

CONNECT THOUSANDS OF BRANCH OFFICES WITH SESSION SMART SD-BRANCH

SASE architecture converges WAN and network security functions, controls access, and manages traffic at the edge

Challenge

Legacy hub-and-spoke branch office networks, designed to support traditional business applications and traffic patterns, can't accommodate the dynamic workloads and diverse data flows that dominate the modern enterprise. The new cloud-first model of IT introduces a variety of performance, security, and availability challenges.

Solution

Session Smart SD-Branch is an advanced, service-centric networking solution that takes SD-WAN to a new level. This fully software-based solution slashes cost and complexity, eliminating the middlebox and VNF sprawl that plague traditional WAN and legacy SD-WAN solutions.

Benefits

- Supports WAN optimization and intelligent routing features to ensure high performance and service quality for diverse applications and services
- Lowers cost and complexity, eliminating the middlebox and VNF sprawl
- Includes SASE functions such as session-based and service-centric routing, dynamic global discovery, and identity-based access and management controls
- Automatically distributes branch workloads across cloud or data center resources

Digital transformation is fundamentally reshaping enterprise traffic flows, and this is introducing performance, security, and service quality challenges for branch office network planners. Across the world, enterprises are adopting cloud-based applications and services to reduce infrastructure cost and complexity, accelerate business agility, and unleash digital innovation. According to a RightScale 2019 industry survey, enterprises now run 79 percent of workloads in the cloud—46 percent in private clouds and 33 percent in public clouds.

Legacy branch office networks, designed to support traditional enterprise applications and services, aren't well suited for the new cloud-first world of IT. The modern enterprise requires a modern enterprise network—an adaptable, application-aware network, designed from the ground up to handle today's diverse workloads and dynamic data flows.

Juniper® Session Smart™ SD-Branch is a state-of-the-art, service-centric solution that eliminates the inherent inefficiencies and cost constraints of traditional branch office networking and legacy SD-WAN solutions. The solution extends the benefits of SD-WAN to the branch office LAN, combining centralized management, programmability, and control, with plug-and-play installation to enable a new software-defined branch. This provides fast, secure, and reliable branch office connectivity for today's digital businesses, with breakthrough economics and simplicity.

The Challenge

Digital transformation is changing the way businesses deliver applications and services, and fundamentally reshaping enterprise traffic flows. Historically, most enterprises hosted applications in central corporate data centers. They connected branch offices 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, while external traffic (Web, e-mail, VoIP, etc.) was typically backhauled across the enterprise network and securely handed off to the Internet.

In the new cloud-first model of IT, applications and services are hosted in public and private clouds (as well as in corporate data centers), and most branch office traffic is no longer confined to the enterprise. Instead, high volumes of business-critical application traffic flows over best-effort public Internet connections where the enterprise has minimal visibility and control.

Legacy hub-and-spoke branch office networks, designed to support traditional business applications and traffic patterns, can't accommodate the dynamic workloads and diverse data flows that dominate the modern enterprise. The new cloud-first model of IT introduces a variety of performance, security, and availability challenges that enterprise network architects need to overcome.

Performance

Today's businesses leverage a variety of cloud-based applications and services with distinct characteristics and quality-of-service (QoS) requirements. Some applications like unified communications, collaboration solutions, and Web meeting services are bandwidth-intensive and delay-sensitive. Other applications like Customer Relationship Management (CRM) and Supply Chain Management (SCM) solutions are more tolerant of packet loss and latency. Network architects must find ways to prioritize, shape, and efficiently route traffic to provide the right service-level agreement (SLA) for the right application.

Security

Cyber criminals and malicious insiders can exploit public and private data networks to steal confidential information or disrupt critical IT systems and services. Network planners must introduce strong security systems and practices to protect data privacy, and to defend enterprise and cloud infrastructure against denial-of-service (DoS) attacks and other threats, without degrading performance, impairing user experiences, or complicating operations.

Availability

Branch office connectivity failures can disrupt critical business applications, hinder 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.

Cost

Conventional branch office networking 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 SD-WAN solutions use service chaining to route traffic through multiple virtual network functions (firewall, IPS/IDS, WAN optimizer, etc.), but each virtual network element is instantiated as a unique virtualized network function (VNF) that consumes CPU and memory. As a result, legacy SD-WAN solutions require high-density multicore systems that are too pricey for most branch office scenarios.

Middlebox Sprawl

Many enterprises rely on a collection of special-purpose branch office networking and security solutions (routers, firewalls, IPS/IDS devices, VPN appliances, etc.) to enable secure and reliable connectivity. Middleboxes create a variety of headaches including:

- Long, drawn-out rollouts—Each middlebox is independently installed, configured, and provisioned—a time-consuming, resource-intensive proposition that requires onsite expertise.
- Inefficient swivel-chair management—Each device has a unique administrative interface and APIs. Introducing new applications, expanding capacity, or troubleshooting problems can be a manually intensive, error-prone endeavor involving multiple distinct CLIs or element management systems.

