

5 Ways that SD-WAN Transforms Your Network



Applications are Moving to the Cloud

Where organizations host applications is changing. How they access applications needs to change as well. Enterprise applications are moving to the cloud and organizations are using SaaS applications.

VMware did a survey and found that the pace of migration for applications to the cloud is accelerating.

- As of 2016 about 50% of new enterprise applications had been moved to the cloud.
- By 2021 we predict that 50% of all applications will be in the cloud.

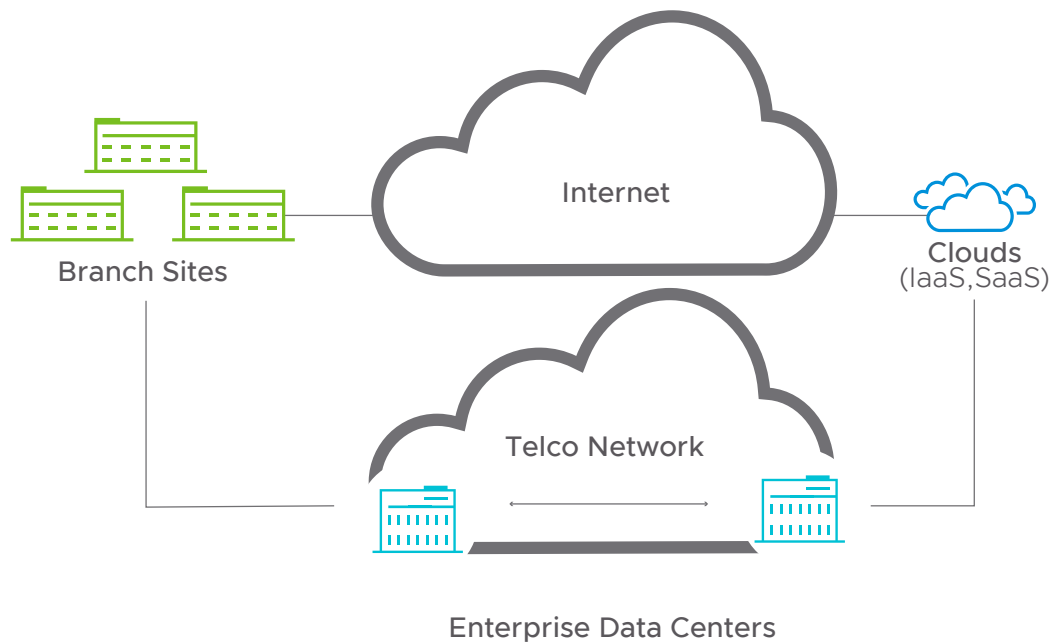
The Wide Area Network (WAN) was built to connect from the branch office to the data center, typically over service provider virtual private networks. With applications residing in the cloud, this is no longer efficient. The cloud is accessed over the Internet. However, Internet performance isn't reliable or secure. The problem is that the Internet is a best effort transport and performance is not guaranteed.



How bad can performance be? We did some performance measurements.

- Packet loss varied up to 12.5% over 24 hours.
- The impact of packet loss is high. During a file transfer with .5% packet loss TCP throughput drops from 10 Mbps to 1 Mbps.
- For real time traffic, the Mean Opinion Score (MOS) drops from 4.5 to 2.5. MOS scores range from 1 for unacceptable to 5 for excellent.

