VeloCloud™ SD-WAN

Enterprise WAN Simplicity, Performance, and Security

KEY FEATURES

- Bring together cloud-delivered networking, security, and AIOps

- Single management interface leverages AI to simplify operations

- Globally distributed PoPs for scalable, on-demand services

- Patented Dynamic Multipath Optimization and deep application recognition improve delivery reliability

- Built-in enhanced firewall strengthens branch and edge security

- Zero-touch deployment and easy service insertion simplify setup

APPLICATIONS

- Support ubiquitous access for branch and digital transformation at the edge

- Meet the latency, bandwidth, prioritization, and security needs of AI-driven apps

- Simplify branch and edge implementations

- Enhance network security

Overview

The WAN is transitioning as enterprises seek to improve agility and economics and adapt to the shift of applications to the cloud. VeloCloud™ SD-WAN offers enterprise-grade performance, security, visibility, and control over both the public Internet and private networks. It significantly simplifies the WAN with zero-touch deployment, one-click business policy, enhanced firewall service, easy service insertion, and cloud-based

network-as-a-service. The result is a better-performing WAN with increased reliability and lower cost of ownership, with enhanced security for branch and remote users.

Today's branch office users are consuming more WAN bandwidth as they collaborate online through apps such as Zoom, WebEx, and Microsoft 365, consume software as a service (SaaS) and cloud services, access large

rich-media files, and use other bandwidth-intensive applications. Corporate IT faces significant challenges due to the architectural complexity, lack of security, and cost concerns of their existing WAN.

Most branch-office WAN traffic is carried over expensive leased lines, such as private MPLS circuits, or unpredictable, unsafe Internet connections, such as DSL, cable, and LTE, and neither is ideal on its own. Deploying leased lines to satisfy bandwidth needs is cost-prohibitive and time- consuming. Using the public Internet might result in a poor user experience due to its lack of stability and protection against cyber attacks. Moreover, legacy WAN has many inherent security concerns.

VeloCloud SD-WAN enables enterprises to support application growth, simplified branch implementations, network and workforce agility, and enhanced network security. While delivering optimized access to cloud services, private data centers, and enterprise applications simultaneously over various types of transport, VeloCloud SD-WAN also reduces cyber attack risks with an enhanced firewall service, intrusion detection systems and intrusion prevention systems (IDS/IPS), URL filtering, malicious IP filtering, security monitoring, hosted firewall logging, and more—all under a single, unified management portal.

Challenges with Branch-Office WAN

WAN technologies used in most branch offices today have changed little, if at all, in the last couple of decades. They were originally designed for applications in private, on-premises data centers. Today, the traditional branch-office WAN architecture faces many networking and security challenges. Some common ones include:

- MPLS typically provides high-quality service but with the trade-off of limited capacity, higher cost, and long deployment lead times. Branch offices with only private-circuit connections rely on backhauling all cloud applications, SaaS, and Internet traffic through the enterprise data center, adding latency, degrading application performance, and driving up network bandwidth costs. Traditional hub-and-spoke WAN architecture might not support cloud migration.

- Broadband provides fast deployments and greater capacity but can lack reliability, security, and assured performance, causing poor user experience.

- Traditional branch office networks lack centralized management, control, visibility, and protection from cyber attacks. Too much management tool variety can make it difficult to troubleshoot or respond to threats quickly.

- Compliance requirements, such as PCI, HIPAA, and GDPR, can be difficult to maintain across multiple branch offices due to different security solutions from different vendors.

VeloCloud SD-WAN Overview

VeloCloud SD-WAN improves upon 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 VeloCloud SD-WAN Edge appliance is a compact, thin, edge device that is zero-touch provisioned from the cloud for secure, optimized connectivity to applications and data. Edge is also available as a virtual network function (VNF) for instantiation on a customer premises equipment (CPE) platform for great deployment flexibility.

Edge uses Dynamic Multipath Optimization (DMPO) and deep application recognition to improve delivery reliability. It aggregates multiple links, such as private line, cable, DSL, 4G-LTE or 5G, and satellite, and steers traffic over the optimal links to other on-premises Edges in branch offices, private data centers, campuses, and headquarters. Edge can also optionally connect to the system of global VeloCloud SD-WAN Gateways to provide performance, security and visibility for cloud services (SaaS, IaaS, B2B Internet).

The Edge's built-in enhanced firewall service further strengthens SD-WAN branch security. Customers can now eliminate legacy firewalls at the branch without sacrificing security, while benefiting from simplified network and security operations.

The system of Gateways is deployed globally at top-tier cloud data centers to provide scalable and on-demand cloud network services. Gateways implement DMPO, cloud VPN, and multisource inbound quality of service (QoS) between global cloud services (SaaS, IaaS, network services) and each 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.

