The Truth about SD-WAN and the Business Transformation Journey

Introduction

It seems as if every organization, large and small, regardless of industry, is in the midst of a digital transformation. And with a migration to the cloud playing a central role in many of these transformations, it's a good time to take a tactical pause and reflect on some key questions businesses should be asking:

Which critical applications should live on-premises or in the cloud?

Which technologies and processes can help us on the path to digital transformation?

Will moving our applications and workloads to the cloud optimize the overall user experience while increasing productivity?

How can we journey to a modernized operations model while maintaining or even strengthening security?

Are the investments we're making in our infrastructure today helping or hindering agile IT?

With these questions in mind, companies need to stay focused on their data, applications, and the delivery of services more than ever. A less critical consideration is where the applications live, as long as they are provided the optimal operating environment and deliver an improved user experience.

One way organizations are doing this is by moving away from traditional Wide Area Networks (WAN) that are rooted in providing access to centralized data centers, to a modern solution that focuses on the application: Software-Defined Wide Area Networks (SD-WAN). These are cloud-based network technologies designed to provide increased bandwidth at lower costs, enhanced security, and other benefits.

The shift to SD-WAN runs tandem with the widespread adoption of cloud and hybrid cloud models. Indeed, the cloud is viewed as a critical element of digital transformation and working with multiple cloud services from different providers has become the new normal for many established enterprises. There is a fundamental search in play: What will offer the business the most agility and efficiency? From another perspective, what new technologies or platforms might be instrumental in achieving key objectives? For those companies that are just starting to do business, having their critical business applications built in and around the cloud seems like the natural way to go.

Organizations are finding that in the cloud era, it's a much better approach to move to SD-WAN, which has emerged as the most effective way to securely connect all users and devices within a multicloud environment to a single fabric. The move to SD-WAN also represents a major shift in network strategy for companies. For years, organizations have been relying on traditional WAN to connect users within particular geographical areas. But for a variety of reasons, this approach may present a number of challenges for digital businesses.

This whitepaper examines the limitations of traditional WAN and describes how and why SD-WAN presents a more viable option for connecting users and devices in today's increasingly complex business environment.

Traditional WAN vs. SD-WAN

Learn how traditional WAN measures up to SD-WAN and how they each fare in terms of supporting cloud-based applications, adjusting for capacity needs, and meeting modern user expectations.

Watch the video

Big migration to the cloud

There's no question that organizations today rely on online connectivity more than ever. They're moving all kinds of business applications to the cloud, and using Software as a Service (SaaS) offerings such as Microsoft® Office 365® and Salesforce® customer relationship management. A good portion of today's IT infrastructure is also moving to the public cloud, as enterprises look to reduce capital expenditures and increase agility. With data volumes growing at steady rates, the cloud offers the ability to flexibly scale according to business requirements.

An April 2019 report by research firm Gartner Inc. forecasts that the worldwide public cloud services market will grow 17.5% in 2019 to total $214.3 billion, up from $182.4 billion in 2018. Gartner said it knows of no vendor or service provider today whose business model offerings and revenue growth are not influenced by the increasing adoption of cloud-first strategies in organizations.[1]

Through 2022, Gartner projects the market size and growth of the cloud services industry at nearly

3x
the growth of **overall IT services.**[1]

Recent Gartner surveys show that **more than a third** of organizations see cloud investments as a

top three
investing priority.[1]

By the end of 2019, the firm expects that more than **30%** of technology providers' new software investments will shift from **cloud-first to cloud-only.**[1]

In many cases, users at organizations need access to multiple clouds in order to find and use all of the applications they need to do their jobs. Businesses need to connect not just the main headquarters, branch and home offices, and other remote facilities, but also mobile devices.

In addition to users, devices and things need access to each other and corporate systems. This becomes all the more important with the emergence of the Internet of Things (IoT). A recent report from 451 Research shows that the number of IoT connected devices (excluding PCs, smart TVs, and game consoles) will be about 8 billion in 2019; it will reach nearly 14 billion in 2024, for a Compound Annual Growth Rate (CAGR) of 12%.[2] This has considerable implications for data center infrastructure and services, storage, server, security, networking, and other areas across the IT landscape, as more data is processed at these endpoints.