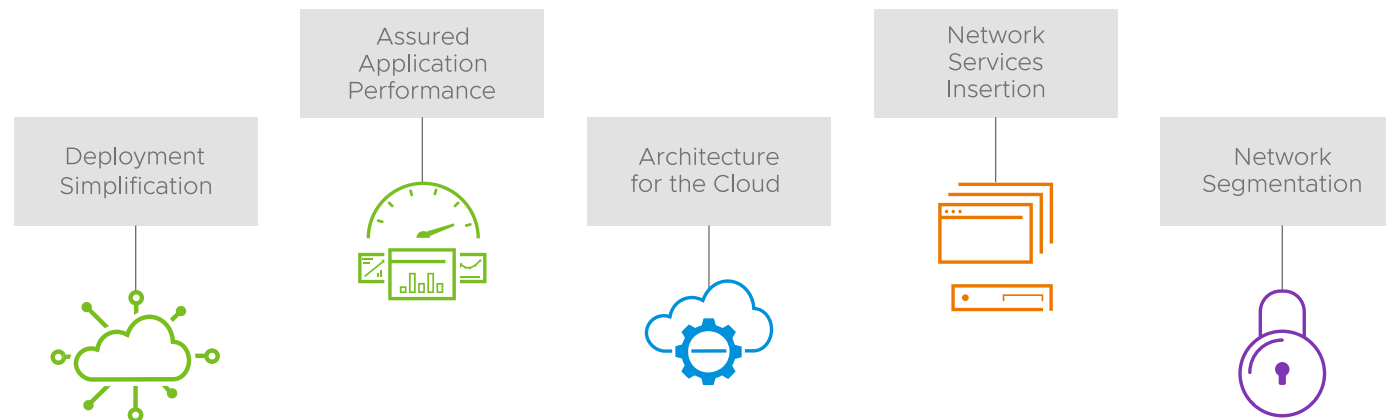
Something needs to be done to improve application performance. The WAN needs to change. The network needs to transform to better support access to the cloud and ensure performance, reliability and security.



Essential Capabilities that SD-WAN Delivers

Existing networks lack the management tools and methods to enable network transformation. They are built on links that are limited in bandwidth, expensive to lease and suffer from slow deployment. Existing networks backhaul traffic to the data center over these expensive and slow links before sending it out to the Internet. This creates delay and as a result, applications run slowly.

SD-WAN was developed to solve these issues and transform your network by making it more responsive, providing greater bandwidth and being more cost effective. It also simplifies deployment and management of network edge devices.



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Essential Capabilities
SD-WAN Delivers

VMware SD-WAN
Cloud-Delivered Model

Deployment Simplification

Assured Application Performance

Architecture for Cloud Migration

Network Service Insertion

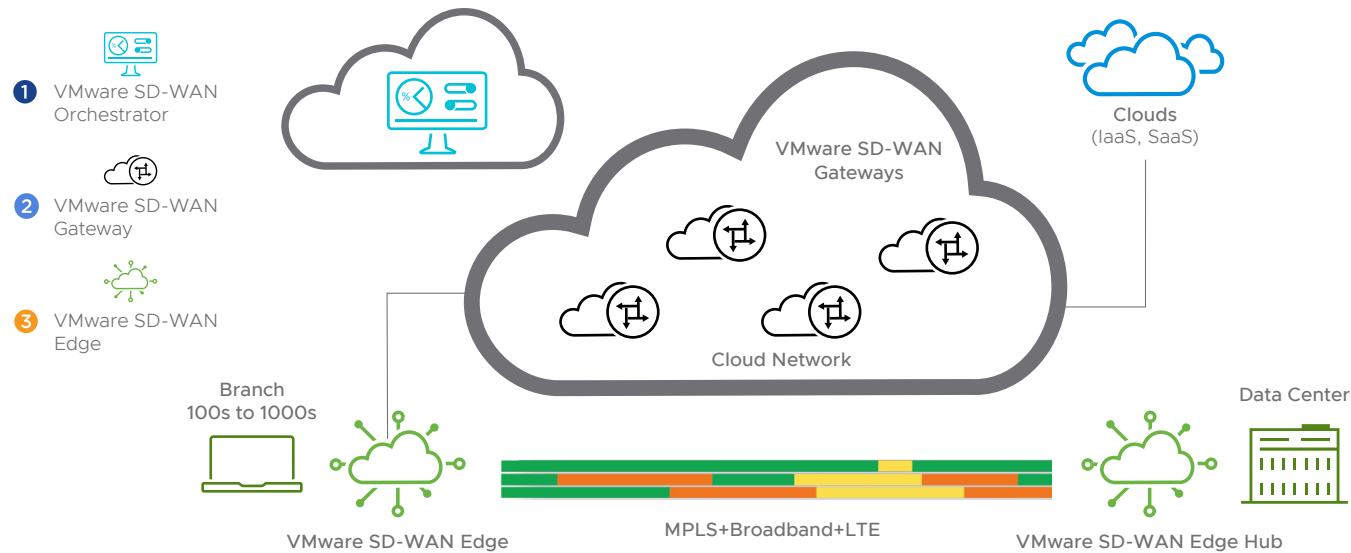
Network Segmentation



VMware SD-WAN Cloud-Delivered Model

VMware SD-WAN™ by VeloCloud® simplifies WAN deployment with a cloud-delivered model. The solution is built on three components.

