SD-WAN: Enabling the Enterprise to Overcome Barriers to Digital Transformation

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IN THIS WHITE PAPER

As businesses embrace digital transformation (DX), cloud and mobility are combining to rapidly shift the paradigm governing application and data traffic in the enterprise. With more applications being delivered from the cloud and more users demanding anytime, anywhere access to applications, the network delivering these applications and data must evolve. In distributed enterprises, such as those with multiple branches, multiple site types, and remote workers, the wide area network (WAN) is ripe for transformation.

This White Paper reviews the current state of enterprise WAN usage, key challenges businesses face today with their WAN, the impact of digital transformation initiatives on the WAN, and key benefits of using software-defined WAN (SD-WAN). The ideas presented in this White Paper draw on the findings of a March 2017 survey of more than 800 network management executives about WAN usage and attitudes. The survey was conducted by IDC and sponsored by Comcast Business.
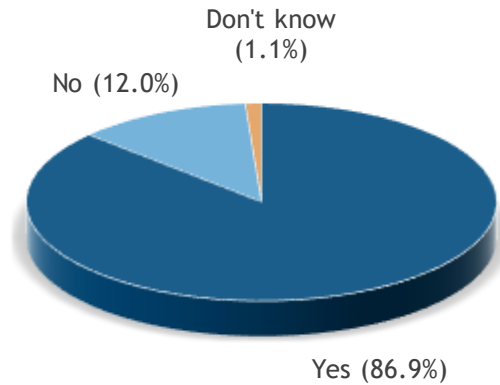
SITUATION OVERVIEW

Today's Enterprise Network: Usage and Attitudes

Traditionally MPLS and more recently Ethernet have provided the requisite connectivity between an enterprise's central office and its branch or satellite offices. MPLS offers the benefits of any-to-any routing, class of service (CoS), and performance guarantees backed by SLAs. However, MPLS is expensive and complex to configure and has installation lead times of 3-6 months. Over the past decade, businesses have sought out other forms of WAN connectivity besides MPLS to compensate for the aforementioned challenges. Our most recent survey of enterprise WAN usage and attitudes indicates that hybrid WANs are now ubiquitous across the modern enterprise, with nearly 87% of respondents reporting having two or more access technologies per business location (see Figure 1).

FIGURE 1

Ubiquity of Hybrid WANs Across the Modern Enterprise

Q.   *Does your organization maintain two or more access network technologies per site?*
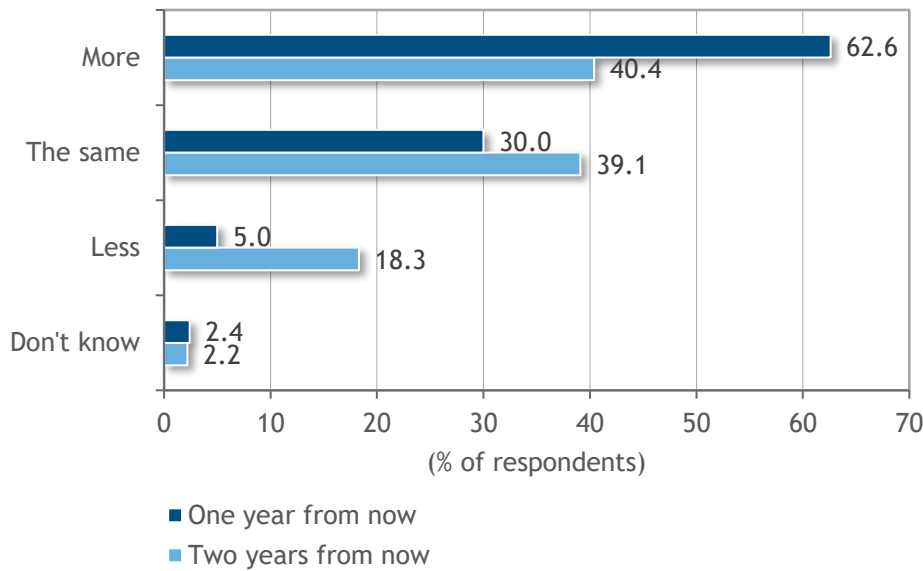

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Enterprises are seeking out multiple access technologies in the WAN because the appetite for bandwidth across a distributed enterprise appears insatiable, and traditional WAN-based connectivity options such as MPLS are not cost effective. Over 60% of respondents expect that their organizations will need more MPLS ports over the next year, while about a third of them expect it to remain the same (see Figure 2). It's interesting to note that, two years from now, the number of respondents who anticipate the need for more MPLS ports will drop to 40%. Enterprises appear likely to pay a higher bill for WAN connectivity unless they adopt alternative WAN connectivity options such as broadband internet. As a result of increased competition and significant cable investment, broadband has evolved over the years to become an enterprise-grade connectivity solution. The wide availability, improved reliability, and speed associated with today's broadband make it a very viable and cost-effective solution for distributed enterprises seeking a less expensive, more scalable alternative to MPLS.

