IDC TECHNOLOGY SPOTLIGHT

SD-WAN: Security, Application Experience and Operational Simplicity Drive Market Growth

April 2019

This Technology Spotlight highlights the key drivers of SD-WAN adoption in the enterprise. The paper also looks at the role of Cisco in this strategically important market.
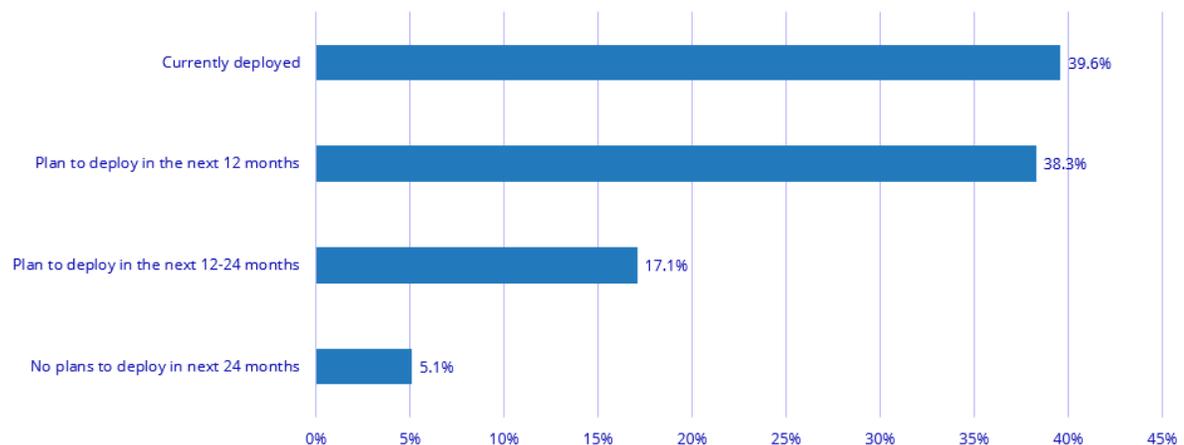
Situational Analysis

IDC's recent *Software-Defined WAN Survey* suggests continuing strong momentum for SD-WAN, with almost 95% of enterprises surveyed expecting to use SD-WAN within 24 months, as shown in Figure 1.

FIGURE 1

Intent to Deploy SD-WAN Continues to be Very High

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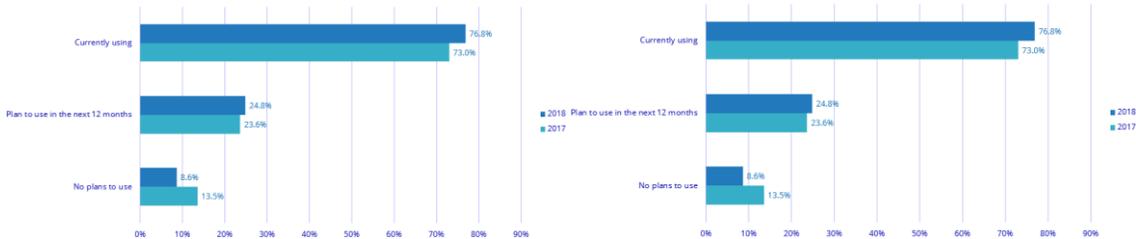

n = 1,202

Source: IDC's *Software-Defined WAN Survey,* October 2018

Cloud usage in all its forms within the enterprise continues to rise, with more than 90% of survey respondents indicating that they are planning to use the cloud for enterprise apps in the next 12 months (see Figure 2). Considering more than 90% intend to use both SaaS and IaaS options, this implies that most enterprise users are connecting to multiple clouds over the course of a typical business day.

