



## Product Brief

### Nortel Virtual Services Platform 9000

*A next-generation solution for mission-critical core networks and data centers, offering an agile, streamlined virtual network services infrastructure.*

In an economic environment in which so many enterprises are being asked to operate with fewer resources and under budgetary constraints, an effective communications network becomes a cornerstone of success.

But with the new demands being placed upon them, networks are growing more complex, and increasingly more mission-critical applications are depending on IT infrastructures to ensure availability, uninterrupted business operations and quality of user experience.

These networks are called upon to provide 24x7 availability, help drive business agility, accelerate time-to-service, respond to the needs of new applications and increase efficiency — all while IT budgets are being curtailed.

Your business imperatives will continue to evolve, and, therefore, so too must your network. Your network must very quickly and cost-effectively adapt — a forklift upgrade is out of the question. You need a platform that allows you to be proactive and move forward at the speed of success, to consolidate and

virtualize — a platform that accommodates new applications ahead of the pack. Equally important, that platform must be space- and energy-efficient.

The right communications solution is critical to your success, and the Nortel Virtual Services Platform (VSP) 9000 is that solution.

The Virtual Services Platform (VSP) 9000 is a next-generation solution for mission-critical core networks and data centers, designed for enterprises, multi-tenant providers and others. The VSP 9000 rises to meet our customers' requirements for a future-proof, ultra-reliable network that easily and cost-effectively facilitates services integration. It provides a less complex, more agile virtual network infrastructure. It simplifies your network and reduces the cost of deploying new services. The VSP 9000 enables the building of a dynamic data center while delivering 24x7 uninterrupted access to enterprise services.

Through virtualization, the VSP 9000 transforms your network and, as a result, your business, providing a foundation for enterprise services such as communications-enabled business



processes and unified communications. It not only simplifies your network but offers enhanced flexibility and scalability and enables faster time-to-service in both your data center and core campus. It works by enabling the virtualized compute infrastructure to be more mobile and available, virtualizing servers and centralizing services, management and security without compromising the high availability, security and performance you require.

### Who is the VSP 9000 for?

“How do I introduce new applications in a way that doesn't require a major capital investment or the use of additional resources, and that doesn't entail the deployment of a complex multi-tiered network that's difficult to manage?”

If this is a question you need to ask within the context of your business model — and you don't have an answer to it — the Nortel VSP 9000 is certainly for you.

The VSP 9000 is for organizations that...

- Are growing and require scalability
- Are suffering from poor application availability and/or performance
- Need a best-in-class resilient solution to extend server virtualization to the network
- Need to simplify management of the network infrastructure
- Need to support virtual services for multiple customers or user groups in a cloud computing environment

The VSP 9000 is for organizations that need to stabilize IT costs and make maximal, cost-effective use of their infrastructures. It's for companies that are virtualizing to reduce the inefficient and inflexible use of servers and

### The key benefits of the VSP 9000

- Lower operating costs, based on reduced management complexity and a simplified architecture design
- A future-proof platform, offering an unmatched architecture that scales up to 27 terabits per second for investment protection
- An ultra-reliable platform, helping ensure uninterrupted business operations
- A “green” solution, with optimized footprint and power consumption
- A dynamic network adaptation, with minimal IT touch, to reduce network downtime

appliances and are looking to reduce maintenance costs. It's for those who are running out of space in the data center and are experiencing exponential increases in power and cooling costs. It's for organizations that want to simplify, save and equip their networks for the future.

### Why virtualization?

The introduction of virtualization has fundamentally changed how compute, network and storage resources are used and managed. From fixed sets of resources in physical servers, we've now moved to virtual machines that can be created and removed on demand, and whose resource parameters can be changed dynamically. These virtual machines can be moved from one physical server to another over disparate geographies.

As multi-core processing architectures and virtualization trends take hold, new possibilities have emerged in how applications can be written. Newer, more powerful distributed applications are being developed and older applications are being retrofitted into the new service-oriented architectures.

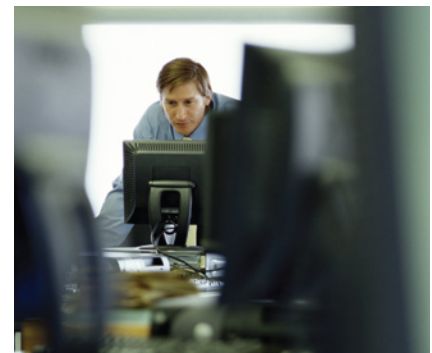
An optimized network must support the unprecedented agility of this virtualized compute environment.