FIGURE 2

Increasing Appetite for Bandwidth

Q. *You indicated your company uses MPLS IP VPN. One year from now, do you anticipate your company will have more MPLS ports, less MPLS ports, or the same amount? Two years from now?*

n = 339

Base = respondents who are using MPLS IP VPN to provide WAN connectivity
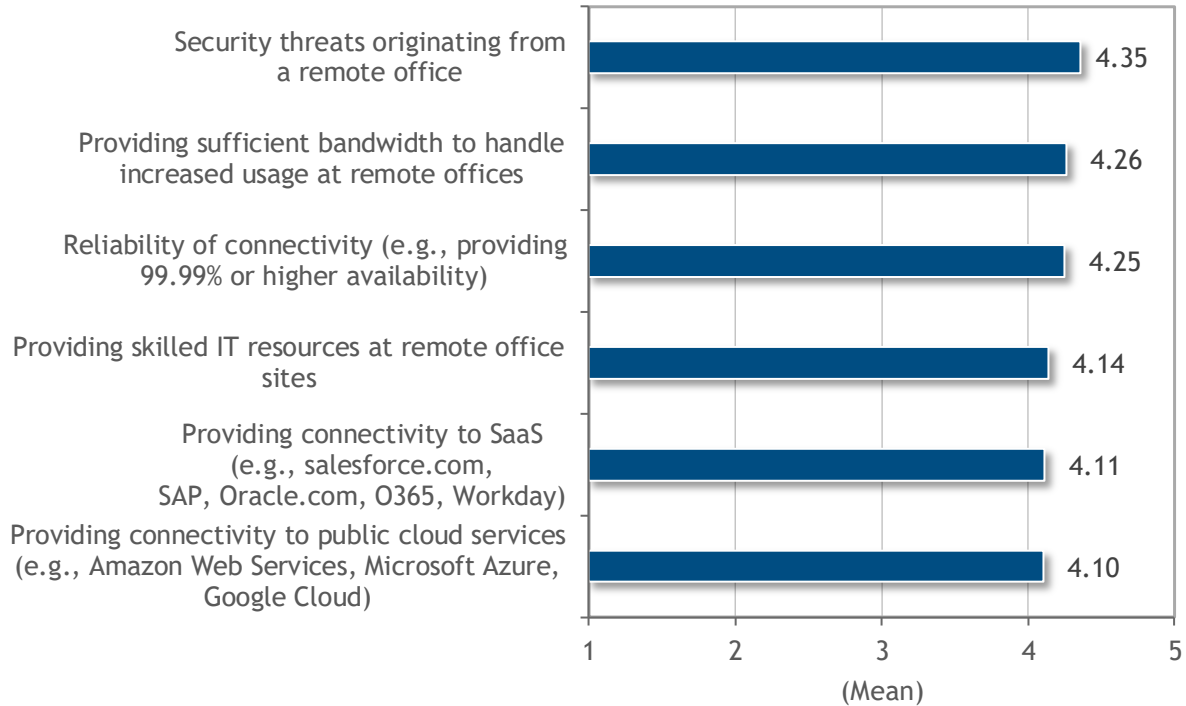
Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Figure 3 indicates that providing sufficient bandwidth at the remote office still ranks as the second-most-important objective for an organization's remote office connectivity strategy, behind security and just ahead of reliability. This brings into focus the significant trade-offs enterprise WAN managers must make. They are expected to support initiatives that require increased bandwidth at the remote office while keeping overall WAN costs under control. These objectives must be achieved without compromising on security and reliability of network connections that traditional options, such as MPLS, have effectively delivered in the past.

FIGURE 3

Objectives for an Organization's Remote Office Connectivity Strategy

Q.   How important is each of the following to your organization's branch or remote office connectivity strategy? (1 = not at all important and 5 = extremely important)

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study*, March 2017

The Digital Transformation Imperative for the Enterprise

IDC defines digital transformation as the process of creating value, growth, and competitive advantage through new digital offerings, business models, and business relationships. Enterprises across the world are embracing digitization of their business processes, enabling the capturing of more data across all functions. This data in turn is used to optimize operations and customer experiences. To keep up with evolving customer expectations, today's businesses are seeking new ways to become more customer centric — from their back-office systems to the front lines of sales and service.
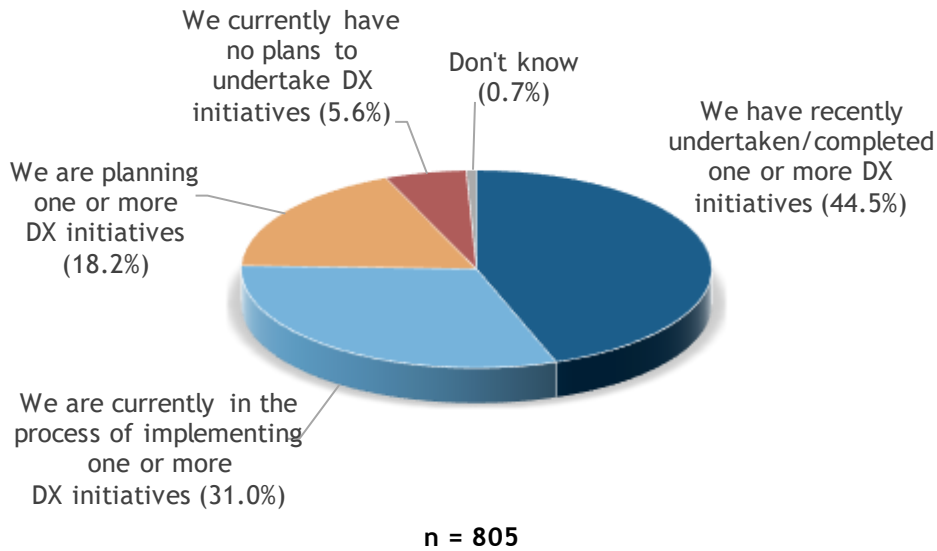
Enterprises across all geographies and vertical markets recognize that embracing DX leads to improved efficiency, new revenue streams, and better customer engagement and experience, and hence DX has become an urgent priority. It's no longer a secret that organizations that fail to embrace and execute on digital transformation risk dire consequences, including long-term business irrelevance. Enterprises in all sectors are applying "digital technologies (mobile apps, social networks, cloud services, big data and analytics, etc.) to achieve measurable benefits (e.g., cost reduction, revenue increase, service improvement) for their customers, employees, and partners." Indeed, 94%

of respondents indicate they have digital transformation initiatives under way or are planning DX initiatives (see Figure 4).

