As the software-defined WAN (SD-WAN) market continues to evolve, enterprises are looking for platforms that go beyond providing connectivity to platforms that leverage artificial intelligence (AI) and cloud to ensure security and end-user experiences across the WAN and LAN.

The Role of Session-Based SD-WAN in an AI-Driven Enterprise

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Introduction

It's a dynamic time in enterprise networking. Enterprises today must support mission-critical, secure connectivity to a range of distributed endpoints while ensuring high-quality end-user experiences. Software-defined WAN (SD-WAN) is an efficient and powerful tool to help address these goals.

While SD-WAN is not a new technology, there are exciting enhancements to how this technology is architected. One novel approach is to use session-based routing, which creates highly efficient, scalable, and stateful segments for each SD-WAN connection. Session-based routing applied to SD-WAN enables scalability, simplified management, and ingrained security. Perhaps most importantly, it gives granular visibility into client and application behavior that can be used to optimize the experience of individual users.

Enterprises are increasingly looking for integrated security features to be built into their edge networking platform and not just bolted on. They're looking to prioritize end-user experience and to more holistically manage their WAN and LAN to leverage automated management and security efficiencies. Enterprises are gaining comfort with relying on the power of artificial intelligence (AI) and data science algorithms to enhance the automated management of the network, often referred to as AIOps.

This IDC Technology Spotlight explores trends driving the SD-WAN market and describes the evolution to the software-defined branch (SD-Branch) and a how session-based routing combines with an AI-enhanced management platform to ensure high levels of network performance and security as well as enhanced end-user experiences.

AT A GLANCE

KEY TAKEAWAYS

SD-WAN is one of the fastest growing segments of the network infrastructure market. Applying session-based routing policies and AI-driven insight, automation, and actions to SD-WAN results in a highly scalable and secure edge networking architecture.

Today, organizations are thinking about more cohesively managing their WAN and LAN together as well as leveraging AI-enhanced management tools across the network. IDC calls this the software-defined branch (SD-Branch).
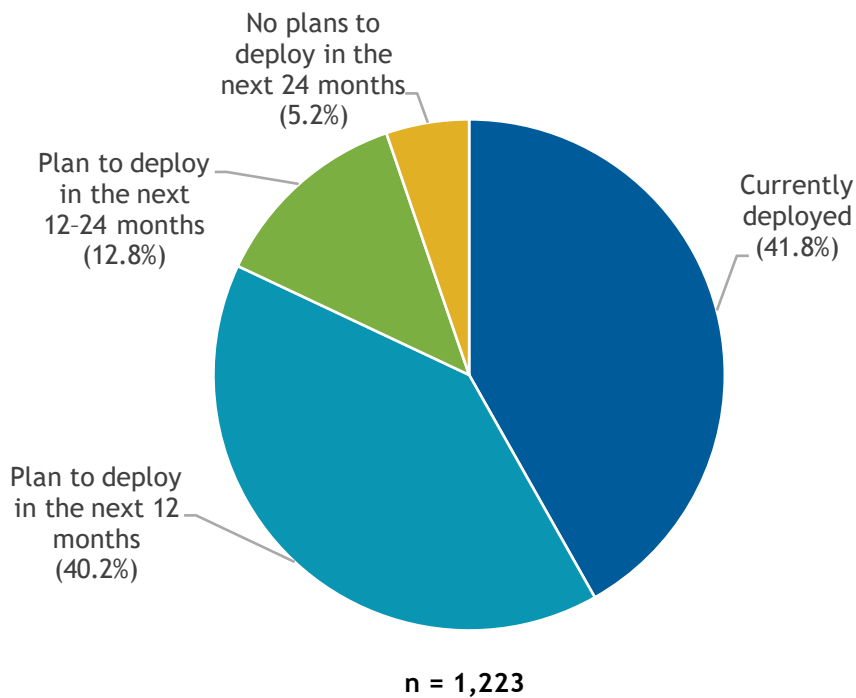
SD-WAN and the Transition to SD-Branch

Over the past handful of years, SD-WAN has grown from a nascent technology to a key enterprise investment priority, even during the COVID era. SD-WAN fundamentally allows enterprises to cohesively manage multiple WAN connection types (e.g., broadband, MPLS, and cellular) while a centralized application policy controller dynamically manages those links to ensure optimized, secure routing. Figure 1 shows the rapid global enterprise adoption of SD-WAN.

