Gain Universal Customer Premise Equipment Flexibility with Dell EMC and Intel

With the Dell EMC Virtual Edge Platform 4600*, powered by the Intel® Xeon® D-2100 processor, Communications Service Providers can break away from the closed proprietary CPE solutions of today, and enjoy freedom to innovate without sacrificing performance with open solutions from Dell EMC and Intel.

Executive Summary

Today, Communications Service Providers (CoSPs) typically deploy managed services on closed Customer Premise Equipment (CPE) platforms that consist of proprietary single vendor hardware, operating systems, and management software. This is expensive and restricts the CoSP to offering only what is delivered by the single vendor solution. While this has served the industry well in the past, it is no longer an effective approach to keep up with demands from the market for services that evolve at the speed of software. Regaining the freedom to innovate by using open platforms that support combinations of the newest and best software functions available from multiple suppliers is paramount in meeting market demand and growing business (see figure 1 for universal CPE (uCPE) use case). The Dell EMC Virtual Edge Platform (VEP) 4600* uCPE, powered by the Intel® Xeon® D-2100 processor, offers a state-of-the-art solution to unlock the innovation potential of managed service creation. The CoSP can select the best software services, and combine them in any way that best meets the needs of their customers, all at the speed of software deployment.

Business Challenge: Realizing fast ROI on new services

CoSPs operate in a challenging market. To remain competitive and make the most of the opportunities afforded by emerging 5G and Internet of Things (IoT) use cases, CoSPs must be able to quickly and cost-effectively launch new, value-added revenue-generating services.

However, the complexity and rising costs of traditional network infrastructures are making it difficult for CoSPs to compete. The lack of flexibility and agility of fixed-function, proprietary hardware poses a serious threat to innovation. It takes a long time...
to bring new or updated services to market, and even longer to see any sort of return on investment (ROI).

The constraints of hardware-based appliances are leading many CoSPs to apply standard IT virtualization technologies to their networks. This process, called network functions virtualization (NFV), decouples network functions from proprietary hardware appliances so that they can run in software on commercial-off-the-shelf (COTS) servers. It delivers many benefits, including reduced capital expenditure (CAPEX) and operational expenditure (OPEX), accelerated time to market, faster ROI, and greater flexibility to scale services up or down in line with customer demand.

uCPE, SD-WAN and the Dell EMC VEP 4600*

On the customer premise side, many CoSPs see uCPE as a way to gain the full benefits of NFV. Replacing traditional fixed-function CPE, uCPE extends the power of the cloud to the network, providing a general-purpose platform for hosting virtual network functions (VNFs) and enabling the rapid development and deployment of services, like Software-Defined WAN (SD-WAN).

Rising in popularity, SD-WAN enables enterprises and CoSPs to lower the total cost of ownership (TCO) of connecting enterprise users to the data center and provides the flexibility to keep up with rapidly changing business environment. It is the convergence of uCPE and SD-WAN that is providing CoSPs with an opportunity to quickly and cost-effectively launch new revenue-generating services.

Eric Vallone, Director of Product Management for Dell EMC’s Service Provider Solutions Group, explains: “The uCPE and SD-WAN market segments are coming together. They work independently of each other but present the best opportunities when they are paired. In essence, uCPE takes the branch office device and virtualizes it, enabling it to run multiple different functions at the CoSP’s or enterprise’s choosing. Combining uCPE with SD-WAN, as a VNF that runs on the uCPE, CoSPs can quickly and cost-effectively launch new managed SD-WAN services to their end customers.”

To support CoSPs in the delivery of these new managed services from the branch office, Dell EMC has launched the Dell EMC VEP 4600 networking platform. The Dell EMC VEP 4600 is purpose built for access; and is specifically designed for hosting uCPE functions. With applicability for the CoSP Edge and Enterprise Branch, it is built for virtualization allowing the deployment of VNFs like SD-WAN.

While SD-WAN is the first use case, the Dell EMC VEP 4600 also gives CoSPs the power in the future to insert and support other new managed services like virtualized firewall, virtualized routing, virtualized Intrusion Prevention System (IPS), Deep Packet Inspection (DPI) or WAN acceleration. To achieve this, the Dell EMC VEP 4600 has been designed to be as flexible as possible, making it easy for CoSPs to add VNFs, storage and memory according to their needs.

