



What Can SDN Do for the Enterprise?



In This Paper

- The legacy networks in place at many enterprises are leading to increased complexity and costs and making it difficult to deploy new services
- Following the success of server and software virtualization, software-defined networks are capturing the attention of many enterprises
- There are three common approaches to SDN, and Dell's Open Networking solutions support enterprises as they migrate at their own pace



Executive Brief

Introduction

Today's enterprises need to adapt quickly to changing market conditions, respond to the needs of customers and partners, and deal with a staggering amount of data and devices in the process. As a result, many enterprises find themselves transforming the way they think about their infrastructures and IT.

This transformation needs to take place on the fly, without risking downtime, and it needs to appear transparent to customers, end users, and anyone else uninvolved in the IT infrastructure. Many enterprises started this transformation with server virtualization and it has continued on with improvements to the data storage infrastructure. It's now time for enterprises to consider transforming their network infrastructure with a software-defined network (SDN).

Why Explore SDN Now?

Many legacy networks were designed for the client-server model of computing, where most traffic flowed from the data center to clients in a north-south fashion. Today's complex workloads and reliance on virtual environments mean more network traffic is flowing from server to server, or east-west instead of north-south. This creates the potential for more bottlenecks in legacy networks.

To solve this and other challenges around manageability, business agility, budgets, and more, many enterprise IT leaders are increasingly intrigued by the idea of "software-defined everything." Server virtualization uses software to make hardware more flexible and adaptive. Software-defined storage improves capacity utilization and data storage economics. The era of the software-defined data center is coming, and it's no longer a far-off fantasy. Software-defined IT projects are now part of the near-term planning in many enterprise IT organizations.

In networking, the emergence of open hardware running merchant silicon, alternative network operating systems, and applications make SDN possible and allow IT professionals to re-think their legacy networks. Many organizations were at the mercy of their network vendor in the past, locked in to proprietary technology and waiting for the vendor to innovate. With proven alternatives now available, and vendors like Dell discussing open networking initiatives, there's more choice in terms of operating systems, hardware, and applications.

Respond to Challenges with SDN

Today's enterprises face a number of challenges that prevent them from serving customers, increasing revenue, and growing their business. SDN can

provide part of the solution to these challenges.

Legacy network costs are rising faster than the budget. Managing the legacy network that exists in many enterprises is becoming an expensive proposition. Enterprises that are locked in with a proprietary network vendor and face a complete rip-and-replace upgrade are trying to make their legacy network fit their modern needs, which leads to increased complexity. Legacy networks consume manpower and budget and can't easily be adapted to serve today's business needs.

Rolling out new services is time consuming. In the modern economy, enterprises must innovate or die. Customers are demanding and they expect businesses to offer the goods and services they need at a competitive price, while the competition is just a click away. This means enterprises need to develop new products and services and make them available quickly. The IT infrastructure needs to be agile enough to accommodate this fast-paced innovation. Many legacy networks aren't up to the task.

Complexity needs to be reduced across the board. Many enterprises are struggling to reduce operational and support complexity in their IT organization. Proprietary tools and applications are contributors to this complexity because they are inflexible

and require a certain degree of specialization for management and maintenance. Open networks, SDN, and open source tools increase agility and reduce complexity.

Different Approaches to SDN

The benefits of SDN are clear. Software-defined networks are easier to manage and less complex than legacy networks, and they help enterprises more quickly respond to changing workloads. How various enterprises arrive at these benefits can differ, however. There's more than one way to software define a data center network.

The Virtualization/Hypervisor

Approach. Vendors like VMware, Midokura, and Microsoft use an approach to SDN that delivers the operational model of a virtual machine

to the data center network across the existing physical network hardware. This approach decouples the virtual network from the underlying physical hardware using virtual switches that are installed in software without requiring SDN/Openflow in the switching hardware. SDNs that use the virtualization/hypervisor approach can deliver optimum agility with application-based networking and provide flexible, efficient security.

