

# SESSION SMART SD-WAN™ ACCELERATES DIGITAL TRANSFORMATION WITH AN AGILE, EFFICIENT, AND RESILIENT NETWORK

*Service-Centric Networking Solution Delivers Breakthrough Economics and Simplicity*

## Challenge

The cloud transforms enterprise traffic flows and the way applications and services are delivered. This presents a variety of performance, security, and availability challenges for enterprise network architects.

## Solution

Session Smart SD-WAN is an advanced, service-centric solution that takes software-defined routing to a new level. Ideal for today's digital businesses, it delivers a flexible, application-aware network fabric that meets stringent enterprise performance, security, and availability requirements.

## Benefits

- Supports a variety of session optimization and intelligent routing features
- Uses fine-grained QoS controls to efficiently shape and prioritize traffic and enforce different SLAs for different data flows
- Protects applications and infrastructure against data loss and malicious attacks
- Provides continuous connectivity without requiring expensive hot-standby tunnels
- Is fully software-based for flexibility, simplicity, and breakthrough economics

*Businesses are adopting cloud-based applications and services to avoid infrastructure cost and complexity, increase IT agility, and accelerate digital transformation. According to a 2020 global industry survey, 96 percent of businesses utilize at least one public cloud<sup>1</sup>.*

*The cloud fundamentally reshapes enterprise traffic flows, introducing a variety of performance, security, and service quality challenges for network planners. Legacy WANs, designed to support traditional enterprise applications and services, aren't well suited for the cloud-centric world of IT. The modern enterprise requires a modern enterprise network—one that is adaptable, application-aware, and designed from the ground up to handle today's diverse workloads and dynamic data flows.*

*Juniper® Session Smart SD-WAN is a state-of-the-art, service-centric networking solution that eliminates the inherent inefficiencies and cost constraints of traditional WAN products and legacy SD-WAN solutions. The fully software-based solution provides agile, secure, and reliable WAN connectivity with breakthrough economics and simplicity.*

## The Challenge

The cloud transforms the way businesses deliver applications and services, and fundamentally transforms enterprise traffic flows. Historically, most enterprises have hosted applications in corporate data centers. They connected geographically distributed sites over MPLS networks or private WANs, over which they had deep visibility and tight control. Most business-critical application traffic was confined to the enterprise network, where external traffic was typically backhauled and securely handed off to the Internet.

Today, businesses deploy applications and services in public and private clouds (as well as in corporate data centers). And most application traffic is no longer confined to the enterprise. Instead, high volumes of business-critical traffic often flow over best-effort public Internet connections over which the enterprise has minimal visibility and control.