Plans of Digital Transformation Initiatives in the Enterprise

Q.   *Is your company currently planning or undertaking, or have you recently undertaken a digital transformation (DX) initiative?*
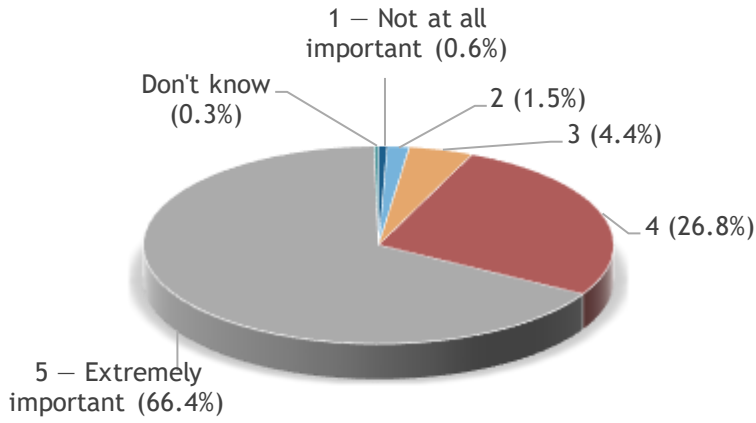

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Interestingly, over 93% of respondents believe that the enterprise WAN is either extremely important or important to meeting corporate objectives, with 66% of them saying it is extremely important (see Figure 5).

FIGURE 5

Importance of the WAN to DX Initiatives

Q.   *How important is the performance of your enterprise WAN to meeting your company's business objectives? (1 = not at all important and 5 = extremely important)*

1 — Not at all important (0.6%)
Don't know (0.3%)
2 (1.5%)
3 (4.4%)
4 (26.8%)
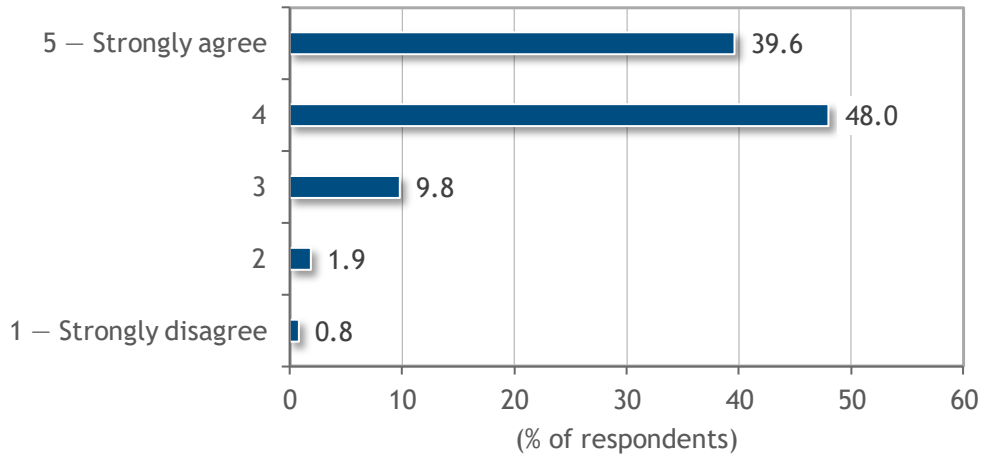5 — Extremely important (66.4%)

n = 802

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Considering that digital transformation initiatives will increase bandwidth usage on the enterprise WAN, it is not a surprise that a significant majority of enterprise WAN managers (88%) see the WAN as very important to their DX initiatives (see Figure 6).

FIGURE 6

DX to Drive Greater Bandwidth Usage in the WAN

Q.   *Our digital transformation initiatives will increase bandwidth usage on our enterprise WAN. State your level of agreement with the following statements.*

