

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

The federal government has accelerated the shift to cloud, migrating IT infrastructure, applications and services to reduce costs and speed 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.



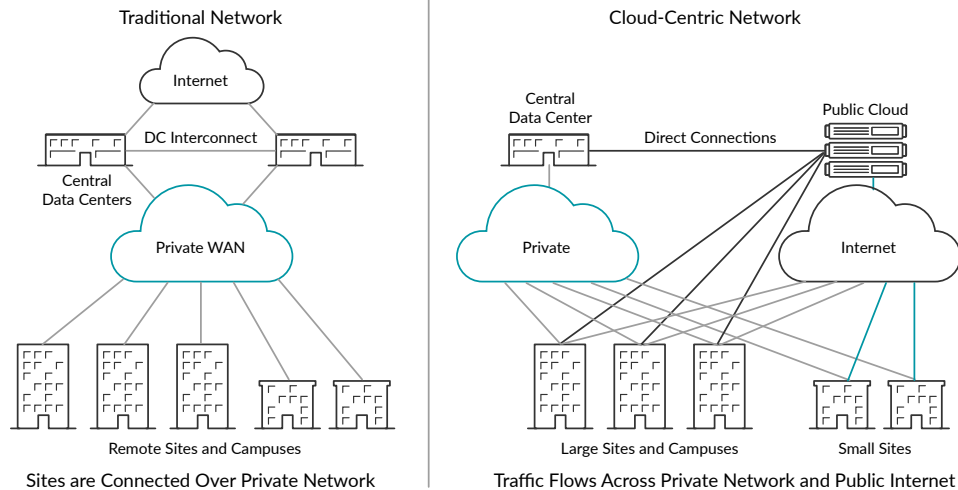


Figure 1: Cloud-centric vs. traditional network

AI-Driven SD-WAN, Powered by Session Smart Routing

Juniper® AI-driven SD-WAN, Powered by Session Smart™ 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 AI-driven 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 AI-Driven SD-WAN include:

- **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, IDS/IDS, URL filtering, and Network Address Translation (NAT) and VPN functionality protect applications and infrastructure against data loss and malicious attacks.
- **AIOps** – Ability to derive insights into gateway health, including CPU and memory consumption and link utilization levels. Also use AI-powered intelligence to assess the impact of metrics such as latency, jitter, and packet loss on end-user experiences on a per-application basis. Get proactive recommendations to improve user experience issues stemming from the WAN.

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

Table 1: AI-driven SD-WAN Eliminates Network Cost and Complexity

Requirement	Traditional WAN and Legacy SD-WAN	AI-Driven SD-WAN
Simple, low-cost platform	Discrete routers and security middleboxes add cost and overhead. Legacy SD-WANs require expensive servers to support multiple dedicated VNFs.	AI-Driven 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 ICASA 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 AI-Driven SD-WAN, Powered by Session Smart 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 AI-Driven 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 AI-Driven 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.

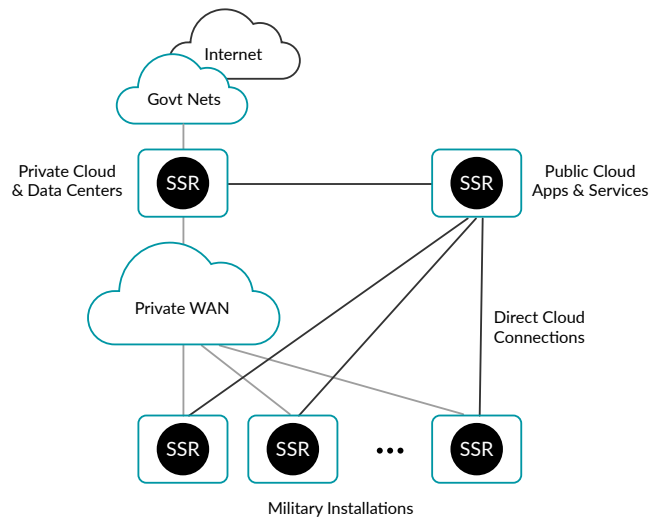


Figure 2: Next-generation military network

Next Steps

Juniper has extensive experience working with federal agencies and supporting their specialized network and security requirements. We offer IC/DoD-certified solutions for missions that demand unflinching network performance.

Juniper Federal Services are designed to provide an enhanced, secure, end-to-end U.S.-based customer support experience, including [Advanced Care Service](#), [Advanced Care Plus Service](#), [Premium Care Service](#), [Flexible Services Credit](#), and [High Security Return Materials Authorization and Non-Return Service](#).

Contact your federal account manager for more information.

To learn more about Juniper solutions for federal, visit <https://www.juniper.net/us/en/solutions/federal-government.html>.

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.



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