The Centralized Controller

Approach. Favored by organizations like the Open Network Foundation and the OpenDaylight Project, as well as vendors like NEC and Big Switch Networks, the controller-based approach to SDN uses a highly distributed network architecture that allows higher scalability and maximum efficiency. It does this by placing control at the edge of the

network for management, automation, and policy. These SDN controllers support multiple network switching and routing devices, expanding the choice of available vendors, operating systems, and the controllers themselves.

The Programmable Approach.

Used by open, standards-based network operating systems like those from Cumulus Networks and Dell, the programmable approach relies on industry-standard languages and libraries such as PERL, Python, and shell scripts; embedded Puppet and Chef agents; RESTful APIs; OpenFlow; and more to manage the network. This open approach to network programming removes the need to learn and rely on proprietary languages with immature development environments and toolsets.



Your SDN-Enabled Enterprise

Enterprises that have already made the move to server virtualization and storage virtualization understand how uncoupling the hardware and software components of those systems has increased utilization and created a more agile IT environment.

Migrating to SDN delivers the same benefits to the data center network. Enterprises that move to SDN have more dynamic, virtualized networks. The networks are easier to manage and are controlled by software instead of the hardware. The network itself is as consumable as the compute infrastructure.

Agile, responsive enterprises are built on agile, responsive infrastructure. SDN helps the network fit this mold. It reduces the complexity of network operations, making it easier to adapt and respond to business needs.

How Dell Can Help

Dell understands that enterprises need to establish a path forward from their current IT infrastructure to one that is flexible and adaptive. In many cases enterprises suffer from gaps in infrastructure expertise or in their available budget. Dell's Future-Ready Enterprise strategy helps enterprises bridge these gaps and meet their challenges on their own terms, in ways that make sense for each individual organization.

When it comes to software-defined networks, Dell's Future-Ready Enterprise strategy is expressed via an open approach that allows enterprises to chart their own course and proceed at their own pace. It starts with Dell Open Networking solutions, which are aligned with the Open Compute Project and enable enterprises to choose between supported operating system choices. This model provides enterprises with access to the rapidly emerging innovations available through open software ecosystems, while at the same time enjoying the stability and assurance of Dell's service and support, and the breadth and power of Dell's global supply chain. Open Networking provides the greatest breadth of solutions, flexibility, and investment protection for enterprises that need to move beyond their legacy networks.

As part of its Open Networking approach, Dell offers customers maximum choice and flexibility as they advance their infrastructure from legacy networks to SDN. Dell Networking's hardware portfolio offers enterprises a place to start. By adopting Dell hardware, enterprises can take advantage of immediate performance improvements and still manage their network through industry-standard management tools.

When enterprises are ready to take the next step toward SDN, Dell's physical architecture lets enterprises add new capabilities and keep traditional

networking functions in the same footprint. Dell M, N, S, and Z-series Ethernet fabric switches, for example, support traditional, programmable, overlay, and controller-based networking solutions on one common platform.

Dell's latest open, flexible Z and S series Ethernet fabric switches help enterprises that approach SDN from the programmability angle because they support the Cumulus Networks Linux-based operating system for networking hardware, Dell Networking Operating System, and more. If the virtualization/hypervisor-based approach to SDN makes more sense, Dell offers joint solutions with vendors like VMware, Microsoft, and Midokura. Enterprises that approach SDN looking for a controller-based approach can take advantage of joint solutions with Big Switch Networks and NEC, for example, or explore Dell's Active Fabric solutions.

Each enterprise will approach SDN in its own way. Each approach to SDN is valid. With Open Networking from Dell, one vendor can help support the move from legacy network to SDN without risking vendor lock-in and proprietary solutions.

Summary

Software-defined networks are the next generation of data center network technology. SDN will help enterprises reduce costs and complexity and better position their business to grow.

There are multiple ways for enterprises to approach SDN, and each enterprise will make its choice based on its needs. Dell's Open Networking

strategy provides enterprises with maximum choice and flexibility when it comes to their network. Dell Networking hardware supports open standards and provides an excellent entry point for enterprises that are looking for a place to start their network modernization.

Enterprises relying on a traditional networking approach can experience immediate improvements by adopting Dell Networking hardware now. But

what sets Dell apart is its ability to use the same hardware to support multiple approaches to network modernization as enterprises move forward.