrastructure and mobility applications to offer an end-to-end solution that addresses the key challenges of workforce mobility. This solution transparently extends communication applications to mobile workers, which gives every worker a consistent set of capabilities while maintaining centralized management and control in the enterprise.

Assured Mobility Solutions

Healthcare workers are highly mobile and always need new ways to effectively communicate with each other and clients. To keep everyone satisfied, you need a solid enterprise mobility strategy that takes into account the needs of the different types of mobile workers, while delivering the best possible performance, security, availability, and reliability.

NEC's Assured Mobility solutions help you provide the anywhere, anytime communications that healthcare staff and patients require. No longer bound by location, the best person to address an issue can immediately – in real time – interface with the patient or other staff. Also, the ability to collect data directly into an application, regardless of physical location, can reduce costs by reducing or eliminating paperwork, while diminishing mistakes and improving information quality.

Components of this solution include:

- Wireless LAN technology to support voice and data devices usable at the patient's bedside and throughout the facility
- Soft phones as voice clients for Wi-Fi endpoints: tablet PCs, PDAs, mobile PC workstations
- Hands-free communications badges are voice-activated phone devices that can be worn
- Customer premises equipment (CPE)-based wireless technology provides in-building wireless telephony supported by the facility's communications platform

The Mobile Client

NEC's UNIVERGE Mobile Client combines unified communications and mobility to take healthcare organization productivity to a new level. It seamlessly extends unified messaging from the business IP communication system directly to mobile devices. With UNIVERGE Mobile Client, mobile employees have all of the productivity-enhancing tools of the office at their fingertips. Mobile Client enables the following capabilities:

- Same business phone number for desk phone and mobile device
- Single mobile device that works as effectively offsite as in the office
- Independent of specific Wi-Fi or cellular technology, providing businesses with more choices
- Presence, instant messaging, and corporate directory access
- Familiar, easy-to-use GUI interface

In healthcare facilities, NEC's Mobile Client can be used to provide presence and availability paging, as well as instant messaging information for physicians, nurses, and other administrative personnel. By using Mobile Client, doctors, nurses, and other medical staff need only carry one device to boost their productivity, communication options, and availability.

Managed Services Offers the Help You Need

Voice and data networks constitute the most critical elements of a communications infrastructure and require the best in management. According to a recent survey conducted by Forrester Research, core traffic in networks has been increasing about 100 percent annually, placing significant demands on infrastructures. This increased network utilization can cause serious delays in mission-critical applications, or even bring them to a grinding halt. Additionally, many organizations' IT resources are so stretched with the task of keeping network and critical applications up and running that new business requirements and special initiatives often take a back seat.

NEC and Juniper have in place an industry-leading managed services organization with the skills, resources, and experience to help navigate through the different phases of discovery, design, planning, implementation, operation, and optimization for unified communications and wireless and enterprise security including vulnerability assessments. In addition, monitoring of customer networks is implemented and managed by NEC unified solutions' network operations center (NOC), which is staffed 24 hours a day, seven days a week by certified network and security engineers trained to detect and interpret alarms related to network infrastructure, applications, and security threats.

The NEC/Juniper Difference

Together, NEC and Juniper Networks have proven to be thought and technology leaders within both the enterprise and service provider markets. Our innovations and technologies are recognized by industry analysts and the market as market-leading and well ahead of the competition in terms of features and capabilities. We share a common vision of integrated high-performance network infrastructure, services, and applications that provides a new way of considering the emerging demands being placed upon healthcare networks and enables the network to be leveraged as a business enabler and gain a strategic competitive advantage.

Because the increase in VoIP traffic also exposes the healthcare network to exploitation (because of the open ports required to support VoIP in a typical firewall solution), the NEC/Juniper partnership has implemented a custom made Application Layer Gateway (ALG) to support NEC-SIP in Juniper Networks SSG Series Secure Services Gateways. The NEC SIP ALG dynamically opens and closes only specific firewall ports or 'pinholes' for permitted calls, while blocking all the previously used data ports. Furthermore, with SSL VPN products from Juniper Networks, cost-effective, clientless access for authorized remote users is enabled with NEC IP Softphone and Mobile Client to ensure secure and reliable access.

The NEC and Juniper partnership provides best-in-class voice, routing, and security in a unified platform. The combination of lower hardware, power, and real estate requirements with integrated management yields a lower total cost of ownership. We provide a single point of contact and accountability that draws on the full range of trained and certified consultants and technicians that are available globally.

Additionally, NEC and Juniper provide end-to-end lifecycle support, as well as business consulting and other professional services. IP migration planning and design, network assessment, optimization, security, and business continuity planning are also included. We can build, implement, and maintain your healthcare communications solution.