Drawbacks of traditional WAN

The need for such a high level of connectivity presents significant challenges for traditional WAN technology. Among the issues IT leadership needs to deal with are network latency, a lack of agility to deploy services, and high costs.

For example, backhauling traffic through the main campus for branch and remote offices introduces latency. This can slow down access to systems and cause applications to perform poorly, which in turn can lead to issues such as decreased employee productivity and poor user experience.

The lack of agility hinders the IT department from rolling out new services to users quickly. Given today's need to be fast to market for virtually everything, this can create competitive challenges for organizations. Users and customers want and expect new services to be rolled out quickly.

In terms of costs, circuits are expensive and having those circuits redundantly out at branch offices is an added cost for enterprises. In a traditional WAN infrastructure, traffic is backhauled through the main campus over costly Multiprotocol Label Switching (MPLS) links. MPLS can be three times the price of broadband internet, and circuit provisioning can take up to six months depending upon the location and carrier. WAN overage fees are not uncommon due to the circuits' inability to support the bandwidth needs of newer applications. Cloud-based applications introduce additional bandwidth concerns, with growing amounts of cloud data needing to traverse the network.

Other concerns with traditional WAN infrastructure involve complexity, inefficiency, and security:

- A lack of centralized management
- No visibility and control of who or what is consuming bandwidth on the WAN
- Time-consuming troubleshooting with each WAN site in its own silo
- Manual configuration of the WAN device at each remote location when policy changes are required
- A lack of secure and reliable WAN transport other than MPLS, and even with MPLS there's no inherent data plane encryption

Furthermore, on-premises security solutions lack advanced threat detection, which is usually updated daily with cloud-based security platforms. There's also no ability to segment traffic based on critical or sensitive applications, including traffic that falls under the domain of regulations such as the Payment Card Industry Data Security Standard (PCI DSS) and the Health Insurance Portability and Accountability Act (HIPAA).

New traditional WAN services at the branch often require manual installation of extra hardware, which leads to a complex stack of appliances that take up space, consume additional power and cooling resources, and require specific skill sets to manage each individual platform.

Lastly, traditional WAN has slower failover times because, when a failure occurs on a WAN link, the routing protocol takes several seconds to converge, resulting in a poor end-user experience. Legacy WAN isn't application-aware and doesn't consider the performance needs of critical applications versus best-effort traffic.

Global Construction Firm Scales with SD-WAN

Tired of struggling with disjointed and aging network systems, this company is building a new future for themselves with SD-WAN and managed network services.

Read the case study

SD-WAN — The modern networking approach

As cloud initiatives continue to crop up at many organizations, CIOs and other IT executives are under pressure to re-evaluate their WAN requirements. The adoption of cloud services, growing volumes of cloud data, and use of virtualization across traditional WAN architectures has led to performance bottlenecks, which impair user productivity when connecting to cloud applications from branch or remote office locations.

More traffic, more users, more devices, more data, and a greater level of complexity now exists with and on corporate networks. With so much more traffic on the network, organizations are more likely to lose visibility of exactly who or what is on the network. This presents huge security risks. The surface area for attack is growing significantly and with so many new devices becoming connected via IoT, there'll be even more potential attack points. IoT, as a model, also generates more data that needs to be accounted for.

SD-WAN is an excellent network solution for this ever-more-complex environment. This technology simplifies the management and operation of a WAN by decoupling the networking hardware from its control mechanism.

Thinking of deploying SD-WAN? Here's what you need to know.

Get expert guidance on starting your journey to SD-WAN.

Watch the video

A key use of SD-WAN is to enable organizations to create higher-performance wide area networks using lower-cost internet access. This allows them to partially or completely replace more costly private WAN technologies such as MPLS.

SD-WAN is designed to address the shortcomings of traditional WAN technologies.