US43517518

FIGURE 2

Multi-Cloud Usage Is Up Significantly

Q. *What type(s) of cloud services or resources is your organization currently using and planning to use in the next 12 months?*
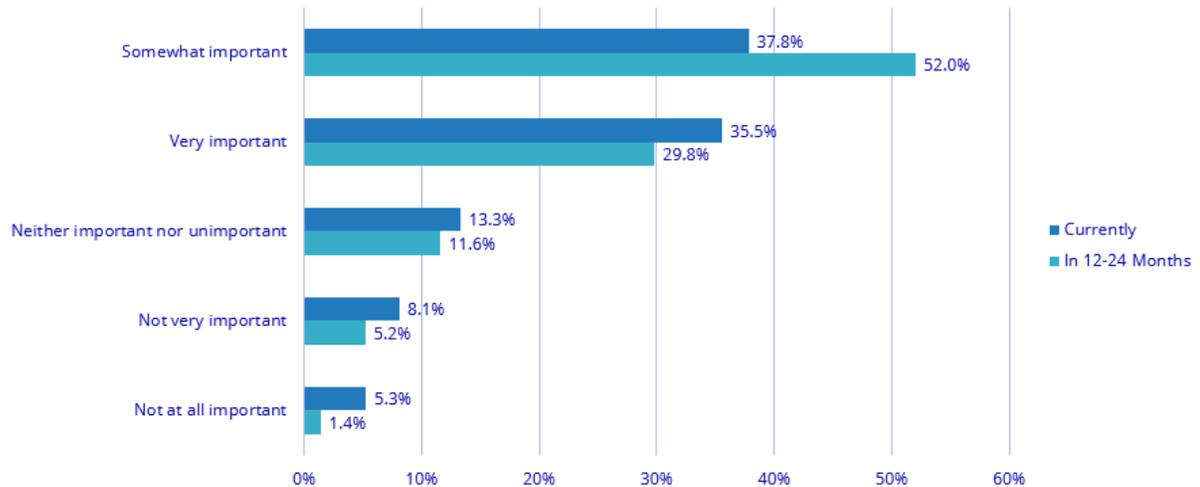

n = 1,202

Source: IDC's *Software-Defined WAN Survey,* August 2018

From a networking perspective, the importance of cloud usage as a driver of WAN technology choice also continues to grow. Nearly 75% of respondents in IDC's SD-WAN survey believe SaaS/ Cloud Services are important to current WAN technology choices (see Figure 3).

FIGURE 3

Cloud Usage Continues to Grow as a Driver of WAN Technology Choice

Q. *Please rate the importance of SaaS/cloud services in your organization's WAN technology choices now and in 12-24 months?*
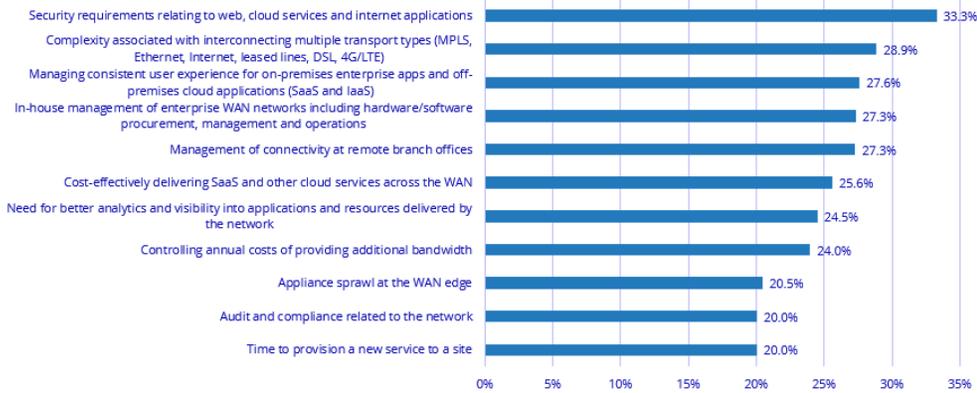

n = 1,202

Source: IDC's *Software-Defined WAN Survey,* August 2018

Security in a cloud context and the rising complexity of multi-transport and multi-cloud connectivity are the top challenges faced by WAN administrators in enterprises today (see Figure 4).

