

Enterprise WAN Agility, Simplicity and Performance with Software-Defined WAN

Vector Security Networks® SD-WAN increases agility and cost effectiveness, while assuring application performance across the WAN.

Today's branch office users are consuming more wide area network (WAN) bandwidth as they collaborate online (e.g., Skype for Business, WebEx, Office 365), increase the use of Software-as-a-Service (SaaS) and cloud services, access large rich-media files, and leverage other bandwidth-intensive applications. Corporate IT is facing significant challenges addressing these demands due to the complexity, cost and static architecture inherent in their existing WAN.

The vast majority of branch office WAN traffic is carried over expensive leased lines (private MPLS circuits) or unpredictable Internet connections (DSL, Cable, LTE) —

neither of which is ideal on its own. Deploying leased lines for all bandwidth needs is cost prohibitive and time consuming, while adopting the public Internet — with its lack of uptime, reliability and performance guarantees — may result in a poor user experience.

Vector Security Networks® SD-WAN enables enterprises to support application growth, network agility and simplified branch implementations while delivering optimized access to cloud services, private data centers and enterprise applications simultaneously over both ordinary broadband Internet and private links.

Challenges with Branch Office Wide Area Networks

According to Ashton, Metzler, and Associates, WAN technologies used in most branch offices today have changed little, if at all, since the 1990s. Traditional wide area networks utilize rigid architectures which are optimized around private data center applications. These architectures are unable to seamlessly integrate cloud computing, Software-as-a-Service (SaaS), virtualization, and other industry advances. Branch offices with only private-circuit connections rely on back-hauling of all cloud applications, SaaS and Internet traffic through the enterprise data center (Figure 1, following page), adding latency, degrading application performance and driving up private network bandwidth costs.

MPLS typically provides high quality of service, but with the trade-off of limited capacity, higher cost and long

deployment lead times. Broadband provides fast deployments and greater capacity, but with the trade-off of reliability. These factors can have the following negative impacts:

- **New applications** inhibited by bandwidth or the lack of assured performance
- **Branch network deployments** delayed due to IT complexity
- **Cloud migration** not supported by traditional hub and spoke branch network architecture

Hybrid WAN enables enterprises to incorporate both private MPLS and broadband Internet which can reduce costs. Hybrid WAN, on its own, does not increase agility, performance nor simplicity.

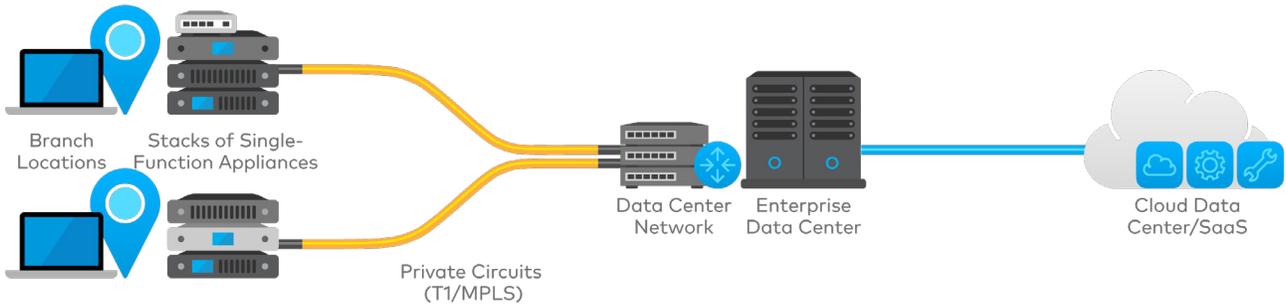


Figure 1. Traditional Branch Office WAN

Solution Overview

Vector Security Networks SD-WAN combines the economics and flexibility of a hybrid WAN with the deployment speed and low maintenance of a cloud-based service. It includes policy-based network-wide application performance, visibility and control while dramatically simplifying the WAN by delivering virtualized services from the cloud to branch offices.

