

NETWORKING SOLUTIONS FOR HEALTHCARE AND PHARMACEUTICALS

Comprehensive Infrastructure Solutions to Keep the Healthcare/Pharmaceutical Network Healthy

Challenge

Healthcare and pharmaceutical organizations must ensure flawless application delivery and scalability of operations, supporting a highly diverse audience and wide range of endpoint devices. They must protect patient records, maintain regulatory compliance and security. To stay competitive and relevant and be considered for stimulus and grants, the networks must be able to quickly evolve. And all of this must be achieved while also controlling costs.

Solution

Juniper's security and infrastructure solutions directly address the needs of the healthcare and pharmaceutical industries, not only solving today's challenges but also enabling organizations to meet new challenges while controlling costs.

Benefits

- Simplified data center that can seamlessly support distributed locations and applications
- Differentiated access and secured applications, data, and infrastructure that helps meet compliance requirements
- A highly reliable provisioning, correlation, and reporting system with a single operating system
- Network systems that grow with the organization's needs while reducing total cost of ownership

Delivering world class healthcare and pharmaceutical services is the goal of every organization committed to patient health. And while healthcare is a discipline that dates back to ancient times, modernization of the healthcare system has heralded new advances in the field. It has also created challenges that did not need to be considered until now.

- **Distributed Infrastructure:** Both healthcare and pharmaceutical disciplines have become significantly more specialized. There is no longer a notion of the "family doctor" or the "town emergency room," but rather a web of primary and secondary care that has grown to include first responders, paramedics, emergency room physicians, operating room staff, laboratories, rehabilitation clinics, and much more. Similarly, drug trials are not typically located in a single facility, but are instead conducted in multiple sites across the globe to ensure a true random sampling. Applications used to deliver care or report on drug trial results must scale throughout this highly specialized, distributed environment. A LAN-like user experience must be delivered, whether in the hospital or in a remote location that could be literally a world away.
- **Heterogeneous Audiences and More Applications:** The number and variety of audiences approaching the hospital or pharmaceutical network continue to grow. Whereas at one time the C-Level executives and maybe doctors had access to network resources, today virtually all disciplines in the hospital require secure access to do their jobs, from department heads to interns to intake clerks. Applications continue to multiply and include everything from labs, patient charting, and third-party insurance, to applications that may be made available to patients such as email, ordering movies, phone service, and other money generating services.
- **Compliance and Security:** The healthcare field was one of the first industries faced with what has become a veritable alphabet soup of federal, state, and local compliance regulations. Rules, amendments, and additions continue to be phased into mandates, which are updated regularly. Healthcare organizations must keep up or face stiff penalties. Equally important is the security stance of the organization. With more people accessing the network from more locations, segmentation of the network and user-based access controls are only the tip of the iceberg. Many endpoint devices such as MRIs and CAT/PET scans cannot be taken offline or even be patched, either due to the criticality of the device or because any patch updates invalidate the manufacturer's warranty. Security and compliance must be considered individually and collectively to ensure the protection of patient health and identity information, in addition to the organization's assets and operations.
- **Government Involvement:** The government is playing a larger role in how health care is funded, regulated and delivered. Whereas the government used to primarily be involved in health care through medicare and medicaid type programs, today the government is involved in setting compliance standards and has taken on massive long term responsibilities with the passage of healthcare reform. The government is

also involved in defining and establishing stimulus grants for healthcare organizations. In most cases, while the stimulus may be granted, a certain level of infrastructure must be already in place. For example, a cancer center which has applied for chemotherapy IV infusion pumps must have the infrastructure available to provide real-time inventory updates via radio frequency identification (RFID), anywhere in the hospital or clinic and at all times. This requirement can only be met with a fully operational network infrastructure.

These factors are driving the development and deployment of healthcare and pharmaceutical IT services. Ultimately, the network will play an increasingly central role in the sophisticated services that an organization provides to its students and employees, as well as in the level of care that it can offer to its patients.