By enhancing or replacing legacy branch routers with virtualization appliances that can control application-level policies and provide a network overlay, less costly internet links can act more like a dedicated circuit. This makes it easier to set up connections for branch office and other remote personnel.

SD-WAN solutions can be physical or virtual appliances and can be installed in small remote and branch offices, large headquarter facilities, or data centers. They're also available via cloud platforms.

With SD-WAN, a centralized controller is used to set policies such as bandwidth priority and restrictions. The technology takes into account the policies and the availability of network bandwidth to route traffic, which helps ensure that application performance meets service level agreements.

Policies can be configured once from a central location and then pushed out to a multitude of devices. With an SD-WAN fabric, companies can connect campuses, branch offices, mobile users, devices, and objects connected via IoT.

Strong security is among the biggest benefits of SD-WAN, which can provide secure communications over any transport. Via a Virtual Private Network (VPN) overlay, data plane traffic is encrypted and multitenancy options are available to segment sensitive traffic. Cloud security features can operate on a much larger scale than a typical on-premises WAN.

WAN market developments reflect a big transformation underway, with Software-Defined Networks (SDN) shifting from the data center to the WAN. Research firm IDC says the SD-WAN market will grow at a 30.8% CAGR through 2023 to reach $5.25 billion.[3] The market will likely continue to grow as managing networks becomes even more complex, more applications move to the cloud, more data is created, mobile device usage expands, and IoT devices proliferate.

SD-WAN will be a key component of digital transformation, which encompasses the move to the cloud, the rise of mobility, the emergence of IoT, and the growth of big data analytics; SD-WAN is capable of connecting all of these facets together, so choosing the right SD-WAN solution is paramount.

Why consider Cisco SD-WAN

The Cisco® SD-WAN solution is an enterprise-grade WAN architecture overlay that enables digital and cloud transformation for enterprises. It fully integrates routing, security, centralized policy, and orchestration into large-scale networks.

Cisco SD-WAN is highly automated, secure, scalable, and application-aware with rich analytics. Cisco SD-WAN addresses the problems and challenges of common WAN architectures and provides the flexible deployment models needed to meet the vast compliance regulations found across all verticals.

Cisco SD-WAN offers:

- Centralized management and policy management, as well as operational simplicity, resulting in reduced change control and deployment times.
- A mix of MPLS and low-cost broadband or any combination of transports in an active/active fashion, optimizing capacity and reducing bandwidth costs.
- A transport-independent overlay that extends to the data center, branch, or cloud.
- Deployment flexibility: Due to the separation of the control plane and data plane, controllers can be deployed on-premises or in the cloud, or a combination of either. Cisco vEdge router deployment can be physical or virtual and can be deployed anywhere in the network.
- Robust and comprehensive security, which includes strong encryption of data, end-to-end network segmentation, router and controller certificate identity with a zero-trust security model, control plane protection, application firewall, and insertion of Cisco Umbrella™, firewalls, and other network services.
- Seamless connectivity to the public cloud and movement of the WAN edge to the branch.
- Application visibility, and recognition and application-aware policies, with real-time Service Level Agreement (SLA) enforcement.
- Dynamic optimization of SaaS applications, resulting in improved application performance for users.
- Rich analytics with visibility into applications and infrastructure, which enables rapid troubleshooting and assists in forecasting and analysis for effective resource planning.[4]
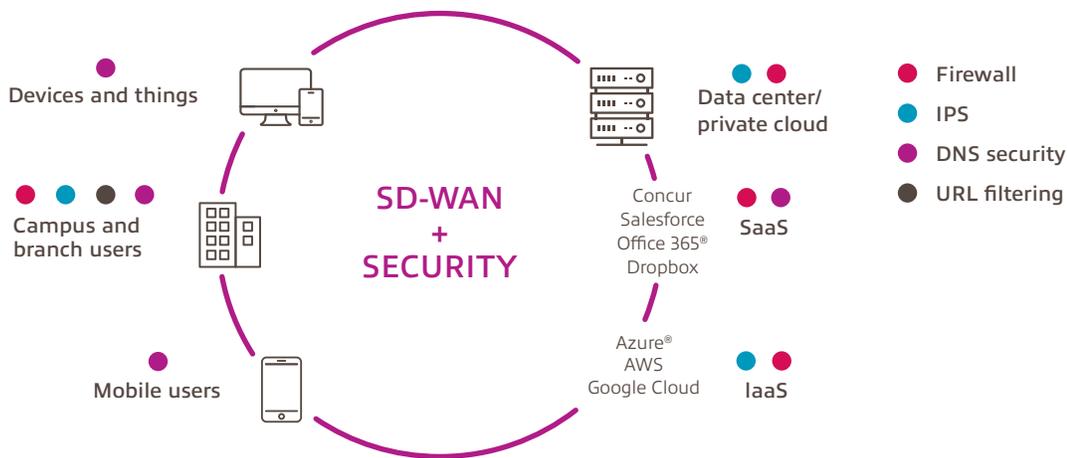
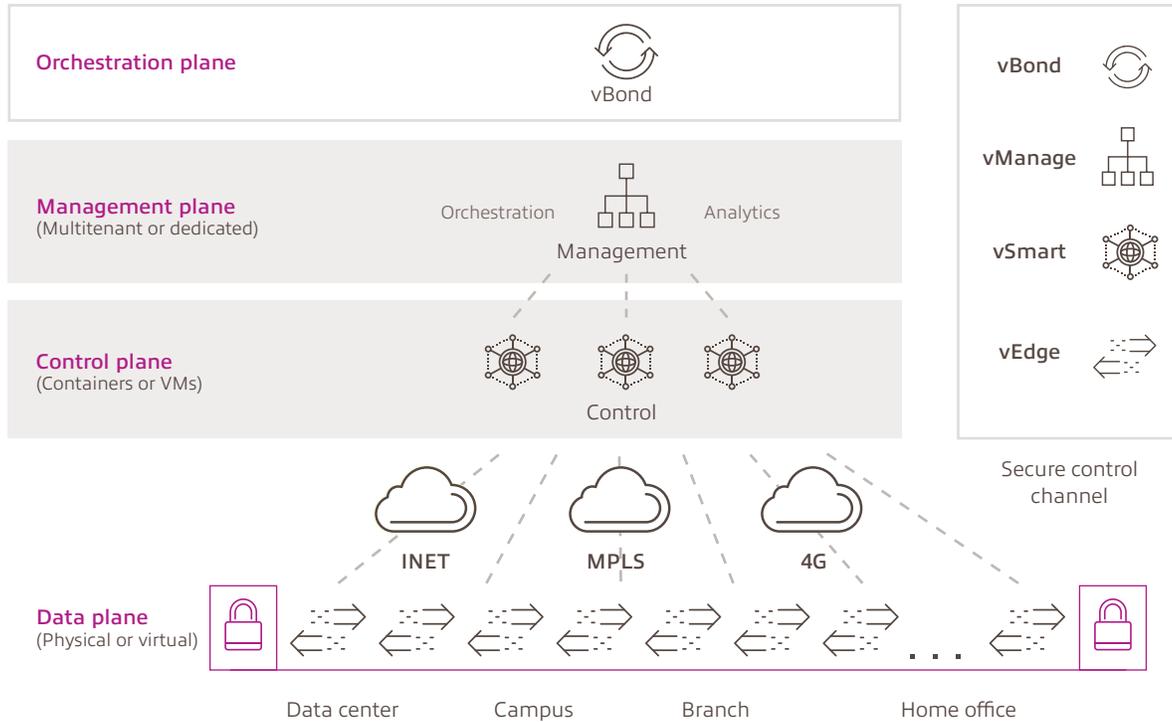Source: Cisco. (October 2018). CVD — SD-WAN Design Guide.

How does Cisco SD-WAN work?

Through the Cisco SD-WAN vManage console, you can quickly establish an SD-WAN overlay fabric to connect data centers, branches, campuses, colocation facilities, and clouds to improve network speed, security, and efficiency. After setting your preferred templates and policies, Cisco SD-WAN identifies connectivity and contextual issues to determine optimal paths for users to get to their destination, regardless of the connectivity they're using.