- The part that sits at your branch office locations is the **VMware SD-WAN Edge** device. It provides WAN connectivity and can replace the branch office router.
- The **VMware SD-WAN Gateways** are hosted in points of presence (PoPs) around the world. Traffic is sent to the Gateways and then routed to the destination, which might be your data center or a cloud provider, like AWS, Azure or Google.
- The **VMware SD-WAN Orchestrator** is a cloud-hosted centralized management system. You don't have to install it; you just connect to it. The Edge devices are configured by the Orchestrator.



The components are delivered as a service for a subscription with the management and cloud interconnect Gateways hosted in the cloud.

The VMware SD-WAN solution is strategically designed as a transport-independent overlay that can work across any combination of circuits to connect your location to your applications. It enables connectivity to both enterprise data centers and SaaS applications and IaaS in the cloud. SD-WAN can dynamically optimize traffic over multiple links.



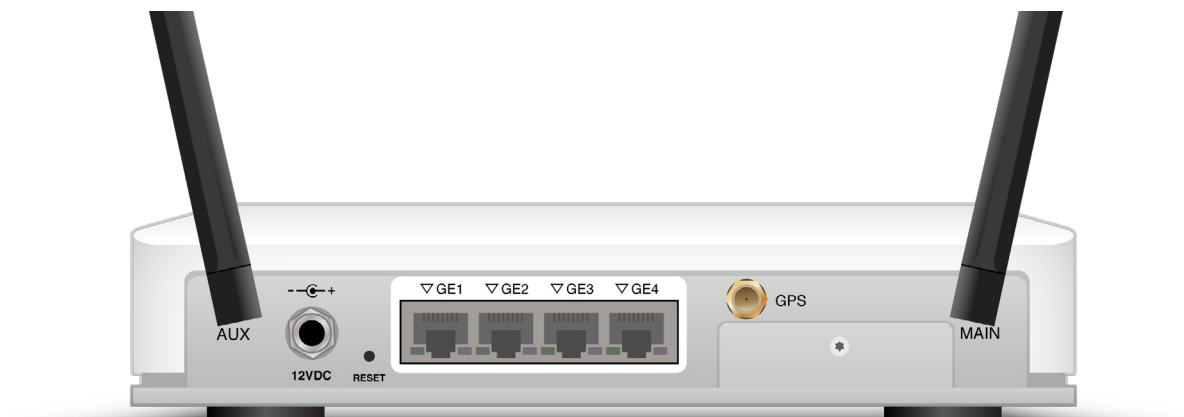
1. Deployment Simplification

A VMware SD-WAN deployment starts with placing a VMware SD-WAN Edge device at each location, such as a branch office and a larger hub device in the data center. The Edge device simplifies site deployment, so you can easily expand your network to new sites and branches quickly and efficiently.

Edge devices are available as a hardware appliance, as a virtual instance that can run on common hardware, or they can run as a virtual instance and a uCPE from various vendors. The Edge is available in the cloud on the AWS marketplace, Azure, and Google.

The Edge device connects your sites to your service provider's WAN and to the Internet and then connects to where your applications are: in data centers, hosted at your service provider, or in the cloud. A smaller device at the remote locations communicates with the larger hub device in the data center. The hub devices aggregate connections from all of the Edge devices.

Edge devices communicate with each other to deliver optimization traffic between them. These devices are auto configured so they are quick and easy to install. Your cost to deploy these devices will be much lower than with a typical router that must be configured manually device-by-device.



Branches



Data centers



Construction sites



Kiosks



Retail stores



Multiple deployment options

The Edge devices offer you flexible deployment options to fit with your branch office device management plan. There are 3 deployment options for the Edge devices in remote offices. The Edge device can:

- Co-exist with your switch or router if you need to support a legacy connection.
- Be the default device and failover to the L2 device using Virtual Router Redundancy Protocol (VRRP). It can co-exist at Layer 3 and use a routing protocol such as BGP or OSPF and failover to the router.
- Be standalone, and replace your existing router, if it is outdated and you are ready to replace it.

