

Network Transformation with Cisco SD-WAN and Equinix Interconnection Oriented Architecture (IOA)

Wide-area network architecture is the foundation for cloud deployment and enterprise digital transformation initiatives.



Overview

With business-critical applications increasingly running in hybrid and multicloud environments, enterprises must carefully consider and optimize the wide area network (WAN) architecture that connects headquarters, branches, remote workers, IoT devices, and the data center to cloud providers.

They must:

- Deliver the best possible user experience
- Offer optimal application performance and availability
- Protect against cyberthreats and adhere to compliance regulations
- Reduce overall costs and operational complexity

CXOs and director-level roles in IT and networking and security specialists will find this white paper a helpful overview of key trends, the challenges posed by legacy network architectures, the solutions provided by Cisco® and Equinix architectures, and direct cloud connection use cases.

Why cloud migration for an enterprise network?

Forward-looking enterprises are migrating applications and workloads to hybrid and multicloud environments rather than running them in corporate data centers. In the process, they are realizing how much the WAN impacts customer experience, security, and total cost of ownership (TCO) and increases or decreases operational complexity.

Too often, the network architecture that connects public and private environments through the public Internet delivers less-than-optimal performance. Centralized topology that runs over multiprotocol label switching (MPLS) circuits, legacy WAN architectures implemented before the cloud's explosive growth usually fall short of delivering the bandwidth needed or addressing latency issues. Simply put, these architectures were not built for the era of cloud computing. In most instances, security is an afterthought—bolted on rather than designed in—and not well-suited to provide visibility into or protection for data in transit. A growing number of CIOs who run on-premises private clouds are looking to get out of the data center business so their organizations can focus on core competencies.

Key trends and challenges

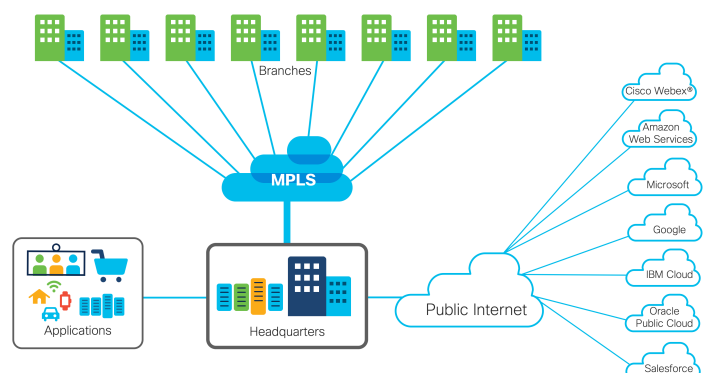
Consider these trends:

- 92 percent of enterprises will grow their WAN bandwidth over the next two years.¹
- 84 percent of respondents to a recent survey have a multicloud strategy.²
- 66 percent of enterprises already have a central cloud team or cloud center of excellence, with another 21 percent planning one.³

The stakes are high: successful cloud migration is a significant challenge due to overall WAN performance. These expensive MPLS circuits often connect the data center to the branch, and then data traffic is backhauled from branch offices to the data center to connect to public-cloud and SaaS providers. (See Figure 1.) This approach is problematic for five reasons:

- Long-distance data paths can cause jittery application performance and increase latency.
- Physical distance between endpoints and the data center increases bandwidth and network-operating costs.
- Data egress charges imposed by public cloud providers increase overall operating costs.
- Indirect, insecure access and a lack of visibility into data traversing the public Internet expose enterprises and users alike to security risks.
- Carriers may require several months to establish new MPLS connections, creating unacceptable delays, while self-provisioning of virtual circuits can be done in minutes.

Figure 1. Traditional centralized enterprise WAN architecture



¹ "Survey Examines WAN Transformation and SD-WAN's Impact"

^{2,3} Cloud Computing Trends: 2019 State of the Cloud Survey

Challenges also exist in the relationship between WAN architecture and an on-premises cloud running in the data center. In this scenario, enterprises must consider not only WAN topology but also where to physically locate private infrastructure to optimize performance, reduce latency, and deliver the best possible user experience.

Although it is true that many CIOs are attracted by the control and security of running workloads in data centers on their premises, more and more of them are drawn to the prospect of migrating these workloads off premises to a secure, well-managed, densely interconnected colocation facility. This point, mentioned earlier in this white paper, is too important not to repeat.

