

# Dell Technologies SmartDPU Software Solutions

Enabling the next architectural shift in IT infrastructure for hybrid cloud with a modern and automated DPU ecosystem jointly engineered with VMware

## Introduction

Today's modern workloads and applications are placing unique demands on IT infrastructures. They are more distributed in nature, are composed of unstructured data such as text, images, and large files, utilize microservices that increase east-west workload traffic across the data center, edge, and cloud, and require near real-time performance. All this traffic requires additional data handling by infrastructure services at the cost of taking computing resources away from their key responsibility of processing daily business applications.

The introduction of GPU's (graphics processing units) with parallel processing capabilities helped offload and accelerate graphic, gaming and AI/ML application from the computing platform CPU (central processing unit). This was followed by the introduction of SmartNICs, sometimes called Data Processing Units (DPUs), which involve several form factors with additional processing capabilities and offloading of certain functions. Vendors like NVIDIA and AMD Pensando have introduced DPUs whose main purpose are twofold: (1) to offload infrastructure services from the computing CPU and make use of additional hardware accelerators to boost performance of those services and (2) to improve security by running security software like distributed firewalls (on the DPU) on different cores than the workloads (on the x86 CPU).

Modern infrastructures will play a major role in supporting these new applications and will integrate DPUs as key components. Dell Technologies along with VMware are driving the development of well-engineered and integrated DPU solutions that can deliver both operational and infrastructure efficiencies with leading edge innovation, automation, and global support services.

## Challenges

While hyper-scale web services organizations have already internally developed DPU-based solutions to help handle the demands modern, distributed workloads, and virtual resources place on compute resources, enterprise organizations are looking for commercially available solutions. Current DPU products from a variety of vendors come with their own operating system software and management tools which creates a heterogeneous and complex infrastructure across an organization's distributed environments. This variety of DPU technologies can also increase both operational and support costs across multiple platforms and silos of expertise.

## An Integrated Turnkey DPU Solution from Dell Technologies

In partnership with VMware, Dell Technologies has engineered a complete end-to-end DPU solution to help provide enterprise organizations transition to a modern and automated DPU ecosystem that will help them meet current challenges both today and as they migrate to extended multi-cloud environments.

The initial release of this HCI-based solution consists of four main components:

### 1. Dell VxRail built on Dell PowerEdge Servers

Dell VxRail is the only HCI solution built for VMware, with VMware, to enhance VMware. VxRail powered by Dell PowerEdge server platforms and VxRail HCI System Software, features next generation technology to future proof infrastructures and enable deep integration across the VMware ecosystem.

The initial release of the Dell SmartDPU Software Solution consists of several models of VxRail platforms specifically designed for integration with select DPU hardware.

# SmartDPU Software Solutions from Dell Technologies

The industry's first HCI-based DPU solution with global support and services for VMware environments

**Optimize performance** - for demanding applications, networking infrastructure services using DPU offloading functions and hardware acceleration engine

**Reduce operational complexity** - with a common operational model, seamless and automated operational experience, and comprehensive life cycle management

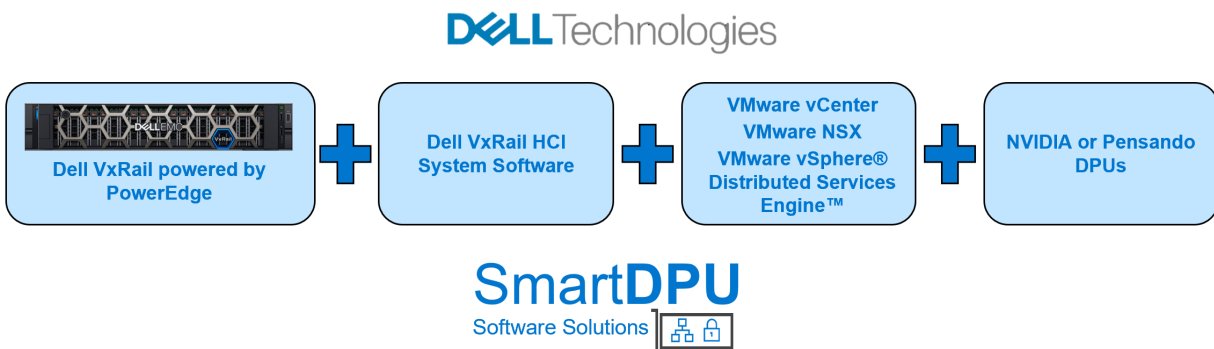
**Gain confidence** – with global support and services across a tightly integrated DPU solution that has been tested and validated from end-to-end

## 2. VMware Software

VMware's ESXi is a hypervisor used to deploy multiple virtual computers on a single physical server. VMware NSX is a full-stack network and security virtualization platform that connects and protects applications across the data center and cloud. NSX reproduces the entire network model in software, so you can create and provision any network topology and deliver critical apps and services faster and easier. VMware's vCenter Server is an advanced server management software that provides a centralized and extensible platform for managing virtual infrastructure.