Solution Benefits

- Simplified SD-WAN adoption.
  SD-WAN is the application being deployed now. Dell EMC offers validated bundles to deploy not only SD-WAN, but enable the next set of security and collaboration services on the same uCPE without shipping additional appliances, or sending technicians to a site.

- Faster time to revenue.
  A family of ready node offerings, ready bundles and reference architectures accelerate time to revenue.

- Future investment protection.
  Expandable options give CoSPs the flexibility to support future managed services like virtualized firewall, virtualized routing, virtualized Intrusion Prevention System (IPS), Deep Packet Inspection (DPI) or WAN acceleration.
Solution Value: Accelerating ROI on SD-WAN managed services

Using the Dell EMC VEP 4600, CoSPs can confidently add new, profitable SD-WAN managed services. Its open and disaggregated framework provides service agility and operational efficiency like that seen in the CoSP cloud.

A family of ready node offerings, ready bundles and reference architectures, designed for CoSPs and enterprises alike, simplify SD-WAN adoption and accelerate time to revenue. At the heart of the ready nodes are validated, pre-tested solutions comprising of Dell EMC compute platforms and industry leading SD-WAN software offerings from Silver Peak, Versa Networks, Riverbed, Nokia, and VeloCloud. Included in the ready node offerings are Bill of Materials (BOM), partner software SKUs for the appropriate use cases, pre-installed drivers, and firmware settings.

The Dell EMC VEP 4600’s efficient cost and performance model enables CoSPs to deliver service level agreement (SLA)-guaranteed WAN, while service chaining and delivery on demand increase revenue-generating service delivery opportunities.

Since the Dell EMC VEP 4600 is a flexible uCPE, it gives CoSPs the power to launch new services in the future, providing investment protection. In addition to a choice of SD-WAN software, the Dell EMC VEP 4600 also provides a solid value chain of ecosystem partners for security services (Palo Alto, Fortinet and SonicWALL), router (Nokia and Brocade/AT&T), WAN optimization and acceleration (Silver Peak and Riverbed), DPI (Nokia) and systems integration (SI) for delivery.

Finally, the Dell EMC VEP 4600 is globally sold and supported, providing CoSPs with the reassurance that advice is never too far away.

Solution Architecture: Dell EMC VEP 4600* with Intel® Xeon® D-2100 processor

To provide the necessary horsepower to run its VEP 4600 platform, Dell EMC selected the Intel Xeon D-2100 processor, making it the first vendor to market with this technology. Eric Vallone, Director of Product Management for Dell EMC’s Service Provider Solutions Group, explains: “We had some very specific requirements that we wanted to build into the VEP product line. We wanted to make sure that it was flexible, but it had the performance that we needed, as well as the ability for us to be able to grow and build not just a single product but an entire line. The Intel Xeon D-2100 processor gave us all those capabilities, but most importantly, it gave us the performance that was necessary for us to be able to deliver these new products and services.”

The Intel Xeon D-2100 processor was developed specifically to address key customer needs at the edge of data center and network. The performance, power and form factor have been optimized for higher performance and perf/watt for SD-WAN and uCPE, delivering up to 1.6x³ faster CPU performance, up to 2.9x² faster network performance, and 2.8x³ faster storage performance. The integrated 4 x 10 Gigabit Ethernet

**Figure 2.** Warehousing cycle deployed remotely with uCPE

<table>
<thead>
<tr>
<th>ORDER FULFILMENT PROCESS STEPS</th>
<th>VEP Eliminates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory Handling</td>
<td>X Cost implications of multiple branches</td>
</tr>
<tr>
<td>Warehouse Management</td>
<td>X Truck roll for each additional service</td>
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<tr>
<td>Order Processing</td>
<td>X Inventory</td>
</tr>
<tr>
<td>Order Fulfilment</td>
<td>X Shipping</td>
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<tr>
<td>Accept or Return</td>
<td>X RMA costs</td>
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**VEP Enables:**
- ✔ Software approach
- ✔ Disaggregated model
- ✔ “Try-to-buy” models

Solutions proven by your peers

Intel Solutions Architects are technology experts who work with the world’s largest and most successful companies to design business solutions that solve pressing business challenges. These solutions are based on real-world experience gathered from customers who have successfully tested, piloted, and/or deployed these solutions in specific business use cases. Solutions architects and technology experts for this solution brief are listed on the front cover.
Controllers with optimizations allow the complex packet processing and other scale-out workloads at the low latency and responsiveness that customers demand. This platform provides a cost and power-efficient foundation for today’s network deployments, the flexibility to rapidly adapt to new service requirements and the headroom to handle future growth.