Cisco and Equinix architectures

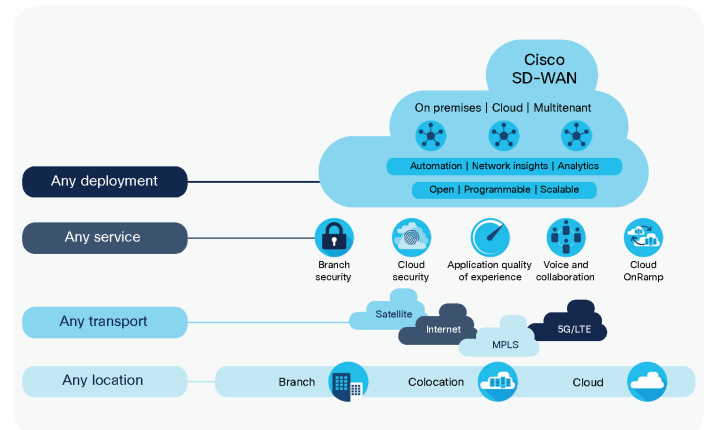
Cisco and Equinix have partnered to offer a seamlessly integrated portfolio of solutions designed to help you rearchitect your WANs to support cloud migration and digital transformation. These global leaders, who specialize in networking and colocation/interconnection, understand that where and how you connect make a difference. Cisco's SD-WAN and Equinix's Interconnection Oriented Architecture® (IOA®) helps to streamline your operations, securely bring users closer to services and applications while lowering your total cost of ownership (TCO).

Cisco Secure SD-WAN

Digital transformation is changing IT architectures across the world. Your network teams must now manage complex edge and multicloud environments to ensure consistent everyday operations. Everything must operate as a single WAN. The IoT and operational technology (OT) are proliferating, adding to complexity and increasing demands on enterprise networks.

Cisco SD-WAN overlay fabric (see Figure 2) answers IT's question: "How do we extend SD-WAN to the cloud, access, and data-center domains?" With its built-in security stack, this cloud-scale architecture delivers powerful control over enterprise networks and connects users across applications and clouds. And Cisco SD-WAN Cloud OnRamp simplifies multicloud connectivity to optimize the user experience and increase productivity. Ranked #1 in 2018 by IDC for global market share, Cisco SD-WAN reduces the five-year cost of WAN operations by 38 percent, accelerates deployment by 58 percent, and cuts unplanned downtime by 94 percent.⁴

Figure 2. The Cisco SD-WAN secure, cloud-scale architecture



Equinix Cloud Exchange Fabric (ECX Fabric)

Built to support global data communications, Equinix Cloud Exchange Fabric™ (ECX Fabric™) directly, securely, and dynamically connects distributed infrastructure and digital ecosystems via Platform Equinix®, the world's largest network of data centers and business ecosystems.

ECX Fabric makes it possible to establish "data center to data center" connections between any two ECX Fabric locations within a specific market, or globally, in minutes. A software-defined interconnection architecture and subscription-based delivery allows enterprises to pay only for what they use—and accelerates the procurement process. On-demand connections and a self-service portal allow users to quickly connect to top cloud, network, and service providers—such as AWS, Microsoft Azure, Google Cloud, Oracle, and Cisco Webex®—or between Equinix data centers. The ECX Fabric ecosystem also includes digital supply chain partners and mission-critical software-as-a-service vendors. As enterprises grow their reach, ECX Fabric grows with them, scaling to connect 45+ markets and enabling global interconnections between 160+ Equinix International Business Exchange™ (IBX®) data centers.

⁴ IDC White Paper, sponsored by Cisco, "Business Value of Cisco SD-WAN Solutions; Studying the Results of Deployed Organizations," April 2019.

Cisco and Equinix use cases

Cisco and Equinix offer several modernized direct-connection options for the cloud, enterprise WAN, and collaboration use cases.

Use case 1: Cloud connectivity

Enterprise endpoints such as laptops and smartphones bypass the public Internet and avoid a traditional centralized network topology to connect directly to the public cloud and software-as-a-service (SaaS) providers. (See Figure 3.)

