CLOUD-FIRST GOVERNMENT NETWORKS ACCELERATE DIGITAL TRANSFORMATION

Enable mission success with service-centric, software-defined networking providing the foundation for agile, secure, and reliable connectivity

Overview

Federal governments are migrating IT infrastructure, applications, and services to the cloud to reduce costs and accelerate the pace of innovation. Cloud initiatives help government agencies increase operational efficiencies, accelerate application deployment, and tightly align recurring expenses with evolving capacity and workload demands.

Forward-looking agencies are implementing cloud-based applications and on-demand services to improve workforce productivity, collaboration, and mobility, and to scale data analytics, AI/ML, and IoT programs. Leading cloud providers like Microsoft Azure and AWS meet stringent government compliance and reliability requirements, and offer isolated clouds, engineered to support secure information and workloads.

The Challenge—Ensuring Fast, Reliable, and Secure Connectivity

Historically, most government applications were hosted in central data centers or colocation facilities. Campuses and remote sites were interconnected over private networks, and most application traffic was confined to the private network, over which the IT organization had tight control.

The cloud fundamentally reshapes network traffic flows, introducing a variety of performance, security, and service quality challenges for system architects. In the new model, applications and services are hosted in public and private clouds, as well as in traditional data centers, and application traffic often flows outside the private network, beyond the control of the IT organization.

Traditional government networks designed to support conventional applications and IT services aren't well suited for the cloud-first era. System planners must re-architect networks to meet the increased performance, agility, and resiliency demands of a cloud-centric world.
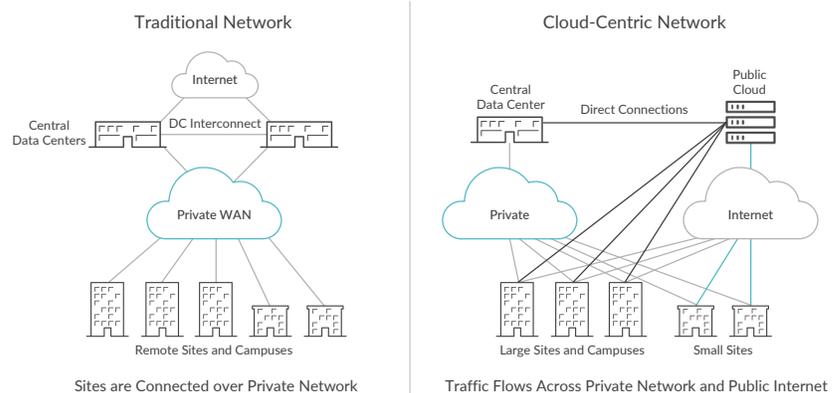

Figure 1: Cloud-centric vs. traditional network

Session Smart SD-WAN

Juniper® Session Smart™ SD-WAN is an advanced, service-centric networking solution that takes the software-defined WAN to a new level. Ideal for next-generation cloud-centric government networks, the solution provides fast and agile WAN connectivity with unmatched economics and simplicity. The Session Smart SD-WAN solution eliminates the inherent inefficiencies and cost constraints of traditional networking products and legacy SD-WAN solutions, and it meets stringent government security, reliability, and performance requirements.

Key advantages of Session Smart SD-WAN include:

- **Economics**—The solution is fully software-based and runs on commercial off-the-shelf servers for ultimate economics and choice. Unlike a traditional service function chaining approach, this solution performs multiple logical network functions (such as router, stateful network firewall, etc.) in a single virtualized network function (VNF), significantly reducing CPU and memory requirements.

- **Scalability**—The solution supports up to triple the number of routers per head-end and delivers up to four times the hardware performance of alternative solutions.

- **Security**—Pioneering Secure Vector Routing provides strong security without the overhead of traditional encryption protocols like IPsec, GRE, or VXLAN. Deny-by-default (zero trust) routing, L3/L4 denial of service/distributed denial of service (DoS/DDoS) protection, payload encryption, and Network Address Translation (NAT) and VPN functionality protect applications and infrastructure against data loss and malicious attacks.