Fundamental to the success of the healthcare and pharmaceutical industry is a high quality network infrastructure that ties all diverse locations together into one consistent and comprehensive scalable solution an increasingly central role. Juniper Networks® solutions for healthcare is uniquely positioned to provide the right combination of high-performance hardware, carrier class software, standards integration, and longstanding experience with network consolidation that are requisite to healthcare and pharmaceutical needs.

The Challenge

The healthcare and pharmaceutical industries will touch every one of our lives at one point or another; they provide services that we literally cannot live without. This is particularly true as advances in medicine and technology increase life expectancy and as the population continues to age. But with these breakthroughs and advances, certain challenges have become more pronounced. Organizations that fail to recognize and definitively act to solve these challenges can put their own long term health at risk.

Both the healthcare and pharmaceutical industries have become significantly more specialized. There is no longer a notion of the “family doctor” or the “town emergency room;” but rather a web of primary and secondary care that has grown to include first responders, paramedics, emergency room physicians, operating rooms, laboratories, rehabilitation clinics, and more. Likewise, drug trials are not generally located in a single facility but instead are conducted in multiple sites, which are often globally dispersed to ensure a true random sampling. Applications that deliver care or report on drug trials must be able to scale to handle these levels of both specialization and distribution. A LAN-like experience must be achieved whether in the hospital or at some remote location anywhere in the world.

Juniper Networks Healthcare/Pharmaceutical Services Solutions

Juniper’s innovative healthcare/pharmaceutical services solutions deliver products that seamlessly integrate and with other standards-based products throughout the network, to help you realize an infrastructure that is:

- High performance, featuring unified switching and routing

platforms that extend from branch facilities to the core

- Operationally streamlined, with optimized, virtual platforms that better and more securely address heterogeneous audiences and varied applications
- Threat resistant, with a portfolio of products that can dynamically adapt to changing network conditions and can help ensure a fully compliant organization
- Agile, enabling you to roll out new products and services
- Consistent in architecture and management, lowering your total cost of ownership (TCO)

Juniper’s offerings consistently address all locations of the healthcare/pharmaceutical deployment, from the data center to the campus, and from the local clinic to the remote specialist. Product portfolios are designed to interoperate and to provide a consistent experience from location to location. Juniper’s market leading switches and routers collapse antiquated architectures and add virtualization, lowering TCO as they speed performance. Juniper’s security solutions are built to cooperate with each other as well as with other standards-based offerings, and are available in modular data center/campus form factors that you can add to as you grow, or in integrated platforms that provide the branch/remote clinic with a host of functionality in one appliance. Juniper products can be managed through a single pane of glass using Juniper Networks Network and Security Manager (NSM). Overall network visibility is provided with the Juniper Networks STRM Series Security Threat Response Managers, and the Juniper Networks Junos® operating system which ties together routing, switching, and security devices on a single platform.

Speed and Consistency of All Applications at All Locations

Juniper’s solution begins in the data center, the central point where applications are hosted. This is where architectures are perhaps the most complicated. Switches intended for the campus LAN have often been pressed into service in the data center, resulting in three tiers of devices at the access layer, the aggregation layer, and the core. In some cases, there is even an extra distribution layer. It is not uncommon to have a different operating system in each of these layers, making the overall deployment expensive and cumbersome to manage. The access tier serves as the direct interface to servers, and is typically deployed as top-of-rack or end-of-row switches connecting servers deployed in racks. Multiple uplinks from the access layer interconnect to the aggregation layer. The aggregation layer is required due to the large number of uplinks from the access layer, which is generally a larger number than can be supported by devices within the core of the data center.

Racks can be consolidated in either end-of-row or top-of-rack switch configurations. Unfortunately these end-of-row and aggregation switches were originally built for campus environments and can present several limitations in this use case, including the forwarding engine, routing engine, and switch fabric. With a larger, more heterogeneous audience in the healthcare environment, oversubscription is a real possibility

and can result in the inability to provision a new application with confidence. Meanwhile, in order to travel across the network, data must go throughout the entire tiered infrastructure to reach its destination, which can result in increasingly unacceptable latency in the network. Too often, security is an afterthought, and often provisioned via a disparate mix of security blades across the aggregation layer. Not only does this take up space and power, but it represents yet another management/operating system that IT staff must master.