n = 780

Base = respondents who are completing or planning to complete one or more DX initiatives
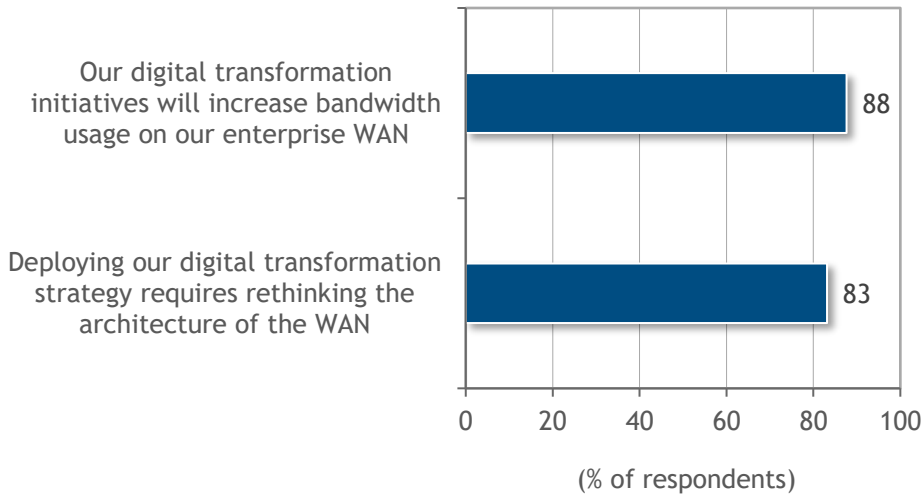
Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Considering the growing bandwidth needs of the WAN, cost considerations, and the need to maintain the security and reliability of connections, it is not a surprise that 83% of survey respondents believe that digital transformation deployment will require a re-architecture of the WAN (see Figure 7).

FIGURE 7

Requirement of WAN Transformation with DX Deployment

*Q. Deploying our digital transformation strategy requires rethinking the architecture of the WAN.
State your level of agreement with the following statements.*

(% of respondents)

n = 780

Base = respondents who are completing or planning to complete one or more DX initiatives

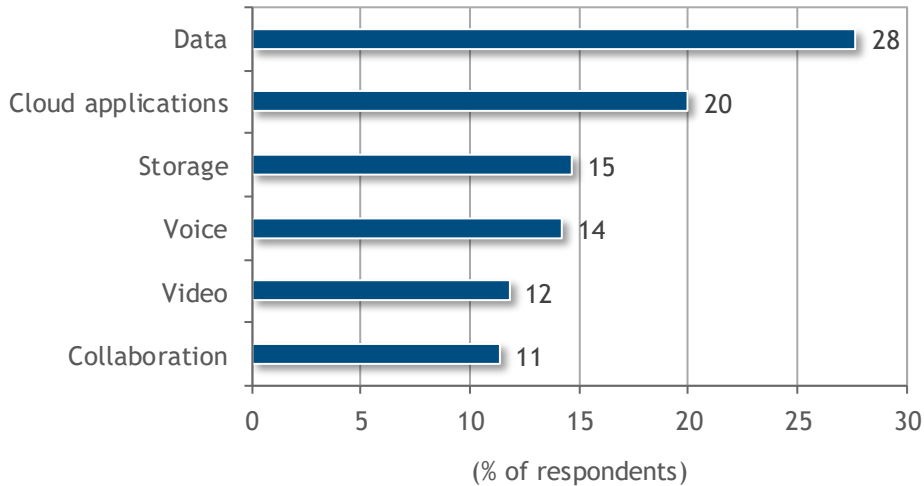Source: IDC's *SD-WAN and Advanced Data Networking Demand Study*, March 2017

Applications Are Shifting to the Cloud

Cloud computing is a key pillar at the forefront of the enterprise's drive toward DX. Cloud is often the starting point in the process of creating a digital business. Accessing applications and data from the cloud provides enterprises with the requisite flexibility, agility, and efficiency to enable digitization without the typical up-front capital investment. A digital initiative requires more computing horsepower — an enterprise can either rent more computing horsepower over the cloud or dial it down when not required. Hence increasingly applications are being delivered from the cloud in its various forms: SaaS, IaaS, or PaaS. IDC believes that the rising tide of DX business initiatives born from CEO-level priorities is driving a rapid rise in IT spending on big data and analytics, mobile, social, Internet of Things (IoT), and machine learning/artificial intelligence technologies to support those DX initiatives. At scale, virtually none of these technologies are possible without cloud as the foundation. Indeed, survey respondents indicate that cloud application traffic is one of the top 2 categories of traffic across the WAN (see Figure 8).

FIGURE 8

WAN Traffic Growth by Category

Q.   What percentage of traffic across your WAN fits into each of the following categories? (mean)

n = 805

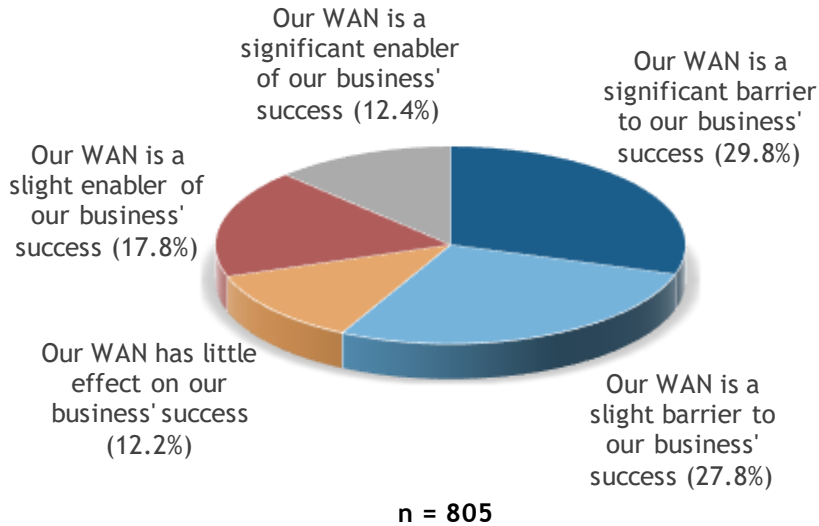Source: IDC's *SD-WAN and Advanced Data Networking Demand Study*, March 2017

As enterprise applications continue to migrate to the cloud and as users become more mobile, bringing more devices onto the network, the WAN serving distributed enterprises needs to evolve to support these heightened application requirements. The WAN needs to address new application-specific requirements such as performance, security, reliability, and availability for the new generation of mobile cloud apps, which are designed to provide more real-time insights and actionable decisions as expected in a digitally driven enterprise. Digital transformation of business processes and increased reliance upon cloud computing also imply that there will be more network traffic across all parts of the enterprise network, including the WAN.

