Dell EMC VEP4600

Technology Guide

Abstract

This document describes the Dell EMC VEP4600 networking switch. It includes features, specifications, and regulatory agency compliance.

Dell Solutions

Notes, cautions, and warnings

(i) NOTE: A NOTE indicates important information that helps you make better use of your product.

△ CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

⚠ WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

Overview

The Dell EMC Virtual Edge Platform VEP4600 is a networking platform that is purpose-built, future-ready, and validated for next generation access deployments.

The VEP4600 is a single-socket, 1RU platform that offers hosted virtualized network functionality, with applicability for the Service Provider Edge and Enterprise Branch. The VEP4600 uses the latest Intel Xeon D-2100 x86-based processor.

The VEP4600 features:

- Intel Xeon-D 2100 processor product family—4-, 8-, and 16-core
- Four dual in-line memory module (DIMM) slots, up to 128 GB
- Two M.2 solid-state drive (SSD) slots
- Two mezzanine slots based on PCI3 x16 gen 3
- Two 10G small form-factor pluggable plus (SFP+) network ports
- Four 1GE ports
- Out-of-band management ports
- Kernel-based virtual machine (KVM), ESXi hypervisors, with native Linux and Versa OS support

ⓘ **NOTE: For a complete list of VEP4600 features, see Specifications.**

Features

VEP4600 is an ideal solution that provides simplified deployment and validated hardware and software options. VEP4600 provides the necessary headroom for hosting network function vitalization (VNF) services. As universal customer premise equipment (uCPE), VEP4600 is ideal for hosting SD-WAN and other VNF services such as routing, firewall WAN optimization, or deep-packet inspection. Use VEP4600 with Service Provider Edge and Enterprise Branch.

The VEP4600 platform offers:

- Open and disaggregated networking
- Best-in-class x86-based networking platform
- Virtualized uCPE services such as a bare metal application or on top of a virtualized environment
- Front-facing I/O ports
- QuickAssist Technology (QAT) on 8-core and 16-core systems
- M.2 SATA SSD high-performance storage
- Out-of-band (OOB) management via Intelligent Platform Management Interface (IPMI)
- Baseboard management controller (BMC)
- KVM support
- ESXi hypervisors and native Linux

Topics:

- Specifications
- Configurations
- VEP4600 IO-side
- VEP4600 PSU-side
- Architecture
- uCPE
- SD-WAN deployment
- MPLS off-load
- Dual Internet WAN
- Multipath interconnect transit
- Software

Specifications

Table 1. VEP4600 specifications

Feature	Specification
CPU	Intel Xeon-D 2100—4-, 8-, and 16-core
Networking ports	4x1GbE 2x10GbE
Management ports	Two 10/100/1000Base-T ports: - One port for the CPU - One port for the BMC
USB ports	- Two USB Type-A receptacle female ports that support USB 3.0 - One Micro USB Type-B receptacle female port for the console port

Table 1. VEP4600 specifications (continued)

Feature	Specification
Console ports	Two serial console ports: • One port for the CPU • One port fo the BMC
Storage option	Two M.2 SATA up to 960GB per slot
OOB management	BMC IPMI 2.0-compliant
Memory	Four DIMM slots, up to 128 GB
TPM	2.0
QAT	Yes, except for 4-core CPU
Expansion slots	Two mezzanine slots based on PCIe x16 gen 3
BMC	IPMI 2.0-compliant
PSUs	Two hot-swappable PSUs
Fans	Hot-swappable and redundant: • Maximum five fans for the 16-core CPU • Maximum four fans for the 4- and 8-core CPUs
Airflow	I/O-side to PSU-side
Optic support	Both SFP+ ports support 10G SR, LR, USR, ZR, and 10GBT
Operating system	• Linux—Ubuntu OS and Red Hat/CentOS ⓘ **NOTE: Not factory installed** • VMware ESXi • Versa OS • ADVA Connector
Dimensions and weight	• Height: 4.45 cm - 1.75 in • Depth: 38.1 cm - 15 in • Width: 43.4 cm - 17.1 in • Weight: 13.75 lbs. (6.34 kg)—One PSU and four fans • 15.75 lbs. (7.14 kg)—Two PSUs and five fans