### Meeting the need

The Nortel VSP 9000 is specifically designed to support these new requirements. Virtual application LANs enable applications hosted on virtual machines to move from one location to another on demand in a completely seamless fashion, and application-specific deep-packet filters ensure that only relevant traffic enters the virtual application LAN, maintaining application security.

The VSP 9000 enhances the 10 Gigabit programmable network processor (RSP) used in the Nortel Ethernet Routing Switch 8600, which allows for much faster implementations of new functionalities, thus meeting the needs of evolving applications without ASIC re-spins and major hardware changes.

Just as importantly, the VSP 9000 offers high resiliency, meeting the fault-tolerant requirements of your mission-critical applications.



## How the VSP 9000 delivers

The VSP 9000 is designed to meet your network requirements in three very critical regards.

The VSP 9000 will meet your requirements today, and then scale to grow as you do — an agility that delivers best-in-class longevity and investment protection.

### It's your foundation for the future....

This platform enables future services integration that can help consolidate and simplify network deployments. The VSP 9000 supports up to 240 10Gbps Ethernet ports per rack with room for three chassis per rack and scales up to a 27Tbps switching architecture in a single chassis or over 100Tbps in a quad switch-cluster architecture. Initial IPv4 forwarding rate is 970Mpps per system. This architecture, combined with a lossless fabric architecture, allows for future services integration, 40Gbps and 100Gbps Ethernet interface incorporation, and Converged Enhanced Ethernet. In addition, the VSP 9000 leverages the fully programmable network processor RSP with Layer 2-4 10Gbps line-rate capabilities, providing the flexibility for incorporating future standards without a forklift upgrade, and thus ensuring investment protection.

### It's carrier-class reliable...

The VSP 9000 builds upon Nortel's solid foundation of always-on technology to deliver maximal business continuity with zero service interruption. Nortel has a deep heritage of carrier-grade resiliency with our patented Switch Clustering technology using Split Multi-Link Trunking and Routed Split Multi-Link Trunking, and the VSP 9000 takes it to the next level by providing network failover in milliseconds. Instantaneous all-port re-routing across a link aggregation



group capability means dramatically reduced packet loss. Patent-pending “in-service control plane integrity check” and “rapid detection and recovery of data path” provide a system-level health check and self-healing. And a redundant control plane and switch-fabric modules mean your business receives information faster and with more reliability.

### It's your gateway to simplified and agile virtual network services...

Nortel has pioneered a faster, simpler way to provide agile virtual network services, and the VSP 9000 advances this initiative, offering Layer 2 and 3 (unicast and multicast) VPN services and “Application VPNs” based on technologies that far surpass current industry offerings:

#### VRF-Lite

Nortel's VRF-Lite allows you to use the same hardware platform to create multiple Layer 3 routing domains in supporting multiple customers or user groups.

In allowing the switch to have multiple routing instances (unicast and multicast), more sophisticated connections are made possible and overlapping IP address spaces are supported. The system can be configured to provide inter-VRF forwarding capabilities to allow access to common resources without incurring additional capital or operational expenses.

Combining VRF-Lite with PLSB provides seamless connectivity for virtual users to connect from anywhere in the enterprise network or branch offices without complex set-up or configuration.

### Services integration

The lossless fabric architecture, along with its 27Tbps switching capability and ultra-reliability, allows future services integration to simplify how enterprises and data centers can be architected. The combination of services integration and virtual network services will drive network simplicity and ultimately lower OPEX.

### IP VPN-Lite\*

Nortel's IP VPN-Lite is a patent-pending, affordable and easy-to-use alternative to MPLS IP VPN. IP VPN-Lite allows you to deploy VPN services in the metro and campus without the complexity, cost and comprehensive training requirements associated with MPLS. IP VPN-Lite runs over any vendor's IP routed core network — a touchless deployment. It utilizes IP-in-IP and any-to-any connectivity with similar MPLS scalability.

If you already have a service provider-supplied MPLS WAN in place, you can use IP VPN-Lite to seamlessly extend existing VPN connections into your campus or metro area. In deploying IP VPN-Lite in this fashion, there's no need to change your WAN and no requirement to deploy MPLS in your campus.

IP VPN-Lite offers simplified management, administration, troubleshooting and maintenance versus the more complex, multi-layered MPLS. It can be leveraged as a standalone, cost-effective alternative to MPLS or as an extension to current MPLS deployments, offering less complex management, training and maintenance.