FIGURE 4

Cloud Security and Rising WAN Complexity Are the Top WAN Challenges Today

Q.   Select the three most important WAN challenges (from the following) that best relate to your company?

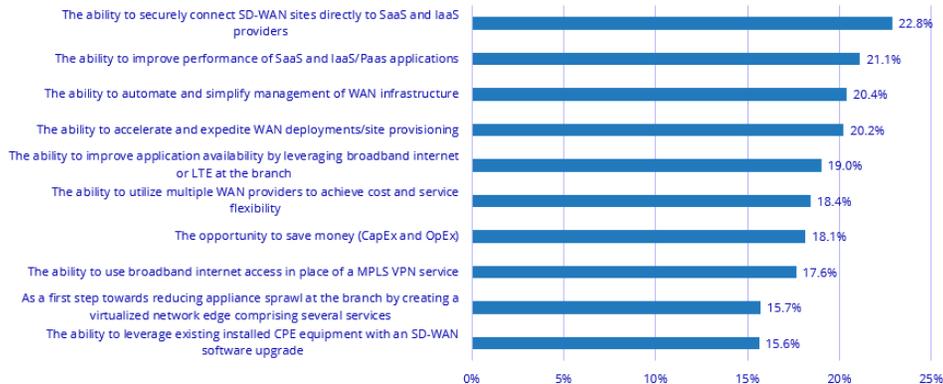| Challenge	%
Security requirements relating to web, cloud services and internet applications	33.3%
Complexity associated with interconnecting multiple transport types (MPLS, Ethernet, Internet, leased lines, DSL, 4G/LTE)	28.9%
Managing consistent user experience for on-premises enterprise apps and off-premises cloud applications (SaaS and IaaS)	27.6%
In-house management of enterprise WAN networks including hardware/software procurement, management and operations	27.3%
Management of connectivity at remote branch offices	27.3%
Cost-effectively delivering SaaS and other cloud services across the WAN	25.6%
Need for better analytics and visibility into applications and resources delivered by the network	24.5%
Controlling annual costs of providing additional bandwidth	24.0%
Appliance sprawl at the WAN edge	20.5%
Audit and compliance related to the network	20.0%
Time to provision a new service to a site	20.0%

n = 1,202

Source: IDC's *Software-Defined WAN Survey,* August 2018

Considering cloud usage is a key driver of WAN technology choice, and considering the top challenges faced by enterprises today, the WAN is demanding a new architecture. SD-WAN fills that void in the market. The top drivers of SD-WAN adoption are not very surprising. The IDC survey suggests that secure connectivity to cloud apps, the ability to improve performance of these cloud apps and the ability to automate and simplify management of WAN infrastructure are the top three drivers of SD-WAN adoption in the enterprise (see Figure 5).

FIGURE 5

Secure Cloud Connectivity, Performance of Cloud Apps, and Simplified WAN Management Are Top Drivers of SD-WAN Adoption

Q.   Which of the following are the top two use case criteria for adopting an SD-WAN technology solution?

Criteria	%
The ability to securely connect SD-WAN sites directly to SaaS and IaaS providers	22.8%
The ability to improve performance of SaaS and IaaS/Paas applications	21.1%
The ability to automate and simplify management of WAN infrastructure	20.4%
The ability to accelerate and expedite WAN deployments/site provisioning	20.2%
The ability to improve application availability by leveraging broadband internet or LTE at the branch	19.0%
The ability to utilize multiple WAN providers to achieve cost and service flexibility	18.4%
The opportunity to save money (CapEx and OpEx)	18.1%
The ability to use broadband internet access in place of a MPLS VPN service	17.6%
As a first step towards reducing appliance sprawl at the branch by creating a virtualized network edge comprising several services	15.7%
The ability to leverage existing installed CPE equipment with an SD-WAN software upgrade	15.6%

n = 1,202

Source: IDC's *Software-Defined WAN Survey,* August 2018

In this paper, we further explore these top drivers of SD-WAN and look at how enterprises have benefited from adopting SD-WAN.