Table 2. AC power specifications

Parameter	Specification
AC power input	100 VAC-240 VAC, 50/60 Hz
Typical AC current draw per system	• 110 VAC: 1.8A for the 16-core processor • 240 VAC: 0.85A for the 16-core processor • 110 VAC: 1.5A for the 8-core processor • 240 VAC: 0.7A for the 8-core processor • 110 VAC: 1.35A for the 4-core processor • 240 VAC: 0.65A for the 4-core processor
Typical power consumption	• 5-fan 16-core CPU: 206.5W • 4-fan 8-core CPU: 170W • 4-fan 4-core CPU: 160W
Maximum power consumption	• 5-fan 16-core CPU: 311W • 4-fan 8-core CPU: 230W • 4-fan 4-core CPU: 220W

Table 2. AC power specifications (continued)

Parameter	Specification
Power available for optics per SFP+ port	1 W

Table 3. Cooling specifications

Parameter	Specifications
Thermal dissipation	• Typical: 682.43 BTU/hr (200 W) • Maximum: 1023.64 BTU/hr (311 W)
Number of hot-swappable fans	Four or five, depending on the configuration ordered
Minimum number of operational fans before shutdown	• Three fans for the 4- to 8-core processor • Four fans for the 16-core processor
Minimum CFM	• Five fans: 35.4 • Four fans: 28.5
Maximum CFM	• Five fans: 107.2 • Four fans: 82.2

Table 4. Environmental Specifications

Parameter	Specifications
Operating temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	-40°C to 70°C (-40°F to 158°F)
Operating relative humidity	• 5% to 85% (RH), non-condensing, continuously • 5% to 90% (RH), non-condensing, short term (< 1% of operational hour per year)
Storage relative humidity	5% to 90% (RH)
Operating altitude	No performance degradation to 10,000 feet (3,048 meters)
Storage altitude	35,000 feet (10,688 meters)

Table 5. Acoustic noise with four fans and one PSU

Test location	Acoustic noise (dBA)
Front	48.7
Back	56.2
Left	49.4
Right	49.5

Table 6. Acoustic noise with five fans and two PSUs

Test location	Acoustic noise (dBA)
Front	49.8
Back	57.7
Left	51.0
Right	51.6

Configurations

VEP4600 is a single-socket, 1RU platform available in the following configurations:

Table 7. VEP4600 configurations

SKU	Description	Region	CPU	Installed SW	Expansion slot	RAM	Storage	PSUs	Fans
210-APGJ	Intel Xeon-D 2100 4 core, 16 GB, Non-QAT, 2x10GbE SFP+, 4x1GbaseT	Global	Intel Skylake-D Cores: 4 Speed: 2.2 GHz Cache: 1MB/core QAT: No	ESXi		1x16 DDR4 RDIMM	128 GB	1	4 max
210-APGT	Intel Xeon-D 2100 8 core, 16 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	Global	Intel Skylake-D Cores: 8 Speed: 1.9 GHz Cache: 1MB/core QAT: Yes	ESXi		1x16 DDR4 RDIMM	240 GB	1	4 max
210-ATWN	Intel Xeon-D 2100 8 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT, VEP4600-V910	Global		Versa		2x32 DDR4 RDIMM	240 GB	2	4 max
210-AXED	Intel Xeon-D 2100 8 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT, VEP4600-V910	US Fed		Versa		2x32 DDR4 RDIMM	240 GB	2	4 max
210-APDH	Intel Xeon-D 2100 8 core, 32 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	China	Intel Skylake-D Cores: 8 Speed: 1.9 GHz Cache: 1MB/core QAT: Yes	ESXi		1x32 DDR4 RDIMM	960 GB	1	4 max
210-APGU	Intel Xeon-D 2100 8 core, 32 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	Global		ESXi		1x32 DDR4 RDIMM	960 GB	1	4 max
210-AXEF	Intel Xeon-D 2100 8	US Fed		ESXi		1x32 DDR4 RDIMM	960 GB	1	4 max

Table 7. VEP4600 configurations (continued)