The Edge appliance is a compact, thin edge device that is zero-touch provisioned from the cloud for secure, optimized connectivity to applications and data. The Edge is also available as a VNF (virtual network function) for instantiation on a virtual CPE platform.

The Vector Security Networks Edge with Dynamic Multi-Path Optimization (DMPO) and deep application recognition aggregates multiple links (e.g. Private, Cable, DSL, 4G-LTE) and steers traffic over the optimal links to other on-premises Edges in branch offices, private data centers, campuses, and headquarters.

The Vector Security Networks Edge can also optionally connect to the system of global gateways as shown in

Figure 2 to provide performance, security and visibility for cloud services (SaaS, IaaS, B2B Internet).

This system of Gateways is deployed globally at top-tier cloud data centers to provide scalable and on-demand cloud network services. Vector Security Networks Gateways implement DMPO, cloud VPN and Multisource Inbound Quality of Service between global cloud services (SaaS, IaaS, network services) and each Vector Security Networks Edge, enabling multiple broadband and private leased lines to appear as a single, high-performance WAN.

The cloud-based Orchestrator is used to provision network-wide business policy, enable services insertion, perform real-time monitoring and analyze application performance.

Deploy in Minutes

Using zero-touch deployment capability, Vector Security Networks SD-WAN can be quickly installed. The Edge is shipped to the branch office where a non-technical person simply plugs in power and a few cables. Activation, configuration, and ongoing management are all handled in the cloud.

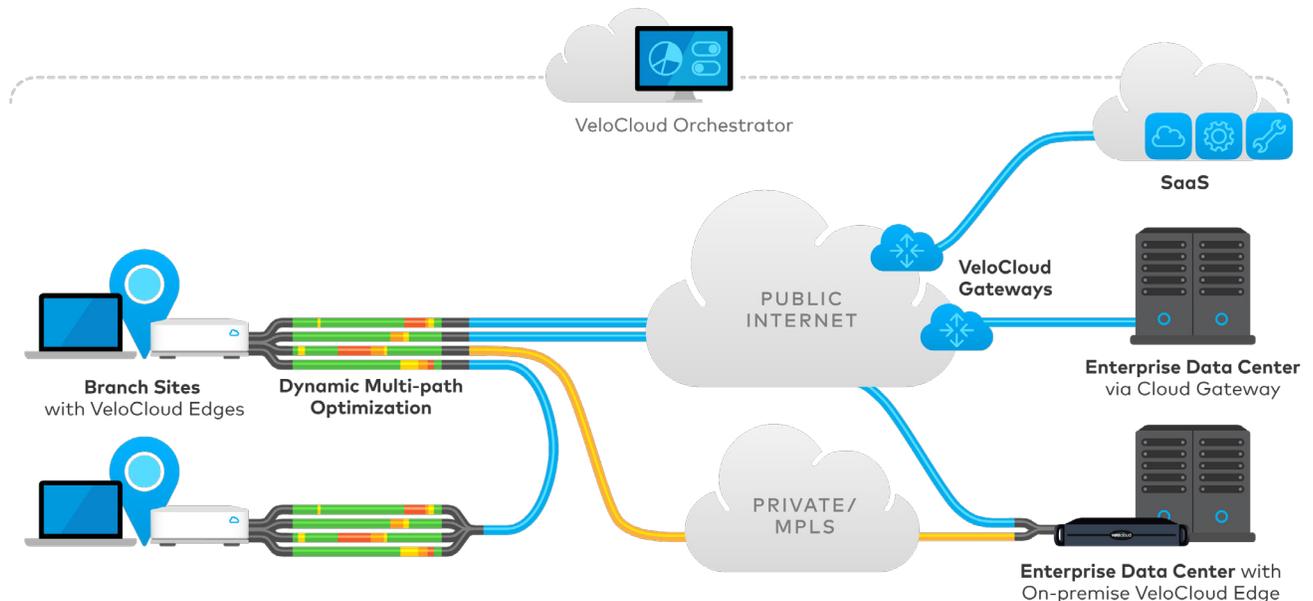
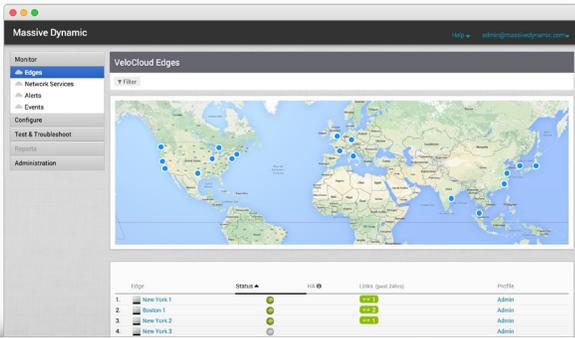
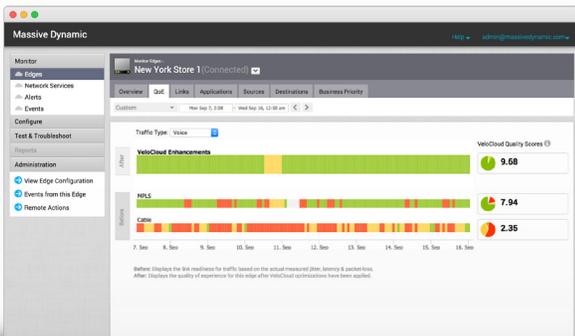