FIGURE 1: *SD-WAN Adoption*

In late 2019, 95% of survey respondents said they had deployed or planned to deploy SD-WAN.

Q ***Does your organization currently use or plan to use SD-WAN technology solutions?***

No plans to deploy in the next 24 months (5.2%)

Plan to deploy in the next 12-24 months (12.8%)

Plan to deploy in the next 12 months (40.2%)

Currently deployed (41.8%)

n = 1,223

Source: IDC's U.S. Software-Defined WAN (SD-WAN) Survey, November 2019
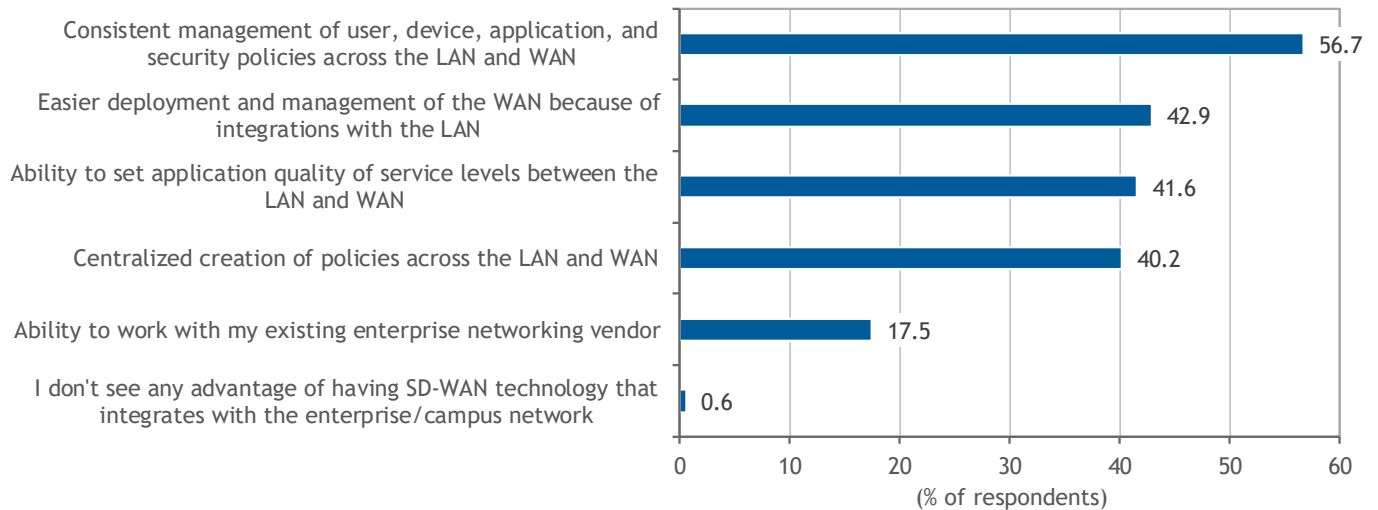
Today, enterprises are looking beyond just connectivity from their SD-WAN platform. Increasingly, enterprises are focusing on the security of the SD-WAN as well as integrations between the WAN and the wired LAN/wireless LAN (WLAN). IDC refers to this important evolution in the market of SD-WAN and LAN and security management as the software-defined branch (SD-Branch). Figure 2 shows the top benefits enterprises gain from more cohesive WAN and LAN management. A variety of other important trends are driving how enterprises are architecting and managing the edge of their networks, including:

» **Ensuring connectivity and end-to-end user experiences.** Focusing solely on network availability is not good enough in today's world; the network must be highly reliable and performant. Any negative event in the end-user experience can be just as disruptive as an outage. Enterprises want to ensure the full end-to-end experience of the network and applications the network is serving.

