

Maximizing the ROI for enterprise SD-WAN services implemented through Universal CPE platforms

Open, centrally-managed uCPE platforms maximize flexibility while eliminating the risk of vendor lock-in for enterprise SD-WAN services and edge compute applications

SD-WAN: strong traction and room for improvement

While Software-Defined Wide Area Networking (SD-WAN) has achieved strong traction with enterprises worldwide, constraints imposed by the architecture of first-generation solutions limit the flexibility and efficiency for companies who are deploying this type of service. Fortunately, the industry is transitioning to a second-generation approach which enables enterprises to maximize the flexibility of their SD-WAN deployments while improving operational efficiency through centralized management and eliminating the risk of hardware or software vendor lock-in.

This solution brief reviews the basic benefits of SD-WAN, discusses the limitations of first-generation architectures and explains how newer solutions based on the second-generation approach offer improved business results along with lower risk. A real-world use case illustrates the benefits achieved by one end-user who adopted the new approach. The brief also highlights new opportunities enabled by the instantiation of edge cloud applications on the same platform as SD-WAN services.

Transforming business operations through managed SD-WAN

SD-WAN is a virtual WAN architecture that allows enterprises to leverage any combination of transport services, including MPLS, LTE, 5G and broadband Internet services, to securely connect users to applications. Enterprises worldwide are adopting SD-WAN to reduce the costs of their networking infrastructure by reducing the dependence on MPLS, while improving the performance of their cloud-hosted applications, enhancing users' experience and increasing their business productivity. In a managed services deployment, an option selected by some enterprises, a Managed Service Provider (MSP) delivers the necessary hardware, software and network connections to the customer, then remotely manages the SD-WAN deployment to ensure that service-level agreements (SLAs) are met.

Unlike the traditional router-centric WAN architecture, SD-WAN is designed to fully support applications hosted in on-premise data centers, public clouds or private clouds, as well as Software-as-a-Service (SaaS) solutions like Salesforce, Office365 and Dropbox, while delivering the highest levels of application performance.

Limitations of first-generation SD-WAN solutions

First-generation SD-WAN products were vertically integrated, comprising proprietary software running on dedicated hardware appliances,

with no flexibility for changes or enhancements to the function set after deployment at the customer premise. This represents a significant limitation in the case of an enterprise who, for example, has standardized on a specific security vendor across their IT network that is different from the security vendor selected by the SD-WAN provider.

In many cases, an enterprise needs to add a newly-released network function to their SD-WAN after deployment, such as a next-generation firewall or load balancer. Similarly, an enterprise may want to exchange a specific application within the SD-WAN for an alternative provided by another software vendor, for reasons of cost, performance, quality or reliability.

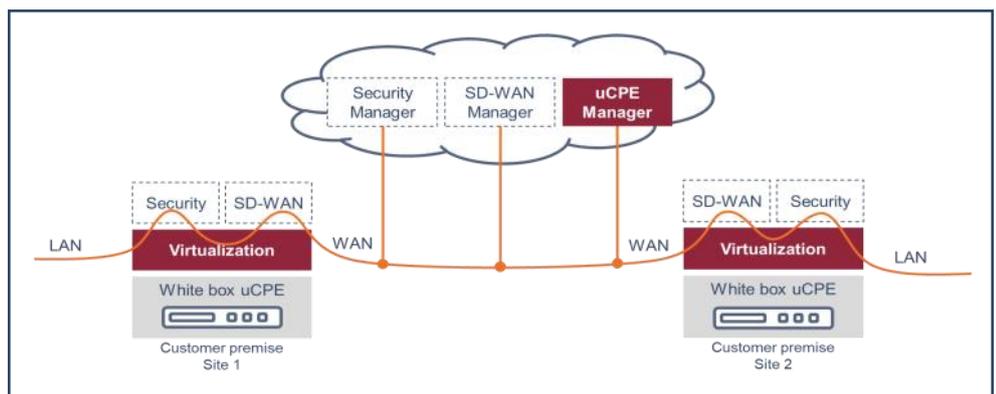
In other scenarios, enterprises need to run their own applications on the servers that host the SD-WAN functions, in a dedicated "tenant space". In many cases, these are edge compute applications representing extensions of functions hosted in a public or private cloud.

Locating compute and storage at the edge of the network, close to the physical location where data is collected, enables that data to be processed and analyzed locally rather than in a central data center or in the cloud. Applications such as industrial IoT (IIoT), highly-immersive augmented reality (AR), video surveillance and smart retail all leverage edge compute to achieve critical low-latency decision-making and/or to minimize the bandwidth required for backhaul to the cloud. In many cases, these applications are physically co-located with SD-WAN services, so significant CAPEX and OPEX savings are possible if they are hosted on the same platform.

Neither of these configurations are feasible in a first-generation SD-WAN architecture.

In terms of physical hardware, some first-generation SD-WANs required multiple appliances to implement all the SD-WAN functions, such as separate Customer Premise Equipment (CPE), router and firewall.

Beyond these limitations that directly impact enterprises, first-generation SD-WANs also impose significant limitations on MSPs that



Example setup of a secure SD-WAN on uCPE for enterprise

deliver them. They are unable to customize the SD-WAN to meet the specific needs of individual customers, or to offer SD-WAN solutions that are differentiated and optimized for specific vertical markets such as healthcare, financial services, manufacturing etc.