In order to consistently and quickly deliver life saving applications successfully, healthcare and pharmaceutical organizations must simplify the data center. Organizations can realize this simplification by virtualizing the access layer and collapsing the core and aggregation layers. Additional benefits can be realized by consolidating security products into an interoperable solution in which all devices cooperate to identify, mitigate, and report on threats in real time.

Juniper has the answer with a complete line of Juniper Networks EX Series Ethernet Switches. The Juniper Networks EX4200 Ethernet Switch dramatically reduces latency across racks. The EX4200 with Virtual Chassis technology has the lowest latency in its class at 1.96 picoseconds. The EX4200 also reduces the number of uplinks required, and drastically lowers the number of switches you have to manage by up to 10 times, which saves you not only in capital expenses but in ongoing power, space, and cooling costs as well. Best of all, the EX4200 enables end-of-rack chassis features at a top-of-rack price, and gives you the flexibility to choose the configuration that works best for you. Virtual Chassis technology can save you up to 33 percent from a standard configuration.

The EX Series can also help you realize the goal of collapsing the core and aggregation layers. This begins with the unique Virtual Chassis technology, and carries through to Juniper Networks

EX8200 line of Ethernet switches in the core. The EX8200 line features industry leading line rate density, which can serve to collapse the aggregation layer. Not only does this simplify the architecture, but it reduces latency as it decreases space, power, and cooling requirements. The Juniper Networks EX8216 Ethernet Switch features a massively scalable 12.4 Tbps fabric, 2 billion packets-per-second (pps) line rate performance, and the ability to aggregate as many as 6,000 servers in a single domain.

Replacement of the access and aggregation tiers with EX Series switches results in:

- Management of up to 10 physical EX4200s as a single logical device, which drastically cuts down the number of devices being managed.
- Fewer number of uplinks from the access tier, because a low latency, high-performance Virtual Chassis backplane is the preferred mechanism for server-to-server traffic. Access to aggregation interconnections need only serve the traffic in and out of the data center or across networks within the data center
- No extra cost to use Layer 3 protocols-based connectivity between access and aggregation tiers.
- Reduction in the total number of ports required in the aggregation tier requiring fewer switches and hence requiring fewer switching tiers (fewer switches translate into fewer ports to be aggregated by high tiers in the hierarchy).

As you speed up the data center, the ability to apply security and policy consistently is vital, since today's healthcare organizations support a wider audience and more applications. Blended threats are abundant and need only a single weak point to gain access and spread throughout your network. Juniper delivers, with best-in-class products including the Juniper Networks SRX Series Services