- **Compliance**—The solution is FIPS 140-2 compliant, and is certified by ICSA labs for network firewall and PCI-DSS compliance.

- **Availability**—The solution provides continuous connectivity without requiring expensive hot-standby tunnels like traditional routing or legacy SD-WAN 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.

- **Visibility**—Unlike alternative solutions that encapsulate all data flows into a single overlay tunnel, Session Smart's tunnel-free architecture gives network administrators full visibility into individual data flows, so they can efficiently monitor end-to-end sessions, track key performance indicators (KPIs), and troubleshoot problems. Zero-touch setup and single-pane-of-glass, remote management simplify deployment, as well as ongoing administration and operations.

- **Performance**—The solution supports a variety of WAN optimization features, traffic steering, and quality-of-service (QoS) functions, and session-aware routing capabilities, along with a tunnel-free architecture to ensure high performance and service quality for diverse applications and services.

Table 1: Session Smart SD-WAN Eliminates Network Cost and Complexity

Requirement	Traditional WAN and Legacy SD-WAN	Session Smart SD-Branch
Simple, low-cost platform	Discrete routers and security middleboxes add cost and overhead. Legacy SD-WANs require expensive servers to support multiple dedicated VNFs.	Session Smart SD-WAN consolidates all network functions onto a single VNF that runs on inexpensive COTS servers. Plug-and-play installation streamlines rollouts.
Strong security and compliance	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. The solution is FIPS 140-2 compliant, and certified by ICSA labs for network firewall and PCI DSS compliance.
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 (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.
Visibility	Tunnel overlays inhibit visibility and control.	Tunnel-free architecture provides visibility into individual data flows, enabling end-to-end session monitoring and troubleshooting.

Fast, Secure and Reliable Cloud Connectivity For 150+ Military Installations

A U.S. DoD military department has used the Juniper Session Smart SD-WAN solution to modernize its global data network and support an extensive cloud migration initiative encompassing 150+ military installations. The solution provides agile, secure, reliable access to a leading FedRAMP-compliant public cloud using the cloud provider's direct connectivity option. The prime contractor selected Session Smart SD-WAN after evaluating a number of potential solutions including using IPsec, generic routing encapsulation (GRE) or Virtual Extensible LAN (VXLAN) tunnels for secure virtual connections.

Session Smart's tunnel-free Secure Vector Routing provides government networks with strong data protection without the overhead of traditional encryption protocols like IPsec, GRE, or VXLAN. And Secure Vector Routing reduces protocol overhead by 30-50% when compared to other encryption protocols. The solution's comprehensive session optimization capabilities boost service quality for diverse data flows, ensuring superior end-user experiences and satisfaction. The session-aware routing fabric extends all the way to the cloud, adapting in real time to ensure high service quality for elastic compute services and dynamic workloads.

The Session Smart SD-WAN solution helps contain expenses and simplify operations by consolidating technology, centralizing management, and gaining detailed visibility into key performance metrics and troubleshooting data. The solution's built-in network management capabilities let network administrators efficiently monitor end-to-end sessions as they isolate and resolve issues. The solution also supports industry-standard performance monitoring APIs, enabling military and government agencies to leverage their existing monitoring platform without making any expensive customizations.
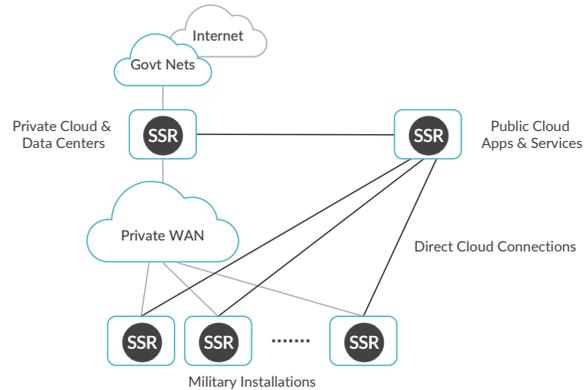

Figure 2: Next-generation military network

For More Information

To find out more about Juniper Networks products and solutions, please visit www.juniper.net.

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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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