Whether hosted in the cloud or on-premises, Cisco vBond and vSmart orchestration and controller platforms authenticate and provision network infrastructure, making certain that the devices connecting to your SD-WAN are authorized. Once connected, the SD-WAN platforms find the best path to bring users closer to the applications they need, managing overlay routing efficiency, adjusting in real time to reflect policy updates, and handling key exchanges in Cisco's full-mesh, encrypted delivery.
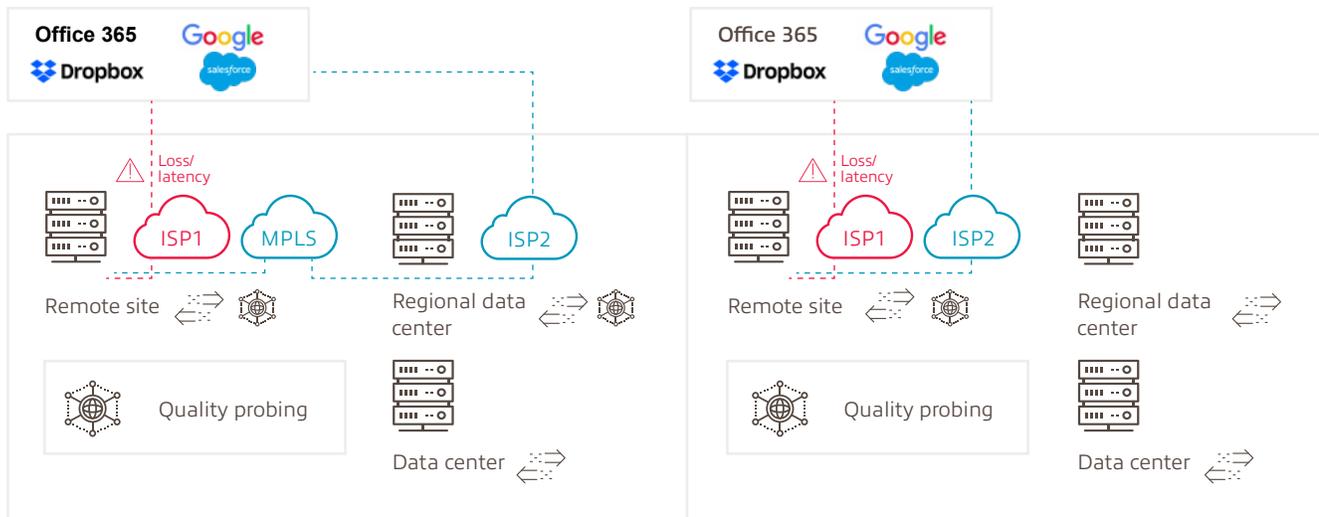
Cisco SD-WAN supports third-party API integration, allowing for even greater simplicity, customization, and automation in day-to-day operations. In addition, Cisco SD-WAN includes the common routing protocols that are critical for all enterprise SD-WAN deployments, such as Border Gateway Protocol (BGP), Open Shortest Path First (OSPF), Virtual Router Redundancy Protocol (VRRP), and IPv6.

The Cisco SD-WAN fabric

Orchestration plane	vBond	
Management plane (Multitenant or dedicated)	Orchestration	Analytics
	Management	
Control plane (Containers or VMs)	Control	
Data plane (Physical or virtual)	INET MPLS 4G	

vBond
vManage
vSmart
vEdge

Secure control channel

Data center   Campus   Branch   Home office

Source: Cisco. (November 2018). Cisco SD-WAN Solution Overview. Doc #US43881619.

Cisco's cloud-first architecture

Office 365 Google Dropbox salesforce

Loss/ latency
ISP1 MPLS ISP2
Remote site
Regional data center
Quality probing
Data center

Office 365 Google Dropbox salesforce

Loss/ latency
ISP1 ISP2
Remote site
Regional data center
Quality probing
Data center

Source: Cisco. (November 2018). Cisco SD-WAN Solution Overview. Doc #US43881619.