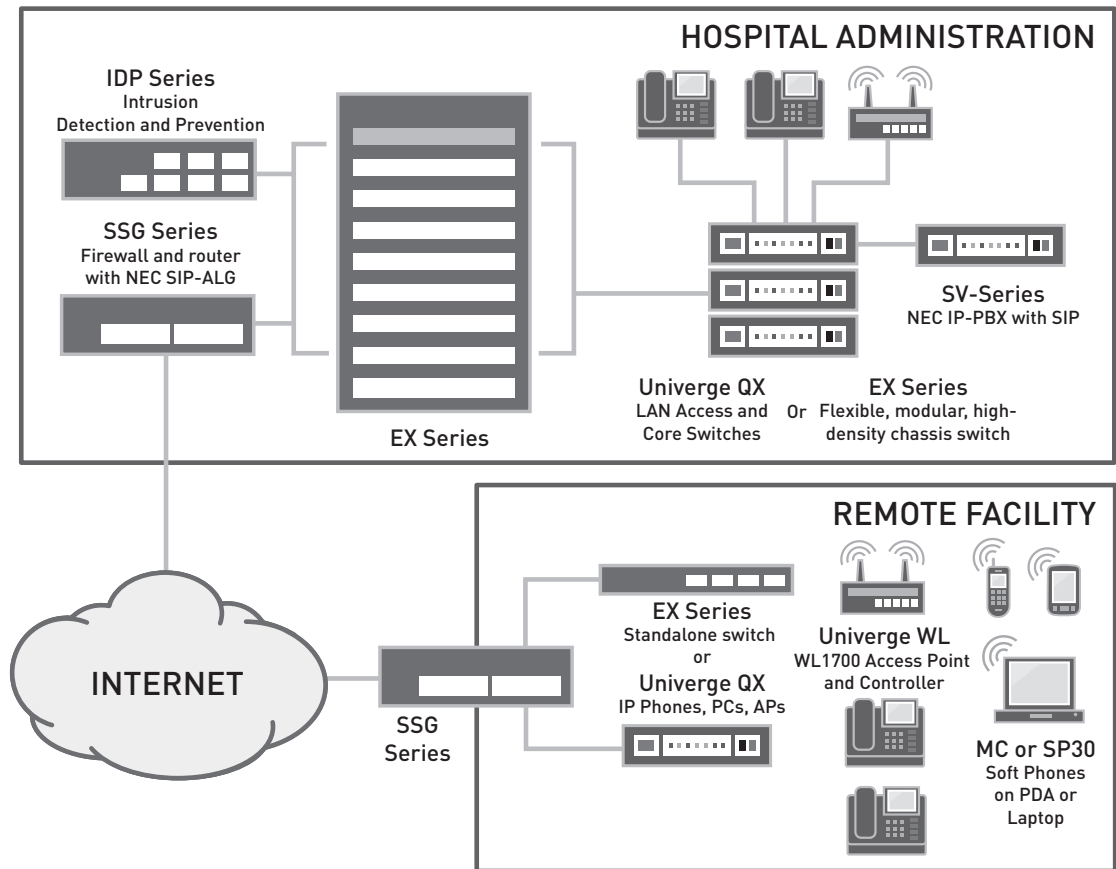


Figure 2: Joint NEC and Juniper Networks integrated healthcare solutions

Healthcare Configuration Examples

Large Hospital

- NEC UNIVERGE SV-Series Communications Servers
- NEC UNIVERGE QX-Series LAN Switches or Juniper Networks EX Series Ethernet Switches
- NEC UNIVERGE WLAN WL-Series Wireless LAN Controllers
- Juniper Networks SSG Series and IDP Series
- NEC Desktop and Wireless Handset Terminals

Branch Hospitals, Surgical Centers or Clinical Labs

- NEC UNIVERGE SV-Series Communication Server
- NEC UNIVERGE QX LAN Access Switches or Juniper Networks EX Series Ethernet Switches
- NEC UNIVERGE WLAN WL-Series (Wireless LAN AP and Controllers)
- Juniper Networks SSG Series and IDP Series
- NEC Desktop and wireless handset terminals

Conclusion

Modern healthcare practices require that healthcare providers extend the capabilities of their environment and the reach of their network, in order to open it to an increasingly mobile workforce while supporting secure and efficient communications. As the network environment becomes increasingly dynamic, healthcare providers must take appropriate measures to ensure their network provides performance, security, availability, and reliability.

NEC and Juniper Networks offer many network, safety, application, mobility, and performance-enhancing solutions to address specific healthcare industry related needs. These solutions help healthcare providers improve the quality of care while lowering overall costs. Through the thoughtful use of IT innovation, today's healthcare providers have the opportunity to enhance the quality and accessibility of their care through cost-effective solutions that increase staff efficiency and keep sensitive information secure.

About NEC

NEC Unified Solutions helps companies unify their business communications through innovative software, applications, development tools, and services. NEC offers a complete portfolio for unified communications, wireless, voice, data and managed services, as well as systems integration and application development. NEC Unified Solutions serves as the North American communications integration arm of global giant NEC Corporation for Fortune 1000, as well as small to mid-sized businesses in vertical markets such as hospitality, education, government, and healthcare. For more information about NEC and Juniper, visit www.necunifiedsolutions.com/partner/juniper.

About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at www.juniper.net.

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