

Dell + VMware + Cumulus Networks®

Unlock the Open Networking Ecosystem

Transitioning Customers to the Software-defined Data Center

Companies across all market segments are looking for ways to modernize their data centers and implement cloud models as a way to achieve economies of scale, instant scaling of resources, streamlined costs and operational efficiencies, all with an enhanced user experience. But traditional data centers face challenges:

- They are unable to meet the business demands of today’s dynamic environments with the expected rate of change.
- Legacy data center networks are brittle, complex to manage and closed to innovation.
- Long network service provisioning cycles slow application deployment time
- Vendor lock-in limits customer choice and flexibility.
- Service innovation and fast rollout constrained by vendor roadmaps.
- Move to cloud models of consumption is slow, complex and disruptive.

Dell, VMware and Cumulus Networks are collaborating to deliver a fundamentally different approach to today’s data centers. VMware pioneered the software-defined data center (SDDC) to transform data center economics, simplify operations and accelerate service delivery. Dell has a proven brand across compute, storage and network with a successful global supply chain to empower customers with open networking hardware. Cumulus Networks is the first full-featured Linux OS for data center networking running seamlessly over industry standard networking hardware, thus bringing the Linux revolution to networking.

The three companies are working together to deliver VMware NSX network virtualization with Cumulus Linux on Dell networking switches to help enterprises and service providers rapidly provision physical and virtual networks and deploy new applications within minutes, while significantly simplifying IT operations and improving IT response time.

Integrated Solution Components

Dell networking switches

- S4810-ON and S6000-ON for a scalable layer 3 underlay fabric
- S6000-ON for L2 gateway

VMware NSX network virtualization

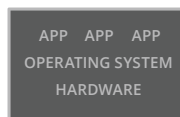
- Provides network hypervisor and allows L2-L7 services to be reproduced entirely in software
- Enables virtual networks to be programmatically created, provisioned and managed
- Allows logical network services to be provisioned in minutes

Cumulus Linux

- Production-grade networking-focused Linux software distribution based on Debian and an open source framework of components
- Support for zero-touch network installation using ONIE loaded on bare metal switches
- VXLAN support, L2 gateway services integration with VMware NSX
- Advanced management/orchestration/automation and enhancements through Linux customizations, third party add-on packages and toolsets

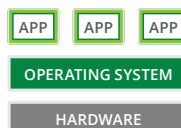
TRADITIONAL

FEATURES LOCK-IN
OPERATING SYSTEM LOCK-IN
HARDWARE LOCK-IN



MODERN

CHOICE OF APPLICATIONS
CHOICE OF OPERATING SYSTEM
CHOICE OF HARDWARE



Partnership to Deliver the Software-defined Data Center

The Dell, VMware and Cumulus Networks partnership is based on a shared vision of abstracting the physical network infrastructure to enable the delivery of critical networking services in software. Abstraction enables new levels of automation, software-based control and logical change management that spans data centers and innovation on an open framework providing customers with a path to the software defined data center.

Dell Open Networking Solution with Cumulus Networks & VMware

Traditionally, customers have deployed proprietary monolithic chassis-based switches built for the pre-virtualized and pre-cloud computing era, which resulted in a vendor lock-in. Dell's open-networking initiative disrupts the traditional networking model, similar to how x86 server vendors disrupted the mainframe/Unix server compute model, enabling rapid innovation and customer choice through hardware and software disaggregation. Dell offers best-in-class industry standard Ethernet switches, and partners with VMware and Cumulus Networks to offer a validated and integrated solution with global enterprise-class services, logistics and assistance in planning and deployment. This truly enables customers to get an end-to-end experience with common acquisition, deployment and services from a single vendor for server, storage and networking.

- Customers deploying Dell open networking switches with Cumulus Linux and the VMware NSX network virtualization platform can now connect scalable, multi-tenant virtual networks to physical workloads such as high performance application databases, legacy systems, storage and appliances at wire rate performance.
- Management with VMware NSX enables simplified operations of large-scale multi-tenant networks for virtual and physical ports.
- The NSX controller configures a modified version of Open vSwitch running in the hypervisors to begin detecting and reporting elephant flows.
- Since Open vSwitch forwards traffic from virtual machines and handles tunneling, it is in a unique position at the edge to handle elephant flows.
- Of the several mechanisms to evaluate the effects of predictive signaling to treat the elephant and mice flows, Cumulus Linux uses the approach of marking flows into alternate queues.

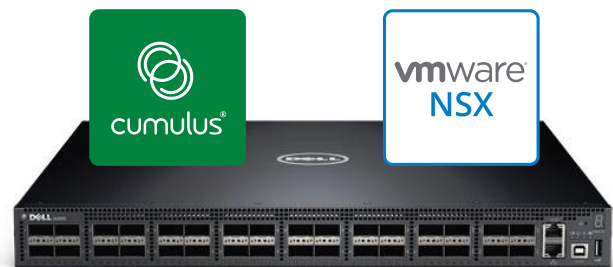
Taken together, this implementation allows for

application flow steering capabilities using merchant silicon and is a huge benefit to the customers, keeping them from having to pay a premium with custom ASICs as demanded by traditional networking vendors.

Customer Benefits

Best-of-breed, standards-based networking ecosystem and reference architecture:

- Data center-wide workload mobility enables instant scaling of infrastructure and maximized server utilization
- Unified visibility and control of end-to-end for virtual and physical infrastructure driving best return on assets
- Logical services reduce time and risk for change management
- Application-specific flow-handling with merchant silicon industry-standard hardware
- Integrated solution stack with the intelligence distributed in software without vendor lock-in
- Simple consumption model for customers across solutions
- Feature velocity with software innovation due to the untethering of hardware and software
- Lower TCO with the increase in operational efficiencies and CapEx gains
- Delivering customer SLAs with an open networking platform built on open standards for faster business acceleration



About Cumulus Networks

Cumulus Networks is bringing the Linux revolution to networking. Founded by veteran networking engineers from Cisco and VMware, Cumulus Networks makes the first Linux operating system for networking hardware and fills a critical gap in realizing the true promise of a software-defined data center. For more information visit cumulusnetworks.com or follow us on Twitter [@cumulusnetworks](https://twitter.com/cumulusnetworks).