Enterprise-Wide Business Policies

VeloCloud 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 set 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

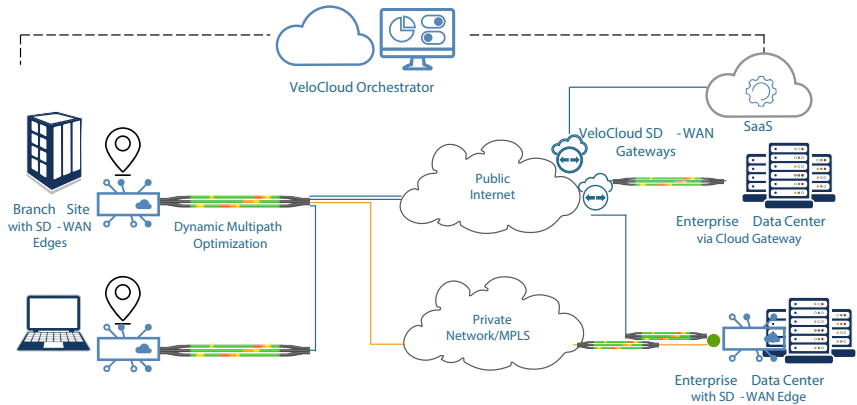*VeloCloud SD-WAN makes setting policy as simple as a single click.*

Figure 1: VeloCloud SD-WAN Service

VeloCloud SD-WAN boosts the service level and capacity of hybrid networks or of standard broadband Internet links by implementing its unique DMPO. This includes the following 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 real-time feedback for dynamic optimization.

Dynamic Application Steering

Applications are automatically recognized and steered to the optimal links 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, midstream to avoid link degradation without any call drop or 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 retransmits 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 dim-out link degradations occur.

Quality of Experience

The SD-WAN overlay with DMPO enables an application-specific quality of experience. Application performance is assured, delivering a high-quality and capacity WAN through a virtual overlay across multiple links, including private and Internet broadband.

Enhanced Security

VeloCloud SD-WAN provides unified, secure communications, regardless of the underlying transport type. Standard IPsec encryption is provided end-to-end between branches and data centers and for interbranch communications. The unique, cloud-delivered architecture also provides automatic VPN from branches to Gateway aggregation points for interoperable access to IaaS, eliminating manual, two-sided tunnel setup from 1XN branches to 1XN cloud data centers. The solution provides the scalability and robust security of public key infrastructure (PKI) 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 pairwise encryption keys.

VeloCloud SD-WAN has important security features built into the Edge's data plane. In addition to the stateful firewall, it offers other features such as traffic segmentation, intrusion detection and prevention (IDS/IPS), URL filtering, malicious IP filtering, security monitoring dashboard, hosted firewall logging, and more. The Enhanced Firewall Service running on

the Edge device improves overall branch network security by detecting unauthorized access to corporate network assets, mitigating threats, and defending against cyber attacks. Today's distributed enterprises

greatly benefit from Enhanced Firewall Service for user traffic protection, consolidated hardware, simple and unified management, reduced operational overhead, and overall cost savings. The Enhanced Firewall Service built into VeloCloud SD-WAN is crucial to an enterprise's digital transformation initiatives.

One-Click Service Delivery

The VeloCloud SD-WAN solution 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 VNFs 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.

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SIEM Integration for Better Security at the Edge

VeloCloud SD-WAN integrates with major security information and event management (SIEM) providers, such as IBM QRadar, to better protect customers with improved security posture, timely detection of threats, proactive protection, and compliance with industry regulations.

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SIEM collects, analyzes, and correlates security data from various sources, such as logs, network traffic, and security alerts. Organizations gain visibility into user traffic, detect threats or malicious activity in a timely manner, and take responsive actions accordingly.

VeloCloud SD-WAN Components

Edges provide zero-touch SD-WAN deployments in branches, and scalable on-premises hub deployments for headquarters and data center locations.

Additionally, all the benefits of SD-WAN, namely assured performance, security, and policy control are available directly at the doorstep of cloud SaaS and IaaS locations through Gateways. The cloud-based Orchestrator provides enterprise-wide business policy, configuration, troubleshooting and at-a-glance monitoring.

VeloCloud SD-WAN Edge

Edges are available as easy-to-install appliances for remote branches with a range of throughput, ports for WAN and LAN connectivity, integrated wireless LAN, and security firewall services. Dynamic routing enables policy-based overlay insertion for both inline and out-of-path deployments. High Availability (HA) setup provides redundancy and failover. In addition to appliance options, Edge is available as VNF software for deployment on standard x86 servers, including virtual CPE devices. The Enhanced Firewall Service protects corporate SD-WAN branch sites against unauthorized access to internal network assets. With the built-in advanced security

features, such as application-aware and session-aware firewall, IDS/IPS, and hosted firewall logging, the Enhanced Firewall Service proactively defends against various cyber attacks and mitigates threats that could potentially cause serious breaches.