Intel® QuickAssist Technology’s built-in acceleration of encryption and compression functions up to 100 Gigabits per second (Gbps) and the Data Plane Development Kit’s advanced packet forwarding acceleration, provides efficiency for growing security workloads and helps preserve compute resources.

In addition to hardware, Intel provided Dell EMC with support throughout the entire design and development of the Dell EMC VEP 4600. “Intel has been a great collaborator, helping us select the right CPUs and chipsets, and integrating Intel® QuickAssist Technology and Intel® Ethernet Controllers onto the platform and working with us to achieve a truly flexible, future-ready solution,” says Gopi Manapragada, Director of Engineering at Dell EMC. “We worked closely together right from the early design stages through to development and testing, bouncing ideas to ensure use cases could be extended beyond SD-WAN.”

**Conclusion**

The Dell EMC VEP 4600 empowers CoSPs to confidently add new profitable SD-WAN managed services and position themselves to add new services via software without the inventory, shipping and truck roll expenses of traditional approaches (see figure 3). It provides CoSPs with a high performance, flexible platform on which to build SD-WAN for their customers and offers product options for SD-WAN services that are built upon the industry’s foremost hardware platforms, along with SD-WAN services and network virtualization from Dell EMC’s premier partners. Moreover, CoSPs can achieve faster time to revenue, with rapid production, using this pre-validated solution, complete with designs, tested reference architectures, and command lines.

Find the solution that is right for your organization. Contact your Intel representative or visit [www.intel.com/networktransformation](http://www.intel.com/networktransformation).
Learn more

You may also find the following resources useful:

- **Intel® Xeon® D-2100 processors:**

- **Intel® Xeon® D-2100 processor product brief:**

- **Dell EMC Virtual Edge Platform:**

Solution Provided By:

![Intel and Dell EMC logos]

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3. Up to 2.8X on ISA-L (Cryptographic Hashing) with Intel® Xeon® D-2183IT processor compared with previous generation Intel® Xeon® D-1587 processor. Configuration and workload details: ISA-L (Cryptographic Hashing): 1-Intel® Xeon® D-1587 Processor (24M, 1.70 GHz Platform: Durango, 4x8GB(32GB 2400MHz ), OS: Red Hat Enterprise Linux* 7.4(Kernel 3.10.0-693.el7.x86_64), Benchmark: ISA-L (2.21)- Cryptographic Hashing (multibinary_sha512), Compiler: NA,BIOS: GNVDINT1.86B.0005.V13.1512071754, Storage: 4 x 2 TB DC P3700 Series PCIe NVMe, Network Device: NA, Network Speed: 1x50GbE, Intel® QuickAssist Technology version: NA, Score: 3.074, compared to 1-Intel® Xeon® D-2183IT Processor (22M, 2.0 GHz) Platform: Yuba City, 4x8GB(32GB 2400MHz ), OS: Red Hat Enterprise Linux* 7.4(Kernel 3.10.0-693.el7.x86_64), Benchmark: ISA-L (2.21) Cryptographic Hashing (multibinary_sha512), Compiler: NA, BIOS: BKVDTRL1.86B.0005.D08.1712070559, Storage: 4 x 1.6 TB DC P4600 Series PCIe NVMe, Network Device: NA, Network Speed: 2x50GbE, Intel® QuickAssist Technology version: NA, Score: 1.075. Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit www.intel.com/benchmarks

Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as “Spectre” and “Meltdown”. Implementation of these updates may make these results inapplicable to your device or system. Intel does not control or audit third-party benchmark data or the websites referenced in this document. You should visit the referenced website and confirm whether referenced data are accurate.

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