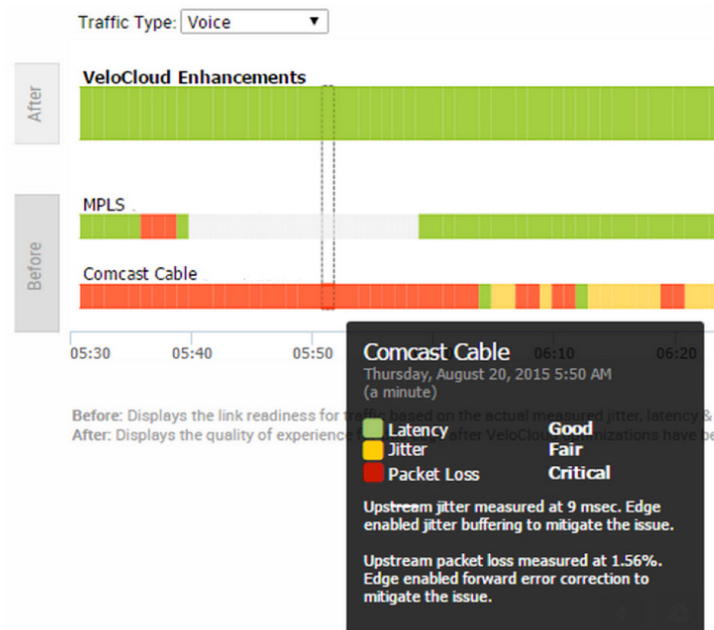
This can lead to greater cost savings as you eliminate routers. Also, the VMware SD-WAN Edges are provided on a subscription-basis, so you don't have to buy them.

Deploy SD-WAN on your choice of vendor appliances. If you choose to deploy the VMware SD-WAN Edge as a VNF, VMware makes it easy. You have a choice of vendor appliances that are tested and approved for this purpose. There are APIs and SDKs for integration with our partners virtual CPE management systems.



2. Assured Application Performance

VMware SD-WAN increases the performance of applications over the WAN with real-time remediation and traffic steering. The VMware SD-WAN Edge device bonds multiple links and virtualizes them to act as one. If you have an existing link that doesn't have enough throughput, you can add a second link and increase your bandwidth without changing anything about your network.



Continuous Link Monitoring

- Drives automation and optimization

Dynamic Per Packet Steering

- Sub-second steering without session drops
- Aggregated bandwidth for single flows

On Demand Remediation

- Protects against concurrent degradation
- Enables single link performance

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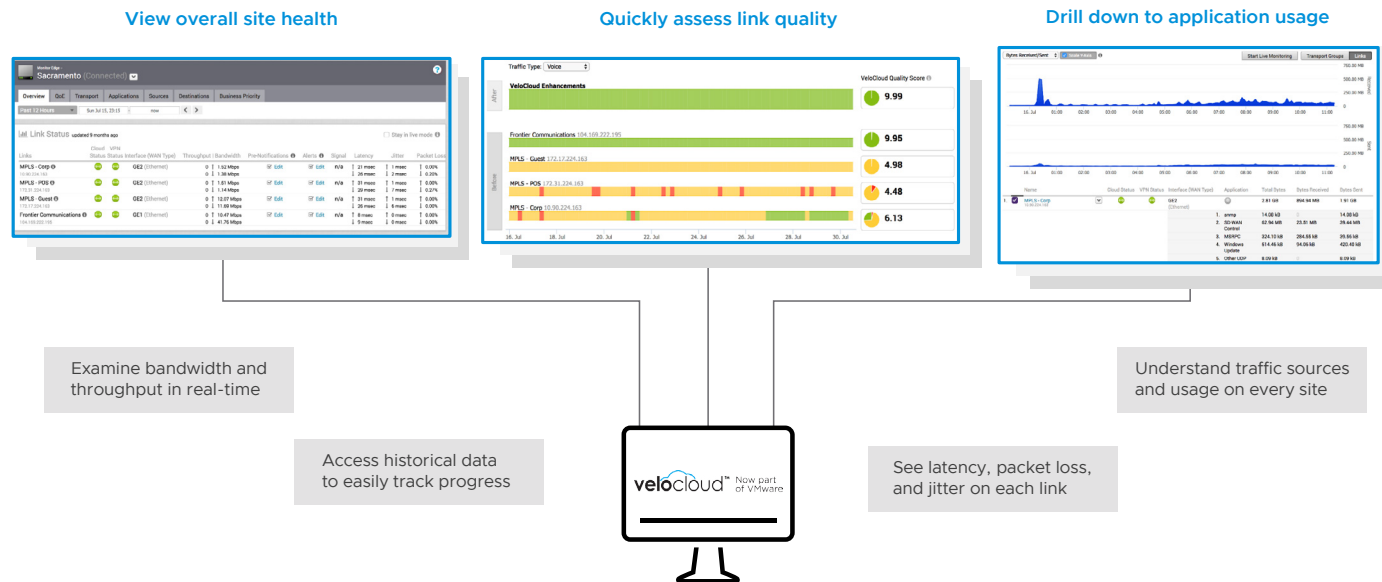
Assured Application Performance

