

Open networking takes hold

By Don Root



Richard E. Weich/Dell Inc.

The shift toward software-defined networking has created a growing ecosystem poised to deliver exceptional network agility, scalability and manageability.

When it comes to technology, open is invariably better. Open ecosystems have proven advantageous for enterprise IT ever since proprietary mainframe architectures and tools gave way to an x86-based server architecture. This paradigm shift led to an open market with open standards that fostered business innovation and growth by helping drive down technology costs and freeing decision makers to select the products and services best suited to specific organizational requirements. Today, data center networks are on the verge of a similar paradigm shift.

Proprietary technologies, still dominant in networking, are no longer efficient or effective in the modern data center for a variety of reasons. Increasing amounts of data — both structured and unstructured — continue to flood the data center from diverse applications and workloads. The popularity of desktop virtualization and mobility initiatives has

Model arrangement

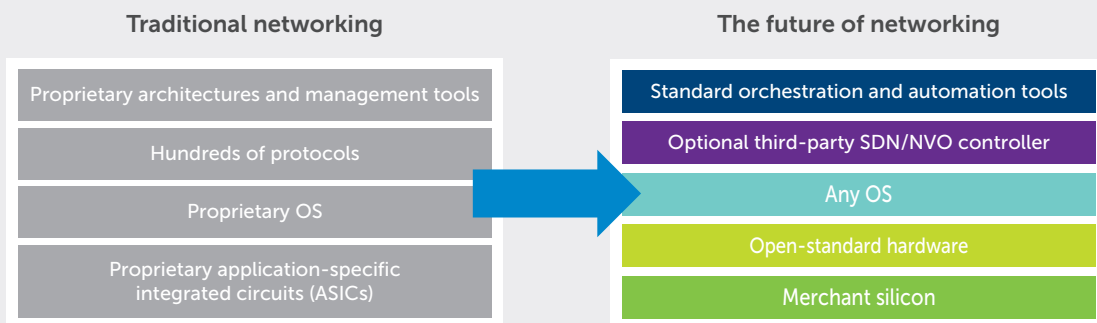
The open networking model includes several components that support software-defined networking (SDN) and open standards (see figure):

- Off-the-shelf networking chips, or *merchant silicon*, which can be used in a variety of standards-based network switches
- Disaggregated networking hardware that supports different network operating systems through use of the Open Network Install Environment (ONIE)
- Network operating systems built for particular environments, enabling organizations to purchase

hardware from their preferred switch vendor and then load a third-party operating system onto that switch

- Optional SDN/Network Virtualization Overlay (NVO) controllers that provide the flexibility network managers need to support an SDN infrastructure

Further supporting the open networking model are orchestration and automation tools, such as the Puppet™, Chef and CFEngine™ platforms, that leverage open-source, standards-based operating systems and frameworks.



Key elements of the transition from traditional to open networking

intensified the demand for anytime, anywhere access to this data. Moreover, many data centers are hosting public and private cloud environments, further changing the nature and predictability of network traffic patterns.

Legacy network infrastructures typically are not designed to handle the volume and dynamism of today's high-performance, virtualized applications and workloads. The scaling and management of legacy networks is becoming ever more complex and burdensome for organizations with constrained IT budgets.

As a result, IT decision makers are looking to networking solutions that are cost-effective to build and maintain, while delivering heightened levels of agility, scalability and manageability. Software-defined networking (SDN) provides a path for enterprises seeking to take advantage of open-source tools, applications and resources. By decoupling the logical network from

the physical network and centralizing control, SDN architectures facilitate efforts to equip networks with real-time intelligence, application awareness, and high levels of automation and application integration.

Evolving network landscape

The emerging open networking model integrates various SDN-based technologies — which include the OpenFlow™ specification, hypervisor-based networking virtualization and programmable switch frameworks — with disaggregated network hardware and software. (For more information, see the sidebar, "Model arrangement.") The development of the open networking model parallels that of the disaggregated server model, which significantly advanced enterprise computing opportunities.

In particular, the disaggregated server model separates the hardware from the OS, letting enterprises choose

the OS independent of the hardware. Similarly, network disaggregation enables enterprises to adopt best-of-breed network equipment, operating systems and applications to develop a flexible network infrastructure that best fits their needs.

Open networking solutions enable IT managers to build an application-agnostic infrastructure and simplify data center network management, orchestration and automation. Organizations can leverage open-source tools and expertise to minimize costly engineering overhead and help reduce the time and effort required to design, provision and manage networks.

Now, organizations that have benefited from the disaggregated server model can enter the open networking era with hardware and software options that provide the flexibility to transform their data centers. These offerings pave the way toward a software-defined data center where all infrastructure components are virtualized.

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Resilient foundation


With a long tradition of supporting open environments and platforms, Dell continues the drive to make computing technology affordable and available. Thirty years ago, Michael Dell helped change the PC industry by simplifying the buying process and selling directly to the end user. Now it's time to focus on networking.

Dell actively supports an open networking vision that gives organizations a choice of disaggregated hardware, third-party operating systems and open, standards-based applications. The company is an inaugural member of

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the Open Networking Foundation (ONF), which helps define open networking technologies and SDN-based concepts.

To help turn the open networking vision into a reality, Dell has been making a number of strategic acquisitions over the years, and has developed an innovative set of open networking switches that allow end users to run network operating systems from different vendors. Ultimately, Dell believes that open networking stimulates rapid development that can propel the network toward an unprecedented level of power and efficiency.

As with server disaggregation, enterprises must likewise transform data center networks to meet demands for heightened agility, scalability and manageability. In anticipation of this transformation, IT leaders can adopt cost-effective SDN-based solutions and work with vendors committed to open networking — laying the foundation for an open networking environment that is designed with the flexibility to evolve with the business. 

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