



Taking the Open Path to Hybrid Cloud with Dell Networking and Private Cloud Solutions



In This Paper

- Frequently, the network is the stumbling point to cloud adoption
- SDN offers a more dynamic, virtualized network infrastructure needed for cloud
- Dell networking and hybrid cloud solutions provide a flexible platform that lets IT deliver new capabilities quickly to market

CIO INSIGHT

Executive Brief

Introduction

Cloud adoption is on the rise.

However, many companies are taking a cautious approach to deployment due to the relative newness of the technology.

For most companies, cloud offers many benefits including more-efficient use of IT resources, reduced operating costs, increased agility to meet changing business needs, and a platform for IT to transition to a more service-oriented approach.

Unfortunately, several challenges can prevent a company from achieving these benefits, including:

- Legacy IT infrastructure is inflexible and cannot be leveraged to support a cloud architecture.
- In some cases, the existing equipment might be useful for cloud, but the multi-vendor management solutions either do not work together or require a great deal of administration time to carry out even the simplest tasks.
- Security is harder to maintain and manage as resources are virtualized and hosted across an enterprise or run on an IT infrastructure outside the corporate firewall.

To address these issues, companies are looking for solutions that allow them to mix and match cloud offerings from different vendors and providers.

The solutions must accommodate a variety of deployment scenarios allowing companies to retain their investment in installed equipment, while providing a way to take advantage of newer equipment, technologies, and services.

What is driving cloud adoption?

The transition to cloud is necessary due to several business factors.

To start, operating costs within the data center are on the rise. It takes more money and IT staff time to manage computing and storage resources in today's complex environments. Additionally, many companies find that there are costs and availability issues with data center power and space. This is happening at a time when IT budgets have remained relatively flat. As a result, IT is being asked to do more with less.

Second, IT is being called on to support changes in the fundamental way users work. IT departments now need to provide a growing mobile workforce with global access to data and applications from multiple devices and locations.

Third, many business units and departments are making independent decisions about their IT and application choices. This has led to a situation where resources are decentralized, while data and applications are siloed. This makes

centralized decision-making and management difficult.

Fourth, the speed of business has changed. The combination of the globalization of business, 24x7 user access, and increased competition forces companies to deliver new products and services in shorter cycle times compared to just a few years ago. As a result, IT must be able to respond rapidly to changing business requirements and quickly deliver the applications and services required to support such new efforts.

To address these issues, companies and IT organizations are exploring migrating to a cloud architecture. A cloud-based architecture will enable the organization to rein in IT costs, gain the flexibility and agility to deliver new and better services, and meet rapidly evolving business requirements.

Which cloud is right?

When moving to cloud, there are three basic options: private cloud, public cloud, or a hybrid cloud that combines elements of both.

Private clouds enable businesses to take advantage of the efficiency of cloud computing without exposing their data and applications to those outside the organization. Public clouds enable companies to leverage a provider's infrastructure, reducing CAPEX and OPEX costs and freeing

up IT staff for other chores. A hybrid cloud environment helps companies realize the benefits of both. But to take full advantage of cloud capabilities and benefits in any of these environments requires an open approach that allows elements from different vendors to seamlessly work together.

Certainly, server and storage virtualization have helped overcome some of the challenges of bringing elements together into a cloud environment. However, the same type of benefits of virtualization must be extended to the network and management tools must work across cloud environments.

Many organizations will find that their network is the stumbling point to cloud adoption. For years, traditional network architectures were based on a series of switches designed to handle common traffic patterns. In some configurations, there could be up to six tiers of network infrastructure (i.e., core, distribution, access, Fibre Channel SAN directors, management, and distributed virtual switches). At a minimum, a data center would employ core, distribution, and access switches.

This type of configuration worked well when most of the traffic was generated by client/server and basic Web applications. With these applications most of the traffic running over the network was in and out of the data center (so called North-South traffic). However, using such a multi-tiered

network architecture can introduce inefficiencies and latencies with today's workloads. The reason: A great amount of traffic now runs between devices rather than in and out of data centers. In virtualized and cloud environments, there is a great deal of server-to-server traffic as virtual machines (VMs) and workloads are shifted to different machines to keep performance up, maximize use of computing resources, and minimize the impact of downtime due to maintenance or hardware failures.

In many cases, companies cannot rip and replace their existing infrastructure just to gain the benefits of cloud. Additionally, it is impractical to develop a cloud infrastructure based on a single vendor's products. Lines of business may dictate that a certain vendor's solution be used or IT may simply want to bring together best-of-breed solutions for different aspects of its private cloud. As such, a cloud solution must support today's heterogeneous data center environments, allowing the use of the best solutions based on business requirements.

Making matters more complex, as IT transforms into a service-centric organization to meet the demands of today's business world, it must deliver services that have ever-higher service



level agreements (SLAs) related to performance and availability. To accomplish that, IT needs a cloud solution that provides sophisticated resource monitoring and dynamic allocation of resources.

Most important, a cloud solution must support hybrid environments. IT needs the flexibility to make use of the best platform -- be it private cloud or public cloud -- for every application.

Finally, since business requirements and needs constantly change over time, a cloud solution must give companies the ability to move applications from platform to platform over time. In particular, a solution must support application portability between on-premises private cloud and public cloud to simplify the way applications are built, deployed, and scaled.

“A cloud architecture needs a way to abstract the network infrastructure.”