<sup>1</sup> Flexera 2020 State of the Cloud Report

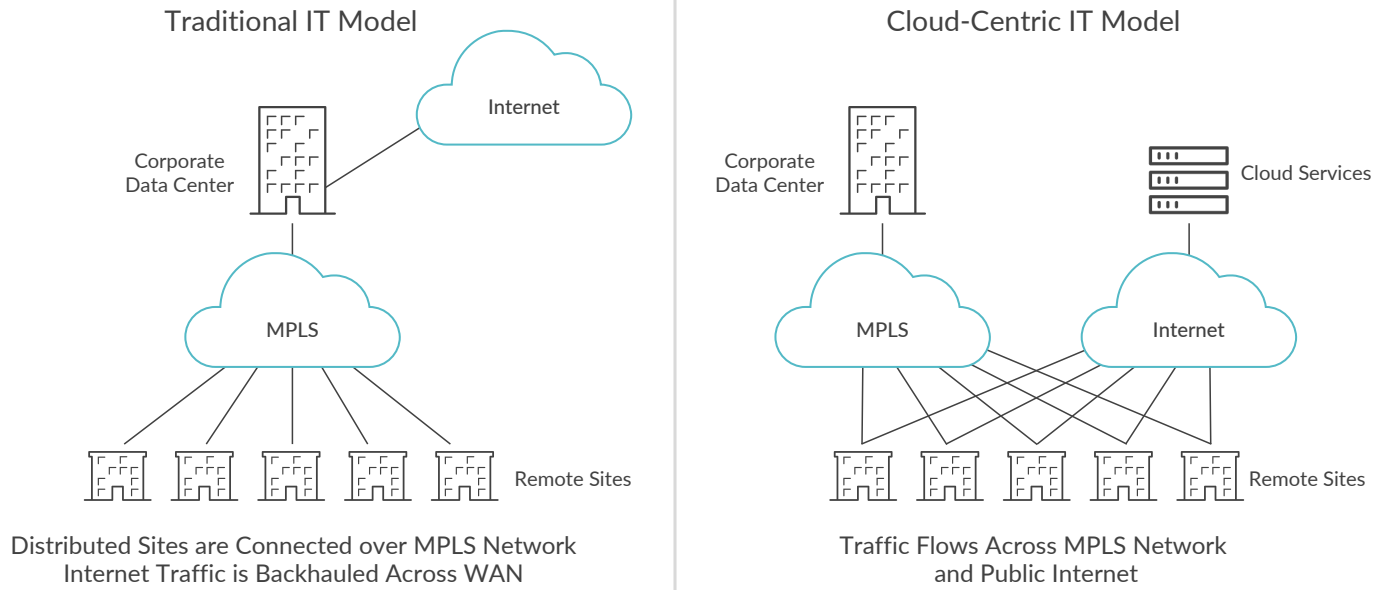


Figure 1: Traditional vs. cloud-centric model

Legacy hub-and-spoke networks, designed to support conventional enterprise applications and traffic flows, can't accommodate the dynamic workloads and diverse data flows that dominate the modern enterprise. The new cloud-centric model of IT introduces a variety of performance, security, and availability requirements for today's enterprise network architects.

### Performance

Today's businesses are powered by a variety of cloud-based applications and services with distinct characteristics and quality of service (QoS) requirements. Some applications like video collaboration solutions are bandwidth-intensive and delay-sensitive. Other applications like CRM solutions are more tolerant of packet loss and latency. Network architects must find ways to prioritize, shape, and efficiently route traffic to deliver the right service-level agreement (SLA) for the right application at the right time.

### Security

Bad actors can exploit public and private data networks to steal confidential data or disrupt critical IT systems and services. Network planners must introduce strong security systems and practices to protect data privacy, and to defend both enterprise and cloud infrastructure against denial-of-service (DoS) attacks and other threats.

### Availability

WAN connectivity failures can disrupt critical business applications, impair worker productivity, and impact the

bottom line. Planners must ensure continuous access to mission-critical applications and services in the event of link failures or ISP outages.

## Legacy WAN Solutions Are Inherently Costly and Complex

Conventional networking and security products and legacy SD-WAN solutions are inherently expensive and complicated, and can't meet the increased price-performance and agility demands of the digital era.

### Legacy Middlebox Sprawl Is Unmanageable

Many enterprises rely on a collection of independent, special-purpose networking and security products (routers, firewalls, IPS/IDS devices, VPN appliances, etc.). These middleboxes create a variety of operational and logistical issues, including:

- **Long, drawn-out rollouts.** Each product is installed and configured individually—a resource-intensive proposition that often requires onsite expertise.
- **Ineffective swivel-chair management.** Each device has a unique administrative interface and APIs. Rolling out new applications, expanding network capacity, or troubleshooting problems can be a manually intensive, error-prone proposition involving multiple distinct CLIs or element management systems.
- **Complex logistics.** IT teams are often forced to engage multiple vendors for product procurement, support, and maintenance. Product interoperability issues often lead to vendor squabbles and finger-pointing.

## Legacy SD-WAN Solutions Are Inefficient and Expensive

SD-WAN solutions can help reduce cost and complexity by virtualizing network functions onto common hardware and eliminating middlebox sprawl. But legacy SD-WAN products are still inherently expensive and inefficient. Limitations of legacy SD-WAN solutions include:

- **No service assurances for individual data flows.** Legacy SD-WAN solutions tunnel traffic across public Internet connections to protect data privacy. Most place all data flows into a single overlay tunnel, which inhibits traffic classification and management. Since all flows are treated identically, network administrators cannot provide different service assurances for different applications.
- **No visibility into sessions or application data.** Because all data flows are encapsulated into a single overlay tunnel, network admins cannot monitor or troubleshoot individual applications or sessions.
- **Poor bandwidth utilization.** Legacy SD-WAN solutions use inefficient, high overhead VPN tunneling protocols like IPsec that squander bandwidth and impair application performance. Tunneling is especially detrimental when data is transported over lower capacity or lossy WAN connections like satellite links.
- **Costly, inefficient redundancy mechanisms.** Most SD-WAN products rely on hot-standby tunnels for failover. Backup tunnels are always nailed up, but rarely used—an expensive and wasteful approach.
- **Inefficient service chaining.** Most SD-WAN solutions use service chaining to route traffic through multiple virtual network functions (firewall, IPS/IDS, WAN optimizer, etc.). Each virtual network element is instantiated as a unique virtualized network function (VNF), which increases memory and CPU consumption, and requires costly high-density, multicore systems.