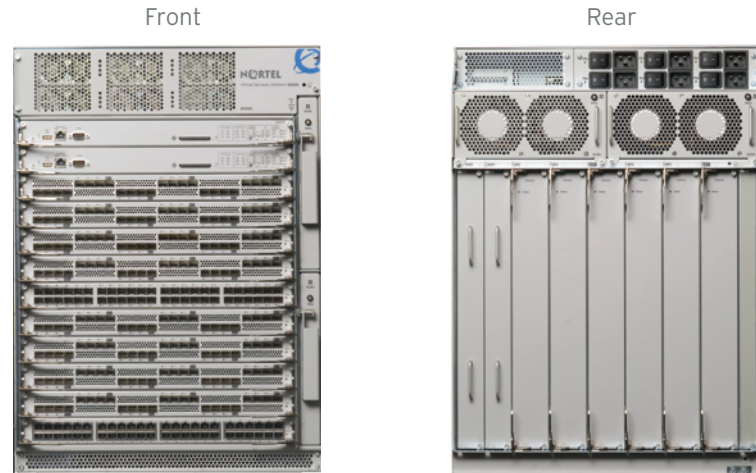
\* Available “Post initial release”

## **PLSB\***

Provider Link State Bridging (PLSB) offers the ability to create a simplified network layer that can dynamically virtualize elements of the network to fully and efficiently utilize network and computing resources, thus reducing the strain on networking resources and personnel. When combined with Virtual Control Service, PLSB provides “Application VPNs” to ensure that VMware VMotion virtual applications within and between data centers are dynamically and seamlessly moved or extended, without the complexity associated with other provisioning solutions.

PLSB, an IEEE 802.1aq Nortel-driven draft standard, offers a robust, resilient alternative to today’s existing solutions for delivering Ethernet-based services and solutions while maintaining Ethernet’s key value propositions of simplicity and cost-effectiveness.

**Figure 1. VSP 9000**



## **VCS\***

Virtual Control Service (VCS) improves efficiency and flexibility when managing a mix of physical and virtual machines across the network. It offers increased resiliency in the virtual data center; better system administrator tools for monitoring and troubleshooting; optimized efficiency of VMware VMotion live migration for maintenance, business-continuity planning and disaster recovery; and a lower total cost of ownership.

## **What’s on the chassis?**

The front of the VSP 9000 contains the I/O slots, control-panel modules and cooling fans. The VSP 9000 provides 10 I/O slots. One 7-foot rack can hold three VSP 9000 chassis. Three module types are being offered: 24-port 10GE SFP+, 48-port 1GE SFP and 48-port 10/100/1000.

There are two control plane modules offering 1+1 redundancy, with the control plane split from the switch fabric based on a mid-plane architecture. Two redundant cooling fans are provided for side-to-side cooling for the I/O and control panel modules. The speed of the cooling fans is adjustable depending on system temperature and fan failure, with sensors located on each inlet and outlet slot to test the temperature and adjust the fan speed accordingly.

The rear of the chassis contains the power supplies, cooling fans, switch fabric and auxiliary modules. There are six power supplies with N+1 and grid-feed redundancy. The power supplies are load shared. Two additional redundant cooling fans provide front-to-back cooling for the switch fabric and auxiliary modules.

## **The VSP 9000 offers:**

- Network efficiency through network virtualization to support Layer 2 and 3 unicast and multicast VPN services for multiple customers and user groups on the same platform
- A simple and cost-effective IP VPN service across the campus metro as compared to MPLS IP VPN through patent-pending IP VPN-Lite (IP-in-IP) technology
- A robust, resilient alternative to today’s existing solutions for delivering Ethernet-based services and solutions while maintaining Ethernet’s key value propositions of simplicity and cost-effectiveness through Nortel-driven IEEE pre-standard PLSB
- An active/active High Availability mode of operation to maximize investment and performance
- Hitless patching
- Instantaneous re-route across all ports in a link aggregation group to minimize packet loss

\* Available “Post initial release”

## How will your network benefit?

The VSP 9000 is designed to maximize the efficiency and potential of your network to deliver a solution that is:

### A future-proof platform

- Highly scalable lossless fabric architecture supports services integration, Converged Enhanced Ethernet and future 40Gbps and 100Gbps interfaces — enabling the expansion of the infrastructure to align with the needs of your business
- Fully programmable network processor RSP for flexible data forwarding and investment protection for Layer 2-4 10Gbps line-rate capabilities without requiring forklift upgrades for future standards
- High density — 240 10G Ethernet ports or 480 1G ports per chassis
- Initial IPv4 forwarding rate of 970Mpps per system, allowing for more efficient data transfer

### Ultra-reliable

- Unmatched ultra-resiliency through patented milliseconds Switch Clustering technology using Split Multi-Link Trunking (SMLT) and Routed Split Multi-Link Trunking (RSMLT); High Availability mode engages all links when forwarding traffic, resulting in industry-leading performance and protection of your business' CAPEX investment
- Instantaneous all-port re-routing across a link aggregation group results in reduced packet loss
- Redundant and hot swappable control plane and switch fabric modules and redundant cooling fans and power supplies for unparalleled reliability

### Simple, flexible and dynamic

- Ensures an uninterrupted virtual application transfer within and between data centers (dynamic application allocation of a VMware application)
- Multi-terabit Switch Clustering optimizes virtual routing and forwarding capacity for multiple customers, enabling always-on and concurrent forwarding of Layer 2-3 traffic across all links

There are six switch fabric modules with N+1 redundancy. This is a distributed architecture in which the load is shared and, in the event of a switch fabric failure, performance is degraded gracefully.

