

VeloCloud and Intel Deliver SD-WAN Solutions for CommSPs

EarthLink® uses VeloCloud™ Cloud-Delivered SD-WAN™ to deliver superior customer experience.



Executive Summary

The enterprise wide area network (WAN) is evolving as enterprises adopt cloud services and need more flexible network access so that workers in branch offices can easily use these services. This has led to hybrid WANs and the use of Software Defined WAN (SD-WAN) services from communications service providers (CommSPs) to help evolve these networks.

VeloCloud™ Networks is an Intel® Network Builders partner whose Cloud-Delivered SD-WAN solution enables enterprises and CommSPs like EarthLink® to offer new services that utilize multiple WAN transports simultaneously and maximize bandwidth, while ensuring application performance. The unique Cloud-Delivered architecture offers these benefits for both on-premises and cloud applications (SaaS/IaaS). This white paper explores the emerging SD-WAN services market and how VeloCloud Cloud-Delivered SD-WAN,™ with a performance boost from Intel® technology, is helping CommSPs to provide services that give real-time visibility into, and control over, network and application performance.

Challenge

In recent years, enterprises have created hybrid WANs to increase the available bandwidth, increase WAN availability, and access new cloud services by augmenting traditional multiprotocol label switching (MPLS), circuit-switched, or leased-line WANs with broadband connections (DSL, cable modem, etc.) for Internet access. These broadband links provide high-bandwidth and relatively low-cost access to cloud services. At the same time they challenge the IT organization to support routing, security, and other appliances for these services—on top of the equipment in place for the legacy WAN.

SD-WANs use a controller to provide a layer of intelligence to better manage the hybrid WAN. The SD-WAN controller centrally manages routing and policy on all the devices in the SD-WAN domain. At the same time, SD-WAN data plane components have evolved beyond simply examining data flows and enforcing static policies to dynamically steering traffic and performing link remediation based on link capacity and link conditions.

According to industry research firm Gartner,* by 2020 at least 30% of international enterprise WAN service contracts will incorporate NFV-based SD-WAN technology, up from less than 1% in 2016.¹ The reason for this rapid adoption, Gartner says, is that while data centers are the biggest strategic imperative for most enterprises, managing their branch office IT is the most expensive aspect of the network.²

In addition to leveraging the software defined networking (SDN) controller technology, SD-WAN solutions leverage network functions virtualization (NFV) to virtualize an Intel CPU-based platform so that it can host several software-based

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network services, called virtual network functions (VNFs). In addition to SD-WAN, other common VNFs include firewall, routing, and network address translation (NAT).

NFV leverages data center virtualization and, when additional data plane performance is needed, relies on the Intel-developed Data Plane Development Kit (DPDK), an open-source set of drivers and libraries that enables wire-speed data plane operations in NFV servers.

Enterprises can buy and deploy SD-WAN systems, or they can turn to a CommSP to provide SD-WAN services. CommSPs have traditionally delivered legacy WANs and, in some cases, the broadband components of the hybrid WAN. Because of this history and their regional or national service footprint, CommSPs are well positioned to partner with enterprises on SD-WAN services.

VeloCloud Cloud-Delivered SD-WAN

VeloCloud offers a complete SD-WAN solution that makes it easy for CommSPs to develop new SD-WAN services. The VeloCloud solution consists of three main components, starting with the VeloCloud Edge deployed at the customer's branch office and optionally at their data centers. The VeloCloud Edge is available as an Intel® architecture-powered appliance, or as a software and NFV-based virtual customer premises equipment (CPE) that can be run on Intel architecture-based servers.

The VeloCloud solution uses VeloCloud Dynamic Multi-Path Optimization (DMPO) to monitor and adapt to changes in the underlying WAN transport links (MPLS and/or Internet) in real time. It then combines this knowledge of the real-time performance of WAN links with deep application recognition and centralized policy management to deliver an extremely resilient overlay network that optimizes the utilization of these links. Additionally, the VeloCloud Edge appliance can host third-party VNFs for other services such as advanced security.

Another part of the solution is the VeloCloud Gateway, a distributed, multi-tenant gateway that optimizes access to both the CommSP's MPLS core and to cloud services as required. The VeloCloud Gateway can provide this optimized access from any facility across the globe—from a CommSP's core network or from a cloud service provider's cloud data center—ensuring scalability, redundancy, and on-demand flexibility.