## The Juniper Session Smart SD-WAN Solution

Session Smart SD-WAN is an advanced, service-centric networking solution that takes software-defined routing to a new level. Ideal for today's digital businesses, it provides agile, secure, and resilient WAN connectivity with breakthrough economics and simplicity for today's cloud-centric businesses. Session Smart SD-WAN eliminates the inherent inefficiencies and cost constraints of conventional networking products and legacy SD-WAN solutions, reducing bandwidth consumption by 30% or more compared to alternative networking platforms. This solution delivers a flexible, application-aware network fabric that meets stringent enterprise performance, security, and availability requirements.

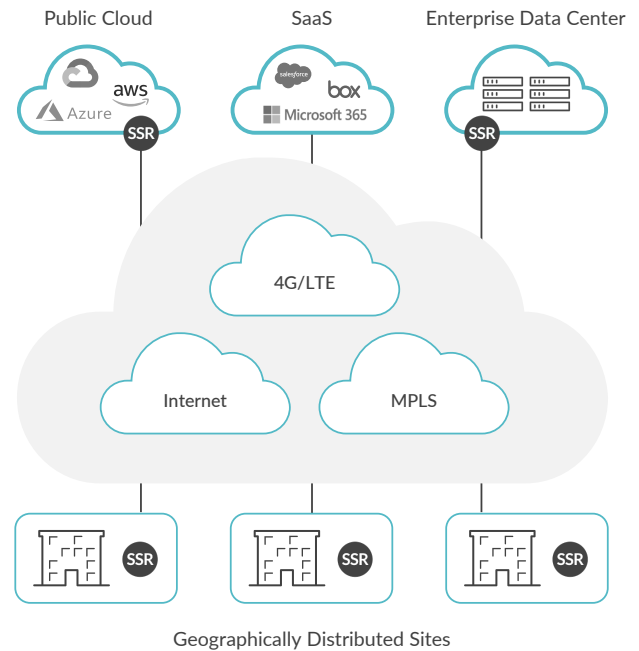


Figure 2: Session Smart SD-WAN solution

## Features and Benefits

### Performance

The Session Smart SD-WAN solution supports a variety of session optimization and intelligent routing features to ensure high performance and service quality for diverse applications and services. Fine-grained QoS controls let network administrators efficiently shape and prioritize traffic to enforce different SLAs for different data flows. Innovative application-aware routing intelligently steers traffic based on administratively defined policies and real-time network conditions, automatically selecting the right network path (MPLS, 4G, Internet) for the right application at the right time. Server load-balancing capabilities automatically distribute workloads across cloud or data center resources to optimize application performance. And a unique lossless application delivery capability boosts WAN bandwidth utilization, helping improve performance over lower capacity WAN connections.

### Security

Session Smart SD-WAN protects applications and infrastructure against data loss and malicious attacks. Inherent security capabilities include deny-all (zero trust) routing, L3/L4 DoS/DDoS protection, payload encryption, and Network Address Translation (NAT) and VPN functionality. The Session Smart SD-WAN's pioneering Secure Vector Routing (SVR) approach provides strong data security without the overhead of traditional encryption protocols like IPsec (SVR reduces

protocol overhead by over 30% when compared to IPsec). The tunnel-free architecture also gives network administrators full visibility into individual traffic flows, so they can efficiently monitor end-to-end sessions, evaluate service quality, and troubleshoot problems.

### Availability

Session Smart SD-WAN provides continuous connectivity without requiring expensive hot-standby tunnels like alternative solutions. In the event of a link failure or network outage, the solution seamlessly redirects traffic over an alternative path without disrupting sessions or impairing application performance. In addition, enterprises can use the server load-balancing capabilities to distribute workloads across data centers or availability zones to provide business continuity and disaster recovery for mission-critical services.