» **Simplicity of deployment, management, and ongoing operations.** Enterprise networks are complex, with a variety of endpoints to support, along with high-bandwidth and low-latency connections. Network management systems should be simple to deploy, manage, and operate, both on day one of planning and deployment and on day "n" when upgrading, patching, monitoring, and troubleshooting the network. Moves, adds, and changes should be easy to achieve without substantive policy reconfiguration and new tunnel assignments.

» **Using machine learning/artificial intelligence to bring greater insight and enhance automation.** One way to simplify managing networks at scale is to rely on machine learning/artificial intelligence technology for event correlation, predictive analytics, anomaly detection, and proactive troubleshooting. This groundbreaking technology has matured significantly in recent years to enable deeper levels of analytics and self-driving network capabilities that ensure end-to-end experiences.

» **Natively integrated security.** Security cannot just be bolted on to an enterprise technology; it must be natively built into the system to ensure efficacy and reliability.

FIGURE 2: *Multiple Positive Perceived Benefits of Integrated LAN and WAN Management*

Q *What advantages, if any, do you see with SD-WAN technology that integrates with enterprise networking needs (wired and/or wireless)?*

Category	% of respondents
Consistent management of user, device, application, and security policies across the LAN and WAN	56.7
Easier deployment and management of the WAN because of integrations with the LAN	42.9
Ability to set application quality of service levels between the LAN and WAN	41.6
Centralized creation of policies across the LAN and WAN	40.2
Ability to work with my existing enterprise networking vendor	17.5
I don't see any advantage of having SD-WAN technology that integrates with the enterprise/campus network	0.6

n = 1,223

Source: IDC's U.S. Software-Defined WAN (SD-WAN) Survey, November 2019

Session-Based Routing for Ensuring Experiences and Securing Traffic

With the SD-WAN market expanding in terms of both adoption and enterprise requirements, there are a variety of approaches to satisfy the evolving needs of the enterprise edge network. One approach that has emerged is the use of session-based routing protocols in SD-WAN. In session-based routing, each SD-WAN connection is an individual, stateful segment managed by a centralized policy controller that is highly scalable with direct connections to various cloud-based endpoints. With each network being its own segment, it is a highly secure architecture, allowing for a zero-trust network with firewall capabilities built in. Session-based routing techniques have several advantages:

» Fine-grained security policies "out of the box" including stateful inspection, plus the ability to work with more advanced security systems, such as next-generation firewalls (NGFWs) and a cloud access security broker (CASB)

» Improved performance and agility by eliminating tunnel setup and overhead, along with stateful awareness, with end-to-end performance assurance

» Intelligent routing, with path selection, flow symmetry, and load balancing, enabling finer-grained control over session traffic that can be optimized and routed based on application (Intelligent routing also delivers detailed levels of insight and analytics into every connection on the network.)

» Dynamic scalability and vast distribution powered by a centralized controller, including direct connections to public clouds

Leveraging AI in a Session-Based SD-Branch

One of the most important enhancements in the networking industry over the past handful of years has been the application of machine learning and artificial intelligence technologies to enhance the operational management, performance, and security of networks. AIOps platforms learn what normal and abnormal behavior on the network is and are programmed to automatically ensure application and user experience. If issues are detected on the network, the system either can provide recommendations for how to fix the problem or can automatically resolve the issue. Some platforms have natural language processing (NLP) features, enabling detailed answers to be provided via simple questions that can be posed to the system, such as "What was wrong with the WAN yesterday?"

Combining session-based routing with AI-enhanced management creates a highly scalable, secure, and distributed edge network.