Cisco SD-WAN gives users the ability to not only manage connectivity across their WAN from a single dashboard, but to connect to cloud platforms with greater speed, reliability, and efficiency.

Cisco SD-WAN OnRamp gives you enhanced, automated connectivity to IaaS and PaaS cloud environments without forcing you into existing multitenant gateways or a time-consuming manual process. Cisco SD-WAN gives instant visibility into cloud traffic, control over deployment, and the convenience of automated management.

In addition, Cisco SD-WAN OnRamp can optimize the SaaS applications used in day-to-day operations.[5]

Predictable application experience

By accessing the advanced vAnalytics engine through the Cisco vManage console, you can quickly provide IT managers with the visibility necessary to isolate issues in the WAN.

Additional components of vAnalytics:

- End-to-end visibility into applications and infrastructure across the entire SD-WAN fabric
- Real-time information for failure correlation, cross-customer benchmarking, and application performance scores
- "What-if" scenarios for performance forecasting
- Assistance planning for application provisioning, bandwidth increases, and branch expansions
- Intelligent recommendations based on existing policies, templates, and preferences
- Application Quality of Service (QoS) categorization and policy changes for predictable performance

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Insight is continuously on the leading edge with Cisco, with a deep-rooted, 24-year partnership and counting. We maintain Gold Partnership status with Cisco, and are proud to have achieved all 5 Master Certifications.

Insight has the technical depth to support the entire Cisco portfolio from edge to cloud. We have Cisco's Trailblazer Partnership status, which provides concierge service from Cisco we are able to extend to our clients. What does this mean?

- When Cisco comes out with their newest solutions, such as SD-WAN/Access/Security, Insight is one of only a handful of partners first engaged to understand and develop services to support these solutions.
- Insight has a direct connection with Cisco Business Units (BUs). We get top-level support and faster issue resolution.

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Provider Program

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24-year partnership

Summary

With so much data and so many applications moving to the cloud every day — and with a growing number of remote and mobile users and devices needing access to information — it's never been more important to deploy the right technology to support connectivity.

In this environment, traditional WAN technology won't cut it. Cisco SD-WAN, on the other hand, is well suited to handle the growing demands of the digital age.

Insight Cloud + Data Center Transformation (CDCT) and Cisco provide the networking and integrated security solutions needed today. CDCT offers a full suite of software-defined services within an integrated network and security portfolio. These include Software-Defined Datacenter, Software-Defined Security, Software-Defined WAN, and Software-Defined LAN.

The SD-WAN market is flooded with countless solutions and offerings.

Cut through the noise and find the tailored solution you need to **enable** and **expedite** a digital transformation. With offerings ranging from readiness assessments all the way through SD-WAN managed services, **Insight CDCT can help bring clarity to the chaos.**

To learn more about the benefits of SD-WAN and other software-defined solutions, visit insightCDCT.com/Solutions/Security-and-Networking.

You might also find the following resources helpful:

- Whitepaper: "Network Security: An Essential Element of Digital Transformation"
- Whitepaper: "Transforming Network Security: How to Win Against Cyberthreats"
- Whitepaper: "Moving Workloads to the Public Cloud? Don't Forget About Security."
- Whitepaper: "Building a Strong Cybersecurity Program During IT Transformation"

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1 Gartner Press Release, "Gartner Forecasts Worldwide Public Cloud Revenue to Grow 17.5 Percent in 2019", April 2, 2019. https://www.gartner.com/en/newsroom/press-releases/2019-04-02-gartner-forecasts-worldwide-public-cloud-revenue-to-g

2 451 Research. (August 2019). IoT Market Monitor Report.

3 IDC, Worldwide SD-WAN Infrastructure Forecast, 2019–2023, Doc # US43881619, July 2019.

4. Cisco. (October 2018). CVD — SD-WAN Design Guide.

5. Cisco. (November 2018). Cisco SD-WAN Solution Overview. Doc #US43881619.

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