SKU	Description	Region	CPU	Installed SW	Expansion slot	RAM	Storage	PSUs	Fans
	core, 32 GB, QAT, 2x10GbE SFP+, 4x1GbaseT								
210-AWTC	Intel Xeon-D 2100 16 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT VEP4600-V930	China	Intel Skylake-D Cores: 16 Speed: 2.0 GHz Cache: 1MB/core QAT: Yes	Versa	4 x10G x710 rNDC card	2x32 DDR4 RDIMM	960 GB	2	5 max
210-ATWM	Intel Xeon-D 2100 16 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT, VEP4600-V930 4x10G	Global		Versa	4 x10G x710 rNDC card	2x32 DDR4 RDIMM	960 GB	2	5 max
210-AXEG	Intel Xeon-D 2100 16 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	US Fed		Versa	4 x10G x710 rNDC card	2x32 DDR4 RDIMM	960 GB	2	5 max
210-APGV	Intel Xeon-D 2100 16 core, 32 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	Global	Intel Skylake-D Cores: 16 Speed: 2.0 GHz Cache: 1MB/core QAT: Yes	ESXi		1x32 DDR4 RDIMM	240 GB	2	5 max
210-APGW	Intel Xeon-D 2100 16 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	Global		ESXi		2x32 DDR4 RDIMM	960 GB	2	5 max
210-AXEE	Intel Xeon-D 2100 16 core, 64 GB, QAT, 2x10GbE SFP+, 4x1GbaseT	US Fed		ESXi		2x32 DDR4 RDIMM	960 GB	2	5 max

VEP4600 IO-side

The I/O-side of the VEP4600 platform contains the access and uplink ports.

There are two fixed VEP4600 Expansion Cards slots on the I/O side which permits networking expansion with the additional network interface controller (NIC) ports.
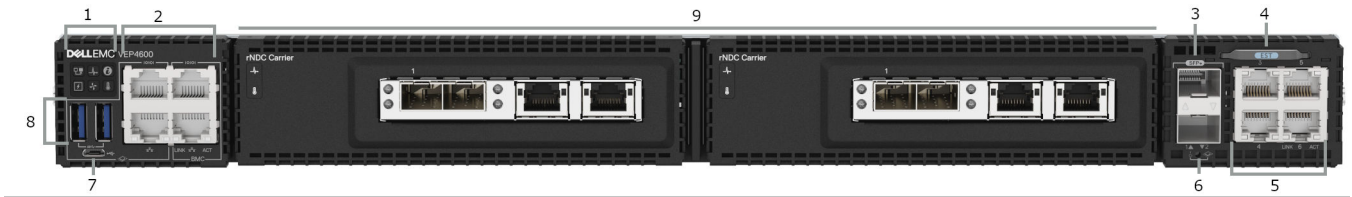
**Figure 1. VEP4600 I/O-side view**

1. Platform status Icons LEDs
2. RS-232 console ports (top) and 10/100/1000 Base-T ports (bottom)
3. SFP+ ports
4. Luggage tag
5. 1000Base-T networking ports
6. Advanced Configuration and Power Interface (ACPI) Power button
7. Micro USB-B port
8. USB Type A ports
9. rNDC VEP4600 Expansion cards (optional)

VEP4600 PSU-side

The VEP4600 PSU-side is the default location for PSUs, including the power connections, and fans.

The VEP4600 system provides two backplane options:

- Four hot-swappable redundant fans for 4- and 8-core configurations
- Five hot-swappable redundant fans for 16-core configurations
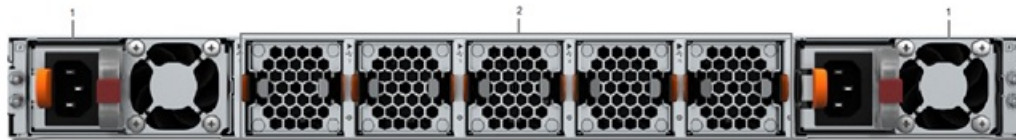
Figure 2. VEP4600 PSU-side

1. PSUs
2. Fans

Architecture

The VEP4600 platform consists of an Intel processor complex with these high-level features:

Table 8. VEP4600 processor features

| Feature	Specification
Storage	Two M.2 SATA SSDs with support up to 960 GB, upgradable to 1.92TB with custom upgrade
Memory	Four DDR4 RDIMM slots up to a total of 64GB in standard configuration, upgradable to 128GB with custom upgrade
Primary management ports	10/100/1000Base-T ports for system access: • One for the CPU

Table 8. VEP4600 processor features (continued)