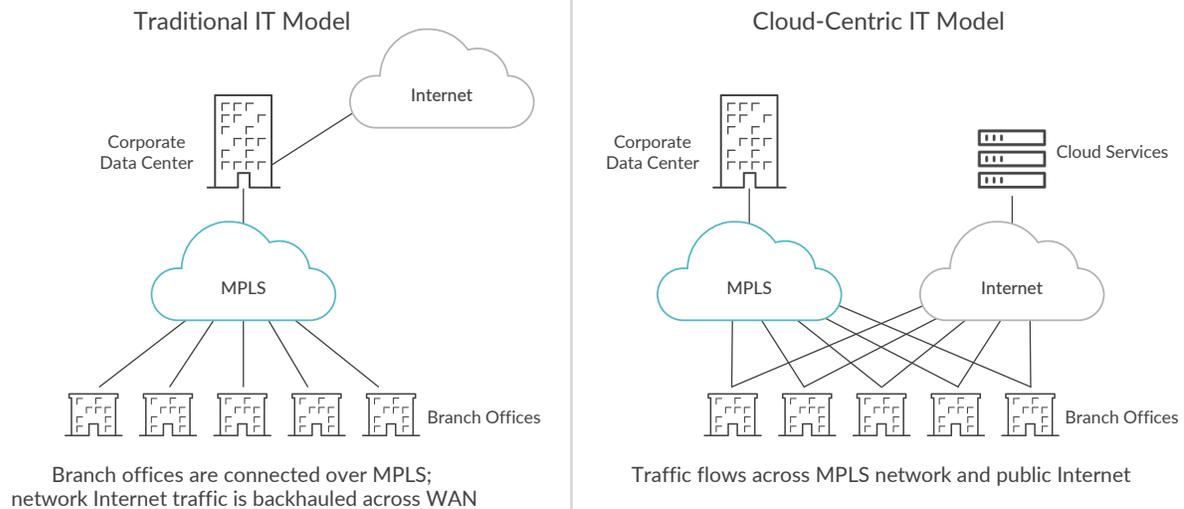


Figure 1: Traditional vs. cloud-first branch office model

- Complicated logistics—IT teams are often forced to interact with multiple vendors for product procurement, support, and software upgrades. Each vendor has a unique service program and software maintenance schedule. And product interoperability issues and compatibility problems can lead to vendor squabbles and finger-pointing.

The Juniper Session Smart SD-Branch Solution Enables an Identity-Centric Secure Access Service Edge

Session Smart SD-Branch is an advanced, service-centric networking solution that takes SD-WAN to a new level. Fully software-based, it slashes cost and complexity, eliminating the middlebox and VNF sprawl that plague traditional WAN and legacy SD-WAN solutions. It also extends the advantages of software-defined WANs all the way down to the branch office LAN, creating a new SD-Branch.

As IDC notes, “SD-WAN is a foundational component of SD-Branch. The most common function that will be deployed in an SD-Branch context is a virtualized router that enables SD-WAN. When enterprises use additional virtual network functions in conjunction with SD-WAN, then it becomes an SD-Branch.”

The Session Smart SD-Branch solution supports multiple network functions in a single VNF instance running on a low-cost commercial off-the-shelf (COTS) platform. Enterprises can execute network functions at the edge and/or in the cloud based on policy, to satisfy diverse business requirements or application needs. For example, traffic from one enterprise organization can be steered through a stateful firewall at the edge, while traffic from a different enterprise organization can be routed through a next-generation firewall (NGFW) running on Azure or AWS.

Session Smart SD-Branch provides the network component of what Gartner calls an identity-centric Secure Access Service Edge (SASE) architecture. The solution polices and manages traffic at the edge of the network, close to users and connected endpoints, for ultimate speed, efficiency, and economics.

Fundamental SASE functions include:

- Session-based routing—The Juniper Session Smart Router operates on sessions rather than individual packets, just like firewalls.
- Service-centric routing— The Session Smart Router is designed around modeling the applications that users consume. Service-centric networking is a top-down approach to configuring routing infrastructure. Rather than using interior gateway protocols (IGPs) to exchange routes and access control lists (ACLs) to restrict access, administrators describe the services within the network and the group(s) within the network allowed to access each one. Dynamic global discovery—For SASE to be truly successful, the network must be able to dynamically detect where services are located in order to deliver valid sessions to those services. Service and Topology Exchange Protocol (STEP) enables Session Smart routers to exchange service and connection information to those services.
- Identity-based access and management controls—Session Smart SD-Branch institutes fine-grained, identity-based access and management controls at the edge, under the direction of a central policy server.