The third component of the solution is the VeloCloud Orchestrator, which facilitates service deployment, management, and teardown—including service activation, VNF software installation, configuration, and real time monitoring. The orchestrator can be deployed either in the cloud or on premises in a data center and reports key performance metrics and end-to-end quality of service. The VeloCloud Orchestrator is both multi-tier and multi-tenant. The CommSP can manage multiple customers from the orchestrator and can also choose whether to provide orchestrator access for their customers to quickly bring up and monitor an SD-WAN service with little training.

Other features and benefits of the VeloCloud Cloud-Delivered SD-WAN service include:

IPsec Virtual Private Networks: The service simplifies workflows for encrypted site-to-site data traffic that is interoperable with existing IPsec systems in headquarters offices or data centers.

Forward Error Correction for Real-Time Applications: Voice and video calls need low packet-loss for optimal performance. The VeloCloud solution can initiate forward error correction (FEC) for these data flows. When combined with application steering and dynamic jitter buffering, degradation of real-time application performance drops significantly.

Network and Application Analytics: The analytics dashboard displays real-time network and application performance data. This information helps enterprises to

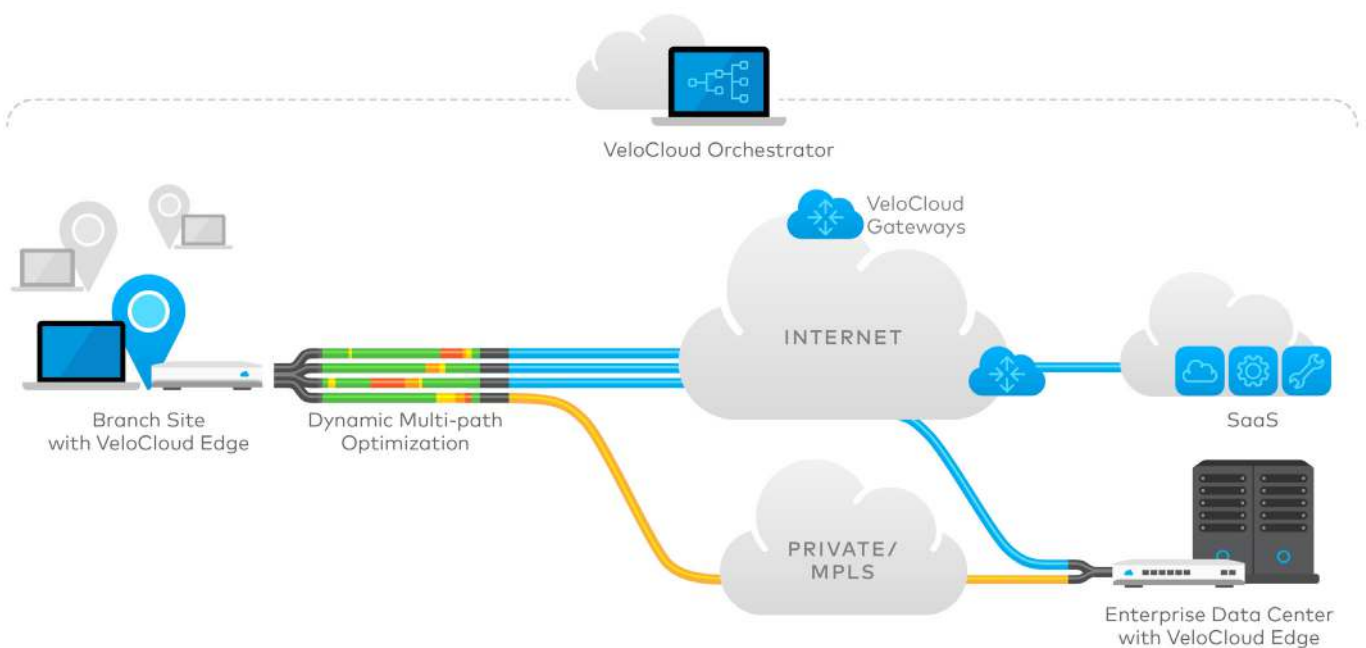


Figure 1. VeloCloud Cloud-Delivered SD-WAN components

make traffic routing decisions to improve performance, especially for voice and video data flows. VeloCloud SD-WAN analytics provides very granular control and a high-level of quality of service because of its capacity to classify data from more than 2,500 applications.

EarthLink Offers SD-WAN Solution

EarthLink is a great example of a CommSP that is adding value to its customer base with VeloCloud Powered EarthLink SD-WAN. With more than 750,000 customers and a company mission to deliver superior customer experiences in a cloud-connected world, EarthLink has been one of the first CommSPs to market with SD-WAN. EarthLink partnered with VeloCloud to develop its service based on VeloCloud Cloud-Delivered SD-WAN.