Feature	Specification
	• One for the BMC
USB ports	• Two USB Type-A receptacle female ports supporting USB 3.0 with maximum data rates of 640 Mbps • One USB Type-B receptacle female port used as a console port. You can connect a laptop to this port using a standard male USB-A to a standard male USB-B cable

Console ports	• Two serial ports for system CPU access: An RJ-45 and a USB-B console port. The USB-B port acts as the console port. The terminal settings are the same for both.
	• One serial port available for system BMC access: An RJ-45 console port.
	• The terminal settings are the same for the USB-B port and the console port:
	  ○ 115200 baud rate
	  ○ No parity
	  ○ 8 data bits
	  ○ One stop bit
	  ○ Flow control disabled by default
	  ○ When the USB-B port is connected, it becomes the primary connection. The system then sends all messages to the USB-B port.

PSUs	The PSUs are located opposite to the I/O-side. Depending on the configuration you select, the platform ships with one or two AC PSUs.
Fans	Depending on the configuration that you select, the platform ships with four or five field replaceable fan trays.

uCPE

Universal customer premise equipment (uCPE) is a disaggregated hardware-based solution that supports NFV-like workloads at the edge, such as the customer or branch. The device is a remotely manageable platform that service providers can deploy, modify, or delete VNFs from a customer site over a wide area network (WAN).
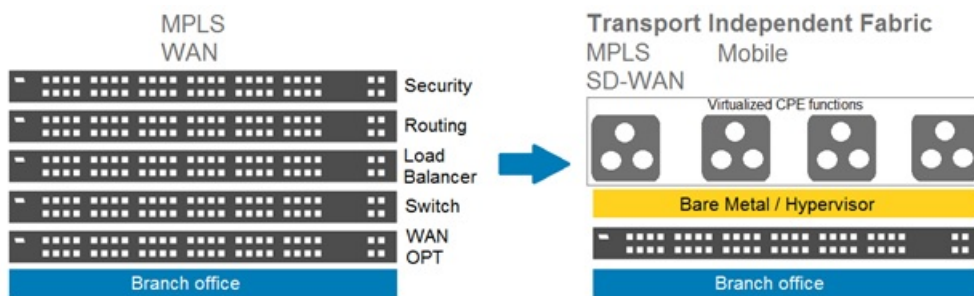
Figure 3. uCPE

Table 9. uCPE advantages

Current model	uCPE
Proprietary architecture, disjointed solution, and hardware that results in high total cost of ownership	Open architecture and commercial off-the-shelf hardware
Complex operation model that cannot scale with growing demand.	Agile technology and services

Table 9. uCPE advantages (continued)

Current model	uCPE
Every application requires an individual CPE, each with long upgrade cycles.	• Independent hardware and software life cycles that enable agility in new services delivery • Dynamic scale-up and scale-out

SD-WAN deployment

Traditionally, wide area networks (WANs) were built over private multiprotocol label switching (MPLS) connections. This provided the security, quality, and class of service (QoS/CoS) that is required by dominant client/server communications from branch-to-data center traffic. Although this configuration is secure and deterministic, it is highly rigid and expensive.

SD-WAN provides a secure and encrypted software-defined virtual network that overlays existing physical network technologies. This overlay provides a transport/access solution that allows you to manage the disparate underlay networks such as MPLS, Broadband as a single intelligent fabric. The overlay also provides application-aware routing, zero-touch provisioning, traffic steering, SLA verification, self-healing, visualization, and common centralized policy management of the network.

The examples that are shown are the most common SD-WAN use cases. The SD-WAN solution in these examples provides a common transport/access agnostic, centrally managed, dynamic application-aware routing solution that you can use in many different ways.

MPLS off-load

To reduce the investment in MPLS bandwidth, when using low-cost broadband against higher-cost MPLS, less mission-critical traffic is typically off-loaded onto lower-cost Internet. Services that require QoS/CoS such as VoIP, are sent over MPLS where edge-to-edge prioritization is supported.

You can firewall Internet traffic via local Internet breakout at the premise or use as a low-cost transport alternative for linking branch locations to each other or centralized data centers over an encrypted tunnel. Through centralized policy management and application-based aware routing, the overlay network can make decisions dynamically and intelligently.