Architecture for Cloud Migration

Network Service Insertion

Network Segmentation

You can combine links of many types and add cheaper broadband to your MPLS link, for example. You might have 2 links, one MPLS and Broadband, connecting a branch site to your data center. If there is a problem on one link, the Edge device immediately steers traffic to the other link. This ensures that you always get good performance even if the links are of varying quality. With this arrangement you can increase throughput while reducing the cost per unit of throughput and still maintain the reliability of your connections.



+Use [RESTful API](#) to enable your own custom heuristics or analytics

Dynamic Multipath Optimization steers traffic to the best link

The feature that does the traffic steering is called Dynamic Multipath Optimization™ (DMPO). It also provides continuous link monitoring. As it detects congestion, it moves traffic to the best link.

DMPO steers traffic packet-by-packet over both links at the same time, so you don't have to wait for a total link failure for the switch over to happen. The traffic steering happens transparently as the connection degrades. You also don't have to wait for routes to reconverge, as you do when using a router for your hybrid network.

If both links are experiencing congestion, the system will send duplicate packets in real time over both links to ensure that they get through. This means that you can get a quality user experience, even with sub-optimal link conditions. All links are utilized, or active/active, so you get what you are paying for, unlike redundant links on a router that are active/passive. In short, you are ensured high performance and don't notice the transition from one link to another.

Network visibility and agile troubleshooting

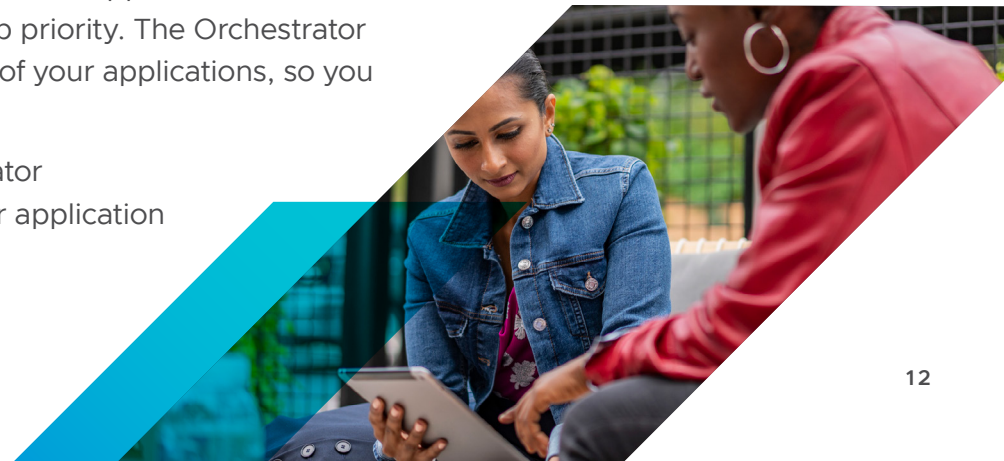
The VMware SD-WAN Orchestrator makes it easy to monitor your devices and the performance of your applications on the network, giving you line-of-sight to your entire WAN. The Orchestrator can save you hours of time spent on device management because it can configure all devices at once from the central console using policies.

The VMware SD-WAN Orchestrator is used to set policies for prioritization of applications on the network to make sure that your most important applications get the top priority. The Orchestrator provides screens to monitor performance of network connections and of your applications, so you can see the benefits of VMware SD-WAN firsthand.