VeloCloud SD-WAN Gateway

The multitenant Gateways are deployed at top-tier network points of presence (PoPs) and in cloud data centers around the world to deliver the full range of SD-WAN benefits. Thousands of Gateways provide a scalable and distributed infrastructure, offering the advantages of quick, secure, high-quality, and direct on-ramps to the cloud from any location. These Gateways enable optimized access to cloud applications and data centers, as well as for accessing private network backbones and legacy enterprise sites.

Gateways can be cloud-hosted or deployed on-premises. The most common deployment option is cloud-delivered Gateways, hosted and geographically distributed worldwide. Additionally, Gateways can be deployed as partner Gateways on the premises of service providers, where they are managed by the service provider.

VeloCloud Orchestrator

The Orchestrator is a cloud-hosted or on-premises central management tool for the VeloCloud SASE components: VeloCloud SD-WAN, SSE and VeloCloud SD-Access. Its web-based user interface

(UI) provides simplified configuration, provisioning, monitoring, fault management, logging, and reporting functions. Orchestrator enables flexible

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implementation of business-based policies for application delivery and traffic management.

VeloCloud SD-WAN

VeloCloud SD-WAN brings the software-defined network (SDN) concept to the enterprise branch WAN. A software-based approach enables the flexibility and portability of deploying virtual Edges on off-the-shelf x86- based hardware or as VNFs on virtual CPEs.

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 and 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 or points of failure across the WAN. Each SD-WAN node receives centralized control policies for easy programmability and enterprise-wide visibility.

Security policies are centrally configured from Orchestrator user interface and enforced at Edge devices at branches. Management can be performed using GUI or REST API.

VeloCloud SD-WAN

VeloCloud SD-WAN and SSE together provide an integrated solution known as VeloCloud SASE. This solution aims to deliver simplicity, superior performance, robust security, and enhanced user experience while converging cloud-hosted SD-WAN networking and advanced security services. VeloCloud SASE, designed to leverage the power of the cloud while minimizing complexity at the edge, is an easy- to-consume platform that enables a unified edge and cloud service model with a single unified portal to manage business policy, security, configuration, and monitoring.
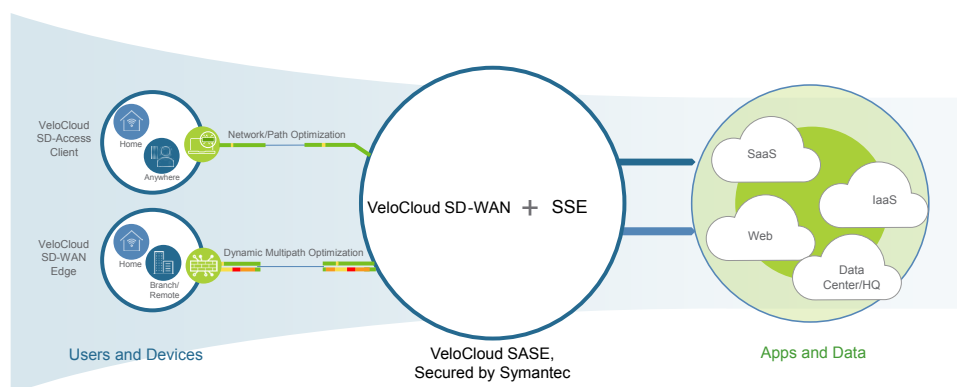
VeloClouD SD-WAN and Security Service Edge (SSE) provide a single-vendor solution known as VeloCloud SASE. This solution aims to deliver simplicity, superior performance, robust security and enhanced user experience.

Figure 2: The VeloCloud™ SASE

VeloCloud™ SD-Access is a cloud-managed, secure, high-performance remote access solution for today's distributed enterprise workforce. Based on Zero Trust Network Access (ZTNA) and optimized for speed, VeloCloud SD-Access ensures application quality and keeps remote workers protected and highly productive. This cloud-managed, scalable client service is set up in minutes. It replaces inflexible VPN infrastructure and delivers a high-performing, private network fabric between servers, clouds, and remote workers' desktops or mobile devices

without requiring an SD-WAN Edge appliance. User traffic paths are optimized, avoiding hairpinning. VeloCloud SD-Access significantly reduces IT capital and operational expenses while extending the SD-WAN experience to users traveling or working at remote locations.

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