Two auxiliary modules are reserved for future usage.

### Achieving maximal uptime

Ensuring uninterrupted business operations requires a reliable and resilient platform with no single point of failure, and the VSP 9000 delivers. At the heart of it is the Nortel carrier-grade Linux OS combined with redundancy. It provides 1+1 control plane redundancy, with separate Gigabit Ethernet manage-

ment between the control plane and I/O, 5+1 switch fabric redundancy, 5+1 power supply, or grid feed redundancy and system cooling fan redundancy. An “in-service control plane integrity check,” “rapid detection and recovery of data path” and hardware assist designed to protect the control plane against denial-of-service attacks and system overload are some of the mechanisms in place to ensure the system availability.

But maximal uptime also requires software that allows for easy and efficient management of your network. The VSP 9000 is equipped to provide a set of complete reporting capabilities and operation-focused features to ensure this with minimal operating costs.

Reporting features include:

- A “flight recorder” to help with real-time monitoring of internal-control message flow
- “Checksums” to determine if hardware, firmware or data corruption occurred
- Error-code correction in memories to correct errors and contain error indication
- Packet counters in chips to help isolate failures, broken packets and lost packets
- The ability to remotely update flash images
- Dual flash images for boot code to help users in always resorting back to original boot code

- Flash memory on cards for log capture
- Common alarms and logging
- LED indication on cards to indicate activity or system health
- Process separation

## Why choose Nortel?

This future-proof platform features unique, and now field-tested, technologies, including IP VPN-Lite and PLSB, for simplified Layer 2-3 networks and SMLT/RSMLT for maximum resiliency.

Nortel has the ability to work within multi-vendor environments but can also serve as your sole provider for efficient networking across all layers of the data center and campus, core to edge. Nortel's carrier-grade reliability is now delivered to the enterprise network.

The operational cost of running a fault-tolerant "always-on" environment has now outpaced the capital cost of the infrastructure used to deliver mission-critical business applications. The VSP 9000 uses patented technologies, but is interoperable with third-party gear to enable network- and system-level

self-healing for uninterrupted business operations. The powerful network virtualization technologies used in the VSP 9000 are specifically designed to support the needs of a virtualized compute environment.

With a highly-scalable switching architecture, the VSP 9000 provides an efficient platform for flexible upgrades to meet network and application requirements by quickly adapting to business needs without the need for a forklift upgrade in the virtualized data center.

Nortel offers core-to-edge network solutions that provide efficient designs and lower OPEX.

## The bottom line

Uptime is of the essence — mission-critical applications must be delivered 24x7, without interruption — and the ultra-resilient Nortel Virtual Services Platform 9000 withstands this challenge. The VSP 9000 delivers the services you need today and positions you for those of tomorrow, and it does

so on a foundation you can trust, thus ensuring business continuity.

The VSP 9000 is purpose-built to support a dynamic data center and high-density 10GE core deployments. It alleviates infrastructure complexity and reduces power consumption with a truly green architecture. And it's designed for the next decade to preserve investment.

The VSP 9000 provides for cost-effective and efficient upgrades to meet evolving network and application requirements, reducing your operating expenses and protecting your network investment as your business grows. Virtualization sees to that, assuring continuity, offering innovative "Application VPNs" and Layer 2-3 VPN services while simplifying your network.

The Nortel VSP 9000 is your platform for today, and the gateway to your network and business evolution.

Nortel is a recognized leader in delivering communications capabilities that make the promise of Business Made Simple a reality for our customers. Our next-generation technologies, for both service provider and enterprise networks, support multimedia and business-critical applications. Nortel's technologies are designed to help eliminate today's barriers to efficiency, speed and performance by simplifying networks and connecting people to the information they need, when they need it. Nortel does business in more than 150 countries around the world. For more information, visit Nortel on the Web at [www.nortel.com](http://www.nortel.com). For the latest Nortel news, visit [www.nortel.com/news](http://www.nortel.com/news).

For more information, contact your Nortel representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

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