SD-WAN: Key Value Drivers

SD-WAN at its core helps enterprises achieve dynamic alignment among business and IT strategy, application policy, and WAN configuration. In other words, it enables the WAN to provide the application experience (reliability, availability, performance), and application security demanded by business users, and the operational simplicity that IT and network admins yearn for in the current paradigm of rising IT complexity. We further explore these three key value drivers of SD-WAN adoption below:

■ **Seamless, secure cloud connectivity.** In the absence of SD-WAN, connecting users securely to public cloud apps is complex and expensive. In most cases, enterprises haul cloud traffic emanating from the branch back to a central internet security point in the corporate datacenter over expensive MPLS links. This also has an impact on app performance for apps that may be leveraging the MPLS links. In cases where the enterprise accesses cloud apps directly from the branch (leveraging IPSec firewalls), in the absence of SD-WAN, the security paradigm is not ideal either. All cloud-bound traffic from a branch is transported over the same IPSec tunnel with no isolation for traffic originating from different business units or traffic intended for different public cloud segments. Application-specific network policy is then applied at either of the two endpoints.

Early adopters of SD-WAN appear to have achieved a reasonable degree of control over these problems of providing seamless, secure connectivity to cloud apps at the branch. With integrated security features in SD-WAN like layer 4–7 firewalls, IPS, anti-malware, and URL filtering, direct internet access from the branch is a nonissue. More importantly, SD-WAN enables an enterprise to segment WAN traffic based on its origin or its destination. Typically, all enterprise apps are segmented into virtual private clouds (VPCs) and traffic into virtual networks (VNETs) to achieve the necessary isolation that the business units owning the apps demand. SD-WAN enables pervasive segmentation to be achieved on the WAN by isolating traffic into specific WAN segments and mapping these WAN segments onto the specific VPCs and VNETS. Application policy can now be applied to each WAN segment, thus achieving seamless, end-to-end secure cloud connectivity for all apps.

A key use case/benefit of SD-WAN that has come to the fore in early deployment is segmentation of enterprise assets that can now be pervasively enabled on the WAN. With SD-WAN, mission-critical traffic and assets can be partitioned and protected against vulnerabilities in other parts of the enterprise. This use case appears to be especially popular in verticals such as retail, healthcare, and financial (see Figure 6).

FIGURE 6

End-to-End Traffic Isolation Using SD-WAN Segmentation
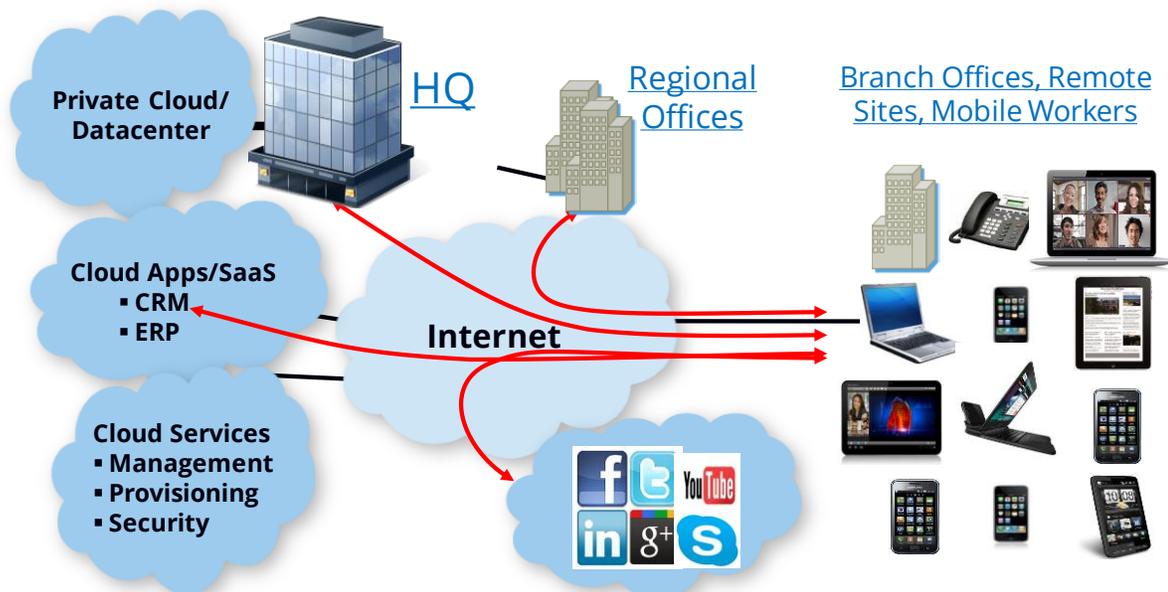
Source: IDC, 2018