This example may also serve as a primary/back-up option if you want to use MPLS as primary and Internet as a secondary back-up.
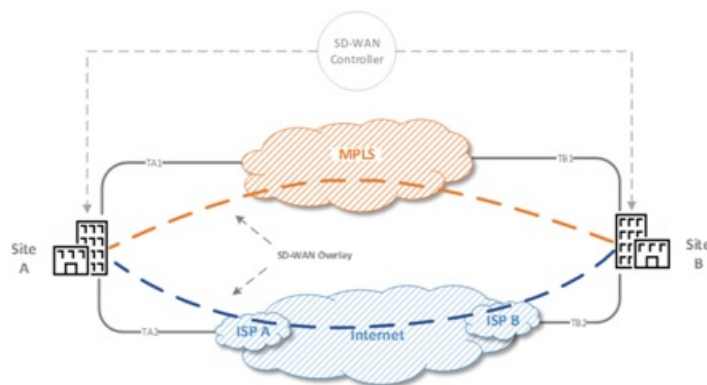
Figure 4. MPLS off-load

Dual Internet WAN

This solution offers support for a *bring your own access* (BYOA) deployment model.

Due to the nature of the Internet, underlying transports offer only best effort, no edge-to-edge QoS/CoS. However, you can offset this limitation by selecting redundant providers that offer different peering points to the Internet. As network conditions fluctuate, the dynamic routing intelligence constantly searches for the best possible path and routes traffic accordingly. This dynamic routing ensures better performance than a single broadband link or broadband links of the same carrier.

The integrated firewall features and overlay link encryption provide a high level of security. Also, recent SD-WAN software innovations include self-healing and packet-loss recovery capabilities that improve Internet and MPLS.

Figure 5. Dual Internet WAN

Multipath interconnect transit

This example shows SD-WAN capabilities that are used to their maximum potential. The overlay network meshes and interconnects between three different clouds and their related access. Traffic steering implements to use any connection to accomplish the policies that the controller mandates.

The previous examples were accomplished through point-to-point tunnels between the source and destination. In this case, the tunnels terminate at intermediate points in the network. This routing provides more routing options for resiliency and performance.
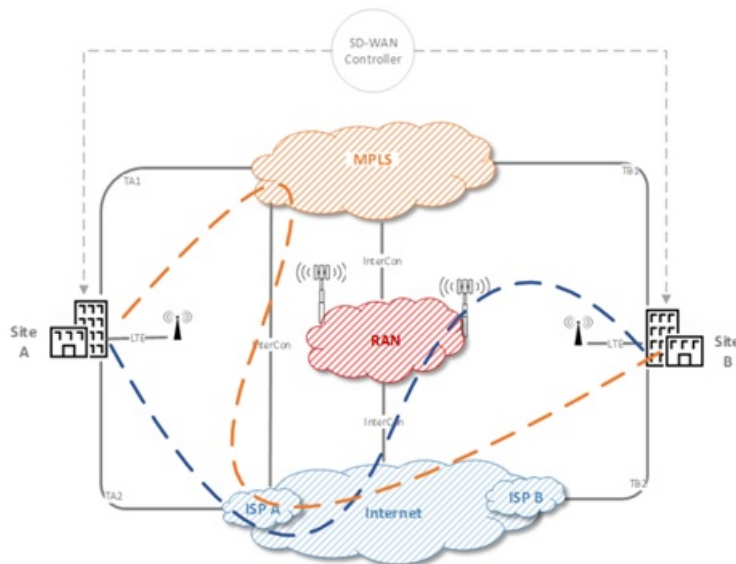

Figure 6. Multipath interconnect transit

Software

Built primarily for SD WAN and uCPE the general purpose VEP4600 provides hypervisor operating system (OS) configurations if supported by the Intel Xeon architecture.

Dell EMC is continually testing and validating software for the VEP4600. Currently, Velocloud, Versa, ESXi and Adva Ensemble are validated. Plans to offer these as pre-loaded bundles are in progress. Announcements when ready.

Trim

Trim (TRIMM in ATA command set, and UNMAP in SCSI command set) informs a SSD which blocks and or data that can be safely deleted.

Trim addresses the different low-level SSD operations compared to legacy hard drive protocols. Trim improves standard write operations and efficient garbage collection of SSD blocks on SSD drives.

Power, cooling, acoustics

With energy costs rising and the increase of data center density, Dell EMC provides technologies to help you realize greater performance with lower energy cost and waste.