When a session-based WAN architecture is applied to networking, organizations can ensure connectivity to a variety of endpoints, get deep levels of visibility and insights into network operations, and efficiently manage a distributed, scalable edge enterprise network by relying on advanced automation techniques.

Considering Juniper Networks (128 Technology)

128 Technology, which was founded by a team of network industry veterans and recently acquired by Juniper Networks, was the first company to apply session-based routing architecture to SD-WAN, which enables the creation of a simple platform that is tunnel free and has no hardware-centric components. It enables agility with centralized management and a zero-trust security model with the ability to scale to managing millions of segments simultaneously.

Components of the Juniper (128 Technology) platform include a centralized orchestration and policy management solution enabled by a Conductor and a Session Smart Router. Together, these components form a distributed control plane and a data plane, both of which are stateful and session aware. Juniper's Session Smart SD-WAN platform creates a fabric of stateful sessions for each connection, allowing for tunnel-free encryptions across a variety of connection types, including MPLS, LTE, internet, and private IP. The Session Smart Router and the distributed control plane enable a variety of capabilities, including granular visibility and control of individual user experiences and policies based on business decisions. The Juniper platform also does service chaining of network functions such as a network-stateful firewall, network address translation (NAT), encryption/VPN, plus link and server load balancing. The Session Smart Router solution can be deployed in datacenters, branch offices, or cloud locations, which, according to the company, allows for the creation of a multicloud fabric.

128 Technology's Session Smart technology will be integrated into Juniper's AI-Driven Enterprise solution, managed by the Juniper Cloud Services driven by Mist AI, which already has advanced functionality for enterprise campus technologies, including WLAN and Ethernet switching. Combined, the 128T SD-WAN and the Juniper WLAN and switching portfolio will create a unique AI-driven SD-Branch offering.

Challenges

Given that Juniper recently acquired 128 Technology, the companies will work to integrate the 128 Technology platform into the Mist cloud. Yet integrations between the SD-WAN, WLAN, and Ethernet switching technologies will be a longer-term opportunity for the combined companies. Juniper also will work with customers to determine the best use cases for an AI-driven platform. Customers are slowly but steadily increasing their reliance on AI-based management platforms for more self-driving network management tasks. As the technologies mature and additional use cases are proven out, enterprise adoption should follow.

Conclusion

SD-WAN is one of the fastest-growing technologies in the networking market thanks to the important benefits it enables for edge network management. Increasingly, however, enterprises are thinking about more cohesive management of their WAN and LAN together, as well as how security is baked into their edge networking architecture. Session-based routing, which combines highly scalable, tunnel-free, securely segmented WAN connections, is an elegant solution for satisfying these goals. When combined with an AI-enhanced cloud-based management platform, session-based routing can enable significant benefits as organizations look to securely and efficiently manage the dynamic needs of their enterprise network.

About the Analyst

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Brandon Butler is a Senior Research Analyst with IDC's Network Infrastructure group covering Enterprise Networks. In this role, he is responsible for market and technology trends, forecasts, and competitive analysis in Ethernet switching, routing, wireless LAN, and emerging segments such as SDN and SD-WAN.

MESSAGE FROM THE SPONSOR

128 Technology's Session Smart Network leads the industry in experience-based SD-WAN. Now part of Juniper Networks, the vision for the client to cloud AI-Driven enterprise is complete. With Session Smart Routing, your network can leverage AI insights to diagnose and self-heal, assuring strong security and superior end-user experiences across the enterprise. Only Session Smart Routers harness the power of session-awareness to identify, secure, and prioritize individual user activities on your network. Intuitive real-time decision making delivers sub-second failover and ensures your traffic takes the best path available based on your specific policies. The result is a SASE-based SD-WAN architecture that is more resilient, easy to manage, and more scalable than ever before. For more information about the impact Session Smart Networking will have on your organization, please contact us at *info@128technology.com.*

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