While end-to-end application traffic isolation in the WAN is a key benefit of SD-WAN, the security benefits do not end there. SD-WAN can also protect application traffic from threats within the enterprise and from outside by leveraging a full stack of security solutions included in SD-WAN such as next-gen Firewalls, IPS, URL filtering, malware protection, and cloud security. This full stack of security solutions can enable policy-based layer 3-7 protection for all traffic on the WAN irrespective of destination – the cloud or the corporate datacenter. Application traffic emanating to the cloud straight from the branch can now be secured using a secure internet or cloud gateway. Users, applications, and their data at the branch edge can be protected by the stack of security solutions incorporated into the SD-WAN on-premises appliance, vCPE, or router, which typically includes next-gen firewall, intrusion protection, malware protection, and URL filtering.

◼ **Application experience.** SD-WAN enables the enterprise to identify and set up application-specific policies and SLA criteria around attributes such as latency, jitter, and loss. A key benefit of using SD-WAN is that it enables dynamic policy-based routing for all application traffic at the branch. Depending on policy defined at the SD-WAN controller and on conditions prevailing on the network links at a branch, application traffic is routed in real time over the most optimal path to deliver the attributes of bandwidth/latency performance, security, or availability for all branch application traffic. With SD-WAN, applications and their users can now be isolated from network brownouts and outages with app-aware policies. If a specific link carrying application traffic goes down, the traffic is automatically routed over another link to preserve the SLA. If a broadband link shows unacceptable packet loss, mission-critical application traffic is automatically routed over a more reliable broadband or MPLS link to ensure the application SLA is not compromised. User experience is thus maximized while ensuring the security posture is not compromised. This feature has helped optimize the performance of a significant number of third-party apps at the branch and hence improve the application experience of users of those apps.

- **Operational simplicity**. With SD-WAN in deployment, new WAN locations / sites and new WAN segments can be provisioned much faster and application policy can be applied to each site and segment. Not only can WAN sites and segments be provisioned faster but different WAN topologies can be created per segment. A specific WAN segment at a branch needs to connect to other branches — this topology can be specified in the application policy for the segment. If WAN traffic on a segment needs to be restricted from being routed to another branch, this can be specified in application policy and implemented at an enterprise level. Importantly, business partners can be provided secure access to specific business segments on the WAN and restricted from others.

  Moreover, SD-WAN solutions come with a fair degree of automation of routine tasks that significantly reduce the complexity inherent in Wide area network (WAN) management today. Policy management can be centrally orchestrated and managed at a granular level by user, by site and by specific applications. Network visibility afforded across all links can be used to proactively remediate problems before they assume troublesome proportions. Using a cloud-managed single management interface, thousands of locations can be managed as a single deployment, greatly simplifying the task of WAN management and allowing the organization to scale the network at significantly reduced operating costs.