Topics:

- PSUs
- Cooling and environment
- Acoustics

PSUs

The VEP4600 supports two AC hot-swappable power supply units (PSUs) with I/O-side to PSU-side airflow. Two PSUs are required for full redundancy. Depending on the configuration you order, the VEP4600 ships with one or two PSUs.

The VEP4600 platform comes preinstalled with one AC PSU (4- and 8-core units) and four field-replaceable fan modules or two AC PSUs (16-core units) and five field-replaceable fan modules, depending on the configuration that is purchased. When the VEP4600 runs with full redundancy, which consists of two PSUs installed and running, you can remove and replace one PSU while the other PSU is running without disrupting traffic.

For AC power specifications, see Specifications.

Cooling and environment

The thermal management for the VEP4600 delivers high performance through optimized component cooling at the lowest fan speeds across a wide range of ambient temperatures. These environmental optimizations result in lower fan power consumption for lower total system power and data-center power consumption.

For cooling and environmental specifications, see Specifications.

Acoustics

Dell EMC focuses on sound quality and the sound power and sound pressure levels.

- Sound quality describes how disturbing or pleasing a sound is interpreted. Dell EMC references various psycho-acoustic metrics and thresholds. For example, tone prominence is one such metric.
- Sound power and pressure levels increase with greater populations or higher utilization. Sound quality remains good even as the frequency content changes.

Dell EMC uses ISO 7779 to measure A-weighted sound pressure levels. For acoustic noise and vibration specifications, see Specifications.

Additional specifications

The following information applies to the VEP4600 platform:

Topics:

Product specifications

The following are product specifications for the VEP4600 platform:

Table 10. VEP4600 product specifications

Feature	Overview
Processor	Xeon microprocessors based on the Intel Skylake micro-architecture with up to 16 cores and several platform-level innovations: · Up to 16-core Intel Skylake technology · Integrated 10GbE/1GbE Ethernet with RDMA · Integrated QAT on both the 8-core and 16-core processors
Socket and TDP	FCBGA 45 mm x 52.5 mm; Up to 110 W
Memory	· DDR4 2666 MT/s · Four DIMM Slots · Up to 128 GB
Out of band management	BMC IPMI 2.0 compliant
Accelerators (QAT) (for 8 and 16-core systems)	· Crypto: Up to ~100 Gb/s IPSec/SSL · Compression: Up to ~100 Gb/s · Public Key: Up to RSA2K 100K Ops
Port configuration options	4x1GE + 2x10GE
Management ports	1x1G Mgmt port to CPU
Design	1RU
Dimension (HxWxD)	1.75 in x 17.1 in x 15 in
Chassis weight with factory-installed components	16.40lbs (7.43 kg), (2 PSUs, and 5 fans, 1 rNDC card)
Power supply	100–240 VAC 50/60 Hz
Typical current draw per platform	· 110VAC: 1.89A (16 core) 240VAC: 0.86 A (16 core) · 110VAC: 1.5A (8 core) 240VAC: 0.7A (8 core) · 110VAC: 1.35A (4 core) 240VAC: 0.65A (4 core)
Maximum power capability	· 5-fan 16-core processor: 311W · 4-fan 8-core processor: 230W · 4-fan 4-core processor: 220W

Table 10. VEP4600 product specifications (continued)

Feature	Overview
Typical power consumption	• 5-fan 16-core processor: 206.5W • 4-fan 8-core processor: 170W • 4-fan 4-core processor: 160W
Serviceability	• Hot swappable fans and PSUs • 10 screws to open the top chassis cover • Memory is field replaceable by Dell Technicians or Dell certified partners
USB	Two USB Type-A
BIOS	Legacy or UEFI
BMC	IMPI 2.0-compliant
Hypervisor	VMware ESXi and KVM
VNF	SD-WAN, security, WAN optimization, routing

Regulatory compliance

Safety

- UL/CSA 60950-1, Second Edition
- EN 60950-1, Second Edition
- IEC 60950-1,Second Edition including all national deviations and group difference
- IEC 62368-1
- EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide
- EN 60825- 2 Safety of Laser Products Part 2: Safety of Optical Fiber Communication Systems FDA Regulation
- 21 CFR 1040.10 and 1040.11