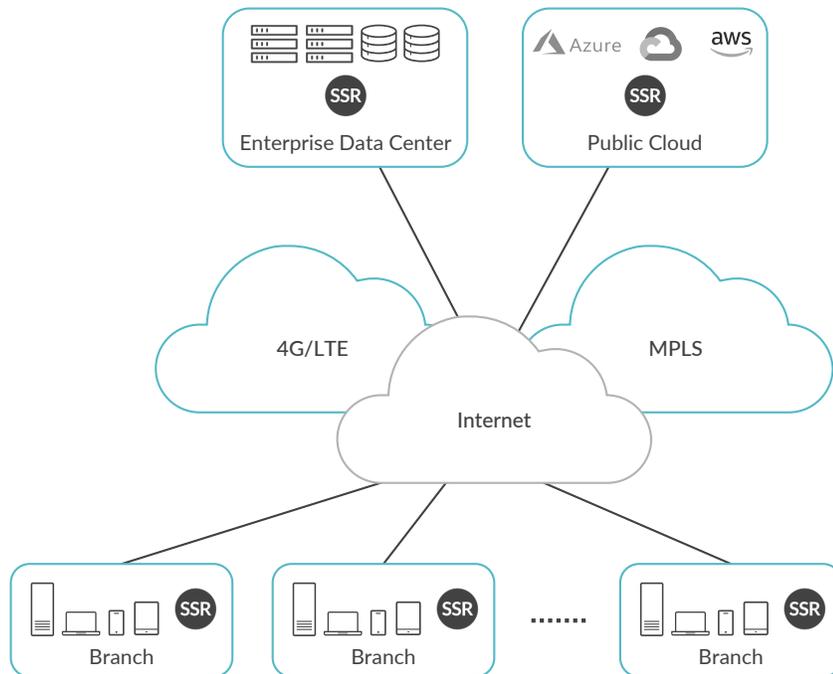


Figure 2: Juniper Session Smart SD-Branch connectivity

Ideal for today's distributed digital businesses, the Session Smart SD-Branch solution provides agile, secure, resilient branch office connectivity for the cloud-first model of IT. The solution eliminates the inherent inefficiencies and cost constraints of legacy branch office networking solutions, delivering a flexible, application-aware network fabric that provides high performance, security, and availability for cloud-centric, business-critical applications and services.

Features and Benefits

Performance

Session Smart SD-Branch supports a variety of WAN 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 branch 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 branch office connections.

Security

Session Smart SD-Branch protects applications and infrastructure against data loss and malicious attacks. Inherent security capabilities include deny-all (zero trust) routing, L3/L4 DoS/DDoS protection, as well as Network Address Translation (NAT) and VPN functionality. The 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.

Session Smart SD-Branch radically simplifies the implementation and security of the branch office LAN by consolidating technology and unifying and centralizing network and security operations. The solution integrates with popular network access control (NAC) solutions like Genians and PacketFence to automatically discover endpoints and enforce fine-grained, identity-based access and management controls at the edge, under the direction of a central policy server. The solution also offers seamless service function chaining integrations with cloud-based security services from Palo Alto Networks, Zscaler, Seceon, and others for ultimate extensibility and choice.

Availability

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

Ideal for deployment at unstaffed remote sites, the solution supports zero-touch provisioning (ZTP) and single pane of glass (SPOG) centralized management for simple installation, administration, and maintenance.

The table below summarizes some of the advantages Session Smart SD-Branch offers over alternative solutions for key branch office networking requirements.

Table 1: Session Smart SD-Branch vs. Traditional WAN and Legacy SD-WANs

Requirement	Traditional WAN and Legacy SD-WAN	Session Smart SD-Branch
Low-cost branch office platform	Special-purpose middleboxes add cost and overhead. Legacy SD-WANs require expensive servers to support multiple dedicated VNFs.	Session Smart SD-Branch consolidates all network functions onto a single VNF that runs on inexpensive COTS or white box servers.
Easy turn-up and operations	Each middlebox has distinct CLI/EMS/APIs. Adds/moves/changes and troubleshooting are labor-intensive, error-prone, and time-consuming.	Unified administration, auto-device discovery, ZTP, and upgrades streamline deployment and management.
Strong security	Tunnel overlays safeguard data privacy, but limit visibility and control, and impair performance.	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 BC/DR 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.

Summary—Agile, Secure, and Resilient Branch Office Connectivity for Today's Digital Businesses

Enterprises must re-architect branch office networks to support today's cloud-based applications and services. Traditional branch office networking appliances and legacy SD-WAN solutions, designed to support conventional enterprise IT architectures and traffic flows, are just too costly and complicated for the digital era.

Juniper Session Smart SD-Branch slashes branch office networking expense and complexity by consolidating functionality, eliminating technology sprawl, and dramatically simplifying operations. The solution converges networking and network security functionality, enforcing policies close to the end user, at the network perimeter, as part of an identity-centric SASE architecture. Autodiscovery capabilities and ZTP make it easy to turn up services and roll out new applications without requiring truck rolls or onsite expertise.

The Session Smart SD-Branch solution delivers a flexible, service-centric network fabric that meets the increased performance, agility, and resiliency demands of the new cloud-first IT model. It lays the foundation for an entirely new generation of branch office applications that help enterprises increase automation, improve productivity, and boost business performance.

Next Steps

To learn how Session Smart SD-Branch can help your organization streamline branch office networking, accelerate digital transformation, and improve business results, please contact your Juniper account manager or visit www.juniper.net.

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.

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701

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