It is increasingly critical that existing WAN architectures evolve to serve the emerging application access requirements. The challenge for the enterprise and their carrier partners is to deliver the higher quantum of network traffic while satisfying application policy requirements without significantly increasing the cost of operating the network. The future of the digital enterprise rests on addressing this challenge effectively in the near future. This alignment however is not evident in most enterprise environments, with 57% of survey respondents viewing the WAN as a barrier to success today versus a minority 30% of respondents who see it as an enabler (see Figure 9).

FIGURE 9

WAN as a Barrier or Enabler of Corporate Success

Q.   To what degree is your enterprise WAN/network currently a barrier or enabler to the success of your business?

Our WAN is a significant enabler of our business' success (12.4%)

Our WAN is a slight enabler of our business' success (17.8%)

Our WAN is a significant barrier to our business' success (29.8%)

Our WAN has little effect on our business' success (12.2%)

Our WAN is a slight barrier to our business' success (27.8%)

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study*, March 2017
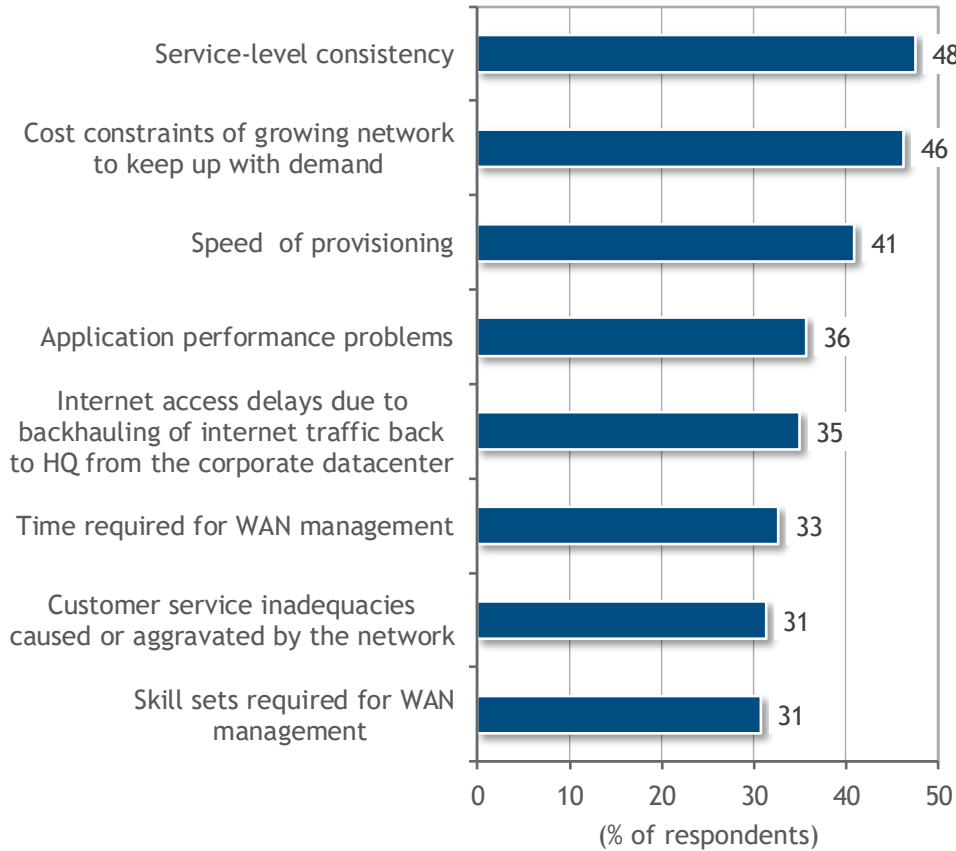
Today's WAN is not seen as an enabler of business success. In fact, more than 56% of respondents saw their WAN as a barrier to their business goals. The top 3 pain points detracting the enterprise WAN from corporate success are (see Figure 10):

- Service-level consistency
- Cost constraints of growing network to keep up with demand
- Speed of provisioning