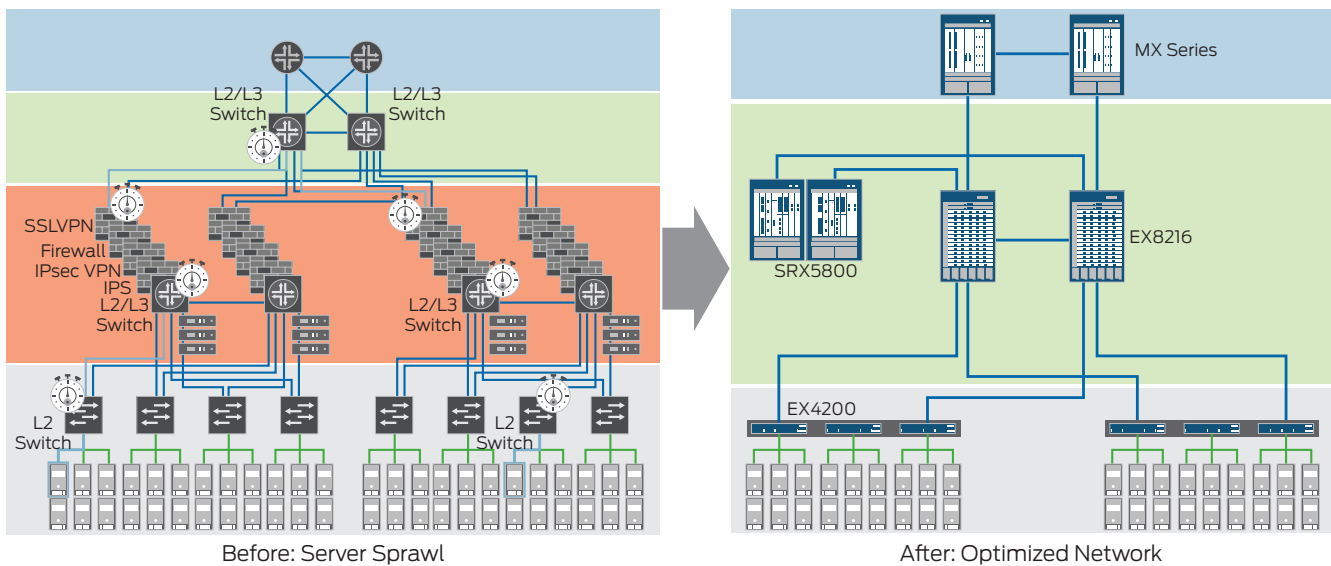


Figure 1: Sever sprawl versus an optimized network

Gateways. Powered by Junos OS, Juniper's single unified operating system, the SRX Series gateways provide a host of features in a variety of cost-effective platforms that scale. The high-end SRX Series is the fastest firewall in the world, offering functionality that can be added to the platform as your deployment grows. The branch SRX Series features integrated functionality in right-sized form factors so that all locations, including clinics, drug trial locations, and field operations, can be as secure and compliant with regulations as your headquarters locations.

Highly Available Life Critical Operations

In the mission critical data center networks that are typical in healthcare/pharmaceutical organizations, any outage is unacceptable. Moreover, the requirements for high availability must encompass slowdowns as well, since latency measured in milliseconds put lives at risk. High availability requirements in the data center are becoming similar to carrier availability requirements. Inter- and intra-site redundancy is vital to ensure that patient care goes uninterrupted, regardless of network or security conditions. Advanced routing capabilities enhance application performance, security, and availability. Juniper's extensive experience in creating products to satisfy the world's largest service providers is the foundation for products that make healthcare networks fully redundant, high performing, and easy to manage and maintain.

High availability in the data center is provided through features such as those found in Juniper Networks MX Series 3D Universal Edge Routers. The MX Series provides industry leading port density, power savings, performance, and reliability for data center network core and aggregation deployments. High availability begins with Junos OS, Juniper's unified operating system used throughout the entire switching and routing platform. Junos OS separates the forwarding and control planes, resulting in a modular software architecture that is remarkably resilient. This design enables individual processes to restart without bringing down the entire router.

MX Series routers also feature a wealth of powerful features designed specifically for use in large, mission critical networks. Unlike routers from some vendors, Juniper's products feature MPLS support that is designed to operate at scale. Virtual private LAN service (VPLS) also extends VLANs, enabling mobility. The MX Series provides unprecedented levels of Layer 2 and Layer 3 scalability, as well as IP multicast, which is frequently not offered in competitive products. With the MX Series, health-related organizations can effectively collapse the core and the WAN edge of their networks, resulting in lower capital and operating expenses.

The MX Series, as well as the rest of Juniper's portfolio for the data center, runs over a common OS with a single management platform, accelerating application deployments and leading to improved efficiencies in space, power, cooling, and management. Juniper Networks M Series Multiservice Edge Routers and MX Series 3D Universal Edge Routers at the edge provide high performance, port dense routing, and switching functionality without compromise on a single platform.