EarthLink used this technology to create an SD-WAN service that helps businesses flexibly meet the network demands of branch offices as they move more of their critical applications to the cloud. This enables IT to support digital business transformation and customer experience innovation.



EarthLink SD-WAN is aimed at medium and large businesses, but smaller businesses

are leveraging the WAN management simplification of the service as well. Key features of the service include:

- Application visibility and control
- Dynamic WAN selection over multiple active / active links
- Path conditioning
- Dynamic IPsec deployment
- Stateful firewall
- Network analytics

A key differentiator is EarthLink's SD-WAN Concierge service, which provides proactive and personalized guidance to help customers maximize the benefits of SD-WAN via an account manager and team of EarthLink technical experts. This team helps customers make important decisions that go into setting up an SD-WAN service that impacts cost, data security, and business efficiency. This includes determining and setting routing and security policies, tracking analytics and business requirements, and ensuring that the policies meet business needs. The Concierge service also includes 24/7 monitoring to ensure optimal performance, uptime, and reliability. In fact, the "proactive monitoring" of a customer's network and application performance can often draw attention to and address issues before the customer is even aware of them.

One of the reasons that EarthLink chose the VeloCloud solution is its policy-based automation capability combined with application programming interfaces (APIs) and support for self-service portals. These capabilities helped EarthLink to implement its SD-WAN Concierge service and provide flexibility to develop new integrated service solutions that combine multiple EarthLink services for customers.

Leveraging VeloCloud's SD-WAN technology, EarthLink also provides customers a 100% service availability SLA, so they can ensure mission critical applications are always up and running.

Based on Intel® Technology

VeloCloud chose Intel technology for three key reasons. The first was Intel's reputation for high performance virtualization and pioneering NFV technologies. In addition, VeloCloud's engineers have extensive experience developing for Intel platforms. Finally, because of their long experience with Intel technology, VeloCloud's customers had confidence that an Intel-powered platform would stand up to their needs.

The VeloCloud CPE equipment is characterized by fast data plane performance, and a key enabling technology that allowed the company to achieve the high networking throughput is the Data Plane Development Kit (DPDK). The DPDK, initially developed by Intel, is a set of open standard software drivers and libraries that improve the packet processing performance of CPUs. The DPDK software library delivers such high performance because it is used to route network packets around the Linux® OS kernel.

Conclusion

Like many CommSPs, EarthLink sees value in helping its business customers maximize their hybrid WAN investments so that branch office employees can take full advantage of cloud services. VeloCloud is helping EarthLink and other CommSPs to deliver a complete NFV-based service with technology enhancements from Intel that provide performance improvements, minimize costs, and provide extensive application control.

About VeloCloud

VeloCloud Networks Inc. is the Cloud-Delivered SD-WAN company, a Gartner Cool Vendor 2016, the Frost & Sullivan* Product Leader in the SD-WAN Solution Market 2016, and a Best of Interop and Best of VMworld* winner. The company simplifies branch WAN networking by automating deployment and improving performance over private, broadband Internet and LTE links for today's increasingly distributed enterprises. VeloCloud SD-WAN includes a choice of public, private, or hybrid cloud network for enterprise-grade connection to cloud and enterprise applications; branch office enterprise appliances and optional data center appliances; software-defined control and automation; and virtual services delivery.

About Intel

Intel (NASDAQ: INTC) is a world leader in computing innovation. The company designs and builds the essential technologies that serve as the foundation for the world's computing devices. As a leader in corporate responsibility and sustainability, Intel also manufactures the world's first commercially available "conflict-free" microprocessors.³ Additional information about Intel is available at newsroom.intel.com and blogs.intel.com and about Intel's conflict-free efforts at conflictfree.intel.com.



¹ Research cited from the "Network Function Virtualization Will Enable Greater Managed WAN Agility and Flexibility" research report, cited on the Gartner Blog Network <http://blogs.gartner.com/andrew-lerner/2016/09/13/a-new-chapter-in-managed-wan-services/>

² "Happy Birthday, SD-WAN," Gartner Blog Network <http://blogs.gartner.com/andrew-lerner/2016/05/01/sd-wan-turns-2/>

³ "Conflict-free" refers to products, suppliers, supply chains, smelters, and refiners that, based on our due diligence, do not contain or source tantalum, tin, tungsten or gold (referred to as "conflict minerals" by the U.S. Securities and Exchange Commission) that directly or indirectly finance or benefit armed groups in the Democratic Republic of the Congo or adjoining countries.

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