FIGURE 10

Top Pain Points with the Enterprise WAN

Q.   What are the top 3 pain points associated with your organization's enterprise WAN today?

n = 339

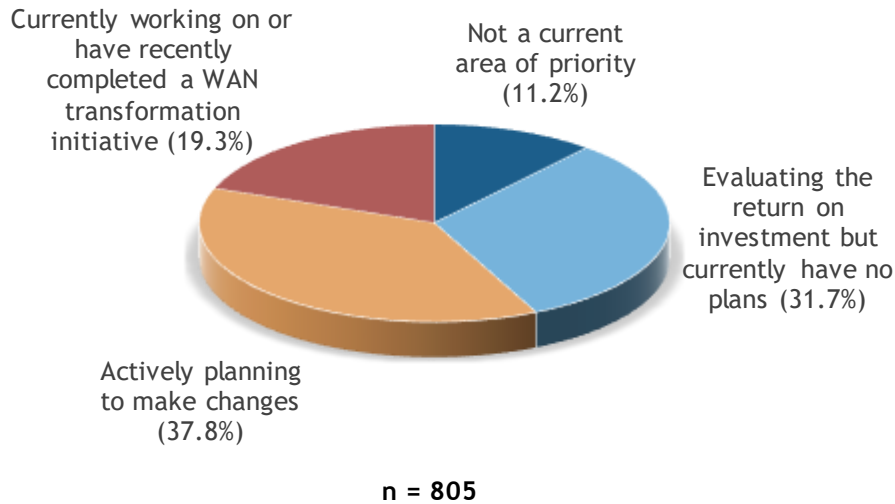Base = respondents who are using MPLS IP VPN to provide WAN connectivity

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Considering the growing gap between the growing needs of the enterprise WAN and its current state, it's not surprising that nearly 57% of organizations have active WAN transformation initiatives under way, with 32% of them conducting ROI studies on WAN transformation (see Figure 11).

FIGURE 11

WAN Transformation Activity in the Enterprise

Q.   Which of the following best describes your organization's current stance toward transforming or improving your current enterprise WAN?

Currently working on or have recently completed a WAN transformation initiative (19.3%)

Not a current area of priority (11.2%)

Evaluating the return on investment but currently have no plans (31.7%)

Actively planning to make changes (37.8%)

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

THE SOLUTION: SD-WAN

What Is SD-WAN?

SD-WAN has emerged as a solution to address this paradigm shift in application and WAN traffic and to rationalize network traffic costs. SD-WAN and the associated concept of hybrid WAN make the challenges of digital transformation manageable on the enterprise network. As per IDC's definition, a hybrid WAN includes at least two WAN connections from each branch office and leverages two or more different network connectivity options (MPLS, broadband internet, 3G/4G, etc.).

SD-WAN enables a hybrid WAN in an active/active configuration and also includes:

- A centralized application-based policy controller
- Analytics for application and network visibility
- A secure software overlay that abstracts underlying networks
- An SD-WAN forwarder (routing capability)

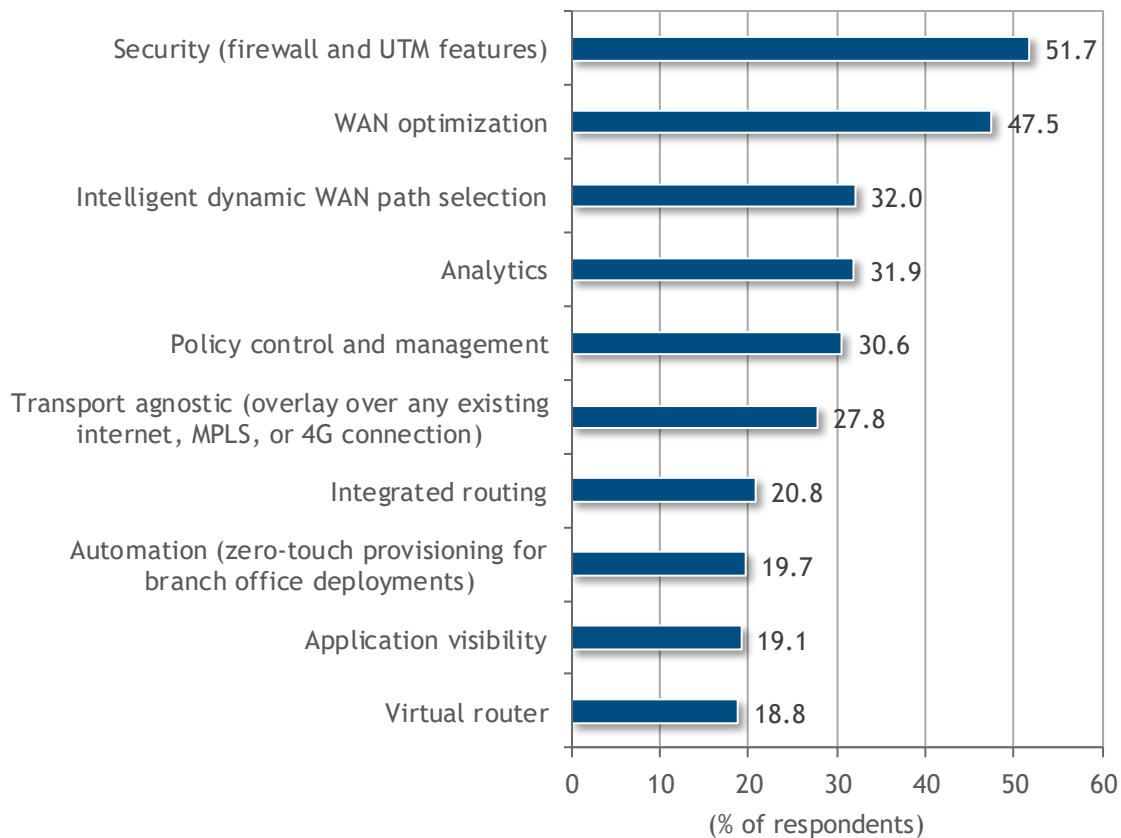SD-WAN solutions promise the enablement of new technical capabilities:

- Application-defined intelligent path selection across WAN links (MPLS, broadband internet, LTE, etc.) based on policies defined on the SD-WAN controller
- Flexible and agile policy definition across all dimensions (security, performance, CoS, reliability, availability) for all apps
- Dynamic application policy and traffic management leveraging the central controller

In our survey, security and WAN optimization rank as top 2 features desired in SD-WAN solutions (see Figure 12).