Fortunately, all these limitations can be addressed by adopting a second-generation SD-WAN based on a universal CPE (uCPE) platform.

Benefits of enterprise SD-WAN services based on uCPE platforms

Rather than proprietary software running on dedicated hardware appliances, second-generation SD-WAN solutions comprise standards-compliant virtualized applications running on “white box” servers under the control of a secure software virtualization platform.

A uCPE-based SD-WAN platform provides an enterprise with the flexibility to deploy whatever combination of applications is best suited to their specific requirements.

Users can select from compatible applications available from multiple suppliers, while retaining the option to replace one function with another after deployment in order to improve the performance or functionality of their SD-WAN. Security patches can be implemented as soon as an updated application is available, without waiting for a vendor to update a complete, monolithic hardware-plus-software product.

For enterprises that require the installation of, for example, a firewall from a vendor pre-approved or even mandated by their IT organization, the appropriate firewall can be installed and configured as part of their unique application set.

Enterprises who need to run their own applications in a dedicated tenant space on the uCPE servers can provision appropriate compute, networking and storage resources while providing secure access to whitelisted team members. Edge compute applications can be hosted on the same platform as the SD-WAN services and managed within the same dashboard.

The same flexibility applies to the software virtualization platform. As long as the original platform selected conforms to the applicable open standards, then it can be replaced at a later date if a newer product offers superior performance, latency, security, reliability or cost. This applies whether the replacement product is from a competing vendor or simply an upgrade to the original platform.

Finally, the uCPE approach to managed SD-WAN maximizes the user’s hardware options. Ideally, the user will choose a white box server based on an Arm or Intel Architecture processor, provisioned appropriately for the expected workloads. If resource requirements change because of different workloads, or a more cost-effective server becomes available, then as long as it meets the appropriate standards the user introduce it without changing software.

While some software virtualization platforms use OpenStack to perform the lifecycle management of virtualized applications, others have emerged that eliminate the need for OpenStack. Typically using NETCONF, these platforms have smaller footprint requirements for CPU cores, memory and storage, enabling the SD-WAN to be installed on lower-cost, lower-power hardware.

A fully-scalable software virtualization platform allows an enterprise to cost-effectively meet their requirements for throughput, capacity and hosted applications, even when those requirements vary widely across a large number of branch offices and remote users. The identical, scalable virtualization platform can be deployed at each node.

A uCPE platform with centralized management of both infrastructure and services ensures efficient operational support for remote branch offices, especially if they lack local IT support with the necessary skills in configuration and management.

In summary, by implementing centrally-managed SD-WAN and/or edge compute deployments as multi-vendor solutions hosted on industry-standard uCPE platforms, enterprises maximize the flexibility of the services they deploy, eliminate the risk of vendor lock-in and optimize their operational efficiency, thereby maximizing the Return on Investment (RoI) for their SD-WAN services.

Case Study: CMC Networks and Enea

CMC Networks, a Global Telecommunications Carrier headquartered in South Africa, servicing the largest Pan African and Middle Eastern network, envisioned a new business opportunity in SD-WAN.

CMC observed that they could grow and enhance their managed SD-WAN business significantly by delivering to their customers a set of networking services selected and configured to match the specific needs of each customer.

To achieve this flexibility, CMC required the ability to deploy a unique combinations of services from multiple vendors on a flexible software platform located at each customer premise.

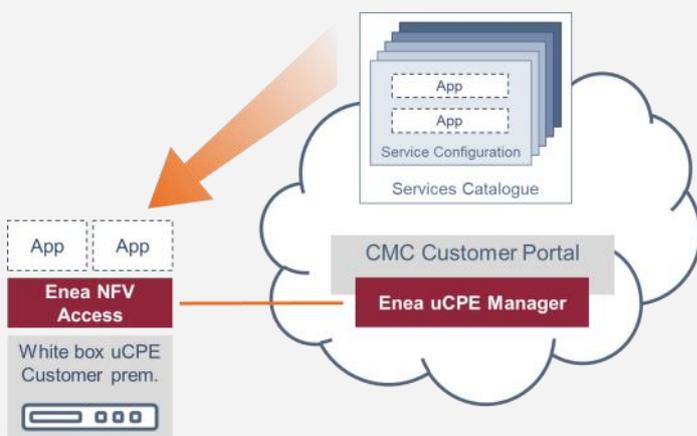
This universal uCPE platform would need to meet all applicable open standards for hosting software-based network services and in parallel minimize the costs of acquisition, installation and operation at remote customer locations.

To address these business and technical challenges, CMC adopted Enea NFV Access, a virtualization and management platform for white-box uCPE deployments whose reliability, security and performance has already been proven in demanding telecom networks.

Enea NFV Access provides CMC with the flexibility to deploy virtualized applications from multiple vendors, running in a virtualized environment on appropriately-sized servers from industry-standard suppliers.

CMC can now supplement basic SD-WAN connectivity with additional customer-requested functions such as next-generation firewalls or routers, all provisioned, configured and updated remotely using Enea uCPE Manager to minimize operational costs while maximizing security.

By adopting this second-generation SD-WAN architecture, CMC was able to expand their managed SD-WAN services in the market, while accelerating their customers’ business transformation.



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