An Eye to the Future

In order to remain competitive, today's health organizations must be agile to take advantage of new medical advances and ancillary applications and services quickly and effectively. The number of different management and operating systems running in the average network, however, can make this task almost impossible. Juniper's products address this issue in three ways. First, Juniper builds its products around open standards. This enables you to choose the right product for each of your requirements, and avoids the cost and limitations of single vendor lock in. Second, Juniper has built its routing, switching, and security appliance around a single operating system—Junos OS. This means that your IT staff has only one OS to learn, and this saves you money. In fact, according to a commissioned study conducted by Forrester Consulting, the use of Junos OS can save 41 percent in overall network operations costs¹. And, because each release of Junos OS is backward compatible and the release train is predictable, you never have to worry about upgrading to the latest release.

Security in the Network by the Network

Juniper Networks Adaptive Threat Management Solutions feature a suite of security products that are designed to work together cooperatively. Any one of Juniper Networks Adaptive Threat Management Solutions can be deployed as a best-in-class point product on its own or as a complete security solution—after all, each has consistently been rated among the top devices in its category. And because these devices are designed to work together, they offer benefits that go beyond the unique functionality that each offers individually. The ability to communicate interactively, regardless of location, makes the network work with you to maximize productivity, mitigate risk, and ensure compliance with regulatory statutes.

Juniper also has unique capabilities for the remote user that may be operating offsite, including the market leading Juniper Networks SA Series SSL VPN Appliances. Not only does the SA Series provide secure, role-based access to applications and resources, but it also dynamically provisions Juniper Networks WX Client and antimalware/antispysware at the same time. This gives you the ability to extend your security stance, even to remote, unmanaged devices, while also speeding performance.

¹ Forrester Consulting, The Total Economic Impact™ of Juniper Networks Junos operation system, Feb 2009

The Adaptive Threat Management Solutions include:

- Juniper's suite of firewalls
- SRX Series Services Gateways
- SA Series SSL VPN Appliances
- Unified Access Control and IC Series Unified Access Control Appliances
- IDP Series Intrusion Detection and Prevention Appliances
- Network and Security Manager
- STRM Series Security Threat Response Managers

For more information on security products for healthcare/ pharmaceuticals, please see the security for healthcare solutions brief at www.juniper.net/us/en/local/pdf/solutionbriefs/3510348-en.pdf.

See It—Control It

Key among Juniper Networks offerings are products designed to offer visibility and control, because you cannot control what you cannot see. Juniper offers comprehensive and innovative centralized management, monitoring, and reporting capabilities with its STRM Series devices. STRM Security Threat Response Managers work with both Juniper devices, and third-party devices you have already deployed, to give you a single “aerial” view of what’s going on throughout your network in real time. This gives your IT department the ability to monitor, trend, and report on activities throughout the deployment, as well as to easily meet regulatory compliance with over 2,000 preformatted reports. Still more operational simplicity is provided via Network and Security Manager, the single platform that can provision and update virtually every product in the Juniper Networks portfolio, as well as create and push policies throughout your entire enterprise.

Summary: Solving the Infrastructure Issues of the Healthcare and Pharmaceutical Industry

Juniper Networks innovation in the healthcare/pharmaceutical space delivers a responsive and trusted environment for handling high volume, time sensitive and life critical operations typically associated with health care. Juniper’s solutions help to ensure risk management and regulatory compliance while speeding unwavering performance anywhere in the network. With a Juniper solution, you can ensure a consistent experience from both a threat and a throughput perspective, whether users are remote, in the branch, or on campus. And because Juniper Networks products are based on industry standards, products within the solution can be added incrementally and are compatible with other standards-based products from any vendor. This creates an environment that is forward compatible for what may be required in the future in order to carry on the important life savings work which is the charter of the organization.

Next Steps

For more information about Juniper Network’s solutions for Healthcare and Pharmaceuticals, please contact your Juniper Networks sales representative or visit www.juniper.net/solutions.

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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