The application monitoring features in the VMware SD-WAN Orchestrator will allow you to troubleshoot issues in much less time, preventing poor application performance and down time.

USING THE VMWARE SD-WAN ORCHESTRATOR, YOU CAN:

- View overall health of a remote site
- Quickly assess link quality
- Monitor application bandwidth consumption





3. Architecture for Cloud Migration

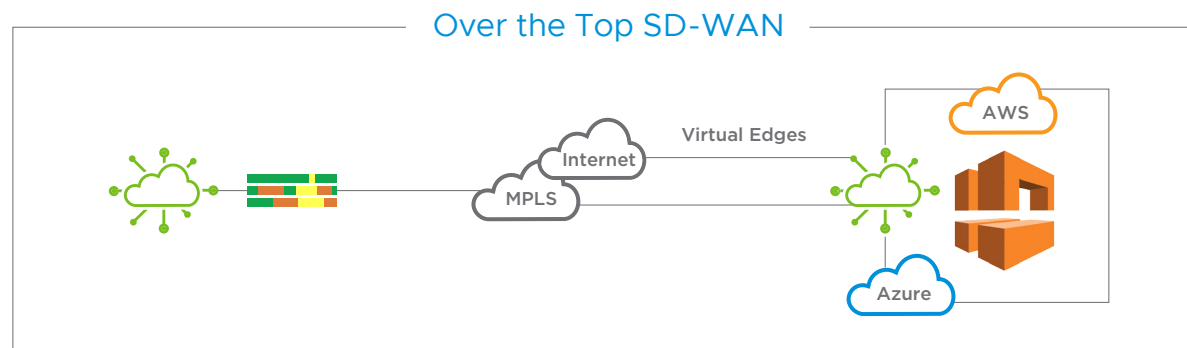
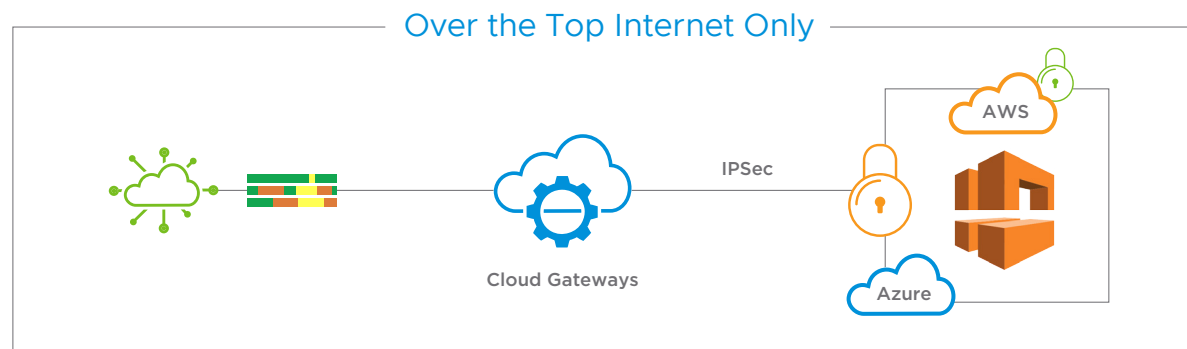
A big benefit of the VMware SD-WAN solution is that you get high performance access to applications in the cloud, such as Microsoft Office 365, and you also get access to your own applications if you are hosting them in the cloud, using IaaS on AWS, for example. This is done by connecting your office locations through a VMware SD-WAN Gateway that is hosted by VMware in a point of presence (PoP) that is close to the applications. Instead of your connection going back to your data center location and then going out to the hosted application, your connection goes directly to the application, over the Internet.

The VMware SD-WAN Gateway provides optimization between the Gateway and the Edge device in the branch office location. So, no matter where your applications reside, you get a high-quality network connection. You don't have to own or manage the Gateways. They are all cloud-hosted by VMware and provided as a service as part of your subscription.

VMware SD-WAN connects you to IaaS with consistent policies

Many organizations are using cloud Infrastructure as a Service (IaaS). VMware SD-WAN provides you with two options for connecting.