VMware vSphere® Distributed Services Engine™ is software that (1) Onboards the DPU to a virtual infrastructure, (2) Manages the DPU lifecycle, and (3) Provides the capability to offload various other infrastructure functions like vSphere Distributed Switch and NSX on the DPU.

The Dell SmartDPU Software Solution running the vSphere Distributed Services Engine software reimagines virtual infrastructure as a distributed architecture that is enabled by offloading NSX networking functions from the server CPU onto the DPU. Offloading NSX services to the DPU frees up host computing resources and enables accelerated networking, and enhanced network observability. The DPU also leverages existing tools and user experiences with vCenter to help preserve management experiences that customers are familiar with.



## 3. Dell VxRail HCI System Software

VxRail HCI System Software, a suite of integrated software elements that sits between infrastructure components delivers a seamless and automated operational experience. VxRail software offers native integration between VxRail Manager and vCenter, all VxRail management is done within the familiar vCenter Server interface. Intelligent lifecycle management (LCM) automates non-disruptive upgrades, patches, node addition or retirement while keeping the VxRail infrastructure in a continuously validated state to ensure workloads are running and clusters are optimized.

The Dell SmartDPU Software Solution takes advantage of VxRail HCI System Software features starting with Day 0 factory integration of the DPU hardware and VMware vSphere Distributed Services Engine software. It also integrates Day 1 functions of bringing up a cluster with the installed DPU and Distributed Services Engine and configuring virtualized networking features. Finally, it integrates Day 2 functions such as monitoring the DPU with phone home capabilities, automating node add/remove/replace functions with the DPU and Distributed Services Engine, and facilitate the life cycle management upgrade of the DPU Distributed Services Engine and driver/firmware for the installed DPU.

## 4. 3rd Party DPU Hardware

The initial release of the Dell SmartDPU Software Solution gives customers the choice from two market leading DPU platforms:

- **NVIDIA®** – There are two offerings from NVIDIA:
  - NVIDIA Bluefield-2® data processing unit (DPU) with dual ports of 10/25GbE, an array of Arm® cores, purpose-built hardware-acceleration engines, and full software programmability powered by NVIDIA DOCA, P4, and OPI.
  - NVIDIA Bluefield-2® data processing unit (DPU) with dual ports of 100GbE, an array of Arm® cores, purpose-built hardware-acceleration engines, and full software programmability powered by NVIDIA DOCA, P4, and OPI.
- **AMD/Pensando** – There are two offerings from AMD/Pensando:
  - AMD DSC2-25G DPU with 2 ports of 10/25G based on 2nd-generation P4-programmable SoC with 16 ARM cores
  - AMD DSC2-100G DPU with 2 ports of 100G based on 2nd-generation P4-programmable SoC with 16 ARM cores

### Dell Global Support and Services

Organizations deploying solutions based on Dell Technologies solutions are never alone: Dell Technologies provides a comprehensive set of deployment and support options covering the entire lifecycle of the enterprise IT investment.

Services such as planning and design, deployment and integration, and education are just a few offerings within a comprehensive set of customer services available. Dell ProDeploy and ProDeploy Plus provide full-service installation and configuration of both hardware and system software by certified deployment engineers. Dell Technologies delivers single vendor support, eliminating the usual headaches encountered when dealing with a multi-vendor solution.

### Summary

Whatever the size of your organization, Dell Technologies SmartDPU Software Solutions can help you derive the full value out of your server, storage, and networking investments. We offer proven end-to-end solutions, comprehensive global services, and a vision that sets the pace in a rapidly changing industry. To find out how we can help you and your network, contact your Dell Technologies representative today.

The industry's only  
**jointly  
engineered  
HCI-based  
DPU solution**

with VMware

**Native  
integration**  
between VxRail Manager  
and VMware vCenter



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