The network creates the cloud

Cloud computing promises a new world of IT agility, with quick deployment of applications to support business needs. However, today's cloud solutions are often complex and unwieldy to manage.

Similar to the way virtualization has allowed IT to separate the operating system and application from server and storage hardware, a cloud architecture needs a way to abstract the network infrastructure to handle changes over time and to scale. This requirement is leading to the rapid adoption of software-defined networking (SDN).

Companies that move to SDN have more dynamic, virtualized network infrastructures. 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. Any private or hybrid cloud endeavor will benefit from SDN. Additionally, SDN provides more real-time intelligence, deep application integration, and high levels of automation.

Unfortunately, the current reality of SDN is one of a fragmented marketplace that forces companies to

pick proprietary solutions, locking a company into that one approach.

Dell takes a different approach overcoming the common barriers to cloud by enabling customers to leverage existing investments, add capabilities incrementally, and simplify their cloud – enabling “Any Cloud” capability. Dell provides the flexibility to choose from a portfolio of intelligent platform building blocks, along with reference architectures, engineered solutions and heterogeneous management tools. Combine that with cloud services and leading cloud partnerships and customers have everything they need to achieve the right balance of on premises, off premises or hybrid cloud environment for the Future-Ready Enterprise.

Central to this strategy is support for cross-vendor platforms from Microsoft, VMware and Red Hat Openstack cloud solutions.

At the heart of these Dell solutions is an openness that allows a company to select the type of environment that best matches its needs. The openness of the solutions prevents lock in to a single vendor or technology and allows for incorporation of new

technologies or solutions as they emerge.

What enables this openness is Dell's approach to SDN at the core of the cloud infrastructure – the network. This is part of the larger Dell Future-Ready Enterprise strategy, which 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 enable companies to choose between several operating systems and open-source tools and administration tools.

The foundation of an SDN strategy begins with next-generation industry-standard hardware. Dell was among the first leading vendors to offer “cloud-class” line-rate, dense, and efficient networking hardware built with industry-standard merchant chipsets and components. Dell's hardware portfolio leads the industry in efficiency, density, and performance and is optimized for next-generation leaf-spine and flat architectures. Dell's own networking solutions combined with open networking partners' advanced offerings deliver the broadest range of next-generation network and SDN frameworks, ensuring investment protection, direct access to open networking innovations and true freedom from proprietary lock-in.

Dell Networking Operating System (OS9) delivers a best-in-class network

OS that includes an industry-standard command-line interface, ensuring that Cisco-trained networking-staff can immediately be comfortable and productive. Additionally, Dell supports next-generation automation, programmability, and SDN capabilities.

In particular, Dell OS9 supports leading SDN technologies and frameworks which can be used in three solution categories: Programmable, overlay, and controller-based.

Furthermore, by virtue of Dell aligning with the Open Compute Project, companies get 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.

A deeper look at Dell cloud offerings

Dell offers private cloud solutions implemented on dedicated cloud infrastructure. These solutions are designed to seamlessly connect with public cloud hosted by a service provider to provide flexibility.

In particular, Dell's approach to private cloud virtualizes an IT environment including servers, storage, and networking. This enables resource abstraction from the underlying hardware, and pooling of resources for efficient utilization. Dell solutions establish software control of the virtualized infrastructure to enable provisioning and configuration of the right resources. Finally, Dell solutions let IT implement policy-based automation to optimize service delivery across the cloud platform. This private cloud architecture can connect to a public cloud provider hosting cloud services. This allows for a flexible hybrid-cloud capability.

With its approach, Dell provides an end-to-end cloud solution for building a private cloud including:

- Flexible modular portfolio of intelligent platform building blocks
- Heterogeneous management tools
- A complete line of services

from design to development, implementation and support

- A robust community of cloud hosting partners that can host private or public cloud infrastructure.

Furthermore, as part of Dell's Open Networking approach, companies get maximum choice and flexibility as they advance their infrastructure from legacy networks to SDN. By adopting Dell hardware, companies can take advantage of immediate performance improvements and still manage their network through an industry-standard command line interface (CLI).

When companies are ready to take the next step toward SDN, Dell's physical network architecture lets them 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 SDN networking solutions on one common platform.

“SDN provides more dynamic, virtualized network infrastructures.”

In particular, Dell's latest open, flexible Z- S-Series Ethernet fabric switches allows it to support companies that approach SDN from the programmability angle because it supports the Cumulus Networks Linux-based operating system for networking hardware, Dell Networking Operating System, and more. If a virtualization/cloud-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 NEC and Big Switch Networks, for example, or explore Dell's Active Fabric solutions.

Rounding out this portfolio, Dell offers the Dell Cloud Manager, which helps companies deploy and manage enterprise-class applications across private, public, and hybrid clouds. It provides a suite of tools for managing the infrastructure, including the provisioning, management, and automation of applications across the leading private and public cloud platforms.

In total, the Dell private cloud solution provides an agile and flexible platform as a foundation for delivering new capabilities quickly to market. It allows for seamless integration with leading public cloud services to bring the full benefits of hybrid cloud to any organization.

In this way, companies can scale services in response to market demands and timing. Additionally, Dell hybrid cloud solutions help companies achieve the lowest possible total cost of ownership for infrastructure required to deliver critical capabilities.

For more information about Dell cloud and SDN solutions, visit: <http://www.dell.com/learn/us/en/04/campaigns/networking>