Business Value of SD-WAN Deployment

The early SD-WAN value proposition and ROI has been largely centered around WAN operating-expense reduction by enabling an enterprise to substitute expensive MPLS with cheaper broadband connectivity options. However, more recent mature deployments of SD-WAN have unearthed significantly higher business value from the operational simplicity entailed in SD-WAN deployments, improved application experience, and the greater scalability and flexibility that SD-WAN has bestowed on the network. Specifically, IDC research suggests that enterprises who have deployed SD-WAN report the following:

- **Requiring less IT staff time to manage and secure WANs** through centralized software-defined automation and segmentation, helping further optimize the cost of running WANs

- **Providing higher-performing and more reliable** business applications, enabling higher employee productivity levels

- **Instilling business operations with greater scalability and flexibility,** helping address more business opportunities and thereby increase revenue

- **Increasing performance while lowering connectivity costs** by increasing bandwidth even as they reduce overall connectivity costs

Longer-term, IDC views the following as critical for sustaining SD-WAN's ROI and business value:

- **Pathway toward a software-defined branch.** In the longer term, IDC sees the SD-WAN as a first step toward a software-defined branch. In this vision, IDC views SD-WAN as a broader platform for several virtual network functions at the branch edge. This model involves the hosting of several network functions that today are deployed as individual appliances on a common hardware platform in a virtual CPE model. The model confers several benefits to the enterprise. While the short-term business benefit may be lower technology acquisition costs, the long-term business case rests on the advantages that accrue from the simplicity, flexibility, and agility that the virtual CPE model gives the enterprise or the service provider delivering the network service.

- **Use of machine learning (ML), artificial intelligence (AI), and intent-based networking systems (IBNS) for dynamic policy optimization.** SD-WAN in its current form does a great job of optimizing the WAN for a set of application-specific policies. The application policy is, however,

a snapshot in time, and it represents what is best for applications and users given current network conditions at that specific point in time. In IDC's view, a great opportunity exists for vendors and enterprises to optimize the network based on policy that is dynamic and changes with time. IDC believes the use of ML/AI techniques and associated IBNS philosophies offers the potential to make SD-WAN a driver of a self-learning, self-healing WAN that is also secure and path-optimized based on a dynamic application policy.

Considering Cisco

In 2017, Cisco acquired private SD-WAN start-up Viptela to enhance its enterprise routing and SD-WAN portfolio of solutions. From a solution architecture perspective, Viptela's SD-WAN solution applies the latest advances in software-defined networking to the emerging cloud-networked WAN context. The solution features a complete separation of the control plane and the data plane. The SD-WAN Controller vSmart provides security, route, and policy management to on-premises vEdge routers. Each controller instance supports up to 3,000 edge devices and can scale out for even larger deployments. The vManage component provides centralized configuration management and monitoring across the network. Both vSmart and vManage are cloud-delivered VMs operated as a service by Viptela.

More recently, Cisco announced that it has integrated the Viptela IP into the widely-deployed Cisco Enterprise Routing ISR platform. Since late 2017, the Viptela SD-WAN Controller vSmart was interoperable with all ISR edge routers including those deployed at production sites. More recently, Cisco has enabled the ISR routers with all key features of Viptela's vEdge routers including zero touch provisioning, encryption and other security functions. In the near-future Cisco intends to have only the ISR as the branch SD-WAN platform, eliminating the vEdge routing SKU from its price list.

Challenges

The SD-WAN market — given its attractiveness — is highly competitive. There is a lot of hype around technology promise and vendor capabilities, which is not healthy for the market in the short term. Vendors such as Cisco have their work cut out for them in terms of making themselves heard and ensuring that their capabilities are fully understood by enterprises in the market.

Conclusion

IDC believes that the SD-WAN market has passed the hype phase and entered a period where early implementations have begun to deliver tangible benefits. To the extent that Cisco can execute on evolving requirements in a dynamic marketplace and address the challenges described in this paper, the company has a significant opportunity for success as this market becomes mainstream over the next few years.

VOLOGY

For more information on IDC, visit www.idc.com. For more information on IDC Custom Solutions, visit http://www.idc.com/prodserv/custom_solutions/index.jsp.

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com