Emissions

- Australia/New Zealand: AS/NZS CISPR 32, Class A
- Canada: ICES-3/NMB-3, Class A
- Europe: EN 55024 (CISPR 24), Class A
- Japan: VCCI Class A
- USA: FCC CFR 47 Part 15, Subpart B, Class A

Immunity

- EN 300 386 EMC for Network Equipment
- EN 55024
- EN 61000-3-2: Harmonic Current Emissions
- EN 61000-3-3: Voltage Fluctuations and Flicker
- EN 61000-4-2: ESD
- EN 61000-4-3: Radiated Immunity
- EN 61000-4-4: EFT
- EN 61000-4-5: Surge
- EN 61000-4-6: Low Frequency Conducted Immunity

RoHS

• EN 50581:2012 All S9999 components are EU RoHS compliant

Agency compliance

The VEP4600 is designed to comply with the following safety and agency requirements:

USA Federal Communications Commission statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures.

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Industry Canada Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This device complies with RSS-247 of Industry Canada. Operation is subject to the condition that this device does not cause harmful interference.

Cet appareil est conforme à la norme RSS-247 d'Industrie Canada. L'opération est soumise à la condition que cet appareil ne provoque aucune interférence nuisible.

Brazil – Aviso da Anatel

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

Brazilian certificante

European Union EMC directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Dell EMC cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of this product, including the fitting of non-Dell EMC option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 32/ CISPR34 and EN55032 / EN55034. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

(i) **NOTE: This is a Class A product. In a domestic environment, this device may cause radio interference, in which case, you may be required to take adequate measures.**

European Community Contact

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Japan VCCI compliance for class A equipment

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準
に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Figure 7. Japan: VCCI compliance for class A equipment

This is Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

ⓘ **NOTE: Use the AC power cords with Dell EMC equipment only. Do not use Dell EMC AC power cords with any unauthorized hardware.**

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ただくことは出来ません。製品本体には同梱された電源コードセットを
使用し、他製品の電源コードセットを使用しないで下さい。

Figure 8. Japan: warning label

Korean certification of compliance

A급 기기 (업무용 방송통신기기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Figure 9. Korean certification of compliance

	KC [equipment type]
품명(Product Name)	Ethernet Switch
모델명(Model)	[model number]
신청인(Applicant)	Dell Technologies
제조자(Manufacturer)	[Manufacturer]
제조년월(Manufacturing Date)	[date]
제조국(Country of Origin)	China

Figure 10. Korean package label

Radio compliance certificate

Korea (Korean warning statement is only required for devices contain 2400~2483 and/or 5725~5825 MHz radios)

해당 무선설비는 운용 중 전파혼신 가능성이 있음

Korean radio compliance certificate

Mexican certification of compliance

Mexican compliance.

La operación de este equipo está sujeta a las siguientes dos condiciones:

1. es posible que este equipo o dispositivo no cause interferencia perjudicial y
2. este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Taiwanese certification of compliance

Taiwanese radio compliance.

台灣: 國家通訊傳播委員會

低功率電波輻射性電機管理辦法

第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使

用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發

現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。 前項合法通信，指依電信法規定作業之

無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

在 5.25-5.35 秭赫頻帶內操作之無線資訊傳輸設備，限於室內使用。

Taiwanese radio compliance certificate

Singapore certification of compliance

Singaporean radio compliance.

Complies with IMDA Standards

XXXXXX (xxxxxx = Dealer Code)

Certification pending.

5

Dell EMC support

The Dell EMC support site provides documents and tools to help you effectively use Dell EMC equipment and mitigate network outages. Through the support site you can obtain technical information, access software upgrades and patches, download available management software, and manage your open cases. The Dell EMC support site provides integrated, secure access to these services.

To access the Dell EMC support site, go to www.dell.com/support/. To display information in your language, scroll down to the bottom of the web page and select your country from the drop-down menu.

- To obtain product-specific information, enter the 7-character service tag, known as a luggage tag, or 11-digit express service code of your switch and click **Submit**.

    To view the chassis service tag or express service code, pull out the tag or enter the `show chassis` command from the CLI.
- To receive more technical support, click **Contact Us**. On the Contact Information web page, click **Technical Support**.

To access switch documentation, go to www.dell.com/manuals/.

To search for drivers and downloads, go to www.dell.com/drivers/.

To participate in Dell EMC community blogs and forums, go to www.dell.com/community.