### Cost and Complexity

Session Smart SD-WAN is fully software-based for ultimate flexibility and economics. The software runs on any commercial off-the-shelf or white box server platform, eliminating middlebox sprawl. And unlike a traditional service function chaining approach, this solution performs multiple logical network functions (router, stateful firewall, WAN optimizer, etc.) in a single VNF, significantly reducing CPU and memory requirements. As a result, the Session Smart SD-WAN software can run on far less expensive servers than legacy SD-WAN solutions. Better still, it supports zero-touch provisioning (ZTP) for plug-and-play installation at remote sites with no IT expertise.

### High Performance

Session Smart SD-WAN outperforms traditional solutions, providing high performance, security, and resiliency, while

avoiding the cost and complexity of traditional WAN products and legacy SD-WAN solutions. The table below summarizes some of the important advantages Session Smart SD-WAN offers over alternative solutions for key wide-area networking requirements.

### WAN Assurance

Mist WAN Assurance is a cloud service that brings AI-powered automation and service levels to the Juniper Session Smart SD-WAN solution. Driven by the power of Mist AI, it simplifies day two operations with insights, proactive anomaly detection & remediation, and automated troubleshooting. The resulting operational simplicity allows you to understand and improve your users' experience across your SD-WAN.

- Session Smart Routers, deployed as SD-WAN edge devices, provide rich streaming telemetry needed for WAN health metrics and anomaly detection.
- Insights derived from Session Smart Router's telemetry data allows WAN Assurance to compute unique "User Minutes" that indicate whether users are having a good experience.
- This data is leveraged within the Mist Cloud AI engine, driving simpler operations, reducing mean time to repair, and providing better visibility into end-user experiences.
- The Marvis assistant for WAN allows you to ask direct questions like, "why is my Zoom call bad?," and provides complete insights, correlation, and actions.
- Marvis Actions identifies and summarizes issues such as application latency conditions, congested WAN circuits or negotiation mismatch.

Table 1: Session Smart SD-WAN Differentiators

Requirement	Traditional WAN and Legacy SD-WAN	Session Smart SD-WAN
Data privacy	Tunnel overlays safeguard data privacy, but limit visibility and control.	Secure Vector Routing protects data privacy, while enabling granular traffic management and visibility.
Application-specific service assurances	Tunnel overlays inhibit traffic management and prevent application-specific SLAs.	Fine-grained traffic management and application-aware routing enable application-specific, policy-based SLAs.
Continuous connectivity	Idle hot-standby tunnels are costly and inefficient.	Multipath session migration provides cost-effective protection against link failures and ISP outages. Server load balancing provides business continuity/disaster recovery for critical applications.
Optimal performance over low-speed links	High overhead tunneling protocols squander bandwidth and impair the performance of delay-sensitive applications.	Secure Vector Routing minimizes protocol overhead. Lossless application delivery optimizes bandwidth utilization and boosts application performance.
Low-cost remote site platform	Special-purpose middleboxes add cost and overhead. Legacy SD-WANs require expensive servers to support multiple dedicated VNFs.	Solution consolidates all network functions onto a single VNF that runs on inexpensive commercial off-the-shelf (COTS) or white box servers.
Easy turn-up and operations	Each middlebox has distinct CLI/EMS/APIs. Adds/moves/changes and troubleshooting are manual-intensive, time-consuming, and error-prone.	Unified administration, auto-device discovery, and ZTP and upgrades, streamline deployment and management.

## Summary—Simplifying Service Delivery and Transforming WAN Economics

Enterprises must modernize their WAN architectures to support today's cloud-based applications and services. Traditional networking products and legacy SD-WAN solutions, designed to support conventional enterprise IT architectures and traffic flows, are too costly and complicated for the digital era.

The Session Smart SD-WAN solution takes software-defined, distributed routing to the next level, satisfying demanding enterprise performance, resiliency, and security requirements. A tunnel-free architecture, combined with intelligent service-based routing provides end-to-end visibility and granular control over individual data flows, enabling application-specific SLAs with ultimate efficiency.

Session Smart SD-WAN ensures highly secure and reliable WAN connectivity without the cost or performance overhead of traditional VPN tunneling schemes. Integral bandwidth optimization capabilities improve the performance of lower quality WAN links. And persistent multipath routing ensures continuous connectivity in the event of link failures or service outages.

## About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.



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