FIGURE 12

Top Features Desired in an SD-WAN Solution

Q.   Which of the following SD-WAN components would you consider the most important for selecting an SD-WAN solution today?

n = 720

Base = respondents who are implementing or planning to implement SD-WAN within the next two years

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017

Key Business Benefits of a Generic SD-WAN Solution

SD-WAN essentially helps an enterprise achieve dynamic alignment between business strategy, application policy, and its wide area network configuration. The key benefits of this alignment across business, application, and network policy are:
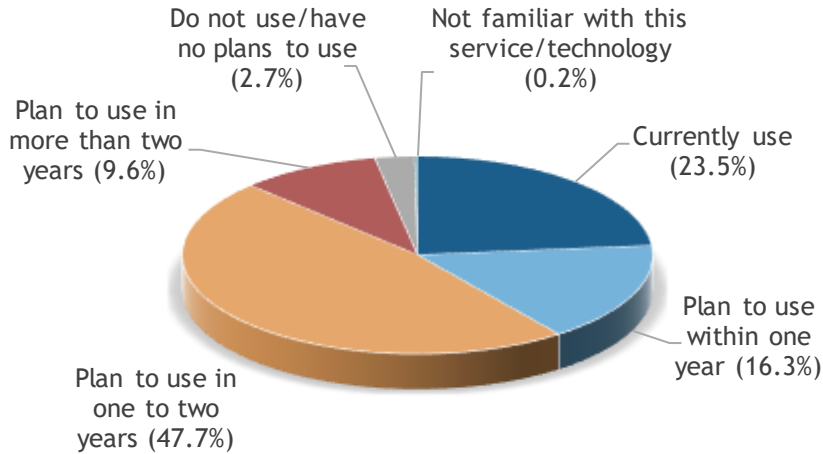
- **Optimization of modern application delivery costs in the face of future application traffic profile change and growth.** As more applications move to the cloud, WAN traffic flows can, for instance, be redefined to reduce backhaul of cloud-destined application traffic to headquarters from the branch, thus reducing WAN bandwidth capacity requirements. Similarly, non-mission-critical application traffic flows can be routed over more cost-effective broadband internet straight to the cloud via application-defined intelligent path selection across all WAN links.

- **Greater flexibility and efficiency of network transport via a cost-effective alignment of network connectivity options and bandwidth with application criticality.** Enterprises have the flexibility of choosing the right WAN link for each application and thus dynamically adding or changing bandwidth available for each application. Similarly, depending on application-specific policy defined on the central SD-WAN controller, application flows can be routed over the most cost-effective connectivity option while ensuring that application-specific performance (latency, jitter) requirements are met.

- **Improved branch IT agility and efficiency through automated and agile service provisioning and reduced complexity.** Centralized provisioning of WAN connectivity options per application per site ensures centralized automation and optimization across all traffic flows across WAN links and reduces the dependence on local IT resources at the branch to ensure a good application experience to users across a distributed enterprise. The central provisioning also reduces the complexity of management of network equipment and functions at branch locations.

- **Secure data traffic for all applications, especially those hosted in the cloud.** While traditional WAN connectivity options such as MPLS VPN guarantee reliability and security of data traffic, routing the application flows over more cost-effective connectivity options such as broadband internet or LTE does not offer the same assurance. SD-WAN solutions with integrated security features such as IPSec encryption, stateful firewalls, or unified threat management (UTM) capabilities enhance data security for applications connecting directly to the cloud.

- **Superior customer engagement (app reliability, availability, performance, security, etc.).** If SD-WAN is about enabling the cost-effective delivery of cloud applications to users in the pursuit of mission-critical DX initiatives, it is important that the technology drives superior customer engagement. By enhancing cloud application reliability, availability, performance, and security, SD-WAN enables an improved application user experience and hence drives superior customer engagement for the enterprise.

Considering the benefits of a generic SD-WAN solution in the light of the inadequacies of a typical enterprise WAN today, it's not surprising that 87% of survey respondents either use or plan to use SD-WAN in the next two years (see Figure 13).