Figure 2. Vector Security Networks SD-WAN Service



Enterprise-wide Business Policies

Vector Security Networks SD-WAN makes setting policy as simple as a single click. Enterprises or their managed service providers can define business level policies that apply enterprise-wide across many Edges, all through a centralized, cloud-based Orchestrator. Link steering, link remediation and QoS are all applied automatically based on the business policies; however, specific configuration overrides may also be applied. The centralized Orchestrator also provides an enterprise-wide view and configurability of routing in an overlay flow control table, eliminating complex node-by-node route configurations.



Assured Application Performance

Vector Security Networks SD-WAN boosts the service level and capacity of hybrid networks or of standard broadband Internet links by implementing its unique Dynamic Multi-Path Optimization. This includes a number of patent-pending technologies:

Continuous Monitoring: WAN circuits are automatically profiled, enabling zero-touch deployments without manual site-by-site adjustments of configuration parameters. Continuous monitoring of link and path quality and available capacity provide the real-time feedback for dynamic optimization.

Dynamic Application Steering: Applications are automatically recognized and steered to the optimal link(s) based on business priority, built-in knowledge of

application network requirements, and real-time link performance and capacity metrics. Dynamic per packet steering can move a session, for example a voice call, mid-stream to avoid link degradation without any call drop or even voice quality glitch. Single high bandwidth flows can utilize aggregated bandwidth for faster response times.

On-Demand Remediation: Remediation including error correction, jitter buffering and local re-transmits are applied on demand when only a single link is available or concurrent link degradations cannot be steered around. Remediation is only applied for priority applications that are network sensitive and only when brownout link degradations occur.

Quality of Experience (QoE): The screenshot at left shows the application-specific quality of experience delivered by the SD-WAN overlay with Dynamic Multi-Path Optimization (uppermost horizontal bar). The multiple underlying individual WAN circuits and link quality are shown below. This illustrates how application performance is assured, delivering a high quality and capacity WAN via a virtual overlay across multiple links, including private and Internet broadband.

Unified and Robust Security

Vector Security Networks SD-WAN provides unified secure communications no matter what underlying transport traffic may be steered across. Standard IPsec encryption is provided end to end from branches to data centers and for dynamic branch-to-branch communications. The unique cloud delivered architecture also provides automatic VPN from branches to cloud Gateway aggregation points for interoperable access to Infrastructure-as-a-Service (IaaS), eliminating manual two-sided tunnel setup from N branches to N cloud data centers.