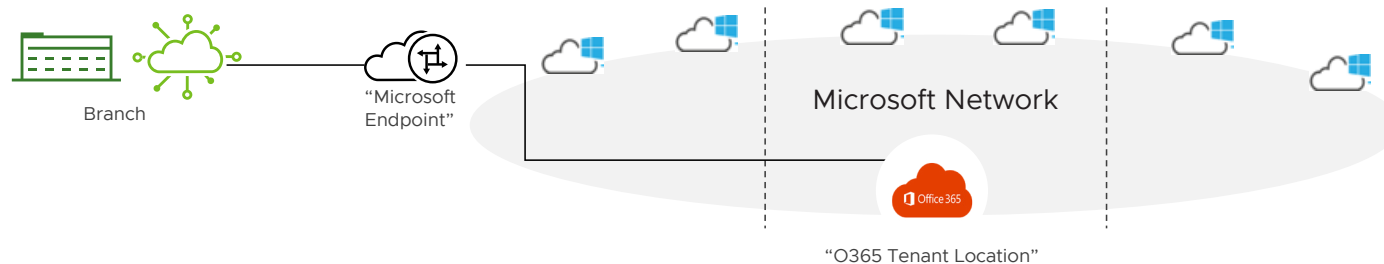
- You can connect over the Internet using IPSec for a secure connection without any SD-WAN device on the other end. With this option, you get optimization between the branch edge device and the VMware SD-WAN Gateway.
- You can also do an optimized connection using SD-WAN and connect with a virtual Edge in the cloud. The virtual Edge is available on popular cloud marketplaces such as AWS, and Azure.



VMware SD-WAN enables Office 365 with high performance

The VMware SD-WAN Edge devices can connect to the Microsoft network for high performance access to Microsoft Office 365. The benefits of this model include:

- Simplifies the hybrid network for local Internet breakout
- Provides a direct Internet connection to Microsoft's endpoint
- Ensures high quality SD-WAN performance and availability



4. Network Service Insertion

An important part of your business is your data and it needs to be protected. VMware SD-WAN Edge does this in several ways. The first is to host on the local device. If you need to run a network service in your branch office, but you have to deploy another physical appliance, you can run virtual appliances on the SD-WAN Edge.

- For a **smaller location**, you can use the built-in firewall on the Edge device.
- For your **medium-sized locations**, the Edge device provides a virtual appliance hosting capability where you can run a next-generation firewall (NGFW) from one of the popular vendors for this type of service.
- For a **larger branch office** that needs to deploy many VMs for multiple network services, the SD-WAN Edge provides a NFV infrastructure.

Distributed services insertion via service chaining

The next way to apply security services is with built-in service chaining capabilities. You can use service chaining to direct traffic to cloud hosted security services. There are many of these available—you might already be using some. Service chaining can provide any type of protection that you need, including website URL filtering or firewalling. It automates tunneling, eliminating the need for site-by-site configurations. It also offers single-click, application-aware policies for service insertion. Using this method helps ensure the security of traffic going over the Internet.



5. Network Segmentation

Network security isn't complete unless you can isolate critical data traffic. With VMware SD-WAN, data can be identified by its type, such as payment card information or medical data, and it can be isolated from other types of data to protect privacy and prevent fraud.

This can be done with segment aware policies. Outcome-driven segmentation allows you to set policies to isolate guest Wi-Fi traffic or point of sale system data for better data integrity. You can configure multi-segments, for example if you have a department with which you need to provide secure application access. If your company acquires another company and you need to provide overlapping IP addresses, you can do that, too. Network services such as QoS and firewall policies can also be set per segment.

In addition to the capability to segment payment card industry traffic, PCI compliance is made simple, efficient, and cost-effective. If you are a retail business and you take payment cards, the VMware SD-WAN solution is PCI DSS 3.2 certified.

We are the first and only solution to offer a PCI-certified cloud-delivered SD-WAN. VMware makes it simple to ensure PCI compliance. Retailers will benefit from the PCI attestation of compliance which will simplify a PCI audit.



SD-WAN is the Answer

As more and more of your applications move to the cloud, you need a network that can keep up. Rather than dealing with the application performance issues that traditional WAN are seeing with cloud solutions, make the move to SD-WAN. With VMware SD-WAN you benefit from simplified and flexible deployment options, improved application performance, and control at the network edge. Contact us today to learn how VMware SD-WAN can help enhance your network.

Begin Your Journey

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