FIGURE 13

Intent to Adopt SD-WAN

Q.   Is your organization implementing or planning to implement SD-WAN into your network?

n = 805

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study,* March 2017
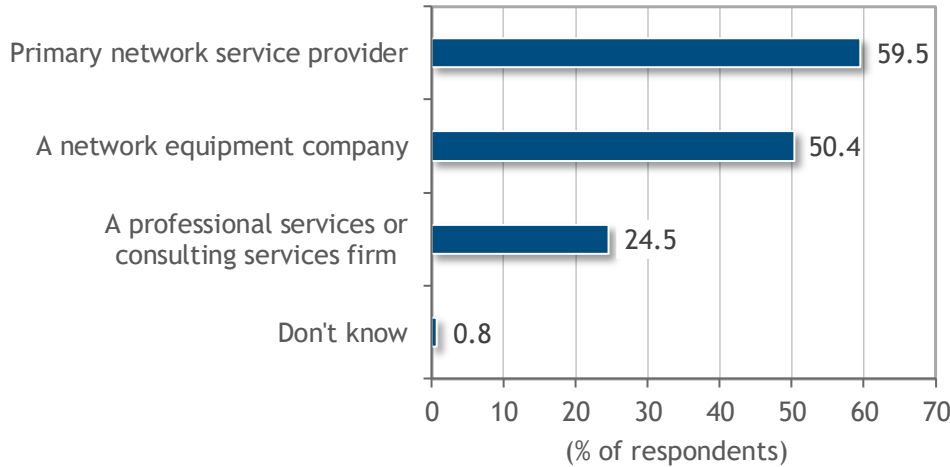
Nearly 60% of survey respondents indicate that they will work with a primary network service provider such as a communication or managed service provider to implement an SD-WAN solution (see Figure 14). IDC sees this as a significant market development. As distributed enterprises have adopted hybrid WANs and become more comfortable using high-speed broadband for WAN connectivity, they appear to be relying more on service providers for management and optimization of their hybrid WANs. By adding SD-WAN to an existing network environment, businesses can combine new software-defined networking capabilities with high-speed broadband connections across an organization to achieve a new level of network, application, and business performance.

A key reason for this development is that because of smart investments over the years, mainly by cable service providers, broadband internet has evolved into an enterprise-grade solution with acceptable levels of speed and reliability. Broadband internet is easier and faster to provision and modify services than MPLS and can support the bandwidth requirements of more apps across a distributed enterprise. Couple this with the obvious benefits of outsourcing network services in terms of opex and capex savings and the scarcity of technical talent in the enterprise, it is no surprise that most enterprise networking leaders feel inclined to partner with a network or a managed service provider for SD-WAN.

FIGURE 14

Planned SD-WAN Implementation Method

Q.   How do you intend to implement SD-WAN?

n = 720

Base = respondents who are implementing or planning to implement SD-WAN within the next two years

Source: IDC's *SD-WAN and Advanced Data Networking Demand Study*, March 2017

CONCLUSIONS

DX with its promise of improved efficiency, new revenue streams, and better customer engagement and experience has become an urgent imperative for the modern, digitally driven enterprise. DX at its heart is about building a more customer-centric model that is designed to dynamically address evolving customer expectations and thus drive superior customer engagement, revenue, and profitability outcomes.

Cloud computing is a key pillar at the forefront of the enterprise's drive toward DX. Cloud is often the starting point in the process of creating a digital business, and cloud traffic is today a key driver of WAN traffic. As most enterprises (92% of respondents in our survey) undergo or plan DX initiatives, the WAN stands out as a key barrier to digital transformation.

The reasons are obvious. DX and cloud initiatives are rapidly increasing the demand for bandwidth across the WAN. Provisioning more legacy bandwidth in the form of MPLS ports is not a practical, sustainable answer considering the significant costs, complexity, and provisioning time required. Not surprisingly, enterprises have been turning to nontraditional WAN connectivity alternatives such as broadband internet, and today, the clear majority of enterprises operate their WANs in a hybrid configuration. Broadband access technologies, through mainly the efforts and investments of cable providers, have evolved into a high-performance, ubiquitous, and reliable enterprise-grade connectivity option, making enterprises even more likely to consider broadband as a cost-effective connectivity option in a hybrid WAN configuration.

Growth of cloud traffic also offers opportunities to rationalize traffic flows across the WAN via a cost-effective alignment of network connectivity options and bandwidth with application criticality. It is clear from our survey that the WAN needs a redesign not only to address the pain points in terms of network operations costs, speed of provisioning, and application performance consistency but also to leverage the opportunities created by growth of cloud traffic.

In response to the dramatic move of application traffic to the cloud, and the opportunities created by the evolution of broadband internet as an enterprise-grade WAN connectivity option, SD-WAN has emerged as a promising solution to drive WAN efficiency and improved application policy optimization – spanning performance, security, availability, and reliability. SD-WAN with its dynamic application policy-based routing capabilities allows enterprises to drive a more efficient site-specific outcome for the WAN while effectively addressing the requirements of both cloud and mission-critical applications. Nearly 90% of enterprises surveyed in our study either have WAN transformation initiatives under way or are planning to implement WAN. Considering the benefits of a generic SD-WAN solution in the light of the inadequacies of a typical enterprise WAN today, it is again not surprising that 87% of survey respondents are either using SD-WAN or plan to use it over the next two years.

60% of enterprises surveyed plan to use a primary network service provider to implement the SD-WAN solution. As distributed enterprises adopt hybrid WANs and become comfortable with using high-speed broadband for WAN connectivity, they appear more inclined to extend the relationship with the service provider to the management and optimization of the hybrid WAN. A key reason for this development is that broadband internet has evolved into an enterprise-grade solution with acceptable levels of speed and reliability. It is easier and faster to set up than MPLS and can support the bandwidth requirements of rapidly growing cloud-delivered apps in the enterprise. Couple this with the obvious benefits of outsourcing network services in terms of opex and capex savings and the scarcity of technical talent in the enterprise, it is no surprise that most enterprise networking leaders feel inclined to partner with a network or a managed service provider for SD-WAN.

Methodology

To understand enterprise demand for SD-WAN and advanced data networking, IDC conducted research with IT/telecom professionals who have strategic insight/knowledge of their enterprise WAN. A total of 805 U.S. midsize and large companies (with 250+ employees) and at least 10 locations were surveyed. Respondents came from organizations that represent a mix of industries, with an emphasis on healthcare, retail, and banking.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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