The solution provides the scalability and robust security of a PKI infrastructure with the consolidated management of an integrated certificate server, secure onboarding of devices and revocation management. Risk is minimized by pinning certificates to specific devices and using unique pair-wise encryption keys.

One-Click Service Delivery

Vector Security Networks SD-WAN simplifies the deployment of services at the branch, at more consolidated enterprise service hubs, and to the cloud, eliminating the need for many single function devices in the branch. One-click service provisioning activates multiple native services and third party virtual network functions from technology partners on the branch Edge. One-click business policies can service chain traffic from branches to both enterprise service hubs and cloud services easily and with application-level granularity.



Platform Details

Vector Security Networks Edges provide zero touch SD-WAN deployments in branches, and scalable on-premises hub deployments for headquarter and data center locations. Additionally, all the benefits of SD-WAN, namely assured performance, security and policy control are available directly to the doorstep of cloud SaaS and IaaS locations via our Gateways. The cloud-based Orchestrator provides enterprise-wide business policy, configuration, trouble-shooting and at-a-glance monitoring.



Edges

Edges are available as easy-to-install appliances for remote branches with a range of throughput, ports for WAN and LAN connectivity and integrated wireless LAN. Dynamic routing enables policy-based overlay insertion for both inline and out-of-path deployments. High-availability deployments are also supported. In addition, the Edge is available as a virtualized network function (VNF) software for deployment on standard x86 servers including virtual CPE devices.



Gateways

Multi-tenant Gateways are deployed by Vector Security Networks and our partners at top-tier network points of presence and cloud data centers for the full range of SD-WAN benefits. Our Gateways provide a scalable and distributed infrastructure with the advantages of hosted, network as a service flexibility. Our Gateways provide the ideal architecture for optimized access to cloud applications and data centers, as well as to access private network backbones and legacy enterprise sites.



Orchestrator & Controllers

The Orchestrator & Controllers provide centralized enterprise-wide installation, configuration and real-time monitoring in addition to orchestrating the data flow through the cloud network. The Orchestrator enables one-click provisioning of virtual services in the branch, the cloud, or the data center. Controllers collect and distribute enterprise-wide routing information, and are distributed alongside Gateways as a service or can be deployed on-premises.

SDN for the WAN

Vector Security Networks SD-WAN brings SDN concepts to the enterprise branch WAN. Business policies implemented across the logical overlay deliver abstraction of application flows from the underlying physical transport. Agility is achieved based on adjusting forwarding to meet policy as well as real-time link conditions. SD-WAN has a distributed control plane for forwarding decisions to be made locally with context, so there are no latency issues nor points of failure across the WAN. Yet each SD-WAN node receives centralized control policies for easy programmability and enterprise-wide visibility.

A software based approach enables the flexibility and portability of deploying virtual Edges on off-the-shelf x86 based hardware or as virtual network functions (VNFs) on virtual CPEs. Management is configurable via both a GUI and a Rest API.

Solution Benefits

The WAN is in transition as enterprises seek to improve agility and economics, and adapt to the shift of applications to the cloud. Vector Security Networks SD-WAN offers enterprise-grade performance, security, visibility, and control over both public Internet and private networks. Vector Security Networks dramatically simplifies the WAN with zero touch deployment, one-click business policy and services insertion, and cloud-based network as a service.

For more information about Vector Security Networks SD-WAN, visit www.vectorsecurity.com/networks/SD-WAN.

For more information about our solution partner, VeloCloud, now part of VMware, visit www.velocloud.com.

 **Now part of VMware**

VeloCloud, now part of VMware, is an SD-WAN market leader. VMware NSX SD-WAN by VeloCloud is a key component of the Virtual Cloud Network and tightly integrated with NSX Data Center and NSX Cloud to enable customers to extend consistent networking and security policies from the data center to the branch to the cloud. For more information, visit www.velocloud.com or www.vmware.com, and follow the company on Twitter @VeloCloud.

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