Benefits:

- Delivers superior performance through enhanced quality of service (QoS) commitments
- Helps ensure secure application experiences through private rather than MPLS connections
- Reduces TCO significantly by reducing costly MPLS spending
- Simplifies day-to-day operations through single pane of glass management

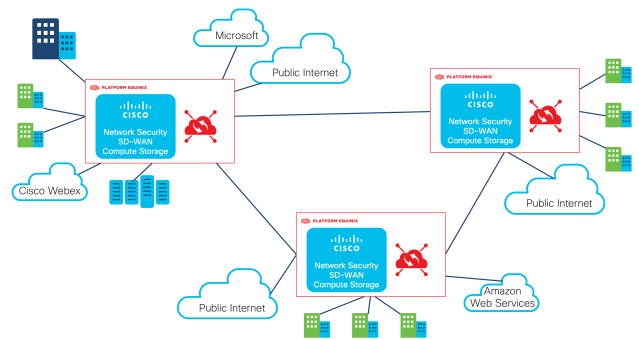
Use case 2: Distributed WAN architecture

As in the first use case, distributed WAN topology optimizes your network by replacing legacy centralized topology with a distributed architecture. This topology moves operations from MPLS circuits to Ethernet and privately connects endpoints to Equinix edge data centers that are connected to each other through ECX Fabric. (See Figure 3.)

Benefits:

- Reduces carrier costs by more than 40 percent⁵ and improves network performance
- Provisions virtual circuits quickly through a centralized management portal
- Decreases latency and delivers the bandwidth necessary for an optimal user experience
- Addresses data sovereignty requirements by keeping data in its country of origin

Figure 3. Cloud connectivity and distributed WAN architecture



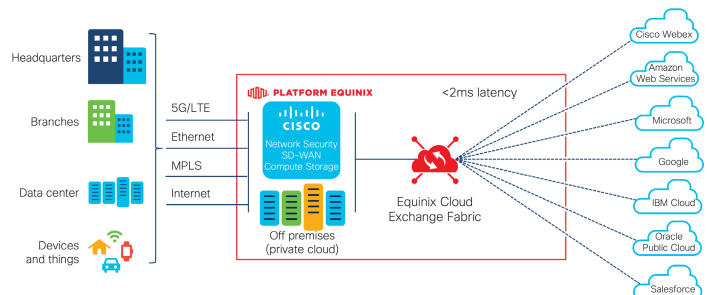
Use case 3: Private cloud footprint at the edge

Moving your private cloud infrastructure off premises to a colocation facility adjacent to public clouds, such as AWS and Oracle Cloud, improves security and performance. This approach enhances application quality of service (QoS) for hybrid, multicloud implementations by moving compute and storage closer to the edge and closer to the public cloud infrastructure. (See Figure 4.)

Benefits:

- Reduces operational costs by running baseline workloads on private cloud infrastructure and spiking to the public cloud
- Delivers optimal performance and user experience by minimizing physical distance that packets must travel
- Improves disaster recovery strategy through database backup to the public cloud
- Makes it possible to run mission-critical applications on a more secure private cloud

Figure 4. Private cloud footprint at the edge

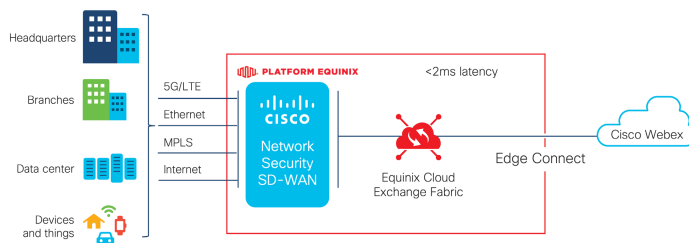


Use case 4: Collaboration services

Direct access to collaboration services, such as those provided at a Cisco Webex Meetings Data Center location, bypasses the public Internet and peers directly through ECX Fabric (See Figure 5). This connection delivers end-to-end security and reduces congestion, packet loss, jitter, and delay while increasing the quality of voice, video, and web sharing—in short, a better collaboration user experience.

Together, Cisco and Equinix provide physical and virtual deployment options for these direct-connect solutions. The right option for your organization may be a combination of both. A physical deployment is likely the best choice when you require higher bandwidth and performance, while a virtual or OpEx model may be best for minimal or short-term deployments.

Figure 5. Cisco Webex Edge Connect to cloud



Why Cisco and Equinix?

Cisco and Equinix have partnered to offer you a seamlessly integrated portfolio of solutions designed to meet your enterprise WAN, private cloud, and collaboration needs in support of your hybrid, multicloud, and digital transformation initiatives at scale.

Work with established leaders

Cisco, a leader in networking, compute, and storage—and owner of 46 percent of the global SD-WAN market—is also an acknowledged collaboration innovator through Cisco Webex.

Equinix leads the global colocation market with 96 percent of all Internet traffic flowing through 210+ data centers in 56 markets and more than 9700 customers.

To learn more about how Cisco and Equinix can connect your enterprise network to the cloud and accelerate your organization's digital transformation, visit the [Cisco and Equinix joint site](#).